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EXECUTIVE SUMMARY

Introduction

In the early hours of September 17, 1989 Hurricane Hugo struck the 39-square mile island of Montserrat with devastating effects. In its wake it left 11 persons dead, others injured, and over 3,000 homeless. Physical damage to homes, businesses, and public buildings was extensive. About 45 percent of all dwelling units were totally destroyed, with an additional 40 percent sustaining serious damage. The island's tourist industry was also severely damaged, with the loss of more than 80 percent of its hotel rooms. All government buildings and schools were partially or totally destroyed. Total damage to property was estimated by the government to be in excess of EC$990,000,000.

This report discusses the findings of an examination of the emergency planning, response, and long-term recovery activities by government and non-governmental organizations in Montserrat. (As part of this project, two additional case studies of the disaster planning, response, and recovery experiences of Antigua, and St. Kitts and Nevis are also near completion.) Our key concern is to analyze the planning, response and recovery activities in order to gain knowledge that can be utilized to lessen the consequences of future hurricanes in the region. With regard to emergency planning and response, we will focus upon the major problems and difficulties encountered in these areas in an attempt to improve future planning and response measures. Regarding recovery, the intent is to derive recommendations for developing successful recovery planning programs that make reconstructed localities less vulnerable to future disasters, and to enhance prospects for distributing recovery aid on the basis of need, and to improve local capability to undertake development efforts. In addition to any usefulness this study may have as a description and evaluation of the planning, response, and recovery experiences in the Eastern Caribbean, we hope it will aid in the development of disaster recovery planning programs in countries that have not recently experienced a disastrous event.

Research Methodology

This study utilizes a number of traditional data gathering devices to undertake this in-depth analysis. The primary data source involves on-site, in-depth, face-to-face interviews with key informants involved in disaster planning, response, recovery and long-term development efforts in Montserrat. A total of 17 interviews were completed during July and August of 1990.

A snowball sampling technique was used to develop a comprehensive list of informants who were key participants in the various phases of the disaster impact. The objective was to reach knowledgeable influential people who were active participants in the disaster effort, or were in a position to objectively observe the activities of participants. Initial informants were identified based on a review of key printed materials (e.g., agency reports and disaster plans). These individuals were asked during the interviews to identify others who should be interviewed and thus the sample was expanded. The informants came from a variety of government agencies, foreign and domestic
non-governmental organizations (NGO's), and private businesses. Informants came from agencies representing such areas as health, national government planning, agriculture, public works, mass media, community development, police, and various NGO's.

Interviews were rich in information regarding the pre-impact, post-impact and recovery phases. They provided detailed data on the activities of various governmental and non-governmental organizations. The interview guides which were utilized for gathering data on emergency planning and response focused upon such issues as the quantity and quality of pre-hurricane emergency relevant resources on the island, the extent and nature of disaster planning that had taken place prior to the storm, the nature, problems, and accomplishments inherent in various response activities, such as damage assessment, search and rescue, the provision of emergency medicine and sheltering, and the nature of the organization and coordination of these tasks. Also the interviews were designed to identify principal concerns about hurricane recovery issues, specific recovery response activities, modes of interaction among various participants in the recovery process, and to explore explanations for successes and failures of various recovery responses.

In addition to the interview data, documentary information was also gathered. This material consisted of technical reports, disaster plans, after-action reports, newspaper coverage of the storm, published investigations, and photographs. This material was content analyzed relevant to the planning, response, and recovery dimensions. This information provided a rich data base for the analysis.

**Summary of Emergency Planning and Response Findings**

The analysis of the emergency planning and response activities in Montserrat indicates both positive and problematic efforts. At this time let us first examine what was well handled. Subsequently we will note some of the major problems inherent in both planning and response.

**What Components Were Well Handled**

First, the experience on Montserrat illustrates the importance of prior disaster planning. Where prior planning had taken place, the response efforts of the agencies were superior to those efforts that were basically ad hoc in nature. Some of the areas that were handled best, such as health delivery, road clearance, the distribution of water, and the development of a food distribution plan at the national (but not district) level all benefitted from prior planning.

Second, the emergent pattern of leadership and crisis decision-making was well handled. Some quick decisions had to be made, and the Governor utilized his past experience to make them. Although it took a number of days to achieve coordination in some areas, led by the Governor the tasks eventually were completed.
Third, while the warning system did not function as planned, it was effective in reaching the public. Due to the efforts of the Governor and the mass media, the people of Montserrat were adequately warned of the approaching storm.

Fourth, certain pre-impact preparedness measures undertaken by specific Ministries and agencies were successful. In particular, the preparations undertaken by the Health Sector, the Ministry of Agriculture, Trade, Lands and Housing (MATLH), and Public Works were successful in protecting important resources.

Fifth, the efforts of the Pan Caribbean Disaster Preparedness and Prevention Project (PCDPPP) were instrumental in the pre-disaster planning that took place. The PCDPPP created an awareness of the need to plan for disasters and provided technical assistance to the nation. Although some weaknesses in prior planning were noted, the problems probably would have been much more severe without the PCDPPP.

Sixth, there were remarkably few casualties given the magnitude of the destruction. While the Health Sector did a laudable job of providing emergency medical care given its modest resources and damaged facilities, the low casualty rates may be attributable to the effective warning system, the precautionary actions taken by the citizens of Montserrat in seeking shelter prior to the storm, and pure good fortune.

Seventh, the publication of The Hugo News was an effective, though improvised, device for communicating with the public.

Eighth, the assignment of the task of soliciting emergency supplies and aid to the Development Unit was quite effective. Utilizing their prior relationships with donor organizations, they were able to mobilize needed supplies for the nation.

Ninth, the response of many government officials and private, volunteer citizens to the emergency effort was very praiseworthy. When faced with problems and difficulties that overwhelmed the resources, prior experience, and planning on the island, many people rose to the challenge. They ranged from the ham operators who maintained contact to the outside world, to the hospital and police personnel who stayed on their posts during the storm, to the Governor who led the country during the emergency period.

**What Components Were Problematic**

A number of serious problems in planning and response were observed. At this time allow us to simply summarize some of the more major ones.

- **Pre-Impact Contextual and Planning Problems**

  First, there was a lack of emergency resources on the island. There were particular weaknesses with regard to health facilities, communication facilities for emergency management, skilled manpower, and port facilities.
Second, the condition of housing on the island was not well designed for hurricane protection.

Third, there was a lack of both emergency management training and disaster public education activities prior to the storm. These problems were amplified by the lack of recent disaster experience, since it had been 61 years since the island had last been struck by a hurricane.

Fourth, the National Disaster Plan had a number of weaknesses, including the following: 1) it had not been updated, 2) it focused primarily upon the pre-hurricane period and devoted little attention to post-hurricane response, 3) it placed great responsibility for local response on the Disaster Chairmen in the eleven districts, but did not provide them with adequate training in disaster management, 4) it provided no contingencies for the loss of communication facilities on the island, 5) the budget and training for the National Disaster Coordinator was not adequate.

Fifth, the position of National Disaster Coordinator was a part-time position that was "tapped on" to a position in the Government Information Unit.

Sixth, planning was viewed as a product, and not as a process.

Seventh, planning within the various Ministries and agencies varied greatly in quality, however even in those units, such as health and agriculture, that had undertaken prior planning, post-hurricane responses had been relatively ignored.

• Pre-Impact Response Problems

First, the planned warning system was not utilized. Furthermore, the system is dependent upon outside meteorological agencies and the mass media.

Second, the evacuation of low lying areas was not very effective. Few people voluntarily left their homes until the last moments prior to the storm.

Third, emergency shelters were not adequately or safely constructed as places of refuge. A number of them were damaged. Furthermore, there was no shelter management in effect prior to the storm.

Fourth, the Emergency Operations Center (EOC) was never opened or staffed prior to the storm. According to the National Disaster Plan the EOC was to be opened at the police station and be functioning prior to the storm in order to coordinate preparedness measures.

Fifth, at the national level most of the pre-impact preparedness measures were ad hoc and unplanned in nature. Even though the National Disaster Plan did devote attention to pre-impact activities, many of these elements were ignored.

Sixth, although the actions and leadership of the Governor were extremely beneficial and positive, emergency planning should not rely upon the expertise and skill of one individual in order to be effective.
• Post-Impact Response Problems

First, there was a delay in opening and staffing the EOC. It was fully two days after the storm before the EOC was functional. This period effectively precluded any attempt to coordinate immediate post-impact activities, such as search and rescue and rapid damage assessment.

Second, related to the lack of prior planning, most of the post-impact response activities had to be improvised. The ad hoc nature of the response worked against effective and efficient activities.

Third, the loss of internal and external communication capabilities was a serious problem. However, the problem was exacerbated because prior planning had not considered this contingency.

Fourth, the system of reliance upon District Disaster Chairmen exhibited serious problems. They lacked training, resources and experience. Some carried out their duties; others did not. The distribution of food and aid at the district level was seriously hampered.

Fifth, there was the widespread perception that role abandonment occurred within some organizations. The problem was perceived within the Health Sector and within the general community. However, it is not apparent how widespread this perceived problem was, or if it was embedded in reality.

Sixth, there was a problem with rapid damage assessment. There was no planning or system in place to undertake the task. The actual damage assessment initially was done in an uncoordinated fashion. An ad hoc arrangement was established by the Governor, but duplicated damage assessments continued.

Seventh, search and rescue activity was unplanned and uncoordinated. By the time the EOC became functional, the critical 48 hour period for rescue activity had already expired.

Eighth, problems of coordination of activities within the Health Sector were noted. Furthermore, the provisions for handling the dead were not included in prior planning and were ad hoc in nature.

Ninth, shelter facilities and management were serious problems during the post-hurricane period. Preparedness planning for shelters was notably lacking. The facilities were not adequate. Shelter management was nonexistent.

Tenth, there were no provisions in the prior planning for the loss of the port facilities. The loss of the port and its attendant organizational problems hindered the distribution of emergency food and supplies.

Eleventh, there were serious problems in the distribution of food at the district level. An equitable system of control and distribution was neither developed nor uniformly implemented.
Twelfth, unsolicited aid contributed to a problem of convergence of unneeded and unusable supplies upon the island. The problem was particularly serious with regard to clothing.

Thirteenth, there were no pre-existing plans for a needs inventory after the storm. Some organizations did have an inventory of resources before the storm; many did not. No standard forms or a needs inventory existed.

Fourteenth, as with the distribution of food, there were problems in the distribution of emergency supplies. The problems concerned establishing uniform and equitable standards of eligibility for aid.

Fifteenth, there were perceived problems of communication and coordination of the regional relief effort between the Caribbean Disaster Response Unit (CDRU) and officials on Montserrat.

**Post Hugo Emergency Planning and Response Changes**

Since Hurricane Hugo a number of positive changes can be noted in the disaster preparedness planning in Montserrat. Many of these are a direct response to some of the problems observed in responding to the storm.

First, a number of Ministries and organizations have undertaken after-action discussions and have updated their prior plans. Interestingly, the organizations that had previously undertaken the most planning were also at the forefront of updating their plans. MATLH has revised its food distribution plan. The Health Sector conducted a serious after-action analysis that resulted in suggestions to improve its post-hurricane response.

Second, for food distribution at the district level, voluntary organizations came to form the National Hurricane Food Distribution Unit based upon their involvement in the disaster. This group will assist District Chairmen and look after elderly persons. The plans now call on using teachers and public servants to be on district committees. They will report to and assist District Chairmen.

Third, a Damage Assessment Committee has been organized by tasks. Agriculture is responsible for assessing damage in the agriculture sector. The Housing and Rehabilitation Unit is responsible for assessing housing. Communication and Works will assess the infrastructure. Pre-printed damage assessment forms have been developed.

Fourth, improvements in the communication system have been undertaken. Some cables are now underground. A repeater has been installed to enable communication by hand held radios to the EOC. The Amateur Radio Society has 13 members stationed at different locations to compliment Cable & Wireless.

However, a number of problems still exist. First, the budget for disaster planning has been increased only from EC$5,000 to EC$8,000. Second, the position of National Disaster Coordinator is still a part-time position within the Information Unit. Third, given this lack of support it is not surprising that
more extensive training and public education programs have not been
developed. Fourth, the National Disaster Plan has not been updated, nor most
importantly, exercised since Hugo. Fifth, a number of serious problems, such
as those involving sheltering and shelter management.

**Summary of Long-term Recovery Findings**

**What Components Were Well Handled**

First, the governor provided much needed leadership in identifying and
coordinating roles of various government agencies. As evidenced by his
designation of the Development Unit as the lead organization for coordinating
and distributing aid, he decided soon after the storm made landfall what had to
be done and who should participate in carrying out the recovery effort.

Second, the PCDPPP played an effective leadership role during the pre-
disaster period in raising awareness and knowledge about hurricanes. This
organization carried out a variety of useful activities involving media
awareness exercises and technical assistance. Much of this work has served as
an important precursory condition in stimulating post-disaster planning
program efforts in Montserrat.

Third, establishment of the Housing and Rehabilitation Unit was an
important, but belated step in coordinating the overall housing recovery
effort. This organization was effective in serving as a central clearing house
for damage data, in distributing housing recovery aid to those in need, and in
monitoring use of such aid.

Fourth, some organizations recognized the disaster as providing a
window of opportunity to pursue activities that were not related to the disaster.
The Canadian University Students Organization (CUSO) sought to advance its
developmental work, and the government carried out public school and utility
pole renovation plans at a more rapid pace than it might have if Hugo had not
struck.

Fifth, foreign NGO collaboration with a local NGO in the village of
Streatham led to a strengthening of local organizational capacity. The goal of
the foreign NGO (CUSO) was to empower the local group, and not to do the work
itself. The local NGO was able to undertake a variety of developmental
activities that built on its disaster recovery work.

Sixth, reliance on a well-established and trained NGO field staff that had
been active for years in pre-disaster development activities was an effective
recovery strategy. Staff could provide for accurate damage assessment, know
which households were in need and eligible for assistance, and could closely
monitor construction practices.

Seventh, an international NGO (CUSO) sent a community action group
leader to Canada to give lectures to the NGO’s sponsors about their NGO support
of long-term developmental work. Sponsors there had an opportunity to learn
first hand that a successful recovery project is not just "brick and mortar"
oriented, but is concerned with local organizational capacity building.
Eighth, in Streatham the NGO collaborative project was made accountable without an overwhelming amount of red tape. Local people were active in monitoring the use of aid. In fact, the monitoring process became developmental when donors and the local Community Act Group were interacting.

Ninth, Hugo was a "dry storm" with limited rainfall. A wet hurricane could have caused much greater damage to an already devastated island, particularly in areas that had been built in floodplains.

What Components Were Problematic

• Pre-Disaster Period

First, the National Disaster Plan was completely ineffective in guiding long-term recovery activities. While the plan text emphasized emergency response, little attention was given to recovery. Thus the plan was widely considered a "paper plan." Government and NGO officials were not familiar with plan contents. Such lack of knowledge was attributed to infrequent meetings focused on reviewing and updating the plan. As a result, recovery responses in Montserrat were ad hoc, and not a product of prior recovery planning.

Second, local development regulations, particularly building codes, and inspection and enforcement procedures were not effectively implemented during the years before Hugo struck. Thus the housing stock was not designed with storm resistant construction techniques.

Third, government staff assigned to carry out disaster recovery programs were not trained and were inadequate in terms of numbers. For example, long delays in releasing records on damage assessments by MATLH caused major delays in the delivery of recovery aid. The delays were caused by lack of staff expertise in computerizing damage data. Also, there was an inadequate number of building inspectors, with only one part-time inspector available for the entire rebuilding effort.

Fourth, the National Disaster Coordinator did not provide effective leadership. This position did not have a budget for adequate training and was only part-time.

• Post-Disaster Period

First, lack of effective interorganizational coordination slowed down the pace of recovery. Many problems of interorganizational conflicts and duplicative actions used up scarce staff time and resources that could have been used for other pressing needs. The case of households being surveyed on multiple occasions by damage assessors exemplified this problem.

Second, because of no pre-disaster recovery plan there was a low capability to undertake recovery activities, no organizational arrangements and coordination in place, low understanding of NGO disaster recovery programs, and low knowledge of what external resources were available.
Thus, most post-disaster recovery activities were undertaken on an ad hoc basis. Since such improvisation dominated recovery response decisions, the pace of recovery was inevitably slowed and made less efficient.

Third, NGO’s with substantial human resources were not, at least initially, acknowledged nor effectively involved in the recovery process. For example, it took more than two months after Hugo made landfall before CUSO and the Peace Corps initiated their recovery programs.

Fourth, many opportunities to prevent or mitigate future disaster losses during reconstruction were lost. A narrow approach of “just put it back” predominated. Many areas could have been reconstructed to be safer from future storms or to enhance underlying long-range development efforts.

Fifth, heavy dependency on foreign assistance and a lack of pre-disaster planning led to a loss of control on the part of Montserrat authorities. Only after the Housing and Rehabilitation Unit was created six months after Hugo did Montserratians begin to exert substantial control over its recovery and its future.

Sixth, much relief work on the part of the international NGO’s was not held to development standards. Some NGO’s, (e.g., Red Cross and U. S. Peace Corps) used their field staff to conduct recovery activities, but did not build on local organizational capacities. That is, staff assigned to recovery activities did not give attention to increasing local capacities to undertake long-term development projects.

Seventh, in some instances NGO relief programs could make little difference or even impede development in the long-run. That is, NGO work could have no impact or lead to a decline in local organizational capacity to facilitate recovery and development. Although the Peace Corps’ prefabricated housing project was successful in delivering new homes, it had limited impact on local organizational capacity building. Further, NGO control of a significant amount of recovery resources and resistance to attempts by government to collaborate, constrained domestic organizational influence in managing the recovery.

Eighth, building codes were inadequate for assuring that rebuilding would lead to improved hurricane safety measures. Further the procedures for implementing the codes during the disaster recovery period were not enforced.

Post Hugo Changes Regarding Long-term Recovery

Since Hugo several positive changes have occurred regarding disaster recovery planning. As in the case of disaster preparedness planning, many of these changes are in response to the problems encountered during the Hugo disaster response efforts. Further, these changes can also be attributed in part to the pre-disaster planning efforts taken by the PCDPPP. First, post-Hugo workshops have taken place that focused on sharing personnel and organizational disaster response experiences. These workshops were organized by the National Disaster Coordinator. Another workshop in Antigua
was regional in nature and was attended by Montserrat government and non-government officials. Still other workshops were on storm resistant building design, and on linking recovery to long-term development issues.

Second, the Disaster Executive Committee has held regular monthly meetings to review and evaluate disaster response strategies. Based on these assessments the committee has been revising the National Disaster Plan and some government organizations have been updating their individual plans.

There are, however, several limitations to this increased priority directed to disaster planning. As discussed previously, one is that the government has only made a marginal increase in the budget for disaster planning (EC$5,000 to EC$8,000). These funds are obviously not sufficient to undertake the tasks required for developing an effective disaster recovery planning program. A second limitation is that as of Fall 1990 an updated National Disaster Plan has not been adopted by the government. Finally, the major portion of post-Hugo disaster planning activity appears to reflect the pre-disaster trend of placing great emphasis on emergency preparedness and little emphasis on disaster recovery.

Based upon the preceding analysis, we offer a number of policy and action recommendation. These recommendations refer to emergency planning, response and recovery. The recommendations suggested here should provide a starting point for improving the emergency and recovery programs on the island. Specific emergency planning, response, and recovery activities and priorities need to be worked out for Montserrat, but in most cases should include the following activities.

**Emergency Planning and Response Recommendations**

1. A program for modernizing, updating and enhancing emergency resources should be undertaken. Priorities should be given to the Health Sector, communication facilities, and the port.

2. The position of National Disaster Coordinator should be made a full-time, independent position that is directly responsible to the Chief Minister.

