Sri Lanka
2005 Post-Tsunami Recovery Program

Preliminary Damage and Needs Assessment

Prepared By
Asian Development Bank
Japan Bank for International Cooperation
and
World Bank

Colombo, Sri Lanka
January 10 – 28, 2005

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A. INTRODUCTION

1. At the request of the Government of Sri Lankan (GOSL), a joint mission comprising of staff from the Asian Development Bank (ADB), Japan Bank for International Cooperation (JBIC), and the World Bank initiated a joint assessment of the damage caused by the December 26, 2004 tsunami. The event affected coastal areas of Bangladesh, India, Indonesia, Kenya, Malaysia, the Maldives, Mauritius, Myanmar, Reunion, Seychelles, Somalia, Sri Lanka, Tanzania, and Thailand.

2. The objectives of the mission were to conduct an initial assessment of the damage caused by the tsunami, in cooperation among the three agencies and in coordination with the Government at the national, provincial, district and local levels, civil society, the Liberation Tigers of Tamil Eelam (LTTE), and other stakeholders. In parallel, the team was also asked to assess the preliminary needs of the affected communities in terms of the medium to longer term reconstruction and recovery phases following the relief period. This coastal areas damage and needs assessment should serve as a platform for all development partners interested in contributing to the rehabilitation effort. This assessment process has also been coordinated with the United Nations (UN) agencies and bilateral donor organizations. The team worked closely with and drew heavily upon the work of the "Task Force for Rebuilding the Nation (TAFREN)" and the Department of National Planning of the Ministry of Finance and Planning, which had already produced a first estimate of the damages prior to the arrival of the team. It also benefited from the assessment work undertaken by the Planning and Development Secretariat of the LTTE.

3. Development of a sound needs assessment in a participatory manner requires several weeks or even months. At the same time, it is important to identify early on the approximate magnitude of the overarching needs, set key policies, define possible implementation and financing mechanisms, and begin restoration activities wherever possible. Based upon this preliminary draft document, consultations with the Government, LTTE, civil society and other development partners will continue and their inputs regarding the assessment will be taken into consideration. In parallel, the assessment will be refined as new data and information become available. The team aims to finalize the report in April 2005.

4. For purposes of conducting the initial damage and needs assessment, the ADB has focused on the transport sector (roads and railways), livelihood restoration, and the simplification of procurement procedures; JBIC/JICA evaluated the power and water supply sectors; the International Labor Organization (ILO) and the Food and Agriculture

Organization (FAO) provided inputs on the fisheries sector and other livelihoods; and, the World Bank – with inputs of World Health Organization (WHO) and German KFW – considered impacts to health, education, agriculture and livestock, tourism, private housing, social and environmental systems, and the overall economic impact. In addition, contributions on strategic issues were provided by UK Department for International Development (DFID). The initial damage and needs assessment did not factor in destroyed private assets that perished along with the devastated houses, the destruction to other public sector buildings, mine action and the impact of the tsunami on tourism outside the tsunami-affected areas. These are not anticipated to exceed 10% of the total anticipated need of reconstruction.

5. The team met with various stakeholders representing the Government, the private sector, international organizations, the LTTE, members of academia, and locally based non-governmental organizations (NGOs) involved in the emergency response and recovery phases. The mission team also participated in field visits to the districts of Amparai, Batticaloa, Galle, Hambantota, Jaffna, Matara, Mullaitivu, and Trincomalee. Team members discussed with representatives from affected communities the extent of the damage, identified the current needs, and verified data collected by the Government and other sources to the extent possible.

6. This document summarizes the preliminary findings and recommendations of the assessment team and highlights long term hazard risk management issues to be considered in order to reduce the impacts of future natural disasters on Sri Lanka.

B. EXECUTIVE SUMMARY

7. In Sri Lanka, the tsunami that struck on the morning of December 26, 2004 left behind widespread destruction and killed over 31,000 people, destroyed over 99,000 homes, and damaged natural ecosystems, and coastal infrastructure. Vulnerable groups, such as poor fishermen living close to the shore in simple houses and shelters, have borne the brunt of the negative impacts. Apart from the coastal communities already being comparatively poor in the Sri Lankan context, the tsunami has compounded previously existing vulnerabilities: the North East is the region worst affected by the tsunami. The percentage of the coastal population affected ranges from an estimated 35 percent in Kilinochi to 80 percent in Mullaitivu and 78 percent in Amparai coastal district divisions compared to the southern districts of Galle, Matara, and Hambantota with less than 20 percent of the coastal population affected, albeit with scattered pockets of severe damage.

Overview of Damage and Needs

8. Overall damage is estimated to be around $1 billion (4.5 percent of GDP). However, many of these assets were concentrated in the private sector. The largest share of output losses appear in the fisheries and tourism sectors due to lost income and production. Many coastal fishermen and small scale farmers' livelihoods were impacted by the tsunami, causing greater vulnerability to poverty. In addition, many people working in the informal sector who service the fisheries and tourism sectors and

communities also lost their livelihoods temporarily; thus many may fall further into poverty in what were already poor areas. Losses to livelihoods are not listed separately in the table below in order to avoid double counting, as these losses have been incorporated into the fisheries, tourism, and agriculture sectors. It is also important to take into consideration that output losses are more difficult to estimate than asset losses, as figures depend upon extrapolation from existing data.

9. Overall incremental financing needs are estimated to amount to be around $1.5 to 1.6 billion. This is in addition to the $2-300 million that the GoSL estimates that it has already spent, and excludes further relief expenditures. In the short term, the majority of resources are required for housing, transportation infrastructure, and livelihood restoration for fishermen, small farmers, small and micro enterprises, and others. The recovery needs run parallel to the level of damage sustained by each sector, with some variation depending upon the recovery strategy and its intent to replace damaged assets with those of equal value, as in the cases of housing and health, or with upgrades to services and infrastructure, as in the cases of power, water supply and sanitation, and transportation (especially railways). In aggregate, this is very close to TAFREN's current estimate (although with more significant differences at the sector level), and consistent with preliminary estimates released by LTTE. These estimates can be expected to converge over the coming weeks of further joint analysis.

Table 1: Preliminary Estimates of Losses and Financing Needs ($ Millions)

	Losses		**Financing Needs**		
Sector	**Asset Loss**	**Output Loss******	**Short Term**	**Medium Term**	**Total Needs**
Housing	306-341	-	50	387-437	437-487
Roads	60	-	25	175	200
Water and Sanitation	42	-	64	53	117
Railways	15	-	40	90	130
Education	26	-	13	32	45
Health	60	-	17	67	84
Agriculture*	3	-	2	2	4
Fisheries*	97	200	69	49	118
Tourism*	250	130	130	-	130
Power	10	-	27	40-50	67-77
Environment	10	-	6	12	18
Social Welfare**	-	-	30	-	30
Excluded Items plus Contingency ***	90		30	120	150
Total ($ Millions, rounded)	**970-1,000**	**330**	**500**	**1,000-1,100**	**1,500-1,600**
Percent of GDP	**4.4-4.6**	**1.5**			**7.0-7.3**

*Includes estimates from ***livelihoods damage assessment*** of fishermen, small farmers, and small businesses in tourism totaling $140 million.
**Targeted assistance to vulnerable groups.
*** Includes items mentioned at the end of paragraph 4 and is estimated at about 10% of the total.
****Refers to 2005 and 2006.
Source: Government of Sri Lanka and staff estimates.

10. The assessment report emphasizes the need to take into account guiding principles – such as conflict sensitivity, subsidiarity, community empowerment, transparency, hazard risk management and coordination between stakeholders – during the development of a comprehensive recovery strategy.

C. BACKGROUND ON THE 2004 TSUNAMI

11. **Overview.** At 0059 GMT, a massive earthquake registering 9.0 on the Richter scale struck off the coast of Sumatra, Indonesia. This was followed by a series of more than 67 aftershocks, the largest of which occurred approximately three hours after the first earthquake and registered 7.1 on the Richter scale. The earthquake triggered a series of tsunami waves that radiated through the Bay of Bengal at a rate of more than 500 kilometers per hour, directly impacting coastal areas of Bangladesh, India, Indonesia, Kenya, Malaysia, the Maldives, Mauritius, Myanmar, Reunion, Seychelles, Somalia, Sri Lanka, Tanzania, and Thailand.

12. Sri Lanka has been extremely hard-hit in terms of loss of life, infrastructure, and economic assets; the 2004 tsunami is widely acknowledged as the largest, most devastating natural catastrophe in the history of the country. Two hours after the first earthquake occurred, the tsunami waves struck an extremely long (more than 1,000 km, or two-thirds of the coastline) coastal area of Sri Lanka across thirteen districts, including Jaffna in the north, the eastern and southern coast, and parts of the west coast as far north as Chilaw. The waves penetrated inland areas up to 500 meters in many places, leaving behind few intact structures and killing or injuring tens of thousands of people. Coastal infrastructure systems, including roads and railways, power, communications, water supply and sanitation facilities, and fishing ports have all been severely damaged. The tourism sector was also affected due to physical damage and cancellation of future bookings.

13. As of January 17, official figures indicated that more than 31,000 people in Sri Lanka were dead and approximately 6,300 remained missing; however, these figures may change as bodies continue to be identified, and depend upon the public health situation during relief efforts. Displaced person estimates stand at 443,000, while the affected population is estimated between one and two million, out of a total population of approximately 19 million people. The Government estimates the number of damaged houses at more than 130,000, of which more than 99,000 have been completely destroyed. About 217,000 people are still living in relief camps, while approximately 226,000 people have moved in with friends or relatives. However, this number continues to decrease over time as families return to their homes to begin rebuilding.

14. The tsunami affected a broad range of economic income and ethnic groups, both rich and poor. More women and children died as many men were away from their homes at the time. As is typically the case with natural disasters, the poorest families – especially those who lost their livelihoods as fishermen or from cottage industries and the socially marginalized such as lone elderly or single parents – will need external support to recover. They are now struggling to rebuild their lives after losing not only family

members and loved ones, but also their homes, assets, and livelihoods. The high death toll, the speed at which the tsunami hit the island, and the sheer magnitude of devastation in coastal areas have all considerably traumatized those who were affected.

