

Assessing adaptation responses to climate change in Coastal Zones of Sri Lanka

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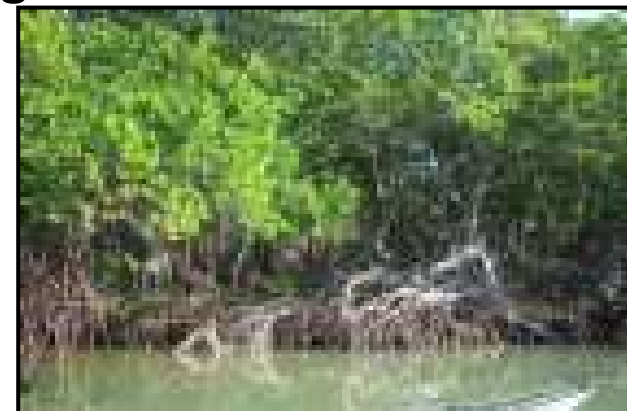
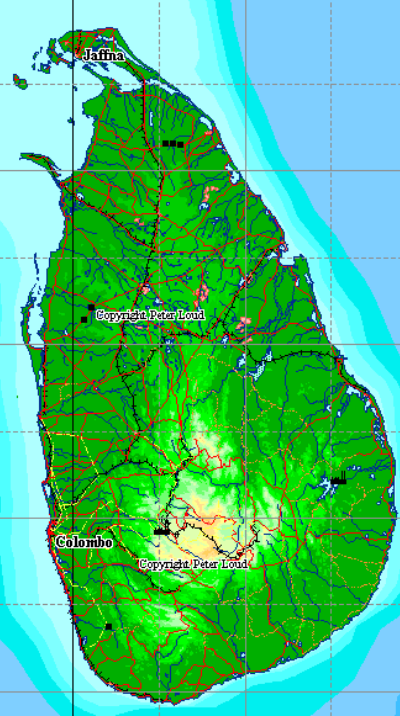
UNFCCC Asian Regional Workshop on Adaptation

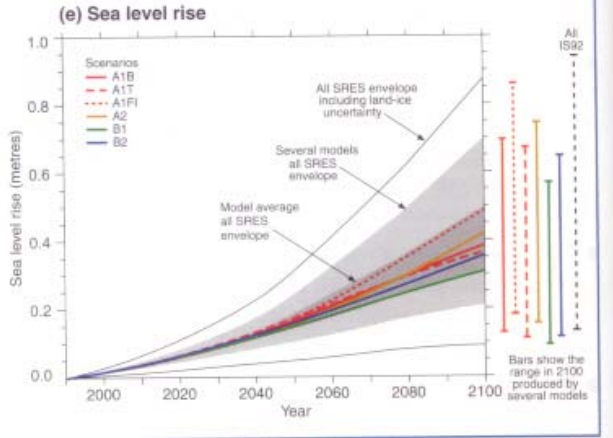
11 – 13 April 2007, Beijing



Sri Lanka

- has 65,00 km² land
- has a long coastline of 1660 km
- coastal zone contains 24% of land
- 65% urbanized land & industrial output
- 32% population
- 80% tourism & 80% fish production
- commercial ports and fishery harbors
- principal road and rail infrastructure
- richest areas of bio-diversity –
 - coral reef, lagoons, mangroves



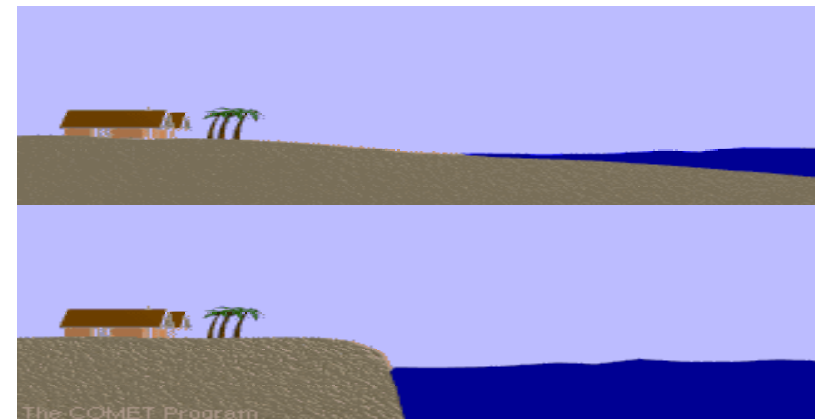


Sea Level Rise

- Global Mean Sea Level → 0.10 -0.20 m
- Next 100 years → 0.09 - 0.88 m (TAR, 2001)

