The Economic Impact of Hurricane Hugo on the Eastern Caribbean

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Abstract

The Eastern Caribbean region is in the path of tropical storms and hurricanes (depressions) which form in the northeast Atlantic and which move through this region before being drawn up by the warm land mass of the continental United States. Thus, virtually every year during the hurricane period from July/August to September/October, a fully-fledged hurricane hits either the islands in the Eastern Caribbean, the Eastern Seaboard of the United States, or both, with disastrous economic consequences. This paper attempts to : (1) Examine the economic impact of hurricane Hugo on the Eastern Caribbean, specifically its impact on Organisation of Eastern Caribbean States (OECS) member states, five of which were hit by this hurricane – Dominica, Montserrat, St. Kitts-Nevis, Antigua-Barbuda, and the BVI. (2) Analyse the impact of hurricane planning and mitigation measures in Montserrat, the hardest hit OECS member state, and in St. Kitts-Nevis. (3) Draw certain conclusions, and the consequent policy implications, from the experiences of these two member states with respect to their planning and mitigation measures.

Findings

The major findings of the paper are that although hurricanes are prevalent in the Eastern Caribbean, little attention has been given to their economic effects and to ensuring that OECS member states have the recuperative capacity to rebound quickly from the after-effects of hurricanes by means of effective planning and mitigation measures. With respect to economic impact, hurricane Hugo caused extensive damage which resulted in the OECS member states affected being knocked off their long-term growth path, from which they have not yet recovered. This recovery depends on their recuperative capacity, which is affected by the magnitude and extent of planning and mitigation measures, the major requirements of which are as follows: (1) Organisational and planning measures for hurricanes.
(2) Preventative and pre-emptive measures to minimise the damages from hurricanes.
(3) Implementation of post-hurricane measures for recovery, short, medium, and long-term. Most OECS member states' activities have concentrated on (1) and (2) and have been sadly deficient with respect to (3) As a result, the member states succeeded in obtaining considerable relief assistance after Hugo from donor agencies (governmental and non-governmental) and from other OECS and CARICOM states. They did not, however, succeed on obtaining much longer term assistance which would have placed their economies in a better position to withstand future hurricanes. The paper, therefore, examines the planning and mitigation requirements which would enable them to do so in the future. It indicates that a disaster mitigation plan is an indispensable requirement and that careful attention has to be placed on the financing of some of the mitigation measures outlined in the plan

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Introduction

From a theoretical standpoint, natural disasters such as hurricanes, earthquakes and floods are dealt with in the context of economic development, since the destruction caused by natural disasters hinders and retards economic growth. Hurricanes, however, have some characteristics which make them the most destructive of nature's forces: their path covers a wide area, moving over hundreds of miles of sea and land; they cause extensive ecological and environmental damage which can have adverse long-term effects; they cause extensive physical (structural) damage with short, medium and long-term implications; and they disrupt human life and livelihoods, leading to sociological and psychological trauma. For small island economies – usually characterised by small ecological space, sensitive ecosystems, narrow economic structure, and unusually high population densities – hurricanes can exert a devastating impact. This impact amounts to a severe economic shock which tends to retard growth and knock economies off their long-term growth path.

The analysis of the economic impact of hurricanes requires an objective analytical framework. Unfortunately, the practice has been to measure the economic impact of hurricanes in terms of value assessments of the damage done, ie the value of infrastructure, property and crops destroyed, and the costs of their replacement. This type of assessment, however, does not measure the full economic effects of a hurricane because it is short-term and static in nature. There are also some economic benefits that can result from hurricanes: essentially they provide the opportunity to improve conditions afterwards. Thus, the longer-term 'disbenefits' and benefits of hurricanes need to be taken into consideration. A benefit-cost analytical framework seems to be most relevant for this purpose in that it makes it possible to measure the detriments or disbenefits, benefits and costs over a specified time frame, since hurricanes exert harmful impacts over an extended period of time.

The disbenefits are essentially: (1) environmental and (2) economic. They can be summarised as Figure 1:

Figure 1: Summary of environmental and economic 'disbenefits'.

