HURRICANE RISK REDUCTION STRATEGIES IN THE WINDWARD ISLANDS: PUBLIC AND PRACTITIONER'S PERSPECTIVES

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June, too soon,
July stand by
August, beware you must
September remember,
October all over.
(Crawford, W.P. 1992:152)

ABSTRACT

There is a hurricane season every year in the Caribbean from June 1st to November 30th; however it is possible for hurricanes to occur outside this period. There are different perspectives of hurricanes held by experts to that of the public and this often create discrepancies in implementing risk reduction measures. Perception of hazards plays a role in how people will respond and make decisions. The Windward Islands are not in the direct path of hurricanes when compared to the Caribbean Islands in the north of the Island Arc, however they are often affected even by the presence of a storm in the region which may cause major devastation.

While a lot of preparations are done to reduce the effects of hurricanes on a short term basis long term risk reduction strategies are minimal or maybe done in isolation to the community. There is therefore need to refocus the goals of Disaster Management to encompass risk reduction in the Windward Island and the Caribbean region as a whole. This can be done more effectively by incorporating the community on a greater level into planning and policies design aimed at risk reduction. Hence there is need for the promotion of a participatory community approach, improvement in early warning systems and greater collaboration in the Caribbean region to make use of the limited resources.

LIST OF ACRONYMS

AOSIS – Alliance of Small Island States

BGA – Banana Growers Association

CARICOM – Caribbean Community

CDB – Caribbean Development Bank

CDERA – Caribbean Disaster Emergency Response Agency

CDM – Caribbean Disaster Mitigation Strategy

CDMP – Caribbean Disaster Mitigation Project

CIMH - The Caribbean Institute for Meteorology and Hydrology

CIA – Central Intelligence Agency

CIDA – Canadian International Development Agency

CRED/EM–DAT – Centre for Research on the Epidemiology of Disasters /Emergencies Database

CUBiC – Caribbean Uniform Building Code

CWSA – Central Water and Sewerage Authority

DFID – Department for International Development

ECHO - European Commission Humanitarian Office

EEC – European Economic Community

EWC – Conference on Early Warning

EU – European Union

GDP – Gross Domestic Product

IADB – Inter-American Development Bank

IFRC – International Federation of Red Cross and Red Crescent Societies

ISDR – International Strategy for Disaster Reduction

NDO – National Disaster Office

NEMO – National Emergency Management Organisation

NOAA – National Oceanic and Atmospheric Administration

OAS – Organisation of American States

OCHA – UN Office for the Co-ordination of Humanitarian Affairs

OECS – Organisation for Eastern Caribbean states

OFDA – Office of U.S. Foreign Disaster Assistance

PAHO – Pan American Health Organisation

PCDPPP – Pan Caribbean Disaster Prevention and Preparedness Project

SVG – St Vincent and the Grenadines

SIDS – Small Islands Developing States

SPSS – Statistical Program for Social Sciences

SWOT – Strengths Weaknesses Opportunity Threats

UNDRO – United Nations Disaster Relief Organisation

USAID – United States Agency for International Development

VINLEC – St Vincent Electricity Company

WINFA – Windward Islands Farmers Association

WHO – World Health Organisation

WMO – World Meteorological Organisation

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1 INTRODUCTION TO STUDY

1.1 CHAPTER INTRODUCTION

This chapter presents the setting on which this study is based by providing a background to hurricanes and other hazards in the Windward Islands. There is also an outline of the specific aims and objectives of this research. The chapter concludes with a brief description of the other chapters, which formulates this study.

1.2 BACKGROUND TO STUDY

The last 250 years has seen the Islands in the Caribbean region devastated by 3 volcanic eruptions, 8 earthquakes, and 21 major hurricanes (Tomblin 1981). In combination with tropical storms the Caribbean has experienced the effects of hundreds of such events (Tomblin 1981; Gibbs 2001). While hurricanes have been affecting the Caribbean region for many years, the statistics from reliable records suggest that there has been an increase in both the number and intensity of these systems. According to CARICOM Secretariat (2003:101) "In the period 1910-1930, North Atlantic hurricanes averaged 3.5 per year, increasing to an average of 6.0 per year during the period 1944 -1980". Presently it is estimated to be much higher as concluded by the World Meteorological Organisation (WMO) (2005) the year 2000 experienced hurricanes of above average, 15 with the average being 10, whether the cause is natural or anthropogenic is still in dispute. This study will focus on a small group of islands in the southern Caribbean Island chain, the Windward Islands.

The Windward Islands like many of the other islands in the Caribbean region are vulnerable to a number of natural hazards including tsunamis, earthquakes,

landslides, flooding, hurricanes and tropical storms and droughts as well as combined environmental and technological hazards such as oil spills (CDERA 1995). As a result, these islands suffer annual losses from a number of these related events in particular hurricanes and secondary hazards such as flooding and landslides. As stated by OAS (1991) entire areas, major infrastructure and economic activities may be crippled by a single event, this puts pressure on the already limited resources of these small island states. Consequently, they are plunged deeper into debt to offset the cost of response, recovery and mitigation activities, seeking loans from the Caribbean Development Bank (CDB) and other lending institutions. The Windward Islands share the characteristics of Small Island Developing States (SIDS) grouping, which includes remoteness, insularity, susceptibility to natural disasters, limited institutional capacity, limited diversification, openness to trade imports, access to external capital, income volatility and poverty (Briguglio 1995:np). These factors and the increasing urban population converging on coastal plains increase the vulnerability of the population of these islands to hurricanes and tropical storms.

While significant progress has been made in developing organisations to manage and respond to disasters in the region, the Windward Islands still appear to be lagging behind in risk reduction strategies. This is evident in the vast amount of damage, which occurred in the 1990's and seem to have spilled over to the 2000's. Many studies on hazards suggest that perception of risk plays a major role in the effectiveness of risk reduction strategies that are implemented.

1.3 AIM AND OBJECTIVES

The aim of this research is twofold: to investigate broad approaches to hurricane risk reduction in SVG; and then to determine how critical is the role of perception of hurricane risk especially in the context of the effectiveness or

appropriateness of risk reduction strategies implemented by both the public and practitioners. To achieve this, the following objectives were undertaken;

- An analysis of the annual impact of hurricanes on communities in the Windward Islands over the last 20 years, to determine the major destructive agents and the sectors most affected by these events.
- To assess the public and practitioners' perceptions of hurricane risk in the Windward Islands.
- To assess mismatches in perceptions of the public and practitioners and the implications for the effectiveness of risk reduction strategies.
- To identify strategies in St Vincent and the Grenadines which have been formulated to reduce the risk from hurricanes.
- To make recommendations regarding reducing risk to hurricanes and related hazards and further improve processes for building community resilience.

1.4 THE WINDWARD ISLAND: STUDY AREA

1.4.1 Geography of the Islands

The Windward Islands is a group of four Caribbean Islands located on the southern end of the Caribbean volcanic arc from Dominica the most northerly, St Lucia, St Vincent and the Grenadines and the most southerly Grenada (Map 1.1). The North Atlantic ocean tropical cyclone region is considered to be that area north of 10° north, between 0° west and the North American and Central American east coast (Hurricane Alley 2005). This area includes the Caribbean Basin in which the Windward Islands are located (Map 1.1). The Windward Islands share a subtropical climate moderated by the northeast trade winds consisting of two seasons, a dry

season, between January and June, and the wet season, coincides with the 'official Atlantic hurricane season' June 1st to November 30th (NOAA 2006).

Map 1.1: The location of the Windward Islands within the Caribbean Region.

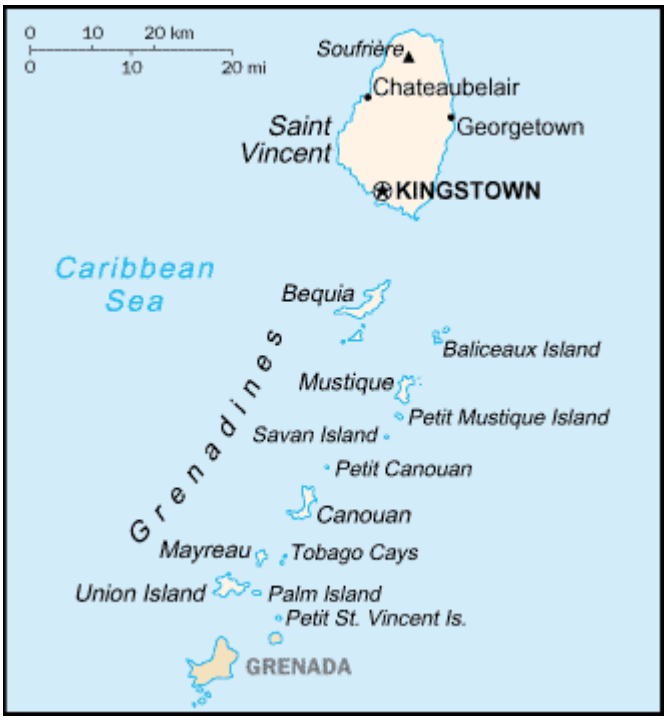
Source: Relief Web 2005

The Windward Islands are known for high annual rainfall ranging from 1000 to 10 000 mm (Walsh 1985) which means the risk of flooding is high. Significantly, the recent reliable records (Hurricane Alley 2005) show that hurricanes have occurred outside the hurricane season in the past and hence are likely to do so in the future. The largest of the islands in terms of physical size are Dominica (754 km²) and St Lucia (616 Km²) while St Vincent and the Grenadines (389 km²) and Grenada (344 km²) are the smaller islands. Despite being the largest Dominica has by far the smallest population according to the 2004 estimates of 69,278 persons, St Lucia with 164,213 persons, St Vincent and the Grenadines with 117,193 persons and Grenada with 89,

357 persons (CDERA 2005). These islands are considered densely populated, except for Dominica, consequently their mountainous nature results in predominantly coastal settlements exposed to the influence of the Atlantic Ocean on one side and the Caribbean Sea on the other.

1.4.2 St Vincent and the Grenadines

The island state of St Vincent and the Grenadines (Map 1.2) is the focus point of this research with supporting work done in St Lucia its closest neighbour with a more organised disaster management programme.



Map 1.2: St Vincent and the Grenadines
Source: CIA (2005)

St Vincent and the Grenadines is subdivided into 6 parishes on the Mainland; Charlotte, Saint Andrew, Saint David, Saint George, Saint Patrick and the Grenadines as one parish. There are 6 towns on the Mainland Chateaubelair, Barrouallie, Layou, Calliaqua, Georgetown and Kingstown the Capital. There are also 15 constituencies used for democratic elections, which are constitutionally due every 5 years, the last

was held in December 2005. The research in the forthcoming chapters focuses on communities in St Vincent and the Grenadines namely Kingstown and Georgetown.

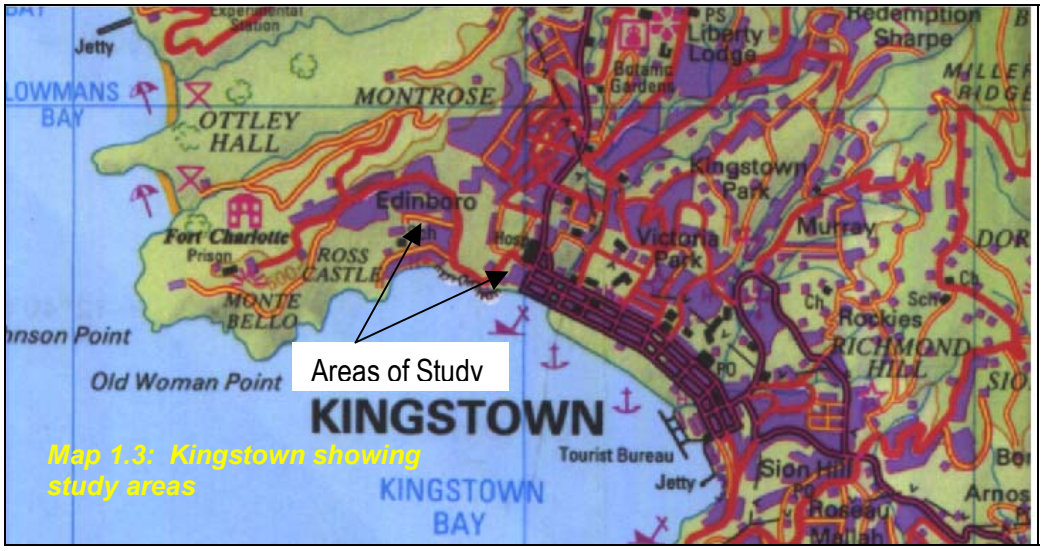
According to the 2004 estimate the populations of St Vincent and the Grenadines is approximately 117, 000 which is an increase from the 2001 official census which recorded a total population of about 106, 000. Table 1.1 shows the 2001 population statistics for the study areas. Kingstown as the smallest town in physical size is more densely populated than the other towns in St Vincent and the Grenadines. In combination with the suburbs, it is home to a quarter of the Island's population. (Government SVG 2001).

Census Divisions	Area(sq miles)	Population 2001	Density 2001 per sq miles
Kingstown	1.9	13,212	6,954
Kingstown Suburbs	6.4	12,508	1,954
Georgetown	22.2	6,914	311
Total SVG	**150.3**	**106,253**	**707**

Table 1.1 Population of SVG and selected towns
Source: Government of SVG: Population and Housing Census 2001

1.4.3 Kingstown

Questionnaire surveys with residents were conducted in Kingstown and Georgetown. Kingstown, located on the south western coast of St. Vincent is the Capital and main administrative centre for St. Vincent and the Grenadines (Map 1.3).



Map 1.3: Kingstown showing study areas

Wilson (1997) outlines the main functions of Kingstown as follows; Government services: location of all the government ministries, centre for wholesale and retailing, centre for public services for example, the main hospitals, more than half of the secondary schools, the location of the main port facilities and a few manufacturing industries.

Like many cities in the Caribbean, there has been an influx of persons to the city with a spill over to the suburban areas in the last 20 years or so, increasing the demand for housing in such areas (Wilson 1997). "In the city centre, there is virtually no spare land for building" (Photo1.1), (Wilson 1997:240) however, there has been some reclamation of land mainly for government offices and other developments. "Much of the water frontage in Kingstown has been reclaimed in the past 15 years" (Mills 2001:1214). Whilst in some areas of Kingstown there are high income residential areas there are areas just outside the city with low-income residential settlements (Wilson 1997). These low-income settlements are more likely to be affected by hurricanes and storms mainly due the substandard nature of the housing and location factors.

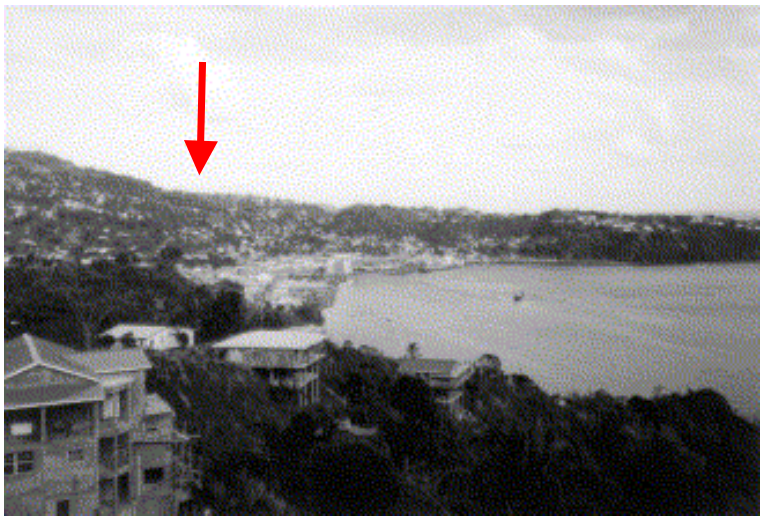


Photo 1.1: Kingstown Harbour shows the greatest concentration of human interaction with the coastline in SVG (Mills 2001:1214).

The residents for the survey in Kingstown are from Rose Place, a small fishing community on the outskirts of the city centre and Edinboro an adjoining community. These areas consist mainly of multiple family units with two floors, which are constructed of lumber or a combination of concrete and lumber. While there is limited vegetation present in Rose Place this is not so for Edinboro, which has a number of fruit trees, flower gardens and fencing. In both areas, many homes are relatively close to the sea and in Rose Place in particular, there are a number of shacks on the beachfront where fishermen converge and even live. There are also a number of shops and commercial buildings in the communities. The structural integrity of many homes appears to be relatively low and they are in a state of disrepair. The study area is easily accessible by paved roads and has basic amenities such as piped water, electricity and telephone services.

1.4.4 Georgetown

Georgetown is located on the eastern coast of St Vincent, approximately 22 miles, from Kingstown. It was the most productive sugar producing area in St Vincent, but has decreased in importance since the sugar industry failed in 1985 because it was unproductive and the competition on the world market. Ishmael (1991:187) surmised that "secondary towns rely on servicing the needs of predominantly one sector, as in the case of Georgetown in St Vincent", such dependence negatively affects the society if that one sector fails. Two decades after the demise of the sugar industry, economic growth in Georgetown remains minimal. The main economic activity in Georgetown presently is agriculture and it is the main rum producing area on the Island. There is one secondary school and a number of primary schools, a hospital, a police station and several small shops. Most of the

residents in Georgetown travel to Kingstown daily to work or to conduct business except for those in agriculture, who may travel to Kingstown to sell their produce.

Map 1.4: Georgetown showing study areas (highlighted).

This thesis will cover seven chapters, this chapter (1), the introduction followed by Chapter 2, a brief review of the literature covering key concepts such as perceptions of risk and risk communication. Thereafter, chapter 3 describes the methodology, which explores the research theory and process and outlines the methods used to achieve the set aim and objectives. Chapter 4 displays the results of both the qualitative and quantitative data that was collected using content analysis, interviews, questionnaires and focus groups. Chapter 5 provides an analysis and discussion of key findings in relation to the choices people make when faced with risks. Chapter 6 offers a conclusion of the research by providing a brief summary of how the aims and objectives were achieved. In addition chapter 6 provides recommendation of strategies with suggestions for a holistic approach, which should include the implementation of community based risk reduction programmes.

2 RISKS AND PERCEPTIONS OF RISKS

2.1 INTRODUCTION

This chapter first outlines the socioeconomic and political nature of the Windward Islands and their exposure to hurricanes and other associated hazards. The chapter then seeks to give an overview of vulnerability factors in SVG contributing to disasters and the need for outside assistance. Another section explores the concepts of risk perception and communication for different sectors of society and the implications for risk reduction. In addition, this chapter outlines aspects of risk reduction and the key roles of preparedness and mitigation. The chapter concludes with theories of perceptions dealing with experts and the lay public. Overall, the aim of the chapter is to illustrate that,

> The level of societal risk to hurricanes impact is a function of the frequency, strength and duration of land falling hurricanes, and of the degree of preparedness and types of mitigation strategies available to and employed by different segments of society (Diaz and Pulwarty 1997:1).

2.2 THE WINDWARD ISLAND SOCIETY

The Windward Islands forms a part of the Caribbean archipelago exposed to a number of hazards such as earthquakes, volcanic eruptions, droughts, and hurricanes (CARICOM Secretariat 2003). Despite the fact that floods are the most frequent hydro-meteorological hazard occurring both during and outside the hurricane season, hurricanes are most likely to result in devastation (CARICOM Secretariat 2003).The Windward Islands are not considered as being in the "normal" path of hurricanes and are less likely to have a direct hit as compared to the islands located at higher latitudes in the Atlantic hurricane zone (Cross 1992; Kilgore and Moore 2003)). However, the

presence of a system in the region can severely affect the islands especially through storm surges, flooding and related hazards such as landslides and other mass movements triggered by intense and or long duration rainfall. As alluded to by Prevatt (1994:315)

> …while greater attention is paid to the extensive wind damage of the major hurricanes like Hurricane Gilbert (1988) and Hugo (1989), storm surges, flooding and erosion from smaller events continue to be cause for concern as it is not uncommon that islands far removed from the storm center are inundated with rainfall.

In many instances, small events in smaller islands are often overshadowed when other countries in the region are directly affected or even more so when there are other disasters globally, such as the Trade Centre bombing in the USA on September 11th 2001 and the Indian Ocean tsunami on December 26th 2004.

2.2.1 Hurricanes

Tropical cyclones are disturbances, which occur over tropical seas generating storms with a wind velocity greater than 74 mph. These physical phenomena are called typhoons in the Eastern Pacific and hurricanes in the Atlantic. Hurricanes are ranked into five categories of intensity using the Saffir-Simpson scale based on the wind speed, pressure and probable storm surge height associated with a landfall hurricane and correlated with the possible damage likely to occur this tropical cyclone (see appendix 1) (NOAA 2005). Systems that have not yet attained hurricane strength and have wind speeds of between 39 to 74 mph are referred to as Tropical Storms (NOAA 2005). It must be noted that in many instances, these less intense, more frequent storms are responsible for much of the damage in small islands such as the Windward Islands, hence this study will focus on both hurricanes and tropical storms.

Hurricanes are accompanied by strong winds, high intensity and long duration rain, as well as storm surges all of which are responsible for adverse effects on people

and property. The magnitude of each of these aspects depends on the characteristics of the storm, the speed at which it travels and its proximity to a country. The most intense winds are often confined to a relatively narrow radius close to the eye wall. However, more distal areas may experience surges associated with the low pressure. " A mature hurricane may have a diameter anywhere from 150 km to 1000 km (620 miles) with sustained winds often exceeding 115 mph near the centre with still higher gust"(Gibbs 2001:n.p.). Clearly, storm surge destruction is greatest along low-lying coastal areas, while wind damage may be more extensive. Thus, small cities and towns located entirely on islands may be particularly vulnerable to extensive loss, with virtually all their buildings being severely damaged or destroyed (Cross 2001:68). Islands such as the Windward Islands, which are often away from the centre of these storms, can still receive considerable effects.

There have been speculations that hurricanes in the Atlantic region are on the increase and are likely to continue in the future due to global climate change. If this proves to be the case it will have serious impacts on the Caribbean region and the Atlantic coast of the USA.

> The years 1995 to 2000 experienced the highest level of North Atlantic hurricane activity in the reliable record. Compared with the generally low activity of the previous 24 years (1971 to 1994), the past 6 years have seen a doubling of overall activity for the whole basin, a 2.5-fold increase in hurricanes and a fivefold increase in hurricanes affecting the Caribbean (Goldenberg *et al* 2001:474).

This significant change in activity may be attributed to natural climate variability, but there is still much debate over exacerbation due to anthropogenic climate change.

"In 2003 the Atlantic basin was extremely active, with 16 tropical storms, 7 hurricanes, and 3 major hurricanes" (Bell G *et al* 2003:1). The year 2005 saw it's first hurricane, 'Dennis', occurring in July, which is not a common trend. Hurricane 'Dennis' was accompanied by heavy and intense rainfall and was responsible for 16

fatalities in Cuba, known for its success in hurricane risk reduction. In addition the Windward Islands were also affected by tropical storm 'Emily' during the month of July with Grenada and its dependencies still struggling to recover from the impact of 'Ivan' 2004, again being seriously affected and significant damage on St Lucia and St. Vincent and the Grenadines. Hurricane 'Katrina' and 'Rita' in 2005 caused severe devastation in the USA despite their more advance disaster management capacity, a timely lesson for all stakeholders in cyclone prone areas, (see fig 2.1, 2005 storm tracking chart).

The hurricane tracking chart shows the path of tropical cyclones for the 2005 hurricane season. The chart is colour coded to show the progression of the cyclone from over the ocean surface where they develop to when they make landfall. The key explains the information provided on the chart which includes; the number of cyclone for the season, the type (whether hurricane or tropical storm), the name and the date when the system developed. This storm tracking chart is useful to identify the pattern of these events which can help to make a certain amount of predictions.

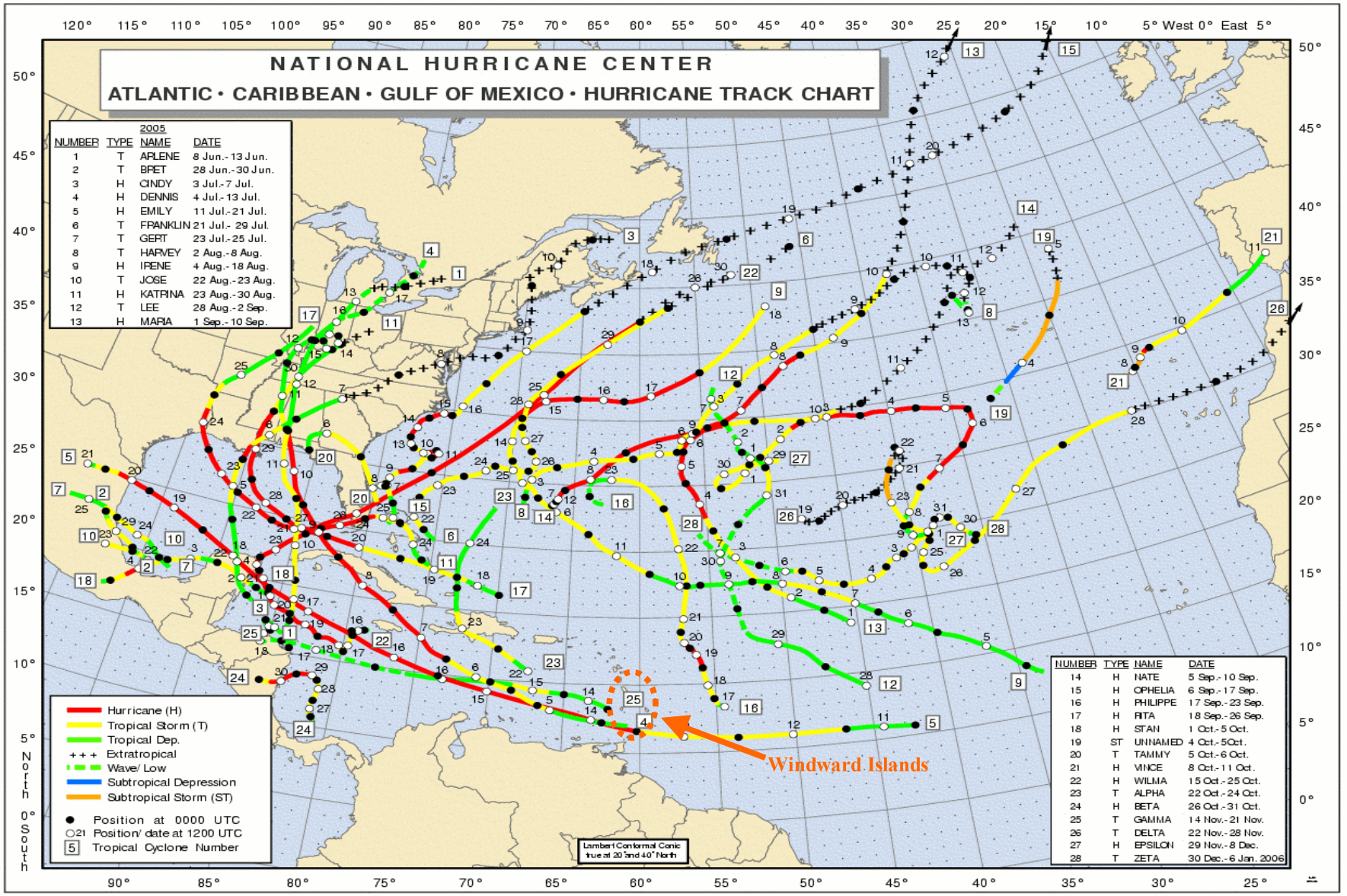


Figure 2.1: Storm tracking chart 2005

NOAA 2006

2.2.2 Political structure

The Windward Islands are former colonies of Britain. Three of the islands have the Queen, as the head of state, represented by a Governor General while Dominica became a Republic on attaining independence (CDERA 2005). All the islands have a parliamentary democracy elected by the people and the leader of the winning party is the Prime Minster responsible for the governing of the country. General elections are constitutionally due every 5 years but can be called before, as in many countries using the Westminster Model. The electoral process can significantly influence policy making depending on the agenda of the winning party. Pelling and Uitto (2001) refers to how political rivalry between parties as well as groups of people can affect the decision making process. "In the Dominican Republic, following hurricane George in 1998, political rivalry delayed the release of US$200 million fast tract disaster rehabilitation loan from the World Bank for 7 months" (Pelling and Uitto 2001:59). This is certainly a harsh reality, which can be detrimental for small island nations, already behind in terms of development.