Impacts on Coastal Zone

- 45-55% of the coast is being eroded by 0.30-0.35 m / year
 - **Storm surge, Monsoon jet streams, Strong winds**
- It is estimated
 - **6.0 km² with 0.03 m rise**
 - **11.5 km² with 1.00 m rise (INC, 2000)**



Impacts on Agriculture in Coastal Zone

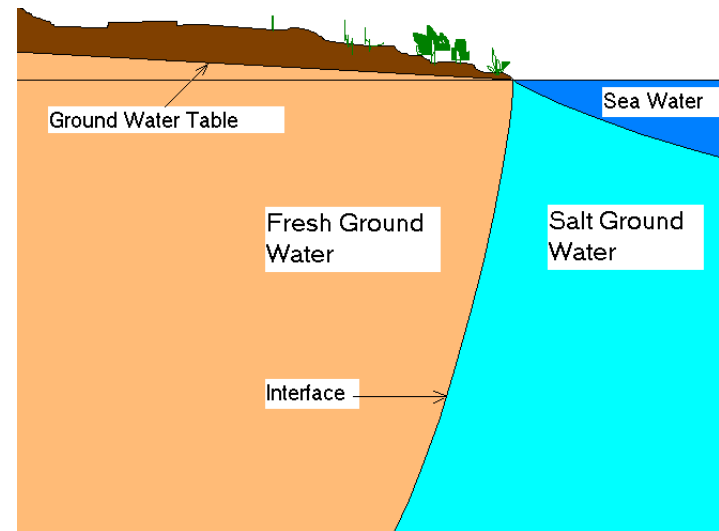
- Salt water intrusion to cultivated land
- per capita land availability 0.3 ha
- actual extent available for agriculture is much less than this (0.13 ha/person)
- coastal community will occupy in agricultural lands



Impacts on Water Resources in Coastal Zone

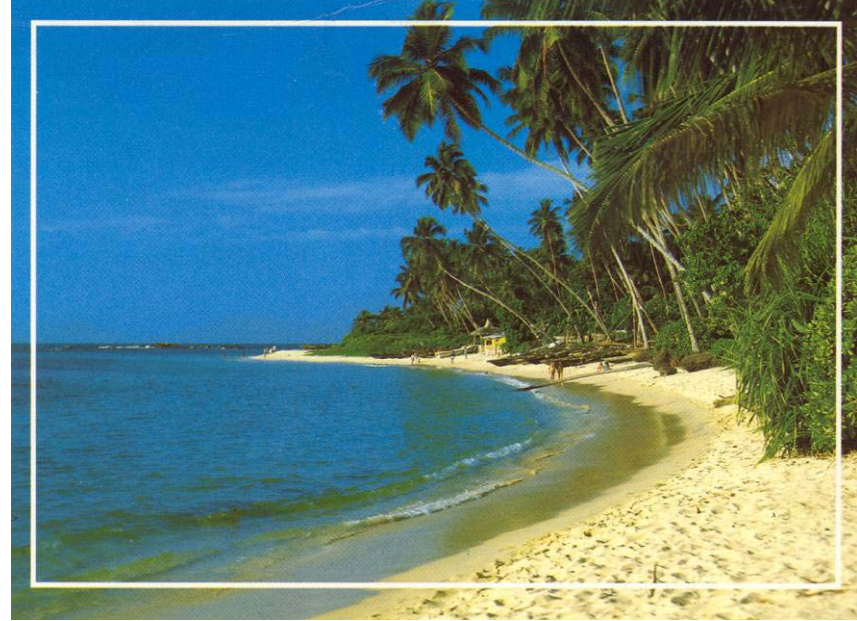


- Salinization of river water
 - irrigation
 - during dry weather, problem will aggravate
- Disturbance to the fresh & brackish water interface in coastal areas