	Measures	Recovery Period
(1) Environmental		
(a) Damage to natural vegetation, forests	Reafforestation	Long-term
(b) Damage to agricultural crops	Recultivation	Short to long-term depending on the type and gestation period of crops destroyed.
(c) Flood damage and damage to the coastal environment	Enhanced measures environmental	Short to medium term
(2) Economic		
(a) Damage to infrastructure	Infrastructural development	Short to medium term
(b) Reduced output from agriculture and forestry	Recultivation and reafforestation	Short to long term
(c) Damage to physical structures, human accommodation	Reconstruction and replacement	Short to medium term
(d) Reduction in services	Human resource development	Short to long term

The economic benefits of hurricanes are long-term. The post-hurricane measures can result in improved infrastructural facilities, improved buildings (supposedly with a greater capacity to withstand hurricanes) and greater environmental protection and enhancement. However, all of these are dependent on the capacity of the economy to provide for them (either domestically and/or from international sources) adequately after a hurricane.

The analytical approach for evaluating hurricanes must, therefore, identify all the disbenefits, benefits and costs over a specified time period, say ten years, and discounting these over this time period to arrive at present values. The shortcomings of the traditional benefit-cost analysis with respect to the quantification of the effects of non-economic variables such as environmental ones are well known. However, a solution has been found using the findings from Environmental Impact Assessments (EAIs) for the purpose, and incorporating them into the benefit cost framework. Nevertheless, since the disbenefits and costs of hurricanes should far outweigh the benefits, resulting in negative benefits-cost ratios, the utility of this type of analysis is mainly in terms of cost efficiencies which can be realised from maximising costs of recuperative measures as well as minimising disbenefits over time. Disaster planning and mitigation constitute important measures for minimising the costs of hurricanes to an economy.

The Economic Rationale for Mitigation

Disaster mitigation has been defined as 'the taking of actions before a disaster that reduces its harmful effects. Mitigation accepts that extreme natural phenomena will occur, but, attempts to limit both human and property losses'.[1] In contrast, disaster preparedness 'encompasses those actions taken to limit the impact of natural phenomena by structuring response and establishing a mechanism for effecting a quick and orderly response'.[2]

The economic rationale for disaster planning and mitigation is based on the premise that the better prepared an economy is for disasters such as hurricanes the easier and quicker it will be for the economy to rebound after a disaster.

For the small economy given in the figure, it is assumed that the drop in its economic growth rate (GDP) from a hurricane would be substantial. Without mitigation, the drop in growth would be more substantial than the mitigation because there would be greater survivability and less economic loss of structures and equipment, thereby enhancing the recuperative capacity of the economy. In turn, this lessens the time period for recovery from the hurricane. Mitigation therefore influences the recuperative capacity of the economy in a positive and effective manner. This recuperative capacity depends on the following:
(1) Organisational and planning measures for hurricanes;
(2) Preventative and pre-emptive measures to minimise the damage from hurricanes; and
(3) Implementation of post-hurricane measures for recovery, short, medium, and long-term.

The first two constitute the major elements of disaster preparedness, but all three are essential requirements for disaster mitigation. In fact, *without the third element it would not be possible* to realise some of the post-hurricane benefits and to ensure that the economy attains a stronger structural base than before. Planning (involving all the above mentioned elements) is an indispensable requirement for disaster mitigation because of the complexity of issues related to hurricanes.

The conventional wisdom today denigrates planning, particularly centralised economic planning, and supports a reliance on market forces as the best means of solving most economic problems. This has been applied also to disaster situations. For example Horwich[3] indicates that: 'The optimal disaster response is one in which market prices are the primary allocator and government is the co-ordinator and provider of goods and services that are truly public-infrastructure, a variety of emergency services and supplies, and care of severe hardship cases.' Even if one adheres to this great reliance on market forces to work in disaster situations, this role for government as co-ordinator cannot be effectively and efficiently carried out without some form of planning involving both physical and economic aspects. The planning process with respect to disaster mitigation requires.

(1) The development of goals and objectives for disaster mitigation;
(2) The formulation of government policies for attaining the goals and objectives; and
(3) The formulation of effective programmes for attaining the goals and objectives.

Essentially, a Disaster Action Plan should be developed. The list of disbenefits and possible benefits given earlier indicates that this plan would have to address short, medium and longer term measures for economic recovery. In small island economies (with their sensitive ecosystems) considerable attention has to be placed on:

(1) Land-use planning in a wide context: environmental, economic, and social (housing);
(2) Sectoral planning, because the different economic sectors of the economy are affected differently by hurricanes. Some sectors can rebound quickly and others less so;
(3) Structural planning, because the physical aspects are important with respect to survivability of buildings, infrastructure etc; and
(+) The financing of the measures required, since no plan – no matter how well thought out – can be implemented without adequate financing, as well as the administrative structure and legal (legislation) requirements.