3. The budget funding for disaster preparedness should be increased to a proper and effective level.

4. The National Disaster Plan should be immediately updated based upon the lessons learned during Hurricane Hugo.

5. This revision of the National Disaster Plan should be undertaken by the governmental and NGO officials of Montserrat, who will be responsible for implementing it during future disasters.

6. Greater emphasis upon the emergency response, recovery and mitigation phases of disasters must be placed in future national disaster planning.
7. The system designating District Disaster Chairmen must be reassessed. The criteria for selecting Chairmen should be based upon disaster experience, technical skills, management expertise, and proven leadership abilities.

8. Training and resources should be provided for District Disaster Chairmen.

9. Future planning should consider contingencies for the loss of communication facilities, port facilities, and contact with outside meteorological and emergency response agencies.

10. Those Ministries and organizations that have not undertaken any internal disaster planning must undertake these activities.

11. All Ministries and organizations should focus their planning efforts on post-hurricane response, recovery and mitigation measures.

12. All Ministries and organizations should submit their plans to the Executive Disaster Committee for evaluation and integration into the National Disaster Plan.

13. Public education and training programs should be enhanced.

14. All disaster planning should be viewed as an ongoing process of public education, training, inventory, and resource procurement, and not simply as the development of a paper plan.

15. The warning system must develop mechanisms for effectively warning the public in the absence of the mass media.

16. Attention must be paid to evacuating hazardous areas to previously designated safe locations. The responsibility for this action should be delegated, and the legality and efficacy of forced evacuation should be studied.

17. Shelters that are to be used as a refuge for short-term, impact sheltering must be examined and determined to be structurally sound.

18. An upgraded EOC with adequate communication facilities should be established.

19. The coordinative roles of the Executive Disaster Committee and the EOC must be more clearly delineated.

20. If the EOC is to play a coordinative function in future hurricanes, it must be staffed and operational before the storm.

21. Greater attention must be paid to the problem of internal communication.
22. The issue of role abandonment should be further studied by those within the nation, and if warranted, appropriate training and education programs should be developed to assist emergency workers in carrying out their duties.

23. A system for rapid and effective damage assessment must be developed. Prior assignment of responsibilities and the development of appropriate assessment methodologies must be undertaken.

24. Provisions should be made for the delegation and coordination of search and rescue activity. Training for appropriate police, defense force or health personnel in search and rescue should be provided.

25. Provisions for handling the dead should be developed.

26. Shelters must be upgraded and provided with adequate cooking, safety and sanitation facilities.

27. An effective program of shelter management must be undertaken.

28. An equitable system for the distribution of food and other emergency supplies at the district level should be developed.

29. A system of needs assessment should be developed that incorporates an ongoing inventory of supplies on the island with forms to effectively determine needs in the post-impact period.

30. Greater communication between and coordination among national and regional relief efforts are needed. In particular, if CDRU is to become institutionalized, national governmental units must be involved in its preparedness activities.

Recovery Planning Recommendations

A major emphasis of this research is that hazard mitigation, recovery and long-term development are interrelated activities. In Montserrat these activities should all be considered in recovery programs. All require planning and depend on similar information bases. It should also be recognized that actions taken (or not taken) in the emergency phase, have impact on the subsequent recovery phase. The following recommendations are offered:

31. Designate a Disaster Recovery Task Force to give direction to long-term recovery. Actions needed to establish this organization are to specify: sphere of responsibility during pre- and post-disaster periods; membership; procedures for activating the organization; and responsibilities of each member.
32. Conduct hurricane hazard vulnerability analysis to describe, at least in general terms, the population-at-risk, and the extent of damages to buildings and public infrastructure to be expected for different locations. Such an analysis requires review of the best available information on location and magnitude of hazards, and, if possible, on structural characteristics of existing buildings. This information can be used to estimate probable damages from future storms.

33. If data are inadequate, institute programs to improve information base for making damage estimates for use in recovery planning.

34. Review existing building codes and compliance procedures for adequacy in relation to hurricane forces to assure safety. This step requires the updating of the Caribbean Uniform Building Code, particularly for small buildings, and the hiring of additional inspection staff. Such staff, however, should not be viewed as "enforcers" of the code, but as promoters and trainers of appropriate building construction practices. The code should not be viewed as "regulatory," but as a guide for providing sound construction practices.

35. Establish regulations defining areas where new building construction is prohibited or subject to special requirements to assure safety.

36. Establish retrofit priorities giving top priority to critical facilities, such as electric power lines or schools, essential to health and safety, and to those facilities that could cause severe loss to occupants or property in the event of their failure.

37. Prepare a loose-leaf binder containing information on potential sources of disaster recovery assistance and instructions on how to apply for such assistance.

38. Provide for training that brings together persons from different organizations that would be involved in the recovery effort. Such training (workshops, table top exercises) would also serve to establish new patterns of communication and cooperation, particularly among government and NGO staff within Montserrat. Professional organizations in engineering, geology and architecture, among others, could play a useful role in such training.

39. Educate sponsors of donor organizations to gain support for using their funds for development activities in disaster relief programs. While training officials involved in carrying out programs is important, training of sponsors is crucial as well.

40. Update National Disaster Plan to include a recovery component and to incorporate lessons learned from recovery experiences.

41. An update of the National Disaster Plan should occur to review appropriateness of recovery strategies as the pattern of urban development, population, economic and hazards conditions change.
42. Revision of National Disaster Plan should be done by representatives of government and non-government organizations that would be involved in the recovery process.

43. Revision of National Disaster Plan should evaluate recovery procedures including the roles and assignments among cooperating organizations.

44. View a disaster as opening up a window of opportunity to do development work.

45. Compile and maintain information regarding non-government organizations that are undertaking (or could undertake) development activity; establish and maintain contacts with such organizations.

46. Domestic and international relief organizations should rely on local people and leadership whenever possible. Such reliance can facilitate long-term recovery and can improve the chances for occurrence of local developmental initiatives. Relief organizations should emphasize building up human skills, and not solely rely on physical and material assistance.

47. Establish evaluation criteria to hold government and NGO relief activity accountable to long-term development standards. Such criteria would serve as a benchmark for monitoring and evaluation of impacts on development. Impacts could be measured based on mitigation, environmental protection or economic growth criteria, among others.

48. Think of local people that experience loss from a disaster as "participants" in the recovery process, and not "victims."

49. Establish a public information program with communications aimed at various segments of the population. The program should cover: information about hurricane and its effects on the island; updates on programs and plans for recovery; information for homeowners and businesses which describes assistance programs and "how to" instructions for repair; continuous progress reports on major recovery problems and responses to such problems.
CHAPTER 1
INTRODUCTION AND RESEARCH METHODOLOGY

In the early hours of September 17, 1989 Hurricane Hugo struck the 39-square mile island of Montserrat with devastating effects. In its wake it left 11 persons dead, others injured, and over 3,000 homeless. Physical damage to homes, businesses, and public buildings was extensive. About 45 percent of all dwelling units were totally destroyed, with an additional 40 percent sustaining serious damage. The island's tourist industry was also severely damaged, with the loss of more than 80 percent of its hotel rooms. All government buildings and schools were partially or totally destroyed. Total damage to property was estimated by the government to be in excess of EC$990,000,000.

This report discusses the findings of an examination of the emergency planning, response, and long-term recovery activities by government and non-governmental organizations in Montserrat. (As part of this project, two additional case studies of the disaster planning, response, and recovery experiences of Antigua, and St. Kitts and Nevis are also near completion.) Our key concern is to analyze the planning, response and recovery activities in order to gain knowledge that can be utilized to lessen the consequences of future hurricanes in the region. With regard to emergency planning and response, we will focus upon the major problems and difficulties encountered in these areas in an attempt to improve future planning and response measures. Regarding recovery, the intent is to derive recommendations for developing successful recovery planning programs that make reconstructed localities less vulnerable to future disasters, and to enhance prospects for distributing recovery aid on the basis of need, and to improve local capability to undertake development efforts. In addition to any usefulness this study may have as a description and evaluation of the planning, response, and recovery experiences in the Eastern Caribbean, we hope it will aid in the development of disaster recovery planning programs in countries that have not recently experienced a disastrous event.
Research Methodology

This study utilizes a number of traditional data gathering devices to undertake this in-depth analysis. The primary data source involves on-site, in-depth, face-to-face interviews with key informants involved in disaster planning, response, recovery and long-term development efforts in Montserrat. A total of 17 interviews were completed during July and August of 1990.

A snowball sampling technique was used to develop a comprehensive list of informants who were key participants in the various phases of the disaster impact. The objective was to reach knowledgeable influential people who were active participants in the disaster effort, or were in a position to objectively observe the activities of participants. Initial informants were identified based on a review of key printed materials (e.g., agency reports and disaster plans). These individuals were asked during the interviews to identify others who should be interviewed and thus the sample was expanded. The informants came from a variety of government agencies, foreign and domestic non-governmental organizations (NGO's), and private businesses. Informants came from agencies representing such areas as health, national government planning, agriculture, public works, mass media, community development, police, and various NGO's.

Interviews were rich in information regarding the pre-impact, post-impact and recovery phases. They provided detailed data on the activities of various governmental and non-governmental organizations. The interview guides which were utilized for gathering data on emergency planning and response focused upon such issues as the quantity and quality of pre-hurricane emergency relevant resources on the island, the extent and nature of disaster planning that had taken place prior to the storm, the nature, problems, and accomplishments inherent in various response activities, such as damage assessment, search and rescue, the provision of emergency medicine and sheltering, and the nature of the organization and coordination of these tasks. Also the interviews were designed to identify principal concerns about hurricane recovery issues, specific recovery response activities, modes of interaction among various participants in the recovery process, and to explore explanations for successes and failures of various recovery responses.
In addition to the interview data, documentary information was also gathered. This material consisted of technical reports, disaster plans, after-action reports, newspaper coverage of the storm, published investigations, and photographs. This material was content analyzed relevant to the planning, response, and recovery dimensions. This information provided a rich data base for the analysis.

Chapter Overview

This report is presented in 12 chapters. Chapters 2 through 7 focus upon the emergency planning and response phases. In chapter 2 the analysis scheme that will be utilized in examining emergency planning and response will be presented. In addition, the pre-Hugo context of resources and prior disaster experience will also be briefly discussed. Chapter 3 includes an analysis of the disaster planning that had taken place on the island prior to the storm. It also discusses what preparatory measures were taken on Montserrat in the 48 hours before Hugo struck. Chapter 4 describes the economic and technological impact of the storm. The organizational and communication problems inherent in the post-impact response are the focus of chapter 5. Specific disaster response activities, such as sheltering, damage assessment, the distribution of aid, handling the dead and the provision of emergency medicine are discussed in chapter 6. Chapter 7 presents a summary of the major findings regarding emergency planning and response. Chapter 8 shifts the focus of the report to recovery by presenting the analysis scheme that will used to examine long-range recovery. The recovery process is presented in chapter 9. Chapter 10 discusses the dimensions of recovery. The major findings regarding recovery are summarized in chapter 11. The policy and action recommendations for the entire study are presented in chapter 12.

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CHAPTER 2
THE ANALYTICAL SCHEME UTILIZED IN EXAMINING EMERGENCY PREPAREDNESS AND RESPONSE AND THE PRE-IMPACT CONTEXT AND RESOURCES

This analysis is embedded within the rich tradition of disaster research into emergency planning and response that has developed over the past four decades (Drabek, 1986; Dynes, 1970; Wenger, Quarantelli and Dynes, 1988; Auf der Heide, 1989). As such, we will discuss the following topics:

1) Pre-Impact Context and Resources. Special attention will be given to the previous planning efforts that had taken place prior to the hurricane. The various emergency plans that existed prior to the storm will be analyzed. In addition, such factors as prior disaster experience and the quantity and nature of emergency relevant resources on the island will be considered.

2) Immediate Pre-Impact Activities. Warning, evacuation, protective measures, and emergency sheltering will be discussed. Each of these activities will be evaluated in light of the findings from previous research.

3) Economic, Social, Health, and Physical Effects of the Impact. The impact of Hugo will be described. This description is essential in order to understand the magnitude of problems facing the island in the immediate post-impact period.

4) Post-Impact Organizational Response Activities. General characteristics that were associated with the organization of the response will be analyzed. Specifically, we will focus upon communication, coordination, and role conflict. We will examine the effect of these three factors upon the accomplishment of specific tasks in the emergency period.

5) Post-Impact Tasks. The specific post-impact activities that were generated by the storm itself will be discussed and evaluated. These tasks include damage assessment, search and rescue, debris clearance, provision of medical services, handling the dead, sheltering, social control, distribution of aid, and the restoration of lifelines.

6) Major Successes and Problems. The factors and activities that were handled best, and those that were the most problematic, will be identified. This analysis will summarize the major findings in an attempt to determine what lessons may be learned from the Hugo experience.
7) Post-Hugo Changes. We will examine any changes that have occurred with regard to emergency planning and response since Hugo. Also, we will consider what attempts have been made to remedy the previously noted problems.

Pre-Impact Context and Resources

Montserrat is a small, British colony of about 12,000 people. It is located in the eastern Caribbean region and is part of the Leeward chain of islands. The economic base of Montserrat is primarily dependent on tourism, and to a lesser extent, on agriculture. Over the past 20 years the island has increasingly become a vacation and real estate investment locale, with many wealthy Europeans and North Americans building large second homes. The capital city is Plymouth. The impact of Hurricane Hugo upon the island and the response of its people and organizations to the disaster must be placed in the context of the available human and material resources that were existent within the nation at the time the hurricane struck. Among the more relevant resources were the following:

Police and Fire Units. The Montserrat police force included 96 uniformed personnel and a clerical staff of two. In addition to law enforcement activities, the department has 10 officers assigned to Immigration anc six men to fire suppression. With regard to equipment, the unit had about six vehicles, two motorcycles, three fire trucks, and two small land rovers in outlying districts. Their communication equipment included one UHF radio system that linked the six police stations in Montserrat. Another radio allowed them to communicate with other Caribbean islands. Some hand-held radio units were also available. The communication system was held together by a repeater station. However, as a number of informants noted to us, the system was not really adequate, even before the hurricane.

Health. The nation is served by one 67 bed hospital and 11 clinics. A total of five physicians are on the island, including one surgeon and one anesthesiologist. (However, two additional physicians were visiting the island at the time of the storm.) The number of nurses is unknown. There are two ambulances on the island that are operated by the Ministry of Health.
The Montserrat Defense Force. The Defense Force was a voluntary unit of less than Company size. As one government official noted, "We did not have enough military personnel to handle the problems of the storm, we had to have more from outside."

The Department of Public Works. The Department of Public Works has a staff of about 30-40 people who work as road crews. Other staff work in the communication division. With regard to equipment, they had 67 pieces, including one D-8 bulldozer, two D-6 dozers, three tipper trucks, and a couple of front end loaders. However, they had a shortage of some equipment, such as chain saws.

Mass Media. Three radio stations were operating on Montserrat at the time of the storm. GEM was a private, FM station, Radio Antilles was a powerful shortwave station owned by European interests, and Radio Montserrat was the government station. Two local newspapers, the Montserrat Times and The Reporter, also served the island.

Communication Facilities. Emergency communication facilities were limited to the previously noted police and mass media capabilities. In addition to the local telephone system, external emergency communication capabilities were available through the airport, port, utilities and a group of local ham operators.

Port and Airport Facilities. A small port was located in Plymouth, the capital. A small airport with a relatively short runway was located on the other side of the island.

In addition to these emergency relevant resources, the condition of housing on the island must be noted. The Caribbean Building Code was in place prior to Hugo, but there has been limited effort in enforcement. As revealed in a damage assessment study (Gibbs and Brown, 1989), most buildings on the island were not built based on hurricane resistant construction practices. Further, there were no land development controls in place, such as zoning and subdivision regulations, that might account for hazard mitigation. Extensive development in several urbanized areas is in the floodplain. (It was fortunate that Hugo was a "dry storm" with limited rainfall and with a moderate storm surge of less than eight feet. Property damage along coastal shoreline and inland "guats" could have been more extensive.)
Prior Disaster Experience

It had been many years since a hurricane struck Montserrat. The last major hurricane impacted the island in 1928. Although a series of hurricanes had hit the island in the 18th and 19th centuries (major storms had struck in 1737, 1740, 1744, 1766, 1772, 1866, 1867, and 1898), it had been 60 years since any catastrophic storm had struck (Fergus, 1990: 7-9). This lack of disaster hurricane experience was noted by a number of individuals, who felt that it limited preparedness and response activities for Hugo. As one informant noted,

What Montserratians knew of a hurricane was from the older people, and they were very few in number. A lot of the older house roofs, one could see that they were built from experience. But, there were no documents available to say, for example, that because of a storm in 1928 that our older houses have been built like this.

Another respondent noted that "There was no sensitivity or realism of the nature of the problem before Hugo. Because of a lack of experience, we were not able to convince people of what they should do."

A Pan American airliner crashed on the island in the late 1960’s. It was the last major disaster event encountered by the officials and public of Montserrat. This crash killed 29 people and stressed the capabilities of the police and emergency response components of the nation. However, no recent hurricane had occurred that provided a recent benchmark for the encroachment of Hugo. While the island has a potentially active volcano and is located astride an active seismic fault, a disruptive event stemming from these hazards has not occurred for many generations.

However, it is important to note that one individual on the island, the Governor, had extensive experience with previous hurricanes because of his posting within the British Commonwealth. The Governor personally had experienced five previous hurricanes, and his experience was to play an important role in the response of Montserrat to the wrath of Hugo.

In sum, before Hugo Montserrat was quite vulnerable. It possessed limited emergency relevant resources. Furthermore, it had been over six decades since a disaster had struck the island. One way in which to lower vulnerability is to improve planning for disasters. At this time let us turn to an examination of the disaster planning that had taken place on the island.
CHAPTER 3

PRIOR DISASTER PLANNING AND
IMMEDIATE PRE-IMPACT ACTIVITIES

In order to better understand the response of Montserrat to Hurricane Hugo, this chapter focuses upon two pre-impact topics. First, we will discuss and analyze the status of emergency planning on the island. As was noted, Montserrat was vulnerable to devastation, given its lack of resources and prior disaster experience. We will consider how effective the planning measures were in mitigating this vulnerability. Second, we will analyze the immediate pre-impact activities of warning, evacuation, emergency sheltering, and general preparedness measures.

Prior Disaster Planning

At the time of the storm Montserrat did have a disaster plan. The document was completed in 1987 by the previous National Disaster Coordinator. According to some of the informants, it was an updated, formalized statement of some previously understood emergency plans that existed within various Ministries and agencies.

The National Plan was a 69 page document that primarily focused upon the emergency period. It delegated authority for disaster response to a six member Disaster Executive Committee composed of the Permanent Secretary, the Disaster Co-ordinator, the Permanent Secretaries of Administration and Ministry of Communications and Work, the Commissioner of Police, and the Commanding Officer of the Montserrat Defence Force. In addition, there were six Standing Committees assigned to coordinate planning in the following specific areas: Public Utilities and Works, Telecommunications, Information and Education, Food and Supplies, Health Services and Welfare, and Shelters. Each Standing Committee had representatives from various governmental agencies and NGO's.

Montserrat also employs a part-time National Disaster Coordinator within the Government Information Unit. This coordinator serves as a policy advisor and provides administrative assistance to the Disaster Executive Committee. The coordinator also has the responsibility to be the chief advocate in promoting hazard awareness and planning in the country.
Of particular importance, it must be noted that the plan also divided the island into 11 districts, each of which was to have a District Disaster Committee. The Committees were to have responsibility for normal disaster functions within their local areas. They were to develop their own plans. Furthermore, the District Disaster Chairmen were to play pivotal roles in the disaster response. Not only were they to oversee disaster operations within their locales, but they also were to serve as liaison personnel to the national Executive Committee and the Emergency Operations Center (EOC).