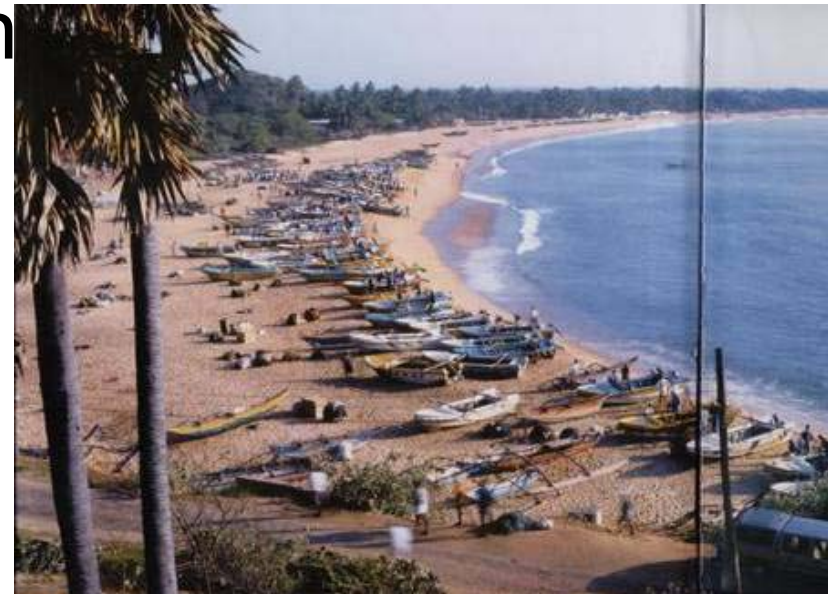
Impacts on Tourism in Coastal Zone

- **Sea Level Rise**
 - tourism related infrastructures
 - many areas of cultural historical and religious significance
 - scenic beauty



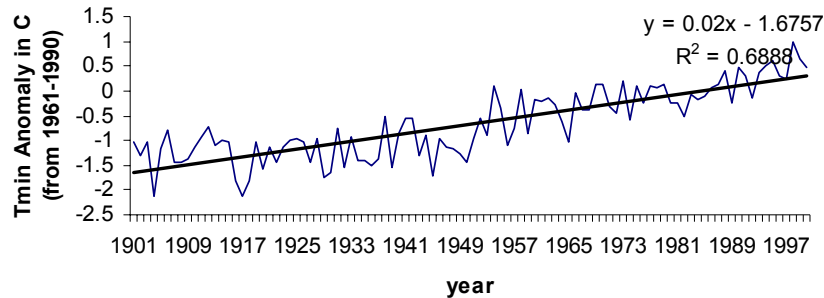
Impacts on Transportation in Coastal Zone

- **Sea Level Rise**
 - principal road
 - rail transport infrastructure
 - commercial ports

