

**Comprehensive Tsunami Disaster Prevention Training Course**

**2<sup>nd</sup> June - 11<sup>th</sup> July 2008**

**ACTION PLAN ON TSUNAMI  
COUNTERMEASURES  
SRI LANKA**

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## **Action Plan on Tsunami Countermeasures – Sri Lanka**

### **1.0 Tsunami in Sri Lanka**

**Sri Lanka** is an island in the Indian Ocean, located in Southern Asia, Southeast of India, at a location within North latitude of 6°-10° and East longitude of 80°-82°. It has a total area of 65,610 Km<sup>2</sup>, with 64,740 Km<sup>2</sup> of land and 870 Km<sup>2</sup> of water bodies. It's coastline is 1,340 Km long. Sri Lanka's climate includes two tropical monsoons, the northeast monsoon (December to March), and the southwest monsoon (June to September). It's terrain is mostly low, flat to rolling plain, with mountains in the south-central interior. Most of the island's surface consists of plains between 30 and 200 meters above mean sea level. In the southwest, ridges and valleys rise gradually to merge with the central highlands, giving a dissected appearance to the plain. The transition from the plain to the central highlands is abrupt in the southeast, and the mountains appear to rise up like a wall. In the east and the north, the plain is flat, dissected by long, narrow ridges of granite running from the central highlands.

Sri Lanka is highly vulnerable to several disasters such as Floods, Earth Slips, and Droughts, but not for the Tsunami. First Tsunami incident recorded in the country was at second century BC. There are no records on tsunamis thereafter. Therefore, people are not aware of tsunami before the 2004 Indian Ocean tsunami. In 2004, before the tsunami reached, the sea water was receded. But people didn't understand that it was a warning for tsunami disaster. Most of the people gathered to the shore to observe the difference instead of evacuation. If the people have previous experience on tsunami they would have evacuated easily. Thirteen districts along the coast were affected and over 35,000 lives lost. Approximately 5,000 people were missing, 562,601 displaced and 100,000 houses were completely damaged. There was no any institutional establishment to cope these disasters at that time. Only the relief activities were carried out at that time through the Ministry of Relief Activities.



Figure 1: Receding of Sea



Figure 2: Relief Camp at Temple

The displaced peoples were gathered to the temples and schools, just after the tsunami. These temples and schools were used as Evacuation Shelters as it has sufficient space until the resettlement of these displaced peoples. People those who were not affected from tsunami came from all over the country with food and other requirements, to help these affected people. The energetic people in the refugy camps also made active contribution to maintain the camp well. Cleaning, preparation of meals and many more other works had been done by these people in their own camps. They worked as a team with self help and mutual understanding. There was no any preparedness for such incident at that time. But just after the tsunami 2004,



Figure 3: Self Help, Mutual Understanding

Government of Sri Lanka concerned on Disaster Counter measures. The Indian Ocean Tsunami in 2004, hits Sri Lanka after about one and half hours from the time of occurring. But as we were not having proper awareness, preparedness and early warning system the damage was very sever.

## **1.2 Review of latest Tsunami Countermeasures**

In May 2005, the Disaster Management Act No.13 of 2005 was enacted. This provides the legal basis for a Disaster Risk Management (DRM) system in the country. The Act establishes the National Council for Disaster Management (NCDM), chaired by the President, vice-chaired by the Prime Minister with participation from Opposition, minority communities and Chief Ministers of the Provinces. This high-level oversight body provides direction to DRM work in the country.

The Disaster Management Centre (DMC) was established to implement the functions indicated in the Act. The Ministry for Disaster Management and Human Rights was established in January 2006 to take the leading role in directing the strategic planning for disaster response, risk mitigation, preparedness planning and risk reduction and also for human rights issues.

Disaster Management Center of Sri Lanka is working on seven thematic components which are consistent with organized and past efforts in the field of DRM and development planning. Those are as follows.

### **a. Policy, Institutional Mandates and Institutional Development**

Policy, Institutional Mandates and Institutional Development including components of preparation of a national disaster management plan, a national policy for DM, a national emergency response plan, reviewing, formalizing mandates and identifying capacity development needs of agencies to perform their DM functions as well as steps to implement policies already in place.

### **b. Hazard, Vulnerability and Risk Assessment**

Hazard, Vulnerability and Risk Assessment comprise activities ranging from flood simulation modeling in key river basins to the development of a vulnerability atlas for Sri Lanka. This will enable development planning which is sensitive to multiple hazards and different kinds of vulnerabilities.