The plan was a somewhat standard functionally based document. In particular, it specified the planning responsibilities, and to a lesser extent the response activities, of various Ministries and agencies within the government. It also considered the responsibilities of various NGO's such as the Red Cross, the St. John's Ambulance Brigade, and the Rotary, Lions and other service organizations. It also prescribed the staffing and functions of the EOC, which was to be opened prior to the storm and to be under the "command and control" of the Commissioner of Police.

With regard to the impetus for this planning effort, a number of informants noted the important role played by the Pan Caribbean Disaster Preparedness and Prevention Project (PCEPPP).

The PCDPPP was involved in the planning. They organized meetings and they stressed the need to update plans. They promoted planning and having people know what their roles would be. They provided expertise and literature, although not much finances.

Another informant noted that:

The impetus for the national plan came from PCDPPP. Also significant was the perception of the importance of PCDPPP activities by the Governor...The PCDPPP provided some training at the management level and generated an awareness of the principles involved in disaster management.

Although a national plan existed, a number of problems with it were noted by a variety of informants. First, the 1987 plan had never been updated. As one knowledgeable informant stated, "It was purely a paper document. There were no previous tests or exercises of the plan." Although a simulation of a volcanic disaster was held in 1988, little attention had been given to disaster preparedness at the national level over the previous two years.
Second, it focused primarily upon the pre-hurricane period, and did not give enough attention to the post-hurricane responses that would be necessary. As one informant observed, "The plan focused on before the storm, and not after. The plan for activities before the hurricane worked pretty well, the problem is that there was no plan for after the storm...We are working on that problem now." In addition, it paid very little attention to the complicated issues of national recovery and the mitigation of future disastrous, hurricane impacts. (See chapter 8).

Third, the plan placed significant responsibilities on the shoulders of the District Chairmen; however, it provided very little, if any, training in disaster and emergent management to those individuals. The individuals who were selected to serve as District Chairmen were not selected on the basis of their training or prior disaster experience; many were local business persons and community leaders.

Fourth, it assumed the continued ability for internal communication within the island. It assumed that the EOC would be able to efficiently and effectively communicate with the various responding Ministries and agencies. Also, it assumed that District Chairmen would be able to communicate with the EOC.

Fifth, there was very limited official emergency management training or public education activity on the island. While a few public address announcements regarding basic hurricane education and protective actions were aired and printed by the local media, a systematic program of public education did not exist. Furthermore, there was limited training for both governmental and NGO officials in how to prepare for and respond to a disaster. This weakness is apparent in a number of areas, but was particularly obvious in the lack of trained shelter managers and District Chairmen.

Sixth, and perhaps most significantly, the planning did not provide the National Disaster Co-ordinator with the proper training, or financial or structural arrangements to undertake proper disaster preparedness. The current Disaster Co-ordinator, while very capable and possessing strong management skills, had never received training in disaster management. The budget for disaster planning amounted to only EC$5,000. In addition, the position of "Disaster Co-ordinator" was part-time and "tapped on" to another position, housed in information services, within the government.
In sum, at the national level the planning indicated the rather common problem of viewing planning as a product, and not as a process (Dynes, et al., 1982, Wenger, et al., 1989). A plan did exist. Some local buildings had been designated as shelters. However, planning, as viewed as a process of continuous updating of plans, training and education of officials and the public, and the inventory and stockpiling of emergency-relevant resources, generally was lacking.

However, more elaborate planning measures were taken within various Ministries and organizations at the sub-national level. The quality of these planning efforts varied widely. Some of the efforts were quite laudable and effective. For example, within the Ministry of Agriculture, Trade, Lands and Housing (MATLH) a rather detailed and updated plan had been developed. The plan covered such tasks as monitoring weather reports and tracking storms, provisions for protecting the Ministry's vehicles, and battening buildings and equipment. It also delegated specific responsibilities for each officer within the unit. In addition to focusing upon these pre-impact preparedness measures, the plan also included detailed procedures for handling food distribution. Perhaps most importantly, the plan had been updated as recently as two months before the impact of Hurricane Hugo.

These positive components of planning within MATLH, however, were muted somewhat by two factors. First, the plan did not provide sufficient attention to the problems of disaster housing, a task that had been assigned to the Ministry. As one informant noted, 'The Housing Section was weaker than the section for Food Distribution. The housing capability within the Ministry was very small. It's planning was 'in theory, but not in fact.' It was not our strong suit.' Second, it was an internal plan that was not integrated with national planning.

Similarly, planning had occurred within the Health Sector. A General Health Sector plan had been developed in 1987 and had been updated prior to Hugo. The plan generally covers the preparedness and response activities for Glendon Hospital. However, one official noted that the plan did not place enough emphasis on post-hurricane activities. "Our pre-hurricane planning was good, but the post-hurricane planning could have been better." Drills and exercises of the previous plans had taken place in the past in the simulation of such disasters as an evacuation of the hospital and a school bus crash. Also, the health sector was involved in the national volcanic exercise held in 1988.
Some limited planning had also taken place within the Public Works sector of the Ministry of Communications and Works. Basically it involved some prior understandings regarding pre-impact activities, such as measures to protect public property and buildings and the placement of heavy equipment at critical points on the island, and post-impact strategies for road clearance.

How effective was the overall planning on the island? A few of our informants felt that it was adequate. For example, one person noted that:

There was fairly good national preparedness. Planning might have been more detailed, but that is common. By and large, people who had responsibilities knew what they were supposed to do.

Others were not so positive. A number of informants noted that at both the national and organizational levels the plans paid too little attention to post-hurricane activities. Furthermore, the quality of plans varied significantly. While some rather effective planning had occurred within some agencies, particularly the agricultural and health sectors, it was viewed as being quite poor in others. As one informant noted:

The planning varied greatly in quality. The health area was good, and so was the food planning within agriculture. The Public Works area was alright. But such areas as housing, shelter management, and national communication to outlying districts was very poor.

Therefore prior to the arrival of Hugo, the state of emergency preparedness and the resources available for emergency response could best be classified as being meager. The island was not blessed with a plethora of emergency supplies, equipment, and communication gear. Its port and airport facilities were limited. While some disaster planning had taken place, it was mainly product oriented, and not process oriented. In particular, there had been very little training in disaster management or public education. As the middle of September, 1989 arrived, this small island stood directly in the path of one of the most ferocious hurricanes to ever strike the Caribbean region.
Immediate Pre-Impact Activities

As Hugo swarmed through the warm waters of the Atlantic gaining strength on its westward jaunt, the people of Montserrat began to receive weather warnings of the approaching storm during the week of September 10, 1989. The warnings intensified from Wednesday until the storm struck in the early hours of Sunday. In this section we will discuss the island's activities with regard to four pre-impact activities: warning, evacuation, sheltering, and pre-impact preparedness measures.

Warning. All weather forecasts, including hurricane warnings, come to Montserrat from the meteorological office at V.C. Bird International Airport in Antigua. This arrangement is part of the Caribbean Meteorological Council which links a network of six meteorological stations throughout the region. This entire system is also linked to the National Hurricane Center in Miami. Forecasts for the region are initiated in Miami and are distributed through the network.

The hurricane warnings come by wire to the meteorological office at Blackburne International Airport on Montserrat. Also, the local electronic media have direct lines to the meteorological office. According to the National Disaster Plan, upon receipt of warnings, the Commissioner of Police is to notify the Executive Disaster Committee, and warnings are to be issued to the public under the supervision of the police. In addition to using the mass media, the plan calls for warning messages to be disseminated through sirens, bells, and other audio devices. However, there are no sirens, and these types of devices were not used during Hurricane Hugo.

In the three days prior to Hugo, the residents of Montserrat became increasingly aware of the approaching storm. While maintaining its Adult Contemporary format, GEM radio increased its weather updates and bulletins on Thursday, Friday and Saturday. Radio Montserrat and Radio Antilles did likewise. Equally important to the warning process was the role of cable television. Cable television can be widely found on the island, and the local system carried the Weather Channel. Therefore, many local officials and residents had rather continuous warnings of the approaching storm. In addition, interpersonal, or word-of-mouth, communication among the residents of the tightly knit nation also contributed to disseminating the warnings.
An important role in the warning process was played by the Governor. Based upon his rather extensive experience with previous disasters, the Governor took a very active role in warning the public. Among the comments mentioned by our informants are the following: "The police were not involved in warning, but the Governor was." "His Excellency, the Governor, did a lot to warn people. He drove around and insisted that people move from the Kinsale area." From Friday until the impact of the storm, the Governor utilized a variety of devices and media to convey warning messages. "The Governor warned the public by loudspeaker, radio and television. He went on the air a number of times. He also went directly into areas and personally warned people."

How effective was the warning system in providing warnings to the public and various officials? It is apparent that although the warning provisions in the National Disaster Plan were not specifically followed, the actual dissemination of warnings was quite effective. People were not warned by sirens and other devices, but they were warned effectively by the mass media and their fellow residents. Certainly by Saturday most of the island was aware that Hugo was approaching, and that it was a dangerous storm. Our informants offered that the message was widespread:

Were the warnings adequate for the island? I don't know how anything more could have been done. Apart from using force to get people to evacuate, nothing more could have been done. There is no siren system on the island, but people were adequately warned by radio, television and by people going around and spreading the message.

One informant who was on the island in 1928 during the previous hurricane offered this interesting comparison with the warnings in effect at that time:

In 1928 the island was completely undeveloped. You also did not have mass media. There were no meteorological stations, no international warning or tracking systems, no CNN and television showing pictures of the approaching hurricane. There was no doubt that it was going to hit. The island had plenty of warning. In 1928 we had to rely on the barometer.

However, while the warning messages were widespread among those on the island, were they effective? It has long been recognized that a warning that is issued, is not necessarily a warning that is received, properly
interpreted, and effectively acted upon (Drabek, 1987: 70-97; Miletii, 1975). Simply put, did people correctly interpret the severity of the warnings and take appropriate action; did they take the warnings seriously?

Unfortunately, without the benefit of conducting a random sample of the population, we cannot answer the question directly. However, we can turn to our knowledgeable informants who were on the scene and in a position to observe the public response.

Our informants were somewhat divided regarding the effectiveness of the public response to the warnings. A few felt that the public did take the warnings seriously. One noted that "the general warning notices were taken seriously." However, the vast majority offered opinions such as the following:

The public was adequately warned, but the people took the warnings too lightly. If they had taken it more seriously, a lot could have been saved. People were out walking around. They did not believe that anything would happen. After all it had been over 60 years since a hurricane had struck.

The public was adequately warned, but a lot of people did not take it as seriously as they should. You could see this based upon the rather crude and ineffective way in which they secured their properties.

At first nobody took it seriously. But on Saturday morning people started to after the Governor started warning them. So by Saturday, after a number of warnings had been issued, most people knew a storm was coming, but they had little experience.

In sum, the warning system functioned effectively, if not exactly according to previous plans. (However, the dependence upon the ability to communicate with outside and distant meteorological stations does place the local warning system in some jeopardy in future storms.) By Saturday, the "word was out." As we shall note in a moment, a number of government agencies and private businesses were taking pre-impact precautions. Also, many members of the public were boarding and protecting their property. However, as we shall indicate with the discussion of evacuation, there is also strong evidence that many on the island had a rather blase attitude toward the approaching storm. Given the lack of recent disaster experience, this response is somewhat understandable.

Evacuation. There was no formal evacuation ordered. No one was forcefully removed from their area of residence. On Saturday the Governor
decided to strongly recommend that the Kinsale area (a low lying locale) be evacuated. On Saturday afternoon, the police and some members of the Defense Force assisted in this effort.

How effective was the evacuation? Apparently very few people left this, or any other, area. As a police official noted:

The evacuation was only suggested. Hence, it was up to the people to decide whether or not to leave. The police provided officers and transport to assist the people. Most of the people were reluctant to evacuate because of fear of theft of property. Also, evacuations had been done in the past, and nothing happened.

Our informants were in general agreement that fewer than five persons evacuated in the period prior to the arrival of the storm. Whether this minimal response was a result of the stated fear of looting, previous "cries of wolf," not appreciating the seriousness of the threat, or simply "not having anywhere to evacuate to on a small island," we cannot determine. However, it is clear that in this regard the nation was quite fortunate. Hurricane Hugo, while generating devastating winds, did not produce a major storm-surge that could have inundated low lying, vulnerable areas. Although hurricanes in the Caribbean do not produce the magnitude of storm-surge that is associated with their striking continental mainlands, a future hurricane packing a significant surge could prove to be disastrous to unevacuated, low areas.

Emergency Shelters. Although few people evacuated during the day on Saturday, as the storm approached and its fury started to become evident, many sought emergency shelter. On Friday morning it had been decided at a meeting of the Disaster Executive Committee to open the 24 shelters on the island. (See the following discussion of this meeting.) These shelters had been previously designated by the Disaster Executive Committee. Although rather serious problems of shelter design and management were to become evident over the next few days (see chapter 6), in the period prior to impact they were simply viewed as places of refuge from the violent winds and rain.

How many people went to emergency shelters in the moments prior to the storm? There is no way to know, because there were no managers in the shelters and no records of who entered them. However, it is obvious that as the storm increased during the evening, sizeable numbers found their way to shelters. For example, one police official noted that "the police took people to
the courthouse. A lot of people went there. Before the storm hit we had about 50 people in the courthouse."

Unfortunately, many of these shelters did not provide proper protection during the storm. Although there is no evidence that anyone died in the shelters, like many buildings on the island, they suffered roof and some structural damage.

**Pre-disaster Preparedness Measures.** A number of governmental and private organizations were taking actions to prepare for the impending storm during the two preceding days. After receiving more specific hurricane warnings indicating that Montserrat was at risk, the Governor held an emergency meeting in his office on the morning of Friday, September 15, 1989. Among those attending with the Governor were representatives from Public Works, Health, Education and Community Services, the Media, the Commissioner of Police, and the National Disaster Coordinator. The eleven District Disaster Chairmen did not attend the meeting, but they were alerted to begin preparations.

At this meeting it was decided that the shelters would be opened and boarded against the storm. Water was to be brought to the shelters. Also, the government ministries were to be boarded. In addition, the Governor would go on the mass media and issue warnings.

It is important to note that the EOC was not opened at this time. *In fact, the EOC was never opened before the storm.* According to the National Disaster Plan the EOC was to be located at the police station and manned prior to impact. Hurricane preparedness measures were to be coordinated from the EOC.

Although no overall coordination of efforts was coming from the EOC, a number of ministries and departments were undertaking precautionary measures. For example, MATLH implemented its disaster plan. In this instance, prior planning appears to have been very beneficial and effective. As one informant in the Ministry noted, "The plan was very well followed for Hugo. Instructions were followed almost to the letter. For example, the Ministry headquarters at The Grove itself suffered roof damage, but files, typewriters, computers, etc. were safe because people took appropriate actions."

Similarly, Public Works spent the 48 hours prior to the storm boarding windows of public buildings and making other preparations. Work shifts were extended and personnel worked extra hours prior to impact. An inventory of
available equipment and supplies was undertaken. (They discovered that they had no working chainsaws, because they had not been maintained after being used in the past.) Heavy equipment was dispatched to Plymouth and to the eastern part of the island. A work crew was sent to Glendon Hospital to assist in boarding the windows.

Meanwhile at Glendon Hospital, a unit of 16 soldiers from the Defense Force assisted hospital staff in implementing the planned, pre-impact activities. The safety of the hospital building itself was a major concern to health officials. One health informant noted:

We more or less followed the plan prior to the hurricane. But, we knew, or strongly suspected, that the hospital would be damaged severely, because we did not have a lot of confidence in the structure of the hospital. So with this concern in mind, we discharged and moved some patients.

Most of the patients were discharged. A total of 22 patients remained in the hospital. The staff moved these patients into an area with a concrete roof. The on-duty shift was retained, and off-duty staff were requested to come to the hospital. Inventories of supplies were checked, and the 16 member Defense Force unit remained to "ride out the storm."

A number of observations regarding these pre-impact activities may be made. First, at the national level, a great deal of the activity was ad hoc in nature. Although functional areas generally followed those stipulated in the National Disaster Plan, many elements of the plan were not followed -- even though the pre-impact provisions were the strongest element of the plan. These ad hoc arrangements could be seen in the areas of warning, the failure to open the EOC, the coordinative role of the Disaster Executive Committee, and the improvised evacuation and emergency sheltering activities. Second, in those units that had previously undertaken planning, the effectiveness of their pre-impact activities were enhanced significantly. Third, the important role played by the Governor cannot be overstated. Although the extreme, centralized leadership role performed by the Governor was not part of the National Disaster Plan, the Constitution of the nation did allow for this arrangement during emergencies and crises. His strong, positive leadership was most beneficial to the nation, given the weaknesses that were evident in the prior planning efforts.
During the evening of September 16, 1989 Hurricane Hugo continued to roar toward Montserrat. As the wind and rain intensified, most residents took shelter. The Governor took refuge in his residence at Government House. He requested that radio stations remain on the air. Power to the island was cut at about 10 p.m. GEM Radio utilized a backup generator to remain on the air. At 12:40 a.m. GEM suddenly stopped its format of Adult Contemporary music mixed with emergency bulletins when Hugo destroyed its transmitting equipment.
CHAPTER 4

THE IMPACT OF HURRICANE HUGO

Throughout Saturday evening and Sunday morning Hugo smashed into the island. Since all the meteorological instruments on the island were destroyed by the storm, no one knows the actual force of the wind. Estimates placed the sustained wind speed at 140-150 miles per hour. However, based upon an analysis of the damage that resulted, some investigators estimate that wind gusts of 240 miles per hour may have occurred (Gibbs and Brown, 1989: 2.4)

Montserrat received the full brunt of one of the strongest storms to race through the Caribbean in the twentieth century. At about 11 p.m. a sizeable portion of the roof of Glendon Hospital was torn from the structure. As the winds increased, devastation occurred throughout the island. The dock and port facilities were lost. The terminal at Blackburne Airport was badly damaged and all the air traffic control facilities were destroyed. The radio transmission towers and microwave equipment on Chances Peak were turned into twisted rubble. The telecommunications mast on St. George's Hill bent to the ground. All the major facilities for communicating both on and off the island were destroyed. Most of the shelters lost their roofs. All public buildings, with the exception of the police station at Salem, suffered damage. The Government Headquarters was severely damaged and lost major portions of its roof.

Private businesses and homes also received heavy blows. The tourist industry was battered by the loss of 88 percent of the hotel rooms on the island, as the storm wreaked havoc on the upscale Montserrat Springs and Vue Point Hotels. Although damage to homes was particularly severe in Kinsale and St. Patrick's, none of the regions were spared. Upper class residential areas, such as Fox's Bay and Richmond Hill, and those housing the less affluent, such as Broderick and Webbs, were all severely damaged. Some estimates of damage in the press stated that over 90 percent of the housing stock had been destroyed. However, later reports produced more realistic estimates that 98 percent of all homes were affected, of which 50 percent suffered severe damage and 20 percent were totally destroyed (Hugo News, September, 1989: 4).
The island's infrastructure received a severe pounding. There was no electrical power as Montserrat Electricity Services (MONLEC) lost most of the power station roof and all of its transmission and distribution system. The phone system on the island was devastated as Cable & Wireless lost its microwave equipment. The water system was severely destroyed, and the loss of electricity did not allow for pumping.

The eye of the storm passed Montserrat at about 7:30 a.m. on Sunday. Then the winds once again returned to strong hurricane force and pummeled the island until about noon. Thousands of trees were destroyed. Debris covered the roads and made them impassable. Utility poles were slammed to the ground throughout the island.