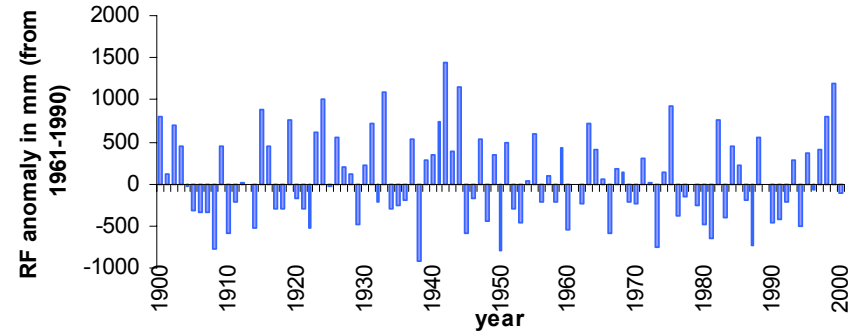


Systemic Observations

Annual minimum air Temperature anomaly trend in Nuwara-Eliya



Annual rainfall variability in Ratnapure

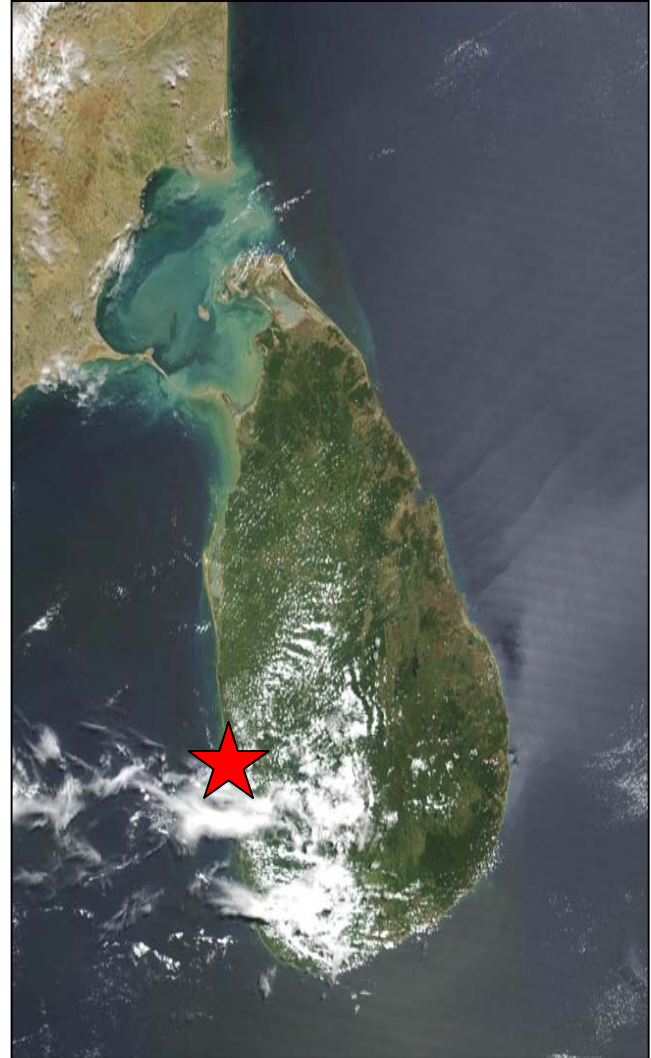