15. It is important to note that the North East region of the country was especially hard-hit by the tsunami because its population is still suffering from the effects of twenty years of civil war. A cease-fire has been in effect for the past two and a half years, during which damaged infrastructure, homes, businesses, health facilities, and schools were in the process of being rebuilt. Many of these assets that withstood the war are now destroyed or damaged. Many people remained displaced by war when the tsunami struck, and now must perpetuate their stays in temporary camps and have few prospects for recovery without external assistance.

16. The North East region's pre-disaster situation gives perspective to the additional burden the tsunami has placed on the population. During the conflict period, approximately 65,000 people were killed and over 800,000 people displaced. Landmines are still prevalent in the region. The school drop out rate is four times higher than the national average, and even before the tsunami struck, the unemployment rate was estimated to be double the national average. At the beginning of 2002, over 40,000 families were still living in relief camps and more than 350,000 houses needed to be reconstructed. Given these circumstances, the recovery needs of the North East region need to be particularly focused on.

17. **National response.** Immediately after the disaster struck, communities and local authorities responded quickly to address immediate needs of the affected people. On December 27, President Kumaratunga addressed the nation and promised full support to the tsunami victims and enacted several emergency response mechanisms to expedite relief activities. The day after the disaster, the Government released LKR 93 million from the National Treasury to facilitate relief operations in ten of the affected districts. In addition, a Center for National Operations (CNO) was formed under the President's Secretariat to oversee and monitor emergency programs and liaise with relevant line ministries, NGOs, the private sector, and other organizations contributing to the relief and recovery phases. Three new task forces comprising representatives of the public and private sectors were also formed under the President's Secretariat: the Task Force for Rescue and Relief, the Task Force to Rebuild the Nation, and the Task Force for Logistics and Law and Order. At the district level, Disaster Management Authorities were appointed to coordinate local relief efforts. The Government has also communicated its actions taken during the relief phase through the Ministry of Information to maintain a transparent approach.

18. In the North East, the Government has been coordinating relief and recovery activities with the LTTE, which has been providing people with temporary shelter, distributing food and other goods, and preparing plans for reconstruction. The LTTE has also actively participated in District Level Task Forces, and undertaken its own needs assessment of the North East.

19. As of January 18, GOSL has distributed more than 2,300 tents, 20,000 mt of food, clothing, and other necessities to tsunami victims and has opened hundreds of temporary shelters. It has also dispatched the military to assist with the search and rescue phase and to help distribute relief items. On January 17, the Government began distributing tsunami relief ration cards, valued at LKR 375 per person per week, to displaced people. The Ministry of Relief, Rehabilitation and Reconciliation is responsible for the distribution of food items to the respective regions, with direct supervision by local government officials at the provincial and district levels.

20. The President's Secretariat has also established a disaster relief fund that aims to centralize and account for funds contributed by private donors to guarantee that resources are strategically used during the recovery process. Nationwide, the Government has spent LKR 350 million on relief activities and has allocated an additional LKR 2 billion for the recovery process to date.

21. **Civil society response.** Many community groups and NGOs have been providing food, health supplies and services, water, and other basic necessities to thousands of families throughout the country. Several NGOs also plan to continue supporting recovery programs. Sarvodaya, one of the largest national NGOs, was one of the first to deliver aid to the tsunami-affected people in many parts of the country, while the Tamil Rehabilitation Organization (TRO) provided emergency assistance to the people especially in the North and East. During the rehabilitation phase, Sarvodaya is planning on reconstructing 20,000 houses for those who lost their homes during the disaster. Other major NGOs active in relief and rehabilitation include SEWA Lanka, the Red Cross Society of Sri Lanka/ICRC, as well as CARE and Save the Children.

22. **International community response.** The United Nations Office of Coordination and Humanitarian Assistance (OCHA) immediately deployed the United Nations Development and Assessment Coordination (UNDAC) Team to the country, to provide technical assistance for the management and coordination of disaster response. Also, the United Nations Development Programme (UNDP) started providing assistance to the Government to coordinate relief efforts at both national and local levels. It also helped the Government to set up the Center for National Operations (CNO) as the central body coordinating all relief operations in the country. Other specialized UN agencies, such as United Nations Children's Fund (UNICEF), the World Food Programme (WFP), and the United Nations Population Fund (UNFPA) also provided emergency assistance.

23. The response of the international community was also rapid. By January 6, contributions in cash and kind of around $22 million had been pledged by bilateral donors for post-tsunami relief programs, channeled mainly through national and international NGOs. Several have also pledged funds for relief and/or reconstruction efforts, including but not limited to: the United States, Australia/the Australian Agency for International Development (AUSAID), Canada/the Canadian International Development Agency (CIDA), Germany, Japan, the European Union and the UK. The multilateral partners of Sri Lanka, including the international financing institutions, have also responded quickly. On January 6, 2005 the UN launched a Flash Appeal aiming to

raise $167 million for the immediate recovery of the country for the next six months; as of January 19, donations totaled $21.8 million.

24. **Private sector response.** The overwhelming human and economic losses caused by the Asia tsunami initiated an outpouring of financial aid and other resources to the region from local, national, and international companies. Companies have provided assistance ranging from helping to re-establish communication systems to donating medicines, food, and money. Hundreds of private firms ranging from international sports conglomerates (such as the International Cricket Council), to global firms (including Daihatsu Motor Company, Dow Chemical, Nestle Corporation, Microsoft, Shanghai Banking Corporation (HSBC), Vodafone, Coca Cola, Shell Corporation, Exxon, and News Corporation) have donated millions of dollars to assist Sri Lanka with its recovery activities. The media reports that some companies have established a network to coordinate their response to the disaster throughout the Asia region. In Sri Lanka, the network has assisted the Government in managing incoming relief supplies at the Colombo International Airport. Local companies in some cases not only contributed financial resources, but also administered relief centers that provided food to displaced people.

25. For those who had insurance policies, local insurance companies are already in the process of assisting clients to process claims. Due to the large scale of reconstruction needed, the Government has announced that it plans to work closely with the private sector as it formulates a longer term recovery program to ensure that the private sector continues to play an active role during reconstruction.

D. GUIDING PRINCIPLES OF THE NEEDS ASSESSMENT AND RECOVERY STRATEGY

26. The impacts of the December 26 tsunami were of catastrophic proportions at the community level. The recovery strategy, therefore, must first and foremost be seen as a revival of communities – a restoration of lives, livelihoods and social networks – which the reconstruction of physical assets and infrastructure will support.

27. Any plan for post-tsunami equitable reconstruction will need to work within the current political situation and develop mechanisms that facilitate the redevelopment of all parts of the Sri Lanka (both Government and LTTE-controlled areas).

28. The complexity of the reconstruction task – ensuring that the millions of dollars that have been pledged internationally translate into accessible and appropriate benefits for every affected individual – requires that adequate attention is paid upfront to implementation mechanisms and processes.

29. Therefore, as the key stakeholders, including Government, the affected communities, donor organizations both public and private, civil society organizations, the LTTE, and others begin to rebuild the shattered coastline, it is important to recognize some critical aspects for the recovery strategy to be effective. While the foundations for these principles already exist, the current unprecedented situation calls for further

strengthening and enhancement. The reconstruction strategy should thus be built on a set of guiding principles, drawing from international experience in previous disasters, and bearing in mind the special political circumstances of Sri Lanka. Such guiding principles, to be reaffirmed and possibly formally adopted by the Government of Sri Lanka and all key stakeholders, include the following:

- The allocation of resources both domestic and international should be strictly guided by the **identified needs and local priorities**, without discrimination on the basis of political, religious, ethnic or gender considerations. The recovery strategy should take into account the extent of progress in Sri Lanka since the signing of the Cease Fire Agreement (CFA), after a long period of conflict, and seek to strengthen the peace process. Reconstruction interventions should be done in such a way as to build confidence between different actors in the process. Reconstruction should similarly be sensitive to the impact on neighboring but unaffected communities.

- The strategy should be based on the principle of **subsidiarity**, meaning each reconstruction activity should be designed and implemented at the lowest competent tier of government. While the Central Government should play the lead role in setting standards, policies and principles, subsidiarity allows for locally appropriate solutions and enables a range of sub-national structures and organizations to be directly engaged in the process. The recovery plan (which should be disaggregated to District level) would provide for capacity building and strengthening at various levels of governance, but especially District and *Pradeshiya Sabhas*, as well as local civil society organizations.

- The recovery strategy should focus on the medium and long term needs of the victims themselves. Therefore enhanced and solid **consultation** with local **affected communities and stakeholders** is essential, and local communities should be empowered to make their own decisions during recovery, and participate fully in reconstruction activities. All interventions need to respond to clearly identified and articulated needs of local communities, respecting local religion, culture, structures and customs. This is especially important with respect to the policies related to shelter and relocation, which should not proceed without such full consultation. Communities should be assisted to return to their original homes as swiftly as possible wherever possible. In order to maximize the speed of recovery, local capacities should be harnessed as far as possible.

- There needs to be better **communication and transparency** in decision-making and implementation. Mechanisms should be strengthened to ensure access to information regarding policies, entitlements, and implementation procedures, and to permit more regular feedback to implementing authorities, as well as grievance redress. Similarly, mechanisms to ensure transparency in resource use and comprehensive **accounting** need to be enhanced, at the aggregate, program and beneficiary levels, accompanied by more effective monitoring and evaluation systems, to permit a full accounting to parliament, development partners, civil

society, and the affected communities themselves of resources deployed from all sources. All parties should reaffirm their policy of **zero tolerance for corruption** in this joint effort.

- Reconstruction processes should **reduce future vulnerabilities** to natural hazards, including floods, cyclones and landslides. A multi-hazard risk approach should be used during the recovery phase to ensure that communities and assets are less vulnerable to impacts of future disasters, while balancing the social costs of excessive resettlement. It should be guided by international standards and best practices in design and asset management.

- All the above considerations suggest a number of factors that will need to be built into the **analysis of individual interventions**. They should be analyzed for their potential impact on the cease-fire and the prospects for peace, and, for long-term sustainability, such interventions should also incorporate considerations such as governance, gender-sensitivity, environment, resettlement/land issues and human rights concerns. The process should be guided by international standards and best practice for protection, with special attention to the needs of vulnerable groups.