2.2.3 Socio-economic structure and Vulnerability

The Windward Islands are members of the Organisation of Eastern Caribbean States (OECS) and CARICOM and other organisations such as the Alliance of Small Island States (AOSIS) working collaboratively to reduce risk to hazards. Bananas are a major income earner in all the islands and is exported to Britain where " a protected market was established to insulate the Windwards from competition from large-scale banana growers in Central and South America, who were able to produce higher-quality and also lower-cost bananas than the Windward Islands" (Grossman 1993:349). The industry has experienced problems since the 1960's due to price

fluctuations, market conditions, competition, pest, drought, storms and hurricanes (Grossman 1993:349). "During Hurricane Alien, [Allen] in August of 1980, Saint Lucia suffered US$36.5 million in damage, with 97 percent of the banana plantations destroyed. In St. Vincent 95 percent, and in Dominica 75 percent, of the banana plantations were ruined" (Earthscan No. 34a, 1983 cited in Botterill and Mazur 2004). This hinders the development of the Windward Islands by plunging vast numbers of people who depend on bananas both directly and indirectly further into poverty and causes a decline in the annual Gross Domestic Product (GDP).

> During 1995 for example, hurricanes Marilyn and Luis and tropical storm Iris caused a drop in the annual rate of Gross Domestic Product (GDP) growth from 3.0 percent to 0.7 percent among the countries of the OECS with the impact on the individual countries being even more severe (CARICOM Secretariat 2003:20).

Tourism is a growing industry, used as a means of diversifying from the failing banana trade, but has it own problems such as changes in consumer taste and sensitivity to the effects of natural disasters (Pelling and Uitto 2001). "With limited and miniscule economies often based almost entirely upon agriculture or tourism, a disaster not only leaves much devastation, but can leave large portions of the population unemployed, tax base destroyed, and a government lacking the resources needed for repairing or replacing lost infrastructure" (Davis, Ricci and Mitchell 2005 np). Lewsey *et al* (2004:393) argued that the small islands of the Caribbean are some of the most vulnerable areas to climate change and the consequent effects of such, which may include an increase in storm frequency and intensity. Consequently,

> while their small land masses leave them vulnerable to hurricanes and tropical storms, that vulnerability has been exacerbated because of human activities e.g. intensive land development, high population density in coastal zones and poorly developed coastal infrastructure are complicated by the impacts of tourism based industries, limited human and cash reserves, and a lack of trained personnel who can address the impacts of climate (Lewsey *et al* 2004:393).

The majority of the population and infrastructure are located along the coast making Dominica particularly vulnerable to strong winds and high seas (Benson and Clay 2004:19). This pattern is very similar in the other Windward Islands. In St Vincent and the Grenadines " traditional extraction sites such as beaches and the Rabacca dry river (near Georgetown) have provided the principal source of construction sand, resulting in severe beach erosion, flooding of coastal areas and loss of dunes and other habitat" (Mills 2001:1213) thereby increasing vulnerability of surrounding populations. "The increasing demand for coastal tourism in the region has changed the demand for land use and increased the price of coastal lands" (Lewsey *et al* 2004:398). As a result, significant numbers of persons migrating to urban areas are forced to squat on marginal land already prone to various hazards and overcrowding. "The migratory trend of the population towards urban centres creates an additional demand for houses in an already stretched market" (Prevatt 1994:308). Urbanisation forces the reclamation of land, poor construction and settlement in unsafe areas that are likely to be affected during hurricanes. This in itself is harmful to the environment and these reclaimed areas are even more vulnerable to the elements of the weather. An example of the environmental impact and exacerbation of risk caused by such reclamation is highlighted by Lewsey *et al* (2004). The Rodney Bay Marina in St Lucia was constructed on what were once wetlands. This upsets the protective nature of wetlands, which acts as a sponge for excess water and protects the coastal environment from storm damage (Bradley; Sorenson and Stevenson 2001). Hurricanes may also highlight or uncover vulnerabilities that existed prior to the hurricanes. Harvey (1995:105) noted,

> Coastal degradation is a problem in Antigua, Dominica, Grenada, St Kitts, St Lucia and St Vincent and the Grenadines. The beaches are threatened by disposal of sewage and other wastes into the ocean, by sand mining for construction and by destruction of coral reefs.

"Residents of smaller communities are often far more vulnerable to disasters than residents of mega cities. The same argument can be, and has frequently been made regarding inhabitants of small island nations" (Cross 2001:70). "Small islands typically have one harbour, one international airport, one major hospital, one electric power plant' (Wason 1984 np; Bisek, Jones and Ornstein 2001). when these services are damaged, it affects the entire country and there no other such services to fall back on unlike larger countries, which might have several airports and other services.

Poverty assessment reports undertaken in 2003 for the CDB indicate unacceptable levels of poverty in all the Windward Islands with rural areas having slightly higher rates. The reports indicated that the poor reside in substandard homes with low-income levels, low educational achievement and large families who lack access to various amenities (CDB (2003)). These conditions are often associated with shaping the perceptions of individuals and their actions in disasters. Wisner (2001) proposed that in order to prevent future disasters it is necessary to understand political and economic power. His proposition is based on many studies which concluded that the poor and powerless are often the ones who suffer most in times of disaster because they settle in high risk areas on lands they do not own and cannot afford to invest in making them safer. Moreover, according to Alexander "In many developing countries, the apathy, demoralisation and isolation induced by hazards are part and parcel of the conditions of poverty" (Alexander 2000:5). "The larger the disparities of wealth in a society the more the poor are forced to carry the blame for the disaster" (Bankoff 2003:160). Therefore, any risk reduction programmes should be a part of total development, which addresses the problem of poverty, or at least consider the implications of such policies on the poor. It however must be noted that all poor communities are not equally vulnerable to disasters rather "there is often a strong

[correlation] between access to resources and the ability of people to prepare or recover from hazards" (Bankoff 2001:25).

2.2.4 The Evolution of Disaster Management in the Caribbean: Windward Islands

The traditional focus of disaster management has been on preparedness to deal with the immediate effects of hazards in particular hurricanes, by providing emergency care and relief to those affected i.e. emergency management. There has been a change over the last 20 years, a key driver was a concern by Ministers of Health in 1972 about the increasing impact of disasters on the region. This concern brought about the development of the Pan Caribbean Disaster Preparedness and Prevention Project (PCDPPP) in 1981 sponsored by CIDA, United Nations Disaster Relief Organisation (UNDRO), CARICOM, European Economic Community (EEC) and the league of Red Cross Societies. The main objective of PCDPPP was to "facilitate the adoption of preparedness and prevention measures at the national and regional levels and, in particular to provide cooperation to the participating states on request" (Watson 1984:np). Even so, most of the islands had only a part time Disaster Coordinator who was assigned that role in addition to their portfolio in another government department. This meant that not much was done proactively prior to the hurricane season and few other staff or resources were set aside to deal with mitigation aspects of disaster management.

The Caribbean Disaster Emergency Response Agency (CDERA) was formed in 1991 to continue the mandate that was started by the PCDPPP. Even then the focus was primarily on the coordinated response to support member states that needed assistance in a disaster situation. Over the years CDERA has grown and expanded into a unit, which focuses on all aspects of the disaster cycle through its

Comprehensive Disaster Management (CDM) strategy (CARICOM Secretariat 2003). CDERA has been instrumental in strengthening of the Disaster Management Units in all of its member countries and drives the move from part-time to full time Disaster Coordinators with the necessary resources to function. While there have been significant improvements in disaster management there is much to be done to effectively reduce risk and vulnerability in the Windward Islands and the wider Caribbean as whole.

One of the major concerns in the Caribbean is the impact of hurricanes on homes, displacing families and putting peoples' lives at risk. Prevatt (1994) attributes this to the poor use of construction methods, which leaves homes vulnerable to the forces of nature. Hurricane Allen in 1979 destroyed three-quarters of the housing in Dominica (Cross 1992), more recently in 2004 in Grenada, Hurricane Ivan a category 3 strength hurricane; Saffir-Simpson scale 1-5,(see appendix 1) affected the Caribbean including three of the Windward Islands before devastating Grenada with damage to housing alone amounting to EC$ 1,380,851,015.00 (US $517,172,664.00) (OECS 2004). The destruction of infrastructure, especially homes in the Caribbean, maybe attributed to the lack of proper regulation and where they exist, no enforcement and dissemination of information to stakeholders.

Prior to 1986, the former British colonies used building guidelines which were related to health laws and made specifications in relation to size and height of rooms, ventilation and toilet facilities (Gibbs 2003). However, these guidelines were insufficient to address vulnerabilities to storm events. Spearheaded by the Council of Caribbean Engineers who felt the need for regulations and uniformity, the Wind Code was developed and was being used as a teaching tool for engineers by the University of the West Indies (Gibbs 2003). The Caribbean Uniform Building Code (CUBiC)

was formulated in 1986 to guide the construction industry in the region, yet as Gibbs highlighted in his report of 2003, only three Caribbean countries have made the use of this code mandatory. There has been very little done in relation to sensitisation, training and revision of the building code and as Gibbs pointed out, copies were only made available for sale in 1990 (Gibbs 2003). Hence, most of the construction done prior to this period would not have adhered to the guidelines set out in the codes and standards. Furthermore, "building codes, specifications, standards and codes of practice have a major influence on the cost and quality of buildings since they control the design and construction aspects of buildings and products" (Chin 1992:437).

In addition an "increasing numbers of persons have resorted to squatting as their only hope for ever owning a home" (Prevatt 1994:308). These persons often use whatever materials are available to them, not necessarily of good quality, and seek help from friends and relatives who do not always have the required skills to do the job.

> "Throughout the region, there has been a trend of shifting away from traditional architectural practices to more vulnerable forms of construction, such as the squatter settlements that proliferate in many urban areas" (Lewsey *et al* 2004:398).

As a result, the losses and damage done to homes from hurricanes and storms has been the cause for much alarm in the Caribbean. Squatter settlements are more common because there are no laws, which prevent this practice so the conditions worsen. Presently governments in the Windward Islands have developed several housing programmes to officially hand over ownership of lands to squatters, provide the basic services of power and water as well as construct low-income homes for others. However while these projects improve the general well being of the poor they do not improve the resilience of these persons to hazards or encourage the use of codes, regulations and standards.

The OECS, which consist of nine islands including the four Windward Islands, developed a building code in 1991 more suited to them, using CUBiC as a foundation and building on its technical background (Gibbs 2003). While there has been some implementation in a number of the OECS countries the only Windward Island where this code is mandatory is Dominica, and only since May 2003 (Gibbs 2003). This has implications for urban development in these islands regarding the regulation of haphazard constructions vulnerable to the impacts of storm, hurricanes and other hazards.

2.3 HAZARDS, VULNERABILITY AND DISASTERS

2.3.1 Hazards and disaster

IADB (1999:5) views a hazard as simply "the probability that a natural or human induced phenomena will occur". A more comprehensive definition by WHO (1999:31) describes a hazard as "any phenomenon that has the potential to cause disruption or damage to people and their environment". This suggests that while there is the possibility for effects to occur they can be controlled even though the hazard itself is uncontrollable. "Much disaster policy still puts emphasis on the impact of nature, and this has led to the dominance of technical interventions focussed on predicting the hazard or modifying its impact (Hamza and Zetter 1998:291), rather than risk reduction. This study has as its heart a focus on natural hazards in particular hurricanes but will specifically investigate non-alignment of perceptions and the need for community involvement in risk reduction project development. Rodrigue (2004:np) defines natural hazards as a combination of "an extreme event and a human society situated in time and space so that its people and assets are in the path of that event".

"A disaster is the manifestation of vulnerability and a hazard with an impact that surpasses the coping mechanism of the affected population" (IADB 1999:5). Some writers distinguish between disasters with a "natural" trigger such as earthquakes and those which result from human interventions such as vehicular accidents. Alcantara-Ayla (2002) suggest that while geophysical events have always existed it is only with human interference that these events actually result in disasters Hence, disasters are created from "natural events interacting with a society which at some level is unable to cope" (Dibben and Chester 1999:133). The debate of what constitutes a disaster is one that has been discussed by many writers for decades, yet there remains no single universally acceptable definition. Quarantelli (1998) however, presents the perspectives of various writers on "What is a disaster". While the definitions for disasters in general differ, it all amounts to the point of society being unable to cope with the occurrence of some event (Lindell and Prater 2003). However, there will be some level of resilience, "risk is very much culturally specific and some societies have often normalised that sense of threat and adopted mechanisms over time for coping with it"(Bankoff 2003:162). Essentially people will use their own indigenous knowledge to cope as long as it works for them.

"Urban areas are not necessarily disaster prone by nature, but are made that way because of structural processes creating rapid urbanisation, population movement and concentration" (Hamza and Zetter 1998:292). Very often migrants and marginalized people inhabit vulnerable areas or create the vulnerabilities by their very lifestyles; a disaster waiting to happen. When disaster occurs, there is the need for outside assistance in the form of immediate relief and recovery processes, but appropriate proactive disaster risk management through community and organisational preparedness could cost less than response, which is the point of this

research. Dibben and Chester (1999:134) argued that aid agencies are not paying enough attention to traditional ways of coping and managing disasters, which will eventually lead to "missed opportunities to provide an effective service and may have hindered the long-term recovery of a region". "Indigenous knowledge and risk management strategies are valuable and must be factored into programmes, but this does not mean that the extensive scientific, technical and managerial expertise of disaster professionals should be devalued" (Twigg 2004:167). They should be integrated for a more holistic approach, which takes into consideration the perceptions of all the stakeholders.

Richer countries such as the United Kingdom and the USA may apparently manage to recover quickly from disasters with limited drawbacks to total development, this is not so for SIDS, which are more likely to suffer disasters of larger national scale than developed countries (Diaz and Pulwarty 1997) or geographically larger developing countries. However, even in these countries natural disaster overwhelms their recovery mechanisms and people are likely to remain displaced for long periods of time, a notable example is the devastation which occurred in New Orleans in 2005 as a result of Hurricane Katrina and other storms and hurricanes. Lindell and Prater (2003:182) assert that "Natural disasters have been found to have no measurable long-term impacts on the overall viability of communities in the United States". Although the impact of hurricane 'Katrina' 2005 will be a test to such viability, the cost of this disaster can be shared by areas of the country that were not affected, because of its size and resource base. In developing countries "a severe cyclone can, and does, lead to long lasting interruptions in normal economic and social activities, ranging from agriculture to education" (Patwardham and Sharma 2004 np) as was the case in Grenada in 2004 resulting from Hurricane

Ivan. Pelling, Özerdem and Barakat (2002:286) infer that "larger, developed economies with sizeable foreign currency reserves, high proportions of insured assets, comprehensive social services and diversified production are more able to absorb and spread the burden of impacts over space and time". It is not the same for small island nations where negative effects on one sector as a result of disasters also affects other sectors. For example, hurricane 'Ivan' in 2004 imparted significant damage on the productive agriculture sector in Grenada amounting to EC$46 million in direct losses and EC$55 million in indirect losses (OECS 2004). The loss reduced the export of local produce thereby diminishing access to foreign exchange, a loss of many local jobs and considerable reduction in local food stocks (OECS 2004).

The year 2005 was also branded as a record breaking hurricane season even before it ended. Wealthy nations such as the United States prepare and mitigate more efficiently in disasters since they possess effective evacuation measures and greater utilization of, in the case of earthquakes, seismic resistant construction which reduces the death toll (Cross 2001). Consequently developing countries, often lack organisation and resources to deal with high impact events. While the losses are very costly in major cities because of their levels of urbanisation, as was the case of Hurricane 'Andrew' which amounted to losses of about US$30 billion, small islands like the Windward Islands often suffer more because their entire economy is affected (Cross 2001). According to Melville (2003:104) "Between 1994 and 1995, Dominica's rate of GDP growth declined from 7.75 per cent to 2.4 per cent, largely due to hurricane damage. St. Lucia also experienced a fall in GDP growth, from 2.4 per cent to 0.5 per cent in the year following Debbie". Such loss places pressure on the governments in the islands to revitalise affected sectors and pay for mitigation, which is normally given secondary attention.

Lindell and Prater (2003) identified several types of impacts that are likely to result from natural disasters; these include physical, social, psychosocial, socio-demographic, socio-economic and political impacts (Lindell and Prater 2003). In many instances, the same area maybe affected even before it can fully recover plunging society into even greater despair than before. This continuous disruption can stunt economic growth and development and even with the influx of outside aid there is not much difference. Pelling, Özerdem and Barakat (2002) suggest that there is low effectiveness in aid because of the length of time used in negotiation for funds and aid in the form of soft loans which have to be repaid. Moreover "large amounts of money are at times spent inefficiently in concentrated relief efforts that distort longer-term development and risk reduction efforts" (Pelling, Özerdem and Barakat 2002:296). Hence while outside aid is needed and is welcomed, in many instances it does not solve the problem of building resilience since it may create a sort of dependency and is very often not the type of aid that is necessary. So in any event mitigation maybe neglected in an effort to deal with the immediate needs while vulnerability to disasters increases.

2.3.2 Vulnerability

"Vulnerability is generally defined as any condition of susceptibility to external shocks that could threaten people's lives and livelihoods, natural resources, properties and infrastructure, economic productivity, and a region's prosperity" (IADB 1999:5). Many authors (La Trobe and Davis 1995; Ariyabandu 1999; Cross 2003) view vulnerability as the result of social, cultural, economic and political factors. These factors according to Hamza and Zetter (1998:292) result in "the marginalisation of groups of people", by factors such as "class, gender, race and ethnicity, age, income, and geographical location" (O'Hare 2000:25). Evidence of

such vulnerabilities "… is most apparent in the economic pressures that force many of the poor to live in cheap but dangerous locations such as flood plains and unstable hillsides…" (Ariyabandu 1999) See photo 2.1.

Photo 2.1: Squatter settlement on hillside in St Vincent, note the slippage which occurred after heavy rain during the 2005 hurricane season.

Source: Ferdinand 2005

These vulnerable conditions increase the risk of devastation if and when disasters occur since vulnerability and risk are related. An over simplified illustration of the multiplier relationship is provided by Alexander (1997)

H x V = R

H = Hazard V= Vulnerability R = Risk

"Hazard vulnerability of communities ranging from small town to mega cities is best viewed as the summation of a continuum of conditions that define physical and social exposure, disaster resilience, pre-event mitigation or preparedness and post event response" (Cross 2001:66). All such conditions must be considered in arriving at an integrated approach to reduce vulnerability and therefore risk. Figure 2.2 provides a summary of some of the factors related to decrease or increase in vulnerability. These

factors can be applied to conditions in St Vincent and the Grenadines some of which are referred to throughout this study, and include reclamation for development and the political process.

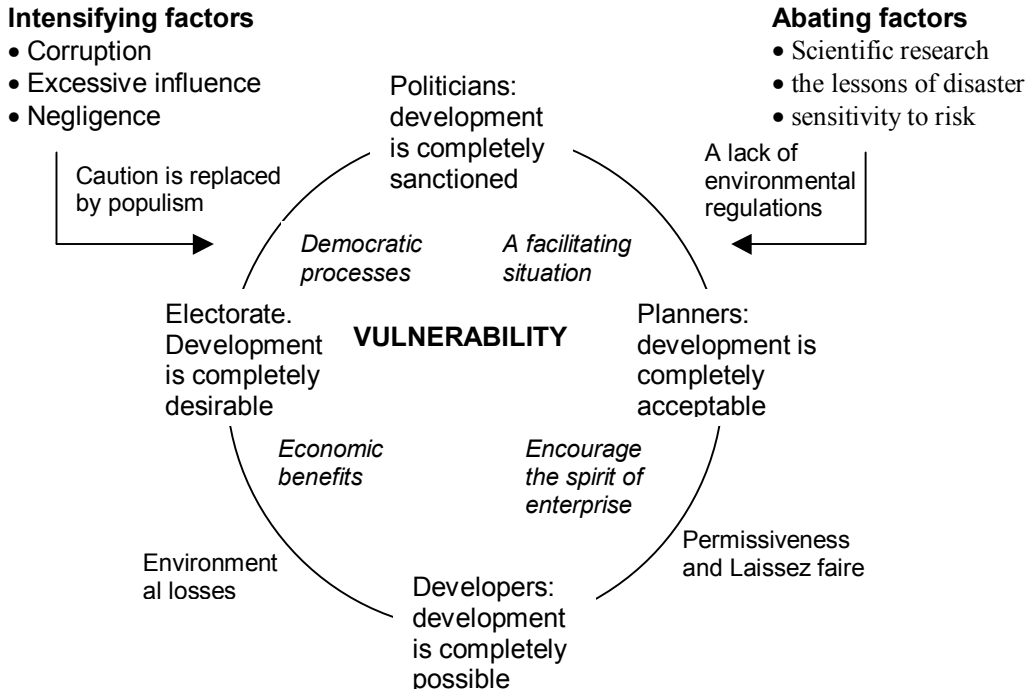


Fig: 2.2 Factors affecting vulnerability: Adapted by author from Alexander (2002:13)

While residents make short term preparations for impending hurricanes they may not significantly reduce the risk in the long term. In any case, they are already residing in areas exposed to strong winds, land slippage, flooding, or environmental degradation. Vulnerability, and therefore risk, is not static but dynamic, related to both past and present socio-economic processes and individual decision-making (Dibben and Chester 1999). As such, the measures of reducing vulnerability will have to be improved and reviewed for them to effectively reduce vulnerability to hazards. Miletti (1999) suggested that advanced warning systems have created a sort of safety net making people believe that they can build in fragile coastal areas because they will receive due warning allowing them to move to safer areas. Krasovskaia

(2001:856) supports this view in a study of flooding in Norway, which indicates that technical measures such as dikes and river regulations while they are designed using probability of occurrence "produce a psychological effect on the inhabitants of complete safety" (Krasovskaia 2001:856). "Whatever the physical reality, disasters must also be viewed in terms of how they are perceived and estimated" (Alexander 2003:570), so that the most appropriate strategies for risk reduction can be implemented for the best most long-term, sustainable results.

2.4 RISKS: PERCEPTION AND COMMUNICATION

2.4.1 Risk Perception

Risk perception is about the relationship between hazards, knowledge, and people attitudes (WHO 1999:36). The assumption is that people who know more about a hazard may be more willing to adopt mitigative measures. "People take risk-related decisions from a range of alternatives based on local knowledge, past experience, experiments, opportunities and existing coping mechanisms" (Heijmans 2001:1). People do what they perceive as the best thing to do unless they are convinced otherwise. There are various factors which are seen as important in shaping perception of risks among households such as class, gender, location and other conditions shaped by demographic, economic, social and political processes (Heijmans 2000; Peacock 2004). Other factors, which are seen as important in shaping perception, include age, experience, household composition, degree of preparedness, proximity and geographic location. Gregg (2004) found that perceptions of volcanic eruptions were linked to the proximity of residents to the volcanoes in Hawaii. However in some cases proximity was not significant because

other factors were deemed more important by individuals, such as providing immediate shelter for their families.

> The ways in which particular individuals decide to manage risk is often a function of their perceptions. Many homeowners do not take action even when the risk is abundantly clear to others and loss-reducing measures are available. It is often the case that many homeowners feel that a disaster will not affect them (Kunreuther, Meyer and Van den Bulte 2004:7).

Some people may think that because of previous bad experiences that they are immune to other dreadful experiences in the future (Peacock 2004). The nature of the experience may be an important factor in shaping their existing perceptions. Those with more personal or more salient experiences concerning personal danger may well have different interpretations and thus risk perception and so behave differently (Peacock 2004). Individuals may also feel helpless and may depend on the government to help them in disasters. Toft and Reynolds (1997:1) stated that, "Risk cannot be measured in objective, unambiguous terms, for any assessment is based on perceptions that are neither neutral nor value free". Therefore, people will, wherever possible, try to reduce the risk that they believe exists but may not be the actual risk. In the same light decision makers may implement strategies that seek to reduce risk to the hazards, which they think exist while there may be additional risks and others underlying that are neglected. It is therefore important that decision makers work in unison with each other as well as with the general public in first identifying the risk and then in risk reduction.

According to Jones, Bisek and Ornstein (2001) some decision makers and citizens in the Caribbean live in denial or are fatalistic. As such, the decisions they make will reflect this attitude. In some societies disasters are so frequent that they become embedded in the culture of the society, as is the case of the Philippines. As a

result they develop "coping mechanisms that have evolved in order to permit communities to come to terms with the constancy of hazards and to mitigate the worst effects of a disaster" (Bankoff, G., Frerks, G., and Hilhorst, D 2003:16). Persons in decision-making positions often measure risk in a different way to the public and therefore the solutions they offer to reduce such risk may be quite different from what the public expect. In a study of flooding in Norway, it was concluded that the public and decision makers had different perceptions about the risk of flooding (Krasovskaia *et al* 2001). The study indicates that in cases where the experts viewed the 'risk to life and health from flooding as moderate to high' about one half of the population did not envisage any danger occurring as a result of flooding (Krasovskaia *et al* 2001). The possible reasoning is that the public think about their individual risk while the decision markers view risk in general (Krasovskaia *et al* 2001:866). In a different light (Margolis 1996:35 cited in Boterill and Mazur 2005:6) suggest that the layperson looks at risk more broadly than the expert whose expertise is narrow and therefore likely to "miss something" of importance to the broader community. This further justifies the need for consultation and collaboration between both groups to develop effective risk reduction strategies. "In any event, the rigorous intellectual activity of making decisions about risk events is beyond the competence of many people and hence inaccurate perceptions may prevail, even among the best educated and best informed members of society" (Alexander 2002:78). In essence the best approach to risk reduction is through collaboration and consultation with all stakeholders since risk reduction which work for one society may not work for others.

Margolis (1996 cited in Botterill and Mazur 2004), implies that the public may distrust a small subset of experts in particular fields for example insurance agents and politicians. If the public do not trust the judgement of these decisions makers they

will be very reluctant to adhere to the strategies and policies they develop. In addition, the public may question risk assessment results if they suspect that experts are in doubt or have disagreements (Botteril and Mazur 2004). Cutter (2003:2) suggests "an aspect of science's vulnerability is the notion that scientific judgements are always correct, while public perception of threats are misguided because they are fostered by the mass media and therefore largely emotional". Both expert and lay person's judgements are subject to cognitive biases based on human inabilities to process all the required information needed for a decision (Cutter 2003). If human risk is unacceptable, then they should make preparations, insure and seek more information.

2.4.2 Risk

"Risk means different things to different people and wide variances are typical between 'experts' and the lay public" (Meacham 2002: np). Therefore, many theories have evolved over time, which attempt to explain the concept of risk and vulnerability in relation to disasters, yet there is still no clear-cut definition of these terms. Alexander (2003:576) distinguishes between "objective risk as that which can be calculated from statistical data or past events" and perceived risk which he considers as the subjective assessment by individuals. However, "there is no objective condition in the world where the word risk applies. It is only when conditions in the world are dangerous and are perceived to be so that risk has meaning" (Pidgeon, Kasperson and Slovic 2003:67). So "people talk about risk when there is the chance, but not the certainty, that something they do not want may happen" (Chongfu 1996:271). It is highly unlikely that people will purposely put themselves at risk, but they may be driven to take risk because of other needs such as providing for their

family (Ariyabandu 1999). In the end they may endanger their lives but live in hope that they would not be affected by disaster

"Research has shown that people are typically unaware of all the risks and choices they face. They plan only for the immediate future, overestimate their ability to cope when disaster strikes, and rely heavily on emergency relief" (Miletti 1999:6). Particularly, but not exclusively, in regions undergoing rapid demographic or developmental change people put themselves at risk because a particular location may be desirable, such as a beachfront location or a hillside with spectacular views overlooking other areas, they "use heuristics to guide them when faced with complex choices" (Mileti 1999:135). Heuristics are judgemental rules based on observation and understanding that people use to help make difficult decisions (Slovic 2000). Writers such as (Renn 1998) indicated that people may even be willing to put themselves in danger in the hope that they will benefit in the end from aid. They may be given a chance to move to safer areas and gain title to lands, and other tangible benefits, but these only solve the problem in the short-term.