#### c. Multi-hazard Early Warning System

Multi hazard early warning system is incorporating elements to generate advance warnings for floods, cyclones, abnormal rainfall, droughts, landslides, tsunamis thus enabling decision- makers to take necessary measures well before the occurrence of a disaster. Three multi hazard early warning towers were established and further 50 tower will be established.

#### d. Preparedness and Response Plans

Preparedness and respond plans are preparing to minimize the adverse impacts of a hazard through effective precautionary actions and timely, adequate responses. Prioritized activities include development of a national emergency preparedness and response plan, and establishment of emergency operation centers at national, provincial, district and local authority level. It minimizes the adverse impacts of a hazard through effective precautionary actions and timely, adequate responses. Prioritized activities include development of a national emergency preparedness and response plan, and establishment of emergency operation centers at national, provincial, district and local authority level.

#### e. Mitigation and Integration of DRR into Development Planning

Mitigation and integration of disaster risk reduction in to development planning encompassing activities relating to reducing impacts of droughts, preventing floods and landslides, and providing protection against tsunami / storm surges sea and coastal flooding by incorporating disaster risk considerations in development plans, thus ensuring sustainable development. There is a proposal to build a breakwater at Galle port. In addition part of the coastal are is conserving with sand and boulder embankments.

#### f. Community-based Disaster Risk Management

Community based disasters risk management involving activities that recognize the fact that communities, even when affected, are still the first line of defense against disasters if they are well prepared. It includes mobilization of community teams, creation of a local

network of trained volunteers and establishment of resource centers and small grants to fund priority projects by community teams.

g. Public Awareness, Education and Training

Public awareness, education and training focusing on empowering the public with ways and means to reduce disaster losses including tsunami, and includes a national awareness campaign, designating a ‘national Disaster Safety Day’, promoting disaster awareness among professionals through integration in university curricula and training, and among children through integration in school curriculum and school awareness programs. Community based awareness programs are conducting to increase the coping capacity of vulnerable community. Sign boards were established in certain areas but it needs further improvements such as solar power panel or luminous color.