- If **debt relief** is granted to Sri Lanka as part of the financing package, it would be especially important to deploy the resources so released in a transparent way for the benefit of the victims, and for such resource use to be carefully monitored.

- A **coordinated approach is critical** to ensure that the above principles are followed and to prevent duplication or overlap in activities. Development partners should adopt behaviour that will minimize the burden on stretched Government administration, not least by maximizing their own coordination. Coordination should not just be between Government and donors, but involve all stakeholders including civil society, the business community and international NGOs, who have resources that will not pass through Government. Capacity would need to be created at the local level for such coordination.

E. PRELIMINARY DAMAGE AND NEEDS ASSESSMENT

30. This section outlines a preliminary estimate of the damage and needs resulting from the widespread coastal destruction caused by the 2004 tsunami by first evaluating the social, environmental, and economic impacts of the disaster and then summarizing the damage and needs for the following sectors: education, health, water supply and sanitation, transportation (roads and railways), livelihoods, housing, power, agriculture, tourism, and fisheries. A summary of the estimated damage and needs is presented in the table below. In depth information on each sector is attached in separate annexes.

31. **Methodology of data collection.** A comprehensive damage and needs assessment is important for identifying key sectoral interventions following a disaster and helps to procure international support for the recovery phase. However, this initial report had to strike a balance between data availability immediately after the disaster, as well as the

speed at which the initial assessment was carried out. Data used in this report have been provided by the GOSL and other sources and verified by the team at the local and national levels during field visits and consultations.

32. This report utilizes as an overarching framework the methodology for estimating the socio-economic and environmental impacts of disasters developed by the UN Economic Commission for Latin America and the Caribbean (ECLAC). Within this framework, the assessment considers asset losses, output losses, and the overall macroeconomic and fiscal effects.

33. Asset losses refer to impacts the disaster has had on assets, including damage to infrastructure systems, capital, and stocks. Output losses indicate the shift of flows in goods and services, as well as other economic flows such as increased expenses, reduced production, diminished revenues, and the cost of emergency relief efforts following the disaster. By presenting the estimated asset and output losses, the report indicates the overall scale of damage suffered.

34. Macroeconomic effects depict ways in which the disaster changes the performance of the country's key economic variables, including impacts on balance of payments, inflation, foreign exchange reserves, and overall economic growth. Examining the macroeconomic effects of the disaster presents a complementary approach to this analysis because they illustrate how the disaster has affected the functioning of the economy and describe any corresponding macroeconomic imbalances.

SOCIAL IMPACTS

35. The social fabric of the tsunami-hit areas of Sri Lanka has been impacted by extensive physical damage, loss of more than 31,000 lives, injuries to more than 15,000, damage to livelihoods, and the displacement of approximately 443,000 people. In addition, the number of women and children among the dead seems to be disproportionately high. More than 900 children have become orphans or separated from their parents. These children, along with widows, single-headed households, elderly, and disabled people comprise especially vulnerable groups in terms of psycho-social distress, restoration of livelihoods, and legal and protection rights. As such, these groups will require special support during the recovery phase.

36. Although these communities have been traumatized, they have demonstrated a strong sense of cohesion in mobilizing themselves into groups to remove rubble and distribute relief supplies. To help counter psychological shocks, GOSL, along with UN agencies, civil society organizations and other partners, plans to offer psycho-social support to families with a special emphasis on addressing the needs of women and young children. Neighborhood and family networks are traditionally strong in Sri Lanka, and represent both an important social asset of reconstruction and a key basis for designing locally demand-driven recovery programs.

37. The extensive damage to homes, workplaces, and productive assets has caused increased vulnerability to poverty. An estimated two-thirds of the fisheries sector has been severely affected. The damage to the tourism industry has resulted in the estimated unemployment of 14,000 people. Many of the more than 5,000 village industries located along the southern and eastern coastlines were destroyed, causing disruptions to livelihood activities of a large number of people. The most pressing need for all those who lost their means of livelihood is the restoration of income sources and the provision of temporary living assistance.

38. **Displacement.** It is essential that families likely to remain in relief camps for an extended period be identified, their needs assessed, and responsibilities for their continued support clearly assigned. Welfare camps currently occupying school buildings and other public buildings will need to be relocated so public services can resume. The relocation should facilitate people's return to their daily routines, reintegration into their home communities, and ensure the provision of education, health and other public services.

39. International experience shows that protection of women and children frequently is inadequate during disaster and conflict conditions. Several reports discuss the lack of security for women and children in camps and refer to cases of sexual harassment, rape, violence, and kidnapping of children. The concerns and the protection of children, women, and other vulnerable people in the camps should be urgently addressed. There is also a need to raise awareness in camps of the risks of sexually transmitted diseases, such as HIV/AIDS.

40. **Relocation.** The tsunami surge destroyed more than 99,000 houses and damaged more than 46,000. The damaged houses form about 13 percent of the housing stock in the affected districts within 500 meters of the coast. In view of the widespread destruction and displacement of people, the GOSL is presently discussing a proposal to define coastal zones of 100m in the south and 200m in the east as no construction zones. Even if this is not implemented as a blanket rule, but only applied in specific high risk areas, there will be considerable relocation of people.

41. Relocation involves a number of issues – Government land acquisition of the private land in the no construction zones, compensation for limitations on land use rights (e.g., cultivation but not construction), and resettlement on vacant Government land with an adequate level of public services. Relocation and resettlement will have huge implications on the livelihoods of affected families and would require comprehensive consultations and development of a resettlement plan and compensation framework, which also would ensure ethnic/religious sensitivity in implementation at both the national and local levels.

ENVIRONMENTAL ASPECTS

42. Along the coastline of Sri Lanka, impacts vary considerably among different areas affected by the tsunami. Except in extremely small pockets, the tsunami has affected a narrow strip along the southern and western coastlines of 500 meters or less at elevations

below 2.5 to 3 meters. The North East coastline appears to have borne the brunt of the disaster, with affected areas reaching 2-3 km inland. Areas protected by natural barriers, such as mangroves and sand dunes, have been left virtually unaffected.

43. **Protected areas in the coastal zone.** While there has been no documented loss of fauna in the protected areas affected by the tsunami, there have been significant impacts on flora and biodiversity. Extensive soil erosion, as well as stress and dieback of flora, were noted in areas of sea water intrusion. The greatest ecological impacts are on freshwater bodies and fishery breeding grounds in protected areas that have been contaminated with saline water. The long term impacts or reversibility of this situation is unknown at this stage.

44. **Coral reefs and the marine ecosystem.** The most significant environmental damage from the tsunami is expected to be marine-related, especially in inter-tidal and sub-tidal areas. Such damage could cause changes in the coastal marine ecosystems, as well as immediate loss of natural resources such as fish, lobsters and crabs. Many coral reefs may have been reduced to rubble in certain places due to the crushing force of the waves. There could also be significant contamination as a result of land runoff of wastes and pollutants, debris, soil and organic matter. In addition, mangrove areas, which protected property and lives during the tsunami, are now damaged.

45. **Debris disposal.** The extent of debris, waste material, and rubble requiring disposal poses a huge issue because of the sheer volume and associated costs involved. Emergency clearance efforts have resulted in haphazard disposal of rubble along roads, in open fields, into drainage ditches, low lying lands and waterways, and along beaches. The dumping of debris in inappropriate locations must be addressed immediately to prevent long term problems of flood control, waterway blockages, and pollution of beaches.

46. **Surface and groundwater contamination**. All of the dug wells located in coastal areas where sea water has penetrated have become brackish and polluted by wastewater and seepage from damaged septic tanks. This is a serious public health issue, as most local water sources have been contaminated. In addition, the pipe borne water supply system in the affected coastal areas is largely out of service because of damage to the distribution network.

MACROECONOMIC IMPACTS

47. The economic impact of the tsunami include asset losses (direct damage), output losses (indirect damage), and fiscal costs (secondary effects). Preliminary estimates of total direct losses are approximately $1 billion (4.5 percent of GDP). Destruction of private assets in the affected districts was substantial (about $700 million). The fishing ($97 million) and tourism industries ($250 million) lost infrastructure and equipment, while the housing sector sustained damages close to $306-341 million.

48. While the impact of the tsunami on the nation's output and national economy is not as considerable as the extent of asset losses, in the areas that were hit, the tsunami devastated lives, social infrastructure, and economic foundations. Output losses resulting from the damage of assets and the disruption in economic activity in the affected sectors are estimated at $330 million during 2005 and 2006 (around 1.5 percent of GDP). In terms of employment, an estimated 200,000 people (or about 3 percent of the labor force) might have lost their jobs, including 100,000 in fisheries; 27,000 in tourism and tourism-related activities; and the rest in other informal sector activities. The tsunami is expected to slowdown GDP growth in 2005 by up to 1 percentage point (from 6 to 5 percent). The relatively limited impact is due to the fact that the most affected sectors of the economy – fishing, hotels and restaurants – together contribute only 3 percent to GDP. Other sectors that will also be negatively affected (but to a much lesser extent) include telecommunications and transport. The construction sector, on the other hand, is likely to partly mitigate losses in output of fishing and tourism and is expected to grow from an average of 5.5 percent in the recent past to 8 to 10 percent in the next three years.

Table 2: Selected Economic Indicators, 2002-2005

	Actual		**Estimate**	**Pre-Tsunami**	**Post-Tsunami**
	2002	2003	2004	2005	2005
Real GDP growth	4.0	5.9	5.2	6.0	5.0
Nominal GDP (LKR Bn.)	1,583	1,760	1,988	2,297	2,297
Fish production (tons)	302,890	284,960	300,000	300,000	200,000
Tourist arrivals	393,171	500,642	565,000	600,000	425,000
Construction sector growth	-0.8	5.5	5.0	6.0	9.0
Inflation	9.6	6.3	7.6	10.0-11.0	12.0

Source: Central Bank of Sri Lanka for historical data and staff projections.

49. It is important to note that although the sectors affected by the tsunami do not constitute a large portion of GDP, the affected provinces (South and North East) contribute about 17.5 percent of GDP while accounting for a large portion of the population (26 percent). Available poverty data for districts in the Southern province affected by the tsunami show that between one-quarter to one-third of the population in these districts live below the poverty line.[1] This implies that a substantial portion of the population in the affected provinces have low per capita incomes. The tsunami disaster has increased the vulnerability of this portion of the population, making a case for channeling resources to address the needs of these vulnerable groups. Although data on incidence of poverty in the North East were not available during the preparation of this assessment, it is widely thought to be higher than the national average.

