

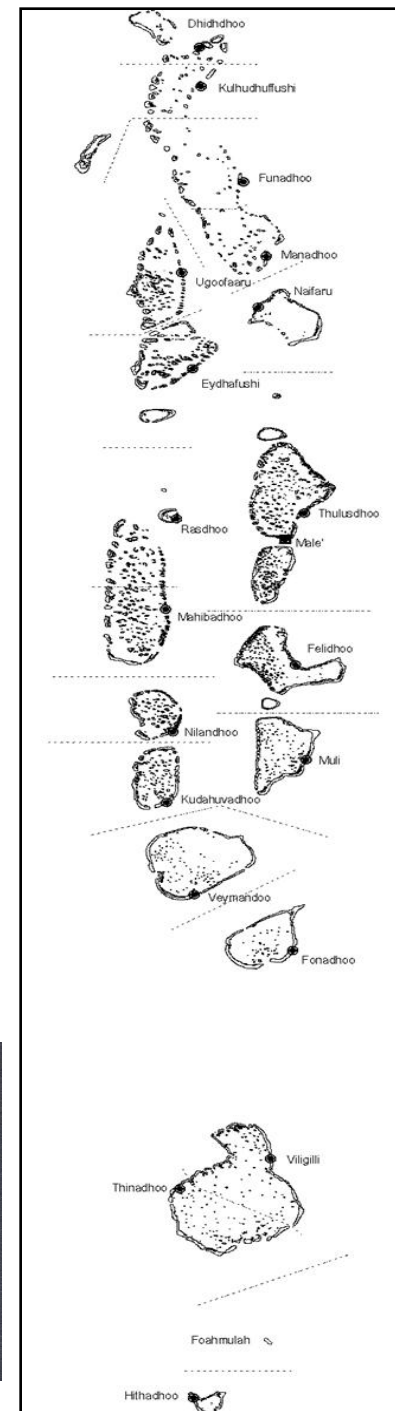
Maldives

Coastal and Marine Hazards



Maldives

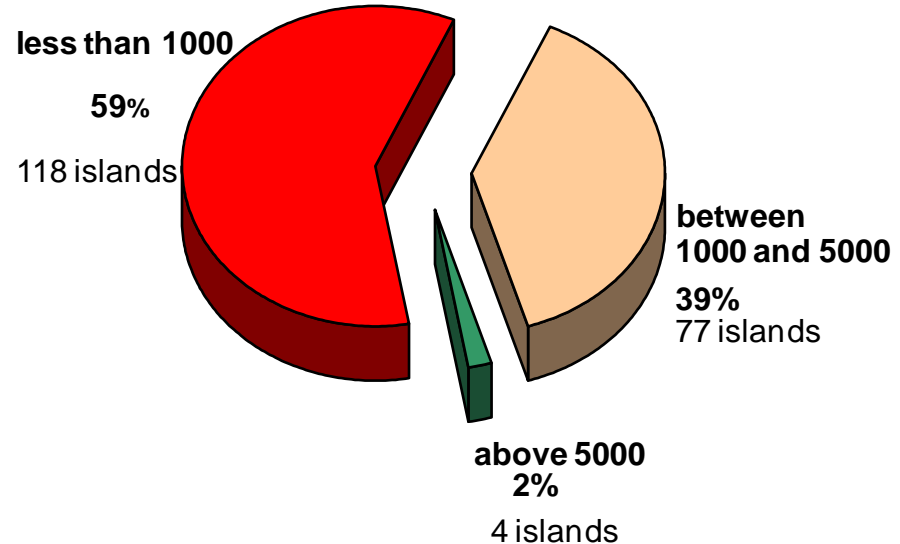
- Population: **300,000**
 - IMR: **16/1000**
 - Life Expectancy: **72 yrs**
 - MMR **1/1,000**
 - Literacy: **98.9%**
 - Net primary enrollment: **95%**
 - GDP growth rate over last ten years **7-9 %**
- Total number of islands: **1,192**
- Number of inhabited islands: **193**
- Land Area: 300 sqkm
- **Main industries**
 - Tourism
 - Fisheries