Risk is often heightened by mismanagement of the environment, as discussed by Alexander (2000:11)

> Urbanisation of floodplains, the deliberate flaunting of anti-seismic building codes, the rapid rise in population of coastal towns that are susceptible to hurricanes, and the spread of precarious shantytowns on unstable tropical hill slopes…. , all contributed to increase risk.

"Throughout the Caribbean beaches are increasingly at risk from sand mining activities which exacerbate erosion of these landforms and increase the vulnerability of coastal infrastructure to flooding" (Lewsey 2004:399). Risk can thus be regarded holistically as the potential for impacts to result from hazards, the level of loss

incurred by the occurrence of some phenomena and the perceived or actual losses as a result of exposure to danger.

Consequently, "risk management has become a dominant concern of public and policy yet the ability of the government to anticipate the strength and focus of public concerns remains weak" (Pidgeon, Kasperson and Slovic 2003:80). Thus researchers consider continuous investigation about the major concerns of the population as a vital part of community empowerment. This would help to focus risk reduction strategies and drive the move for community participatory approaches rather than just top down approaches.

2.4.3 Risk communication: warning and information dissemination

The communication of information to the public is central to risk management. "Risk communication is based on the assumption that people make wrong decisions because they are uninformed about the consequences of their actions" (Mileti 1999:140). "Vulnerable people need to know about the hazards and risks they face, and the measures they can take to mitigate and prepare for potential disasters" (Twigg 2004:165). One of the problems in trying to prevent a recurrence of a catastrophic event is that of communicating relevant information to all those individuals and/or organisations that require it (Toft and Reynolds 1999:84). "Communities may be prepared for the likelihood of an event, but many of them are ill prepared for the nature and extent of the consequences" (Gough 2000n.p.). All too frequently "the communication process is not informed by communities' experiences and perceptions of risk, or the impact of their socio-economic circumstances or the way they see and manage risk" (Twigg 2004:166).

In the Caribbean, the public receives information about impending hurricanes 36 hours in advance; a 'hurricane watch'. This is issued via radio and television and

persons are advised to undertake preparedness measures. A hurricane warning is issued 24 hours before the hurricane is likely to affect any of the islands, the public is advised to go to a shelter if they are in high risk areas (Niles 2001). In St Lucia, this advice is given in French Creole as well as English. There are however, no specified risk maps to identify relative risk areas and therefore how would the public know the level of risk they face. While path prediction errors may occur, modern hurricane equipment is relatively reliable (Moin 2001:179) therefore advice should be taken seriously, but this is often not the case. According to Jones, Bisek and Ornstein 2001) despite the fact that the Barbados Central Emergency and Relief Organisation has been in place since 'Janet' (1955); there is still a high level of complacency among its population. They further stated that the public interest in St Vincent and the Grenadines is relatively, low despite the number of hazards likely to occur (Jones Jones, Bisek and Ornstein: 2001). When SVG is threatened by hurricanes the warning mechanism is heightened to include two phases a 'Cautionary Hurricane Warning' and a 'Final Hurricane Warning' (Figure 2.3).

URBAN AREAS: **Cautionary Hurricane Warning (Kingstown)**	**RURAL AREAS:** **Cautionary Hurricane Warning**
1) A red flag with a black rectangle centre flown from Police Headquarters 2) Loudspeakers and radio and TV announcements.	1) Red flag with black rectangle centre flown from police stations 2) Loudspeakers, TV and radio announcements.
Final Hurricane Warning 1) Two red flags with black rectangle centers flown from Police Headquarters, TV and radio announcements 2) Ringing of church bells for five minutes 3) Blowing of siren for five minutes	**Final Hurricane Warning** 1) Two red flags with black rectangle centers flown from police stations, TV and radio announcements. 2) Ringing of church bells for five minutes

Figure: 2.3: Phases of hurricane warning in St Vincent. NEMO (2004:35)

There is no documented information to support any testing of this system and from the interviews and focus group meetings conducted for this research there is no indication that the public is familiar with this system.

Moin (2001:181) highlighted several limitations in the context of cyclone early warnings mechanisms, they are subdivided into four broad categories:

- Inadequate observation and communication facilities
- Lack of up to date forecasting techniques of path, intensity, size and storm tides
- A limited understanding of certain peculiarities inherent in the tropical cyclones
- The deficiency in public education about the tropical cyclone and the warning system.

Such limitations can be applied to the early warning mechanism in St Vincent and the Grenadines and is a vital part of the risk reduction process to avoid disasters. The media also plays a vital role in the transfer of information to the public and therefore has to be very careful that what they convey is accurate. It may become very difficult to change peoples' mind once they hold fast to certain beliefs. If they believe that they have no control over certain risks then they will do little to reduce it.

> Not only can the media amplify or attenuate hazards perception and political action, it can bias the representation of an actual disaster, with negative impacts on the equity and efficiency of response and public understanding of the hazard realized in it (Rodrigue 2004 np).

This can cause people to ignore advice and programmes presented by the authorities to reduce risk to hazards. The way information is processed by the public is sometimes a reflection of "ignorance and misinformation about the actual risk of danger and even the meaning of terms used by the media and meteorologist" (Drabek 2000:40). Many persons might not be able to understand the technical jargon of the experts and tend to ignore any information related to the hazard event.

> In all probability, the first way in which most people receive information on any given disaster is through mass communication media of newspaper, television and radio. Unfortunately, however, this form of information is often more concerned with sales figures or audience rating than a dispassionate exposition of what has occurred (Toft and Reynolds 2004:84)

It is therefore of paramount importance that decision makers work closely with the media and the community to ensure effective and accurate dissemination of information.

2.4.4 Risk Reduction: preparedness and mitigation

Disaster management should be proactive and attempt to identify and measure hazards thereby reducing risk before they occur. Mustafa (2003) emphasises the importance of assisting affected persons not just to return to a state of "Normalcy" but also to build capacity so they will be better able to respond and cope in the future. "Normality" could be the condition of vulnerability, which allowed the crisis to become a disaster in the first place (Hamza and Zetter 1998:291). Therefore, risk reduction should be aimed at making persons more resilient than they were before the disaster occurred. Ayscue (1996:3) makes the point that in the past "when homes were damaged by hurricanes they were usually repaired to their pre-storm conditions but were not often upgraded to reduce or mitigate damages from the next storm", thereby increasing the loss of resources to pay for the same damage every time a disaster strikes.

"Disaster risk reduction is the technical, social or economic action or measures used to reduce direct or indirect and intangible disaster loss" primarily mitigation and preparedness (La Trobe and Davis 2005:16). Many writers such as (Hamza and Zetter 1998) make note of the importance in addressing economic, political and social factors as paramount in risk reduction. "Risk reduction by prior

mitigation is cheaper than disaster relief as a result of unmitigated risk" (Alexander 2000:11). To achieve this, proper communication and dissemination of information with the communities at risk are essential as this may help to shape perceptions of their environment, potential dangers and how they can become actively involved. It can be argued that

> Strategies for the prevention of natural hazards are universal, yet their applicability needs to take into account the particular characteristics of the threatened entity, in such a way that a better understanding of the vulnerability of a specified social entity (natural and human) could lead to the development of adequate disaster prevention strategies (Alcantara-Ayla 2002:108).

This is exactly the point of this research focusing on the Windward Islands being a small region with similar strengths, weakness, opportunities and threats (SWOT) as opposed to the Caribbean as a whole where the SWOT's are more diverse.

Even though in the Caribbean several codes and standards have been developed over the last 20 years to promote risk reduction "homeowners and investors are not mandated to adhere to any existing standards or codes" (Lewsey 2003:399). There is therefore the "need to strengthen the links between local communities and national government, so that the community increasingly gain a voice in planning and land use decisions" (Lewsey 2003:400). Planning and land use requirement are normally passed down from the top with little or no input from the community who sometimes are unaware of their existence.

2.4.5 Preparedness and Mitigation

Preparedness includes "all measures undertaken to ensure the readiness and ability of a society to forecast and take precautionary measures in advance of imminent threat, and respond and cope with the effects of a disaster by organising and delivering timely and effective rescue, relief and other post disaster assistance" (La

Trobe and Davis 2005:16). Mitigation is defined as "measures that can be undertaken to minimise the destructive and disruptive effects of hazards and thus lessen the magnitude of a disaster" (La Trobe and Davis 2005:16). So while some disasters cannot be prevented, measures can be undertaken to lessen the tangible and intangible losses to human society. On the whole, disaster risk reduction entails measures to curb disaster losses by addressing hazards and people's vulnerability to them.

Good disaster risk reduction happens well before disasters strike, but also continues after a disaster, building resilience to future hazards. Reducing risk to hurricanes includes avoiding settling in high risk areas, the proper use of the environment, construction practices, family awareness and insurance. "Risk-reduction measures for one hazard should be compatible with risk-reduction measures for other hazards" (Cutter *et al* 2000:713), especially since hazards such as flooding and landslides occur both during and outside the hurricane season. The public and decision makers may have different views about hurricane risk and therefore the decisions they make in reducing this risk will vary. It is only with proper communication and understanding that a holistic approach that addresses complex vulnerabilities and cascading hazards be achieved in the development and implementation of effective risk reduction strategies. This research is not intended to critique risk reduction strategies implemented in SVG (though primary data gives significant insight into perceived effectiveness of some measures) but ultimately to make recommendations of how the public and decision makers can work together to implement strategies that are best suited to the existing hurricane risk in the Windward Islands.

3 METHODOLOGY

3.1 INTRODUCTION

This chapter describes the research methods adopted to achieve the aims outlined in Chapter 1, as well as highlight the advantages and disadvantages of the different approaches. Thereafter there is an outline of the specific methods, which were utilised to collect data from the different samples, and the data analysis technique used to test and display the results. Each section also seeks to present some of the constraints and biases involved in carrying out the research.

3.2 RESEARCH APPROACH

Many researchers (Gough 2000; Peacock 2004; Davis, Ricci, and Mitchell 2005) have found perceptions of risk to be a significant determinant of behaviour and decision making with regards to hazards. Therefore, this study will collect data on the perceptions of hurricane risk that informs the risk reduction strategies utilized by both the public and decision makers in the Windward Islands. A review of existing literature pertaining to perception, the concept of risk, and vulnerability provided insights into arguments presented by practitioners and researchers in Disaster and/or Emergency Management. The field research was conducted using a combination of qualitative and quantitative methods, a process referred to as "mixed methods" (Tashakkori and Charles 1998:18). While in the past many researchers were adamant about adhering to either of these approaches, it is quite common today to find a combination of both approaches in single studies (Haralambos and Holborn 2004). In addition, the study will adopt an interpretive approach in the analysis of the field data. An interpretative approach seeks to derive meaning and motive from social action

(Haralambos and Holborn 2004), a useful approach in a study, which seeks to understand perceptions of hurricane risk in the Windward Islands. While advocates of this approach consider quantitative methods as inadequate or inappropriate to research human behaviour, there are benefits to be gained from combining qualitative and quantitative methods.

Haralambos and Holborn (2004) highlighted three conditions under which methods can be combined; triangulation, facilitation and complementarity. Triangulation while often used to describe the combination of methods is specifically associated with the use of one method to verify the findings of another method. Facilitation is where one research method gives way to the utilisation of another method (Haralambos and Holborn 2004). Complementarity is where a method is used to achieve the aim for which it is best suited. It is with this complementary nature in mind that the "mixed method" approach to research is utilized in this study. This was done using quantitative methods of structured questionnaires and semi structured interviews and qualitative methods in the form of focus groups and content analysis.

The qualitative method refers to a "naturalistic approach" which allows for a degree of flexibility in the collection of personal data (Silverman 2000). This approach is considered as "richer, more vital, as having greater depth and as more likely to present a true picture of a way of life, of people's experiences, attitudes and beliefs" (Haralambos and Holborn 2004:871), than does quantitative data. The result of this method is an in-depth description of the variables being studied. As such, the limitations of the qualitative method include the inability to replicate the study exactly as well as the tendency to have a relatively high level of unreliability because of the interactive role of the researcher. The quantitative approach on the other hand is considered as a more scientific or "positivist approach" which is more structured and

collects information, which can then be transformed into numeric data and used to make inferences about the larger population (Walsh 2001:10). While this method is ideal for collecting a large amount of data, it limits the scope as to the reasons and behaviour of the variables being tested (Silverman 2000). Specific methods of data collection were carried out to achieve the aim and objectives outlined in chapter one.

3.3 RATIONALE FOR SELECTION OF LOCATIONS

This is an outline of the criteria used for the selection of the Windward Islands: Dominica, St Lucia, St Vincent and the Grenadines and Grenada and subsequently two of these islands to conduct the research. The section further presents the techniques used for sub sampling within the selected islands. The final section sets the scene around which the study is based by giving a general overview of the study area and population. This study on the Windward Islands collected data from St Vincent and the Grenadines supported by data from St. Lucia.

The Windward Islands are the most southern of the Caribbean Islands and while a part of the Atlantic hurricane zone are outside of the normal path of hurricanes. However as the reliable records indicate this area frequently experiences the detrimental effects of tropical storms and hurricanes via direct hits or hazards associated with the presence of a system in the region, as described in detail in chapter 2 section 2.2.1. Therefore, the Windward Islands were selected because they are often overlooked as not being seriously affected. This has implications for the allocation of international aid, finance for mitigation programmes, research and research grants as well as institutional support. The already limited resources available nationally and regionally are often insufficient to finance recovery and long-term mitigation programmes while addressing other developmental needs.

The Windward Islands are a group of islands with many similarities in terms of geographical location (Windward Islands), geological structure, economic base and the experience of similar hazards, which includes hurricanes, droughts, fires and volcanic eruptions. The Islands are also united in the trading of bananas to the United Kingdom as a major contributor to their GDP (Ishmael 1991). The historical account, chapter 4 will show that this is one of the most vulnerable sectors to the destructive forces of hurricanes, a livelihood on which a large percentage of the population is dependent. These islands, which are already working together in the trading of bananas, could benefit further from more collaboration on risk reduction issues.

St. Vincent and the Grenadines and St Lucia were selected to conduct research based on the close proximity of St Vincent and the Grenadines and St Lucia to each other, St Lucia being approximately 21 nautical miles from St Vincent, yet the experiences in terms of "hits and misses" by hurricanes are slightly different. There is a contrast in terms of size with St Lucia being almost twice the size of St Vincent and the Grenadines and has a significantly larger population. They are also at different levels of progress in Disaster Management with St Lucia being more established and organised although both Islands are members of CDERA. The CDERA agreement signed by heads of member States:

> …requires that each Participating State establish or maintain a National Disaster Organization (NDO) or a national relief organization capable of responding swiftly, effectively and in a coordinated manner to disasters in Participating States. This is the government-designated organization, which has overall responsibility for the country's National Disaster Management Programme. (CDERA 2005:np)

This agreement provides the foundation on which the National Disaster Management Organisations should establish and function. To achieve the research aim and objectives regarding perceptions of practitioners, two groups of professionals from

St Vincent and the Grenadines and St Lucia, involved at different levels of Disaster Management in the disaster cycle were considered:

- Practitioners in regional disaster organisations such as CDERA and PAHO.
- Practitioners in National Disaster Management Organisations in St Vincent and the Grenadines and St Lucia, these include National Disaster Offices and National Red Cross

3.4 ANALYSIS OF FREQUENCY AND IMPACTS OF HURRICANES

The analysis of existing data according to Gray (2004) involves the use of "unobtrusive" measures to collect information such as "documentary evidence, physical evidence" and data stored in archives (Gray 2004:263). This method of data collection reduces researcher bias but also has limitations which include; inaccessible data, as well as "inaccurate and incomplete" data especially from internet sources (Gray 2004:281). Despite such restrictions, content analysis is important in research especially when used along with other methods. This study includes a critical analysis of historical data on hurricanes over a twenty-year period from 1984 to gain an appraisal of the impacts on the selected islands. This data was instrumental in the formulation of the questionnaires for the interviews with decision makers in relation to the major hazards, risk reduction measures as well as the vulnerable elements on the Islands.

The historical information was drawn from various sources, which included online databases, archives of various organisations and libraries. The documents reviewed included situational and government reports, academic papers, journals and statistical data. The Caribbean Hurricane Network website was also a vital source of

past data on hurricanes and was utilized in the historical account. The archive contains a wide range of information, not found in hardcopies from a library. These include;

> non conventional and unpublished works produced by local, national, regional and international organizations involved in the field of disaster management. Types of materials include books, periodicals, articles, newspaper clippings, conference and seminar reports and presentations, projects, technical reports, maps, posters, video recordings, audio tapes, and photographs. There is also a specialized periodicals collection retrospective to 1980s (StormCarib 2005: np).

The Centre for Research on the Epidemiology of Disasters (CRED) Emergencies Database EM – DAT was also a useful source of statistics available online. It provides statistics for disasters world wide based on 10 or more fatalities, 100 or more persons affected, a call for international assistance or the declaration of a state of emergency (CRED EM – DAT 2005).

3.4.1 Limitations

There are a number of limitations, which arises from using CRED EM-DAT for historical data. Data coverage is poor for many data categories, certain countries and event types especially before 1970 (Brooks and Adger 2003). "Where a country is associated with a non-zero number of events over a given period but no data are recorded for these event, the sums of the killed and affected categories are set to zero", this can be misleading (Brooks and Adger 2003:7). Hence, this research collected historical data from various sources in an attempt to gain better insight of past hurricane impacts.

3.5 SAMPLING

An important part of any study is the selection of an appropriate subgroup of the larger population on which to conduct the research. "The use of samples saves the researcher time and money, since it reduces the number of individuals to be

studied" (Haralambos and Holborn 2004:894). Samples can be used to make inferences on behalf of the larger population, if they are carefully selected. The main ways of choosing samples are probability and non-probability sampling. Probability sampling is the selection of a sample by allowing each unit of the population an equal chance of being selected in the sample. This is not the case in a non-probability sample where a more ad hoc method of selection is applied.

Probability sampling is best used if the sample is to be considered as representative of the larger population and generalisations can be made on behalf of the whole (Burgess 1993). On the other hand, in non-probability sampling every member does not have a chance of being in the sample and is therefore unsuitable for making inferences relating to the whole. In addition, non-probability sampling is mainly adopted when no form of probability sampling can be used (Burgess 1993). There are various types of probability sampling which include simple random, best used for large populations, where each member of the population has an equal chance of being selected in the sample. However the sample can be biased if there is "the over or under representation of particular categories of the population" (Burgess 1993:27).

Stratified random sampling takes into consideration subgroups within the population that are important to the study. This ensures that each subgroup is either, represented equally or in relation to their size in the larger population (Burgess 1993). This method is regarded as one of the more accurate forms of sampling because it can take into account important variables such as age and gender. However, its practicality depends on the availability of a sampling frame with the correct type of information (Haralambos and Holborn 2004). Cluster sampling is where groups or clusters are used as the sampling frame because the population being studied is

scattered over a large geographical area. An example suggested by Burgess (1993:29) is "dividing a geographical region into constituents areas" from which random samples can then be selected randomly. This method of sampling helps the researcher to concentrate on specific areas, which saves time and money (Burgess 1993).

This study used a number of methods to select appropriate study areas to complete the questionnaires. Initially a cluster sampling approach was used to determine which field study areas were targeted. In cluster sampling "the population is divided into clusters, and some of these are then chosen at random. Within each cluster units are then chosen by simple random sampling or some other method" (Hunte and Tyrell 2004:np). Clustering was deemed as the most appropriate method at this stage since the entire island can be affected in a single hurricane event so that those persons with hurricane experience are spread over the entire island.

Once a subpopulation was identified, consultation was done with the National Disaster Coordinator who gave qualitative information regarding hurricane experiences of these towns. Based on this information with regards to recent hurricane experiences and impacts from tropical storms and hurricanes it was decided to target specifically the populations of Kingstown the Capital city and Georgetown.

After the focus towns were selected it was decided to spread the data collection over a week, visiting on different days at different times in order to allow more persons the chance to participate. The process of accessibility sampling was used where "units are selected on the basis of convenience, such that one selects the most accessible units from the population" (Clifford and Valentine 2004:233). The visits involved walking through the communities and knocking on doors of homes making a brief introduction, asking persons to participate in the research and talking them through the informed consent. In each community the survey began on a

Monday which on both occasions were national holidays. The Saturday of each week was used to conduct the focus group meetings with a selection of willing participants who had also completed questionnaires.

3.5.1 Practitioners sub sampling approach

The purpose of the interviews was to evaluate the perceptions of the practitioners in the Windward Islands. Intended for the purpose of this study, practitioners include professionals who work in Disaster Agencies and organisations that support national emergencies. These include persons who direct government agencies, volunteer organisations and Non Governmental Organisations in the selected Islands as well as serve on committees set up by the National Disaster Agencies to plan, prepare and respond to national emergencies. The selection of such persons was done via non probability sampling where the key sectors were identified and a sampling frame constructed in the form of an organisational chart. This was then used to select a 'vertical slice' and the key practitioners in the selection contacted for interviews (Figure 3.1). In a few cases where key persons were not available snowballing was utilised where other persons were suggested as perspective interviewees.

To select the population for the interviews, information was drawn from CDERA as well as the National Emergency Response plans of St Vincent and the Grenadines and St Lucia. The CDERA data was used to identify collaborative regional organisations that assisted in planning, training, and other areas of the disaster cycle (see appendix 2). National Response Plans were used to identify major strategic organisations that worked along with the National Disaster Office, these were categorised into 4 groups based on their major functions: Military, Government Agencies, Non Governmental Organisations and volunteers or community based

groups. These were further subdivided into subgroups of ministries, departments and agencies as the basis of stratified sampling. This organisational chart was used to select a 'vertical slice' of 10 these key persons from St Lucia and St Vincent and the Grenadines for interviewing. Personnel with identical roles were selected from both St Lucia and St Vincent and the Grenadines to be interviewed, for comparative purposes, intended to served as a means of suggesting a more holistic approach not just on a national scale but also regionally.

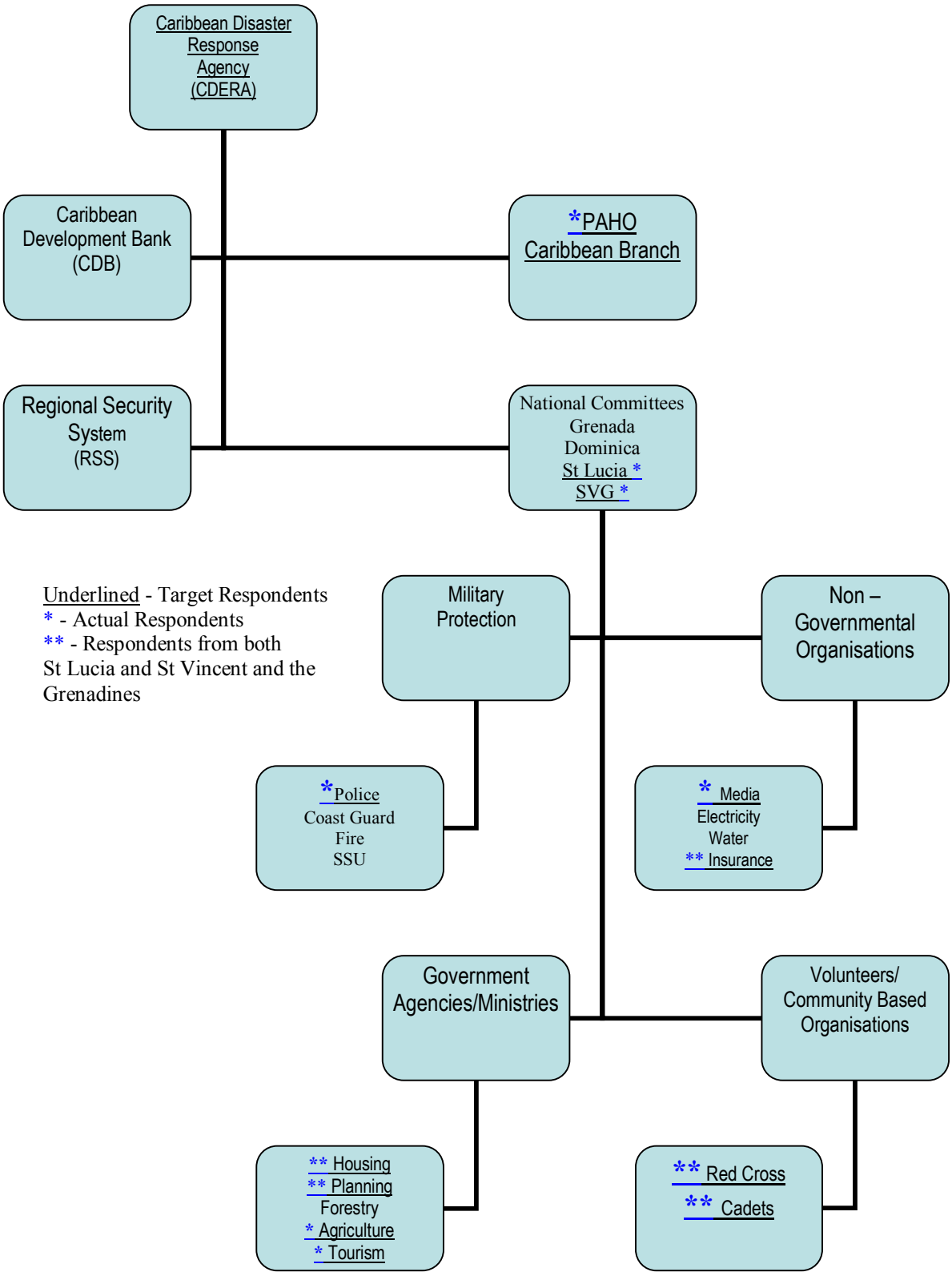


Figure 3.1 Practitioners and service support sampling frame. *Disaster Management in the Caribbean is coordinated by the Caribbean Disaster Emergency Response Agency, formed by the Heads of Government of 16 CARICOM nations. This organisation collaborates with regional and international organisations as well as national disaster coordinators for each nation. These NDC's then work along with national agencies, which includes – Military, NGO's, other government agencies and ministries as well as volunteer and community based organisations.*

On the regional level, an interview was conducted with a representative of PAHO another significant organisation that works along with CDERA as well as with individual countries with a focus on the health and environmental aspect of Disaster Management. On the national level there was a target of 10 decision makers to be interviewed but only 8 were realised from both St Lucia and St Vincent and the Grenadines. The initial sample was subdivided into two volunteer organisations from each country, two Non Governmental organisation, the national Disaster Coordinator of each country, five government ministries, and other agencies. This selection took into consideration that the government played the major role in National Disaster Management on the islands. An attempt was made to interview similar decision makers from St Lucia and St Vincent and the Grenadines, however due to non response this was only possible for 6 of the 10 intended decision makers. Those organisations, which participated, and their major roles in risk reduction are highlighted in section 4. in the results chapter.

3.5.2 Questionnaires for the Public and Sub sampling approach

Questionnaire surveys were carried out in two communities in St Vincent and the Grenadines to understand how the public perceive hurricane risk and risk reduction. "Questionnaires consisted of a list of pre set questions" (Haralambas and Holborn 2004:899) used for every member of the sample population to ensure that the same information is collected from each respondent. The sample selected for the questionnaire survey with the public consisted of residents of the communities of Georgetown and Kingstown. For the purpose of this research, the population for the questionnaires included all geographical areas that had both frequent and recent hurricane experiences. These areas were identified as locations within the broader settlements of Kingstown and Georgetown. The sampling frame within these two

towns consisted of all the households likely to be affected by hurricanes. These covered residents located along the coast as well as further inland who were selected using a' doorstep' approach during visits to the community to complete questionnaires.

The time allotted for the survey was one week, the sample target was 50, which was selected as a suitable size for this type of small-scale research with time and resources constraint. The survey in Georgetown reached the target because persons were more willing to participate while in Kingstown it was 80% of the target due to reluctance from residents. In order to accommodate the working population surveys had to be done in the afternoon after the end of the normal working hours of around 4:30 pm. There also had to be a cut off time of 6:30 pm since this is when persons were preparing evening meals and many doors were also closed at this time, so people had to be given their privacy. This meant that the surveys had to be spread over several days and times allowing for a wide range of perspectives to be collected.