50. Preliminary estimates of financing needs for reconstruction are estimated at around $1.5 billion (about 7 percent of GDP). Rebuilding activities will require a substantial increase in imports in the next two to three years, resulting in a widening of the trade balance. According to preliminary official estimates, relief and reconstruction needs will lead to an increase in merchandise imports in 2005 by around $700 million

[1] The per-capita GDP in the affected provinces is estimated at about $640, compared to a national average of $930 and about $1500 in the Western Province.

relative to original projections, while merchandise exports are expected to remain at pre-tsunami levels. Increased private transfers will contribute to financing increased imports. Services receipts will decline reflecting a drop in tourist arrivals in the order of 175,000 relative to original 2005 projections (600,000). Additional external financing requirements after the tsunami are estimated at $790 million in 2005, which could be provided in the form of new concessional loans, grants, and possibly debt relief. The receipt of large foreign inflows is expected to help mitigate the impact of the tsunami disaster on the external sector.

Table 3: Selected Balance of Payments Indicators ($ Millions), 2002-2005

	Actual		Estimate	Pre-Tsunami	Post-Tsunami
	2002	2003	2004	2005	2005
Exports	4,699	5,133	5,787	6,305	6,305
Imports	6,105	6,673	7,957	8.824	9,541
Trade balance	-1,406	-1,540	-2,170	-2,519	-3,236
Current account balance	-236	-76	-626	-824	-1,564
Capital account:					
Direct investment	186	201	178	261	261
Private long term	-21	-33	8	90	90
Government long term	162	449	327	470	470
Disbursements	542	808	655	873	873
Amortization	380	359	328	403	403
Financing gap	-	-	-	-	790
Overall balance	339	428	-212	97	182
Current account balance (in percent of GDP)	-1.4	-0.4	-3.2	-3.8	-7.1
Gross official reserves (end of period)	1,566	2,147	1,825	1,948	2,133
In months of imports	2.4	2.8	2.2	2.2	2.3
Oil price ($ per barrel)	25.0	28.9	37.7	40.5	40.5

Source: Central Bank of Sri Lanka and staff estimates.

51. Measures of the fiscal impact of the tsunami on public sector finances are highly tentative at this point, as they are still being worked out by the authorities. According to official estimates, the impact of the tsunami on revenues is expected to be marginal (0.3 percent of GDP). Revenues from the value added tax (VAT) and customs duty from the increased imports in 2005 are expected to compensate for most of the revenue shortfalls from tourism and fisheries. Additional tsunami-related expenditures are estimated at LKR 50 billion and to be funded by external concessional assistance. Of this amount, LKR 10 billion will be an additional recurrent cost and the rest will go to capital, resulting in the widening of the fiscal deficit from the budgeted 7.6 percent of GDP to 9.6 percent of GDP in 2005. Ultimately, the level of increased expenditures will depend on the ability of the Government to mobilize external resources and on the absorptive capacity of the public administration. Unlike asset and output losses, substantial fiscal costs for reconstruction will continue in the medium term.

Table 4:Fiscal Framework (As Percentage of GDP) 2002-2005

	Actual		Estimate	Budget	Post-Tsunami
	2002	2003	2004	2005	2005*
Total expenditures and net lending	25.4	23.7	23.7	24.8	26.4
Current expenditures	20.9	19.0	19.2	18.5	18.5
Subsidies and transfers	4.7	4.0	5.1	4.0	5.3
Capital expenditures and net lending	4.6	4.7	4.5	6.4	8.0
Total revenues	16.5	15.7	15.6	17.2	16.9
Budget deficit before grants	-8.9	8.0	-8.1	-7.6	-9.6

**Assumes debt moratorium of 50% on principal and 50% on interest.*

Source: Ministry of Finance estimates.

SECTOR BY SECTOR ANALYSIS

52. The following section describes the findings of the damage and needs assessment for each individual sector, with more detailed descriptions available in the attached annexes. It ends by summarized the damages from a regional perspective.

Education

53. **Damage – LKR 2.7 billion ($26 million).** The tsunami caused damage to a total of 168 public schools, 4 universities, and 18 vocational/industrial training centers. The major proportion of damage has been to primary and secondary schools, which account for over 90 percent of the number of institutions damaged and about 92 percent of the cost. Physical damage to schools and state-run universities and vocational/technical education training institutions includes school buildings, equipment, machinery and tools, furniture, books and other library resources, and consumable teaching learning material such as chemicals, and chalk and white-board pens. Relief camps were also set up in about 275 undamaged schools to provide temporary shelter for displaced individuals. Further, according to the Ministry of Education, around 91 destroyed or damaged schools are located too close to the seashore will be relocated to new locations further away from the coast. The total cost of the damage to the education capital stock, according to preliminary estimates, is approximately LKR 2.7 billion ($26 million).

54. **Recovery needs – LKR 4.7 billion ($45 million).** The most urgent need is to repair educational facilities wherever possible to enable students to commence their academic programs. All universities can be repaired immediately, as the extent of damage is fairly minor. In addition, undamaged schools which are currently not functioning, as they are being utilized as relief camps for displaced individuals, need to be cleared with classes recommencing as quickly as possible. Where reconstruction of other education institutions is likely to be delayed, either due to the extent of damage suffered or the need to relocate the school or training institution, alternative arrangements must be made to facilitate students' ability to attend other schools and training institutions. Where this is not possible, temporary shelters to conduct lessons should be provided. The cost of reconstructing and restoring damaged schools, universities, and vocational training and technical education institutions with quality upgrading, is estimated to be about LKR 4.7 billion ($45 million).

Health

55. **Damage – LKR 6.3 billion ($60 million).** Damage to the health system occurred in three primary areas: the loss of services, human resources, and damage to health-related infrastructure. Following the disaster, 92 local clinics, hospitals and drug stores were either destroyed or damaged, causing disruptions to delivery of health services and patient care. Several health sector personnel were killed by the tsunami, which created gaps in service provision following the disaster. Public health infrastructure losses include damaged hospitals, drug stores, cold rooms, preventive health care offices, health staff accommodation facilities, district health offices, vehicles (ambulances, lorries, vans, double cabs, motor bikes), and medical equipment (in hospitals, stores, clinics). The estimated cost of the damage to the health sector is approximately LKR 6.3 billion ($60 million).

56. **Recovery needs – LKR 8.8 billion ($84 million).** The immediate health need is to make basic health care services available to displaced people. Measures need to be taken to provide clean water into the relief camps and to health facilities. It is also essential to address the prevention of communicable diseases (especially vaccine preventable and vector borne diseases) among the affected people (including the displaced). The tsunami caused considerable trauma to those affected, and a holistic program addressing the psycho-social needs of the affected (including displaced) should be implemented to address these issues. In addition, existing non-damaged health institutions need to be equipped to provide expanded curative services. Temporary facilities that can provide care to additional patients must be established during the recovery period. In the medium term, it is necessary to reconstruct and re-equip the health institutions damaged due to the disaster. The estimated total cost of rehabilitating the health sector, including the provision of medical equipment and vehicles, is approximately LKR 8.8 billion ($84 million).

Housing

57. **Damage overview and recovery needs – LKR 46 to 51 billion ($437 million to $487 million).** The tsunami surge completely destroyed around 99,480 homes and partially damaged about 44,290. The completely and partially damaged houses together comprise 13 percent of the housing stock in the administrative divisions along the coast. The net replacement cost for housing is estimated between LKR 46 to 51 billion ($437 million to $487 million). These estimates do not include commercial properties. Since most of the affected housing stock was built over a long time period, its replacement value was depreciated by 30 percent to determine the damage estimate, which is in the order of LKR 32 to 36 billion ($306 million to $344 million).

58. **Reconstruction strategy.** Before beginning the reconstruction of homes, the Government must define and develop a clear reconstruction strategy able to be coordinated and monitored over multiple jurisdictions with varying institutional, human, and physical infrastructure capabilities. Previous experiences with post disaster reconstruction indicate that as far as possible *in-situ* reconstruction managed by affected

households (facilitated by NGOs) and assisted by combinations of cash grants and access to loans is the most feasible and sustainable option. However, it is apparent that in select locations, it will not be advisable to reconstruct affected housing *in situ* and people will need to be relocated. In such cases, the guiding principles will be to, as far as possible, keep affected communities intact while at the same time providing for individual families and or subsets of the community to opt out of such initiatives. As part of the recovery process, units of local government will be assisted to develop and mainstream consultative and inclusive recovery strategies including local area redevelopment plans. Assistance will also be required for the development and adoption of practical and enforceable building regulations. GOSL may also require assistance to facilitate construction materials and equipment supply chains.

Agriculture and Livestock

59. **Damage – LKR 304 million ($3 million).** The damage to the agriculture sector is mainly confined to the destruction to standing crops in paddy and other crop fields and home gardens along the entire coastal belt and the washing away of parts of cashew and betel cultivations along the eastern coast. Entry of sea water to productive fields has induced high levels of soil salinity. Consequently, farmers will be unable to grow crops in those soils for about 3-4 years until the salinity is naturally flushed away by seasonal monsoon rains. A total of about 2,308 hectares of paddy lands, 589 hectares of other field crops, 473 hectares of vegetable cultivation, and 201 hectares of fruit crop areas were completely destroyed. In addition, about 2,500 home gardens, mainly in the North East, were washed away. In terms of livestock, the overall damage is not significant at the national level, although many poor families have lost domestic animals, which served as a safety net against vulnerability to crop failures, provided supplementary incomes, and added health and nutritional benefits. About 63,000 birds, 6,500 cattle and 3,100 goats are reported to be killed. Agricultural infrastructure was also damaged, including a large number of public buildings. The total damage to the agriculture sector is estimated to be LKR 304 million ($3 million).

