

# **Planning for Disaster Management and Vulnerability Reduction in the Fisheries Sector of Caribbean Island States**

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## **ABSTRACT**

Within the insular Caribbean, planning for disaster management has traditionally been divorced from the normal planning process for the major economic sectors. In the fishing industry, planning for disaster management has often been limited to removal of fishing vessels to "safe" areas before a hurricane event and making arrangements for compensation to fishermen for damage to fishing gear and vessels. With the increase in the number and intensity of hurricanes being experienced in the region and the recognition that other natural and man-induced disasters that pose a potential threat to the fisheries sector, this level of planning is no longer sufficient. Instead, a more proactive approach is necessary. Planning for disaster mitigation in the fisheries sector needs to be integrated into national planning for disaster mitigation. Fisheries Management Plans should reflect the understanding of the need to reduce the vulnerability of the Fisheries Sector to disasters. More thought needs to be given to ensuring that there is accurate information on which to base post-disaster assessments, that artisanal fishermen are encouraged to adopt a small business management approach to their occupation, that a high priority is given to personal safety at sea, and that fisheries infrastructure is designed in a manner that minimizes the probability of damage occurring during a disaster. This paper reviews the current status of planning for disaster mitigation in the fisheries sector in the British Virgin Islands and discusses some of the approaches that should be taken to reduce the vulnerability of the fisheries sector to natural disasters.

**KEY WORDS:** British Virgin Islands, disaster management, vulnerability

## **INTRODUCTION**

Disaster management is a part of the natural cycle of life within the Caribbean region. At the most basic level, persons living in the Caribbean are aware that the Caribbean lies within the Hurricane belt. They know that during the months of June to November (the Hurricane Season) there is a high probability that at least one of

the countries will experience the effect of tropical waves, depressions, storms, and the more cataclysmic hurricanes. They understand that there is a need to prepare before hand for the possibility of these events by engaging in such activities as securing of property, purchasing additional food supplies, and engaging in minor improvement of homes.

Fishermen are directly affected by the Hurricane Season. During this period, fishers are reminded:

- i) To pay special attention to the weather forecasts,
- ii) To exercise extreme caution when venturing offshore,
- iii) To reduce the amount of fishing gear that they may have at sea, and
- iv) To make arrangements to have their fishing vessel safely secured if/when warning is given of a storm event.

This level of preparation is necessary and useful, however is it enough? The answer to this question is a resounding no. A look at the experience of the island of Dominica, for instance, will demonstrate that the dislocation within the Fisheries Sector caused by hurricanes and other natural disasters is high, and that it is advisable to spend more time, money, and effort in planning for disaster reduction.

#### **Case Study – Dominica**

Dominica is located in the Eastern Caribbean at 15°N and 61°W. It is the largest and most mountainous of the Windward Islands with a total land area of 289 square miles. During the last thirty (30) years, natural disasters have had a dramatic impact on agriculture, forestry fisheries, and the overall natural environment in Dominica (Michael, unpublished). Dominica has experienced the pervasive and destructive impacts of hurricanes and landslides. During the last three decades, Dominica has been directly impacted by at least ten (10) tropical storms and hurricanes, the most significant of which were: David, Frederick, Allen, Hugo, Iris, Luis, Marilyn, and Lenny. All of these events impacted on the coastal and marine resources of Dominica, several of them resulted in extensive direct loss to the Fisheries Sector. Table 1 summarises the Fisheries related impacts of hurricanes and other disasters experienced in Dominica during the period 1979 to 1999.

A brief review of Table 1 will indicate that the impacts of natural disasters such as hurricanes and landslides are varied. The include the following:

- i) Loss of income to fishers,
- ii) Destruction of/damage to Fisheries habitat,
- iii) Destruction of/damage to fisheries infrastructure such as landing sites and fishing complexes,
- iv) Reduction in/disruption of food supply,
- v) Damage to/loss of fishing vessels and gear, and
- vi) Economic losses to the country

While the above paragraphs focus on hurricanes and weather related disturbances, it must be noted that the Caribbean may be affected by several other natural disasters. These include earthquakes, floods, storm surges, and volcanic activity. Apart from the natural disasters, the potential for a range of man induced

disasters also exists. Among these man induced disasters are those resulting from marine pollution, industrial activity, and development (construction).