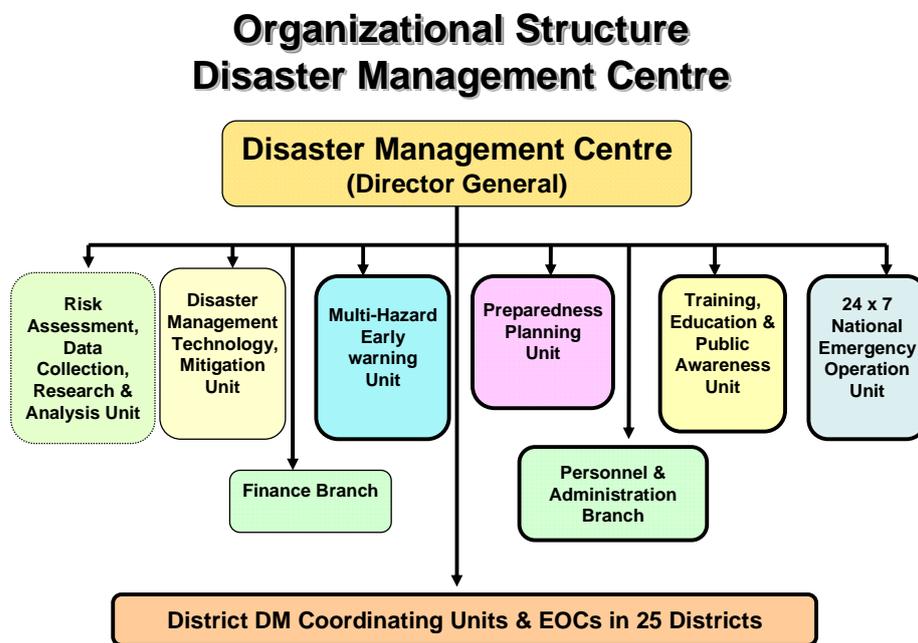


Figure 4: Organizational Structure of DMC



Figure 5: Sign Boards

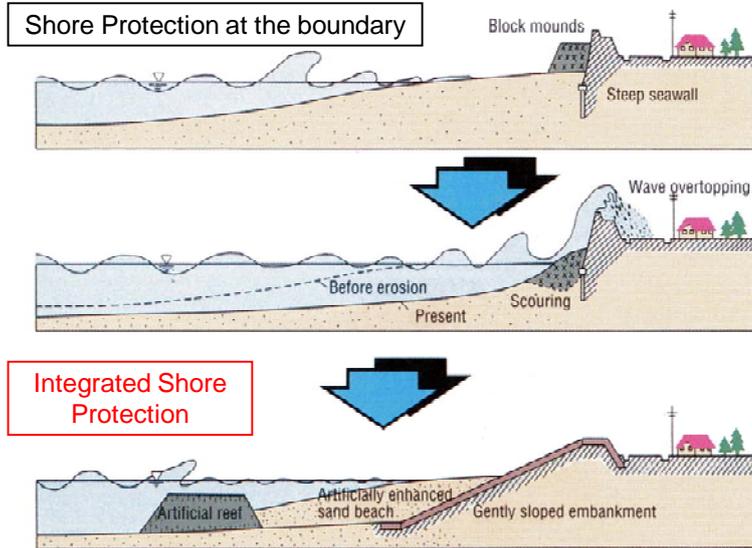
## 2.0 Impression of tsunami Counter measures in Japan

### 2.1 Valuable points and weak points of Countermeasures

Japan has established tsunami countermeasures in each and every location where necessary, such as tsunami gates, sea walls, embankments and levee. Similarly, the awareness level of the community also has been improved with several mechanisms such as community based hazard mapping, 3D movies, and incorporating the subject in to school curriculum.

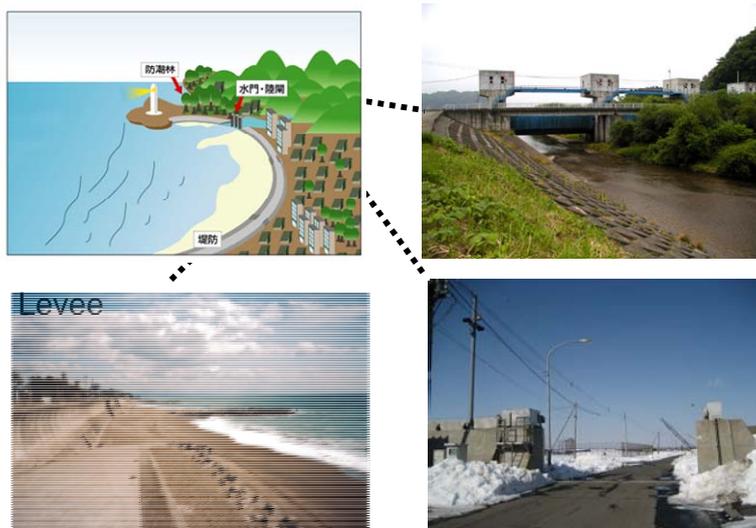
The Japanese Meteorological Agency had developed the automated early warning system to disseminate the warning message within few minutes. It is very useful and appreciable, as Japan experience Tsunami within few minutes after earth quake.

# Integrated Shore Protection



Some of the coasts are being developed with integration shore protection approach which is highly effective in reducing tsunami damage. All the officials engaged on Disaster Management are equipped with very sophisticated facilities for quick response which is very effective.

# Tsunami Protection Facilities



Most of the structural measures for tsunami countermeasure in Japan are built to the height less than inundation height. Most of the break waters are less than anticipated tsunami height. Most of the levees are lower than the inundation height. Most of the tsunami water gates are less than inundation height. Though there are automated gates are in operation, it takes few minutes to close the gate. It is very essential to have quick operating gates as Japan experience tsunami within few minutes. Some of the gates are manually operated. There will be a high risk involved on operator when the gates are manually operated. Therefore it is important to concern about these lapses in future constructions.

Most of established sign boards are not in multi language, not equipped with solar paneled or luminous color for night vision. Especially tourists will face difficulties due to language problem.

## **2.2 Most Impressive and Interesting activities**

The most interesting and Impressive activity is awareness for future generation. It is very interesting the way of tsunami disaster teaching in schools at lower grade students. In addition the movies such as tsunami animation with 3D is very impressive. It gave sense to the real situation which is very important in awareness.

## **2.3 Difference of Counter measures in between Japan and Sri Lanka**

Japan experiences tsunamis very frequently from long ago. Therefore people are getting experience and awareness in different ways. The counter measures also started from long ago. Therefore, the counter measures in Japan are in very high standard. In addition Japan is experiencing tsunami within very short time after the earthquake. Therefore the response also very well developed. As a well developed country, Japan has no any financial and technological barriers for necessary measures.

When we consider the recent past, up to 2004 Indian Ocean tsunami, Sri Lanka has not experienced a tsunami. Though we had enough lapse time (more than one and half hours) in 2004, we were not evacuated due to lack of awareness, preparedness, early warning. Similarly we have not developed any structural measures or non structural measures as tsunami counter measures before 2004. An addition we did not had any institutional frame work to deal with the tsunami.