60. **Recovery needs – LKR 427 million ($4 million).** Immediate recovery programs covering the next 3-12 months should focus on helping affected families recover from their losses by ensuring that those dependent on crop husbandry and livestock-raising are included in any cash grant assistance programs. In addition, the affected population should be provided with micro-credit facilities through community-based revolving fund mechanisms to restart their livelihoods. The rehabilitation of damaged structures and agriculture/livestock service facilities should begin immediately, not only to reduce the potential adverse environmental impacts, but also to provide immediate employment opportunities in affected villages. The Agriculture Department should carry out testing of salinity-affected agricultural fields and take measures to provide technical guidance for a speedy recovery of those fields. Effort should be made to also repair the agriculture-related buildings and other public facilities damaged by the tsunami to enable a fast resumption of services to those who have been affected. The estimated recovery needs for agriculture and livestock sector is LKR 427 million ($4 million).

Livelihoods

61. **Damage (Assets and Materials).** The damage sustained to the livelihoods sector ranges from destroyed fishing boats to damaged informal guesthouses, through the loss of business inventories to the loss of simple tools and workshops. The most affected sub-sectors are fisheries and related small-scale food processing, as well as the informal sector. Businesses that are now in high demand (such as boat builders, carpenters, cement brick producers) have lost most, if not all of their tools, and face a clientele that has lost everything. Overall, an estimated 5,000 small businesses have been lost. Of the 2,800 unregistered hotels and guesthouses, about two-thirds were damaged. Job losses have subsequently been very high. The number of those who lost the means of supplementing their incomes by working in informal jobs is estimated at 40,000. The loss of employment in the fishing industry is around 100,000. An estimated 27,000 working in tourist and tourist-related services have lost their jobs, including those working in internet cafes and diving shops, driving taxis, and selling souvenirs. The future of at least 6,000 more jobs in tourist hotels is uncertain. Agriculture too has suffered, but in this sector job losses of 30,000 are likely to be temporary. Total job losses are estimated around 200,000.

62. **Recovery Needs – LKR 14.7 billion ($140 million).** In the medium and long term, micro-credit interventions will emphasize assistance to self-employed and small businesses to take advantage of new business opportunities and the adoption of modern, higher productivity technologies. This applies especially to the heavily affected fishery sector, but also affected micro-entrepreneurs, where large potential for efficiency increases exist. Micro-finance could also move towards offering insurance, especially life, crop and productive assets. And last, but not least and crucial to prevent the grant/subsidized loan scheme from eroding the financial viability of micro-finance institutions, a credible exit strategy – moving away from the highly subsidized and grant approach – will also have to be formulated and implemented.

Power

63. **Damage – LKR 1 billion ($10 million).** Despite the unprecedented loss of human life, it appears that the impact of the tsunami disaster on the power sector is rather limited and marginal. The damage is largely confined to the medium and low voltage distribution lines and transformers located in coastal areas, while other infrastructure (such as grid-substations, major transmission lines, and power plants) was not directly damaged by the tsunami. The number of households in the Ceylon Electricity Board (CEB) operating area to which electricity supply was interrupted is approximately 62,500 (about 2 percent of total CEB household customers) and more than 7,800 in Lanka Electricity Company Ltd. (LECO) operating area (more than 2 percent of total LECO household customers). About 48 km of medium voltage distribution lines (11kV and 33kV) and 405 km of low voltage distribution lines (below 400V) are destroyed and need to be replaced. About 70,000 sets of meters and service wires connected to households are also damaged, as the tidal wave washed away houses, distribution poles, and wires. A total of 88 sub-stations located in the distribution networks were also damaged. The

total cost of damage to the assets owned by the CEB and LECO, according to the preliminary estimate, is approximately LKR 1 billion ($10.0 million).

64. **Recovery Needs – LKR 7.0-8.1 billion ($67-77 million).** The most urgent need is to resume power supply to affected customers as soon as possible. The short term priority should be, therefore, placed on repair and rehabilitation of the existing damaged distribution lines and service connections, particularly in CEB operating areas. Expansion of the distribution network will be needed to supply power to new houses to be provided to tsunami-affected people. To address demand growth in the affected areas, medium voltage the distribution network and the transmission network will need to be strengthened and expanded. Total needs estimated by the team, based upon preliminary information from CEB and LECO, are between $67-77 million. The cost of medium to long term needs will vary depending on the increase of overall energy demand in the North East and Southern Provinces, including the affected areas.

Water Supply and Sanitation

65. **Damage – LKR 4.4 billion ($42 million).** In the water and sanitation sector, the tsunami disaster affected 14 districts in the Northern, Eastern and Southern Provinces, mostly in the areas where dependency on wells was high. A rough estimate shows at least 12,000 wells were damaged mainly by salt water intrusion and approximately 50,000 were abandoned. The physical damage to the existing water supply schemes by the tsunami is principally restricted to the distribution network along the shoreline. Nine pipe systems were damaged and then immediately repaired by the National Water Supply and Drainage Board (NWSDB). Damage to sanitation facilities includes individual household latrines and the sewerage pump house at Mt. Lavinia, which is part of the Colombo sewerage system. Along with infrastructure, water supply-related equipment was also damaged that needs replacement. The total damage is estimated to be LKR 4.4 billion ($42 million).

66. **Recovery Needs – LKR 12.2 billion ($117 million).** The needs may be categorized into two main phases; immediate restoration of services, and in the longer term, a focus on service expansion for the replacement of damaged wells, as water demand grows. Damaged wells need to be cleaned, repaired, or reconstructed, while water quality needs to be systematically tested over a reasonable period. Sanitation facilities need to be provided in areas where communities are beginning to return to their homes. There is also a need for rehabilitation of damaged water distribution networks. In addition, the physical rehabilitation works need to be complemented by hygiene education programs, particularly in relief camps. Due to prior damage to the water delivery system by the civil conflict, along with the lack of adequate water resources, most of the tsunami-affected areas suffered from water shortages even before the tsunami. Over the medium to longer term, these areas need to receive expanded water supply services based on the demand forecast. The estimated total cost for both phases is LKR 12.2 billion ($117 million).

Transportation – Railways

67. **Damage – LKR 1.5 billion ($15 million).** The tsunami caused damage to the Southern rail corridor estimated at LKR 1.5 billion. This is the most important rail corridor in Sri Lanka carrying 78,000 passengers (mostly commuters) per day and freight from the Port of Galle. In this 160 km long corridor, the dual track portion between Maradana in Colombo and Kalutara, suffered minor damage that was quickly repaired. Beyond Kalutara (on the single track section) an approximately 20 km length has suffered severe damage to embankments, track work, bridges and culverts, signaling and communication systems, buildings and rolling stock. Repair commenced on December 27, 2004 and is on-going; however, services remain suspended beyond Kalutara. Full resumption of service is not anticipated until May 2005, with partial services possibly resuming at the end of February. The damaged rolling stock will remain out of service for some time, as it cannot be returned to the Colombo workshops for repairs until partial services are restored. The Northeastern and Eastern Rail Corridors suffered only minor damage that was quickly repaired. Rail service on these corridors resumed on January 10, 2005. However, severe speed restrictions continue to apply on a number of sections.

68. **Recovery Needs – LKR 13.6 billion ($130 million).** Short term needs in the Southern rail corridor consist of permanent repair to the damaged section, replacement of equipment and rolling stock and restoration of services to pre-tsunami levels. This includes track bed, rail and sleepers; bridges and culverts; railway stations and substations; railway employees quarters, other buildings; communications and signaling systems; locomotives; power sets (multiple units); passenger coaches; and construction equipment. The Sri Lankan Railway has proposed that the entire 160 kms of the Southern Rail Corridor be reconstructed and rehabilitated in the medium term. As such, medium term needs include track and sleeper replacement; bridge replacement or rehabilitation; signaling and communication system repair and upgrading, improvements to buildings, and procurement of additional rolling stock and equipment. In the North Eastern and Eastern rail corridors, short term needs include the laying of wooden sleepers over sections totaling 200 kms in length. The medium term alternative to this is to reballast, lay concrete sleepers and continuously weld the existing rail. This intervention would considerably improve operating speeds and safety and reduce maintenance. Longer term needs have also been identified to extend the Southern Rail Corridor to Kataragama (110 km) and to twin track the 72 km long single track section. In addition a new 120 km long double track electrified railway has been proposed between Colombo and Matara to be constructed alongside the Southern Expressway Road Corridor. The estimated cost of the medium term needs is LDK 13.6 billion (130 million).

Transportation – Roads

69. **Damage – LKR 6.3 billion ($60 million).** The tsunami-damaged sections of the national road network (Classes A and B) totals approximately 690 kms in length, in addition to approximately 700 kms of provincial roads (Classes C, D, and E), and approximately 1,100 km of local government roads have been damaged. The damaged sections represent 5 percent of the national road network and about 2 percent of the

provincial and local government road networks. Bridges and culverts were displaced and embankments eroded by the advancing and retreating tsunami. The main damage occurred to roads that were already in a greatly deteriorated state due to lack of maintenance and damage during the conflict period. Further, on the east coast, flooding before and after the tsunami caused damage to coastal roads. Therefore, it is not possible to separate out the value of road damage due to the different sources—i.e., conflict, flooding, and the tsunami. The damage is estimated at LKR 6.3 billion ($60 million) which corresponds to 30 percent of the estimated short and medium term financing needs.

70. **Recovery needs – LKR 21 billion ($200.2 million).** In the short term, temporary repairs are being undertaken to restore the affected roads to a passable condition. This includes temporary filling of embankments, culvert replacement and the erection of temporary Bailey bridges. Roads in the Southern Coastal Corridor have already been temporarily repaired and are now passable. Temporary repairs to roads are also proceeding on the east coast with the objective of opening all roads to a passable condition by the end of January 2005. It is intended that the temporary repairs will, in the short term, be consolidated by permanent repairs to embankments, drainage systems (including flood protection measures), and that the temporary bridges and bypasses would be replaced by permanent bridges. In the medium term, there is a need to bring the tsunami-affected national roads to a maintainable and uniform standard, including embankment and carriageway widening, repairing, pavements, drainage improvements, flood protection measures, culvert and bridge rehabilitations or replacements. In order to reap the economic, commercial and social benefits of rehabilitating the coastal A and B class roads, it is also necessary to rehabilitate connecting provincial and local government roads. Long term needs have been identified for coastal national roads to widen and realign sections to reflect future development planning.