In addition to the painful loss of homes, property and businesses, Hugo also took its toll in human life. Eleven people died during its impact. Most of the victims were elderly residents. Fortunately, there were very few injuries. Most of the injuries were minor, and only three persons required hospitalization. Compared to the magnitude of the catastrophic damage to property, the number of casualties was remarkably small.

However, finding other indicators of good fortune for the island was difficult. To some extent Montserratians were lucky in that Hugo did not produce a sizeable storm surge nor a significant amount of rain; it was a vicious, but relatively dry, storm. Therefore, no bridges or culverts were lost and low lying areas were spared major problems of flooding. Because of precautionary activities, there was not a significant loss of heavy equipment. Food warehouses and supermarkets lost little of their stock. Perhaps most importantly, the Governor was not one of the casualties.

By noon on Sunday Montserratians were out of their homes and shelters and surveying the damage. As we discuss the post-impact activities of the nation it is important to remember the sheer magnitude of the problems that it faced. The destruction on the island was catastrophic. Although there were a number of problems and deficiencies that occurred in the post-emergency response over the next two weeks, the tasks were Herculean and the efforts were laudable.
CHAPTER 5

POST-IMPACT ORGANIZATIONAL RESPONSE

In discussing the emergency activities that took place in the immediate aftermath of the storm, we shall present a brief description of the first few hours. Subsequently, we will discuss some general response components that underlie specific activities. Among the issues to be considered are communication, coordination and role conflict. In chapter six we will discuss such specific tasks as search and rescue, damage assessment, social control, health care, handling the dead, sheltering, the distribution of emergency aid, and the restoration of lifelines.

Post-Impact Activities

On Sunday there was very little organized emergency response activity. Because of the extensive debris on the roads, traveling any distance other than on foot was almost impossible. Telephones and other forms of non face-to-face communication were inoperable. Therefore, families and neighbors formed small, isolated pockets of informal group activity to assess the damage and begin to pick up the pieces. Most people remained near their homes or the shelters where they had taken refuge during the storm. As one informant noted, "On Sunday, people were either in their own house, or a friend's, or in shelter." Another official simply noted that "On Sunday, I was in shock."

The Governor went to the EOC at the police station on Sunday, however the EOC was still not formally staffed or opened until Monday. The Governor met with some police officers, including the Commissioner. Some of the officers had remained at police headquarters during the storm. A representative from MONLEC also came by. However, given the inability to communicate with others on the island and the impediments to travel, it would be at least two more days before the EOC was fully staffed and operational.

While internal communication was basically nonexistent, Montserrat was not totally cut off from the outside world. Bobby Martin, a ham radio operator, worked from his home to link the island to outside agencies. A few other hams also began to inform the world about conditions in Montserrat.

On Monday the British Navel frigate H.M.S. Alacrity arrived in the harbor of Plymouth. In addition to bringing her helicopter, and crew of about
100 sailors, she also brought her radio which further linked Montserrat to the outside world. Also on Monday the more formal and organizational response began. We will discuss various elements of the response. However, before discussing such specific tasks as damage assessment and handling the dead, we will consider two contextual issues that influenced all that was done over the next two weeks. These two contextual issues are communication and coordination of the response activities.

**Communication**

The loss of communication facilities created serious problems both for external and internal communication. As was previously noted, except for a small number of ham operators, there was no way to communicate off the island until the H.M.S. Alacrity arrived on Monday. There were no functioning radios at the EOC or the police headquarters. As one informant noted:

Initially, there was supposed to be a ham operator at the EOC, but he was off the island at the time and not available. He came back and ham operators were working out of Barclay’s Bank. There was no radio at the EOC itself; it was broken. Although police have a radio there, it was not functioning. From Monday until Thursday we were mainly able to communicate through the British ship, the ham operators, and aircraft coming to the island.

On Thursday the Pan American Health Organization (PAHO) came to the island with a portable satellite. Therefore, five days after the storm external communications were possible through a combination of the Alacrity, the PAHO satellite, and the placement of a few ham operators at the airport, Red Cross headquarters, and a bank. One official involved in procuring emergency aid for the island noted that:

We first were able to contact the donor agencies through the ship. By about Thursday PAHO came and we were then able to call donor agencies through the satellite link that they established.

However, the problems of communicating off the island were relatively minor compared to the problems of internal communication on the island. The
following observations by a government emergency official indicate the magnitude of the problem:

We had no communication on the island. The police used a loudspeaker for the first two days and just went around giving out information. Initially, if people wanted to find out what was going on, they had to travel by foot, but main roads were cleared pretty quickly. After two days you could drive around. A phone line was finally placed at the EOC within about a week.

Similar problems were echoed by an official from the health sector.

There was very limited communication at the EOC. All they had were police, line-of-sight stuff, like walkie-talkies. After Monday, however, they could communicate with the British ship.

An official from a NGO remarked:

All phones were lost on the island. We had no means of internal communication, other than physically going somewhere, such as the EOC. Prior to the storm each police station had a radio, but all the antenna were blown down.

Finally, one government official described the negative effects of these communication problems in this manner:

In trying to get a quick coordination of food effort, we worked with the central disaster committee. We told them that we needed to get word to and from the district people. But, the only way to communicate with the EOC was to physically go down there. The first morning we had to walk to the EOC, but by the third morning the main road was clear and we could actually drive down there. It would be valuable to have the district people on a radio network that we could have access to.

Below the national level similar problems existed for many organizations. For example, a health official noted that:

There was no communications at the hospital after Hugo. We did not even have internal communications at the hospital. Some form of communication system was badly needed. We could not communicate with anybody else, such as Public Works, Agriculture, etc. It was months until the hospital had a working phone.
The Montserrat police force was utilized as a short-term solution to the problem of communication. As one official noted:

After Hugo, the police used hand sets or walkie-talkies to communicate, but this was limited only within Plymouth. However, the police were being used as couriers; they were taking messages to people. This is not a good or proper use of the police.

Communicating with the public through the mass media system was also extremely difficult. All local radio stations were off the air for at least two days. During the weeks following the emergency only GEM Radio was able to broadcast, and they did so for limited hours and at reduced power. As one media official observed:

GEM's transmitting facilities suffered total destruction. All the transmitters and antennae went down. They used a spare antenna and sections of two antennae to get back on the air. On Tuesday afternoon they once again were able to broadcast, but with service limited to the Plymouth area. However, by Thursday they had pretty good coverage to most of the island. But, they never got back to normal operations and programming until November 1, 1989.

Problems of communicating to the public forced government officials to utilize outside media. As one official described:

How did we communicate with the public after the storm? Well we had GEM Radio after about three days for limited coverage. But, mostly we sent tapes over to Antigua and radio stations there would broadcast it.

In addition, the government began publication of "The Hugo News." This government newsletter was first published by the Information Unit on September 22, 1989. It varied in size from four to eight pages. Its publication run of 500 copies came out two or three times a week for the next month. Both the use of outside radio stations and the publication of "The Hugo News" were unplanned, improvised attempts to inform the public.

It is important to note that the previous planning that had taken place at the national level did not foresee the total loss of communication facilities. There were no plans for establishing critical circuits or backup systems. Ease of communication within the nation was assumed. This weakness in prior
planning, combined with the severe destruction of the communication system, was one factor that seriously hindered the ability to undertake and effectively coordinate emergency response measures.

The Coordination of Emergency Response Activities

It was not until Monday that organizational response activities began on any meaningful scale. On Monday morning many government employees and officials reported to work. The Public Works claimed to "have no no-shows" as it began to clear the road from the airport. In other Ministries organizational response activities also started.

The coordination of these emergency response activities was to be undertaken by the Disaster Executive Committee at the EOC. However, although the EOC was to be staffed and operational before the storm struck, it actually did not begin to function until Monday, and it was not "up and really running" until Tuesday. Prior to the storm the Governor assumed leadership and "took control of the situation." This pattern continued for at least the two weeks after Hugo hit.

After making his Sunday visit to the police station and its EOC, the Governor went to the EOC on Monday. The first official meeting of the ad hoc group that would coordinate the disaster was held during the morning. The Governor was joined by the National Disaster Coordinator, the Commissioner of Police, and representatives of other agencies. A number of individuals "sort of drifted in and out." It was decided to hold daily meetings at 3:00 p.m. The Governor continued to serve as the emergency coordinator of this "Disaster Group." Eventually the "Disaster Group" included representatives of Public Works, the Development Unit, Radio Montserrat, the port, agriculture, MONLEC, the police and defense forces, and other agencies. The meetings continued to be held at 3:00 p.m. for about two weeks.

The attempt to coordinate the emergency response was hindered by the previously noted diffuse, island-wide pattern of massive damage and the loss of communication facilities. A phone line was not established to the EOC until Thursday, four days after the impact. The EOC did have a backup generator that functioned. However, it was overloaded with the demands of computers, the printing of "The Hugo News," etc.

An analysis of the coordination of response at the national level reveals a number of important characteristics and problems. First, it is clear that the
Governor was the one individual who assumed executive, management responsibility. Based upon his prominent position on the island, his personal leadership style, and his prior disaster experience, he took control. A number of informants discussed this arrangement, and they unanimously praised the Governor for his actions and felt that it was beneficial for the nation. For example, one government official noted that:

The Governor ran the country for two weeks after the storm. There are provisions in the Constitution that allowed him to assume control of the country under emergencies. But, this was not spelled out in the national plan. The government, including the Permanent Secretaries, felt that this was best. The Governor did a terrific job.

Second, the emergency response was basically ad hoc in nature and not guided by the prior planning efforts. Almost all activities, including such varied tasks as damage assessment, the solicitation and distribution of aid, transportation, sheltering, the provision of health services, and the handling of the dead, were the result of ad hoc, on-the-spot planning and decision-making. As one informant noted, "Just about everything, from the involvement of the Governor to damage assessment, was creative and ad hoc." This unplanned response probably was the result of a number of factors, including the previously noted weaknesses in disaster planning at the national level, the general inattention to post-hurricane activities in all the island's plans, the lack of emergency training and experience on the island, and the massive nature of the destruction on the island. Whatever the reasons, it is widely recognized that unplanned emergency responses are neither as effective nor efficient as those based upon sound planning practices.

Certainly, the coordination of emergent, unplanned responses is most difficult.

Third, certain elements of the proposed management scheme were particularly problematic. The system of reliance upon District Disaster Chairmen exhibited serious problems. Some of the District Chairmen carried out their responsibilities, others did not. The Chairmen had not been properly trained. They had other, personal responsibilities. They lacked resources, such as radios. They were to communicate their needs to the EOC and serve as liaison personnel with the Advisory Group. But, without communication
facilities they had to go in person to the EOC. A number of them did not. One informant noted that:

Some people did not respond as readily to their duties as they should have, according to the plan. The police were sent out to go and ask people to come to the EOC. This was not limited to the District Chairmen. Some of the District Chairmen did come, but some of them also forgot what their disaster responsibilities were. Of course, they had no previous experience.

In addition, some NGO representatives felt that they were somewhat ignored and not well integrated into the disaster management process. As one informant from a NGO noted:

I popped into the EOC once or twice on Monday and Tuesday I was a member of the Disaster Committee, but I was not asked to attend any meetings during the emergency period. It is my impression that the NGO's were not included in meetings at the EOC. It was mainly a government operation. Although the Governor was in charge for two weeks, he consulted only with the Ministers.

In sum, the coordination of the emergency response was ad hoc, emergent, somewhat delayed, and hindered by serious problems of communication. As we shall briefly discuss, this was compounded by some serious problems in handling specific, emergency response tasks. However, it is important to also note that the efforts of most of the various officials and agencies were laudable. People worked sixteen hour days for weeks. A great number of creative and effective decisions and actions were undertaken. As we will note later, some things, such as the clearance of main roads, were very well handled. The leadership exhibited by the Governor was exemplary, and in the absence of effective pre-disaster planning, it was essential.

**Role Conflict**

Before discussing specific disaster tasks, the issue of role conflict or role abandonment must be mentioned briefly. Role conflict and role abandonment refer to the situation in which emergency response personnel perceive a conflict between their responsibilities to their professional, organizational roles and their responsibilities to their family and friends. Quite simply, it has been proposed that personnel, such as police, health workers, and those in other emergency roles, will experience conflict between carrying out their
formal duties and caring for their families and friends. Furthermore, it is argued that they will often abandon their formal, organizational roles and take care of their families instead (Kiillian, 1952; Barton, 1970; Dynes, 1970).

Research has consistently found that while individuals may perceive conflict between their familial and organizational roles, they very rarely abandon their emergency responsibilities (Dynes and Quarantelli, 1976). In fact, studies have shown that the problem is not a shortage of needed emergency personnel, but actually a surplus. This surplus results from the convergence of off-duty personnel and volunteers to the scene (Drabek, 1987).

However, we were repeatedly informed by those with whom we spoke that role conflict and role abandonment were problems in Montserrat. For example, one person from the health sector noted that, "People had conflicting responsibilities. People have to look after themselves first; this comes before the national responsibilities." A representative of an NGO stated that, "Conflicts occurred between helping people and helping oneself, since most people suffered so much personal damage." A government official stated the problem in the following manner:

You have to allow time for workers to look after their own properties. A guy is not going to work if he feels he is endangering his family by doing government business. A lot of what workers did depended on how close it was to their homes.

The extent to which this problem was widespread is difficult to determine. In addition to these comments, evidence of widespread role abandonment can be found in the perceived shortages of workers in the health sector. Also, the Governor on the weekend after the storm made an impassioned plea on the radio for the people of Montserrat to "get back to work and to get off their bottoms and start to put the national back together." Similar admonitions appeared in the pages of "The Hugo News" of September 26, 1989. However, in other sectors there was no apparent shortage of people to help. Many organizations had adequate staff within a few days after the storm.

At the least it can be safely concluded that there was the rather widespread, collective impression that role abandonment was a problem. If this perception is accurate, and we are not certain that it is, it represents a departure from previous findings from disaster research. Possible factors that
may have caused role abandonment include: 1) the lack of prior experience and, most importantly, training in emergency and disaster response, 2) the limited prior disaster planning, 3) the limited public education activities prior to the storm, 4) the massive destruction that personally affected almost everyone on the island, and 5) the inability to move about the island in the first few days after Hugo struck. This latter factor is particularly important. It is likely that if some individuals did not come to work during the first few days, it was because they physically could not get to their posts because the roads were impassable.

As we turn our discussion in the next chapter to some of the specific tasks that were being undertaken during the emergency period, it is important to remember that the accomplishment of these tasks was severely influenced by the communication, coordination and possible role conflict difficulties we have noted.
CHAPTER 6

POST-IMPACT EMERGENCY TASKS

In this chapter we will discuss some specific, emergency response tasks that were undertaken during the initial two-week, emergency period. We will discuss the impact of a lack of prior planning upon these activities. We will also describe the emergent division of labor and consider which organizations were undertaking the activities. Finally, we will discuss some problems and attempted solutions associated with various tasks.

Initial Damage Assessment

As with many of the post-impact emergency tasks, the initial assessment of damage to the island was not guided by any previous planning. One government official simply noted that "We had no previous plan for damage assessment." However, one of the most critical tasks that must be accomplished in the early emergency period is the assessment of damage. Effective decision-making regarding the allocation of resources and the establishment of response priorities is dependent upon an understanding of the magnitude, patterns, and location of destruction.

On Sunday damage assessment was being done. In effect, it was being done by all Montserratians as they assessed their properties and neighborhoods. However, there was no systematic, coordinated, or organized assessment occurring during the first day.

On Monday the Governor took control of the assessment problem. One of the first assessments of the devastation to the island was undertaken by the helicopter from the H.M.S. Alacrity. It flew over the island and provided a "bird's eye view" of the damage on Monday. The image presented was one of serious devastation. However, one informant noted that, "We knew that the estimate was low, because from the air they were not counting the houses that had disappeared."

The Governor also developed an ad hoc assessment group, composed of architects, builders, and surveyors. They began to travel to the various districts, but as one informant noted, "Since there was no system in place, it took a while to get things organized." The Financial Secretary was placed in charge of damage assessment. A questionnaire was developed that obtained
data from homeowners and assessed schools and other public buildings. By about Wednesday or Thursday a rough understanding of the nature of damage was available. As one government official noted:

Within the first few days, there was an overall image (a rough one) of the extent of damage. Initially, there was no one person or group in charge of assessment. Thank goodness the Governor took charge. I knew after a couple of days that the police station was the only significantly undamaged building. It was readily apparent that it was almost 100 percent damage to government property. The sheer magnitude of the destruction made damage assessment easier, because everything was damaged.

**Search and Rescue**

As in most disasters, the vast majority of those who were rescued from the debris were rescued by volunteers, fellow neighbors and family members. There had been no previous systematic planning or training for search and rescue activity. The National Disaster Plan does not address the issue in any detail. However, members of the Montserrat Police Force undertook some search and rescue activity from the various district stations. Some members of the Defense Force also assisted. After Monday the sailors of the H.M.S. Alacrity were active and provided some medical care to the victims.

The difficulty in undertaking search and rescue involved blocked roads and limited access to areas. The police became involved in road clearance. Furthermore, with limited transportation victims had to be carried for great distances on foot.

Unlike the situation with damage assessment, there was no attempt to coordinate or organize this emergent, informal rescue operation. Research has consistently shown that most victims who are rescued alive must be found and extricated during the first two days (Wenger, 1989; Olson and Olson, 1987). By the time the EOC began to function effectively, 48 hours had already passed since Hugo struck. Almost all of the victims had been freed or rescued by that time. Our informants did not see search and rescue as having been a serious problem.

**Initial Debris and Road Clearance**

Responsibility for clearing debris from the roads resided with Public Works. There had been some prior, informal strategic planning for road
clearance. In addition, the Director of Public Works had experienced previous hurricanes. Based upon this understanding, Public Works undertook a number of pre-impact measures. They extended shifts and worked overtime before the storm. They also dispatched some equipment to Plymouth and to the eastern part of the island in case some parts of the island might be isolated. A Public Works official described the process in the following manner:

Our priority is to clear the main roads as soon as possible after the disaster. The highest priority is given to the road to the airport. We sent equipment to the other side of the island. When they have cleared the airport side, then they start working toward Plymouth. Meanwhile, the Plymouth people begin working toward the airport.

Road clearing did not begin until Monday. A number of workers from Public Works could not get into headquarters, so they joined with other village people and tried to hack their way into Plymouth. About 20 people were able to get to the headquarters on Monday morning. The previously dispatched equipment was put into operation.

The clearing of the main roads was undertaken rather quickly. By Tuesday it was possible to get a light vehicle from Plymouth to the airport. Heavier vehicles could make the trip within an additional day or two.

Damage assessment was an important component of this operation. By Monday it was known that the port had been destroyed. Therefore, opening the road to the airport was particularly important because cargo and aid would have to come through the air. Also, by Monday it was determined that there was no culvert or bridge damage. This finding pleased the officials at Public Works, one of whom noted that, "It was great news, because then I knew it was mainly a clean up job, which is much easier than a repair job."

By the three days after the storm the main roads were passable. In this effort Public Works was assisted by some police, Defense Force, and H.M.S. Alacrity personnel. Debris clearance continued during the emergency period. Later Public Works became involved in providing emergency housing. They also assisted in the transportation of 80,000 tons of material from the airport. However, the relatively quick and effective clearance of the main roads is a testament to the benefits of prior strategic planning.
The Provision of Emergency Medical Care and Health Impacts

As was previously noted, the health facilities on the island were limited before the storm. There were only five resident and two visiting physicians on the island when the storm hit. Glendon Hospital had a bed capacity of 67. There were only two ambulances. The hospital staff had taken a variety of pre-impact measures, such as releasing all but 22 patients, moving the patients to safer locations within the hospital, and boarding the hospital. However, the health capacity of the island was lessened even more when the hospital and all of the other buildings in the Health Sector sustained damage during the storm. Fortunately, aided by the pre-hurricane precautionary actions, no one was injured at the hospital during the onslaught of Hugo.