3.6 INTERVIEWS

3.6.1 Choice of Method

To interview practitioners it was felt that the best method to use was semi-structured interviews, which have the advantage of leaving room for discussion while being guided by a number of set questions (Wisker 2001). This method was selected rather than the highly structured interviewed which are much like questionnaires with coded answers and leaves no room for discussion (Wisker 2001). At the other extreme are open interviews which have the potential to loose focus and can be very difficult to analyse and compare responses, therefore semi-structured interviews were

considered a balance of the two extremes and a more feasible method to collect the data from the practitioners (Wisker 2001).

3.6.2 Ethics and Consent

The ethical aspect of research were taken into consideration when conducting the questionnaires, consent forms were prepared outlining the aim of the study and signed permission sought from the respondent to use the information given by them. The form also indicated that participation was purely a matter of choice and could be withdrawn at any time without any consequences. The interviewees were also assured that while their job roles would be mentioned they would not be referred to by their names.

3.6.3 Designing Interviews

In reviewing the literature the researcher noted areas that were relevant in the decision making process of risk reduction, with a focus on the community. WHO (1999) "Community Emergency Preparedness: A Manual for Managers and Policymakers" along with other articles were helpful in the selection of the themes and formulation of the questions. These included their roles in disaster management and whether a multidisciplinary, multi-sectoral approach was adopted. It was also important to ascertain the hazards and their destructive agents that are likely to affect the study area. The other themes covered were communication between the public and decision makers, vulnerable groups and finally an overview of risk reduction strategies and perceived challenges to implementing them. These were subdivided into 10 questions, all open-ended with some questions having two parts (see appendix 3).

3.6.4 Conducting Interviews

All the interviewees were asked 10 questions which can be found in appendix 3. The questions were not asked in the same order based on the flow of the interview but all the questions were covered. The interviews lasted approximately 30 minutes to an hour depending on the engagement of the interviewee. The researcher wrote the information as it was relayed by the interviewees. In a few cases, several persons from an organisation decided to attend the interview session based on their expertise or collaboration in different areas such as project implementation and finance. In addition, "take away" leaflets were given for additional information that may be required and business cards and email addresses provided if further contact was needed.

3.6.5 Process of analysis

To analyse the questionnaire the responses were transcribed and subdivided in to 5 themes based on key themes some of which evolved from the literature review. These themes included communication, vulnerability, risk reduction, disaster management organisations and hazards. Like answers were grouped together and a written summary of the responses were done. The findings of the interviews are presented in Chapter 4 section 3 with further discussion in Chapter 5.

3.6.6 Limitations and bias

There were a number of limitations encountered during the interview stage of the data collection. These include the unavailability of persons at the time of the appointment, resulting in rescheduling and in a few cases no interview at all. A number of practitioners were either new in the field or were responsible for one particular area and were unable to give the required information. To combat this

problem more than one person attended the interview. There was reluctance on the part of a few practitioners to participate in the interview, however once they understood the importance of the research they consented.

3.7 QUESTIONNAIRES

3.7.1 Choice of methods

Questionnaires presented a means of investigation that is practical for collecting data from a large number of respondents over a short period. Structured questionnaires were used as part of the study to collect information about how residents view hurricanes. Structured questions with closed answers were selected as opposed to open-ended questions to make it easier for respondents to complete as well as reduce the amount of time to answer questions. This was considered the best way to conduct the field research for the study as time was limited and it allowed the researcher to cover a wide range of questions on various topics.

3.7.2 Ethics and Consent

The ethical aspects of research were taken into consideration when conducting the questionnaires, all respondents was presented with an introductory letter which outlined the aims of the research and a consent form seeking signed consent from the respondent. The form also indicated that participation was purely a matter of choice and could be withdrawn at any time without any consequences to them. They were also given a duplicate of the consent form signed by the researcher with contact details in the event of any queries. Respondents were assured that they would not be mentioned by name and address to allow them to feel free to answer the questions without worrying about being identified.

3.7.3 Designing questionnaire

Questionnaires can be written in a highly unstructured manner where the questions are open-ended to a very structured questionnaire with closed ended questions. Open-ended questions allow the respondent to express their views freely without having to select from a list of predetermined answers. However, this has the problem of researcher bias in interpreting the answer given by the respondent correctly. Closed questions on the other hand provide the respondents with choices for each question as in multiple choices (Marshall 1997). This makes it easier for the respondent to select and is less time consuming. They however restrict the answers to the choices given which may not ideally express the views of the respondent (Marshall 1997).

The questionnaire consisted of 30 closed questions of various types covering a range of topics (see appendix 4). The first part of the questionnaire dealt with the background of the respondents and their house information. The next set of questions asked about preparedness measures, experiences, communication means and knowledge of warning processes. The questions were developed based on feedback from the literature on various perception and hazard studies to identify variables that were significant such as socio economic background and demographic status. The study on "Pre disaster mitigation program" by the Oregon Natural Hazards Workgroup was a useful guide.

The questions consisted mostly of 'Multiple choice' type questions, which included questions with several choices as for ownership of property, "respondent owned, family, government, rent, other". Using the choice "other" allowed the respondent to give an answer that was not included in the options hence reducing any bias. There are also various questions with just two options such as "yes" and "no".

Boxes were provided with each option to tick the most suitable choice answer. One question asked respondents to rank hazards by investigating about the likelihood of hazards to affect them. This question used a 'Likert scale' where there are a range of options such as "most likely hazard" ranked 1 to "least likely hazard" ranked 5. The questionnaire was piloted to ensure clarity and understanding of the questions and suggestions were incorporated.

3.7.4 Issuing questionnaires

While postal surveys were considered and are an inexpensive means of data collection there is the problem of low response rate, which "could seriously bias the results, since there may be systematic differences between those who return questionnaires and those who do not" (Haralambas and Holborn 2004:900). This could be only persons who perceive hurricanes to be a threat. Telephone surveys are also an inexpensive means of conducting a survey and are deemed to have a higher response rate than postal surveys. However, the limitations include difficulty in establishing a connection with the participants and excluding persons who do not have access to telephones which can bias the results. In addition Haralambas and Holborn (2004) noted that asking sensitive questions over the telephone can be difficult as well as expecting persons to remember the choices given from which they have to choose.

In recent years the possibility of emailing questionnaires has developed however there is the drawback of limited or lack of access to computing facilities (Haralambas and Holborn 2004) as well as availability of email addresses and whether they are functional. Since many people from the study areas in particular from Georgetown indicated a limited reading ability this method was deemed not suitable for this study. In terms of the administration of the questionnaires, this was done by walking from house to house in the two selected communities and after

seeking signed permission asking persons to complete the questionnaires. In some cases especially in the Georgetown community, persons indicated they could not read and asked to have the questions read to them so they could select their answer.

3.7.5 Process of analysis

The analysis of the data collected was done using the Statistical Programme for Social Sciences (SPSS). The data was entered into spreadsheets and frequencies tabulated on all the variables to generate frequency tables and diagrams. In addition, cross tabulations were done to show correlation between two or more variables. The results and analysis of findings are presented in Chapter 4 with further discussion in Chapter 5.

3.7.6 Limitations and biases

A number of the residents who were visited refused to answer questions because they linked the survey to one of the political parties, a common occurrence since election campaigns were being carried out at the time. There were also persons conducting enumeration surveys at the time and persons indicated that they were weary of answering questions. Others refused to participate unless there were some tangible benefits to be gained, they did not see the point of doing something for nothing and felt that they were getting nothing from the researcher doing such a study. After analysis there were also a number of aspects the researcher felt should have been included which may have affected perceptions, such as the length of time residing in a particular area, income and family size.

3.8 FOCUS GROUPS

Follow up sessions in the form of focus groups were organised for respondents of each community following the questionnaires in order to obtain feedback on

issues raised in the questionnaires. Despite the poor response in terms of numbers attending the focus group, it was very productive, the focus group in Kingstown was less successful than the focus group conducted in Georgetown in terms of attendance. There were 7 persons present at the Georgetown focus group meeting and only two at the Kingstown meeting.

Krueger (1994:6) summarised a focus group as "a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive, non threatening environment". The typical size of a focus group is 7 to 10 but can range from 4 to 12 participants (Krueger 1994). As part of this research, the focus groups consisted of persons who participated in the questionnaire survey and raised issues that were significant to the study and were worth investigating further. Some of those issues included concerns about housing, relocation, politics and preparedness. Focus groups are a qualitative approach used to gain further insight into the attitude and perceptions of participants using open-ended questions (Krueger 1994). Krueger (1994:29) highlighted four different ways in which focus groups can be used, these include

- Before qualitative procedure – helpful in developing the qualitative process.
- Same time as quantitative procedure – triangulation to research the same thing.
- After quantitative procedure – useful after questionnaires to provide insight and further interpretation of results as in the case of this research project.
- Before quantitative procedure – Independent of a quantitative method in the same study.

As part of this study focus group meetings were held after the questionnaire surveys were completed with the aim of acquiring additional information or shedding light on issues that arose from the questionnaires. All the respondents who completed

questionnaires were invited to attend a focus group meeting at the end of the week (Saturday) at 4:00 pm. They were told that refreshments will be served as an incentive to encourage them to attend. Prior to that, arrangements were made with the Principal of a school in the community (also hurricane shelter) for the use of a classroom in which to hold the meeting.

At the meeting participants were reminded of the aim of the study and informed that the purpose of the focus group was to clarify and add detail to issues raised by the questionnaires. Participants were also invited to feel free to express themselves and assured anonymity. While the turnout was poor, seven persons present at the Georgetown meeting and two persons in Kingstown the feedback was very productive and participants spoke freely. At the end of the meeting persons were given a leaflet with some hurricane information and a snack.

The relatively poor attendance at the focus groups meetings could be a reflection of the low perceptions of respondents of hurricane affecting them. However there might have been other factors responsible for the low response rate, Saturday being a day that is traditionally used for house work in some cases a day of worship. There were a number of persons who indicated beforehand that they could not attend the meetings but most of the respondents gave the assurance that they would attend. The researcher therefore concludes that the non attendance is due mainly to their low perception of hurricanes as a major risk. In light of this the researcher believes that on any other day of the week the response would have been much the same.

The result of the focus groups will be incorporated in the discussion of the results in chapter 5.

3.9 RESEARCHER'S POSITIONALITY

Positionality according to Flowerdew, R. and Martin, D. (2005:113) is "how your own identity will shape the interactions that you have with others" thereby influencing the outcome of the research. He further stated that:

> Sharing the same background or a similar identity to your informant can have a positive effect, facilitating the development of a rapport between interviewer and interviewee and thus producing a rich, detailed conversation based on empathy and mutual respect and understanding (Flowerdew and Martin. 2005:113).

Throughout the questionnaire survey concerns were raised by residents about the researcher being affiliated to a political party. Those concerns arose because it was an election year and persons had reservations. In addition there was an enumeration exercise taking place at the time and residents complained about answering too many questions. However once the purpose of the research was explained to the residents, most decided to participate in the survey.

The researcher's positions as a resident of the island, a teacher and volunteer during hurricanes was an added advantage for the research. This assisted the communication process with the respondents as well as the practitioners. Many of the practitioners were quite enthusiastic about research being done in relation to hurricanes and so were very helpful and supportive. The literature however acknowledged that sharing the same background as those being studied is not always advantageous (Flowerdew and Martin. 2005).

> Mohammad cited in Clifford and Valentine (2003:188) confirms that "positionality does not disappear where we appear to be 'insiders', since we are also partly 'outsiders' by the very fact that we are engaged in research, and other aspects of our own identities (such as dress, accent or education) can be markers of our differences as well as our similarities.

Thus, it is possible for participants in the field research to answer in a way they think you expect them to respond. In the final analysis what is important in terms of the researcher's position is awareness and acknowledgement of how their position may affect the research (Clifford and Valentine 2003).

4 RESULTS FINDINGS

4.1 HISTORICAL ANALYSIS 1984 – 2004

The aim of the historical analysis is to give an overview of the impacts of hurricanes in relation to cost and affected sectors in the Windward Islands for the last twenty years. In addition an attempt has been make to highlight the physical agents such as storm surge, wind, and rainfall that are responsible for the damage. Analysis of the historical account provided some evidence of what lessons have been learnt, as impacts change, perhaps related to changing mitigative approaches. The assessment also highlights what else can be learnt from those past experiences. Overall the analysis of the history of hurricane caused disasters is useful when looking at how people prepare and try to mitigate and whether these measures have been effective. Future risk reduction measures can be implemented based on the history of the hazards (their frequency and magnitude), stakeholders perceptions of the hazards and associated risk and the reality of the impacts of the hazards.

4.1.1 Impacts of hurricanes

In order to provide a context for the analysis of the field data this initial section will present an historical analysis of past impacts of storms and hurricanes on the Windward Islands from 1984 to 2004. This study focuses on this period because it represents a shift in the focus of disaster management and the period over which detailed records of cyclone hazards have been kept. Hence, the most reliable records of associated impact intensity date back about 20 years. According to Pelling (2005), despite challenges in disaster data there have been some improvements over the last 20 years. The data presented here was derived from the following sources; Hurricane

Alley, The Caribbean Institute for Meteorology and Hydrology (CIMH), The Centre for Research on the Epidemiology of Disasters -Emergencies Database (CRED EM – DAT), CDERA and CDB. It was difficult to find data that was specific to the Windward Islands since much of the data covered the Caribbean region and in come cases with Latin America.

Over the last 20 years, there have been very few storms, which directly affected the Windward Islands. Despite that, the records show that these islands experienced heavy rains and accompanying conditions from hurricanes in neighbouring regions. In the past, hurricanes in the Windward Islands were responsible for a large number of deaths, noticeably much has changed over the years with more focus being placed on disaster reduction. The worse cases occurred in Dominica where hurricanes were responsible for 2,000 deaths in 1930, 40 deaths in 1979 but only 3 in 2001. However, it appears that whilst deaths are fewer, infrastructural damage has increased (Gibbs 2001). According to Gibbs (2001), this is due primarily to poor construction practices and settlement in vulnerable areas.

4.1.2 Atlantic Hurricanes 1984 – 2004

Statistics from Hurricane Alley (2005) show that the number of hurricanes occurring during the 20-year period being studied, has fluctuated significantly from as few as 6 in 1986 to as many as 19 in 1995. According to Wilson " the 1995 hurricane season in the Atlantic Caribbean region was the most active for 62 years with 19 tropical storms and hurricanes" (Wilson 2001:112). The most active months for that period were August and September in addition, hurricanes are known to have occurred outside of the hurricane season, in April 1999 and 2003, and December 1981 and 2003. The late 90's to the present has shown some years to have very active seasons with between 12 to 16 storms and hurricanes occurring (See table 4.1). The

year 2005 was also a record breaking year with the most storms ever recorded and some of the worst devastation in areas normally spared such wrath.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	**Tot**
Year													
1984								4	6	1	1	1	13
1985							2	3	3	2	1		11
1986						2		1	2		1		6
1987								3	3	1	3		10
1988								3	7	1	1		12
1989						1	2	4	2	1	1		11
1990							2	6	2	4			14
1991							1	1	3	3			8
1992				1				1	4	1			7
1993						1		4	3				8
1994							1	2	2		2		7
1995						1	4	7	3	4			19
1996						1	2	4	2	3	1		13
1997						1	4		1	2			8
1998							1	4	6	2	1		14
1999						1		4	3	2	2		12
2000								4	7	4			15
2001						1		3	4	5	2		15
2002							1	3	8				12
2003				1		1	2	3	4	3		2	16
2004							1	8	3	2	1		15
Total				2		10	23	72	78	41	17	3	246

Table 4.1: Tropical storms and hurricanes in the Atlantic area from 1984 to 2004 (http://www.hurricanealley.net/natlhst06.htm)

Data compiled by Burton (2005) showing the 100 km distance of these systems in relation to the Windward Islands, indicates that five of the systems which developed between 1986 to 1989 passed within 100 km of the Windward Islands. Four of the hurricanes and storms, which developed between 1994 and 1999 and eight during 2000 and 2004 passed within 100 km of the Windward Islands (see table 4.2). "For a radius of 200 miles from it's centre winds will be gale force. For a radius of 50 miles they are of hurricane speed" (Crawford 1992:158**).**

Year	**Dominica**	**Grenada**	**St Lucia**	**St Vincent and the Grenadines**
1986		Danielle		Danielle
1987				Emily
1988	Gilbert	Isaac, Joan	Gilbert	Isaac, Joan
1994			Debby	
1995	Iris, Marilyn		Marilyn	
1996	Hortense			
2000		Joyce		Jerry
2002				Lilli
2004	Jeanne	Charley, Ivan, Earl	Bonnie	

Table 4.2: Hurricanes and storms within 100km of the Windward Islands

Table 4.3 is a synopsis of some of the most destructive storms to affect the islands. The table also shows the main agents responsible for the damage and the sectors that were most affected. Although table 4.2 shows 17 named hurricanes and storms passing within 100 km of the Windward Islands only a few are highlighted in table 4.3. Therefore table 4.3 represents those events which would have caused significant impact as well as those for which documentation was available.

Name	Year	WI Affected	Dominant Hazard	Overall Cost of Damage	Sectors Mainly Affected	Comments
Tropical Storm **Danielle**	1986	SVG Dominica	Rainfall	Approx. EC$3.8m	Roads, water, electricity, bananas and other crops	Loan to SVG from CDB EC1.44m for rehabilitation.
Tropical Storm **Emily**	1987	SVG	Rainfall Flooding Landslides	Approx. EC$ 12.7 m	Agriculture, housing, marine infrastructure, road network, social and economic infrastructure	Emergency loan EC$ 104 m for rehabilitation of bananas.
Tropical Storm **Debbie**	1994	St Lucia	Rainfall, Flooding, Strong winds, Landslides	Approx. EC$ 200m, 60m for roads and bridges	Water supply, road network, agriculture mainly bananas and coconuts	75% of the island's water supply was affected
Hurricane **Luis**	1995	Dominica		Approx EC$ 175m	Agriculture mainly bananas and tree crops, housing, roads, coastal defences and the water systems.	
Hurricane **Lenny**	1999	St Vincent St Lucia Most Caribbean	Rainfall Storm surges		Marine infrastructure, roads	An unusual hurricanes affecting the usually sheltered coast of the islands
Hurricane Ivan	2004	Windward Islands especially Grenada	Storm surges Waves Winds	Over $US 815m, Grenada alone, over 1 billion $US dollars for the Caribbean.	Mainly homes and other infrastructure electricity, telecommunication, water supply, serious deforestation deaths in Grenada	About 85% of Grenada received damages.
Tropical storm/Hurricane Emily	2005	Windward Islands	Flooding Landslides	Over EC$ 300 m	Significant damage to housing stock mainly in Grenada and dependencies and St Vincent and the Grenadines. Minimal damage to bananas and some road blockage	Most assistance was sent to Grenada which had not fully recovered from hurricane 'Ivan' the previous year.

Table 4.3 Overview of impacts of most devastating hurricanes in the Windward Islands: 1984 to 2005

4.2 QUESTIONNAIRE FINDINGS

This section presents the findings of the questionnaire survey with community residents in St Vincent and the Grenadines. The purpose of the questionnaires was to find out how the public view the risk of hurricanes and risk reducing measures. The survey included a total of 90 respondents, 50 from communities in Georgetown and 40 from communities in Kingstown. The results were analysed using SPSS.

4.2.1 Background Information

In terms of the gender of respondents 35% were males while 64% were females, this is however not representative of the male/female ratio in the St Vincent and the Grenadines , which is about 51% males and 49% females. There was little variation in the percentage of male respondents from Georgetown (36%) and Kingstown (35%). There was a large proportion of female to male respondents from both areas, but there was little variation between Georgetown (64%) and Kingstown (65%), (See fig 4.1).

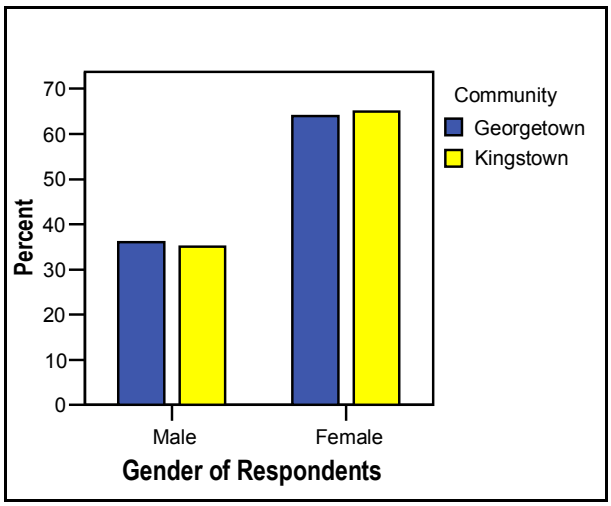


Figure 4.1: Gender of respondents by community

The respondents in the study were distributed between all age categories, however the demography of respondents is not representative of the age structure in St Vincent and

the Grenadines (SVG). According to the 2001 population census the smallest age group are those 45 years and over while age 24 and under make up the largest age group in the SVG population. In the field sample 32% of the respondents were aged over 54 while only 2 % of the sample population was less than 24 years old. The 25 - 35 age group comprised 17% of the total, 22% from the 35 – 44 age range and the 45 – 54 age range accounted for 15% of the sample (See figure 4.2).

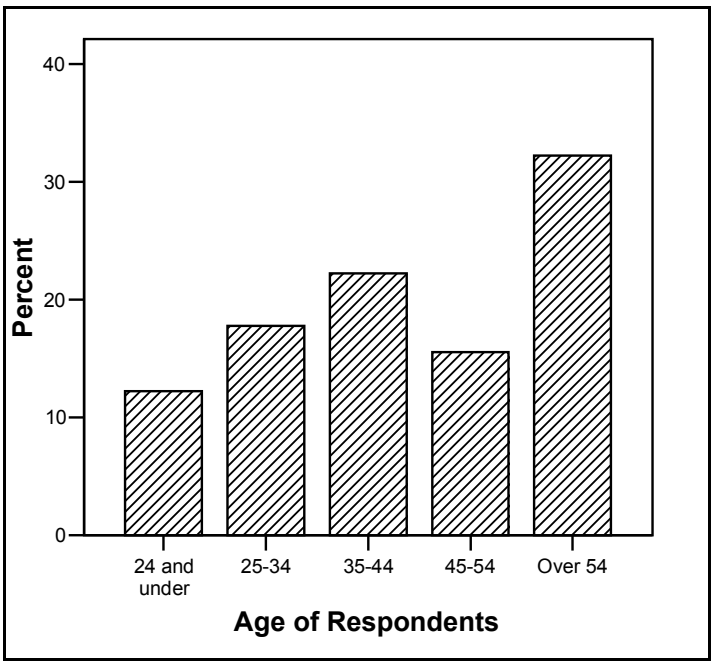


Figure 4.2: Age of respondents

There is little difference in the age structure of the respondents from within the two sampled communities, persons 24 and under, accounted for the smallest percentage in each sample, 5% of the Georgetown sample and 6% of the Kingstown sample. The largest percent of respondents in both communities is in the over 54-age group being 36% of the Georgetown sample and 28% of the Kingstown sample. In the Georgetown sample, 10% of the respondents are between 25 – 34 age groups and is 15% of the Kingstown sample. In the age group 35 – 44, the Georgetown sample is represented by 26% while the Kingstown sample is 18%. In the category 45 – 54,

14% of respondents are from the Georgetown sample and 17% from the Kingstown sample (see fig 4.3).

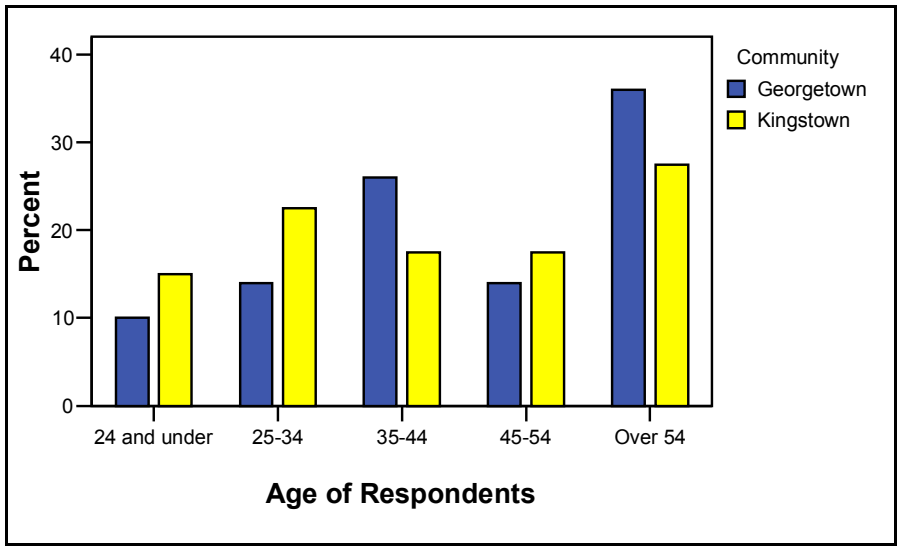


Figure 4.3: Age of respondents by communities

4.2.2 Education

Most of the respondents in the study had some formal education (97%). Those whose highest level of education attained is primary level, accounted for 53%, 28% had attained as high as secondary level education, 3% college level and 2% university level education (see fig 4.4).

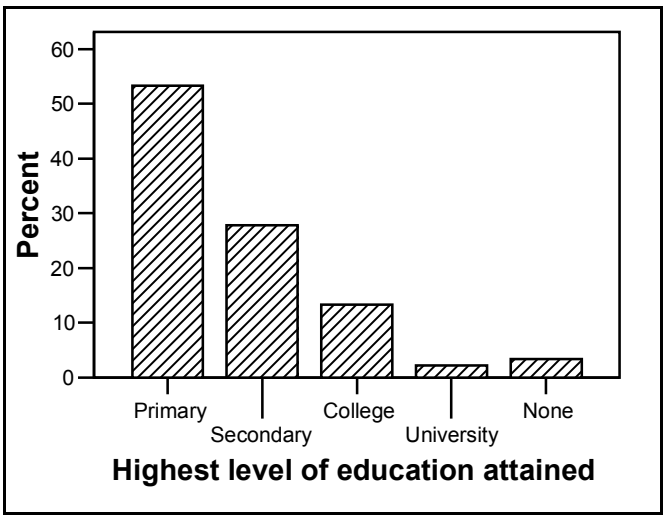


Figure 4.4: Highest level of education attained

In the Georgetown community 66% of the sample attained a primary level education while for the Kingstown respondents the figure was 38%. About 20% of the Georgetown respondents had attained secondary level education and 23% of the Kingstown respondents. Those respondents who achieve up to college level education represented 6% of the Georgetown respondents and 23% of the Kingstown respondents. In terms of attaining university level education this accounted for only 2% of the Georgetown sample and 3% of the Kingstown sample. About 6% of the Georgetown respondents had no form of schooling, (see fig 4.5).