Vulnerability Indicators

- Average elevation 1.5m above sea level
- 97% of all inhabited islands reported perennial beach erosion and 64% of them undergo severe erosion
- Wide dispersal of population across very small islands
- Remoteness and inaccessibility of islands
- Extremely high economic dependence on tourism
- High import dependence
- High diseconomies of scale,
- High transportation costs

Population Distribution (excluding capital (Male'))



Vulnerability of Maldives to Climate Change & Sea-Level Rise

- Land, Beach and Human Settlements
- Critical Infrastructure
- Tourism
- Fisheries
- Human Health
- Water Resources
- Agriculture and Food Security
- Coral Reefs
- Biodiversity



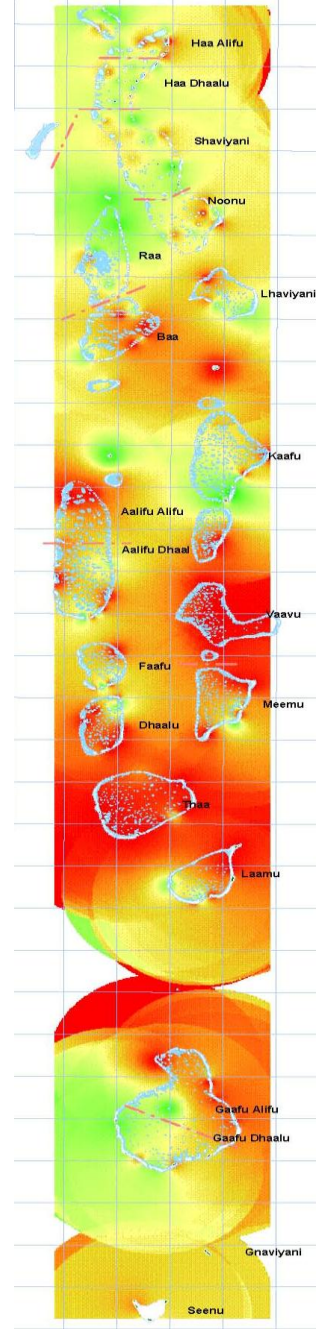


Natural Hazards

- Geological hazards:
 - effects of submarine earthquakes and tsunamis,
 - coastal erosion
 - changes in island dynamics
- Marine hazards: Storm/tidal surges, (*udha*)
- Climate-related hazards: Climate change; sea level rise, changes in precipitation (heavy rainfall, dry spells), sea surface temperature rise, storm activity.
- Biological hazards: Pest outbreaks

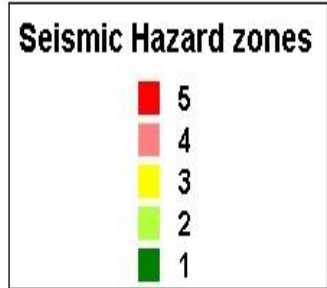
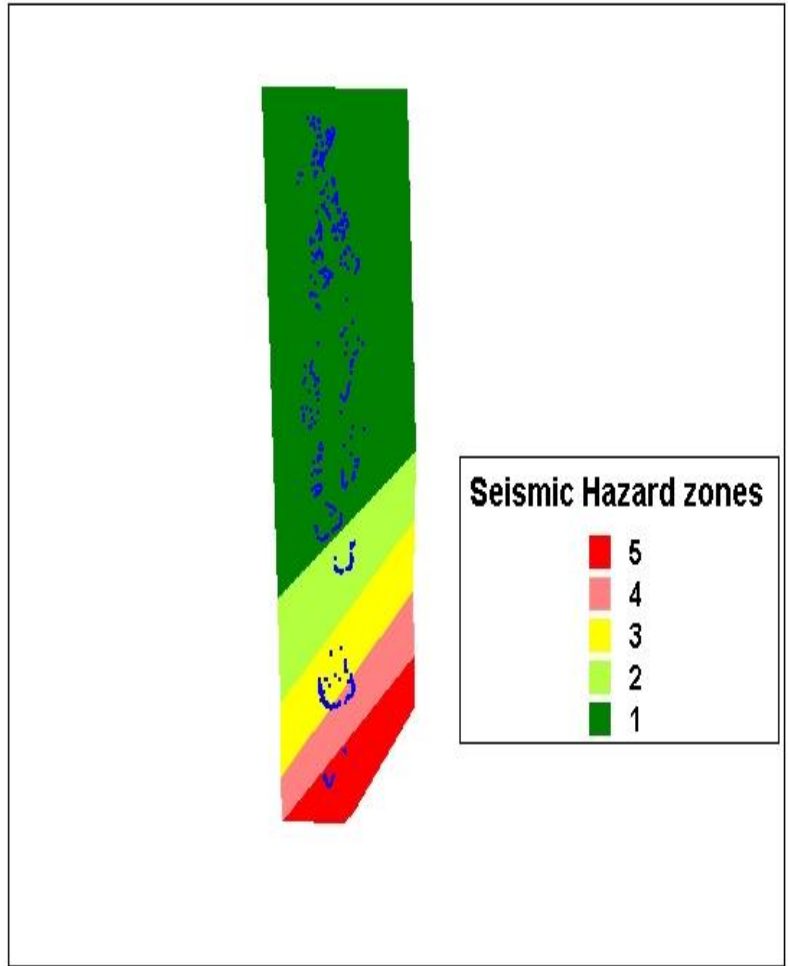
Tsunami strikes: 26 December 2004