Most of the development activities are carried out without concerning the risk of tsunami hazards. But after 2004 tsunami we have incorporated the tsunami countermeasures in development activities. People in Japan are very decent, well discipline and obey rules and regulations. But the peoples in our country are not up to the standard of Japanese, as far as above are concerned. Further, Sri Lankan Government is not in a position to go for huge structural measures due to financial barriers.

### **3.0 Proposed Activities for Tsunami Countermeasures in Sri Lanka**

#### **3.1 Problems of tsunami counter measures in Sri Lanka.**

The topographical condition in coastal area of Sri Lanka is completely different to the Japan. Entire coastal area is flat with very few bays. Openings or the mouths of Bays are much wide, when compared with those in Japan. The population is not concentrated only to river valley bays and it is spread unevenly along the entire coastal belt as the topography is flat. About 65 percent of the urbanized areas in the country is in coastal belt. Most of the railway lines, some of the highways, tourist infrastructures and large number of industries are also there, in this area. As we have not experienced tsunami during recent past, there were hardly any restrictions for development activities as far as tsunami countermeasures are concern. So all the rules and regulations, with an aim of mitigation of damages due to a tsunami, specially in respect of development activities are

adopted only after the 2004 Indian Ocean Tsunami. Most of the residents in coastal area are engaged on fishing as their income source. Most of their houses are located just along the coast and have not enough strength to bare the tsunami force. Re location of those residences is also a burning problem. Negative attitudes shown by the residents for re-location are also constraints against adopting of suitable tsunami counter measures.

Due to these reasons, the use of structural measures to reduce the tsunami damage is limited. But it can be practiced in some of the places situated in bays surround by hills with high population density. In Sri Lanka, we too, have constructed many structures such as embankment in “Inamura No Hi”. But those are not for the prevention of Tsunami. These embankments have been constructed for the purpose of irrigation. There is a possibility of establishing similar type of structural measures as tsunami embankments. However, the high capital investment will be a problem for the country as it is a developing country. Further, there is a proposal to establish tsunami break water at Galle harbor with the assistance of Japanese government.

### **3.2 Proposed activities**

Introductory program for National Disaster Management Committee will be carried out to make them aware about the possible mitigation measures. This committee represents the higher authorities in all the governmental and non governmental institutions dealing with disaster management. The aim is to get the national level intersectoral co-ordination and co-operation for possible mitigation measures carried by individual organizations.

Awareness programs will be conducted in highly vulnerable districts with the consent of the DMC officials. These programmes are proposed to be carried out for government officials and local political authorities of the respective districts, who are having the responsibility of decision making, planning, implementing and management in development activities. By doing such programmes it is possible to motivate them to have a coordination in possible mitigation measures carried out on their own institutions. After that the feasibility studies will be carried out for possible structural measures with