Even a rather small mass casualty incident had the potential to seriously overwhelm the limited resources and damaged capacity of the health sector. Fortunately, Hugo did not produce massive casualties. There were eleven deaths and a small, but unknown, number of casualties. Only three victims were hospitalized for injuries directly related to Hugo.

Immediately after the impact on Sunday the hospital and medical staff faced a number of problems. First, the hospital was damaged and flooded. One official stated that, "The whole place was a mess. We had to restore some semblance of order; we could not leave it messy." Representatives of the Defense Force assisted in the clean-up. Second, there were no communication facilities at the hospital, even for internal communication. Third, the hospital had a back-up generator which functioned for awhile, but was inadequate. Fourth, because of damages they had to find alternative housing for the patients. The Margetson Memorial Home, the former Matron's home, was on the grounds and was converted as a ward for some of the patients. Fifth, on Sunday there was a shortage of nurses at the hospital. Apparently the nursing staff could not get to the hospital because of debris. Available staff included the Director of Health Services, who had remained at the hospital during the storm, the on-duty staff who were retained, and some volunteers.

With regard to emergency health care, a few injured persons arrived on Sunday, but the numbers increased on Monday and Tuesday. (On Sunday many people could not get to the hospital, and some did not realize that they needed medical care until later.) There are no accurate records regarding the number of people who received medical care, however most of the injuries were minor, such as minor lacerations and nail puncture wounds. There were
a few crush injuries. The operating rooms were relatively secured and did not suffer great damage. No injured patients required transportation off the island for medical treatment.

Immediately after the storm, the hospital did not know how many patients they would be receiving. As one health official noted, "We did not know the extent of injuries until Monday or Tuesday when damage assessment was a little better. We were somewhat surprised at how few patients we got." Most of the patients arrived at the hospital on foot and in private vehicles. There was no triage undertaken either at a field location or at the hospital. A health official explained that:

In our hospital plan it is prosed to do triage. In the couple of drills that we had done in the past, triage was undertaken. But, we did not do triage after Hugo in any organized manner. There was really no need for it. Those that were dead, we knew they were dead before they got here. Some were dead for hours before they got here. The other injured sort of slowly trickled in over a few days.

As previously noted, the prior planning in the Health Sector had focused upon pre-hurricane measures, and did not provide details on post-hurricane response. Therefore, some problems in coordination were evident. During the emergency period a command post was established at the hospital. But it was somewhat an informal arrangement and did not eliminate problems of coordination within the hospital. As one official noted in an after-action report:

After the storm there was a certain amount of uncertainty on what roles were being played by the staff of the hospital. This led to some confusion and the issuing of conflicting orders. A command center was established, but its function was hazy. Many important staff members did not show up for duty, probably because it was impossible to do so as a result of blocked roads, or because they were not clear on what they should be doing if they did show. Proper systems were not established for the proper receipt and distribution of hospital relief supplies. Generally speaking the coordination and organization was good, but could have been improved with proper telecommunications and more interaction among staff. (Buffong, 1989: 4).

By Tuesday and Wednesday doctors were able to reach some areas in the Eastern and Northern parts of the island. With further clearing of the roads,
health personnel with loudspeakers went to outlying areas and warned the residents about health hazards.

A related, and unforeseen, problem faced the Health Sector in the form of sheltering. The health complex contained a building for housing the geriatric and chronically ill. After Hugo a number of elderly people who had lost their homes used it as a shelter. In fact, the number of people housed in the building tripled after the storm. It exceeded the capability of the building. It created problems of shelter management and posed a potential health threat.

The situation at the hospital did not return to a semblance of normalcy for six to eight weeks. The first four weeks after the storm were "very unusual." There were only about 20 of the 67 beds in use. Normal health care was limited. A few babies were delivered at the hospital and some minor treatment was provided. However, there was no significant increase in patients (except for those at the geriatric home). No patients had to be evacuated overseas for treatment.

In sum, the health sector was fortunate in that the number of casualties were relatively light and did not overwhelm the limited and damaged capacities of the health system. However, the health sector also indicated some very positive elements. Prior disaster planning had been undertaken, even though it was somewhat limited in its focus. Most significantly, the health sector was one of the few to undertake a systematic, after-action critique of their actions (Buffong, 1989). This objective, critical analysis noted a number of problems in the health response and proposed efforts to remedy them in the future. It should be a model for all other organizations.

Handling the Dead

The death toll was 11, however our informants gave numbers ranging from 10 to 15. Most of the victims were buried in a mass grave. One official described the process in the following manner:

Most of the dead were brought to the hospital. Then they were handed over to the Environmental Health Officer who took them to the cemetery. Most of the people who died immediately after the hurricane were buried in a mass grave. This amounted to about 8 to 9 people. Those who died a couple of days later were buried under usual circumstances.
This procedure was not pre-planned, and it varied somewhat from the normal method for handling the dead on the island. Normally, if cadavers are to be kept for more than a day or so, they are taken to the hospital, because the hospital has storage facilities. However, it has storage for only four cadavers. If they are to be buried quickly, the burial is done by private citizens and Environmental Health officers.

The ad hoc nature of handling the dead is also indicated by the involvement of the police. One police official noted that:

Police officers also transported dead bodies. It was not supposed to be our responsibility, but we ended up doing it. We took them to the cemetery.

It is interesting that there was apparently no public criticism or complaint regarding the mass burial. In a number of disasters, including the Mexico City earthquake of 1985, attempts at mass burials were met with public outrage and had to be halted (Dynes, Quarantelli and Wenger, 1990). Given the small number of casualties, the small size of the island, and the deterioration of some of the cadavers, family relatives were accepting of this procedure.

Shelters

There were 24 official shelters opened before the storm. Many of these suffered damage, but remained open after the storm. No one knows how many people were sheltered in these locations, because no records were maintained. However, a report in The Hugo News one week after the storm estimated that 2,500 people were homeless and that about 1,200 people were in the shelters. Obviously, one week after the storm the majority of the homeless were not in official shelters.

The provision of shelters, particularly for long-term sheltering of the homeless, was one of the most problematic areas of emergency response. The problems involved all elements of sheltering, including inadequate facilities and a total lack of shelter management.

First, the shelter facilities were inadequate. They were simply structures that could hold a large number of people. They lacked cooking
facilities, water and sanitary facilities. One government official noted that:

Shelters were chaotic in that they had no cooking facilities, no medicines, no toilets. They were just a lot of people in a big room. PAHO came in and offered outhouses for the shelters.

Second, there was no shelter management of any kind. One official offered the following observation:

There was absolutely no shelter management at all. There was chaos and disorder in the shelters after the storm. The Community Services Department was supposed to manage them, but nobody did. We still do not have a shelter management program.

Another respondent echoed this evaluation:

There were serious problems with the shelters. No food was given to people at them. There was no organization or designated shelter managers at each shelter. They had problems of sanitation. They did not have kitchens, and we had to rely upon canned stuff. Also, some people decided to squat in shelters long after they should have been out. Some stayed for months.

Third, a great number of informal shelter arrangements were undertaken by organizations and individuals. A number of places that were not designated as shelters soon were engaged in rather extensive shelter operations. As we previously noted, the Health Sector suddenly found itself in the long-term shelter business with its geriatric building. The Red Cross sheltered about 10 people. Most importantly, individuals opened their homes to their fellow victims. One official observed that:

The places that were designated as shelters were not physically large enough to accommodate the number of people who came to them. People literally created shelter for themselves. For example, a District Chairman had 60 people in his house at one time. Buildings that were not regarded as shelters were used.

Another government official noted that "Many people took the homeless into their homes. Other homeless just hooked or matched together galvanized roofing that was blown off buildings and slept under it."
In sum, there were serious problems in providing shelter for the victims. These problems appear to be directly a result of the lack of planning prior to the hurricane.

Social Control

The Montserrat Police force engaged in a variety of activities before and after the impact of Hugo. Some of these they had planned to do, others were ad hoc and unplanned. In addition, some things that they were supposed to do according to the National Disaster Plan, they did not carry out.

First, the police were charged in the National Disaster Plan to be involved in a number of activities that they failed to accomplish. They were to open, staff and command the EOC prior to the storm; this action was never taken. Furthermore, after the storm the Governor, not the Commissioner of Police, assumed command responsibilities. In addition, they were to assist in warning in that they were responsible for an Emergency Alert System and an Audible Warning System. These systems were not functional.

Second, the police did engage in some pre-planned activities, such as evacuation and normal police and law enforcement duties. As was previously noted, there was limited evacuation on the island. In addition, the protection of property proved to be manageable. As in most disasters, there was not a major problem with looting (Wenger and Quarantelli, 1988). There were about 15 arrests for looting. Police officials claimed that most of it was minor, and involved radios, television sets, VCRs, and food. Certainly compared to the extensive looting that occurred on other islands in the wake of Hugo, there were no major social control problems on Montserrat.

Third, the police became involved in many ad hoc, unplanned activities. They served as couriers and messengers. They transported the dead. They assisted in debris clearance. This extension of normal police duties into other areas was viewed as a problem by some. One police officer noted that, "We became involved in too many duties that were not ours. We were involved in a lot of things that we were not supposed to do."

Finally, like other organizations the police were hampered by an inability to communicate. Although some officers had remained at their posts throughout the storm, and off-duty personnel reported for work relatively soon after the impact, the normal police communication system was destroyed.
The repeater station was out, therefore they could not communicate with the district offices. Only within Plymouth could they communicate by hand sets.

**The Acquisition and Distribution of Emergency Food and Supplies**

The procuring and distributing of food and emergency supplies was beset by a number of logistical and organizational problems. First, both the airport and the port were damaged. The airport was reopened within 24 hours after the storm. The port jetty and dock facilities were totally destroyed. Second, with the exception of a national level food distribution plan developed by MATLH, there had been no previous planning for acquiring and distributing aid. This lack of planning was particularly problematic at the district level. Third, the ad hoc, emergent development and activities of the regional Caribbean Disaster Response Unit (CDRU) was perceived as complicating the effort for Montserratians. Allow us to discuss these issues in more detail.

**Loss of Airport and Port Facilities.** Both the airport and port facilities were lost. However, the airport was rather quickly reopened. By Monday relief flights started to arrive. A British C130 Hercules began a rather constant daylight shuttle service bringing supplies from Antigua to Montserrat. The C130 was to leave on September 27, 1989, but it remained until the middle of October. The Defense Force and Public Works were responsible for unloading and transporting the supplies to Plymouth. As one official noted:

> Lots of stuff came through the airport. It had to, because we did not have a port. Although there were problems because some of the supplies were not properly marked, the airport situation worked fairly well.

Another government official also observed that the airport operation was fairly successful.

The airport operations were better managed (than the port). A smaller volume of material was handled there. Also, it did not get containers, which presented problems at the port. It was handled by the Defense Force and Public Works also helped with transport.
However, the loss of port facilities presented serious problems for the island nation. Initially, the problem was not too severe, because building materials and other bulky items took some time to get to Montserrat. With their arrival, serious problems surfaced. One government official observed that:

The stuff that was bulky could not be brought by the Hercules; it could only come by ship. Things were piling up on the dock and not moving out quickly enough. This was a two to three week problem. The Port Manager was in charge of the dock, and there was chaos. A long line of ships were waiting to unload. Some had to actually leave and come back later. Some had perishable items, and by the time we got them, they were rotten.

The initial logistical problem involved replacing the jetty. A flat bottom barge with a crane was obtained from Edgehill Associates in Barbados. The European Economic Community, United Nations Development Program and local money paid for it at a cost of US$2,000 a day. The barge arrived about one week after the storm. After about 20 days Montserrat received a free replacement barge from St. Lucia. This barge did not have a crane, but it was free. This make-shift port was use for months after the storm.

There were also problems in the organization of port activities. For example, one government official noted with great consternation that the port was closed shortly after the hurricane.

Immediately after the hurricane the port personnel wanted to close the port on Wednesday, because the port is usually closed on Wednesday. The barge had not arrived yet, but things were coming from the airport. People were in need.

An NGO official noted that there "was confusion at the port." He added:

Generators were sent to us. They reached Montserrat, but they never reached us. The government and one or two individuals collared them at the airport or port. It was difficult to keep track of things. This confusion lasted about two weeks and continued with the handling of cargo at the port. For example, another container came to us, but there were no invoices, no idea at all of where it came from or who sent it.

No provisions had been made in the National Disaster Plan for the loss of the port. The solutions were ad hoc in nature and the structure of port management also had to be improvised.
The Organization of Food Distribution. The National Disaster Plan designated responsibility for the distribution of emergency food to MATLTH. The Ministry had developed plans at the national level for food distribution. The previous plans had called for the Ministry to take about three days rations of food from warehouses to selected places before the hurricane. However, in the year prior to the hurricane, the national disaster committee had agreed with the Ministry's recommendation that food should not be taken out before a hurricane, but only after it.

Operating upon this basis, the Ministry began food distribution operations on Tuesday afternoon. They first determined what food was available in local warehouses and supermarkets. They set up a command center at the Ministry's headquarters and contacted the District Chairmen to get reports from the districts on what food was needed. They had an island-wide distribution of food by Wednesday, and operated on a third day cycle for two weeks.

During the first five days the Ministry relied upon locally available food. Local merchants provided food and were reimbursed. Standard packs of basic commodities were prepared and transported to the 12 district distribution points by members of the Defense Force, Public Works and prisoners.

By the weekend following the storm, they ceased to utilize local food and turned to the foodstuffs which began to arrive from off the island on Tuesday night. (There was apparently no resistance on the part of local merchants to this switch to non-local food. They realized that local staples had been largely consumed.) They had very little control over what food was arriving. As one official noted:

We had little control over what food was being sent. We were asked for a priority list of items, which we prepared. But the food was coming in very, very quickly. While there was some unusual stuff arriving, there was not really a surplus of anything, except an oversupply of sugar from St. Kitts. We did not have a shortage of sugar and did not ask for it, but it came.

With regard to the volume of external food, one official estimated that they could have fed the country for about one month on the supplies that came from the outside. This informant also estimated that about 65-70 percent of food that arrived was distributed. Although there was a slight shortage of juice, most of the supplies were more than adequate.
Therefore, at the national level the organization of food distribution appears to have been fairly effective. It was based upon prior planning efforts. A system of distribution was developed and operational by Wednesday.

However, there were serious problems in the distribution of food at the district level. One official from the Ministry described the problem in the following manner:

The major difficulty was that although we were well organized at the national level, the district level organization did not complement the level of organization we had at the national level. We were able to get the food to the district level, but at that level they had difficulties. The District Chairmen were not prepared to distribute the food efficiently or equitably.

The local District Chairmen decided at what locations food would be distributed. Some designated community centers and police stations, others used shelters and their own homes. The food arrived at the district level in cases. Therefore, some food had to be repackaged for families of varying size.

Authority was also given to the District Chairmen to decide, based upon their knowledge of local people and their needs, who should receive food. It was intended to give food to the truly needy. However, our informants were in agreement that the system did not function well. One government official noted some of the problems with the distribution at the local level.

The agriculture people took food from warehouses to the District Chairmen who were responsible for distributing it in their districts. There were problems with the organization and control of this. People would go to different locations and get food. There was confusion. Some districts handled it alright, but in others it was chaotic, because there were no plans.

Another government official was very concerned about the inequities in the system.

I do not approve of the manner in which food was distributed. Sometimes it was inequitable. Some people got whatever they needed, but others came to me and complained about distribution. They said that they went to the distribution points, told of their situation, and were denied food. I suggested that they try another distribution center. Then they were told that they were not in the right area. I started to work closely with church organizations to solve this problem.
This system of food distribution continued for two weeks. In order to attend to the housing problem, MATLH turned the distribution of food over to NGO's. The Ministry assisted the NGO's in distributing food, but the NGO's took over the program and distributed it for the next month.

Several local merchants were able to open their markets by the end of the first week. Officials estimate that about 50-60 percent of the population received some form of emergency food, of whom 30-40 percent were truly in need.

The Organization of Other Emergency Relief Supplies. Because there had been little prior planning for organizing the acquisition and distribution of relief supplies, an ad hoc arrangement was developed under the influence of the Governor. The Development Unit was assigned the task of assessing needs and procuring aid. By Wednesday members of the Development Unit were at the EOC and operating. They requested that various organizations, such as health, agriculture, utilities, etc. identify their needs and bring them to the Development Unit. During the first week the Director of the Development Unit went to Barbados and met with various donor organizations in a meeting chaired by the United Nations Development Program. He returned with a list of agencies who could supply different kinds of supplies. At first they were only able to communicate with the donor agencies through the H.M.S. Alacrity's radio. However, by the second week they had a telephone and could link needs to specific donors.

Research has shown that in all disasters a "convergence problem" involving the arrival of vast quantities of unsolicited aid occurs. Often supplies arrive that are unneeded or unusable. The problem is particularly serious with regard to clothing (Fritz and Mathewson, 1957; Drabek, 1987). Convergence was a problem in Montserrat. As one official noted:

There was not a lot of problem with the arrival of unsolicited aid during the emergency period, but later in the post-emergency period a lot of unneeded food and clothes came in. We had a person stationed at Antigua airport to advise on the entry of unnecessary items, like clothes. We tried to stop it in Antigua, and we were successful to some extent. But we got a lot of it. We still have a lot of it in storage. Some was bad, but we are still, 11 months later, getting clothes.

When the supplies arrived at the port, they were distributed to the various agencies. For example, food went to agriculture, building supplies to
Public Works, and medicine to health. Some clothing was sent to the Red Cross. Community Services was assigned the responsibility for distributing blankets, tents, cots, and other short-term emergency supplies.

As was the case with food distribution, there were some problems involved in the distribution of supplies to individual victims. Some of the problems involved a lack of supplies. For example, one official felt that more tents, blankets and cots were needed, particularly in light of the massive destruction of homes.

I would say we really needed a lot of tents in the first week. People had no place to sleep. Community Development was only able to give out about 76 tents. The Red Cross also distributed some. Eleven months after the storm, we still have people in tents...Cots were also a problem. We were only given 13 cots to distribute. We also only got 300 lanterns, and without electricity we needed three times that number.

Other problems were of an organizational nature. Because of the need for ad hoc arrangements given the lack of prior planning, criteria for the reception of aid were neither consistent nor applied uniformly to the victims. For example, problems occurred in the distribution of plastic covering for roofs. The material came in bulk and was not in standard sizes. Therefore, it needed to be cut. They were distributed from Public Works and there were problems.

Similarly, there were no uniform standards for determining who should qualify for aid. One official described the problem in the following manner:

No matter what a person's financial background, they all felt that supplies were coming in, and that they should get some. The problem was one of trying to decide who was truly in need and should get it. For example, mattresses presented a problem. Some people came in for mattresses and I did not believe that they qualified, because they had already bought mattresses as soon as the stores had reopened after the storm. Some people hid this information. We wanted to give aid to those who really needed it, but we had no consistent, uniform standards.

In sum, the ad hoc arrangement of assigning responsibility for the acquisition of supplies to the Development Unit seemed to be quite effective. The Unit utilized its existing network linkages to donor agencies to procure aid. However, as was the case with food distribution, there were problems in the distribution of aid that resulted from the lack of prior disaster planning.
The Organization of External Aid on a Regional Basis

Montserrat received aid from a number of foreign nations and donor organizations. The British, for example, not only sent the H.M.S. Alacrity, but they also sent a contingent of the Royal Engineers from Belize to assist the Public Works Department. In addition, a team to help restore electricity, paid for the C130 Hercules, and supplied over EC$1,000,000 of lumber. They also received aid from neighboring islands, including support from the Defense Forces of Guyana, Trinidad-Tobago, and Barbados, the Commonwealth Youth Programme, supplies from St. Kitts-Nevis, physicians from Antigua, and a team of 40 skilled workers from Dominica. The aid was extensive and most needed.