The development of an action plan based on the above requires extensive expertise in a number of disciplines. The plan itself is a costly exercise but far more costly will be the measures to be implemented, ie the programme, before and after a hurricane. Small island economies generally do not have the financial capability to provide for or earmark adequate funds for disaster mitigation purposes which will ensure high levels of survivability. However, the costs associated with various levels of mitigation indicate there are high and increasing returns for low to medium levels of mitigtion and decreasing returns for high levels. Thus, in the planning process attention has to be given to costs and benefits of various levels of mitigation. Nevertheless, without tackling the thorny question of how much an economy should invest in disaster mitigation, it is obvious that the recovery period would be longer and costs substantially higher without a plant than they would be with a plan and programme. With a plan, the possibilities of getting assistance from foreign sources (donors) for a programme are also considerably enhanced, particularly if the plan indicates levels of counterpart funding which the recipient country is prepared to provide.

Hurricanes therefore constitute both a threat and an opportunity for small island states. Since there is no control about the incidence and ferocity of hurricanes, the only meaningful approach to hurricanes is one of preparedness in all its facets. This requires careful *planning* and also for providing the *means* to implement recuperative measures quickly. These constitute the essential elements of disaster mitigation.

The Impact of Hurricane Hugo

In this section, a macro economic analysis will be made of the economic impact of hurricane Hugo on the OECS member states it affected. The analysis will be based on: (1) Identifying the long-term growth path for the economies which will be studied, (2) The short-term impact of hurricane Hugo on this growth path covering the period 1989 to 1991/92. (3) Analysing the magnitude and extent of the recovery which has taken place and needs to take place to put the economies back on their long-term growth path. Fortunately the OECS member states being studied have not been subjected to any other hurricanes during this recovery period so that the effects of Hugo can be more clearly identified

	Dominica	Montserrat	St Kitts-Nevis	Antigua-Barbuda	BVI	Total
			EC$ million			
Agriculture, forestry & fisheries	50 1	12 1	22.6	9 1	3 4	97 3
Infrastructure	15 0	85 0	10 8	15.0	69 8	195 6
Residential & commercial buildings	5 0*	600 0*	250 0*	120 0*	136 7	1,111 7
TOTAL	70 1	697 1	288 4	144 1	209 9	1,404 6
GDP 1988 at factor cost	324 3	116 0	280.0	874.1	158.8	1,753.2
Damage assessment as percentage of GDP 1988	21 6	600.9	101.2	16.4	132.2	80.1

*Estimated on the basis of level of destruction and damage of houses

Figure 2 (Right). Population density and per capita incomes

Figure 3 (Above) Breakdown of preliminary damage assessments

Short-term Impact

The economies of OECS member states of Dominica, Montserrat, St. Kitts-Nevis, Antigua-Barbuda and the British Virgin Islands (BVI) are dependent on tourism and/or agriculture for their economic development. Dominica is almost completely dependent on agriculture while Antigua-Barbuda and the BVI are almost completely dependent on tourism. Thus, the economies provide and interesting range of reliances between the two sectors. Their environmental and agricultural characteristics are also relevant: Dominica is the most environmentally diverse with its high mountain ranges and lush tropical vegetation. Bananas are the major crop in a diversified agricultural base. Montserrat is mountainous and well-forested, with a small but diversified agricultural base. St. Kitts-Nevis has a combination of high lands and low lands with an agricultural base predominated by cane sugar. Antigua and Barbuda are flat in areas and hilly in others with a very small agricultural sector The BVI consists of small, mainly hilly islands with little agriculture. The marine environment is fairly similar for most of the islands but Dominica, Montserrat and St. Kitts-Nevis have small continental shelves and few fringing reefs, while Antigua-Barbuda and the BVI have larger continental shelves and many fringing reefs. As a result, the latter islands are better endowed with fisheries resources than the former. The islands are all densely populated and have, with the exception of Dominica, relatively high per capita incomes. In 1991 their population (according to the 1991 Census), population density and per capita incomes which would not have changed significantly since Hurricane Hugo, and are shown in Figure 2.

