New and Ongoing Initiatives to Reduce Vulnerability

❖ Vulnerability Assessment

Understanding vulnerability is a first and critical step towards mitigation. Vulnerability assessment in response to natural hazards and climate change has been given widespread attention. Mitigation planners and technicians on disaster impact assessment teams are advised to become familiar with the various methodologies being used through projects or initiatives by various agencies and strategies identified for reducing vulnerability.

❖ Adaptation

In work associated with climate change impacts on sea level rise, three possible coastal response options have been identified, namely:

Protect:	Protect land from sea by using to allow continuation of existing uses by using hard structures (such as seawalls) and soft measures (such as beach nourishment);
Accommodate:	Landuse is continued with some adjustments (such as elevating buildings on pile)
Retreat:	No attempt is made to protect land from sea and in extreme cases the coast is abandoned.

(Source: Intergovernmental Panel on Climate Change: Climate Change 2001: Impacts, Adaptation and Vulnerability, Chapter 6. Coastal Zones and Marine Ecosystems).

Photo 29: Retreat from river banks

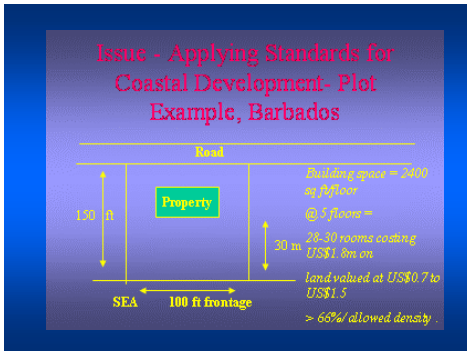

Figure 20: Applying Standards for Coastal Development – Plot Example, Barbados

These adaptation options are obviously relevant to storm surge, whose effects on coastal areas will be exacerbated by sea level rise. However, these options may also be relevant to impacts from other natural hazards and therefore can be adopted for use in planning and mitigation strategies where appropriate.

❖ Resilience

Another concept used in relation to the impacts of climate change on coastal areas is ***resilience***. Coastal resilience has three important components:

Ecological: Ecological buffering provided by coral reefs, salt marsh, mangroves;
Morphological: Morphological protection offered by sand and gravel beaches and coastal dunes
Socio-economic: Technical, institutional, economic and cultural ability of a society to cope with impacts from sea level rise.

We know that in the case of hurricanes storm surge can adversely impact on the resilience offered by ecological systems. Societies are however less vulnerable where such systems are not impaired by human activity. In the case of floods, the ecological resilience provided by wetlands is well known and the natural streams and watercourses act to channel water (morphological function) in a manner to reduce impact from floods.

Table 56
Application of Adaptation Options to Various Hazards

HAZARD	ADAPTATION OPTIONS		
	Protect	**Accommodate**	**Retreat**
Floods	❑ River Training (Gabions) ❑ Revetment ❑ Canalization	❑ Elevated buildings (on plies)	❑ Relocation
Storm surge	❑ Seawall ❑	❑ Elevated floors ❑ Beach nourishment	❑ Building Setback (30m from sandy beaches in Barbados and 10 m from cliffs) ❑ Relocation
Earthquake	❑ Na	❑ Structural reinforcement	❑ Relocation
Volcano		❑ Na	❑ Relocation
Drought	❑ Desalination ❑ Reverse Osmosis (RO)	❑ Water conservation measures for homes, crops	❑ Relocate livestock ❑ Abandon lands

Figure 21: Procedures for storing boats

The assessment team should also be aware of the resilience that emerges in human systems following successive hurricanes in some countries of the region. The growing institutional capacity in early warning systems, much quicker responses in the restoration of energy and communications infrastructure and prompt response in most cases by insurance companies in addressing claims are all indicators of socio-economic resilience to hurricane disasters.