Because of the multinational nature of the disaster in the Leeward Islands, CARICOM developed an ad hoc coordinating group based at the airport in Antigua. This unit, known as the CARICOM Disaster Relief Unit (CDRU), handled the aid that came through CARICOM governments and sent it to the various islands from Antigua. This unit also provided the Regional Defense Forces that came to the island.

The operation of the CDRU was not totally appreciated on Montserrat. Part of the problem was that since CDRU had not previously existed, appropriate protocol, interaction and planning with local officials had not taken place. One official described the problem.

I think in our case, there was confusion. It was only after the emergency period that we on Montserrat realized who we were dealing with at the CDRU. It was not obvious to us at first that CDRU was coordinating the relief effort from Antigua. The name, "CDRU," was not known to us during the emergency period.

Another government official noted:

It is said that a large number of people sent things to Montserrat that did not actually reach Montserrat. Some were diverted elsewhere from Antigua. CDRU was of little use to us.

However, a few informants had a positive view of the role of the CDRU. They felt that given the multinational nature of the disaster, region-wide coordination was needed.

Upon hearing about the CDRU after about one week, they were requested to send a representative of Montserrat to Antigua to liaison with
CDRU. The Governor appointed a person who formerly lived on Montserrat, but was currently residing in Barbados, to this task. The National Disaster Coordinator did not know about the appointment of this individual until after the fact.

One informant noted that the Development Unit did not go through the CDRU to solicit aid. They went directly to the donor agencies. It was also noted that better communication between Montserrat, the CDRU and the airport was needed. One official noted that, "We need better information on what has arrived and is being sent to the airport. For example, we made a request to Jamaica for nurses. But when the nurses got to Antigua, they were sent elsewhere; even though we had requested them."

Although the validity of the negative claims made against CDRU cannot be verified, it is apparent that the operation of this emergent, coordinative body was marked by some confusion and lack of appreciation at the national, as opposed to regional, level. However, other informants did view the CDRU positively.

**Restoration of Lifelines**

The systems for distributing water, electricity and telephone service to the island were devastated by the storm. The restoration of water was accomplished first. Those areas that did not have water were supplied by a water truck that was filled at the reservoir. Some areas were restored during the first and second weeks. However, water was rationed in Plymouth and was only available for two to three hours a day during the initial emergency period. This rationing was necessary because the mains which resupply the town reservoir were badly damaged.

Besides leaks in the system, a major problem involved the lack of generators to run the pumps on the island's deep wells. By the third week after the storm, two generators had been obtained, and one month after the storm water supplies were normal for 80 percent of the customers on the island. When MONLEC was able to restore electrical service to the pumping station in the St. George's Hill/Weekes area late in October, the system was basically back on line. However, it was severely damaged, and leaks within the system had greatly reduced its efficiency.

The restoration of electrical power was more difficult and took longer. Some areas did not have service until February, 1990. However, some essential
buildings in the downtown Plymouth area were provided with electricity during the first two weeks. These included supermarkets, the port, and the hospital. However, progress on restoring the rest of the island was slow, due to the massive destruction of power poles. In October a contract with British Electric International was signed that provided needed technical and manpower assistance. The major problem involved a shortage of manpower and poles.

Some phones on the island were not affected because the wires were underground. However, Cable & Wireless lost all their microwave equipment on Chances Peak and both internal and external communication was hampered for months. Although some priority buildings and areas, such as the EOC, had phone service within the first two weeks, phone service was not restored to the entire island until July of 1990.

In sum, the emergency response on Montserrat was basically ad hoc in nature. Some rather serious problems were encountered in the accomplishment of a variety of tasks, including sheltering, damage assessment, and the distribution of food and aid. These difficulties were compounded by the significant communication and coordination difficulties that occurred after the storm.

One week after the storm the H.M.S. Alacrity left Plymouth harbor, taking her equipment and 100 sailors with her. The headline on the lead story in The Hugo News on September 28, 1989, proclaimed, "Government Back in Charge." In the story the Governor announced that it was now time for the restoration of normal government procedures and systems. As such, he was formally turning control of the government over to governmental officials. He would return to Government House over the weekend. In the September 30, 1989, edition of The Hugo News a story urged all government workers to return to work the following Monday morning. The two week emergency period was over.
CHAPTER 7
A SUMMARY OF THE MAJOR FINDINGS REGARDING EMERGENCY PREPAREDNESS AND RESPONSE

The analysis of the emergency planning and response activities in Montserrat indicates both positive and problematic efforts. At this time let us first examine what was well handled. Subsequently we will note some of the major problems inherent in both planning and response.

What Components Were Well Handled

First, the experience on Montserrat illustrates the importance of prior disaster planning. Where prior planning had taken place, the response efforts of the agencies were superior to those efforts that were basically ad hoc in nature. Some of the areas that were handled best, such as health delivery, road clearance, the distribution of water, and the development of a food distribution plan at the national (but not district) level all benefitted from prior planning.

Second, the emergent pattern of leadership and crisis decision-making was well handled. Some quick decisions had to be made, and the Governor utilized his past experience to make them. Although it took a number of days to achieve coordination in some areas, led by the Governor the tasks eventually were completed.

Third, while the warning system did not function as planned, it was effective in reaching the public. Due to the efforts of the Governor and the mass media, the people of Montserrat were adequately warned of the approaching storm.

Fourth, certain pre-impact preparedness measures undertaken by specific Ministries and agencies were successful. In particular, the preparations undertaken by the Health Sector, MATLH, and Public Works were successful in protecting important resources.

Fifth, the efforts of the PCDPPP were instrumental in the pre-disaster planning that took place. The PCDPPP created an awareness of the need to plan for disasters and provided technical assistance to the nation. Although some weaknesses in prior planning were noted, the problems probably would have been much more severe without the PCDPPP.
Sixth, there were remarkably few casualties given the magnitude of the destruction. While the Health Sector did a laudable job of providing emergency medical care given its modest resources and damaged facilities, the low casualty rates may be attributable to the effective warning system, the precautionary actions taken by the citizens of Montserrat in seeking shelter prior to the storm, and pure good fortune.

Seventh, the publication of The Hugo News was an effective, though improvised, device for communicating with the public.

Eighth, the assignment of the task of soliciting emergency supplies and aid to the Development Unit was quite effective. Utilizing their prior relationships with donor organizations, they were able to mobilize needed supplies for the nation.

Ninth, the response of many government officials and private, volunteer citizens to the emergency effort was very praiseworthy. When faced with problems and difficulties that overwhelmed the resources, prior experience, and planning on the island, many people rose to the challenge. They ranged from the ham operators who maintained contact to the outside world, to the hospital and police personnel who stayed on their posts during the storm, to the Governor who led the country during the emergency period.

**What Components Were Problematic**

A number of serious problems in planning and response have been noted in the previous pages. At this time allow us to simply summarize some of the more major ones.

**Pre-Impact Contextual and Planning Problems.** First, there was a lack of emergency resources on the island. There were particular weaknesses with regard to health facilities, communication facilities for emergency management, skilled manpower, and port facilities.

Second, the condition of housing on the island was not well designed for hurricane protection.

Third, there was a lack of both emergency management training and disaster public education activities prior to the storm. These problems were amplified by the lack of recent disaster experience, since it had been 61 years since the island had last been struck by a hurricane.

Fourth, the National Disaster Plan had a number of weaknesses, including the following: 1) it had not been updated, 2) it focused primarily
upon the pre-hurricane period and devoted little attention to post-hurricane response, 3) it placed great responsibility for local response on the Disaster Chairmen in the eleven districts, but did not provide them with adequate training in disaster management, 4) it provided no contingencies for the loss of communication facilities on the island, 5) the budget and training for the National Disaster Coordinator was not adequate.

Fifth, the position of National Disaster Coordinator was a part-time position that was "tapped on" to a position in the Government Information Unit.

Sixth, planning was viewed as a product, and not as a process.

Seventh, planning within the various Ministries and agencies vary greatly in quality, however even in those units, such as health and agriculture, that had undertaken prior planning, post-hurricane responses had been relatively ignored.

**Pre-Impact Response Problems.** First, the planned warning system was not utilized. Furthermore, the system is dependent upon outside meteorological agencies and the mass media.

Second, the evacuation of low lying areas was not very effective. Few people voluntarily left their homes until the last moments prior to the storm.

Third, emergency shelters were not adequately or safely constructed as places of refuge. A number of them were damaged. Furthermore, there was no shelter management in effect prior to the storm.

Fourth, the EOC was never opened or staffed prior to the storm. According to the National Disaster Plan the EOC was to be opened at the police station and be functioning prior to the storm in order to coordinate preparedness measures.

Fifth, at the national level most of the pre-impact preparedness measures were ad hoc and unplanned in nature. Even though the National Disaster Plan did devote attention to pre-impact activities, many of these elements were ignored.

Sixth, although the actions and leadership of the Governor were extremely beneficial and positive, emergency planning should not rely upon the expertise and skill of one individual in order to be effective.

**Post-Impact Response Problems.** First, there was a delay in opening and staffing the EOC. It was fully two days after the storm before the EOC was functional. This period effectively precluded any attempt to
coordinate immediate post-impact activities, such as search and rescue and rapid damage assessment.

Second, related to the lack of prior planning, most of the post-impact response activities had to be improvised. The ad hoc nature of the response worked against effective and efficient activities.

Third, the loss of internal and external communication capabilities was a serious problem. However, the problem was exacerbated because prior planning had not considered this contingency.

Fourth, the system of reliance upon District Disaster Chairmen exhibited serious problems. They lacked training, resources and experience. Some carried out their duties; others did not. The distribution of food and aid at the district level was seriously hampered.

Fifth, there was the widespread perception that role abandonment occurred within some organizations. The problem was perceived within the Health Sector and within the general community. However, it is not apparent how widespread this perceived problem was, or if it was embedded in reality.

Sixth, there was a problem with rapid damage assessment. There was no planning or system in place to undertake the task. The actual damage assessment initially was done in an uncoordinated fashion. An ad hoc arrangement was established by the Governor, but duplicate damage assessments continued.

Seventh, search and rescue activity was unplanned and uncoordinated. By the time the EOC became functional, the critical 48 hour period for rescue activity had already expired.

Eighth, problems of coordination of activities within the Health Sector were noted. Furthermore, the provisions for handling the dead were not included in prior planning and were ad hoc in nature.

Ninth, shelter facilities and management were serious problems during the post-hurricane period. Preparedness planning for shelters was notably lacking. The facilities were not adequate. Shelter management was nonexistent.

Tenth, there were no provisions in the prior planning for the loss of the port facilities. The loss of the port and its attendant organizational problems hindered the distribution of emergency food and supplies.
Eleventh, there were serious problems in the distribution of food at the district level. An equitable system of control and distribution was neither developed nor uniformly implemented.

Twelfth, unsolicited aid contributed to a problem of convergence of unneeded and unusable supplies upon the island. The problem was particularly serious with regard to clothing.

Thirteenth, there were no pre-existing plans for a needs inventory after the storm. Some organizations did have an inventory of resources before the storm; many did not. No standard forms or a needs inventory existed.

Fourteenth, as with the distribution of food, there were problems in the distribution of emergency supplies. The problems concerned establishing uniform and equitable standards of eligibility for aid.

Fifteenth, there were perceived problems of communication and coordination of the regional relief effort between the CDRU and officials on Montserrat.

**Post Hugo Changes**

Since Hurricane Hugo a number of positive changes can be noted in the disaster preparedness planning in Montserrat. Many of these are a direct response to some of the problems observed in responding to the storm. First, a number of Ministries and organizations have undertaken after-action discussions and have updated their prior plans. Interestingly, the organizations that had previously undertaken the most planning were also at the forefront of updating their plans. The Ministry of Agriculture, Trade, Land and Housing has revised its food distribution plan. The Health Sector conducted a serious after-action analysis that resulted in suggestions to improve its post-hurricane response.

Second, for food distribution at the district level, voluntary organizations came to form the National Hurricane Food Distribution Unit based upon their involvement in the disaster. This group will assist District Chairmen and look after elderly persons. The plans now call on using teachers and public servants to be on district committees. They will report to and assist District Chairmen.

Third, a Damage Assessment Committee has been organized by tasks. Agriculture is responsible for assessing damage in the agriculture sector. The Housing and Rehabilitation Unit is responsible for assessing housing.
Communication and Works will assess the infrastructure. Pre-printed damage assessment forms have been developed.

Fourth, improvements in the communication system have been undertaken. Some cables are now underground. A repeater has been installed to enable communication by hand held radios to the EOC. The Amateur Radio Society has 13 members stationed at different locations to compliment Cable & Wireless.

However, a number of problems still exist. First, the budget for disaster planning has been increased only from EC$5,000 to EC$8,000. Second, the position of National Disaster Coordinator is still a part-time position within the Information Unit. Third, given this lack of support it is not surprising that more extensive training and public education programs have not been developed. Fourth, the National Disaster Plan has not been updated, nor most importantly, exercised since Hugo. Fifth, a number of serious problems, such as those involving sheltering and shelter management.
CHAPTER 8

THE ANALYTICAL SCHEME UTILIZED IN EXAMINING ISSUES OF LONG-RANGE RECOVERY

The analysis of the recovery process in Montserrat is the subject of the next four chapters. In this chapter we will present the analytical scheme that was utilized in this examination. Chapter 9 discusses the recovery process. In Chapter 10 we analyze six dimensions of the recovery process. Finally, in Chapter 11 we will summarize the major findings regarding recovery. (Recommendations regarding recovery are included with those concerning emergency planning and response in Chapter 12.)

The discussion of the disaster recovery process is based on the Haas et al. (1977) conceptual model of the disaster recovery process. Four stages of response are conceptualized: 1) emergency response; 2) restoration of public services (electricity, water, telephone); 3) replacement reconstruction period marking the return of capital stock to pre-disaster levels; and 4) betterment and developmental reconstruction involving economic growth and development of a disaster stricken locale. Chapter 9 addresses the last three stages.

In chapter 10 the second part of the analysis focuses on issues surrounding six dimensions of the recovery process. The dimensions are derived from the limited, but growing, literature in disaster recovery and sustainable development (Berke and Reddy, 1990; Haas et al., 1977; Rubin, 1985; and Anderson and Woodrow, 1989):

1) **Organizational Coordination.** Were there specialized organizations created (e.g., recovery task force) after the disaster to enhance coordination and communication or did pre-disaster organizations handle these functions? What types of communication and relationship building activities did such organizations employ? How effective were these activities in sustaining communication and coordination?

2) **Monitoring and Assurance of Compliance.** Was the use of aid by recipients effectively monitored? Did aid recipients comply to donor organization recovery strategies (e.g., structural strengthening, purchase of hazards insurance)? Were there sanctions for noncompliance?
3) **Recognition of Rights.** Did "outside" foreign organizations recognize the legitimacy of domestic governing authorities in administering recovery programs? Were there instances of external organizations challenging domestic authorities? If such challenges occurred, did they erode domestic organizational commitment and capacity to manage the recovery?

4) **Presence of Strong Leadership.** Were there individuals or organizations that provided a strong moving force in recovery activities before or after the disaster? Did they have foresight about planning and implementing recovery activities? What types of resources did these individuals invest (e.g., time, energy, money) to promote recovery?

5) **Availability of Resources.** Were there sufficient resources -- financial, material and human? Was the distribution of resources fair and equitable? How well was resource acquisition and distribution tied to damage assessment data?

6) **Linkage of Recovery to Well-Established Activities.** Were there instances of linkage of recovery programs to ongoing development programs? Did recovery officials create new, separate initiatives or did they take advantage of established programs, and make small, incremental adjustments to established behavior? If linkage occurred, were the political, social and economic consequences of recovery activities more manageable?

In chapter 11 the third part of the analysis presents conclusions. The conclusions focus on successes and failures of the Montserrat experience in recovery. In addition, changes that have taken place in the recovery area on Montserrat are also discussed.

Finally, recommendations are derived from the analysis and presented in chapter 12. These recommendations should be useful to officials involved in developing effective and equitable programs for the acquisition and distribution of aid. They should also be useful in enhancing the capacity of government and non-government organizations to anticipate and respond to a range of common and significant developmental issues that disaster stricken countries must confront during recovery.
CHAPTER 9
THE STAGES OF THE RECOVERY PROCESS

Recovery is not an event, it is a complex process of social action that can be conceptualized as evolving through a number of phases. In this analysis we are utilizing the conceptual scheme of Haas et al. (1977).

Stages of the Recovery Process

The emergency period in Montserrat came to an end about two weeks after Hugo made landfall. As we previously discussed in chapters 5 and 6, debris on streets was cleared, and some basic public facilities, such as the airport and radio communications, had been repaired to at least a minimal level of operation.

The restoration period began during the emergency period. The pace of restoration was not even. Restoration of water and electrical utility services occurred within two or three weeks in some areas. Other areas did not receive electrical service until February, 1990, five months after the storm. The seaport was not functional until three months after Hugo. Telephone service was not restored until July, 1990, nearly 10 months after the disaster, which marked the end of the restoration period.

The replacement reconstruction phase in Montserrat began early in the restoration period. It started with the initiation of a comprehensive and detailed housing damage assessment on a house-to-house basis by MATLH three weeks after the storm struck. By about two months after Hugo, all major recovery aid donor organizations had established operations in Montserrat. Separate damage assessments were thus initiated by various other government and non-government organizations. Because of a deluge of assessments taking place, victim households were often surveyed on multiple occasions. This caused much frustration among residents.

The duration of the replacement reconstruction phase was extended because of the absence of a workable disaster plan that could have provided better coordination among those government agencies and NGO's conducting the damage assessments and providing recovery aid. Further, MATLH had no pre-disaster plan for collecting and examining damage data. As a result, there were unforeseen complications in making the assessments available. In fact,
while the MATLH assessments were to be available within weeks, it took about 11 months. Many of the households that had been assessed were thus not eligible for aid until the assessment data became available. Another cause for the extended duration of this phase was due to the sheer scale of destruction. Short supply of skilled labor and building materials further slowed rebuilding. In addition, a massive inflow of overseas money for rebuilding second homes of expatriot owners caused additional pressures and delays for the local population in finding labor and materials.

Because of much confusion, delay and overlapping operations by numerous aid giving organizations, the government created the Rehabilitation Unit six months after Hugo struck. The organization, with staff drawn from several government agencies, was created to coordinate and direct the overall housing recovery effort in Montserrat. Since its creation, the unit has widely been considered to be successful in monitoring and coordinating the recovery effort. Nevertheless, as of July 1990 the replacement and reconstruction phase was still ongoing as many poor households (about 1,200) in need of recovery assistance had not received aid.

The betterment and development stage began in the midst of the replacement and reconstruction phase. One event is a likely indicator of the start of this final phase. Eight months after the hurricane struck, a NGO based housing recovery program involving the Caribbean Conference of Churches and the Canadian University Students Organization began to successfully link its recovery operations to long-term developmental activities in two villages. Another event involved the commissioning of a consultant report by the United Nations Commission for Human Settlements to assess the feasibility of permanently establishing the Rehabilitation Unit as the lead government organization for formulating and carrying out a long-range housing development program in Montserrat. Such a program obviously would not be solely directed toward disaster recovery, but would be primarily oriented to developmental concerns. As of July, 1990 a final decision by the United Nations and the Montserrat government had not been made regarding the status of the Rehabilitation Unit.
CHAPTER 10
THE DIMENSIONS OF THE RECOVERY PROCESS

In this chapter we will analyze six important dimensions of the recovery process. These dimensions have been selected based upon their analytical importance to an understanding of the effectiveness and efficiency of recovery efforts.

Organizational Coordination

Four sets of organizational coordination activities were particularly salient during the disaster recovery in Montserrat, including the national disaster planning program, NGO (non-governmental organizations) collaboration, Rehabilitation Unit, and damage assessment process.