	Size (sq. km)	Population	Population Density	Per Capita Income Factor Cost $
Dominica	749 8	71,794	95 7	5,540
Montserrat	102 3	10,900	106.5	12,400
St Kitts-Nevis	269 3	41,826	155 3	9,660
Antigua-Barbuda	440.3	63,880	145.0	14,750
BVI	153 0	14,615	95 5	12,400*

*Estimate

Hurricane Hugo struck the islands in the last quarter of 1989 with varying degrees of intensity. Dominica was least hard hit, being furthest away from Hugo's direct path, which went through Montserrat (the hardest hit), St. Kitts-Nevis, and the BVI and skirted Antigua-Barbuda, whose southern region was more affected than the north The force of winds ranged from over 80 mph to 190 mph. "Sustained winds of 130 mph and heavy rainfall were first felt in Dominica. By the time the hurricane had reached Montserrat winds of 150 mph and gusts of over 190 mph were recorded. Antigua, positioned to the north-east of Montserrat, experienced approximately half the wind speeds while St. Kitts-Nevis were struck by winds over 120mph. The British Virgin Islands, finally, being closer to the eye, received the full force of the hurricane, with sustained winds of 170 mph."[1]

Hurricane Hugo caused extensive damage to agriculture, fisheries, housing, tourist accommodation (hotels) and the infrastructure which serves all sectors. Preliminary damage assessments carried out by the UNDP, FAO and others indicate that the value of damage done amounted to nearly $1 5 billion in the OECS region. This is broken down in Figure 3.

In terms of damage, the building and housing stock constituted the largest single element. The percentage of houses destroyed or damaged were as follows: Five per cent in Dominica, 12 per cent in Antigua-Barbuda, 30 per cent in the BVI, 45 per cent in St. Kitts-Nevis, and 84 per cent in Montserrat Infrastructural damage was the second most important element due to damage caused to electrical installations and power lines, to communication facilities which were virtually totally put out of operation, roads, harbour facilities, and water systems. The third element was damage to the natural resources and productive sectors of agriculture, forestry and fisheries.

Rehabilitation costs for post-hurricane recovery are based on the damage assessments. In residential and commercial buildings, as well as for infrastructure, these costs could conceivably be higher than the value of loss if they are to be replaced by better and improved structures and equipment. In natural resources however they should be less since for agriculture and forestry they involve primarily recultivation costs Estimates of these costs are shown in Figure 4.

Figure 4: Estimates of rehabilitation costs for post-hurricane recovery.

	Damage assessment agriculture, forestry and fisheries	Rehabilitation costs	Percentage of damage assessment
		EC$ million	
Dominica	50 1	29 6	59 1
Montserrat	12 1	6.1*	50.0
St Kitts Nevis	22 6	5 6	24 9
Antigua-Barbuda	9 1	2 8	30 8
BVI	4.4	1.6	48.5
	97 3	45 7	46 8

*Estimated

Source: UNDP 'Hurricane Hugo in the Eastern Caribbean. Status of Damage Assessments and Rehabilitation Requirements", UNDP/UNDRO Beneficiary Meeting. New York November 17, 1989.

*There has been no standardised assessment made of the damage loss with the result that the data given here provide some idea of the relative magnitudes of loss between OECS Member States and should therefore be treated as such

	Average growth rate, GDP 1980-1988	Average growth rates, GDP 1989-1991	Downturn % points 1989-1991
Dominica	4 9	4 3	0 6
Montserrat	3 7	–4.4	8.1
St. Kitts-Nevis	6.0	4.9	1.1
Antigua-Barbuda	6.8	2 2	4 6
BVI	3.4	n.a.	n.a

Figure 5 (Far left) and Figure 6 (Left): Comparison of average growth rates in the OECS economies before and after hurricane Hugo.

	Growth rates GDP 1988-1991			
	1988	1989	1990	1991
	Per cent			
Dominica	7.9	–8.1	6 6	2.0
Montserrat	9.4	5 6	21.3	–23.7
St. Kitts-Nevis	9.8	6 7	3 0	6.8
Antigua-Barbuda	7.7	5 2	2 8	1 6
BVI	n.a.	n a.	n a	n.a

Of the $97.3 million dollars of damage done to agriculture, forestry and fisheries, it was estimated that $45 7 million, or 48.8 per cent of the value of damage would have to be expanded to bring back this sector to its pre-hurricane production level. When the other sectors, ie infrastructural and residential and commercial buildings, are taken into consideration, the costs of recovery from the hurricane should be relatively close to the damage assessment estimate of $1.5 billion. Investment of this order of magnitude, given the absorptive capacity of the small economies involved, can only be made over a period of years, thereby indicating that full recovery from the effects of the hurricane is at least a medium-term phenomenon.

Growth of OECS Economies

In the period 1980–1988 (ie the pre-hurricane Hugo period) the OECS economies experienced high rates of real economic growth. Excluding the BVI whose average growth rate was 13.4 per cent for the period, the growth rate ranged from an average rate of 4.9 per cent in Dominica to 6.8 per cent in Antigua-Barbuda. As a result of hurricane Hugo the average growth rates for all the islands for the post-Hugo period 1988–91 in comparison to average growth rates for the pre-Hugo period 1980–1988, are shown in Figures 5 and 6.