Research in assessing impacts of climate change on vulnerable sectors

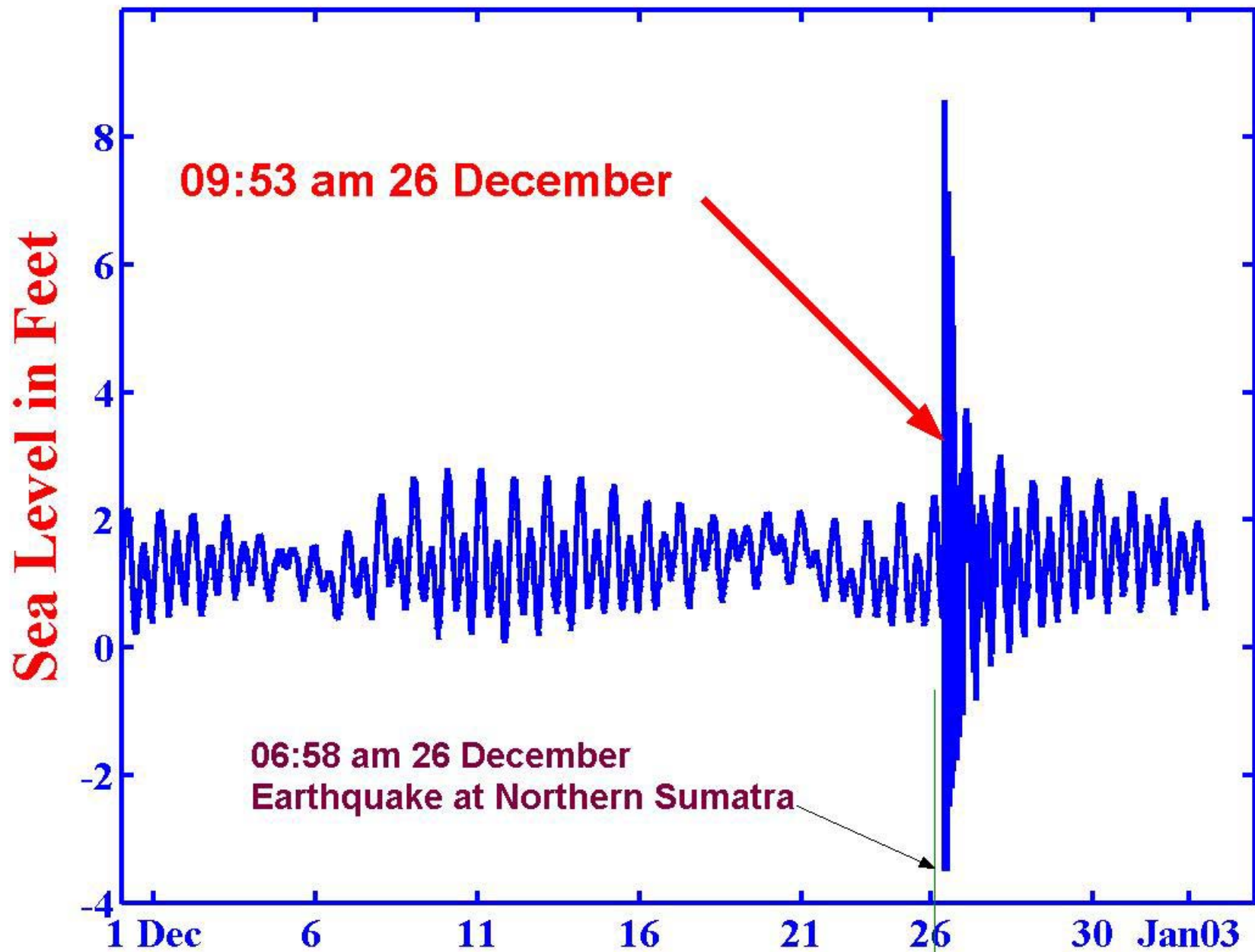


Adaptation Strategies

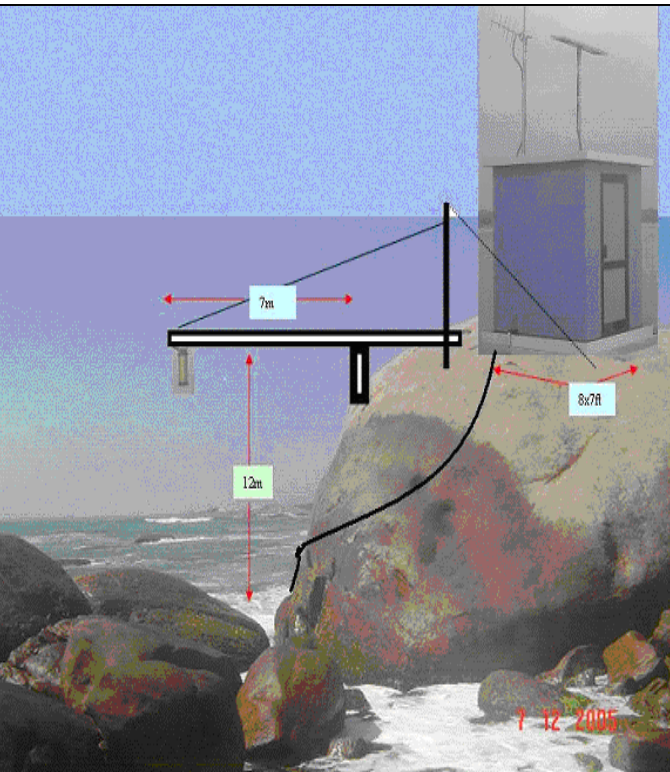
Tide Gauge at Mutwal, Colombo, NARA



Mutwal, Colombo Sea Level Monitoring Station (NARA)