National Disaster Planning Program. Evidence revealed that the effectiveness of the National Disaster Plan and the Executive Committee was mixed. On the positive side, representatives from the Ministry of Agriculture, Trade, Lands and Housing (MATLI) indicated that the ministry had formulated a successful disaster plan for food acquisition and distribution. This plan, according to those interviewed, was prepared in response to what staff members had learned by participating in Disaster Executive Committee meetings and training sessions before the disaster.

On the negative side, all our informants maintained that the National Disaster Plan was ineffective in guiding long-term recovery and reconstruction activities. These individuals gave several reasons in explaining failure of the plan. One was that the plan emphasized disaster preparedness and response activities, but did little concerning recovery. In fact, only four pages of the 69 page plan addressed recovery concerns. As a result, recovery activities were poorly organized and undertaken on an ad hoc basis.

Two activities exemplify the lack of pre-disaster recovery planning. One was inadequate debris removal planning. During the months following Hugo it became increasingly difficult to remove debris from damaged areas due to a lack of suitable debris removal sites. The presence of debris in residential areas in need of repair severely hampered reconstruction efforts for several weeks. In fact, the problem became so pressing that the
government resorted to using an undeveloped flood channel or "guat" as a debris dumping site in one large residential area on the west side of the capital city of Plymouth. Another activity dealt with damage assessment. As will be discussed in greater detail, this activity was undertaken by numerous government and non-government organizations with little coordination and a great deal of replication.¹

A second reason for failure was that while the plan details the responsibilities and tasks of various government organizations, it makes limited reference to the responsibilities of the Disaster Executive Committee in coordinating activities of numerous government and non-government organizations involved in disaster recovery. Although an organization like the MATLH may have had a plan, the Disaster Executive Committee did little in acting as a focal point for coordinating the individual plan implementation activities. Further, a high-level administrator of the MATLH mentioned that the emergency food plan was prepared "in-house" and that the plan had not been circulated to members of the Disaster Executive Committee before Hurricane Hugo.

A third reason was that the National Disaster Coordinator was not given visibility as the leading advocate for disaster planning. As was noted in chapter 3, the coordinator position is only part-time, and is not given a separate organizational identity, as it is located within the Information Office of the Ministry of Communications and Works.

A fourth reason was that the National Disaster Plan was not, as one government administrator noted, "a living document." (See chapter 3 for a discussion of similar problems related to emergency planning and response.) When asked if they were familiar with the plan which was prepared in 1987, most public officials interviewed indicated that while they were aware of its existence, they were not familiar with plan content and the actions their organizations were to implement as specified by the plan. They attributed this lack of knowledge to several factors including, for example, infrequent executive committee meetings for reviewing and updating the plan, low priority of disasters given by their organizations, and an island-wide belief that a hurricane disaster would not occur because over 60 years had elapsed since the last storm struck Montserrat.

Since Hugo, however, the government has given increased priority to disaster planning. The Disaster Executive Committee has held regular monthly
meetings to review disaster response and recovery strategies that did or did not work. Based on these assessments the committee has been revising the National Disaster Plan and government organizations have been updating their individual plans. Further, the government has sponsored workshops on storm resistant building design, and on linking recovery to long-term redevelopment programs. Most officials interviewed indicated that compared to pre-Hugo, Montserrat was better prepared to respond and recover from a disaster by the 1990 hurricane season.

**NGO Collaboration.** Two prominent cases of NGO collaboration had varying degrees of success. Each collaborative effort evolved on an ad hoc basis and had no relation to the pre-disaster planning activities on the island.

Of most long-term significance was collaborative effort by an external NGO -- Canadian University Students Organization (CUSO) -- an intermediary NGO -- Caribbean Conference of Churches (CCC), and a local NGO -- Community Action Group. CUSO sought to provide housing recovery assistance after Hugo. About two months following the disaster, CUSO established an arrangement with the CCC which had been involved in community developmental work in the Streatham District of Montserrat for several years before the storm.

The arrangement involved CUSO providing funds to the CCC for undertaking reconstruction activities in Streatham. The CCC, in turn, was to use its organizational network in the district to carry out the reconstruction work. The CCC employed a five-member housing assistance team for a six-month period (January, 1990 to June, 1990). All team members were Streatham citizens and had been voluntary members of the Community Action Group - a group that had been supported for several years by the CCC to undertake development activities. They included a foreman, two experienced carpenters and an apprentice carpenter. The fifth member, also a Streatham citizen, was the volunteer project coordinator of the Streatham Community Action Group. Interviews with a local citizen and several public officials whose government ministries had been active in Streatham revealed that this individual was well respected for her local organizational building and management capabilities. CUSO also supplied the housing assistance team with building materials and logistics for transporting reconstruction material.

The accomplishments of the team were substantial. The team conducted a series of local training workshops on rebuilding and structural strengthening techniques, built 22 homes, and repaired a severely damaged
community center. Perhaps of greater significance were the long-term developmental accomplishments. During an interview the local coordinator maintained that team members took much pride in their work. She also indicated that the local visibility and sense of importance of the Community Action Group were raised considerably as a result of its post-disaster activities. Such heightened interest has, according to her, translated into several local improvement projects that are not related to disaster recovery, nor supported by external NGC's. Drawing on local volunteers the group has undertaken, for example, building a recreational facility and improving backyard garden agricultural practices in the district. In sum, compared to pre-Hugo, the post-Hugo Community Action group was better organized, had more staff and given greater political importance in taking on development projects.

The local coordinator was also given the opportunity by CUSO to convey the accomplishments of the group to CUSO supporters. She went to Canada for three weeks during May of 1990 and made numerous presentations. These presentations, according to the coordinator, provided a rare opportunity for a grass roots organizer to demonstrate how foreign NGO funds were used. The coordinator believed that because CUSO sponsors were given a first-hand account of the project, as opposed to a second-hand account given by a CUSO staff member, the sponsors gained a better understanding of the issues. In particular, the local coordinator believed that CUSO sponsors learned that a successful recovery project is not only product oriented (e.g. number of homes rebuilt), but also addresses local organizational capacity building and long-term development concerns.

A second case of NGO collaboration involved a cooperative agreement between the Montserrat government and the U. S. Peace Corps to undertake a housing recovery project. The project coordinator was an young, energetic American architect with limited experience in project management. Under his supervision was a team of eight local full-time workers that he had trained to construct pre-fabricated homes for those victims that had been participants in a pre-Hugo low income public housing assistance program. His supervisor was a British engineer of the Montserrat Public Works Department. Interviews with public officials at the ministerial level revealed that the project was widely considered a success in the context of recovery. During the nine-month duration of the project (November, 1989 to July, 1990) 191 pre-fabricated homes were transported and erected. An additional accomplishment
was that the workers gained basic carpentry skills and became more employable in the local economy.

This project, however, had a key disadvantage. There was a perception among three of the government agency staff interviewed that it did not exhibit clear commitment to the Montserrat leadership and did not provide Montserrat authorities control of the program. Because the project director and his supervisor were not Montserrat citizens, "The project had taken on a life of its own," as one high-level government administrator indicated. Additionally, she maintained that the project was not integrated with other housing recovery or development programs administered by the government. The administrator further explained that while these individuals had good intentions, they were not familiar enough with the politics and culture of Montserrat to effectively link their projects with others.

**Damage Assessments.** Constraints on expedient delivery of recovery aid regarding interorganizational coordination problems stemmed from conducting damage assessments. Separate damage assessments were undertaken by individual government agencies and NGO's in the months following Hurricane Hugo. Initially the Ministry of Finance conducted a rapid visual survey of damages within days after Hugo (see chapter 6). The estimates of damage from this assessment were used as a basis for requesting foreign aid. Three weeks after storm landfall MATLH conducted a comprehensive and detailed damage assessment on a house-by-house basis. Using 18 enumerators the assessment was completed in about one week. The assessment was to be used by various government organizations (Community Services Unit and Public Works) that had a role in housing recovery. Further, the Community Services Unit undertook a specialized damage assessment targeted only for those low-income households that were receiving assistance before Hugo under a public housing program. Also during the weeks after Hugo several NGO's (e.g., Red Cross, Caribbean Conference of Churches, Salvation Army and Lion's Club) conducted individual assessments.

It was not surprising, therefore, that those interviewed consistently expressed concern that victim households were often surveyed by damage assessors on more than one occasion. In fact, an interview with a local CCC staff member revealed that her home was assessed four times before her family finally received assistance. Such multiple assessments caused much public anxiety and frustration that was directed toward the government. Such
frustrations contributed to the belief of unconfirmed rumors of aid
distribution for political purposes. This, according to most individuals
interviewed, contributed to explaining why those in need had not received aid.

An additional problem with the damage assessments was that the data
collected often did not meet user needs. For example, according to Community
Services Unit staff, some data that was important for making housing
assistance decisions (e.g., measures of socioeconomic status and of housing
demand) were not collected. MATLH staff were keenly aware of this problem.
They indicated that there was inadequate time in the days immediately
following Hurricane Hugo to work with user organizations in designing a
complete and comprehensive survey questionnaire. They also maintained that
the MATLH's housing component was not well-developed relative to its
agricultural component, and thus there was insufficient in-house expertise
for questionnaire design. In fact, according to ministry staff, the MATLH only
has one staff member of 59 employed by the ministry to operate its housing
program.

Another difficulty was the long delay by the MATLH in making damage
assessment data available. The delay was caused by difficulties in
computerizing the data. The original intention for computerization was to
enhance efficiency of data access and retrieval for user organizations.
However, soon after the damage assessments were completed ministry staff
discovered that there was insufficient expertise to use their software for data
entry. (As of July, 1990 -- 10 months after the storm -- MATLH staff had
acquired staff expertise in use of the software and were within weeks of
completion of computerizing the data.)

There were negative political consequences that resulted from the
delay. Staff in Community Services and Public Works indicated that several
weeks had passed before a decision was made to not wait for the computerized
data, but to access the data manually. This delay caused much anxiety and
frustration among these agencies. It ultimately "fueled many underlying 'turf
battles'," according to one agency staff member.2

Rehabilitation Unit. Six months after Hurricane Hugo made landfall
(March, 1990) a housing recovery agency -- Rehabilitation Unit -- was created
by the Montserrat government. The unit's responsibility was to handle the
high number of eligible households (1,200) that had not received aid at the
time the unit was established. The 12-member unit staff (nine full-time and
three part-time) is interdisciplinary and represents a range of government agency interests involved with housing recovery. The unit's director is a former high level administrator with the Montserrat customs office, with substantial management experience, particularly in dealing with international organizations. The remaining staff includes social workers, engineers and an architect that were drawn from Community Services, Public Works and the MATLH.

The Rehabilitation Unit's primary objectives are to: 1) assume direct administrative responsibility and coordinate all government housing recovery programs; 2) consolidate damage assessment data bases collected by the MATLH and various NGO's; and 3) conduct an assessment of the 1,200 remaining households to prioritize recovery needs based on level of damages and household resources.3

Interviews with Rehabilitation Unit staff indicated that the organization has been successful in achieving its objectives. As of July, 1990 about 800 of the 1,200 households had been assessed, with 300 having received assistance in the form of building materials. In addition, many of those interviewed both within and without the unit agreed that the ongoing turf battles among government agencies had subsided due to coordination efforts of the unit. Staff members from several NGO's (Christian Children's Fund, U.S. Peace Corps and Red Cross) also indicated that they have had better interorganizational relations and cooperation with the government since establishment of the unit.

As a result of the unit's success some discussion is underway within the Montserrat government on giving it permanent organizational status, with a full-time staff and budget. A study by a consultant was commissioned under the sponsorship of the United Nations Commission for Human Settlements to assess the feasibility of the unit as the lead government organization for formulating and carrying out a long-term housing development program in Montserrat (study to be cited in the final report). The study was completed in July 1990 and recommended that the unit be given permanent agency status. At the time of writing this report, it was too early to assess the impacts of the study recommendations on government policy regarding the Rehabilitation Unit's role in housing development.
Monitoring and Compliance Activities

Activities involving delivery of housing assistance, monitoring how the aid is used, and assurance that aid recipients comply with housing reconstruction guidelines varied among government and non-government organizations. The predominant government agencies responsible for housing for the first six months after the disaster were the Community Services Unit and the Public Works Department.

The Community Services Unit was responsible for those victim households that were receiving assistance before the disaster under the unit's social welfare housing program. These households automatically qualified for one of two types of assistance. One was to receive building materials for repairing damaged, but not destroyed homes. The other involved provision of a prefabricated home, if the structure was damaged beyond repair. The Public Works Department administered a program for all households that were not participating in the Community Services Unit welfare program before the disaster. Each household that incurred damage and requested assistance was given an equal amount of building materials. The Public Works Department was also responsible for storing and distributing building materials for the Community Services Unit, as well as its own program.

According to Community Services and Public Works staff monitoring and compliance, activities under these programs were disrupted resulting from several incidents. One was the long delay by the MATLH in making damage assessment data available and in collecting appropriate information to assess the level of household need for aid. Another dealt with ongoing problems of coordination and sharing of information among government and non-government organizations. A final reason for disruption involved incidents of politically motivated aid distribution, as opposed to distribution based on need. While it is difficult to verify the actual occurrence of these incidents, the perception of their occurrence was widespread, at least according to those interviewed. Because of this perception of politicians usurping administrative procedures in aid distribution much mistrust has ensued. This, according to one Community Services social worker, seriously eroded government agency staff commitment and support to long-term recovery efforts.

Activities for monitoring and assuring use of building strengthening techniques were more effective under the prefabricated housing assistance
program than for other housing recovery programs. As mentioned, the Peace Corps team built prefabricated houses for eligible low-income households. The basic building design blueprint for these structures was prepared by a Peace Corps staff member and incorporated building strengthening (e.g., use of high pitch hip roofs and hurricane straps). Because the team prefabricated housing components "in-house" at a Public Works warehouse, compliance to the blueprint was assured. Under the other programs houses were repaired off-site by either a carpenter or the aid recipients themselves. This procedure obviously leaves decisions about construction to homeowners and local carpenters and does not assure that structural strengthening occurs. Furthermore, while there was a national building code in place before the disaster, it was widely criticized for lacking storm mitigation standards. Thus there were no building construction and mitigation guidelines to follow.

During the months after Hugo, several housing reconstruction workshops were held to inform the public and building professions about mitigation and repair techniques. These workshops were sponsored by the government, United Nations, and an American university. However, because of limited Community Service Unit and Public Works Department building inspection staffs there have been no follow-up field checks to assess the quality of reconstruction. Interviews with staff of these two organizations suggest that only a limited number of aid recipients made efforts to incorporate mitigation into their reconstructed homes, and that the workshops have had little impact.

Establishment of the Rehabilitation Unit should lead to improvement of monitoring and compliance activities in Montserrat. As mentioned, the unit has attempted to improve monitoring of aid distribution by serving as a central clearinghouse of records on households that have received aid from government or NGO's. The Unit is also in the process of conducting a detailed damage assessment of needy households. The assessment will include information on housing needs and socioeconomic status which was not collected by the original assessment of the MATLH. This information should help the unit to more effectively prioritize household assistance based on need then has previously been the case. Also, the unit has sufficient staff (two engineers, one architect and two social workers) to conduct field verifications on the use of the housing aid.
NGO activity in monitoring use of the aid, and assuring that aid recipients comply with a given organizations' objectives varied widely. In the case of the housing recovery program of the Caribbean Conference of Churches (CCC) and Canadian University Students Organization (CUSO) monitoring and assurance was very effective. This success was, according to a CCC organizer, due to a "well-staffed and trained locally based housing assistance team" with a "strong motivation to use community aid to the fullest extent." The organizer further maintained that because team members were local citizens, they could regularly observe how aid was used for reconstruction in their communities. This close contact served as a deterrent to using aid for unintended purposes.

In another case the Red Cross was not as effective in monitoring use of its aid. Unlike the CCC/CUSO program, the Red Cross effort did not have a well-staffed field organization in place throughout the recovery period to regularly conduct field inspections. Except for three volunteer local staff, almost all Red Cross personnel came from other nations in the Caribbean region to assist in assessing damages and distributing aid. Most of these individuals left Montserrat within two or three months after hurricane landfall.

**Recognition of Rights**

Public officials consistently expressed concern that the Montserrat government experienced much difficulty in working with foreign NGO's during the recovery. These officials maintained that some foreign NGO's were often not flexible enough to work with the government in distributing housing aid. In fact, the word "resisted" was frequently used to describe their reactions to some NGO's. For example, the Montserrat government failed in an attempt to establish a Disaster Coordinating Committee eight weeks after Hugo. The membership of the committee was to consist of representatives from 10 different government agencies and NGO's active in housing recovery. The objective of this committee was to coordinate housing recovery programs of the member organizations. The key reason for failure of the committee, according to those interviewed, was resistance on part of the NGO's to participate.

In particular, Community Services Unit staff believed that NGO's did not recognize the organizational capacity of the government, and especially of the unit in delivering housing assistance. The staff maintained that as a social
service agency, the unit had a better understanding of housing recovery needs of Montserrat residents, particularly those of the poor, than expatriate staff of foreign NGO's. They further believed that as Montserrat government personnel they had a legitimate right to be involved and familiar with foreign organization operations in their country.

An interview with an expatriate NGO program director, for example, revealed that offers to collaborate and combine recovery resources to his organization by the Montserrat government were passed over. Government staff did not have the experience in disaster response and recovery that the NGO official felt was needed. Because of the large number of victims, the program director maintained that his NGO decided that it could not take a "risk" with these inexperienced government agencies.

There were, however, exceptions to this reaction from foreign NGO's. As mentioned, in one example, the Canadian University Students Organization saw what was happening and considered the disaster a special opportunity for setting into motion a process of collaboration. The Canadian organization involved a local NGO (Caribbean Conference of Churches) and took a long-term developmental approach to disaster recovery.

**Leadership**

When asked if there were any organizations playing a leadership role in raising awareness and promoting the need for disaster planning before Hurricane Hugo, the one organization mentioned was the Pan Caribbean Disaster Preparedness and Prevention Project (PCDPPP). (Four of eight informants mentioned the PCDPPP.) These individuals were well aware of the PCDPPP's work over the previous four or five years. Key activities that were considered useful included, among others, conducting a table-top simulation of volcanic eruptions, media awareness workshops, and disaster evacuation exercises.

While there was consensus among those interviewed that these activities had not translated into effective post-disaster recovery responses, they agreed that the PCDPPP was instrumental in raising awareness and knowledge about hurricane disasters. One key official suggested that this heightened concern and understanding has served as an important precursory condition in stimulating the active disaster planning program currently underway in Montserrat. A representative of a well-known NGO
maintained that the PCDPPP was instrumental in providing technical assistance to enable her to conduct an audit of her organizations' capability to respond to future disasters. The audit revealed several weaknesses which the NGO is currently addressing.

One organization (Development Unit of the Ministry of Finance) and one individual (Governor) were mentioned most frequently (three of eight informants) as effective leaders during the post-disaster recovery period. The Governor of the country was instrumental in motivating the country through numerous media appearances. Additionally, for a short period of time he provided much needed leadership in identifying and coordinating the roles of various government agencies. In particular, as chairman of the Disaster Executive Committee, he also was effective in reviving the committee as a viable disaster planning organization. A key factor in explaining the effectiveness of this individual was his previous experience with coastal storm disasters as a public administrator for over a decade in the South Pacific. Unfortunately, the Governor's term in office expired 3.5 months after the disaster, and he no longer was an active participant during the recovery.

The Development Unit was appointed by the Governor as the lead agency in coordinating the acquisition of international aid. Because of pre-disaster responsibilities in acquiring outside aid for economic development, this organization had a well-established network of international donor groups. The network was useful in making requests for and in acquiring disaster recovery funds, materials, and personnel.