**Table 1.** Fisheries related impacts of selected natural disasters occurring in Dominica -1979 to 1999. (Summarised from Michaels, unpublished).

Event	Date	Fisheries Related Impacts
Hurricane David	August 29, 1979	472 or 75% of fishing boats destroyed A further 157 or the remaining 25% lost engines Excessive landslides Extensive coastal erosion
Hurricane Hugo	September 17, 1989	Damage to the Agriculture Forestry and Fisheries Sector estimated at EC\$49,000,000
Hurricane Luis	September 18, 1989	Ten (10) fishing Boats destroyed Completion of Roseau Fishing Complex set back by six months at an additional cost of EC\$2,000,000
Hurricanes Iris, Marilyn and Luis	August 27, Sept 5 and Sept 18, 199	Fishery landing sites, boat houses, boats and engines lost to an estimated value of EC\$ 3,500,000
Hurricane Lenny	November 18-19,	Significant loss of coastal infrastructure and unquantifiable damage to damage to coastal and marine environments Coastal Flooding Fisheries Complex ground floor and ancillary equipment severely damaged – EC\$3,500,000 estimated damage Twenty five (25) boats lost and one hundred and twenty-six (126) boat sheds destroyed Overall damage to the Fisheries sector – EC\$1 600,000
Tropical Storm Debbie	September 9 and 10 1994	Losses in Fisheries and non-banana agriculture amounted to EC\$ 5,000,000
Layout Valley Landslide	November 1997	Pot fishery destroyed Dramatic fall in fish sales Fishermen dislocated and forced to use other landing sites Reefs located two miles offshore covered with mud Aquatic life in Layout river obliterated

Note that Iris was a Tropical Storm and did not reach Hurricane intensity, however, its effects were similar to that of a hurricane.

Given the experiences of the Caribbean with disasters in the past (hurricanes and more recently increased volcanic activity), and the potential for similar disasters in the future, there is a need for improved planning for disasters within the region. There is now widespread acceptance of the importance of "Comprehensive Disaster Management" as the fundamental strategic base of Disaster Management Planning. This has arisen largely because it is realized that responding to disasters as they

occur does not mitigate the effects of the disaster nor reduce vulnerability to future hazard impacts. In summary, Comprehensive Disaster Management means the capability to manage all types of emergencies by coordinating wide-ranging actions in all four phases of the Disaster Cycle – Mitigation, Preparedness, Response and Recovery. It embraces all risks, natural and man-made and action extends from the district and community to national policy levels.

Within the Fisheries Sector, it must be realized that preparing for the immediate threat of a disaster is not enough. More long-range planning is necessary. Disaster management must become an integral part of the Fisheries planning process as well as a part of the national planning process. More attention must be given to risk assessment and vulnerability reduction within the sector. National fisheries management organisations must form strategic linkages with national and regional disaster management agencies, as well as partnerships with fishermen and other stakeholders, to facilitate better planning for disaster management within the sector.

While several examples can be drawn from the experiences of other Caribbean countries in terms of the analysis of need and the associated recommendations, it has been decided that the emphasis will be placed on the British Virgin Islands (BVI) for two related reasons:

- i) It is the location from which two of the authors of this paper have functioned during the last year, and
- ii) The BVI has an international reputation for being in the forefront of disaster management thinking in Small Island Developing States.

This paper therefore:

- i) Describes the conceptual framework as it relates to the linkage between disaster management and fisheries management within the region,
- ii) Discusses the status of the British Virgin Islands as it relates to planning for disaster management within the fisheries sector, and
- iii) Makes recommendations for policies, strategies, programs and projects that would reduce the vulnerability of Caribbean Countries to disasters.

#### PLANNING FOR DISASTER MANAGEMENT IN THE FISHERIES SECTOR OF THE BVI

In the British Virgin Islands considerable emphasis has been placed on the protection of life and to some extent safeguarding fishing gear and equipment, however, the focus has been almost exclusively on hurricane hazards. As development has proceeded, man induced hazards have become increasingly significant and threaten the viability of the sector. For example, the discharge of toxic and hazardous waste into the marine environment, or the illegal dumping of industrial waste, all have the potential to produce disastrous consequences.