In every economy there was a significant down-turn. It was highest in Montserrat followed by Antigua-Barbuda, St. Kitts-Nevis and Dominica.

The OECS economies demonstrated great economic resilience in rebounding from the hurricane. Immediately after the hurricane there was extensive economic activity due to repair of facilities and to new construction. Most of this was due to extensive donor agencies relied and rehabilitation assistance. In agriculture, crops were replanted, and in the case of bananas and other fast-growing crops, it took only nine months before there was some production In all the economies with the exception of Dominica, destruction of the infrastructure resulted in a short-term inflow of skilled labour for the repair of facilities (electrical poles and wiring) There was also a longer term inflow of labour for construction purposes. This labour came mainly from other OECS and CARICOM member states. Hotel facilities damaged by the hurricane were repaired within three months, so they were operational during the high season of 1989/1990, and residential reconstruction continued feverishly for about 18 months afterwards.

The forests, which suffered extensive damage (particularly in Montserrat) also rebounded quickly. Just two years after the hurricane the mountains and valleys of Montserrat were as green as ever, although the standing stock of trees was considerably reduced. The extensive reconstruction activities in 1990 caused only a small down turn in economic growth for most of the affected states. In fact, growth in GDP for Montserrat in 1990, 23 1 per cent, was the highest experienced during the period 1980–1990

In 1991 there was a more significant down turn in GDP growth rates due to the hurricane and the Gulf War which resulted in a down turn in the growth of tourist visitors to the OECS sub-region, and to the Caribbean on the whole. The down turn in economic growth continued in 1992, with forces other than the effects of the hurricane, such as the recession in North America and parts of Europe, currency fluctuations and depreciation of the pound sterling, contributing to this. In agriculture, declining prices for bananas and depreciation and fluctuation of the Pound Sterling, adversely affected the value of agricultural exports of Dominica A shortage of agricultural labour in St Kitts-Nevis affected production of sugar and led to the importation of labour for this purpose from St Vincent and the Grenadines and Guyana.

With respect to the relatively quick period in which the economies rebounded from the economic shock of the hurricane, this was due to the swift inflow of capital and labour for repair and maintenance of infrastructural facilities and for repairs to hotels and reconstruction of commercial and residential buildings. As a result, the construction sector became the engine of short-term growth and was fortunately supported by tourism. Since the tourist sector was the important growth sector in all the islands, with the exception of Dominica, it played a key role in preventing a serious economic decline in the first year. Construction activity, primarily for residential construction, continued well into the second year. However, by the second half of year two, there was a significant down turn in this activity, with most of the residential replacements completed. As a result, in Montserrat the growth rate of GDP declined by 23.7 per cent in 1992.

In year three (1993) it was likely that growth rates would be low for the affected OECS economies. Thus, although the economies have rebounded swiftly, they had not fully recovered from the effects of the hurricane three years afterwards This recovery from hurricane Hugo is dependent, as pointed out earlier, on the environmental and economic characteristics of the stricken economies as well as on the effectiveness of disaster planning and mitigation measures pursued by them.

Case Study of Montserrat and St. Kitts-Nevis

All OECS economies had done some planning and had some mitigation measures in place. In fact, all OECS states had access to organisations designed to handle disaster, particularly hurricanes. But, there existed only one organisation, WHO – financed Pan Caribbean Disaster Preparedness and Prevention Project, PCDPPP, located in Antigua-Barbuda, which catered to all OECS member states. There were, however, many other organisations with some mandates for disaster preparedness such as the Regional Security Services (RSS) with headquarters in Barbados; the OECS Secretariat whose Director General was the nominated OECS Co-ordinator, and the CARICOM secretariat which had a disaster co-ordinating unit. All individual islands also had their own organisations for this purpose: disaster committees consisting of government and private sector representatives under a National Disaster Co-ordinator and had developed National Disaster Plans. With the exception of the PCDPPP, all these organisations were concerned primarily with disaster preparedness; their major concern was primarily with short-term relief measures. Medium to longer term planning and disaster mitigation measures were virtually ignored, and there is little evidence that mitigation was incorporated into overall development plans where these existed in OECS member states.

