

Why the study??

- Fish poisoning
- Sea water mixing
- Bad smell
- Black thick mud
- Diseases
- High pollution



Scope of the Assessment

- to assess the 'green' environment (ecosystems such as coral reefs, mangroves, lagoons, beaches and farmlands as well as biodiversity and protected areas); and
- To assess the 'brown' environment (pollution, debris and impacts of human settlements and infrastructure)

Rapid Assessment Teamwork

- Directed by the Ministry of Environment and Natural Resources
- Implemented in close cooperation with the Central Environmental Authority
- Undertaken with financial support of the United Nations Environment Programme (UNEP) Tsunami Disaster Task Force

Rapid Assessment Fieldwork

 Surveys undertaken by teams from the Colombo, Eastern, Ruhuna, Jaffna, Moratuwa and Sri Jayawardenapura Universities and eminent personnel

 Other information sources include CCD, DWLC, NARA, UDA, and international agencies (IUCN, IWMI, UNEP/OCHA, ADB, JBIC, JICA, World Bank, UNDP, FAO, etc.)

The 'green' assessment

- Over 800 sites at one-km intervals along the affected coast, with transects running inland from the high tide line
- Data collected on the precise pattern of tsunami inundation, physical, ecological and social damage, land use, constraints and options for land use in the future

The 'brown' assessment

- Focused on potential contamination at over 750 sites at risk because the tsunami affected facilities either contained or received potentially hazardous materials
- Each site assessed for type, scope and intensity of pollution, disease risks and salinization
- Physico-chemical and microbiological analysis of samples of water and soil

Major Assessment Findings with their severity

- Variation in depth of penetration
 High
- Debris and solid waste
- Salinization of drinking water wells
- Contamination of water bodies
- Resettlement and reconstruction
- Damage to marine ecosystems
- Damage to shoreline ecosystems
- Damage to inland ecosystems

- High

- High

- Moderate
- Moderate
- Low
- Low
- Low

Variation in depth of penetration

- The waves were up to 9 m high, and penetrated inland for up to 3 km
- The median depth of penetration was about 300 m in Trincomalee and Ampara, 130 m in Batticaloa, 110 m in Matara, 100 m in Hambantota, 70 m in Galle, and 50 m in Jaffna





Debris and solid waste

- Over 500 million kg of rubble

 an enormous challenge to the solid waste management system
- Debris and sand, from the tsunami or clean-up operations, block drainage channels in many areas, posing a risk of waterlogging, loss of farmland, and increased mosquitoborne disease
- Little blackish sludge from coastal areas





Salinization of drinking water wells

- Salinization has made more than 15,000 wells unusable for drinking water supplies
- Over-pumping of wells in an attempt to clean out contaminated water has often encouraged saltintrusion, which has done more harm than good





Contamination of water bodies

- Many coastal water bodies have been contaminated with salt-water, debris, and sludge - eg Karagan lewaya, Sastarawila in Panama etc.
- Some have also become stagnant, anoxic and dead from lack of oxygen and purification
- Some water bodies to cause chronic impacts and others to cause acute impacts





Resettlement and reconstruction

- New settlements in or near protected areas and other ecologically sensitive sites
- Increased demand for sand and wood for reconstruction, and other building materials
- A potential for these activities to cause more irreversible damage to the environment than the tsunami itself (Water supply and sanitation issues)





Damage to marine ecosystems

- Mechanical damage to some coral reefs- eg; Hikkaduwa, Unawatuna etc. and other marine fauna
- Debris and sand deposition on reef
- Where they still existed after years of mining, blastfishing and bleaching, intact coral reefs acted as buffers to the waves





No sea fish poisoning

Damage to shoreline ecosystems

- Sand dunes prevented wave damages drastically but in few places where there is modification by human intervention there was a breach of sand dune causing devastation – eg: Panama, Bundala
- Erosion or deposition of sand in beaches
- Destruction of other types of vegetation in the shoreline – eg: Karthivu





Damage to inland ecosystems

- Frontline mangroves damaged but acted as a good shield – eg: Rakewa
- Destruction to vegetation such as Pandanus (Wetakeyia), palmyrah trees and some of the less saline tolerant plants
- Destruction to crops having economic value such as banana, *Casuarina (Kasa)* etc.
- Alien species of cactus spread in some areas (eg. Bundala Sanctuary)
- Little risk of bioaccumulation in coastal fauna





Proposed Interventions

Technical Interventions

- Managing debris and waste
- Assessing and remediating environmental contamination
- Rehabilitating ecosystems
- Restoring land drainage
- Water supply and sanitation
- Sustainable sourcing of sand and other building materials

Strategic Interventions

- Policy development and implementation
- Building capacity for environmental management
- Promoting public participation in ecosystem restoration
- Disseminating knowledge
- Mapping coastal zone terrain
- Promoting regional collaboration
- Building national consensus

Managing debris and waste

- Assist the local authorities to implement proper solid waste management by mobilizing the communities through "cash for work" programmes with the direction and guidance of CEA
- Preferably one dumping site for each district and many temporary dump sites





Assessing and remediating environmental contamination

- Restore affected lagoons and estuaries
- Remedy pollution hot-spots associated with debris dumping particularly in abandoned and in-use mineral pits
- Share information among countries on appropriate technology
- Rehabilitate and reconstruct fishery harbours





Rehabilitating ecosystems

- Rehabilitate SAM sites-Eg Hikkaduwa, Kalametiya, Rakewa etc.
- Rehabilitate protected areas- Eg Yala, Bundala etc.
- Rehabilitate wetlands Odu lagoon in Batticaloa and Valachchanai etc.





