

## ❖ Policies Leading to Vulnerability

Example: Seaside (Beachfront) Tourism Policy

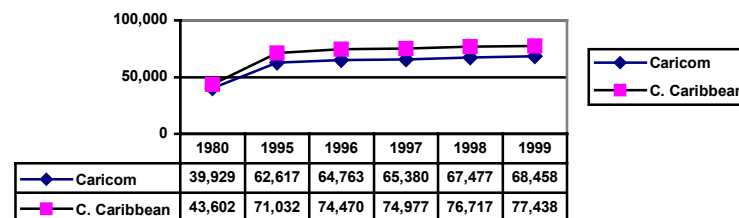
- Of 77,438 accommodation rooms built in the Commonwealth Caribbean it is estimated that well over 65 per cent are in coastal areas;
- In a number of major resort areas tourism facilities and support services are built in areas < 20 ft AMSL (above mean sea level);
- In St. Kitts, close to 2000 hotel rooms planned or under construction will occur in an area less than 1000 ft from the relatively exposed shoreline in the Frigate Bay tourism resort area.
- For St. Kitts, this would be an investment of approximately US\$100 million in an area known for its vulnerable to storm surge.

The growth of new rooms in St. Kitts goes against the trend in tourism room construction which as Chart 3. indicates has not grown significantly in CARICOM and the Commonwealth Caribbean between 1995 and 1999.



**Figure 8: Indicators of tourist accommodation activity**

### Chart 3: Tourist Accommodation Units in CARICOM and the Commonwealth Caribbean 1980 - 1999



(Source: CTO Caribbean Tourism Statistical Report, 1999-2000)



Widespread damage by hurricanes to hotels and tourism infrastructure in Antigua, Nevis, St. Kitts and Anguilla and other countries may be partly responsible for slower growth in new hotel construction. Impact has been particularly severe for seaside properties, raising questions about the vulnerability of the beach front tourism policies in the region.

**Figure 9: Indicator of Widespread damage to Antigua's North West Coast**



### ❖ Vulnerability Assessment

Vulnerability assessment is now being performed for countries, regions of countries, businesses (e.g, hotels) and homes. In reality, public appreciation of the socio-economic and environmental susceptibility of a country to natural disasters is gained from the experience of such events. The application of various methodologies for hazard and vulnerability assessment in the Caribbean is in direct response to recent experiences. A notable example in which assessment methodologies are being applied at the country or sub-country level is the OAS Caribbean Disaster Mitigation Project (CDMP). Among the outputs of CDMP are:

- Hazard mapping and vulnerability assessment studies for the OECS (post –Hurricane Georges)
- Assistance with updating national Disaster Management Plans, using the results of hazard risk and vulnerability analysis, for the OECS;
- Hazard Mapping for Jamaica (e.g, storm surge mapping for Montego Bay)

Hazard analysis is a first step in understanding the extent to which human activities are exposed to the risk associated with a natural hazard. The prediction or actual evaluation of the socio-economic and environmental costs associated

with such an event provides the real clue to the vulnerability of a community. Strategically, different approaches could be considered in vulnerability assessment:

a) Use of Vulnerability Indicators (i.e., hazard risk + human activities = vulnerability) applied to:

- Policies
- Development strategies
- Country
- Communities

b) Environmental or Vulnerability Audits and/or Due Diligence Procedures for existing:

- Homes
- Hotels
- Manufacturing plants
- Essential Services (e.g, hospitals, energy installations, water production plants)

c) EIAs for proposed developments, e.g:

- Roads
- Hotels
- Dams
- Hydro-electric plants



### **Important Questions to be asked about Planning Practices and their relationship with vulnerability**

- Town & Country Planning Offices: *Do plans, strategies land use policies, standards lead to vulnerability?*;
- Agencies and major private developers responsible for physical infrastructure and area development (e.g., Ministries of works, Utility corporations, Urban or regional development corporations, Port authorities): *Do Projects make communities/the nation more vulnerable?*;
- Sector agencies ( Ministries of agriculture, Education, Health, etc.): *Do policies, physical development strategies and policies reduce vulnerability?*