Prior to the hurricane, there was good and extensive warning given to the population with respect to when the hurricane would hit and the emergency measures which should be undertaken on the personal and household levels. Information indicating the location of hurricane centres available for refuge was also provided. Immediately after the hurricane, disaster organisations at the national and regional levels become operational Antigua-Barbuda became the operational centre for OECS relief activities with the prompt arrival at the V C. Bird International Airport (which was operational) of RSS forces from Barbados, Jamaica and later Guyana and Trinidad and Tobago. The PCDPPP provided the early co-ordinating functions, establishing communications with other OECS states, namely Montserrat, St. Kitts-Nevis and the BVI. Once these were established, there was quick response from the international community for relief supplies and transport Air transport was supplied by the US Airforce which was operational as soon as it was safe to do so, followed by the RAF, Canada (RCAF), the Government of France, which provided a helicopter, and the Guyanese Defence force. Barbados became the centre for donor activities with regular donor meetings being co-ordinated by the UNDP At the same time, CARICOM and other OECS states mounted relief efforts of their own, all of which were co-ordinated from Antigua-Barbuda where daily planning and co-ordination meetings were held at the EAS Secretariat. Both governmental and non-governmental organisations, (NGOs) played substantial roles in the relief efforts These efforts resulted in considerable relief assistance and were largely responsible for putting back in place quickly communications, water and electrical systems.

St. Kitts-Nevis and Montserrat are good examples of the disaster measures taken and their effects. These two OECS member states, along with Dominica which from previous experiences with hurricanes was the best organised OECS member state,[5] had Natural Disaster Plans and Action Programmes in place for disasters which involved some elements of mitigation.

St Kitts-Nevis

St. Kitts-Nevis was well-prepared for the hurricane from a disaster preparedness standpoint. It had a National Disaster Committee that had prepared a hurricane plan and programme which involved the following key elements:
(1) Protecting key installations – the power plant,
(2) Ensuring that power would be available at the industrial estate and hospital quickly;
(3) Providing or demarcating buildings (schools & churches) as 'hurricane centres';
(4) Demarcating national focal points for receipt and distribution of relief; and
(5) Informing the population of some of the essential measures.

The rationale behind the plan was simple: it was designed to ensure that there would be a relatively quick return to work of the industrial labour force and others, hence the emphasis on protecting power sources As a result of the programme, the power plant survived virtually intact, even though most of the lines and poles were down. Because priority had been given to replacing power quickly to the hospital and to the industrial park, repairs were first made to the lines serving them. As a result, within three days of the hurricane work had resumed in the industrial park for the plants which were not badly damaged. The hospital, although badly damaged, was quickly repaired. Schools were reopened and were all operational within three weeks of the hurricane. Right after the hurricane there were about 750 people in shelters in St. Kitts and Nevis and by the second week in October there were only 23 people in these shelters in St. Kitts Infrastructural repairs were made quickly to the port, which had sustained damage, to the water supply and electrical systems.

International and regional assistance in the form of air transport and troops (from Trinidad and Tobago and Barbados) contributed significantly to the infrastructural repairs. The Government of St. Kitts was also quick to obtain raw material supplies for the government's low-cost housing scheme, many houses of which were badly damaged, from the supplies offered by donor agencies and from some CARICOM member states For example, the Government of Jamaica provided a large supply of galvanised sheets for roofing purposes. Two Hurricane Hugo Disaster Funds were established, one by the Rotary Club of St. Kitts, and the other by the Government of St. Kitts and Nevis to assist those most affected by the hurricane, mainly the poor and uninsured people.

Montserrat

The Government of Montserrat paid considerable attention to disaster preparedness. Since 1985 there had been a draft outline of a National Disaster Preparedness Plan and in 1986 a Natural Disaster Co-ordinator was appointed In 1987 a revised National Disaster Plan was published which listed the authorities, responsibilities, precautions and warning systems established to deal with a disaster. An Emergency Operating Centre (EOC) was also established It was pointed out[6] that although sectoral responsibilities of specific ministries and departments were described, coverage was uneven, and the section of the plan concerning action to be taken after a disaster was extremely brief and gave only a broad idea of what was to be done.