We can say that some attempt has been made to offer a higher level of protection to marine vessels in general, through the construction of two marine shelters and several breakwaters. A Marine Pollution Action Group exists, and there

is ongoing dialogue among officials of the United States mainland Government, the UK Government, and the Governments of Puerto Rico, the United States Virgin Islands, and the British Virgin Islands to arrive at a Memorandum of Agreement with regard to joint action in the face of major marine pollution incidents in general and oil pollution in particular.

There also have been attempts to educate fishermen in safety at sea techniques, thus reducing their vulnerability to risk. There has also been an attempt to tie the requirement for safety gear on vessels to the licensing and registration process for fishing vessels.

Recently, a mitigation and development planning framework has been developed by the Office of Disaster Preparedness as the basis for long term mitigation. This National Mitigation Strategy recognises the vulnerability of the environment in general and proposes corrective action in a range of areas. These are summarised below:

- i) Policy Measures
- ii) Administrative Measures
  - Legislation
  - Institutional Capacity Enhancement
  - National Mitigation Sub-Committee
  - Private Sector, Non Governmental Organisation and Community Based Organisation Partnership
- iii) Preventative Measures
  - Land Management and Development Control
- iv) Property Protection Measures
  - Building Regulations and Land Infrastructure Development Guidelines
- v) Natural Resource Protection Measures
  - Conservation and Enforcement
- vi) Structural Mitigation Measures
  - Protective Barriers and Stabilization Structures
- vii) Public Information Mitigation Measures
  - Hazard Identification and Risk Assessment
  - Outreach Programs
  - Education and Training
- viii) Emergency Services Measures
  - Preparedness and Response mechanisms

#### **REDUCING THE VULNERABILITY OF THE FISHERIES OF THE BVI**

In addition to what is broadly proposed, we wish to highlight a number of areas in which we think concerted long-term interagency action should be undertaken. For convenience these may be divided in structural and non-structural mitigation activities. Mitigation represents a method or way of reducing vulnerability to disasters. Structural mitigation activities relate to the design, construction, and maintenance of infrastructure whereas non-structural activities relate to human

activities that can reduce risk.

### **Structural Mitigation Activities**

*Design of Fisheries Infrastructure* — Historically, shore side fisheries infrastructure has been designed to provide maximum convenience to fishers and management personnel. This has resulted in designs that emphasize operational convenience for fisheries and administrative efficiency for officials. This often results in facilities located within a storm surge zone, with very costly and sensitive equipment located on the ground floor. The effect of Hurricane Lenny on the Fisheries Complex in Dominica clearly demonstrates that in future buildings should be designed to combine resistance to natural hazards with convenience to the human population.

*Construction Materials and Techniques* — The quality of construction materials and the nature of the workmanship have a major impact on the structural integrity of buildings. Most of the Caribbean faces two major natural hazards – hurricanes and earthquakes. Building materials and construction styles should reflect that reality. Expert advice should be sought on these matters and the necessary supervision provided at all stages in the construction of fisheries infrastructure.

*Physical Planning and Development Control* — The location of buildings of all types, allied to the two areas identified above, can either increase or decrease vulnerability. Buildings which are poorly sited or where the natural environmental protection, such as dunes and mangrove swamps, are eliminated are vulnerable to hazards. It is important though that development control issues are not seen as an isolated concern of the fisheries sector. Indeed, the needs of the sector should be completely integrated into national development control policies and practices, which are sensitive and responsive to the needs of the sector.

*Foreshore Protection* — The coast is a complex environment in which a host of dynamic forces impact each other. In many Caribbean islands, coastal roads are main arteries, and hotels on the coast are a major part of the economic infrastructure. Action is often taken on the coast to protect infrastructure and land based facilities. If these are not carefully designed and constructed, they can predispose the fisheries sector to hazards such as hurricanes earthquakes and industrial pollution.