Newly Installed two Tide Gauges



Kirinda



Trincomalee



Adaptation – Coastal Zones

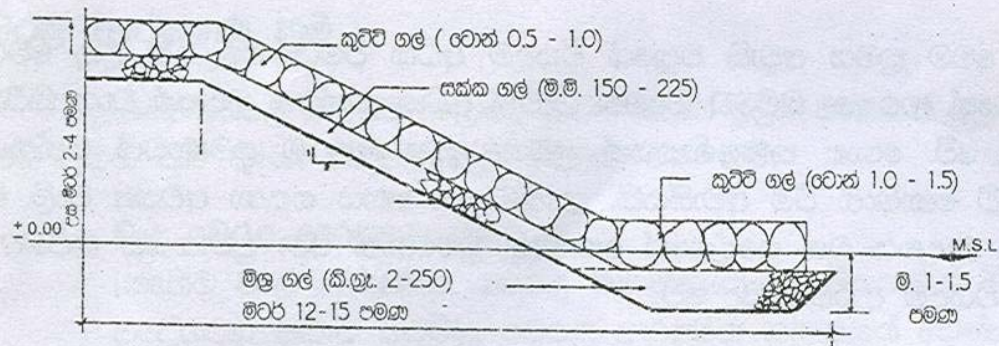
- strengthen existing sea defense structures
 - revetments, groynes, etc.

Interlocking concrete units



Rock armored revetments

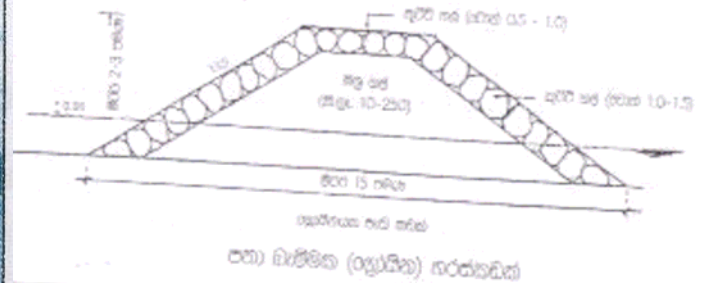




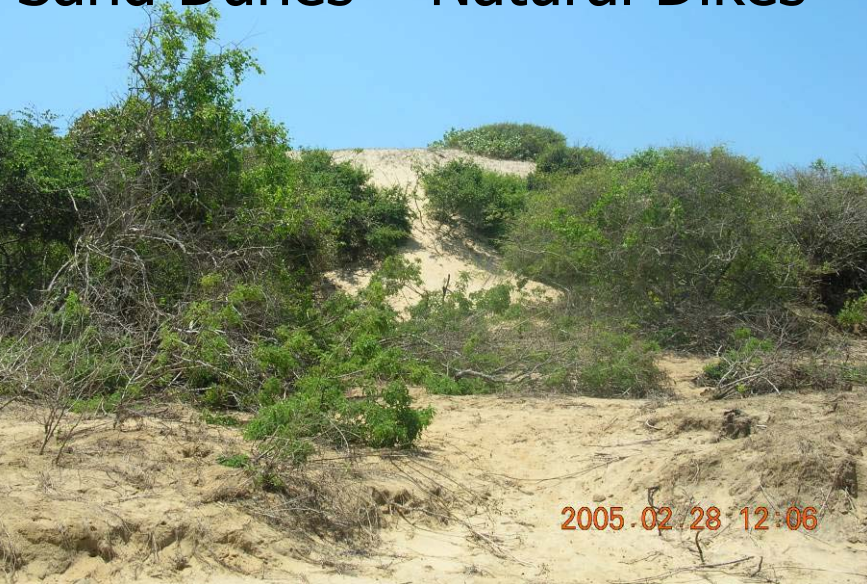
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Rock armored revetments