The measures which Montserrat had put in place served it well. Although the island experienced winds gusting up to 190mph and there was extensive damage to houses (84 per cent of the housing stock was damaged) there was little loss of life (11 fatalities) Of the churches and public buildings designated as shelters, all but one held up during the hurricane. Roads and the landing strip at the airport were cleared quickly after the storm and within four days virtually all roads were cleared and the only major pier at Plymouth, which was destroyed, was replaced by temporary barges. The power and telephone lines were totally destroyed, but by the end of December, 60 per cent of the power and 40 per cent of telephones were operating again. The water supply system, emergency planning for which was quite elaborate, was also completely restored by December.[3]

Overview of the OECS Experience

The OECS experience with hurricane Hugo revealed that member states were relatively well prepared from a disaster preparedness standpoint but not from a disaster mitigation standpoint. As a result of the deficiency in the latter, OECS states sustained higher levels of losses than would have occurred had greater attention been paid to mitigation and also were unable to maximise on the donor assistance available for other relief purposes. Because of ignorance with respect to the types of donor assistance available and lack of planning, OECS economies received mainly short-term relief assistance from donor agencies. Although these agencies indicated that their assistance programmes covered both relief (within a six month timeframe from the time of the disaster) and longer term recuperative measures, OECS economies were not able to capitalise on this with well-thought-out programmes which would have been possible if these had been included in their National Disaster Plans. An attempt by the Economic Affairs Secretariat (EAS) to develop an OECS Hurricane Rehabilitation Programme failed to attract the interest or participation of the member states involved.

After the hurricane, as pointed out earlier, a comprehensive review of the impact of the hurricane on agriculture and fisheries was carried out by FAO and UNDP, Barbados, did an assessment of damage and rehabilitation requirements for submission to donor agencies.* Although the UNDP study indicated the measures which needed to be taken to ensure a steady recovery, it did not succeed in inducing much donor activity with the result that, after the initial post hurricane donor assistance, OECS member states' governments bore the brunt of the recovery costs. This was also the case with regard to the costly infrastructural rehabilitation which was necessary. In tourism and residential reconstruction, private enterprise bore most of the costs but governments had to assist low income and largely uninsured householders

The major inadequacy exposed by hurricane Hugo was the lack of serious mitigation measures. Although there had been some mitigation measures in effect, particularly with respect to protecting infrastructural facilities such as power and water facilities, there was not a concerted programme which covered the sensitive economic sectors. Even within infrastructure, telecommunications stood out as an area which had received little attention from a mitigation standpoint. As a result, telecommunication systems, even those of Cable and Wireless Ltd (which had some mitigation measures in place but which had been based on only three OECS member states being affected at any one time by one hurricane) were virtually completely knocked out by the hurricane.

Hurricane Hugo also exposed the inadequacy of hurricane and disaster legislation in many OECS member states and as well as the inadequacy of legislation pertaining to building codes. The BVI had the most adequate and up-to-date disaster preparedness legislation in place, but the other OECS member states had legislation of varying degrees of efficacy. The destruction of residential construction, particularly new buildings, revealed that building codes were either inadequate or had not been adhered to. It was noteworthy that older traditional houses with the inverted V-type of roof survived the hurricane better than the more modern ones which usually had flat roofs. The structural deficiencies of buildings and the extensive destruction of communications systems due to structural defects led to attempts to remedy the deficiencies of an OECS-wide basis

The UNDP financed studies on housing standards and on survivability and retro fitting of communications systems. These studies resulted in draft model legislation and comprehensive and consistent building codes for OECS member states. Unfortunately, up to the present time, not all OECS member states have implemented the recommendations of these studies, nor have they put in place the necessary legislative arrangements. The hurricane did not reveal the deficiencies in environmental legislation because, although there was extensive damage to beaches and the coastal environment, there were no serious environmental mishaps such as oil spills. However, environmental legislation remains an area of serious deficiency.

*UNDP, Barbados, "Hurricane Hugo in the Eastern Caribbean: Status of Damage Assessments and Rehabilitation Requirements", UNDP/UNDRO Briefing Meeting, New York, November 17, 1989.

Lessons Learnt and Policy Implications

Hurricane Hugo exposed many deficiencies with respect to disaster planning and mitigation in the OECS member states in the Eastern Caribbean. These member states were not as well-prepared as they should have been, since although they all had developed National Disaster Plans, these did not possess medium and longer term programmes with the administrative, legislative and financial support required to implement them As a result, the OECS economies succeeded well in utilising short-term relief assistance but did not succeed in obtaining medium to longer term funding which could have resulted in structural strengthening of their economies. Thus, although there have been improvements in some areas since hurricane Hugo – eg up-dated building codes and measures to ensure the greater survivability of structures – the OECS region is still not as well prepared for hurricanes as it should be. The need for consistent and well integrated strategies and policies for disaster mitigation is therefore of high priority.