### **❖ Vulnerability of Electricity, Communications and Water Infrastructure**

The transmission and distribution of electricity at high or lower voltage has been shown to be one of the most vulnerable infrastructure components to storm related wind damage. Visible and highly profiled direct damage is evidenced from felled poles and damaged distribution cables and transformers. Since telephone lines are usually carried on the same poles, the cost for repair and replacement of both electricity and telephone services can be easily estimated by utility companies. The indirect cost to homes and business lost from telephone communication and data search and transfer through the internet is more difficult to estimate.

Two major factors linked to the vulnerability of energy and communications services are:

- Materials and methods used in the construction or installation of poles, transformers and cables. The use of wood poles rather than concrete or metal pilons and suspended rather than buried cables is justified by authorities because of high cost of mitigation.
- Lack of or loose application of standards for construction and installation.

The vulnerability of infrastructure works could be assessed against standards used by Planning Authorities or utility companies and design or engineering specifications governing installation of various works. Where the law does not



obligate utility companies to comply with standards, enforcement by Planning Authorities is not legally possible. However non-legally binding building codes or standards can nevertheless be applied to mitigate against damages from future natural hazards. When Planning agencies lack enforcement authority, mutually beneficial procedures for monitoring building and installation practices could be worked out with utility companies.

A vulnerability assessment of infrastructure works may find among other things:

- Inadequate foundation or footing for bearing the wooden poles used commonly in a number of countries;
- Insufficient wind resistance provided for pole mounted transformers;
- Excessive weight of transmission lines (for electricity, telephones and in some cases cable television);
- Poles planted in areas subject to erosion or flooding;
- Water pipes buried in watercourses or natural or manmade drains.

For a number of islands, standards used for the construction and/or installation of electricity, communications and water infrastructure are still evolving and are quite often not public knowledge. Table 5 summarizes the source of standards and guidelines used from observations in some OECS countries.



**Table 5**  
**Source of Standards and Guidelines Used in the Construction and/or Installation of Electricity, Communications and Water Infrastructure**

<b>Source of Standards and Guidelines</b>						
<b>ELECTRICITY &amp; COMMUNICATIONS</b>	<i>Item</i>	<i>Standard/Guidelines/Practice</i>		<b>WATER</b>	<i>Item</i>	<i>Standards/Guidelines/Practice</i>
	Hydro-works	Design/engineering specifications			Desalination Plants	Design/Engineering Specifications
	Conventional Power Plants	Local building codes or Utility Company standards			River Intakes	Engineering Specifications
	Exchange & Substations	Design/engineering specifications & Building codes/standards			Treatment plant	Local building codes/standards or Utility Company standards
	Poles (size & foundation) Poles (distance)	Utility Company standards (ratio of pole height to depth of footing for poles); spacing of poles depending on weight and resistance factors.			Storage of Treatment Chemicals	Local Public/Environmental Health Standards
	Weight of Cables	N/a			Pipe Size	Utility Company or International Standards (Volume and Pressure Specifications)
	Mounting of transformers	Utility Company standards (mounting device dependent on weight of transformer)			Bed for pipe or conduit	Utility Company and International standards (depth; sand bed; gravel over and soil cover specified)
	Microwave transmitters	Engineering/design specifications				



### ❖ **Use of GIS in Vulnerability Assessment**

Conventionally, physical planning or town and country planning offices were the main agencies using maps to present land use, socio-economic and environmental data in a spatial context. Manual techniques have given way to digital technology and its superior application for data storage and analysis. Widespread use of Geographic Information Systems (GIS) in recent years has revolutionized the management of socio-economic and environmental data for a range of uses including hazard mapping and vulnerability assessment.



Figure 10: Montego Bay Hazard Map - Storm Surge