- Waves up to 4 metres struck shortly after 9am
- Only 9 islands escaped flooding
- Displaced and homeless: **15,000**
- Totally evacuated islands: 13
- 1/3 of population affected
- Infrastructure damage across the country
- Destroyed 62% of the value of GDP



Hazard Mapping

Examples from National Risk Profile

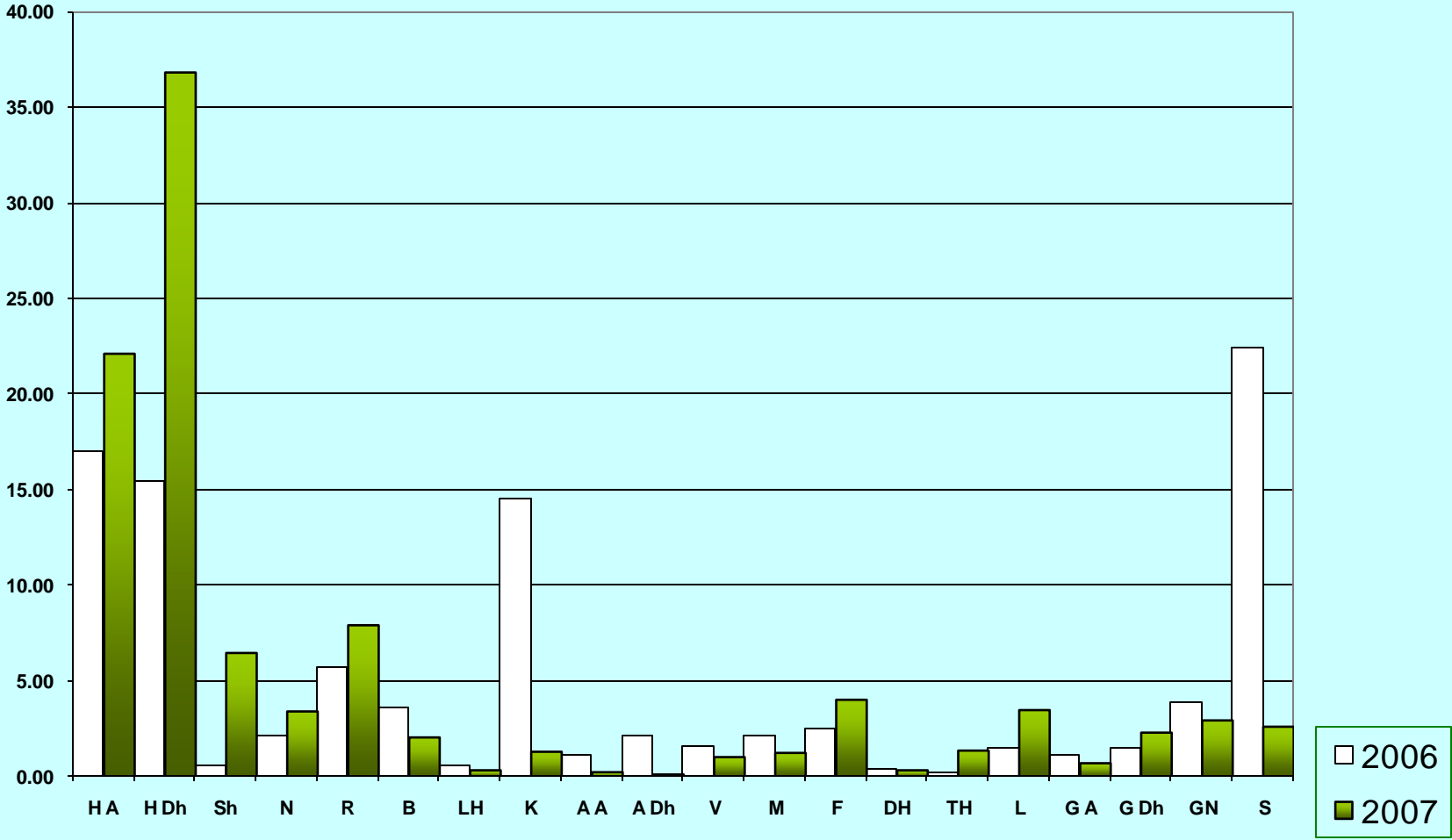




Human-induced hazards

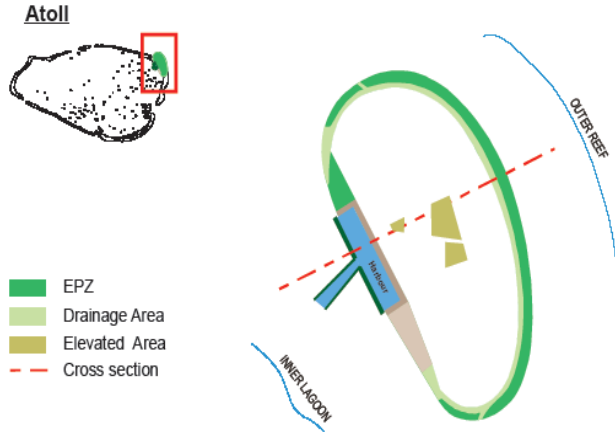
- Oil spills
- Invasive alien species
- Population pressure and impacts on islands

Observation of tarballs on islands in the Maldives 2006 and 2007



Enhancing Mitigation and Redevelopment

Conceptual Design for Enhanced Mitigation



Note: Elevated areas to be distributed within island. These can be used for Emergency Evacuation. Buildings such as Schools and Public buildings will be constructed upto two storeys for same.