### **Non-structural Mitigation Measures**

The National Integrated Development Strategy (NIDS) of the British Virgin Islands identifies vulnerability reduction as one of the strategic planks of national development to promote sustainability. While it may be true that the fisheries sector contributes less than 5% of GDP (NRMU 1998) its significance may be under-reported because of the difficulties associated with quantifying the spin off benefits of the sector, since so much takes place at a cottage level. In terms of direct

employment, approximately three hundred (300) fishermen directly employed represent a substantial proportion of the indigenous labour force. Further, the use of more modern technology suggests that the economic potential of the sector is considerable, especially if the techniques advanced in the Fisheries Management Plan are employed. The non-structural mitigation activities that may be followed are considerable, and in the interest of brevity, we will merely highlight a few of these:

- i) *Risk and Vulnerability Assessment* — There is a clear need to professionally assess the vulnerability of the fisheries sector, its infrastructure and the people involved to the effects of hazards of all kinds. Such a study would produce the greatest benefit. There is for example, anecdotal evidence that hurricanes have been the most disastrous of the hazards. However, information recently coming to light suggests that it is the destruction of habitat and nursery areas through industrial and domestic waste, along with developmental activities that is causing the more significant impact.
- ii) *General Environmental Protection* — The Ministry of Natural Resources and Labour has publicly lamented the inadequacies of current environmental legislation. Expeditious action to improve such legislation could become a major contributor to mitigating the effects of hazards and indeed eliminating some hazards altogether. It would of course be necessary to have the appropriate enforcement mechanisms following closely on the heels of any such legislation.
- iii) *Improved Information Gathering* — At present there is no systematic process of collecting and updating information of the fisheries sector that could be used to assist with disaster planning and management. There is need for accurate up to date information on the fisheries sector that could be used to assist with planning for vulnerability reduction. Information of the length, make, model and age of fishing vessels, as well as estimates of their value and their insurance status should be collected and updated regularly. It may be advantageous to store this information in a centralised government system.
- iv) *Operational Plan for Vulnerability Reduction* — The Fisheries Management Plan presents a comprehensive framework for the management of the sector, however, it does not embrace vulnerability reduction or mitigation specifically. It would be necessary to develop operational guidelines, which focus on issues such as:

Retrofitting of existing facilities

Improving shelter arrangements for fishing vessels

Guidelines for marine safety

The re-introduction of a twenty-four hour ship to shore radio system.

In that regard, strong emphasis should be placed on training fishers in marine safety and the use of safety equipment such as flares, life jackets and radio communication equipment. Fishers should also be trained in navigation and basic seamanship skills. The local H. L. Stoutt Community

College offers such training. Arrangements should be made to facilitate fishers in fully utilizing this resource.

- v) *Capacity Building* — There is a need to continue the ongoing process of capacity building within the Fisheries Unit of the Conservation and Fisheries Department. This should include greater emphasis on vulnerability reduction and disaster management as an integral part of the strategy for sustainability. Advantage should be taken of ongoing training in disaster management at the local community college, as well as safety at sea modules provided by the Office of Disaster Preparedness and volunteer rescue organizations such as the Virgin Islands Search and Rescue (VISAR) and the local Red Cross.
- vi) *Empowering Fishers* — The Virgin Islands Fisheries Act 1997 makes provision for a Fisheries Advisory Committee, it identifies a role for Fisher organizations in the management of the Fishing Industry. The Fisheries Advisory Committee should be implemented. This committee, in addition to “empowering” the fishers, could then play a strong role in disaster planning for the sector. The development of strong fisher organizations should be encouraged and facilitated. By working closely together in a cooperative relationship, fishermen may find it easier to access resources such as marine insurance and training opportunities. They would also be in a position to spread the risk normally associated with investment in the Fisheries Sector. They would also be able to offer mutual assistance to each other in several other aspects of disaster management.
- vii) *Interagency Actions* — There is no single agency that can unilaterally execute all the tasks necessary to promote mitigation. The Fisheries Unit of the Conservation and Fisheries Department should take advantage of existing administrative structures such as the Marine Pollution Action Group and the National Mitigation Task Force to ensure that the vulnerability concerns of the sector are placed on the front burner.

### CONCLUSION

In conclusion, there is a great opportunity in the British Virgin Islands to elevate vulnerability reduction in the fisheries sector to a new plane of significance. This has much to do with the overall environment that exists for disaster management in the Territory and the development of a number of strategic initiatives that are designed to reduce the Territories overall vulnerability to hazards of all kinds in all sectors. It is clear however, that in the final analysis, it is the expertise, energy, and commitment that fisheries officials can bring to bear on the process through advocacy and interagency collaboration that will largely determine the extent to which fisheries becomes a hazard resistant and truly sustainable sector.

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