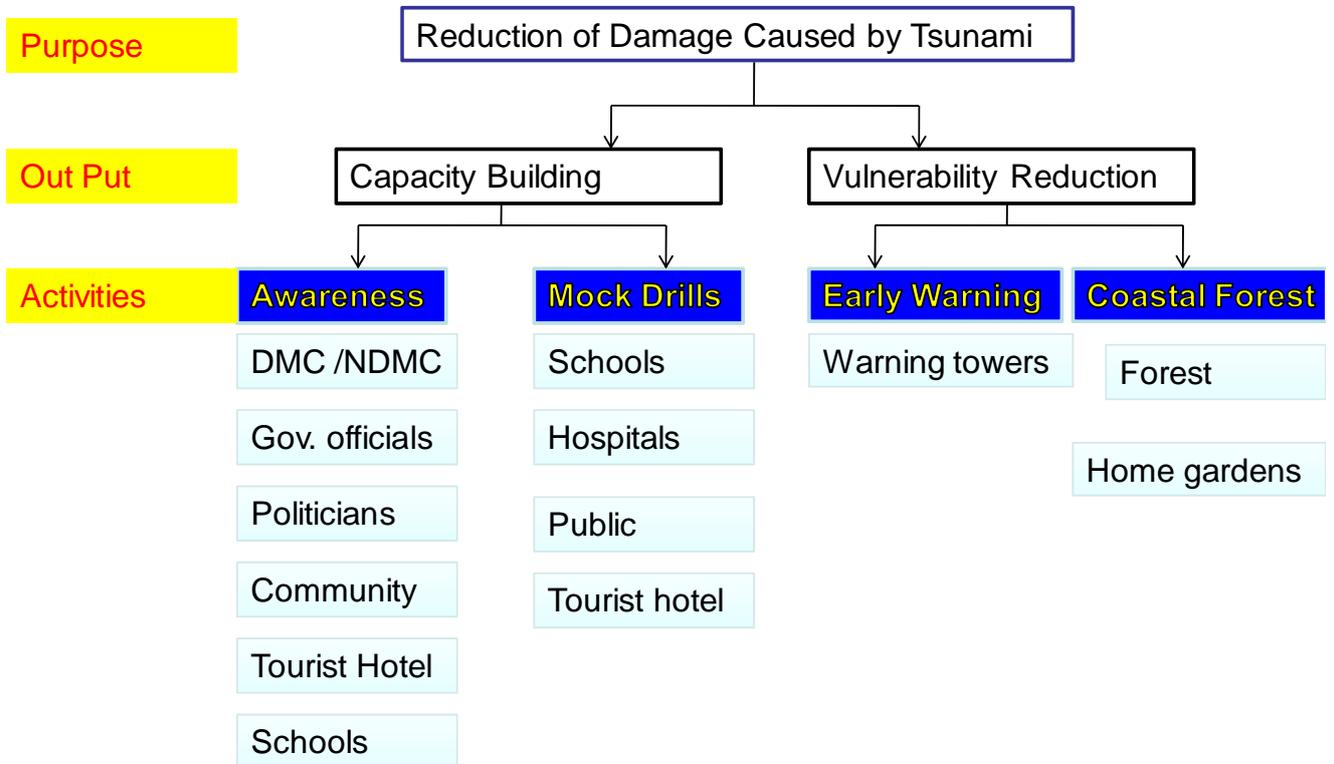
respective authorities. Feasible mitigation measures will be established based on the fund availability.

Multi language sign boards will be established based on the necessity. The existing sign boards have to be modified with luminous colors or solar panel boards. Several Tsunami monuments will be established in vulnerable areas to convey the message to future generation.

Awareness programmes, for the vulnerable community of selected districts, will be conducted to motivate and to establish coastal forests along the coast, and also to establish tree crops in their home gardens and to improve the existing coconut plantations. Coastal forest will be established along the coastal belt in Galle, Matara, Kaluthara, Ampara and Hambanthota Districts, as a community based participatory pilot project. This can be further extended based on success of the project. Existing coconut cultivated lands will be improved to increase the thickness of the cultivations and *Pandanous* species will introduce as undergrowth. Home gardens of the residents in inundation area will be improved with establishment of tree crops (fruit crops).

Awareness programs, for the school children of the vulnerable areas, will be conducted through different modes. The aim is to motivate the students to establish and maintain coastal forest along coastal belt, introduce tree species in their home gardens and to serve as volunteer of their area. The possible coast conservation measures will be established with these voluntary groups.

# Action Plan





Operation	indicator	1	2	3	4	5	6	7	8	9	10	11	12
Capacity Building to Reduce Damages caused by Tsunami	Extent of forest established .Coverage area												
Activities	In charge	1	2	3	4	5	6	7	8	9	10	11	12
3.0 Establishment of coastal forest													
1 Identify the possible locations	D AD	----											
2 Awareness of community	D AD	----											
3. Planning & Budgeting	D AD	----											
4. Forward budget for approval	DG D		----										
5. Preparation of Planting materials	AD DDM			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
6. Establishment of forest	AD DDM			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
7. Maintenance of forest	AD DDM			-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
4 Early Warning													
1 Evaluation of lapses in existing system	DG D/AD	----	----										
2 Design system with modifications	DG D/AD			-----	-----								
3. Preparation of budget & approval	DG D					-----	-----						
4. Establishment of new system	D AD							-----	-----				
5. Feed back	DG									-----			

Operation	Indicator	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year
Providing assistance to DMC and co-ordinating the work of Irrigation Department with DMC and conducting Awareness Programmes.	Number of PMC meetings held. (for activity 2.1)			
<b>Activities</b>	<b>In charge</b>			
1.Providing Data : 1.1 Data related to floods 1.2 Data related to river water levels	ID & DMC	Through out the year. Through out the year.	Through out the year. Through out the year.	Through out the year. Through out the year.
2.Awareness Programmes : 2.1 Conducting awareness work in Project Management Committee meetings in Irrigation Schemes near the coastal belt area. 2.2 Providing assistance for the awareness programmes conducted by DMC.	ID & DMC	In monthly meetings. As per the programme of DMC.	In monthly meetings. As per the programme of DMC.	In monthly meetings. As per the programme of DMC.
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