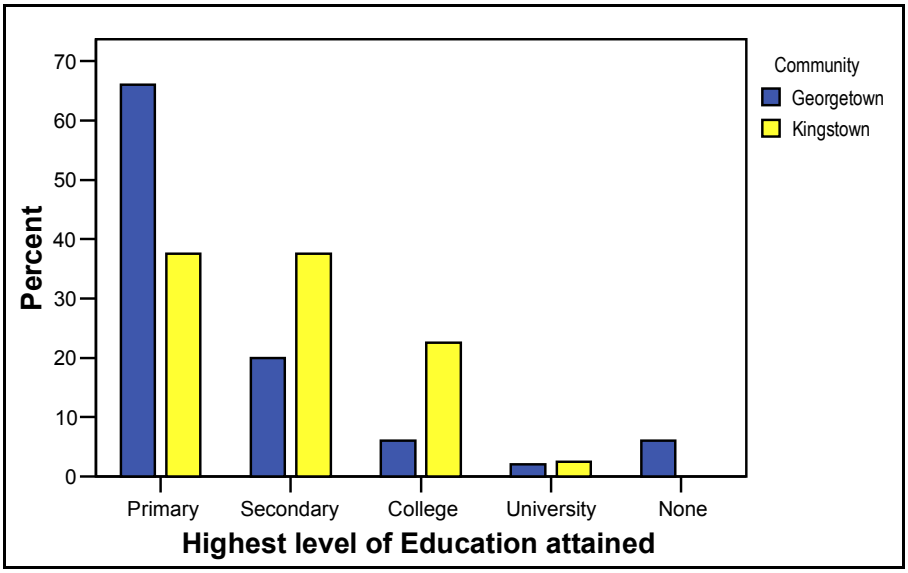


Figure 4.5: Level of Education by Community

In the cross tabulation of age of respondents and the highest level of education, most respondents in the over 54 age group, 42%, had attained only primary education. A number of respondents from the various age groups had attained up to secondary level education 32% in the 25 to 34 age group and college education 33% in the 24 and under age group. One respondent from the 24 and under and 1 from the 45 -54 age group had attained university education (see fig 4.6).

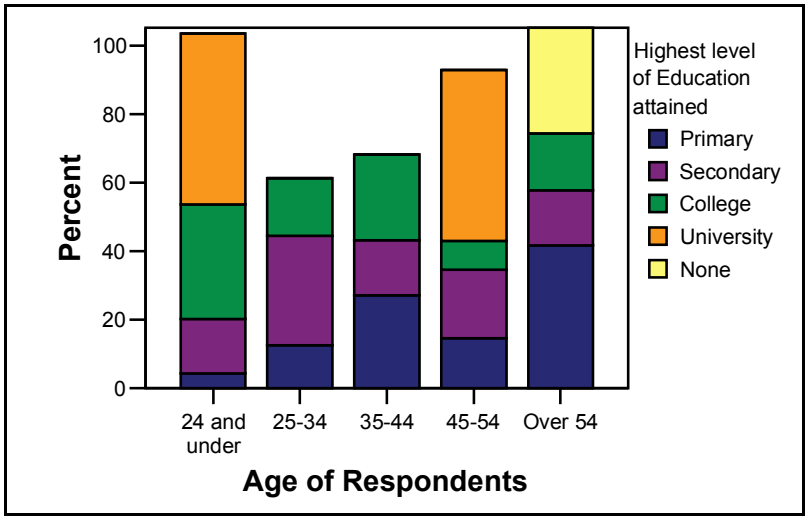


Figure 4.6 Highest level of education attained within different age groups

4.2.3 Housing

Housing is a critical factor in this study since the domestic sector is one of the most affected sectors during tropical storms and hurricanes resulting in a lot of human suffering. About 40% of the participants in the survey owned the properties in which they lived, while 32% lived on properties owned by their families. 22% of the respondents lived in rented properties, 2% lived in properties owned by the government and 3% lived in properties with other types of ownership such as a friend, or even unsure ownership status, (See fig 4.7).

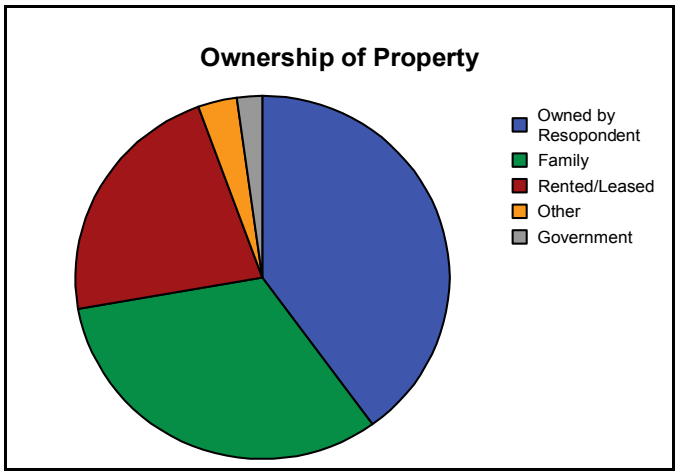


Figure 4.7 Ownership of property by respondents

The results indicated that 18% more persons in the Georgetown sample own homes more than for the Kingstown sample (48 % to 30%). There was greater disparity in terms of rented or leased accommodation where the Kingstown sample accounted for 32% more than the Georgetown sample, (8% to 40%). Residents who lived in properties owned by the government were 4% of the Georgetown respondents. About a quarter of the respondents from the study area lived in accommodations owned by their family, 13% more in Georgetown as oppose to Kingstown (38% to 25%). Other types of ownership such as friend represent a small percentage of each study population 2% in Georgetown and 5% in Kingstown (See fig 4.8).

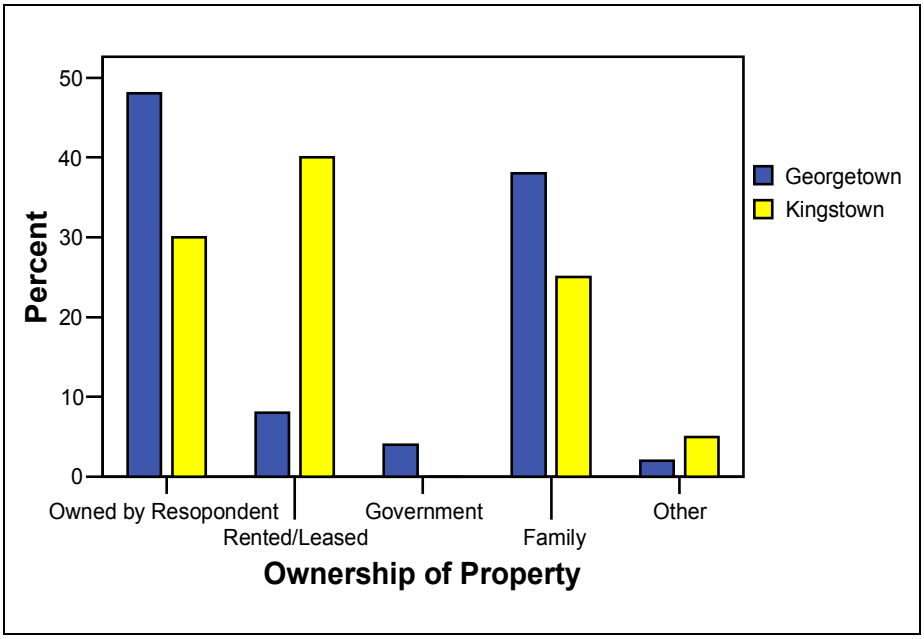


Figure 4.8 Ownership of property by community

Bricks and mortar accounted for the construction of most homes (64%), 28% were constructed from lumber and 8% were mixed material having had part of the home constructed from lumber and another part from concrete. The main roofing material used on homes was corrugated roofing panels used by 90% of the respondents while 10% used other materials such as asphalt or poured concrete. Most

respondent's homes had glass window closures while others, in particular wooden houses had wooden window closures.

Photo 4.1 Housing and roof structure in the study areas in St Vincent

Figure 4.2: Another type and very uncommon roofing tiles in St Vincent, note the more common corrugated sheets shown in fig 4.1

The results indicated that only 22% of the persons surveyed knew that the property they lived in was insured, while 76% claimed they had no insurance and 2% were unsure as to whether there was insurance on the property or not. This represents 18% of Georgetown respondents who knew their properties were insured and 28% of Kingstown respondents. In Georgetown 82% of those surveyed claimed there was no insurance on the properties they lived in while it was 68% of the Kingstown sample. About 5% of the Kingstown sample said they were unsure about the insurance status

of the home, (see fig 4.9). While there is no policy that stipulates that rented properties be insured some landlords may insure their properties. In some cases tenants may be unaware as to whether the property they reside in is insured or not by the landlord.

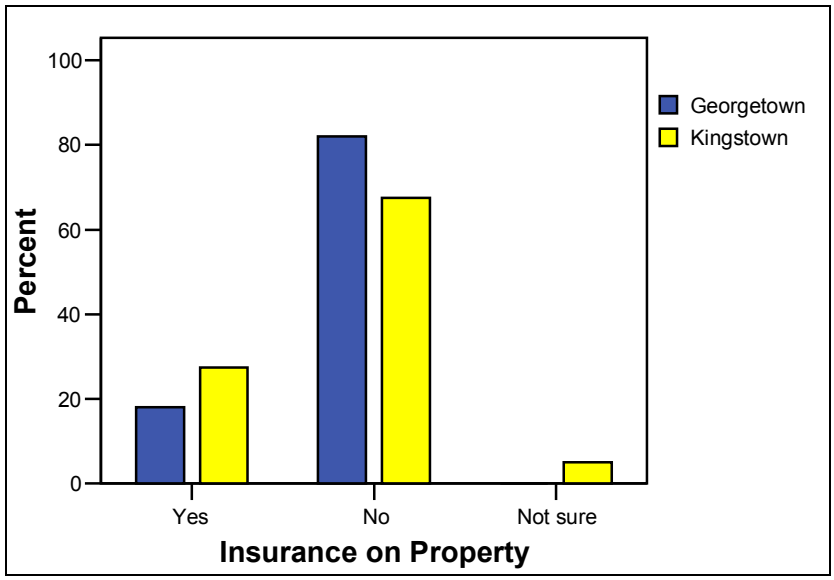


Figure 4.9 Insurance of property by community

In the cross tabulation of ownership of property and insurance, 33% of the persons who lived in their own property had insurance while 67% homeowners had no insurance on their properties. In relation to rented properties 10% of the respondents knew the properties were insured while 80% claimed there was no insurance on the property. About 21% of family owned properties were insured while 79% were not (see table 4.4). The persons residing in government properties claimed the properties were not insured, perhaps the government bears the cost of repairs.

Type of ownership	Property Insured	Property not Insured by occupant	Not sure if insured	Total
Owned by respondent	33.3 %	66.7 %	0 %	100 %
Rented/Leased	10 %	80 %	10 %	100 %
Family	20.7 %	79.3 %	0 %	100 %
Government	0 %	100%	0 %	100%
Other	0 %	100%	0 %	100%

Table 4.4: Table showing ownership of property and insurance cross tabulation

The persons who claimed there was no insurance on the property they lived were questioned as to whether they would consider getting insurance, 63% said "no" while 12% said "yes". The main reasons given for not considering insurance include; No need 2%, too costly 17%, not enough knowledge of insurance 8%, never thought of it 6% and others 32%. Some of the other reasons given include not the owner of the property, have to move soon, would not get insurance because of age or location of the home and one respondent said he was "insured in Christ."

4.2.4 Experience

73% of the persons surveyed claimed to have experienced a hurricane or storm before 26 % of the sample said they had never experienced a hurricane or storm. Persons were asked to give the number of hurricanes or storms experienced or their names, but most had no recollection. The significant storms mentioned were Janet 1955 (mostly respondents over 54), Alan 1979, Emily 1987, Lenny 1999, Lilli 2002, as well as Ivan 2004.

In the last hurricane season 2004, 50% of the respondents (not of the 76% who had experience) had damage to their property which included damage to roof or loss of the entire roof, damage to vegetation, flooded homes and damage to crops. About 2% lost their entire home and 1% stated other damage which included damage to retaining walls and landslides on their property. Those who did not receive any damage to their property during the last hurricane season accounted for 47%. During the last hurricane season, 21% of the properties sustaining no damage were insured while 74% were either not insured by the occupant or unsure about insurance status. In terms of the respondents who experienced damage to their property, 24% were insured while 76% were either not insured or not sure whether the property was

insured. All the homes that were completely destroyed and properties that had other damage were indicated as having no insurance coverage, (see table 4.5).

Damages from last hurricane season	Insurance on Property %			Total
	Yes	No %	Not sure	%
No damage	21.4	73.8	4.8	100
Damage to property	24.4	75.6	0	100
Total loss of home	0	100.0	0	100
Other damage	0	100.0	0	100

Table 4.5 Damage from hurricanes in 2004 and insurance

To determine the perception of hazards held by respondents they were given five hazards which are likely to affect the areas they reside in and were asked to rank them from 1 to 5, 1 being the most likely and 5 being the least likely. No answer was given by 4% of the respondents who were not sure how to rank them or did not think they could rank something created by nature. The results are shown in the table 4.5. The hazard with the highest percentage and most likely to occur as selected by the respondents was hurricanes, 68%, and the least most likely earthquake 2% (See table 4.6).

Hazard	1	2	3	4	5
	%	%	%	%	%
Hurricanes	67.8	16.7	8.9	2.2	0
Volcanic Eruption	11.1	40.0	14.4	13.3	17.8
Flooding	8.9	11.1	22.2	38.9	14.4
Landslide	5.6	15.6	23.3	20.0	32.2
Earthquake	2.2	13.3	26.7	21.1	31.1
No Answer	4.4	4.4	4.4	4.4	4.4

Table 4.6: Ranking of five major hazards by community respondents

4.2.5 Preparedness

In terms of the location of hurricane shelters 90% of the respondents knew where the nearest hurricane shelters were located, whilst 10% did not know. With regards to hurricane shelters, 11% had stayed at shelters in the past, while 89% had

never stayed in a hurricane shelter. Of the persons who had stayed in shelters 70% said the experience was good, 20% said it was very good and 10% said it was average. There is no clear indication of why the experience was generally good, an issue which should have been raised in the focus group meetings.

With regards to knowing what a hurricane watch is, 48% said they knew but only 44 % knew what to do when one was issued (see fig 4.10a and b).

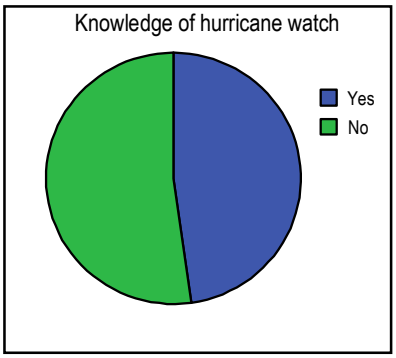


Figure 4.10a

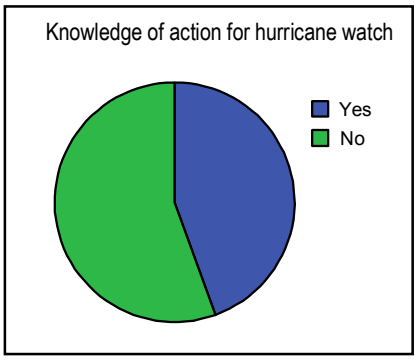


Figure 4.10b

On the other hand, 82% of the respondents said they knew what a hurricane warning is, while only 73% of those who knew were sure of what to do to effectively prepare themselves when such advice was issued (see fig 4.11a and 4.11b).

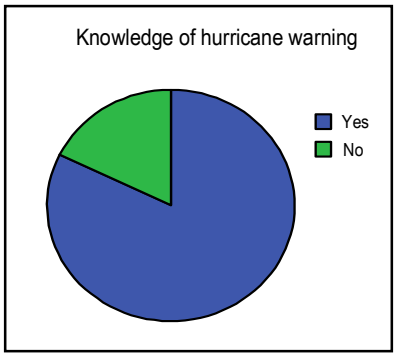


Figure 4.11a

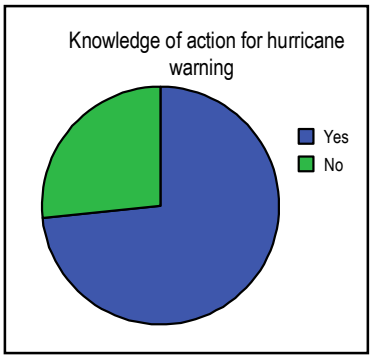


Figure 4.11b

Although the results above show that some 27% were unclear what action to take

when a hurricane was imminent; with regards to more general preparations, about 97% of the respondents make some form of preparation which include putting up door and window shutters, stored up supplies, although many said they only stored food if there was money available or that they needed the food daily so could not store up, secure important items in plastic, trim trees and clear drains. Only about 3% claim they made no form of preparation whatsoever. However, 74% of the respondents did not have a household plan so only 26% had a household plan for hurricanes.

In the cross tabulation of household plan and ownership of property, 26% of respondents with household plans owned the properties they lived in, 22% were rented or leased, 9% were government owned, 35% were family owned and 9% had other types of ownership, (see fig 4.12) .

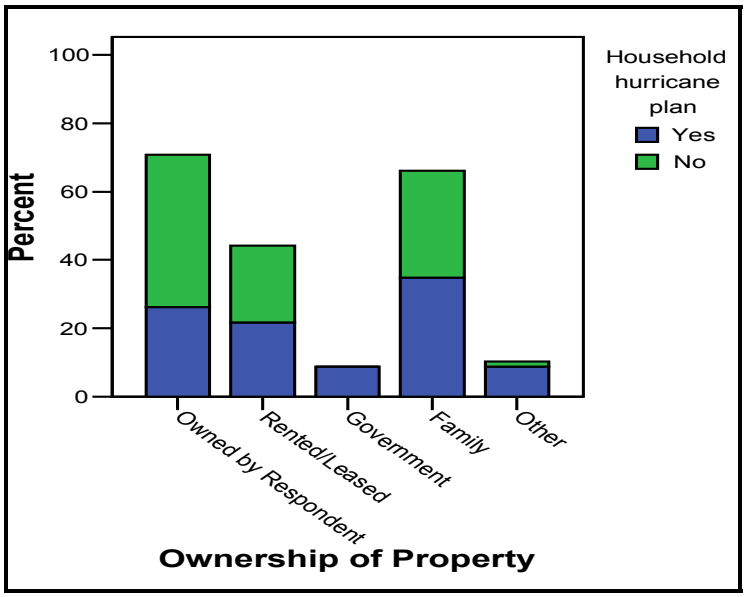


Figure 4.12 Ownership of property and household plan

The respondents were asked who, in their opinion issues hurricane warnings. 64% of the public said the Disaster Coordinator, 10% the Prime Minister, 10% the Constituency Representative, 12% the Radio Announcer and 3% said some other person. When asked if they got information from the disaster office on how to prepare for hurricanes 81% said yes while 15.6 % said no. This corroborates with

figure 4.11 and 4.12 where persons get information on hurricanes. Respondents said they received most information about hurricanes in general and during an event by radio (80%), 18% by television and 2% by other sources. During a storm or hurricane over 96% of the respondents stay tuned to their radios for updates.

86% of those surveyed would like to get more information on hurricanes from some source while 14% did not wish to get additional information. Approximately 43% of the respondents would like to receive information via the radio, 28 % via the television, 4% via newspaper, 6% via the internet and 4% other sources. In terms of whom they preferred or trusted source would be to get information from, 54% of the respondents said the Disaster Coordinator, 14 % did not give an answer or said it did not matter. 7.8% said they would like the information to come from the Prime Minister, 3.3% said the Constituency Representative, 10% Radio Announcer and 10% wanted information from prominent persons in the society such as police, school principals and nurses.

4.2.6 Response

Respondents were asked about their main action during last year's hurricane season, 74.4% said they secured their homes and stayed indoors, 11.1% left and moved to other communities, 8.9% went to a hurricane shelter, 1.1% did nothing but went about the day as usual and 4.4 % did other things such as go outside and observe what was going on (see fig 4.13)

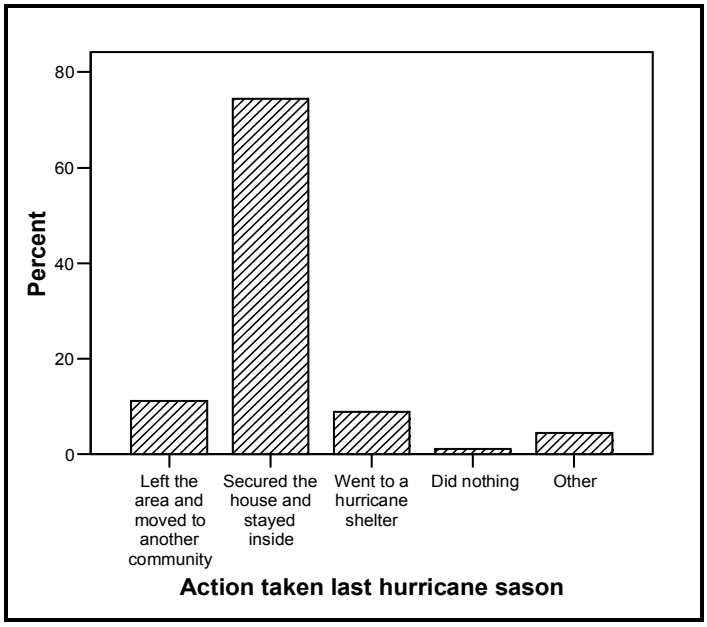


Figure 4.13 Action taken by respondents in 2004 hurricane season

4.2.7 Recovery

In response to how they will rebuild if their homes were damaged by hurricanes, 59% said they would wait for assistance from the authorities, 22% said they would try to rebuild on their own. 13% said they would seek assistance from family and friends and 6% said they would find other means of rebuilding such as crediting supplies from stores, (see fig 4.14).

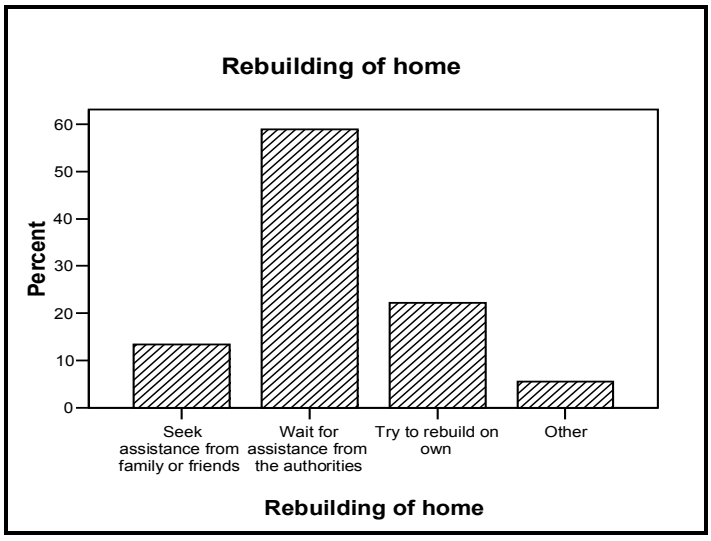


Figure 4.14: How persons would seek to rebuild destroyed homes

In the cross tabulation on measures of rebuilding their homes and damage from the 2004 hurricane season 11% said they would seek assistance from family and friends, 58% said they would wait for assistance from the authorities, 27% said they would try to rebuild on their own and 4% said they would seek other means of rebuilding. Those respondents who lost everything and those who had other types of damage to the property said they would wait for assistance from the authorities.

In correlating age of respondents and means of rebuilding after a hurricane or storm most people in all age categories plan to seek assistance from others including the government. This is especially significant in the over 54 age group (73%) and the 25 to 34 category (69%) of persons who would wait for assistance from the government to rebuild, (see tab 4.7).

Age of Respondents	Seek assistance from family or friends	Wait for assistance from the authorities	Try to rebuild on own	Other means	**Tot**
24 and under	27.3%	36.4%	36.4%	-	100%
25 – 34	12.5%	68.8%	18.8%	-	100%
35 - 44	15.0%	50.0%	30.0%	5.0	
45 – 54	21.4%	50.0%	28.6%	-	100%
Over 54	3.4%	72.4%	10.3%	13.8	100%

Table 4.7 Age of respondents and how they will rebuild after storms and hurricanes

Overall 59% of the respondents said they would wait for assistance from the authorities to rebuild, 22% said they would try to rebuild on their own, 13% said they would seek assistance from family and friends while 6% said they would find other means of rebuilding such as crediting supplies from stores.

4.2.8 Perceived Effectiveness

Respondents were asked if the information they received was adequate to help them to properly prepare for hurricanes, about 90% of the respondents answered in the affirmative. A large proportion of the respondents, 79% felt that the authorities are doing enough to inform people about hurricanes, while about 18% felt that enough

was not being done. In relation to the safety of hurricane shelters, 38% felt that shelters were safe, 28% felt that they were unsafe, 30% said that some were safe and 4% were not sure whether they were safe or not.

This section presented the perspectives of the public on hurricanes and some of the decisions people make in relation to such hazards. While it is clear that most persons own their homes, relatively few have insurance or household emergency plans but many make other immediate preparations to guard against hurricanes. While the public receives information from various sources there are some discrepancies in understanding warnings and what actions should be taken and when. Attempts will therefore be made in Chapter 5 to combine findings and concepts and theories reviewed in Chapter 2 to define how perceptions and factors affecting such may be the cause of some of the discrepancies in the choices people make. In the following section (4.3) the key findings from interviews with practitioners are presented and results compared with the public survey responses.

4.3 INTERVIEWS WITH PRACTITIONERS

The purpose of the interviews with practitioners was to attain the perceptions of the practitioners and other professionals in organisations which provide support in disasters in the Windward Islands in relation to hurricane risk and risk reduction strategies. For the purpose of this study practitioners are the persons responsible for the operation of agencies which play an active role in the disaster cycle at different stages or a representative selected by this person. Participation in the research was received from 17 of the 22 targeted interviewees.

4.3.1 Disaster Management Organisations: Windward Islands.

This section presents some of the organisations, which collaborate with the National Disaster Organisations to activate the National Disaster Plan and respond during national emergencies. A number of the organisations such as the Red Cross and Cadets also conduct training in areas such as mass casualty management, disaster preparedness and vulnerability assessment. The persons who head these organisations are therefore responsible for making decisions on behalf of their organisations or agencies during national emergencies or as members of the National Disaster Management Committee hence the term practitioners. This section also highlights the major role of the organisations in risk reduction and disaster management as a whole.

Table 4.8 displays the organisations that were included in the field data collection from both St Vincent and the Grenadines and St Lucia, their roles in risk reduction and collaboration with other organisations in carrying out these roles.

1. Pan American Health Organisation – Caribbean Branch	
Major Roles: The major role of PAHO is to ensure international coordinated assistance in health before (if possible) or immediately after a disaster, to guide all assistance to those who need it. **Works with**: Affiliated with any organisations mandated by the country involved including CDERA, UNDP, UN which is their umbrella agency and donor agencies such as CIDA – Canadian, EU – Commission (ECHO)	
St Vincent	**St Lucia**
National Emergency Management Organisations (NEMO)	
2. Major Roles: Coordinate all responses necessary for many emergencies and disasters. The lead agency for matters pertaining to disaster management which includes ensuring the country is involved in mitigation activities to coincide with developing planning. **Works with**: Government ministries - communication and works, public works, solid waste, health, Agency for Public Information, tourism, national necurity, Social Development. Red Cross, Girl Guides and NGO's, district committees	**3. Major Roles** Prepare the country for any event, work along with all organisations that have an interest in disasters. **Works with**: All permanent secretaries, national committees: DANA, SUMA, transport, telecom, welfare, shelters, works, oil spills, hospitals, crisis unit, district committees (18), national hazard mitigation committees, Chiefs – fire, police, medical, met office, customs, cadet corps, government liaisons officers.
Ministry of Planning	
4. Major roles: Project implementation of disaster mitigation. Emergency recovery projects, disaster management project- financial and procurement responsible for education development programme and HIV/AIDS prevention and control. **Works with**: NEMO, Government ministries - education, social development, health, agriculture and world Bank	**5. Major Roles**: Ensuring that buildings are approved to construction standards. No code in effect to enforce as yet. There is a draft of the building code that has not been passed however recommendations have been made by the department. Approved land use development. Land use policy. **Works with**: NEMO
Housing Ministry/Division	
6. Major roles: The main focus is on drainage in all areas and the anchorage of roofs. Housing projects ensure cost of housing is cheaper. **Works with:** Work in partnership with NEMO to construct houses for persons who lost homes due to hurricane 'Ivan' in 2004.	**7. Major Roles**: Housing and policy decision. Anything to deal with structural integrity and the built environment. Housing planner. Develop and produce manuals for building inspectors, lend assistance to national land policy. **Works with:** sit on committee for NEMO.