Fisheries

71. **Damage – LKR 10.1 billion ($97 million).** Sea fishing has been the most severely hit sector, industry, and livelihood as a result of the tsunami. About 27,000 fishermen and their family members died, with the largest number (approximately about 20,000 – source LTTE) in the North and East. In addition, about 90,000 fishermen's families have been displaced due to the loss of housing and other household assets. Of the country's boat fleet (about 29,700), around 65 percent has either been fully destroyed or damaged to varying degrees, including 594 multi-day boats, 7,996 motorized day boats and about 10,520 traditional non-motorized boats. Fishing implements such as outboard motors, ice storages, fishing gear and nets also have been destroyed. Most of the damaged boats have been washed ashore by powerful sea tides and remain scattered on adjoining coastal lands, which will incur additional costs to the boat owners. Eleven large fishing harbors have been destroyed or damaged to varying degrees. Several marine structures, service facilities, and equipment in harbors have been also damaged beyond repair. The total damage to the sector, excluding the damage to housing and personnel assets of the victims (included in the housing sector assessment), is LKR 10.1 million ($97 million).

72. **Recovery Needs – LKR 12.4 billion ($118 million).** In the short term, there is a need to make a coordinated national effort to bring the industry back to operation as soon as possible. Commencement of the rebuilding and renovating of urgently needed infrastructure facilities is absolutely essential. There is also a need to focus on helping the affected families to recover from their losses by ensuring that those who depended on sea fishing are included in cash grant assistance programs. Affected fishermen and their families should be provided with micro-credit facilities through community–based revolving fund mechanisms to restart their livelihoods. These needs have been estimated at LKR 12.4 billion ($118 million).

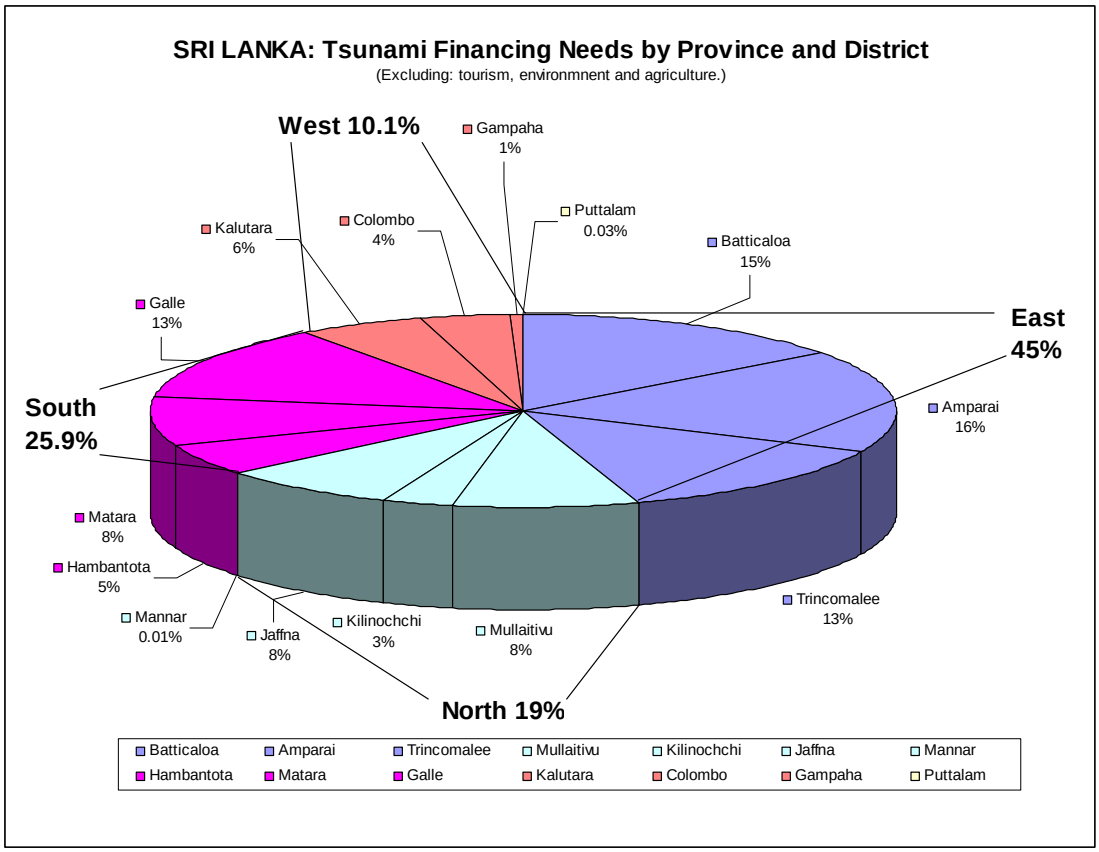
Tourism

73. **Damage – LKR 26.2 billion ($250 million).** In Sri Lanka, the tourism sector accounts for about 2 percent of GDP, generates direct employment for about 50,000 and indirect employment for an additional 65,000, and over $350 million in foreign exchange earnings. The tourism sector began to pick up following the cease-fire and peace negotiations in 2002, reaching a historical record of 565,000 arrivals in 2004. The tsunami caused extensive damage to this sector, with about $200 million in damages to hotel rooms and $50 million in tourism-related assets (souvenir shops, vehicles). About 3,500 hotel rooms out of the total 14,000 rooms in medium to large scale hotels are currently not in operation. In the small guest houses about 1,200 rooms out of a total of 4,000 rooms have been affected. Tourist arrivals were poised to reach 600,000 in 2005, but have subsequently been revised downwards to 425,000. Preliminary estimates of the resultant output loss in 2005 and 2006 for the sector stands at $131 million. Minimal disruption to the tourism sector is expected beyond 2006.

Damages and Needs by Region

74. The two charts below provide a regional breakdown of the estimated post-tsunami financing needs in Sri Lanka. This first does not include the tourism sector[2], since it is likely to get financing from the private banking and insurance sectors, and therefore, is not considered aid dependent. The second provides the full picture of required financing from all sources. The East is the most heavily affected area, accounting for well over 40% of the financing needs. The Galle District is also very heavily impacted, and close to 30% of the financing needs under either definition are in the Southern Province. Similarly, the North has about 20% of the damage. A detailed breakdown by region and district of the estimated financing needs, including all sectors, is provided in Table 5.

[2] Environment and agriculture needs are also not included, due to unavailability of district-specific data. Total financing needs for environment and agriculture are approximately 1.7 percent of all needs.


SRI LANKA: Tsunami Financing Needs by Province and District
(Excluding: tourism, environmnent and agriculture.)
West 10.1%
Gampaha 1%
Puttalam 0.03%
Colombo 4%
Kalutara 6%
Batticaloa 15%
Galle 13%
East 45%
South 25.9%
Amparai 16%
Matara 8%
Hambantota 5%
Trincomalee 13%
Mannar 0.01%
Jaffna 8%
Kilinochchi 3%
Mullaitivu 8%
North 19%
Batticaloa Amparai Trincomalee Mullaitivu Kilinochchi Jaffna Mannar
Hambantota Matara Galle Kalutara Colombo Gampaha Puttalam

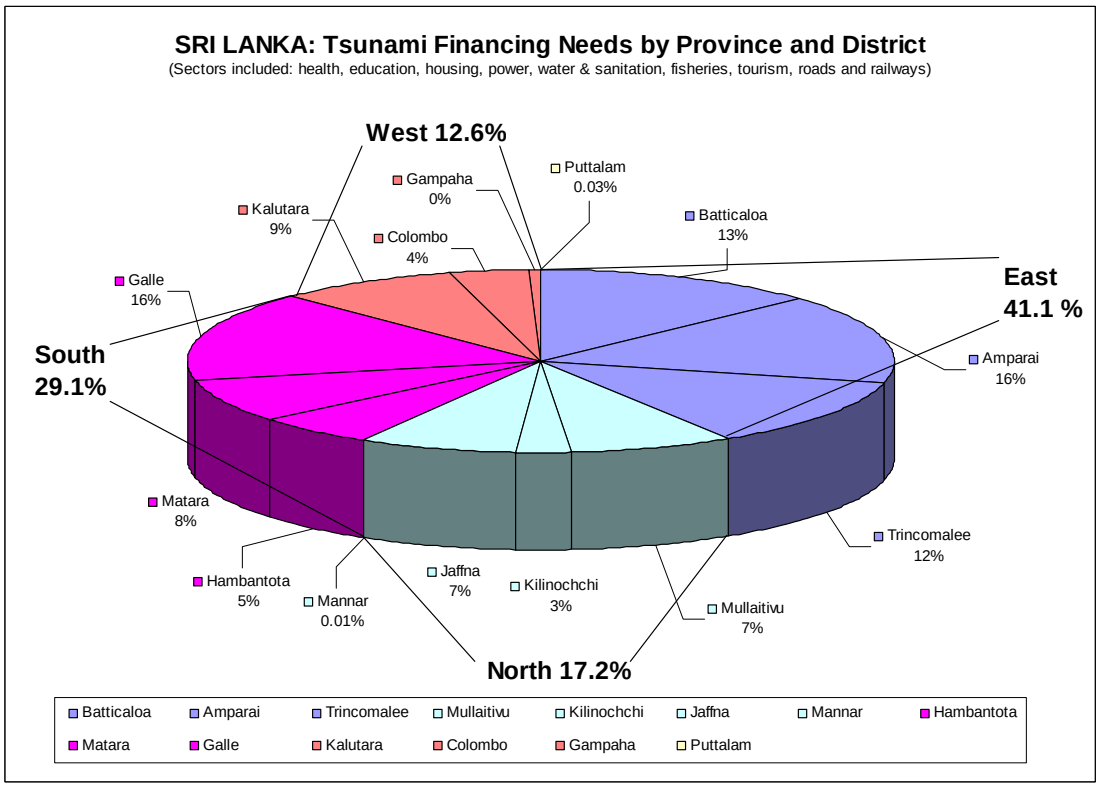

SRI LANKA: Tsunami Financing Needs by Province and District
(Sectors included: health, education, housing, power, water & sanitation, fisheries, tourism, roads and railways)
West 12.6%
Puttalam 0.03%
Gampaha 0%
Kalutara 9%
Batticaloa 13%
Colombo 4%
Galle 16%
East 41.1 %
South 29.1%
Amparai 16%
Matara 8%
Trincomalee 12%
Hambantota 5%
Jaffna 7%
Kilinochchi 3%
Mannar 0.01%
Mullaitivu 7%
North 17.2%
Batticaloa Amparai Trincomalee Mullaitivu Kilinochchi Jaffna Mannar Hambantota
Matara Galle Kalutara Colombo Gampaha Puttalam