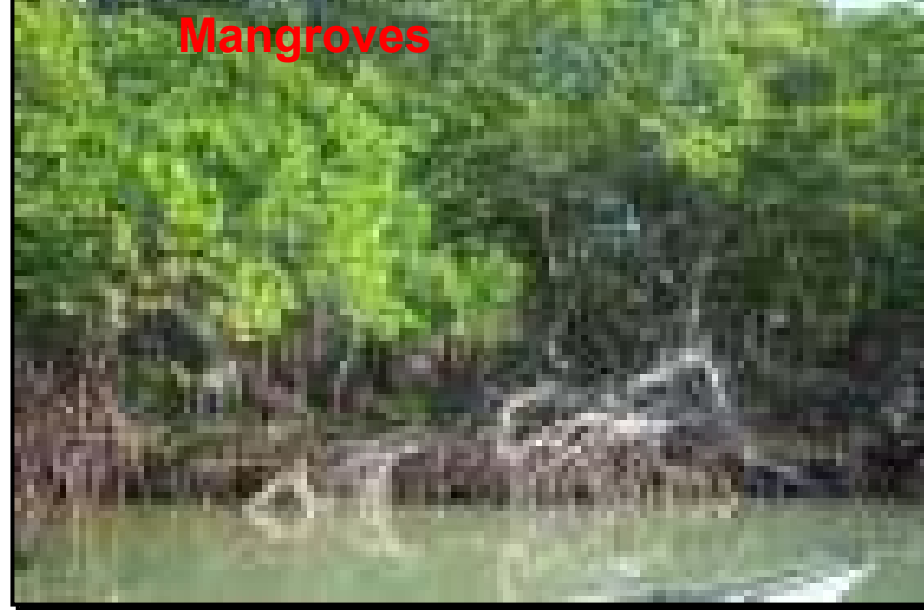
Groynes



Sand Dunes – Natural Dikes



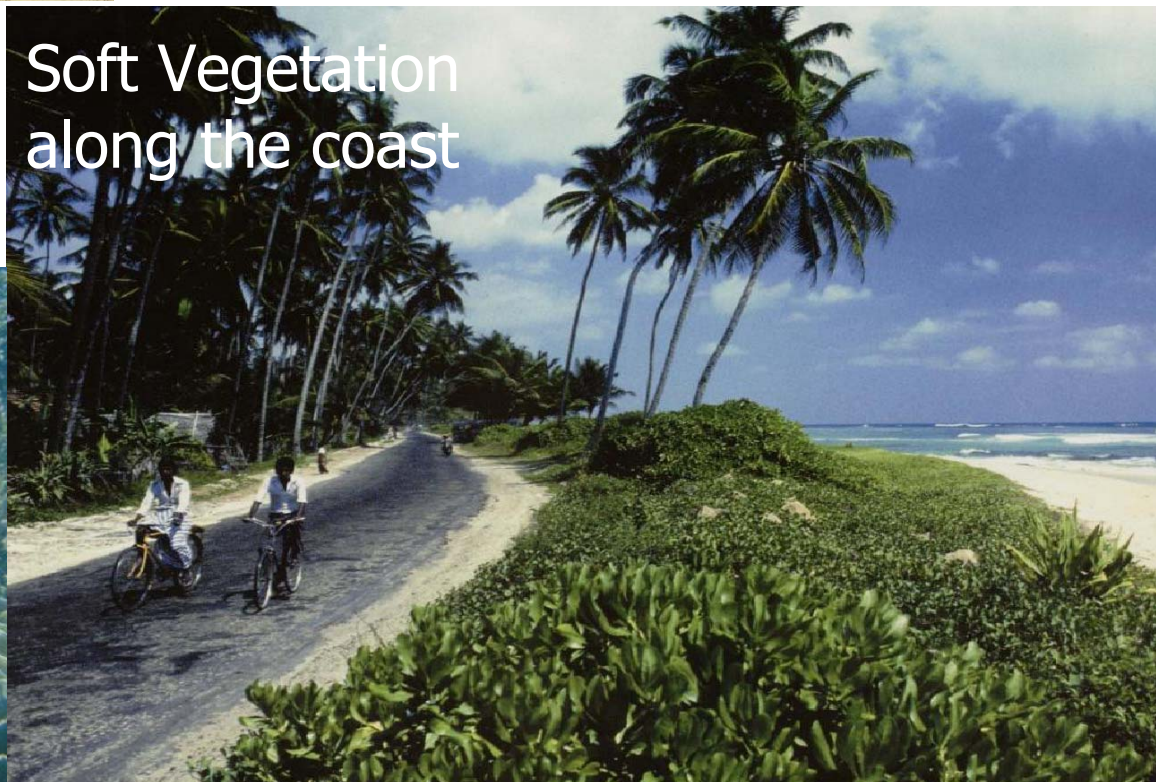
Mangroves



Coral reef



Soft Vegetation along the coast



Adaptation..