Volunteer – Cadet Force	
8. Major roles: Assist at the emergency operation centre and warehouse. **Works with:** Red Cross, police, girl guides, and other volunteer organisation as well as NEMO	**9. Major Roles**: Part of the supply management committee responsible for the distribution of all supplies to the island for relief. **Works with:** NEMO, Rotary, Service Clubs, Lions Club, Kiwanis, SDA, disaster organisation, chamber of commerce. Works with Red Cross in the first 72 hours to assist in feeding and then with the national committee.
Private - Insurance	
10. Major Roles: To provide compensation for clients and country **Works with:** NEMO for risk management and building codes.	**11. Major Roles**: Vital role of the recovery after the hurricane, financial assistance in reinstating after hurricane or government would have to assist. **Works with:** NEMO committee
Volunteer - Red Cross	
12. Major roles: Shelter assessment. Sit on the disaster community set up by NEMO. Care of shelters including managers for evacuee, damage assessment. Tracing – finding family members. Communication Taking care of people, procurement – food. First 72 hours after the disasters responsible for managing shelters. Advisory committee- emergency, executive committee, damage assessment committee, health services and voluntary services. **Works with:** Ministry of education, Ministry of communication and works, NEMO	**13. Major Roles**: Training in disaster management and preparedness, support micro projects, community work, organised communities for response and preparedness. Mitigation exercise, risk reduction and vulnerability and capacity assessment. **Works with:** organisation that shares the same interest such as cadets, church groups, community groups, contract by government.
14. Ministry of Agriculture	**15. St Lucia Police Force**
Major Roles: Managing government facilities. **Works with:** NEMO	**Major Roles**: Protection of life and property, trained in risk reduction strategies, provide relief to affected persons in the community. **Works with:** NEMO, fire and community groups and subgroups
16. Ministry of Tourism, cultural division	**17. Radio St Lucia**
Major Roles: Public awareness, being part the public service human resource for response. **Works with:** NEMO	**Major Roles**: Public education and awareness critical of national emergency broadcast system. **Works with:** NEMO, department of information services.

Table 4.8: Organisations represented by interviewees and the role of the organisations in Disaster Management/Risk Reduction

4.3.2 Major Hazards: Interviewee's perspectives

The practitioners and other professionals were asked to identify the major hazards affecting the Windward Islands in particular SVG and St Lucia. In addition they were asked to highlight the hazards responsible for most devastation. The following are the hazards identified by the interviewees and the number of respondents who considered them to be of major significance. All answers were based on the interviewees perspectives since the questions were all open-ended allowing them to give their own perspectives.

A Major Hazards according to interviewees

Major Hazards	No of respondents
Hurricanes and tropical storms	17
Flooding (some triggered by poor road and drainage maintenance)	12
Landslides	8
Volcanic eruption	7
Fires – bush and property	6
Hazards which result from poor housing and other buildings and building in river beds and unsafe area	5
Drought	2
Hazards associated with deforestation	2
Poor land use	1
Garbage disposal problems	1
Prolong rainfall outside the hurricane season	1
Fishing incidents	1
Violence	1
Vehicular accidents	1
Strong winds	1
Invasive pests	1

Table 4.9: Major hazards identified by interviewees

The interviewees identified a number of hazards which were likely to affect the islands, these were grouped into 16 categories as presented in table 4.9. Hurricanes were identified by all interviewees as one of the major hazards, flooding was the second most common, practitioners included flooding both during and outside the hurricane season in this category. Landslides were also considered as significant by almost 50% of the interviewees, several made the connection between landslide triggered by factors such as deforestation and poor land use.

B Hazard responsible for most devastation

Hazard responsible for most devastation	No of respondents
Hurricanes and resulting hazards	**14**
Flooding and landslides	1
Volcanic Eruption	1
Fires	1

Table 4. 10: Hazards causing most devastation according to interviewees

In relation to the hazard that was responsible for most devastation on a countrywide basis, all but three of the practitioners said "hurricane" while the others were divided between flooding and landslides outside of the hurricane season, fires and volcanic eruption. It must be noted that all the Windward Islands are volcanic Islands and there still exist active volcanoes on all of these islands. It is noteworthy that both the practitioners and the general public are concerned about the destructive effects of hurricanes and despite the existence of other major potential hazards, the majority think that hurricanes are the most significant.

C The most destructive agents of storms and hurricanes as perceived by Practitioners

Most destructive agents of storms/hurricanes	No of Respondents
Combination of wind and rain	8
Wind	4
Storm surge	3
Rain and associated flooding and landslides	2

Table 4.11: The destructive agents of storms and hurricanes

In relation to which destructive agents in a hurricane have been responsible for most devastation over the last 20 years, just over one third of practitioners felt that it was is a combination of wind and rain. However, mention was made of hurricane Lenny that caused storm surges in St Vincent and Tropical Storm Debby, which did a lot of coastal damage in St Lucia. The impacts of these storms have been presented in more detail in the historical analysis, table 4.3.

Many practitioners and other interviewees emphasized the point that there are too many unplanned settlements along the coast, destroying these areas and increasing

the risk of damage from storms and hurricanes even if of very little strength. While it is quite clear that the Windward Islands are vulnerable to a number of hazards, both natural and human induced, hurricanes make more of an impression/impact on persons in the region. The geography of the Windward Islands in addition to other factors has led to very populated coastal areas exposed to all the destructive agents of a hurricane.

4.3.3 Communication of hurricane information

Practitioners and other interviewees were asked about their perceptions of the warning systems in place for storms and hurricanes and how in their opinion the public responded to these systems. The practitioners and other interviewees were then probed for their perception of the role of the media in the transfer of information to the public on how to effectively prepare for emergencies and disasters

A Warning Systems

In relation to the functioning of the warning systems for hurricanes there was a general consensus from practitioners that while the present systems were functioning there was much room for improvement. It was however stressed that there was a need for earlier warnings, NEMO (St Lucia) recalled that with "Hurricane 'Lilli', the rain came in the hills and caused flash floods hence this caught many persons unprepared" (Disaster Coordinator, St Lucia).

Another important point that was raised by several of the practitioners was that while there was a functioning system in place for hurricanes they were concerned that there were few systems in place for other hazards. It was also emphasised that the warning system has not been fully tested because there has not been a major hurricane in most of the islands in recent years.

B Percentage who receive warnings

Practitioners and other interviewees were asked to estimate the percentage of the public who received warnings and to describe the general response to such warnings, most agreed that approximately 80% to 90% receive warnings. It was felt that being such a small society that information spreads quickly so those who do not get the advice directly from the authorities would get it from others in the community.

Just about half of the interviewees claimed that there was some degree of complacency by the public, especially since there had not been a major hurricane for a number of years. The Ministry of Planning representative commented that "The response is generally poor, with the attitude that it won't happen to us" while the National Red Cross representative remarked that "when nothing happens, people say this is a blessed country".

In St Lucia, the warnings and advice were broadcast in both English and French Creole to cater for the bilingual nature of the population. Some practitioners felt that the impact of hurricane 'Ivan' on Grenada in 2004 might change the attitude of the public, while others said that these things are quickly forgotten or viewed as isolated incidents. It was apparent that information was passed on to the public with regards to pending hurricanes and storms, however very little was done prior to the hurricane season. The major concern is that while the information gets across to the public many do not heed these warning and is of the view that nothing will happen.

C The functioning of the media

All the interviewees viewed the role of the media as integral in the dissemination of information to the public. There are indications that there has been some improvement in media coverage over the last 20 years; it was stated that while they are presently doing a good job there is still room for improvement. Radio is

deemed to be of particular importance since it is one of the most widely available media and a battery-operated radio becomes the most reliable means of communication during a hurricane.

Interviewees from the media and National Disaster Coordinators raised concerns about the recent attempts by persons in the media to give live coverage. They do not see this as a good practice because it gives the public the impression that it is safe to venture out during a storm. There is also concern about call in programmes hosted by radio during hurricanes where persons call in and give false information, practitioners believe this is a very dangerous practice.

There is therefore a call from the interviewees for an improvement in the quality of media programmes and the transfer of correct and adequate information to the public. It was also indicated that the media need to do a lot more outside of the hurricane season and find innovative means of incorporating information that would appeal to all audiences. It was also suggested that they need to work more closely with the national disaster organisations and other agencies. In St Lucia, the National Disaster Management Organisation has a two-way telephone system with the radio station for easy access and transfer of information between the National Disaster Director and the radio announcer. While this is a very important link in communication, the radio personnel admitted that the system must be improved for more effective communication to take place.

While the media is actively involved in the transfer of information in relation to storms and hurricanes in the Windward Islands, radio plays the most significant role, however, there is a lot more that should be done. This vital since the survey with the community respondents indicate that 80% get most information about hurricanes

via the radio and about 97% listen to the radio for information during storms and hurricanes, more detailed information is available in sec 4.2.

4.3.4 Risk reduction

In an attempt to determine whether the strategies implemented are effective in reducing the impact of hurricanes, interviewees were asked to outline some of the mitigation strategies they promoted. They were also asked to highlight some of the challenges encountered in trying to implement the strategies. Their views on where the focus of mitigation should be directed were also investigated.

A Views of work done by the authorities

Respondents were questioned about what the National Disaster Authorities are doing to prepare the population for hurricanes and the trigger effects. About one quarter of the practitioners felt that the work being done by the authorities responsible for disaster management and risk reduction was very good while the majority felt that enough was not being done. A point that has been highlighted by many practitioners is that while a lot is being done there is need for major changes in the attitude of the public for any positive impacts to be made. One of the practitioners who commented, "People do not listen even when other countries are seriously impacted, they easily forget" (Practitioner). In addition, it was said that the funds are not always available to do all that is necessary to reduce risk and build community capacity.

One of the major changes in disaster management in the Windward Islands is the employment of fulltime Disaster Coordinators with disaster as their sole responsibility. This replaced the part-time coordinator who worked in a government ministry and had disaster preparedness as an added responsibility. Hence very little was being done in relation to risk reduction but more for response. According to the

practitioners while there have been improvements in hazards and disaster plans there is need for a lot more planning and testing of these plans. While it was felt that the governments in the islands have been very supportive it is felt that they are not always ready to undertake mitigation measures and are more concerned with short term results. In conjunction with government support is the need for updated building codes, policies and legislation to endorse these mitigation programmes.

Most of the interviewees, in particular those from the government agencies, work along with the national emergency management organisations in the different islands and from the response there has been significant improvement in disaster management but there is always room for improvement. This view is supported by the community survey with 81 % claiming that they receive information from the disaster office in relation to appropriate actions for mitigation and preparedness for hurricanes in St Vincent and the Grenadines.

B Focus of risk reduction

Education was considered by two thirds of the interviewees, including the disaster coordinators and the various government ministries, as the focus of risk reduction programmes. Practitioners, in particular in the planning and housing ministries, felt that the focus should be on the implementation of standards, policies and building codes and the legislation to enforce them. Others believe that the focus should be on;

1. Building government and community capacity (Tourism Representative).
2. More innovative programmes, using experiences from past events to "get the message across" (Insurance Representative).
3. More collaboration between the relevant agencies, it was felt that there was too much focus on individual praise and personal interest, with people trying to "out do each other" (Disaster Coordinator).

4. Improvement in infrastructure and maintenance of roads, drainage, controlling rivers near vulnerable settlements (Red Cross Representative).
5. Need for more insurance and more support by insurance companies (Housing Representative).

C Challenges to risk reduction

The major challenges to risk reduction that were highlighted by the interviewees included:

- Lack of interest by the general public it is "only after things go wrong they want to listen". (St Lucia National Radio).
- Lack of legislation; so even if there are planning and zoning rules in place they are not enforced and even some legislation is not enforced. So many squatter settlements proliferate (Housing Representative).
- There is an additional cost to the consumer to construct according to building codes and it is the poor who will suffer as a result (Housing Representative).
- The attitude of the public "God will protect us" so there is the need for constant education. They need to accept more responsibility (Red Cross).
- There is more interest in the short term rather than the long-term solutions (Insurance Representative).
- Lack of resources to fund long-term mitigation strategies, and the timeframe to implement them, since the hurricane season occurs every six months (PAHO Representative).
- There is the need to be more proactive rather than reactive (Cadet Force, Police Force, Planning)
- Government and politicians rhetoric and inaction: not willing to invest in mitigation programmes. The partisan political atmosphere also affects the

implementation of mitigation programmes. Political cycles force short term planning. (Planning Representative, Disaster Coordinators, Volunteers)

D Funding for risk reduction strategies

The major sources of funding for mitigation strategies are generated from: national government, organisations, fundraising activities and private enterprises and loans from various lending agencies such as the CDB. There are also contributions from regional governments and organisations, which include CDERA, PAHO and CDB. A lot of the funds comes from international organisations such as; OFDA, ECHO, CIDA, CEPEC, EU, USAID, IFRC, US Army, FACIA, World Bank. Most of the practitioners, in particular the Disaster Coordinators, the PAHO Representative and the Red Cross Representatives indicated that the funds are not enough to cover the vast amount of work involved in risk reduction; but that they used it in the best possible way. It was also noted that the funds mainly address the emergency need, which last only for a period of 6 months, and often do not focus on long-term reduction programmes. It was further mentioned by the PAHO that there is a critical need to address vulnerability on the long-term basis a task left up to the government and one they often cannot afford.

4.3.5 Vulnerable groups

Interviewees were asked to give their views on who they considered as the most vulnerable group to disasters in the study areas. They were then asked whether they were aware of any programmes in place that will be implemented to address the needs of these vulnerable groups. Respondents generally discussed the programmes that were undertaken or planned by the organisations they were representing.

A Most Vulnerable groups according to practitioners

Most Vulnerable groups	Count
Poor – live in vulnerable areas in poorly constructed homes.	11
Old especially those who live alone.	7
Children especially the very young	6
People who live on coastal areas and squatters	3
Women	2
Farmers	1
Homeless	1
Disabled	1
Everyone	1

Table 4.12: Vulnerable groups identified by the Interviewees

B Addressing Vulnerability

There were a number of vulnerable groups identified by the interviewees (see table 4.12), the poor were considered most vulnerable by the volunteer organisations, the regional representative and most of the government ministries and the National Disaster Coordinators. It was felt that they were especially vulnerable since they often construct substandard homes in unsafe areas.

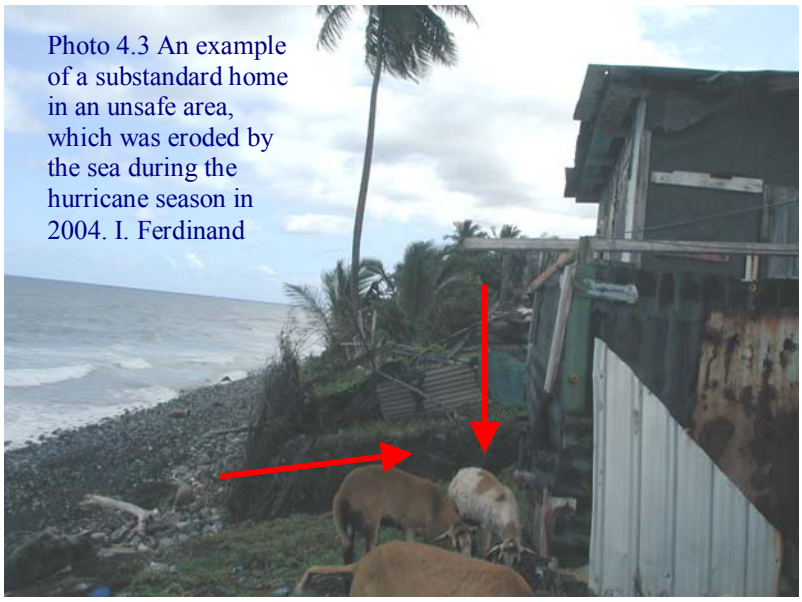


Photo 4.3 An example of a substandard home in an unsafe area, which was eroded by the sea during the hurricane season in 2004. I. Ferdinand

The Red Cross, the Ministry of Planning, Tourism and Agriculture Ministries, Insurance representative and one Disaster Coordinator considered the old as being among the most vulnerable. The other most vulnerable group were children

especially the very young, regarded as so mainly by the Disaster Coordinators, Red Cross, Tourism and the Insurance Representatives. The Housing Ministry, in particular, was concerned about people who reside on coastal areas and in squatter settlements.

The Housing Representative in SVG felt that a lot is being done to address the problem of housing in St Vincent and the Grenadines, with the construction of low-income homes. There are also a number of relocation programmes to remove people from coastal and vulnerable locations, mainly in St Lucia. The housing division in St Lucia, highlighted several programmes, which include: PROUD a programme which deals with the transfer of land ownership in squatter settlements to the residents. There is also a training programme for construction workers, this is done in conjunction with the Sir Arthur Lewis Community College.

Respondents from the planning division in St Vincent stated that work is being done to upgrade drainage, control rivers and construct breakers in many coastal areas. The World Bank is currently funding these programmes in the Windward Islands, work has already started in St Vincent and is further highlighted in Chapter 6.

The Red Cross organisations in the islands felt that the elderly were very vulnerable especially if they live alone and in some cases they are not willing to make changes and adapt to change and mitigation efforts. These Red Cross organisations indicated that they assist these persons during times of disaster in term of moving to shelters and address other needs. Only one organisation mentioned the disabled and homeless, who are often ignored in disaster planning.

The issue of children, especially the very young, being left unattended in times of disaster was also addressed, in a number of cases children have been washed away by rivers or flood waters. This is quite significant since the community survey shows

that over 70 of the families surveyed did not have a household disaster plan for hurricanes. It is apparent from the interviews that practitioners believe that poverty is a significant factor in the effective implementation of mitigation efforts in the Windward Islands.

5 ANALYSIS AND DISCUSSION

This chapter presents a broad analysis and discussion of the results in the preceding chapter, pertaining to the varying perspectives of hurricane risk and risk reduction strategies. The perception of the public and practitioners will be reviewed for discrepancies, which will be explained with theories put forward in the literature review. The chapter will also examine vulnerability to disasters and possible causes of such vulnerability. In addition this chapter will give a synopsis of communication of information, preparedness for hazards, perceptions of shelters as well as agency collaboration as part of the disaster management process.

5.1 HAZARDS IN THE WINDWARD ISLANDS: PERCEPTION OF HURRICANES BY THE PUBLIC AND PRACTITIONERS.

Many studies have concluded that perceptions of hazards are important in determining how people will behave and make decisions (Gough 2000; Fordham and Ketteridge 1995; Krasovskaia 1995). Different people perceive things differently and their choices will reflect those differences (Weber and Milliman 1997). Despite that, practitioners need to understand the perceived or personal risk of the community before they can engage them in effective risk reduction measures.

The Windward Islands are prone to a wide range of hazards, the major ones identified by the literature include flooding, hurricanes and storms, earthquakes, volcanic eruptions and droughts The fieldwork conducted for this research shows overwhelmingly that both practitioners and the public consider hurricanes as the most likely hazard to affect them. This view is supported by the CARICOM Secretariat report (2003) and Burton (2005) a representative of the CIMH (2005). However while

practitioners ranked flooding as the next most likely hazard and volcanic eruption thereafter, this perception is not shared by the public in St Vincent. The public ranked volcanic eruptions as more likely than flooding which is ranked third. This view could possibly be influenced by the fact that the study area, Georgetown is home to La Soufriere volcano which last erupted in 1979 and is likely to erupt again. Although proximity to a hazard is not a well researched variable, it has been found to be significant in helping to shape perception (Gregg 2004; Peacock 2004).

Whilst hurricanes are frequent and notable in their cumulative impacts, perhaps a volcanic eruption might be lower in frequency but higher magnitude and therefore could be more devastating. Volcanic eruptions can also last for several years as in the case of the Montserrat Volcano, which erupted continuously for 2 years (Monastersky 1997). While there is a volcanic emergency plan in St Vincent, last dated 1985, there is no recent hazard assessment for volcanic and other hazards in SVG. This being the case it is difficult to say who has the accurate perception of hazard risk. Hence, one of the recommendations that will be highlighted in Chapter 6 is a review and development of an appropriate methodology for assessment of hazards in an area prone to complex natural hazards.

The methodology adopted for this research used structured questions to conduct a survey with the public on likely hazards while using open-ended questions for the practitioners. The practitioners highlighted about 16 hazards while the public ranked the five major hazards identified by the literature, from most likely to least likely. It would have been ideal to have the public identify the hazards they thought were of major significance so they could articulate "personal risks" freely. Instead a group of 5 hazards were compiled based on feedback from the practitioners and the literature as those more frequent and likely to impact the public. A different approach

would give a better understanding of the sort of and level of risk that are perceived as acceptable to the public and the risk reduction measures they will be willing to undertake (Slovic 2000).

A study of volcanic eruption by Davis, Ricci, and Mitchell (2005) found that residents closest to the Vesuvius and Etna volcanoes in Italy were actually more concerned about crime and overcrowding and other social problems rather than a future eruption. It is important to establish these risks since several studies have found that they influence the willingness to apply risk reduction measures (Peacock 2004). Drabeck (2004:50) considers such behavioural concerns of persons as reasonable,

> a framework that researchers call "bounded rationality" that is, individuals try to process whatever risk related information they have at their disposal. Unfortunately, that processing often reflects ignorance and misinformation about the actual risk of danger and even the meaning of terms used by the media and meteorologist.

Hence communication of information will be discussed later as an important tool in influencing hazard perceptions and reducing risks to hazards.

While all the stakeholders perceive hurricanes as very likely to affect them, they appear to under perceive the intensity and severity of these systems. This can have serious implications for the pace and level of adoption of risk reduction measures. The literature advocates an increase in the number (see table 4.3) and intensity of storms and hurricanes expected each year (see fig 5.1). This increase in intensity and duration has been attributed to climate change which means "sea level is rising and will continue to rise as oceans warm and glaciers melt. Rising sea levels means higher storm surges, even from relatively minor storms, causing coastal flooding and erosion and damaging coastal properties" Union of Concerned Scientist [UCS] 2006:np) (see fig 5.2).

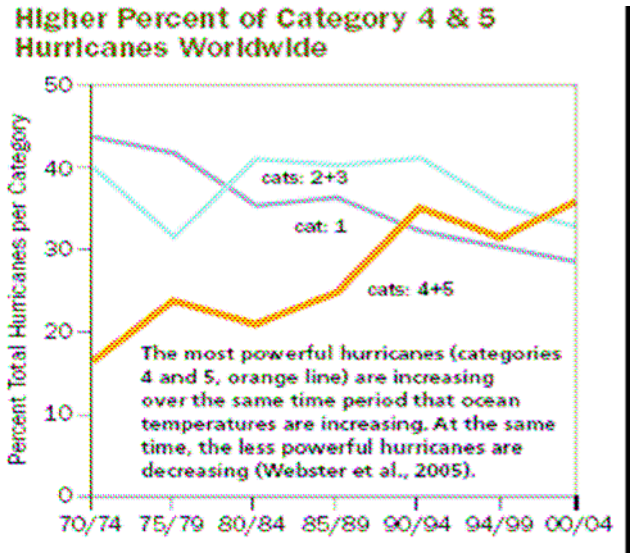


Figure 5.1 Increase in the intensity of storms. Adapted from UCS (2006:np)

With this trend estimated to continue for the next 10 to 40 years, as suggested by Goldenberg *et al* (1991) adjustments in perception of both public and practitioners is essential to effect change in risk reduction measures.

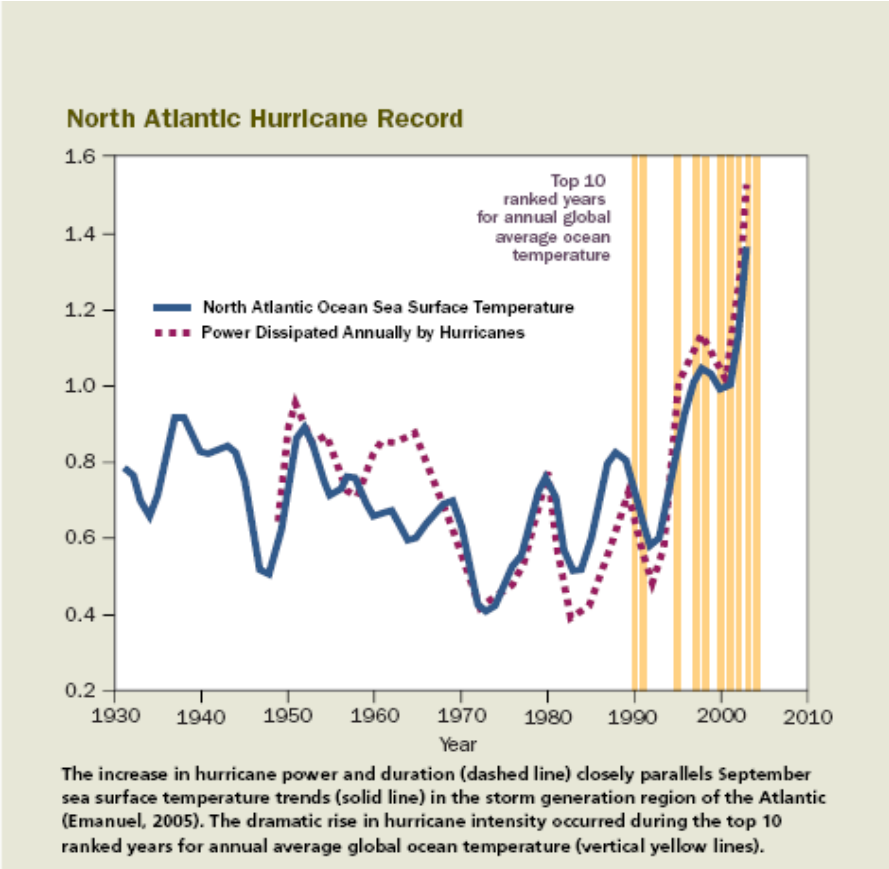


Figure 5.2. The increase in the duration and intensity of storms with climate change Adapted from UCS (2006:np)

5.2 CAUSES OF DISASTER: DISASTER AND VULNERABILITY

The literature suggests that one of the major causes of disaster is vulnerability which may exist in various aspects of social life. Some aspects of vulnerability highlighted include social, political and economic (Cross 2001). So "in order to raise awareness of a particular risk within a community it is necessary to consider many of the specific social, cultural and psychological issues that are present within it (Horman 2001:15).

5.2.1 Age

Tobin (2005) considers age as a significant factor in disaster planning especially regarding the elderly. This is a view that is supported by a number of the practitioners interviewed who consider the very old, as well as young children, as vulnerable groups in the Windward Islands society. Despite this, many homes still do not have family emergency plans which can leave these persons in an awkward situation not knowing exactly what to do thus increasing the chances of being left traumatised after the disaster or losing their lives. Those responsible for mitigation can sensitise children in particular to increase awareness in homes. Patel (2005) concluded that had Asian children been more informed and aware more lives could have been saved in the Asian tsunami 2004. He further surmised that

> Children are effective messengers to deliver this type of information and awareness to remote communities. In addition, playing an active role in the face of a disaster can mitigate many of the psychological traumas such as shock, helplessness and guilt that children face in the aftermath (Patel 2005:1).

The data collected from the field showed that the age group 45 and over represents the largest percent of the sample population but is actually the smallest fraction of the population of SVG. Their representation is due mainly to the fact that the study targeted persons responsible for the home to obtain the type of information

that was required. In addition many homes consisted of extended families or older persons living alone. This however does not mean that these are the persons who will take an active part in community based programmes or influence risk reduction strategies but they might well be.

The older persons in the study considered Hurricane Janet 1955 as the last major hurricane, while the younger persons claimed no major storm experiences during their lifetime. However this view by older persons could be attributed to the value that they place on human lives rather than on material or monetary assets. They would have survived what was considered a major hurricane and so have a sense of security that they have "weathered the storm". So even though there are other storms and hurricanes that are more devastating in terms of economic and infrastructural losses they may not be perceived as major by some older persons in the society.

5.2.2 Gender

Research has found that men and women react differently in times of disasters, women tend to be the ones who prepare and take care of the family and are often more stressed than men (Tobin 2005). While the study did not focus on gender issues, where both sexes were present in the home the woman was encouraged by the man to participate in the survey hence the field data shows a larger response rate for females than males. This trend could be as a result of the traditional roles of men and women in the homes where men go out to work and women were responsible for taking care of the home (UN/ISDR 2002). In support of this view PAHO (2005 n.p) affirm that "women are made more vulnerable to disasters through their socially constructed roles".