Table 5: Tsunami Financing Needs by Province, District and Sector

($ Millions)

Province/ District	Education	Health	Housing*	Power *	Water & Sanitation**	Fisheries ***	Tourism ****	Roads	Railways	Total	% of total	Province/ District
North East	**30.2**	**56.2**	**317.6**	**27.6**	**87.6**	**62.6**	**7.2**	**132.3**	**53.1**	**774.4**	**58.3**	**North East**
Batticaloa	7.85	17.84	66.78	7.77	18.3	8.23	0	30.76	17.4	174.93	13.2	Batticaloa
Amparai	13.38	16.63	101.2	15.14	32.67	6.85	1.6	22.27	0	209.74	15.8	Amparai
Trincomalee	5.46	14.89	35.82	3.55	9.07	19.77	5.6	31.82	35.7	161.68	12.2	Trincomalee
Mullaitivu	1.37	6.49	46.33	0	11.24	13.99	0	19.09	0	98.51	7.4	Mullaitivu
Kilinochchi	0	0.09	18.21	0	3.62	1.01	0	11.93	0	34.86	2.6	Kilinochchi
Jaffna	2.11	0.24	49.25	1.14	12.74	12.6	0	16.44	0	94.52	7.1	Jaffna
Mannar	0	0	0	0	0	0.13	0	0	0	0.13	0.0	Mannar
South	**12.3**	**31.1**	**75.9**	**37.6**	**18.0**	**42.8**	**76.6**	**46.9**	**46.1**	**387.3**	**29.1**	**South**
Hambantota	1.27	0.32	10.13	11.39	2.83	10.73	11.2	25.19	0	73.06	5.5	Hambantota
Matara	3.76	3.24	36.44	5.83	8.66	15.92	8	11.14	10.5	103.49	7.8	Matara
Galle	7.25	27.52	29.32	20.37	6.53	16.14	57.4	10.61	35.6	210.74	15.9	Galle
West	**2.5**	**0.7**	**42.9**	**1.6**	**8.3**	**12.5**	**46.3**	**21.7**	**30.8**	**167.3**	**12.6**	**West**
Kalutara	1.71	0.4	16.34	0.94	3.32	8.73	46.3	18.56	17.3	113.6	8.5	Kalutara
Colombo	0	0.32	25.1	0.6	4.6	0.32	0	3.18	13.5	47.58	3.6	Colombo
Gampaha	0.76	0	1.49	0.03	0.38	3.41	0	0	0	6.07	0.5	Gampaha
North West	**0**	**0**	**0.14**	**0**	**0.03**	**0.18**	**0**	**0**	**0**	**0.35**	**0.03**	**North West**
Puttalam	0	0	0.14	0	0.03	0.18	0	0	0	0.35	0.03	Puttalam
Provinces Total	**45**	**88**	**437**	**67**	**114**	**118**	**130**	**201**	**130**	**1,329.3**	**100.0**	**Provinces Total**

NOTE: Does not include environment and agriculture needs due to unavailability of district specific data. Total needs for environment is US$18 million and for agriculture US$4 million.

* Low estimate

** Total damage cost, including indirect loss

*** Including boats, fisheries harbors and buildings

**** Including large hotels, guest houses, small hotels and hotel related assets such as souvenir shops, vehicles, etc.

F. IMMEDIATE AND MEDIUM TERM RECOVERY STRATEGY

Implementation Approach

75. One of the main challenges of developing a comprehensive, as well as efficient recovery strategy is to translate the guiding principles such as conflict sensitivity, principle of subsidiarity, community empowerment, communication and transparency, coordinated approach and others into operational reality. The aim should be to ensure a balance between the North East and the South, have the locus of implementation at the district level where ever possible, strengthen local community mechanisms through public works, rely on the home owner driven approach and cash grants wherever possible to empower individual households, introduce accountability and monitoring systems, and initiate trust fund mechanisms to ensure coordination amongst donors.

76. Given that Sri Lanka is tentatively emerging from a two decade old civil conflict, it would be important to implement tsunami related reconstruction efforts in such a manner that reinforces the peace process or at least does not weaken it. A key element here would be to ensure a regional and ethnic balance in the allocation of resources between the North East and South. Mechanisms will have to be established to facilitate the equitable re-development of all areas without disturbing the cease-fire.

77. Five steps are envisaged to initiate this process of operationalization, *i.e.*, a vigorous process of public consultation, a communications program defined in consultation with international development partners and stakeholders, the establishment of an arbitration and mediation service, and the development of district based reconstruction plans for the affected areas.

(i) The public consultations should include different line agencies within the Government, the legislature, the LTTE, political parties, local authorities, civil society, the private sector, international NGOs and the general public to reach consensus on implementation modalities. This process would help identify possible areas of contention and attempt to secure a compromise where possible, not to mention ensure acceptance of the guiding principles.

(ii) A two-way communications program relying on the internet, print and electronic media, and a dedicated reconstruction newsletter would reinforce accountability and monitoring. Monthly beneficiary surveys could be built into the program to facilitate community monitoring of ongoing reconstruction efforts at the village level. By targeting different audiences from national to local, it would in addition ensure appropriate feedback from the regions and help build a national consensus through the recovery program.

(iii) Mediation and arbitration structures would be used to address reconstruction-related disputes and flag possible bottlenecks that need to be addressed at a higher policy level.

(iv) District reconstruction plans should be used to guide a balanced allocation of resources between different parts of the country. This could well be the mechanism to match resources with needs. Such plans would be compiled in close cooperation with district authorities, municipal and provincial structures, and other stakeholders, moving beyond a narrow technical assessment to include social development, livelihood, gender, environment, governance and conflict dimensions.

(v) The international development community would work in close consultation with the Government and other stakeholders to design appropriate funding mechanisms to ensure the coordinated allocation of international development assistance for the reconstruction process. Possible trust fund mechanisms should be anchored within a national framework for recovery where the use of private and NGO resources would be synchronized.

Overview of Financing Needs

78. The assessment team proposes that a phased recovery strategy be employed in order to prioritize and execute activities. Phase one refers to immediate recovery assistance (about 12 months) to address urgent activities. This phase has already begun in many places. Phase two shifts into medium to longer term recovery assistance (up to 3 years) for other works and major mitigation efforts. This recovery strategy must take into account and complement other post-tsunami recovery plans currently under discussion, as well as efforts of Sri Lanka's development partners.

G. LONG TERM HAZARD RISK REDUCTION ISSUES

79. Prior to the tsunami disaster, the risks from natural hazards to Sri Lanka were considered low. Sri Lanka experiences mostly weather-related hazards, resulting in localized and seasonal floods, landslides, cyclones and droughts. Monsoon-associated landslides also occur in the districts of Badulla, Nuwara Eliya, Ratnapura, Kegalle, Kalutara, Kandy, and Matale.

80. In Sri Lanka, vulnerability to hazards is related to physical, environmental and legal-institutional weaknesses. Land use patterns, human settlement developments and construction practices that are not sensitive to weather related hazards are the most significant contributors to creating unsafe conditions. Recurrent patterns include encroachments into flood plains and substandard construction on unstable slopes. Land use practices that do not respect natural resource protection, as well as environmental factors (such as depletion of forests and mangroves, coastal erosion, siltation, and inadequate water and water-shed management) may further exacerbate the impacts of natural hazards. It is anticipated that changes in demography and climate, and the continuation of unsound environmental practices and development patterns may increase frequency and losses from disasters.

81. Recognizing the challenges exposed by the recent tsunami, Sri Lanka should develop a risk management approach, based on the principles that:

- The post-tsunami reconstruction program, and in general, all development programs, should be guided by multi hazard risk considerations;
- Improved institutional capacities are required for improved management of emergency response, particularly at the local level;
- The interest expressed by the international community to support an advanced early warning system in the region should be seized, as it provides an opportunity for better forecasting and early warning of disasters to save lives and livelihoods.
- Risk transfer mechanisms should be considered to mitigate the financial impact of disasters on the economy and future development activities.

Risk Identification

82. **Multi-hazard risk assessment.** A nationwide, multi-hazard risk mapping from existing data and further local assessments could inform reconstruction planning and help set future risk reduction priorities. Local risk mapping involving local stakeholders can enhance awareness of risks and inform district preparedness plans. In addition, as many disasters in Sri Lanka are weather related, environmental factors should also be a part of risk assessment.

Emergency Preparedness

83. **Early warning systems (EWS).** The interest expressed by the international community to support an advanced Indian Ocean Tsunami Early Warning System provides an opportunity for better forecasting and early warning of disaster to save lives and livelihoods. There is a need to strengthen and integrate within the proposed regional system the national systems that already exist to monitor regular hazards needs.

84. **Emergency information and communication systems.** Bringing the right information to the public and authorities is crucial to mounting a swift emergency response operation in order to save lives and property. The technical improvement of the EWS needs to be backed up by an information dissemination system that provides timely, accurate and coordinated information flow to emergency management agencies, press, local administration and the public.

85. **Decentralized emergency preparedness.** Communities and the local level administration have always been the front line responders to localized disasters in Sri Lanka, and the tsunami despite its scale was no exception. The enhancement of emergency response capacity of these local actors for future would therefore require preparedness planning primarily at these levels. Community based disaster preparedness plans and actions in high disaster risk areas would be the most effective way of improving public resilience and rapid action in disasters. Community-based disaster preparedness plans and actions in high risk locations would be the most effective way of improving public resilience and response to disasters.

Investment in Risk Reduction

86. **Reducing risks in post-tsunami reconstruction.** Post-tsunami reconstruction is a major investment in rebuilding the country. The opportunity to protect this investment from future disasters Sri Lanka may face should not be missed. Lessons combined fro m the tsunami and findings from the rapid multi hazard risk assessment should be fed into reconstruction planning and future risks reduced through improved building standards and design considerations.