Cross Section of an Island with Enhanced Mitigation Features

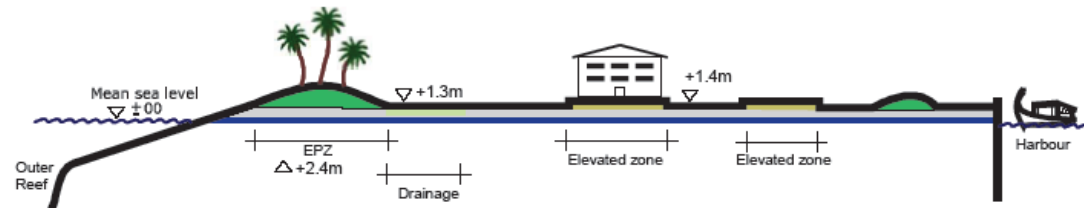


Figure 4: Cross Section of EPZ

Enhancing Mitigation and Redevelopment

- Enhance disaster mitigation and preparedness of selected islands
 - Wider environmental protection zones (Coastal protection)
 - Disaster mitigation measures
 - Community awareness
 - Elevated areas for vertical evacuation in the event of floods
 - Easy access in emergencies
- Status
 - Seven Islands are being identified as Safer Islands
 - Development would be in phases
 - Reclamation of one Safer island has been completed and ongoing work on another
 - Detailed risk assessment studies ongoing for 9 islands