Interestingly, none of those interviewed indicated that the National Disaster Coordinator played a leadership role during the recovery process. The absence of a strong leadership role provided by the coordinator is likely due to, as mentioned, poor administrative visibility and insufficient staff time allocated to the position.

Resources
Resources include organizational staff and materials used for reconstruction.

Staff. The adequacy of staff varied by organization and type of recovery activity. The MALHI damage assessment staff consisted of 18 agriculture extension agents. Each agent was college educated or had a post-secondary school degree. Most agents were stationed in various parts of the
country before Hugo worked on agricultural development projects. This allowed for considerable familiarity with local geography, and political and social conditions. The agents also had some experience as enumerators for various population and agriculture censuses conducted by MATLH.

Given these skills, it is not surprising that the data collected by these individuals was widely considered to be accurate. However, there were several shortcomings in ministry staff expertise regarding assessment of housing needs and computerizing damage data. This led to subsequent difficulties concerning the usefulness and availability of the data.

On the one hand, the government program for delivering aid to victims receiving public housing assistance was well-staffed by the Peace Corps' housing assistance teams. On the other hand, the government program for delivering aid to victims that did not receive such assistance was not adequately staffed. Once a household received assistance, there were no follow-up on-site inspections to verify use of the aid due to severe staffing limitations. In fact, the country only employed one part-time building inspector who was assigned to other duties during the first nine months after the disaster.

By relying on well-established and highly trained field staffs, the Caribbean Conference of Churches and the Canadian University Students Organization project had considerable success in delivering aid and monitoring construction practices. Also, as in the case of Antigua, the Montserrat Red Cross drew on the regional field network of Red Cross chapters in the Caribbean to effectively conduct damage assessments. However, staff assigned to assessing damages were not available for working with local organizations in building their capacity to undertake long-term recovery activities, such as distribution and monitoring of aid, as well as long-term development initiatives.

**Material Acquisition.** Montserrat experienced a severe shortage in building materials for about seven months after the disaster. The shortage was caused by two factors. One was a two-month delay in distributing materials due to inadequate seaport unloading facilities. The other involved households that had sufficient resources to quickly buy any available materials. These households were upper income or had expatriate relatives or friends sending money. Although there are no accurate data available, one social worker in Community Services maintained that there were more
Montserrat citizens living overseas, than residing in Montserrat. Thus the magnitude of expatriate aid was substantial.

The presence of these two factors, according to several informants, led to price increases for labor and building materials at three or four times pre-disaster levels. It was often suggested that building suppliers, contractors and carpenters were "price gouging" or "taking unfair advantage of the situation," or "thriving off the misery of others."

**Linkage of Recovery to Developmental Issues**

While no linkages of recovery programs to ongoing development projects were pre-planned, several instances of such linkages occurred during disaster recovery. Of greatest significance was the linkage of disaster recovery activities supported by CUSO to a local development program organized by the CCC. Because the disaster recovery was viewed as a long-term development issue by both organizations, the cooperative arrangement did not require a grand departure from the well-established, and politically and socially acceptable ways of doing things. In fact, as mentioned, infusion of resources resulting from the disaster reinforced the CCC's and the locality's capacity to undertake a variety of development projects not related to disaster recovery.

Three other links between recovery and development were identified. The Ministry of Education had a long-term school improvement plan in place before Hurricane Hugo. The plan was to include refurbishment or replacement of schools. Since Hugo destroyed or severely damaged most schools on the island the ministry has decided to allocate international recovery aid funds on the basis of the plan. Another link was the replacement of damaged above-ground electric utility lines with lower maintenance and more storm resistant underground lines. This activity was compatible with the long-term plan of the power company to replace existing lines with underground ones. A third link, as discussed in more detail (see section on Organizational Coordination and Communication), involved the establishment of a housing rehabilitation agency. The original purpose of this organization was to consolidate and coordinate government and NGO housing recovery assistance programs. However, because the agency has been effective, government officials are seriously considering the possibility of permanently
establishing the agency to carry out long-term housing development programs.
CHAPTER 11
A SUMMARY OF MAJOR FINDINGS REGARDING LONG-RANGE RECOVERY

This section summarizes the principal study findings in light of the conceptual dimensions on recovery introduced in chapter eight. The discussion addresses both the successes and failures of the recovery effort in Montserrat.

What Components Were Well Handled

First, the governor provided much needed leadership in identifying and coordinating roles of various government agencies. As evidenced by his designation of the Development Unit as the lead organization for coordinating and distributing aid, he decided soon after the storm made landfall what had to be done and who should participate in carrying out the recovery effort.

Second, the PCDPPP played an effective leadership role during the pre-disaster period in raising awareness and knowledge about hurricanes. This organization carried out a variety of useful activities involving media awareness exercises and technical assistance. Much of this work has served as an important precursory condition in stimulating post-disaster planning program efforts in Montserrat.

Third, establishment of the Rehabilitation Unit was an important, but belated step in coordinating the overall housing recovery effort. This organization was effective in serving as a central clearing house for damage data, in distributing housing recovery aid to those in need, and in monitoring use of such aid.

Fourth, some organizations recognized the disaster as providing a window of opportunity to pursue activities that were not related to the disaster. The Canadian University Students Organization (CUSO) sought to advance its developmental work, and the government carried out public school and utility pole renovation plans at a more rapid pace than it might have if Hugo had not struck.

Fifth, foreign NGO collaboration with a local NGO in the village of Streatham led to a strengthening of local organizational capacity. The goal of the foreign NGO (CUSO) was to empower the local group, and not to do the work
itself. The local NGO was able to undertake a variety of developmental activities that built on its disaster recovery work.

Sixth, reliance on a well-established and trained NGO field staff that had been active for years in pre-disaster development activities was an effective recovery strategy. Staff could provide for accurate damage assessment, know which households were in need and eligible for assistance, and could closely monitor construction practices.

Seventh, an international NGO (CUSO) sent a community action group leader to Canada to give lectures to the NGO's sponsors about their NGO support of long-term developmental work. Sponsors there had an opportunity to learn first hand that a successful recovery project is not just "brick and mortar" oriented, but is concerned with local organizational capacity building.

Eighth, in Streatham the NGO collaborative project was made accountable without an overwhelming amount of red tape. Local people were active in monitoring the use of aid. In fact, the monitoring process became developmental when donors and the local Community Act Group were interacting.

Ninth, Hugo was a "dry storm" with limited rainfall. A wet hurricane could have caused much greater damage to an already devastated island, particularly in areas that had been built in floodplains.

**What Components Were Problematic**

**Pre-Disaster Period**

First, the National Disaster Plan was completely ineffective in guiding long-term recovery activities. While the plan text emphasized emergency response, little attention was given to recovery. Thus the plan was widely considered a "paper plan." Government and NGO officials were not familiar with plan contents. Such lack of knowledge was attributed to infrequent meetings focused on reviewing and updating the plan. As a result, recovery responses in Montserrat were ad hoc, and not a product of prior recovery planning.

Second, local development regulations, particularly building codes, and inspection and enforcement procedures were not effectively implemented during the years before Hugo struck. Thus the housing stock was not designed with storm resistant construction techniques.
Third, government staff assigned to carry out disaster recovery programs were not trained and were inadequate in terms of numbers. For example, long delays in releasing records on damage assessments by the MATLH caused major delays in the delivery of recovery aid. The delays were caused by lack of staff expertise in computerizing damage data. Also, there was an inadequate number of building inspectors, with only one part-time inspector available for the entire rebuilding effort.

Fourth, the National Disaster Coordinator did not provide effective leadership. This position did not have a budget for adequate training and was only part-time.

• **Post-Disaster Period**

First, lack of effective interorganizational coordination slowed down the pace of recovery. Many problems of interorganizational conflicts and duplicative actions used up scarce staff time and resources that could have been used for other pressing needs. The case of households being surveyed on multiple occasions by damage assessors exemplified this problem.

Second, because of no pre-disaster recovery plan there was a low capability to undertake recovery activities, no organizational arrangements and coordination in place, low understanding of NGO disaster recovery programs, and low knowledge of what external resources were available. Thus, most post-disaster recovery activities were undertaken on an ad hoc basis. Since such improvisation dominated recovery response decisions, the pace of recovery was inevitably slowed and made less efficient.

Third, NGO's with substantial human resources were not, at least initially, acknowledged nor effectively involved in the recovery process. For example, it took more than two months after Hugo made landfall before CUSO and the Peace Corps initiated their recovery programs.

Fourth, many opportunities to prevent or mitigate future disaster losses during reconstruction were lost. A narrow approach of "just put it back" predominated. Many areas could have been reconstructed to be safer from future storms or to enhance underlying long-range development efforts.

Fifth, heavy dependency on foreign assistance and a lack of pre-disaster planning led to a loss of control on the part of Montserrat authorities. Only after the Rehabilitation Unit was created six months after Hugo did
Montserratians begin to exert substantial control over its recovery and its future.

Sixth, much relief work on the part of the international NGO's was not held to development standards. Some NGO's, (e.g. Red Cross and U. S. Peace Corps) used their field staff to conduct recovery activities, but did not build on local organizational capacities. That is, staff assigned to recovery activities did not give attention to increasing local capacities to undertake long-term development projects.

Seventh, in some instances NGO relief programs could make little difference or even impede development in the long-run. That is, NGO work could have no impact or lead to a decline in local organizational capacity to facilitate recovery and development. Although the Peace Corps' prefabricated housing project was successful in delivering new homes, it had limited impact on local organizational capacity building. Further, NGO control of a significant amount of recovery resources and resistance to attempts by government to collaborate, conained domestic organizational influence in managing the recovery.

Eighth, building codes were inadequate for assuring that rebuilding would lead to improved hurricane safety measures. Further the procedures for implementing the codes during the disaster recovery period were not enforced.

Post Hugo Changes Regarding Long-term Recovery

Since Hugo several positive changes have occurred regarding disaster recovery planning. As in the case of disaster preparedness planning, many of these changes are in response to the problems encountered during the Hugo disaster response efforts. Further, these changes can also be attributed in part to the pre-disaster planning efforts taken by the PCDPPP. First, post-Hugo workshops that have taken place focused on sharing personnel and organizational disaster response experiences have taken place. These workshops were organized by the National Disaster Coordinator. Another workshop in Antigua was regional in nature and was attended by Montserrat government and non-government officials. Still other workshops were on storm resistant building design, and on linking recovery to long-term development issues.
Second, the Disaster Executive Committee has held regular monthly meetings to review and evaluate disaster response strategies. Based on these assessments the committee has been revising the National Disaster Plan and some government organizations have been updating their individual plans.

There are, however, several limitations to this increased priority directed to disaster planning. As discussed previously, one is that the government has only made a marginal increase in the budget for disaster planning (EC$5000 to EC$8000). These funds are obviously not sufficient to undertake the tasks required for developing an effective disaster recovery planning program. A second limitation is that as of Fall 1990 an updated National Disaster Plan has not been adopted by the government. Finally, the major portion of post-Hugo disaster planning activity appears to reflect the pre-disaster trend of placing great emphasis on emergency preparedness and little emphasis on disaster recovery.
Chapter 12

RECOMMENDATIONS

Based upon the preceding analysis, we offer a number of policy and action recommendation. These recommendations refer to emergency planning, response and recovery. The recommendations suggested here should provide a starting point for improving the emergency and recovery programs on the island. Specific emergency planning, response, and recovery activities and priorities need to be worked out for Montserrat, but in most cases should include the following activities.

Emergency Planning and Response Recommendations

1. A program for modernizing, updating and enhancing emergency resources should be undertaken. Priorities should be given to the Health Sector, communication facilities, and the port.

2. The position of National Disaster Coordinator should be made a full-time, independent position that is directly responsible to the Chief Minister.

3. The budget funding for disaster preparedness should be increased to a proper and effective level.

4. The National Disaster Plan should be immediately updated based upon the lessons learned during Hurricane Hugo.

5. This revision of the National Disaster Plan should be undertaken by the governmental and NGO officials of Montserrat, who will be responsible for implementing it during future disasters.

6. Greater emphasis upon the emergency response, recovery and mitigation phases of disasters must be placed in future national disaster planning.

7. The system designating District Disaster Chairmen must be reassessed. The criteria for selecting Chairmen should be based upon disaster experience, technical skills, management expertise, and proven leadership abilities.

8. Training and resources should be provided for District Disaster Chairmen.

9. Future planning should consider contingencies for the loss of communication facilities, port facilities, and contact with outside meteorological and emergency response agencies.
10. Those Ministries and organizations that have not undertaken any internal disaster planning must undertake these activities.

11. All Ministries and organizations should focus their planning efforts on post-hurricane response, recovery and mitigation measures.

12. All Ministries and organizations should submit their plans to the Executive Disaster Committee for evaluation and integration into the National Disaster Plan.

13. Public education and training programs should be enhanced.

14. All disaster planning should be viewed as an ongoing process of public education, training, inventory, and resource procurement, and not simply as the development of a paper plan.

15. The warning system must develop mechanisms for effectively warning the public in the absence of the mass media.

16. Attention must be paid to evacuating hazardous areas to previously designated safe locations. The responsibility for this action should be delegated, and the legality and efficacy of forced evacuation should be studied.

17. Shelters that are to be used as a refuge for short-term, impact sheltering must be examined and determined to be structurally sound.

18. An upgraded EOC with adequate communication facilities should be established.

19. The coordinative roles of the Executive Disaster Committee and the EOC must be more clearly delineated.

20. If the EOC is to play a coordinative function in future hurricanes, it must be staffed and operational before the storm.

21. Greater attention must be paid to the problem of internal communication.

22. The issue of role abandonment should be further studied by those within the nation, and if warranted, appropriate training and education programs should be developed to assist emergency workers in carrying out their duties.

23. A system for rapid and effective damage assessment must be developed. Prior assignment of responsibilities and the development of appropriate assessment methodologies must be undertaken.

24. Provisions should be made for the delegation and coordination of search and rescue activity. Training for appropriate police, defense force or health personnel in search and rescue should be provided.

25. Provisions for handling the dead should be developed.
26. Shelters must be upgraded and provided with adequate cooking, safety and sanitation facilities.

27. An effective program of shelter management must be undertaken.

28. An equitable system for the distribution of food and other emergency supplies at the district level should be developed.

29. A system of needs assessment should be developed that incorporates an ongoing inventory of supplies on the island with forms to effectively determine needs in the post-impact period.

30. Greater communication between and coordination among national and regional relief efforts are needed. In particular, if CDRU is to become institutionalized, national governmental units must be involved in its preparedness activities.

Recovery Planning Recommendations

A major emphasis of this research is that hazard mitigation, recovery and long-term development are interrelated activities. In Montserrat these activities should all be considered in recovery programs. All require planning and depend on similar information bases. It should also be recognized that actions taken (or not taken) in the emergency phase, have impact on the subsequent recovery phase. The following recommendations are offered:

31. Designate a Disaster Recovery Task Force to give direction to long-term recovery. Actions needed to establish this organization are to specify: sphere of responsibility during pre- and post-disaster periods; membership; procedures for activating the organization; and responsibilities of each member.

32. Conduct hurricane hazard vulnerability analysis to describe, at least in general terms, the population-at-risk, and the extent of damages to buildings and public infrastructure to be expected for different locations. Such an analysis requires review of the best available information on location and magnitude of hazards, and, if possible, on structural characteristics of existing buildings. This information can be used to estimate probable damages from future storms.

33. If data is inadequate, institute programs to improve information base for making damage estimates for use in recovery planning.

34. Review existing building codes and compliance procedures for adequacy in relation to hurricane forces to assure safety. This step requires the updating of the Caribbean Uniform Building Code, particularly for small buildings, and the hiring of additional inspection staff. Such staff, however, should not be viewed as "enforcers" of the code, but as promoters and trainers of appropriate building construction practices.
The code should not be viewed as "regulations," but as a guide for providing sound construction practices.

35. Define areas where new building construction should be prohibited or subject to special requirements to assure safety.

36. Establish retrofit priorities giving top priority to critical facilities, such as electric power lines or schools, essential to health and safety, and to those facilities that could cause severe loss to occupants or property in the event of their failure.

37. Prepare a loose-leaf binder containing information on potential sources of disaster recovery assistance and instructions on how to apply for such assistance.

38. Provide for training that brings together persons from different organizations that would be involved in the recovery effort. Such training (workshops, table top exercises) would also serve to establish new patterns of communication and cooperation, particularly among government and NGO staff within Montserrat. Professional organizations in engineering, geology and architecture, among others, could play a useful role in such training.

39. Educate sponsors of donor organizations to gain support for using their funds for development activities in disaster relief programs. While training officials involved in carrying out programs is important, training of sponsors is crucial as well.

40. Update National Disaster Plan to include a recovery component and to incorporate lessons learned from recovery experiences.

41. An update of the National Disaster Plan should occur to review appropriateness of recovery strategies as the pattern of urban development, population, economic and hazards conditions change.

42. Revision of National Disaster Plan should be done by representatives of government and non-government organizations that would be involved in the recovery process.

43. Revision of National Disaster Plan should evaluate recovery procedures including the roles and assignments among cooperating organizations.

44. View a disaster as opening up a window of opportunity to do development work.

45. Compile and maintain information regarding non-government organizations that are undertaking (or could undertake) development activity; establish and maintain contacts with such organizations.

46. Domestic and international relief organizations should rely on local people and leadership whenever possible. Such reliance can facilitate long-term recovery and can improve the chances for occurrence of local developmental initiatives. Relief organizations should emphasize
building up human skills, and not solely rely on physical and material assistance.

47. Establish evaluation criteria to hold government and NGO relief activity accountable to long-term development standards. Such criteria would serve as a benchmark for monitoring and evaluation of impacts on development. Impacts could be measured based on mitigation, environmental protection or economic growth criteria, among others.

48. Think of local people that experience loss from a disaster as "participants" in the recovery process, and not "victims."

49. Establish a public information program with communications aimed at various segments of the population. The program should cover: information about hurricane and its effects on the island; updates on programs and plans for recovery; information for homeowners and businesses which describes assistance programs and "how to" instructions for repair; continuous progress reports on major recovery problems and responses to such problems.
ENDNOTES

1. Another key coordination problem that constrained the recovery process dealt with logistical difficulties in distributing building materials. A freighter with a large shipment of materials arrived at the Montserrat seaport about six weeks after Hugo. However, because this ship's cargo unloading facilities (the ship was designed to unload cargo from the stern and not the more common bow unloading) it could not be accommodated by Montserrat temporary port unloading facilities. The freighter was anchored in the port-harbor for two months before adequate facilities were installed for unloading.

2. Such battles centered on government agencies wanting to expand their roles in disaster recovery. For example, as social workers Community Service staff considered themselves most informed about housing needs of disaster victims and thus most qualified to take a leading role in the recovery effort. Public works staff felt that their agency was most suitable of all government agencies to manage the recovery effort because the agency had the most capability in storing and distributing building materials.

3. The first detailed damage assessment conducted by MATLH was determined by ministry staff to cover 73% of the 4400 households in Montserrat. The remaining 27% (1200 households) were to be assessed in a second survey conducted by the Rehabilitation Unit.

4. About 100 households received assistance under this building material replacement program.

5. An estimated 200 households were eligible for the prefabricated home program.

6. About 1200 households have received assistance under this program.

7. Once a household was considered eligible for assistance under these programs a purchase order was issued to the household. The perspective aid recipient then was to turn in the purchase order to Public Works to obtain building materials. The order specified the types and amount of materials to be distributed to a household.

8. As of July 1990, Montserrat was still $EC500,000 short in supplying building materials for 200 to 300 of the 1200 remaining households that are still in need of assistance.
REFERENCES


Buffong, Vernon L. R., 1989, "Considerations After Hurricane Hugo - Health Sector, Montserrat, West Indies," Plymouth, Montserrat.