Restoring land drainage

- Clear the drainage channels in water logging area
- Drain the trapped water in localized ponds created
- Make new drainage paths as appropriate





Water supply and sanitation

- Provide new water supply schemes in the affected areas
- Provide safe and healthy water from the existing mobile units - more than 100 in use
- Rehabilitate sanitary facilities in temporary welfare camps for transition period
- Provide sanitary facilities for new settlements





Sustainable sourcing of sand and other construction materials

- Identify the areas from which sand could be harvested for construction work
- Promote reuse and environmentally friendly materials





Other strategic interventions

- Policy development and implementation
- Building capacity for environmental management
- Promoting public participation in ecosystem restoration
- Disseminating knowledge
- Mapping coastal zone terrain
- Promoting regional collaboration
- Building national consensus



Major Intervention

Managing debris & waste

Specific Projects

- Debris clearing in Karthivu
- Clearing of Hospital wastes in Kinniya hospital
- Restoration of abandoned or ongoing mineral pits in Akurala, Telwatta, Hikkaduwa, Habaraduwa and Ambalangoda areas

Project : Debris clearing in Karthivu

Area of Concerned : Batticoloa District

Background

- Damaged hospital, school and other infrastructure
- Resulted in a mixture of debris in many areas

Interventions proposed

- Identify an area in which solid wastes could be dumped
- Minimize the dumping material with an encouragement of reuse and recycle
- Dump non-hazardous material in the proposed area in an environmental sustainable manner
- Encourage the reuse of hospital wastes as practical as possible
- Disinfect with Chlorination the remaining hospital wastes
- Dump the disinfected hospital waste in the dump yard











Project : Restoration of abandoned or ongoing mineral pits in Akurala, Telwatta, Hikkaduwa, Habaraduwa and Ambalangoda

Background

- Haphazard dumping of debris
- Ideal habitat for mosquito breeding and other disease causing organisms
- Pollution could be on the rise
- Visual pollution is apparent

Interventions proposed

- Find out whether these areas are flood retention areas
- If yes, dredge and clean the areas
- If not, reclaim properly for utilization
- If the water remains, clean it and plan for any other beneficial use such as aquaculture or recreational activities etc.









Area of Concerned : Galle District

Major Intervention

Assessing and remediation of Environmental contamination of water bodies

Specific Projects

- Restoration of Karagan Lewaya, Hambantota
- Restoration of Sastharawila, Panama

Project : Restoration of Karagan Lewaya

Area of Concerned : Hambantota District

Background

- Debris collection along the shoreline is apparent
- Scum formation is high
- Faecal pollution is high
- BOD & COD are high indicating high pollution
- Skin diseases once exposed to water are likely

Interventions proposed

- Remove the scum formed in the shoreline
- Dredge the sludge collected in the shoreline and dump them in a suitable area within the lewaya
- Disinfect the areas where people have access
- Monitor the quality of water for some time after the restoration





Major Intervention

Provision of Water Supply & Sanitation

Specific Projects

- Cleaning of selected drinking water wells affected by the tsunami waves in Ampara and Batticaloa Districts
- Safeguarding the existing mobile drinking water supply units in all Districts
- Rehabilitation of sanitary facilities of transtitional camps in Trincomalee, Batticaloa and Ampara Districts
- Ensuring proper water supply and sanitation in permenant housing schemes

Project :	Area of Concerned :
Cleaning of selected drinking water wells affected by	All Districts
the tsunami waves	

Background

- Filled with saline water or/and debris
- Some are abandoned
- Became polluted due to solubilization of debris
- Groundwater pollution is likely
- Skin diseases are likely to continue
- Other types of pollution specially faecal pollution are high





Project : Cleaning of selected drinking water wells affected by the tsunami waves

Area of Concerned : All Districts

Interventions proposed

- Empty the well if it is not cleaned earlier
- Never over-pump anticipating freshwater as opposed to saline water
- If possible, stock the well with freshwater carried from bowsers
- Disinfect the well perhaps with chlorination
- Make sure the residual chlorination is less than 1 mg/L and more than 0.2 mg/L before consumption
- Do this procedure for all abandoned wells for remediating groundwater pollution





Disaster Management Plan

Area of Concerned : All Districts

Background

- Most of them operated by unskilled personnel
- Sources of water body in some cases are not suitable
- Final water quality seems to be bad
- Operational difficulties are numerous
- No responsible party for trouble-shooting





Area of Concerned : All Districts

Interventions proposed

- Find out the number of mobile units available
- Study the operational activities by an expert team
- Advise and train the personnel on the correct usage
- Find out means and ways of rectifying problems encountered
- Launch a water quality monitoring scheme
- Establish a helpdesk at CEA for any technical assistance





The Strategic approach

- Establish a high-level Multi-stakeholder Platform at the Ministry to coordinate and direct environmental inputs to the implementation of the Post-tsunami rehabilitation and reconstruction strategy and programs
- Establish an Environmental Helpdesk at CEA to facilitate rapid responses in implementing the Post-tsunami rehabilitation and reconstruction programs and projects





Let us join to rebuild and reconstruct our nation in an environmental sustainable manner