Enhancing Mitigation and Redevelopment

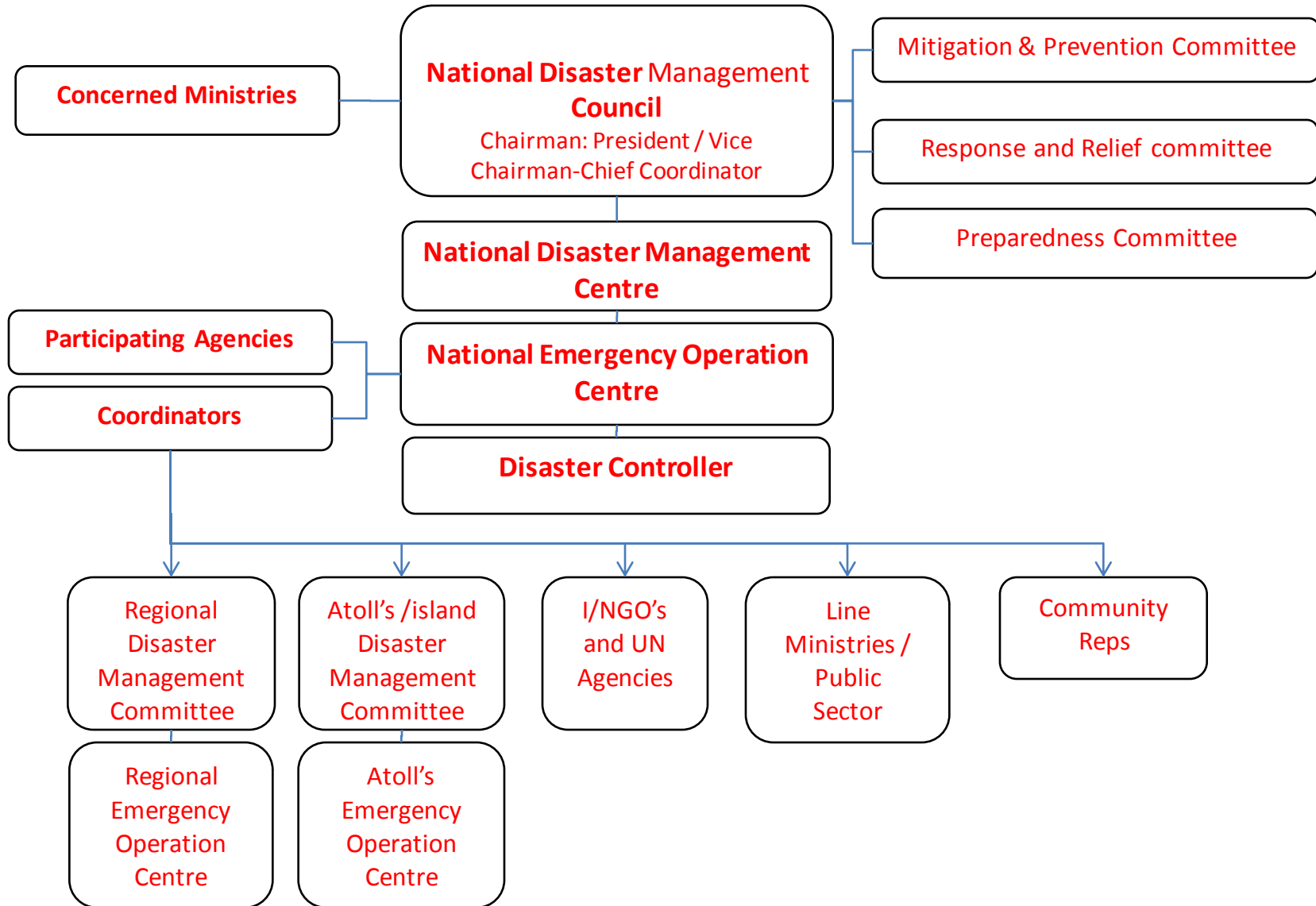
- Lessons Learned:
 - Difficulty to implement safe island features on a populated island especially if densely populated and not being reclaimed
 - Need to carry out detailed risk analysis studies to determine particular vulnerabilities of each island
 - High costs of implementing programmes



Disaster management in the Maldives

- The **National Disaster Management Centre** established as a permanent body in 2005
- Preparation of a draft **National Disaster Management Plan**
- A **Disaster Management policy** has been drafted with multi stakeholder input.
- **Disaster Management** and **Disaster Risk Reduction** incorporated into the National Development Plan

Institutional Framework



Thank you