Despite the fact that traditions are changing and so the roles of women, they are still considered as caretakers of the home and are likely to suffer more in disasters.

The fieldwork for this research also showed that where men lived alone they showed great interest in participating in the survey and so can be effective in spearheading risk reduction measures. Future studies can seek to find out if men and women have significantly differently perceptions of hazards and reduction measures in the Caribbean. CDERA took the initiative in 2005 to organise the first workshop on gender and disaster management in the region, recognising that differences exist in the way men and women perceive and react to disasters (CDERA 2005). Presently no documentation in relation to the details of the conference is available to the researcher to include in this study. Nevertheless, in the final analysis "women and men working together can identify those hazards that are threats to their homes and livelihoods and work collectively to build safer communities" (UN/ISDR 2002: 2).

5.2.3 Experiences

Peacock (2003) claims that the effect of experience seems to lead individuals to take mitigation of some sort. But while experience and likelihood to evacuate may be related, experience does not seem to significantly affect the decision to move to shelters, especially before the onset of hurricanes. Peacock (2004:8) stated that "no consistent relationship has been documented for whether or not individuals who have had a "hurricane experience" are more likely to evacuate". As a volunteer during national disasters in SVG for a number of years it has been observed that many persons move to shelters only after hurricanes damaged their homes making them uninhabitable.

In addition the field data shows that the decision to use shelters seems not to have been affected by person's experiences in shelters since many did not go to the shelters at all. As cited in Whitehead *et al* (2000:5) "while Dow and Cutter (1997) find no differences in factors such as age, race, gender, and past experience between

evacuees and non-evacuees, other research suggests that social and economic factors do affect evacuation decisions''.

It can be inferred that there is little correlation between experience and type and amount of preparations that are made in the study areas as other factors such as employment and job security seem to weigh more heavily than preparations. This was brought out during the field surveys when asked about storing food supplies, most persons spoke of clearing drains and cutting branches but said they could not afford to stock up on food. Jessamy and Turner (1999) found similar results in Grenada and thus concluded that "while the hazard perception of residents favour adoption of adjustment strategies, i.e. relocation, structural mitigation measures, their current socio-economic status dictates the choices that are made" (1999:19). This view is recognized by Schilderman (2004) who points out that "Livelihood analysis in particular has also helped in the understanding that natural disasters are not the only risk poor people are facing, a fact generally over looked in the earlier dominant thinking in disasters" (Schilderman 2004: 416).

The reluctance to evacuate appears to be a common problem in the Caribbean region. The World Disaster Report (2005) highlights the situation in the Dominican Republic in the hurricane season of 2004, despite the various means of warning to even the smallest of communities many people did not evacuate (IFRC 2005). Persons felt a sense of safety because they had made certain preparations. The reported stated "Many decided not to evacuate, because they lived in wind-safe houses. Some awoke to find their houses flooding" (IFRC 2005: np). Many persons assume that shelters were no safer than their homes or were generally unsafe so they prefer to face the storm at home. Smith (1999) and Whitehead *et al* (2000) support the view that persons will evacuate if they did not feel safe but once people feel safe

they will not evacuate. This has led to many disaster authorities moving towards the issuing of evacuation orders. In the same light, evacuation should not just be based on the characteristics of the hazards but more so on "additional knowledge of household behaviour" for it to be an effective risk reduction measure (Smith 1999:2). This further emphasizes the need for additional research and community consultation to find out the role of perception and other factors in making decisions relating to hazards.

5.2.4 Home ownership and location of settlements

Settlements according to USAID (2002:56) refer to "concentrations of people in physical space". Each settlement consists of shelters such as houses and offices and their related support services (USAID 2002:56). Hazards often cause large scale destruction to settlements especially where vulnerability is high, especially in informal settlements. The topography of the Windward Islands limits development of the interior of these islands and forces most of the settlements to build up along the coast of all the islands as discussed earlier in section 2.2.3. This means that habitable lands are limited and expensive, whilst tourist attractions and high-class residential areas occupy the best areas. Therefore, the poor and less fortunate have to settle for the marginal lands in vulnerable areas (Lewsey *et al* 2004).

Forty percent of the residents surveyed owned homes and the majority of these persons were from Georgetown. Home ownership is important as it is likely to affect the risk reduction choices people make. Jessamy and Turner (1999:19) found that in Grenada "35% of the households were renting the house and therefore precluded from investing in mitigation measures", a similar situation is prevalent in SVG and perhaps the wider Caribbean. It was further indicated by a few practitioners interviewed that people often construct their homes in high-risk areas such as floodplains, unstable hill

slopes and areas too close to the coast. An example of this can be seen in photo 5.1 which was taken during the field survey in the Georgetown study area.

Photo 5.1. Erosion in Georgetown along the coast after hurricanes. Ferdinand 2005

These locations place persons at high risk, from even low impact events. This highlights the need for hazard assessment and hazard mapping as well as vulnerability assessment aimed at risk reduction. So, if **H x V = R** then a reduction in Hazard and Vulnerability should result in a corresponding reduction in risk.

Poverty assessment reports for St Vincent and the Grenadines indicate that 37.5 % of the population or 43, 875 persons were poor, 25.7% or 30, 069 persons were indigent poor and the highest percentage of such poverty exist in rural areas (CDB 2002). "Existing poverty that forces people to use fragile mountain terrains for housing and other living subsistence adopts unsustainable dependencies on available natural resources and hikes the degradation cycle" (Osti 2004:7). While practitioners view squatting and poor location of homes as a problem, there are no land use regulations and zoning laws and where present they are not enforced. Nevertheless it must be noted that "whilst not always easily recognized or known to the outside world, poor people everywhere do have their own strategies to prevent disasters" (Schilderman 2004:418). Some of the good practice examples include reinforcement

of bamboo structures against cyclones in Philippines (Hall 1997 cited in in Schilderman. In India Mitchell (n.d cited in Schilderman 2004:419) highlighted "the use of high shelves or raised storage platforms, electric connections placed high on walls, the use of metal furniture that resists water better and the storage of grain in metal containers placed high on shelves" to protect their homes against floods.

Another problem raised by practitioners concerning the public is the construction of homes using substandard materials (see photo 5.1). Perhaps this is what some people can afford to build but only through consultation can practitioners find out such needs and address them in an effort to reduce vulnerability. Through the literature reviewed and the field research it is apparent that other problems such as job security and income controls the type and quality of home a person can construct. As pointed out by (Yodmani 2001:8), risk reduction strategies for the poor should work towards reducing economic vulnerability and at the same time capitalize on (and perhaps nurture) the inherent social and cultural capacities of the poor communities.

In SVG the government has embarked on the construction of many low-income homes to address the problems of home ownership, squatting and other housing issues. While this is a positive step, there are other related problems which the government is yet to address including the acquisition of suitable and affordable insurance coverage and job security. Collymore (2000:1) expressed concerns that;

> Despite the long history of economic setbacks resulting from hazard impacts, Latin America and the Caribbean Governments have traditionally paid little attention to altering the conditions of vulnerability. Considerable investment has been directed at mitigating the post – impact humanitarian crises associated with hazard events.

The new low income homes in SVG are built without consultation with the public as to whether this is their primary need. They move to new and unfamiliar environments but are not educated and empowered about the potential risks in these areas and how

to mitigate them. One of the concerns raised by a participant during a focus group meeting was the preference of being given the land to construct a home that he can afford rather than having one built for him by the government and not being able to repay. It is evident from the session that the residents were not clear about what the government plans were in terms of their relocation from the high risk areas. Even so many of them were still residing in the same high risk areas almost a year after their homes were affected. As commented by one participant "all I know is that I have to move but I don't know anything else" (Respondent 2005). One of the key theories highlighted in sec 2.4.3 is the importance of providing key information to vulnerable persons so they can make sensible choices that will reduce risk.

One of the significant concerns, which derived from the questionnaire surveys, was the percentage of persons who were relying on the authorities to rebuild if their homes were damaged in a hurricane. This accounted for 59%, while 22 % felt they could manage on their own and another 13% relied on other sources such as family and friends for assistance in rebuilding. Many practitioners feel the public should be more responsible and become less dependent on the government and outside aid. In the past when people lost their homes in a disaster the government had been building homes for them or providing materials to repair their property. While these sorts of programmes help in the recovery process, the way they are carried out can be more detrimental than beneficial in the long run.

What is important is that communities are empowered with the knowledge and skills to build their resilience to disasters. Authors such as Alburqurez (2004), Boughton (1997) and Buckle (1999) advocate the importance of community in disaster risk management. Pandey and Okazaki (n.d:1) sumised that "in order to build disaster-resilient communities, they first need to be empowered so that community

members can cope with the adverse effects of natural hazards". As a part of this process the public will need to be weaned off the assistance that they have become so used to and provided with alternative support and motivation. Unfortunately many programmes are administered without the involvement of the community which in itself can be a disaster.

Reference can be made to the Indian government reconstruction strategy aimed at reconstructing 30,000 houses in 52 villages and repair work of a further 211,000 houses. According to Schilderman (2004: 417)

> The programme was essentially top-down, did not allow for user participation because complicated technologies were used, and the World Bank and the government were in a hurry, which did not allow for much training. The net results were a loss of confidence in traditional construction technologies and a high cost of construction. Further more the World Bank stimulated the use of large contractors, each with its own workforce, in place of using local labour.

The aforementioned programme resulted in houses that were too small for residents and so they extended them in their own traditional ways, the persons were still uneducated in relation to building standards and were essentially not better able to mitigate future risk than before (Schilderman 2004: 417).

5.3 COMMUNICATION OF INFORMATION

Peacock (2004) advocated that there are variations in the significance of knowledge in determining perception but it is still a significant variable. Paton and Johnson (2001:271) argued that, "If people over-estimate their existing knowledge, the likelihood of them attending to public information will be reduced". While members of the public are familiar with the terms hurricane watch and hurricane warnings there are concerns about what to do when this advice is issued although they are outlined in the National Disaster Plan.

"Traditionally, natural hazards risk perception has been explained by factors such as prior experience, knowledge, socio-economic and demographic, and household composition" (Peacock 2004:5). It is the belief of the national disaster authority, that those with more knowledge of hazards will make more sensible decisions aimed at reducing risk. It was alluded to by Peacock (2003:152) that "if knowledge about the effectiveness of a mitigation adjustment is known, which also implies some knowledge about the hazard itself, then adjustments are more likely to be adopted". While having the knowledge of hazards is not the same as educational achievement, in the data collected for this research they are closely related. This is not to say that persons who had attained lower levels of educational achievements are unlikely to adopt risk reducing measures but they are more likely to be affected by other concerns such as job security, access to capital which can affect their decision making choices. The more educated persons were the ones who had family disaster plans and only 16.7% of those who had attained primary education had family disaster plans.

This research found that radio is the most widely used source of information to the public in SVG, Becker *et al* (2001) and Krasovaskia (2001) also found radio to be the most widely used source of information for most persons. It is also the source of choice by which most persons would like to receive information about hurricanes. The practitioners also agreed that this is an essential source of information which has shown quite a lot of improvements over the years. The disaster agencies need to capitalise on this medium while trying to expose the public to other mediums for early and effective information dissemination. Anderson in Enarson (2001:12) found that,

> "women farmers (particularly those who are not the head of the household) prefer seasonal climate forecast information to be made available through the extension officer or school, rather than the radio (preferred by male interviewees). The farmers stated that in attempting

> to balance farming, child care and other domestic responsibilities, they are less able to schedule a fixed time to listen to the radio".

While most respondents claim that they get information via the radio finding the time to listen to risk related programmes may be limited, taking into consideration that Georgetown, in particular, is an agricultural community. The authorities would therefore have to schedule programmes at times when most persons are likely to be listening or have repetition of programmes in conjunction with the use of other communication mediums.

Effective communication is among the factors which have contributed to Cuba's success against hurricanes and other hazards. In the 2004 hurricane season while 70,000 homes were damaged only 4 persons died from hurricane 'Charley', later that same season 2 million persons were evacuated in preparation for hurricane 'Ivan' and no lives were lost (World Disaster Report 2005). It is suggested that that for successful transformation of information local governments should follow these 'three simple lessons [which] emerged from Cuba (Thompson and Gaviria 2004).

- package information simply
- use an easily accessible medium,
- and build on the communication resources at hand.

The majority of practitioners in SVG and St Lucia believe that 80% to 90% of the public receives hurricane warning but that very few heeded the warning. 81% of the public surveyed admitted to receiving information on how to prepare for hurricanes and 97% make some form of preparations. Despite all the preparations hurricanes still manage to damage and destroy much infrastructure annually.

According to Becker *et al* (2001) inappropriate response to warnings may be the result of either incorrect information or misinterpretation of the information that

was passed on. Therefore, while the practitioners see the public as being complacent, the public may think they are making the necessary preparations, or they are making all the preparations they can with the resources available to them. Gough (2001) found that persons felt they were well prepared because they had Civil Defence Kits but "they are often unaware of the possible extent (temporal and spatial) of major natural hazards event" (Gough 2001: np). This further highlights the need for education and dissemination of information. Another possible reason for persons seeming unprepared may be that people have their own coping strategies based on what usually works for them (Becker *et al* 2001). If practitioners understand such coping strategies through consultation with the public then they would be in a better position to work with them.

Cultural factors can also play a role in how people behave and interpret the information available to them. Gough (2002: np) suggested that "some cultural perspectives are an important adjunct to technical and scientific information because individual and community understanding and awareness of natural hazard issues significantly affect the way communities responds to events" (Gough 2002). A number of the respondents commented that the island is blessed because it had been spared many direct hits in the past and not necessarily because of anything that was done. "They adopt a fatalistic attitude that accepts disasters as divine acts of God, may exacerbate hazards event and may not stimulate appropriate responses" (Tobin and Montz 1997:156). Some persons may even adopt a "cry wolf syndrome" when warnings are issued and nothing happens, they think it will never happen so they make little or no preparation for subsequent events. Still other people believe if disaster strikes, it will not affect them "normalisation bias" (Becker *et al* 2001). If practitioners engage the public in consultations then they will be able to supply

answers as to why they make certain choices and adjustments can be made to effectively reduce risk.

Even practitioners are of the view that the Windward Islands have not had a major hurricane in a long time, in fact since hurricane 'Janet' in 1955 which suggests that they share similar perceptions to that of the older persons surveyed. As a result, they claim that the warning systems have not been fully tested, but these systems can be tested via simulation exercises instead of waiting for actual events to do so. While modern hurricane tracking equipment is very accurate, hurricanes are still very unpredictable because they change direction and strength may have long intense periods of rainfall, strong storm surges and each one is often unique. The records from the CIMH (2005) indicate that the Windward Islands were affected by 17 storms and hurricanes between 1984 and 2004 of up to category 4 strength. These systems have resulted in millions of dollars in losses and millions more for rehabilitation. Perhaps some of the practitioners expect a category 5 storm to fully test the warning systems. However if these islands already suffer such severe losses as a result of lower intensity storms then, how can they cope with the destruction which could result from a high intensity events such as hurricane 'Katrina'. This is not to say that low intensity events cannot be used to test and improve the existing warning systems but they should not be solely relied on to do so. Therefore, if the islands can withstand and cope with low intensity systems then any improvements can only help them to withstand greater intensity events such as category 5. Perhaps preparations in relation to information is not sufficient but this is difficult to evaluate since measures of effectiveness is either nil or limited in SVG. In the final analysis,

> "there is no conclusive evidence regarding whether or not a public education or information programme actually makes a significant difference of increasing human response to warnings. The most reasonable interpretation of the evidence, when considering the

> empirical, anecdotal, and practical, is that good pre-emergency information will increase response although the amount cannot be estimated (Sorenson 2000:121).

5.4 SHORT TERM PREPARATIONS FOR PENDING HAZARDS

Based on this research finding many members of the public only prepare on a short term for hurricanes, they trim trees, clear drains and secure roofs but they do not engage in long-term mitigation strategies. Even many disaster agencies lack proactiveness which may be attributed to a lack of funding as highlighted by many practitioners who were interviewed. In other cases problems developed because of roles and responsibilities that are not clearly defined and duplication of tasks which may lead to assumptions that other will take up the tasks.

In relation to Central America, Comfort el al (1999) argued that "cutbacks in government spending on health, transportation and other public services also reduced the capacity of local and national governments in the affected region to respond effectively to the disaster" (Comfort el al 1999:41). Similar conditions also exist in SIDS such as the Caribbean moreover, "Disasters are likely to result in additional expenditure or the partial reallocation of already committed financial resources (or both), to meet the cost of repair and rehabilitation of public property and to provide support to the victims" (Benson and Clay 2004:29)

Practitioners also suggested that more persons should insure their properties against losses from hazards. The collected data showed that only a small percentage (22%) of those interviewed were residing in homes that were insured, the majority being from Kingstown. Those persons who owned properties seem more concerned about insurance than those who did not own the property they lived in. This was particularly so in Kingstown where insurance services were prevalent than in Georgetown which did not have any of these services. Homeowners in Kingstown

also showed more interest and willingness to purchase insurance than those in Georgetown where less than 40% of them had insurance. The literature suggests that the public does not have much confidence in insurance companies which makes them reluctant to purchase insurance (Margolis 1996 cited in Boterill and Mazur 2004).

Insurance companies were asked specifically about special offers to homeowners and from indications, very few incentives exist. The offers available are mainly for commercial institutions that will most likely be insured anyway with or without such incentives. There should be special packages for poor persons to encourage them to insure, as well as older persons who are of the view they are too old to get insurance. Vermeiren (2000) concluded that the insurance problems in the Caribbean stemmed mainly from the low risk retained by the insurance companies in the region and the high risk to reinsurance agencies. As the damage from hurricanes increased insurance agencies were reluctant to reinsure such companies or imposed fees that were passed on to the customer (Vermeiren 2000). This meant that only those who could afford high premiums could get coverage from insurance.

5.5 *PERCEPTION OF SHELTERS*

In St Vincent and the Grenadines the main facilities used for shelters includes schools, churches and community centres. These shelters are provided with shelter managers who are trained in this area and include teachers and other public servants. The evacuees are responsible for their food and well being for the first 72 hours in the shelter after which provisions are made for them by the disaster management authority. The survey found that most persons knew the location of the nearest hurricane shelter yet many opted to stay at home and ride out the storm despite residing in vulnerable areas – close to the coast, hill slopes and on river banks. Some persons even recall looking through their windows and seeing the sea destroy

retaining walls as it approached their homes. Others described the height of the flood water which trapped them in their homes. Pelling (2002) established that in the Dominican Republic persons who evacuated preferred to stay with neighbours mainly for two reasons. These include the fact that "it enabled them to keep watch over their homes and possessions following the hurricane" and there were "rumours of bad conditions and lack of food in government shelters" (Pelling 2002:69). Based on the field surveys carried out for this study, residents also have similar concerns and so even when in danger will choose the option of remaining at home throughout the storm. In similar support Tobin and Montz (1997) suggests the reluctance to move to shelters has to do with whether the hazard threatening is of greater risk than leaving their property exposed to looting. These are areas where the community can become actively involved in building community spirit and support and a sense of belonging and security.

5.6 INTER AGENCY COLLABORATION

The research carried out in the Windward Island, ascertained that the level of interagency collaboration was limited to the national disaster offices within the islands. In most cases it included being on a committee which operated during the hurricane season and perhaps for other national disasters. Many agencies work on their own because, as hinted by one Disaster Coordinator, they all wanted to get the praise for themselves. In some instances they may also be competing for limited available funding from international organisations and lending agencies. It is however evident that for effective risk reduction all stakeholders must collaborate to make the best use of resources and to gain the best possible results for any action to reduce risk to hazards. In a study of Central American countries disaster issues

Comfort *et al* (1999) arrived at what can be considered a holistic approach to reducing risks outlined in the following extract.

> If disasters are to be addressed as ongoing problems rather than occasional crises it will be necessary to engage national and international participants including public, private and non-profit sectors in a collective effort to reduce hazards. Among others this requires addressing the following tasks: identifying participating organizations, establishing mechanisms of communication and information exchange among them, developing a set of common standards for assessing performance on the shared goal of risk reduction, and scheduling regular periods for review of existing conditions, feedback to all participants, and revision of action strategies across the region (Comfort *et al* 1999:42).

This would avoid the duplication of tasks and programmes and strengthen the disaster management capacity in any country.

This chapter provided an analysis and discussion of the results findings. A number of vulnerabilities were identified as existing within communities and between practitioners and in some cases the institutions they represented. The following chapter will look at some of the risk reduction programmes carried out in St Vincent and the Grenadines and make further recommendations.

6 CONCLUSION AND RECOMMENDATIONS

This chapter summarises the aims and objectives undertaken in this research and gives a brief synopsis of the research findings. It further outlines some of the risk reduction strategies which have been undertaken in St Vincent and the Grenadines over the last five years. Finally the chapter presents recommendations of risk reduction measures which can be implemented in SVG and possibly other Windward Islands in light of the findings of this research.

The aim of this research was to investigate the broad approaches to hurricane risk reduction in the Windward and then to determine how critical the role of perception of hurricane risk is especially in the context of the effectiveness or appropriateness of risk reduction strategies implemented by both the public and practitioners.

To achieve this aim the study fieldwork was done in St Vincent and the Grenadines where communities were surveyed and selected practitioners interviewed. An attempt was also made to interview similar practitioners in St Lucia another Windward Island. Interviews and research were done in Barbados as the home to the head offices of the regional disaster coordinating bodies.

The following objectives were achieved:

1. An analysis of the annual impacts of hurricanes on communities in the Windward Islands over the last 20 years, to determine the major destructive agents and the sectors most affected by these events. An overview of hurricane data was undertaken which showed that while the Windward Islands are not in the direct path of hurricanes they are often seriously affected by storms and hurricane events almost every year. The impact is generally caused by a combination of wind and

rain as well as storm surges as a result of the geography of the islands with a build up of coastal settlements. The damage is normally island wide as islands are generally very small and most economic sectors are affected. However the housing sector presents the greatest challenge since it directly affects the general livelihood of the population.

2. To assess the public and practitioner perception of hurricane risk in the Windward Islands. The Windward Islands are home to a number of complex hazards, however the literature as well as the stakeholders surveyed agreed that hurricanes are the most significant. It is however noted that since all the Windward Islands are volcanic then it is likely that a volcanic eruption can be devastating in the long term. Questionnaires were administered to 90 residents in selected towns in SVG and 17 practitioners between St Vincent and St Lucia. While the majority of persons recognize that storms and hurricanes are a threat, preparations are seasonal and short term and therefore not very effective, from all accounts this seems to be the trend in the Windward Islands.
3. To assess mismatches in perceptions of the public and practitioners and implications for the effectiveness of risk reductions strategies. The field data reveal that there are a number of factors which may influence the risk reduction choices taken by the public as well as stakeholders. One of the most significant of such is the lack of or the limited capital to finance programmes and in some instances agencies compete for the available funding from outside agencies. In general the public also suffer from limited resources to make the necessary long term changes or even make short term preparation. It is evident that while poverty does not always go hand in hand with disaster, they are related. There is also a

range of other factors such as gender, experience, location of settlement and communication issues which may affect decision making.

4. To identify strategies in St Vincent and the Grenadines, which have been formulated to reduce the risk from hurricanes. In the past there were few strategies implemented to reduce risk to hazards there were simply preparedness measures. However, with the establishment of a regional body PCDPPP later replaced by CDERA a management approach was adopted to drive risk reduction in the entire Caribbean region. While there has been some progress, there is room for improvement in particular involving the community on a greater level.
5. To make recommendations regarding reducing risk to hurricanes and related hazards and further improve processes for building community resilience. The study recommends a holistic approach to risk reduction with community participatory approach as the forefront in improving the effectiveness of risk reduction. This approach should drive the move away from communities, which are too dependent on aid and help to build capacity by educating and empowering people to build resilience.

6.1 DISASTER RISK REDUCTION EFFORTS IN SVG

Over the last 5 years in St. Vincent and the Grenadines the Disaster Management authority has been restructured to include a National Emergency Office with a full time Director and staff as well as the implementation of new strategies. The following are some of those strategies that have been completed while others are ongoing. The information was collected from reports in collaboration with the Training Officer at NEMO. The researcher however views most of these strategies as top down approaches and may involve little or no community participation. This research views a community participatory approach as necessary for a more holistic

risk reduction programme and so recommendations will be made to incorporate the community on a greater level. According to Bendimerad (2003:60) "experience has shown that some of the most successful risk reduction initiatives have closely involved communities in understanding risks and designing appropriate response plans".

a. National disaster plans – Recent (2004) revision. The first plan was developed in 1985 and was revised in 1991 and 1993. A copy of the first plan was however not available to make an analysis of changes that have been made. The plan includes a hurricane plan, a volcano evacuation plan and a flood response plan. The document outlines the plans and procedures to be followed in the event of national disasters and the roles and functions of the organisations involved. While the plan is comprehensive there are still areas of concern which are relevant to the proper functioning of the plan. This includes simulation and testing of the plan, limitations in training and the non-functioning of community disaster groups. Unfortunately copies of the National Disaster Plan are not widely available, so members of the public know very little about its existence or what it entails.
b. Several of the local newspapers publish weekly preparedness information and promotion of risk reduction measures in relation to hurricanes but only when the hurricane season approaches. This may not be a viable means since reading ability maybe a problem especially among the elderly. In addition, the public did not highlight this as a significant source of information.
c. Publication of the location of hurricane shelters on the government website at http://www.gov.vc/. The website was developed just about a year ago and many persons are not aware of its existence. In addition, this site is limited to persons who have access to computers. Therefore this medium would reach many of the

same persons who would know the information anyway and does not cater for those with reading problems either.

d. Radio programmes of lessons learnt with feedback from the public, held after the passing of hurricane 'Emily'. A number of persons who called in were concerned about the language of hurricane advisors and felt that the average person cannot make sense of the information. While the radio is the medium of choice for receiving information of the majority, there are concerns about the times disaster related programmes are aired. The usual time is on a Sunday morning when most persons might be at church or otherwise occupied. Interaction with the community might be an ideal way to learn of appropriate times based on the audience such programmes are seeking to capture.

e. The World Bank has funded a number of mitigation projects in the OECS (includes Windward Islands). In SVG these include river protection for 3 rivers and sea defence in one area to improve warning mechanisms. Another was the construction of an Emergency Operation Centre which houses the National Disaster Office, this centre was occupied in 2005. These physical infrastructures were necessary to facilitate a more proactive risk reduction programme.

f. Cable and Wireless a local telecommunication company presented a number of VHF radios to the Radio Rainbow league which is a volunteer group operating VHF and Ham radios. The aim of the group is to have these radios set up in remote parts of the country to provide a link with the National Disaster Office in times of disaster. Attempts are being made to place radios in all communities and train persons who will communicate with the national disaster office during disasters especially if the normal communication medium fails.

g. There were about three shelter management workshops where volunteers were trained in managing shelters, a project funded by the World Bank as part of the improvement in disaster preparedness in the OECS. Some of these persons would also be used as trainers to train other persons in shelter management. The researcher concluded that these sessions are not well advertised and participation is limited to certain communities as well as social groups. In addition when disasters do occurs many of these persons are not the ones who manage shelters.

h. As part of the Environment and Sustainable Development unit a post-disaster project on rapid environmental assessment workshop was held in SVG. This was attended by 28 persons from various government ministries which included National Security, Health, Forestry, Education, National Disaster Committees, social clubs, Windward Island Farmers Association (WINFA), St Vincent Electricity Services (VINLEC), Cable and Wireless, Port Authority, Banana Growers Association (BGA), Central Water and Sewerage Authority (CWSA), Meteorological Office, Fisheries Department, Physical Planning, and volunteer organizations. This was aimed at equipping persons to make assessment after a hazard to aid in quick recovery. Other similar workshops include damage and needs assessment and data collection. These workshops focus mainly on government ministries and professionals and the information hardly ever filters down to the community or community groups hence the focus of this project. On the other hand this will improve the data storage mechanism so that lessons can be learnt from past events and improvements can be made in the future. So if a particular area is considered as high risk that settlements can be prevented and the necessary risk reduction measures can be implemented.

i. A Hydrologist workshop under CADEM project was organised to improve the flood early warning system in the Marriaqua area, which is frequently affected by floods. The project will use a computerised system to measure stream flow and rain fall. It is expected that with this system in place persons will be warned early and can therefore take appropriate responses in the event of flood. However the necessary information needs to be communicated with the public so that they will know when and how to respond and what they are responding to.

j. Several workshops were held on warehouse management to train persons to manage warehouses and distribute supplies as directed by the National Disaster Authority. This would reduce the haphazard distribution of relief supplies and provide transparency and proper management of such resources which are often very limited. This is a very important measure which should help to ensure that those supplies are distributed to those who need it most.

k. Disaster management training for teachers from several primary and secondary schools in assisting with a disaster plan for school. While the aim of the project was good, to get teachers to develop disaster plans for their schools, there were no follow up and most schools still have no disaster plans. Children should be actively involved in disaster planning and preparations or how else would they know what to do if a disaster occur while they are in school. As the study advocates children can be used to improve disaster preparedness in the homes something which is lacking in SVG and other Windward Islands.