The main lessons learnt from the experience of OECS Member States with Hurricane Hugo are as follows:

(1) The better prepared a country is the better its chances of getting a large share of relief assistance, not only in the short-run but for longer periods;
(2) Donor agencies are prepared to supply relief relatively quickly, but there is need for co-ordination of these agencies' efforts; and
(3) Considerable assistance is available from regional sources (CARICOM and OECS) in terms of in kind (non-monetary) assistance and technical services.

The main constraints to the improvements of disaster management at all levels identified in an OECS/PCDPPP workshop in December 1989 were as follows:

- The absence of disaster policy.
- Lack of disaster planning at the sectoral level.
- Inadequate allocation of resources to disaster planning
- Insensitivity at the top levels of the political decision making and administration
- The inadequate attention given to recovery and rehabilitation planning.
- Insufficient involvement and integration of the private sector and its resources in the disaster planning process.

These constraints indicate the areas which need to be tackled in developing improved action plans in the OECS in the future. There is one important aspect missing and that pertains to the means of financing the measures advocated in the Action Plans. It is clear, as pointed out earlier, that without the means to implement plans they are virtually useless. Because it is obvious that OECS states cannot realistically provide full funding for their Action Plans, there has to be a great reliance on donor assistance for this purpose. But, to maximise this assistance. OECS states should be quite prepared to earmark their contribution to counter-part funding, ie some provision should be made for providing between 10 to 20 per cent of costs of necessary funds. This earmarking can best be done, in order to avoid funds remaining idle when there is a disaster, by indicating in the budgetary process that a fixed percentage of capital budgets for infrastructure would be used for this purpose in case of emergency.

The costs of mitigation are not extensive, except for high levels of protection and survivability It has been pointed out[7] that relatively simple retrofitting measures as well as an adherence to building codes would have provided high levels of protection and survivability of the telecommunications systems, other infrastructure, critical facilities such as hospitals and also commercial and residential buildings in the OECS member states. Assuming that better mitigation measures would have reduced the value of losses of these systems and facilities by ten per cent, not an unreasonable assumption, this would have reduced losses by $150 million in the OECS member states affected by the hurricane. Mitigation costs at this level of protection should be less than ten per cent of this value, most likely in the range of $10 to $12 million (seven to eight per cent). These costs, are not prohibitive or beyond the measures of the OECS economies (both governmental and private enterprise) to provide for and would have permitted a faster recovery from the effects of the hurricane.

Conclusion

The Eastern Caribbean region is directly in the path of hurricanes so island states within this region have to be well prepared for them. Hurricanes constitute a serious economic threat in that they can retard growth and development. Over the longer run, however, hurricanes can bring about beneficial structural changes if they are well prepared for. In fact, since the incidence and ferocity of hurricanes cannot be controlled, the only meaningful approach to them is one that stresses preparedness in all its facets. This requires careful planning, namely the development of action and contingency plans, and the provision of the means of implementing the plans. In the Eastern Caribbean, the small OECS member states have considerable difficulties in obtaining finances required for action plans and have necessarily to rely on donor agencies to supply financing and technical expertise. The magnitude and extent of the finances that can be acquired externally is however very dependent on the magnitude of the counter-part funding which the States could provide.

The OECS member states' experiences with hurricane Hugo conformed well to the economic theory pertinent to disaster: all the economies with the exception of Montserrat experienced a decline in their economic growth as an immediate impact. The economies rebounded surprisingly quickly, although up to now (four years later) they have not yet fully recovered, and other economic forces are coming to the fore which push the detrimental economic impacts of Hugo into the background. Despite the latter forces, it seems reasonable to conclude that it will be at least four to five years before these economies can recover from Hugo and again attain their long-term growth rates. Other shocks, caused by economic forces or by other hurricanes, will of course increase the period it will take for OECS economies to attain the high and stable growth rates they had enjoyed during the 1980s up to the hurricane year.

Two pertinent questions arise from the experiences of the OECS member states: (1) What factors contributed to the quick rebound made by these economies. More importantly: (2) Whether there were structural changes brought about by Hugo which would be beneficial with respect to increasing and sustaining growth rates. In other words, have OECS member states attained, because of the destruction caused by Hugo, an improved and strengthened infrastructure as well as better and stronger commercial and housing stocks? With respect to this second aspect, it is not possible to determine whether there were extensive improvements in quality. Since, however, the emphasis was placed on short-term rehabilitation and reconstruction, there was little expansion in capacity. The main reasons for this were the lack of planning for this purpose and the lack of funds by OECS member states. It is therefore essential that OECS member states should pay greater attention to disaster planning and mitigation in the future.

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