- **Agriculture**

- Look for alternative land uses;
- intensify the rice breeding program for salt tolerance;
- switch back to traditional varieties (Pokkali)

- **Water Resources**

- slat water barriers especially during the drought or dry spells
- Long term planning for building fresh water intakes at the upstream of rivers

National Obligations under the UNFCCC

- Article 4 of the UNFCCC states the commitments in order to properly implement the convention. These commitments / requirements can be listed as;
 - Preparing national communications
 - Developing national climate change programmes
 - Preparing and managing greenhouse gas inventories, including emission database management
 - **Assessing vulnerability and adaptation**
 - **Developing and implementing adaptation plans and measures**
 - Assessing mitigation options
 - **Research and systemic observation of climate and other functions**
 - Developing and transferring technology
 - Improved decision-making, including assistance for participation in international negotiations
 - Clean Development Mechanism (CDM)
 - Needs arising out of the implementation of Article 4.8 and 4.9 of the convention
 - **Education, training and public awareness raising**
 - Information and networking, including databases
 - Institutional capacity-building, notably through secretariats or focal points
 - Enhancement of the enabling environment

- **UNFCCC adopted in 1992 & Sri Lanka has ratified in 1994.**
- **INC submitted in 2000**
- **SNC is underway (Proposal has just submitted)**
- **However some requirements / obligations didn't fulfill yet due to various reasons.**
- **Recently, Sri Lanka has participated in the NCSA, which was funded by the GEF.**
- **Identified barriers, gaps, opportunities, interventions to properly implement the convention requirements**

National Capacity Self Assessment Project (NCSA)

--Gaps, needs & concerns--

Issue No	Issue	Capacity needed at		
		Systemic level	Institutional level	Individual level
1	Assessing sea level rise and climate change impact on flora and fauna in future	Create interagency coordination mechanism* among the relevant Departments and Institutions	Increase no. of tide gauge stations to strengthen the data coverage (NARA & Ports Authority).	Awareness raising on sea level rise and their Consequences, coastal flooding, etc. (Coast Conservation Department, NARA, UDA, Sri Lanka Tourist Board, Forest Department, Wildlife Conservation Department & Local Authorities, etc,
2	Unable to assess/demarcate vulnerable areas due to sea level rise	Make necessary actions to identify as a priority task as it affects to many sectors and national economy, allocation of funds to carryout contouring around the country at 50 cm and 100 cm above the mean sea level, increase carder and necessary budgetary allocations, if required, to carryout the above work	Make arrangements to establish inter-institutional coordination to address this issue, awareness raising on the consequences of the sea level rise in different sectors, make necessary steps to increase carder and necessary budgetary allocations if required	Change attitudes by conducting awareness programmes on sector specific issues with regard to sea level rise, make available necessary information and data
3	Failure to asses the impact of changes in wave characteristics on coastal zone	Identify as an important issue in coastal and marine area management, Make available necessary budgetary allocations to carryout the tasks	Enhance the capacity to prepare the project proposals in Coast Conservation Department, inter-institutional coordination to address this issue	Awareness raising on sea level rise and wave changes due to climate change among staff members of the relevant institutions
4	Unable to assess adaptation measures	Formulation of a long-term national Research policy*, Change in attitudes of policy makers & Ministerial level officers, Amendments to the present cadre to increase number researchers in departments** / institutes**	Formulation of institutional* research agenda to address this issue, Capacity building at institutional* level to conduct research,	Change in attitudes, Awareness raising on sector specific adaptive measures for individuals

Local & Regional Projects & Donors on coastal issues

- APN & LOICZ has been funding for coastal projects in Sri Lanka.
- APN has funded;
 - An assessment of nutrient, sediment and carbon fluxes in the coastal zone in South Asia. (Bangladesh, India, Nepal, Pakistan and Sri Lanka with collaboration from Australia and USA). - 2001
 - An Assessment of the Socioeconomic Impacts of Floods in Large Coastal Areas (Bangladesh, India, Pakistan, Sri Lanka) - 2005
 - Regional Scoping Workshop on Science-Policy Interactions in Coastal Zone Management in South Asia (Bangladesh, India, Pakistan and Sri Lanka) – 2005
- LOICZ has also facilitated small grants for conducting research in to coastal issues.
- Sri Lanka is nominated as the South Asian node for the LOICZ.

Possible National & International Actors on Coastal Issues

- International
 - GEF / UNDP/ UNEP / TWAS
 - START / AIACC
 - APN / LOICZ
 - WMO / IOC
- Local
 - NSF
 - NRC
 - UGC
 - CCCS