This is not to say these are the only means of risk reduction implemented but they represent the most recent and highlighted strategies, based on information collected by the researcher.

6.2 DISASTER RISK REDUCTION IN SVG: RECOMMENDATIONS

This section outlines some of the risk reduction strategies that can be implemented in SVG based on the discussion in the preceding chapter. Some recommendations have been made in the discussion chapter and therefore will not be repeated but may be referred to and expanded.

6.2.1 Holistic Approach to Risk Reduction

The research on the broad approach to risk reduction in the Windward Islands and the role of perceptions of hurricane risk and risk reduction highlighted some key issues which include a number of complex hazards, lack of awareness and a lack of collaboration among stakeholders. The research also acknowledges that some work has been done in risk reduction by the National Disaster Authority and other key agencies but a lot more can be done aimed at encompassing the community on a greater level. In light of these findings this study is suggesting a more holistic approach which incorporates all stakeholders and promotes total development (see fig 6.1). Bendimerad (2003: 60) suggests that

> Actions aimed at reducing risk should address the social factors that determine vulnerability as well as changes in the political environment that could increase the resilience of communities. Four parallel and complementary lines of actions can be considered to reduce exposure to disasters and achieve a more sustainable approach to development:

- Community/stakeholder participation
- Public policy actions
- Safer construction and urban development
- Development of a culture of prevention

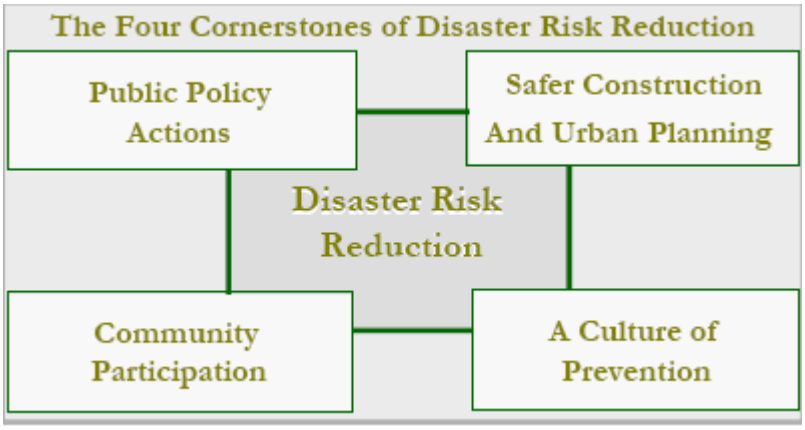


Figure 6.1: Holistic approach to disaster risk reduction (Bendimerad 2003: 60)

The study recommends the use of these four cornerstones of Disaster Risk Reduction as a viable means of community participative approach.

6.2.2 Community Participation

Bendimerad (2003) advocates that reducing community vulnerability is of paramount importance in reducing risks to disasters and building more resilient communities. "Vulnerability concerns the interaction between a community, it environment and hazards" (WHO 1999:4) so empowering communities is crucial in reducing vulnerability. Many researchers (Buckle 1999, Burby 2001) emphasize the importance of active community participation in reducing risk to hazards

> The primary strategy of vulnerability reduction is to increase the capacity of local communities and organizations to prevent, prepare for and respond to the impacts of disasters. It is a strategy that combines changes at the community level with changes to national and international policies and practices (La Trobe and Davis 2005:2).

Risk assessment also goes hand in hand with reducing vulnerability, Cutter, Mitchell and Scott (2000:713) believe that "effective mitigation of losses from hazards requires hazard identification, an assessment of all the hazards likely to affect a given place, and risk-reduction measures that are compatible across a multitude of hazards". Based on the fact that the Windward Islands are vulnerable to a number of

hazards and hurricanes being an annual occurrence then a nationwide risk assessment is recommended. If that is done then the information can be made available in the National Disaster Plan to the necessary stakeholders, simulations can be done to test the level of preparedness, the public made aware and the information made available to trainees and at workshops. This means that such assessments should be done in the early stages of the risk reduction process.

WHO (1999:30) suggest that the term "vulnerability assessment", "hazard analysis", "threat assessment" and "risk assessment" are the same concepts hence for the purpose of this study they are referred to collectively. WHO (1999:30) defines the process as a "procedure for identifying hazards and determining their possible effects on a community, activity, or organisation". It is therefore suggested that for a nationwide risk assessment the process shown in fig 6.1 can be implemented in the Windward Islands using the Community Emergency Preparedness Manual, (WHO 1999) as a guide. This process involves an identification of hazards which should lead to the construction of hazard maps to act as a guide to stakeholders when making decisions. This would also guide development as persons would be more aware of the risk involved in locating in high risk areas and insurance agencies will also be guided accordingly, in an integrated process.

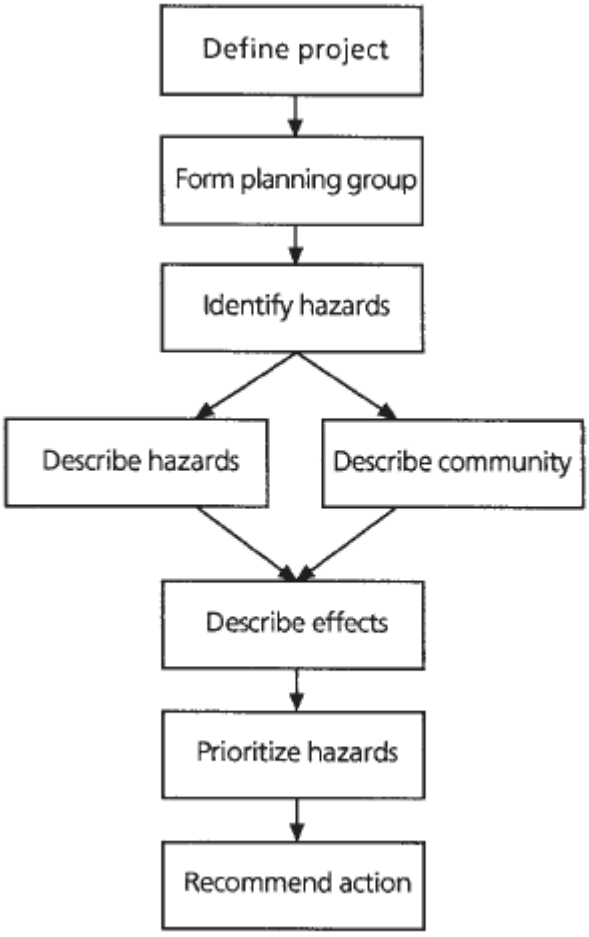


Figure 6.2: Process for risk assessment Adapted from WHO (1999:33)

The suggested process will be useful in addressing a number of concerns within the study areas such as the level of vulnerability and coping mechanisms of the community. Hence the prioritisation of risk and in the final analysis strategies aimed at reducing the risk of disasters. Community participation at all levels of the process is important so they will be more informed and likely to make adjustments which they were actively involved in developing.

Mention has already been made of the successes of the Cuban disaster management strategy much of which can be attributed to the involvement of the community. Thompson and Garivia (2004:31) highlighted three areas of community involvement which contributed to this success; these include "promoting their participation in emergency planning, risk mapping and simulation exercises at the neighborhood level

and in the workplace". The Caribbean region already has a close working relationship with Cuba and receives assistance in various fields and can seek to collaborate with them in the area of risk reduction. Most of the strategies outlined in 6.1 aims to strengthened organizational capacity but pays little attention to community needs and interaction into the risk reduction and management process.

"Communities also have perceptions that may or may not be based on reality, but nonetheless are important to consider and incorporate in the development of risk reduction initiatives" (Bendimerad 2003:60). This study identified varying perceptions of hurricane shelters which many persons considers as no safer than their homes. The National Disaster Office has been ensuring that many persons are trained in shelter management but this does not change the reluctance of persons to use shelters. "Community participation involves a process that first identifies linkages between formal government structures and a community's social structures and then creates mechanisms to integrate them in a common agenda" (Bendimerad 2003: 61). The National Disaster Agency in SVG has trained persons to carry out assessments in communities which is important if accurate information about the community is to be collected. The focus now must be on getting the communities to be more proactive in making risk reduction decisions and make the link suggested earlier by Bendimerad (2003).

6.2.3 Public Policy Actions

Public policy, according to Bendimerad (2003: 62), "is a set of decisions that guide the actions of government, businesses and civil society. Disaster risk reduction policy deals with the course of action adopted by government and civil society to understand hazards, assess vulnerability, evaluate risk and adopt measures for risk reduction". In SVG and the other Windward Islands some attempts have been made

to update the legislation intended to reduce risk to disasters, yet there is still a lot that can be done.

There are building codes in the Windward Islands but they are not yet mandatory in SVG and a number of other Islands. In addition all stakeholders need to be informed about these codes and their role in its functioning. One of the major problems highlighted by the practitioners is poor house construction and the location in high risk areas, yet there have been few policies to govern land use and settlement and where they exist they are not enforced. It must be noted however that the community must be involved in some way in policy development and implementation for them to be successful or they are less likely to respond.

One of the key factors Bendimerad (2003:63) focussed on in relation to public action policy is the necessity for collaboration of all the stakeholders to "integrate disaster management and development". Practitioners interviewed suggested that there is not enough collaboration between agencies who seem more interested in individual praises. There is nevertheless some level of collaboration between the National Disaster Authority and other government agencies and organisations in training personnel and building organisational capacity. Research has shown that greater success is achieved when collaborative work is undertaken. As a recommendation this research suggests more interagency collaboration which utilises the limited available resources in SIDS.

Thompson and Gaviria (2004) cited instances where the Cuban example was replicated in parts of Central America with much success. Mention was made of the training of emergency committees in Nicaragua which aided in effective evacuation from hurricane 'Mitch' (Thompson and Gaviria 2004:47). Another example cited was where the Usulutan and San Vincente communities in El Salvador were able to

mobilise themselves when dams were opened causing flooding in various communities. As a result of quick action using replicas of the Cuban model, no lives were lost in these communities whereas many were lost in others. (Thompson and Gaviria 2004:47). Through the regional organisation CDERA there are training sessions and workshops in different islands geared at risk reduction but very often they are attended mainly by local persons. What this study is advocating is that invitation can be extended to regional members of CDERA to attend training sessions and workshops in other Islands, so each country does not have to replicate the same training.

6.2.4 Safer Construction and Urban Development

Bendimerad (2003) recognises that one of the major causes of vulnerability is urbanisation especially in a haphazard manner. This is one of the concerns raised by the practitioners interviewed as well as the literature on the Caribbean which highlights problems such as squatter settlements and settlements in high risk areas such as flood plains and hill sides. One of the strategies implemented in SVG involved the measurement of stream flow and early warning systems (6.1: i), this strategy should help residents to evacuate before danger approaches. The effectiveness of such a strategy is dependent on the level of awareness of the community. This strategy is likely to be more successful if that link with the community is present and they are aware of the risk they faced and means of reducing such risks.

Bendimerad (2003:64) is therefore suggesting that "improving traditional construction practices should constitute an important action in the risk mitigation agenda of any community". With the work being done on building codes in the Caribbean regions it is expected that this situation will be improved but it cannot be

done in isolation from the public. Retrofitting is also a means of improving substandard homes however "without strong incentives, people are reluctant to make investment that may or may not be needed" (Bendimerad 2003:65). This also calls for some level of collaboration among stakeholders such as insurance agents, hardware suppliers, housing ministries and the community. Additionally Bendimerad (2003:65) suggests that some of the concerns of urban planning and safer construction can be reduced via "microzonation and risk mapping" which can be adopted in the Windward Islands.

6.2.5 Development of a Culture of Prevention

A culture of prevention according to Bendimerad (2003:66) has to do with "how people perceive risk and their motivation to enhance resilience or aggravate vulnerability. Developing a culture of prevention equips the community with the knowledge and skills necessary to reduce risks to hazards. The strategies outlined in sec 6.1 provides for the experts, those who already have the knowledge and understanding, government ministries and NGO's.

Bendimerad (2003: 67) provided a number of key action which should be developed to bring about a culture of prevention, they include;

- Awareness raising
- Societal arrangements
- Accountability forging
- Empowerment

If these actions are promoted at the community level they can help to bring about communities that are more proactive and resilient.

Awareness raising is a means of informing persons of the risk they face and equipping them with the possibly means of reducing the risks they face. The use of radio programmes in SVG is one of the strategies used in SVG to heighten awareness,

but there are others which can be implemented. Including disaster studies on the curriculum and at all levels of all learning institutions can help to increase awareness in communities. Another important aspect of raising awareness is effective communication and early warning as advocated by the third conference on Early Warning and Communication (EWC III) (2006).

Effective communication between all stakeholders is of paramount importance as it is "essential for educating, warning, informing and empowering people to take practical steps to protect themselves from natural disasters" (Fraser 2004:2). This study recommends that "all disaster reduction programs should include communications and awareness-raising as a central, ongoing element and should have a clear strategy for doing this" (Twigg 2004:169). Burke (1999:25) highlighted 11 steps that can be used to achieve effective communication and awareness.

Eleven steps in a communication strategy

1. Define the overall project purpose.
2. Define the aims of the project's communication strategy.
3. Identify and prioritise audiences and participants.
4. Determine information needs.
5. Identify barriers and opportunities.
6. Identify communication channels and messages.
7. Plan coordinated timing of activities.
8. Formulate communications materials.
9. Participatory pre-testing.
10. Implementation.
11. Evaluation

Figure 6.3: Steps in a communication strategy adapted from Burke (1999:25)

As part of the information dissemination process this study recommends that disaster information is emphasized more on the school curriculum at all levels as well as in nationwide educational programmes. This is one of the strategies which contributed significantly to the success of disaster risk reduction in Cuba. This is

reiterated by the UN/ISDR and partners with the launching of the campaign,

" 'Disaster Risk Reduction Begins at School' [which] aims to inform and mobilize Governments, communities and individuals to ensure that disaster risk reduction is fully integrated into school curricula in high risk countries and that school buildings are built or retrofitted to withstand natural hazards"(UN/ISDR 2006).

In lieu, the communication strategy can look at the varying forms of communication in the risk reduction based on Fraser's (2004:4) subdivisions;

1. Technical communications systems, such as satellites, remote sensing devices, and computer networks, and other technology-based communication systems research, predict, track, and provide early warning of natural hazards.
2. Disaster site communications maintain links with disaster response officials, the government, affected populations, and sources of emergency relief supplies.
3. Organizational communications are essential for the effective, dependable operation and interaction of private, governmental, and multinational disaster prevention and relief organizations.
4. Communication for scientific development and policy formation, between scientists, engineers, government officials, other disaster response officials, insurers, the media, and the public develop our knowledge of natural hazards and how to keep them from becoming disasters.
5. Public education and communication - through electronic and print media, wired and cellular telephones, and alternative media--educate the public about natural hazards and disaster prevention, warn of approaching hazards, and facilitate participation in public discussions about disaster preparedness and response.

Figure 6.4 Forms of communication in risk reduction. Adapted from Fraser 2004:4

These forms of communication can be used in simulations to check the readiness of the system at different levels. In addition the International Conference on Early Warning 2006 have produced two documents which can be used to develop the information dissemination and early warning systems in any part of the globe. The documents include "Developing Early Warning Systems: a checklist" and the "Compendium of Early Warning Projects", both documents are available on line at *www.ewc3.org*

Societal arrangements are necessary among the persons in a community to help bridge the gap between those in authority and the community. If communities

are organised they are in better position to develop linkages with agencies and organisations and can build their capacity by improving "transparency, disseminating information and initiating reform" (Bendimerad 2003:68).

Bendimerad (2003) also suggested that to prevent a culture of prevention there should be some level of accountability from all the stakeholders which should bring about a level of responsibility. As such persons will be more responsible for the decisions they make and is more likely to adhere to policies and other risk reducing measures. In the final analysis empowerment is also seen as part of the process of building a culture of prevention. Bendimerad (2003) indicated that this will arise out of good governance and increased knowledge. Empowering the Windward Islands communities to reduce their vulnerability and hence risk will also help to relieve the National Disaster Authority of some of its task of pushing risk reduction issues. On a whole using the Four Cornerstones as a guide to risk reduction might be useful process in reducing risks to hazards in the Windward Islands.

6.2.6 Recommendations for future research

Future research should seek to find out if the perception of men and women in the community have significantly different perception of risk and they affect decision making. In addition, further studies need to find out some of the traditional coping strategies of members in the community and their effectiveness in reducing risk to hazards. This study asked the sample communities to rank named hazards, but perhaps future study should ask the community to list some of the hazards that are likely to affect them.

This chapter presented a synopsis of the disaster risk reduction efforts that have been undertaken or in process in SVG, some which are ongoing. However this study recommends a number of strategies which can be useful with more community

collaboration and participation and eventually empowerment to reduce risk to hazards. These recommendations are intended to be more holistic involving all the stakeholders in the society and where the community plays a more participative role.

This chapter presented a synopsis of the disaster risk reduction efforts that have been undertaken or in process in SVG, some which are ongoing. However this study recommends a number of strategies which can be useful with more community collaboration and participation and eventually empowerment to reduce risk to hazards. These recommendations are intended to be more holistic involving all the stakeholders in the society and where the community plays a more participative role.

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APPENDICES

APPENDIX 1

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, as storm surge values are highly dependent on the slope of the continental shelf and the shape of the coastline, in the landfall region. Note that all winds are using the U.S. 1-minute average.

Category One Hurricane:

Winds 74-95 mph (64-82 kt or 119-153 km/hr). Storm surge generally 4-5 ft above normal. No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Some damage to poorly constructed signs. Also, some coastal road flooding and minor pier damage. Hurricane Lili of 2002 made landfall on the Louisiana coast as a Category One hurricane. Hurricane Gaston of 2004 was a Category One hurricane that made landfall along the central South Carolina coast.

Category Two Hurricane:

Winds 96-110 mph (83-95 kt or 154-177 km/hr). Storm surge generally 6-8 feet above normal. Some roofing material, door, and window damage of buildings. Considerable damage to shrubbery and trees with some trees blown down. Considerable damage to mobile homes, poorly constructed signs, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of the hurricane center. Small craft in unprotected anchorages break moorings. Hurricane Frances of 2004 made landfall over the southern end of Hutchinson Island, Florida as a Category Two hurricane. Hurricane Isabel of 2003 made landfall near Drum Inlet on the Outer Banks of North Carolina as a Category 2 hurricane.

Category Three Hurricane:

Winds 111-130 mph (96-113 kt or 178-209 km/hr). Storm surge generally 9-12 ft above normal. Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Damage to shrubbery and trees with foliage blown off trees and large trees blown down. Mobile homes and poorly constructed signs are destroyed. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Flooding near the coast destroys smaller structures with larger structures damaged by battering from floating debris. Terrain continuously lower than 5 ft above mean sea level may be flooded inland 8 miles (13 km) or more. Evacuation of low-lying residences with several blocks of the shoreline may be required. Hurricanes Jeanne and Ivan of 2004 were Category Three hurricanes when they made landfall in Florida and in Alabama, respectively.

Category Four Hurricane:

Winds 131-155 mph (114-135 kt or 210-249 km/hr). Storm surge generally 13-18 ft above normal. More extensive curtainwall failures with some complete roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Extensive damage to doors and windows. Low-lying escape routes may be cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of structures near the shore. Terrain lower than 10 ft above sea level may be flooded requiring massive evacuation of residential areas as far inland as 6 miles (10 km). Hurricane Charley of 2004 was a Category Four hurricane made landfall in Charlotte County, Florida with winds of 150 mph. Hurricane Dennis (pdf) of 2005 struck the island of Cuba as a Category Four hurricane.

Category Five Hurricane:

Winds greater than 155 mph (135 kt or 249 km/hr). Storm surge generally greater than 18 ft above normal. Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes. Severe and extensive window and door damage. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of all structures located less than 15 ft above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5-10 miles (8-16 km) of the shoreline may be required. Only 3 Category Five Hurricanes have made landfall in the United States since records began: The Labor Day Hurricane of 1935, Hurricane Camille (1969), and Hurricane Andrew in August, 1992. The 1935 Labor Day Hurricane struck the Florida Keys with a minimum pressure of 892 mb--the lowest pressure ever observed in the United States. Hurricane Camille struck the Mississippi Gulf Coast causing a 25-foot storm surge, which inundated Pass Christian. Hurricane Andrew of 1992 made landfall over southern Miami-Dade County, Florida causing 26.5 billion dollars in losses--the costliest hurricane on record. In addition, Hurricane Wilma (pdf) of 2005 was a Category Five hurricane at peak intensity and is the strongest Atlantic tropical cyclone on record with a minimum pressure of 882 mb.

Source: http://www.nhc.noaa.gov/aboutsshs.shtml

APPENDIX 2

Sub-regional structure at-a-glance

Sub-Regional Focal Point
Responsible for:

Antigua
Anguilla
British Virgin Islands
Montserrat
St. Kitts

Barbados
Dominica
Saint Lucia
St. Vincent

Jamaica
Bahamas
Belize
Turks & Caicos

Trinidad & Tobago
Grenada
Guyana

CDERA: collaboration with other organisations

Since its inception, CDERA has pursued a policy of collaboration with national, regional and international organisations which have overlapping interests. This helps to ensure more rational use of the limited resources available to the region as duplication is minimized. It also means that technical assistance provided is of the highest quality as each agency is allowed to take the lead in the area where it has specific technical expertise.

APPENDIX 3

My name is Idelia Ferdinand and I am a graduate student at Coventry University, United Kingdom. You are invited to participate in an interview on the hurricane risk in the Windward Islands.

The interview is expected to take approximately 30 minutes to complete.

Name of organisation: Country Location:

PRACTITIONERS

1. What are the major roles of CDERA in risk reduction/disaster management in the region? What other organisation do you work along with to carry out these roles

2. What do you consider as the major hazards affecting the Windward Islands (St Vincent, St Lucia, Grenada, and Dominica)? Which hazard do you think is responsible for the most devastation?

3. What do you consider as causing the greatest damage during hurricanes/storms in particular over the last 20 yrs.(storm surge, winds, rain, landslides, flooding etc)

4. What are your views on the warning systems in the region that are being used to inform the public of hurricanes/storms?

5. What percentage of the public do you think receives warning? How do you view the public's response to hurricane warnings?

6. What are your views on the work being done by the (government, NGO's and other agencies) to reduce risk to hurricanes?

7. How do you view the role of the media in hurricane risk reduction? (print, radio, TV etc)

8. Who do you consider as the most vulnerable groups in the society? What are some of the plans in place to address these groups?

9. What are the major sources of funding available to your organisation to cover risk reduction programmes? Does the fund received cover the risk reduction programmes that they are allocated towards?

10. Where do you think the major focus should be, in terms of reducing risk to hurricanes? What do you consider as the major challenges in such areas?

APPENDIX 4

QUESTIONNAIRE – COMMUNITY RESIDENTS

My name is Idelia Ferdinand; I am a graduate student at Coventry University, United Kingdom. I am doing research on hurricanes in the Windward Islands and would appreciate your participation.
The questionnaire is expected to take approximately 30 minutes to complete.

Name of Community _____

BACKGROUND INFORMATION

Please tick the box next to the best answer which applies to you.

1. Gender: □ Male □ Female

2. Age range: □ under 24 □25 – 34 □35 – 44 □45 – 54 □Over 54

3. What is your highest level of education?
   □ Primary
   □rySeconda
   □College
   □ University
   State Other _____

HOME INFORMATION

Tick the answer which best applies to the property you live on.

4. Who is the owner of the property you live on?
   □Owned by the respondent
   □ Rented/ Leased
   □ Government
   □ Family
   State other _____

5. What is the main type of material used to build the house you live in?
   □ Concrete/Bricks
   □ Lumber/Wood
   State roof materials and any other materials used to construct the house
   _____

6. Rank the following hazards from 1 to 5 in terms of which do you think is most likely to happen? **Use 1 for most likely and 5 for the least likely**
   Hurricane _____
   Volcanic eruption _____
   Earthquake _____
   Flooding _____
   Landslide _____

7. Do you have insurance on your property? □ Yes □ No

8. If answer to 7 is No, would you consider taking out insurance? □ Yes □ No
   B. Why not? **(Answer only if you answered No for question 8)**
   ☐No need
   ☐Too costly
   ☐Not enough knowledge about insurance
   ☐Never thought of it
   State other _____

EXPERIENCE

9. Have you ever experienced a hurricane/ storm? □ Yes □ No
   10. If you answered yes to question 9, how many? (Can you give the year/s)
   _____

11. Tick all that applied to you, during the last hurricane season
   □No damages
   □ Little damage to roof
   □Loss of entire roof
   □Damage to vegetation
   □Flooded home
   □ Total loss of home
   State other experiences
   _____
   _____

12. What did you do the last time your community was threatened by a hurricane? (**Tick all that applies**)
   □ Left the area and moved to another community
   □Secured the house and stayed inside.
   □Went to a hurricane shelter
   □Did nothing
   State other _____

   _____

13. Have you ever stayed in a hurricane shelter? □Yes □N o

14. If you answered yes to number13, what was the experience like at the shelter? (**Tick the best choice**)
   □Very good
   □ Good
   □Average
   □ Not very good
   □Not good

15. Do you think that hurricane shelters are safe? □Yes □No

16. How would you try to rebuild your house if it was damaged during hurricanes?
 Seek assistance from family or friends
 Wait for assistance from authorities (government, or non governmental organisations)
 Try to rebuild on your own

State any others_____

KNOWLEDGE

17. Do you know where your nearest hurricane shelter is located? Yes No

18. Do you know what a hurricane **watch** is? Yes No

19. Do you know what to do when a hurricane **watch** is issued? Yes No

20. Do you know what a hurricane **warning** is? Yes No

21. Do you know what to do when a hurricane **warning** issued? Yes No

22. Who do you think is responsible for providing information to the public on hurricanes?
 Prime Minister
 Constituency Representatives
 National Disaster Coordinator
 Radio announcer

23. Do you get information from the disaster office on how to prepare for hurricanes?
 Yes No

24. From which of the following sources do you get most information about hurricane preparedness?
 TV
 Radio
 Newspapers
 Internet
 State other _____

25. Is the information received enough to help you prepared for hurricanes?
Yes No

26. Would you like to get more information about hurricanes? Yes No

27. From where would you like to get the information about hurricanes?
 TV
 Radio
 Newspapers
 Internet

State other _____

28. From whom would you like to get more information from about hurricanes?
□Prime Minister
□Constituency Representatives
□National Disaster officer (coordinator)
□Radio announcer
State other _____

29. Do you think that the authorities are doing enough to inform people about hurricanes
□Yes □No

PREPAREDNESS

30. Which of the following preparations you normally make for the hurricane season? (**Tick all that applies**).
□Secure roof
□Door and window shutters
□Store up food and other supplies
□Secure important items
□Move to a shelter
□Trim trees around the home
□Clear drains
State Other_____

31. Which of the following sources do you rely on most for information during a hurricane?
□TV
□Radio
□Disaster office
□Friends
□Relatives
□None of the above

32. Do you have a plan that your household uses for hurricanes? □Yes □No

THANK YOU VERY MUCH FOR YOUR ASSISSTANCE