87. **Protection of public infrastructure.** Medical and educational facilities built in high risk areas should incorporate improved standards to reduce their risks to hazard impacts. Educational buildings rebuilt after the tsunami should also be located in safe locations and use design specifications to double as cyclone and tsunami evacuation centers for the affected population, particularly in low lying cyclone areas.

88. **Legislations and standards for future safety.** A significant number of ordinances, acts and laws exist in Sri Lanka that relate to land use planning, human settlements, development and conservation of natural resources. Review of existing legislations and standards from a risk reduction perspective, simplification of procedures for their implementation and clarification of institutional arrangements for their enforcement should go hand in hand with reconstruction efforts.

89. **Local risk management strategies.** As hazards in Sri Lanka are very localized, risk reduction measures should be carefully tailored to local areas rather than imposed in a blanket fashion.

Institutional Capacity Building

90. **Disaster Management Authority and a system for coordination.** The lessons and experiences of the tsunami relief and recovery coordination should be distilled in developing an appropriate disaster management mechanism and an authority that reflects the risks faced by Sri Lanka. A National Disaster Management Plan would clarify roles, responsibilities and streamline coordination across administrative levels and various stakeholders. An emergency relief fund could support the plan for the speed of action during emergencies.

91. **Education and training.** Training and exercising of disaster management plans help to maintain a well functioning system to respond and should involve national, provincial and municipal staff, NGOs and the public. Both the public and the authorities will need to understand the basic principles if disaster risk reduction is to take root in the country. Professional education, short training courses, and primary and secondary school books should create awareness and knowledge of hazard risk reduction. National and local authorities should be routinely trained in emergency management as part of their civil servant training and networked to share their experiences.

92. **Creating a culture of safety through awareness-raising.** While public awareness of disaster risks is high due to the tsunami, in general there is limited public understanding of the local risks, or the actions that can be taken to reduce their impact. A major public awareness campaign on various hazards should start while the memory of the tsunami is still recent.

93. **Knowledge sharing.** International exchange of best practices and knowledge sharing among practitioners, authorities and NGOs, particularly from the region, can significantly contribute to capacity building at all levels.

Mechanisms for Risk Transfer and Financing

94. To ensure that both the local people and the national economy can recover quickly following a disaster, it is important to consider the benefits of risk transfer and financing mechanisms. In Sri Lanka, larger businesses in tourism and industry are insured, middle class families have some insurance policies covering certain assets such as cars; however, insurance penetration is inconsistent and individual housing and livelihood insurance against losses caused by natural disasters is not widespread.

ANNEX I - SOCIAL IMPACT

A. INTRODUCTION

1. This annex addresses the social impact of the tsunami disaster and the recovery needs of the affected population. These social dimensions have an important bearing on reconstruction in specific sectors, which are covered in more detail the sectoral annexes. This annex gives an overall presentation, differentiating between the immediate impacts and the more longer term impacts and concerns.

B. DAMAGE OVERVIEW

2. The social fabric of the tsunami-hit areas has been seriously affected by the number of human deaths (over 31,000 people in 13 district of 5 provinces) and injuries (exceeding 15,000), thousands missing and over 440,000 displaced. The main victims were already vulnerable groups, such as poor fishermen living close to the shore in simple houses and shelters. The share of women and children victims seems to be disproportionately high, probably because a higher proportion of women and girls were caught unaware in the houses on the Sunday morning when the tsunami struck. The very high death toll in relation to both number of injured and to material damage will have long-term consequences on the well-being of other family members, particularly widows, single-parent children, orphans, and the elderly.

3. ***The North East.*** Apart from the coastal communities already being comparatively poor in the Sri Lankan context, the tsunami has also in other ways compounded already existing vulnerabilities. The North East is the region worst affected by the tsunami. The percentage of the coastal population affected ranges from an estimated 35 percent in Kilinochi to 80 percent in Mullativu and 78 percent in Amparai compared to the southern districts of Galle, Matara and Hambantota with less than 20 percent of the coastal population affected, albeit with scattered pockets of severe damage.

4. Twenty years of civil conflict has caused disruption of social structures, high levels of vulnerability, wide-spread displacements of persons belonging to all ethnic groups and the destruction of infrastructure and housing. Its replacement and rehabilitation was already underway prior to the tsunami, and is essential for economic life to resume and livelihoods to be re-established. Around 58 percent of the total housing stock needed rebuilding or construction. The unemployment rate is estimated to be more than double the national average. The tsunami caused further losses of lives, destruction of livelihoods and much of the remaining physical infrastructure and means of production have been damaged or destroyed.

5. The conflict has created deep fractures in the social fabric and ethnic tensions have been accentuated. Women and children have particularly suffered from the break-up of social structures and the abusive comportments induced by war. The school drop-out rate is four times the national average, and twice as many infants are underweight as in the rest of the country. Around 180,000 (start of 2002) Internally Displaced People (IDPs), residing in and outside the North East, with more than 40,000 families residing in welfare centers and others with relatives

and friends. As of yet, there are no clear indication of the tsunamis impact on the existing IDPs in the North East, nor on the separate ethnic communities.

6. ***Orphans.*** According to UNICEF (January 13, 2005) based on information from 364 camps, about 900 children are left without parents. Of these, 44 are unaccompanied children (i.e., without parents and residing in an institution or with non-family care givers), and 858 children are residing with relatives but without parents. More than 3,000 children have lost one parent. When a social assessment of all affected households has been conducted, these figures can be expected to increase substantially. Orphans constitute a group which will require special protection immediately and continuing in the medium and long term. In the North East pre-tsunami, there were already at least 2,500 children in 41 registered children's homes, and the exact number in over 50 non-registered institutional care facilities is not available. As of yet, there is no information available on whether any of these children's homes have been affected by the tsunami.

7. Priority must be given to family reunification in the case of separated children and for orphans culturally-sensitive interim and alternative care options sensitive need to be provided. Unnecessary institutionalization of children must be avoided. Psycho-social support and legal protection may also be required, and needs to be provided through local capacities. Awareness raising and training on child rights and child protection should be carried out targeting all concerned actors. Special attention should be paid to children's inheritance right to land and property, and administration hereof by legal guardian until the child reaches maturity.

8. ***Single-headed households.*** Widows and single-headed households present a particular vulnerability as they have to deal with their psycho-social distress as well as caring for children on their own. The loss of a mother has particularly negative physical and psychological impact on small children and infants, while the loss of the male head of family constitutes a serious blow to the economic livelihood of the household, significantly reducing its coping ability. Female-headed households are as a result of the twenty years of civil conflict more common in the North East than in the rest of the country. The many orphans, widows, single-headed households, old and disabled are especially vulnerable groups in terms of psycho-social distress, restoration of livelihood, and the legal and protection rights – on such issues as property and inheritance rights, and custody of children – will need to be addressed.

9. ***Shelter.*** During the first days of the disaster, it was reported that approximately 193,000 housing units were fully or partially damaged and around 160,000 families were displaced by the tsunami. They sought refuge with families and friends or in the approximately 800 welfare centers established in religious and public places and schools over the following days. Considering the scale of the disaster, relatively few families remain in the welfare centers. Affected families have benefited from the traditionally strong family ties and social networks to find host families willing to provide them shelter. While this provides better protection for females and other vulnerable household members, it can only be a temporary solution unless formalized and backed up by regular compensation to the host family. Some three weeks after the disaster, many people have started moving out of the temporary shelters. Some have started repairing their damaged houses or are beginning to erect temporary shelter near their ruined the houses.

10. Families who are likely to remain in camps for an extended period need to be identified, their needs assessed and responsibilities for their continued support clearly assigned. Welfare camps currently occupying school buildings and other public buildings will need to be relocated to allow for the resumption of public services. The relocation should facilitate people's resumption of pre-tsunami daily routines, and reintegration into their home communities.

11. Several reports suggest a lack of security for women and children in camps, referring to cases of sexual harassment, rape, violence and kidnapping of children. It is not possible to establish the number of actual incidents, as there exists a strong social/cultural reluctance to address these issues. Local women's groups stress the urgency of the issue, and confirm that it is seriously under-reported. International experience also shows that protection of women and children is frequently violated under disaster and conflict conditions. Reports from camps further indicated that lack of privacy for women and girls in connection with washing and changing clothes, breast feeding children and shortage of sanitation facilities adds to the exposure of the displaced women and girls. In certain camps, recognition of these security problems have led to arrangements to keep women and men separate (which has the drawback that it splits families), but the level of domestic violence reportedly has also gone up in the aftermath of the disaster. Pregnant women in the camps lack sufficient access to reproductive health care in view of the potential effects which the psychological and physical strains will put on their maternal health. There is also a need to raise awareness in camps of the risks of sexually transmitted diseases, such as HIV/AIDS.

12. ***Legal aspects*.** An unspecified number of affected people had been living in squatter houses or other forms of informal settlements, which may complicate inclusion in housing recovery schemes. The situation is particularly pronounced in the North East where a substantial proportion of the population lives on unauthorized land. Furthermore, the tsunami has in many cases resulted in owners' loss of property documents, which together with the simultaneous destruction of the Land Registry Office could pose problems in recognition of property rights, not least in cases of transfer of rights to legal heirs. With the large-scale destruction of housing, the physical demarcation of individual land plots may also have been lost in many cases.

13. Restoring lost records of property rights to housing, commercial property, and lands should be launched as soon as possible, with special assistance given to the poor, squatters and widows and orphans in demonstrating legitimate property rights. To deal with the issue of protection of land and inheritance rights as well as land dispute resolution, it is recommended that a multi-disciplinary Land Task Force be established in each district for a limited period of time in order to facilitate and speed up recovery work (as is the case in the North East Housing Reconstruction Program; NEHRP).

14. Two World Bank operational directives (Indigenous Peoples, OD 4.20 and Involuntary Resettlement, PO 4.12) may have direct relevance to the future rehabilitation program. Indigenous people live in several districts, but they are located in interior areas rather than in the coastal regions. However, as of yet, there is no decisive information as to the impact of the tsunami on these groups. If the Social Assessment indicates that any of these communities will be included in the recovery efforts, specific consultations will be undertaken with them. Based

on the consultation report, the program would decide what specific modalities to implement vis-à-vis these communities and would prepare a brief written plan describing the consultative steps taken, the action agreed upon and the supporting arguments.

15. A more pertinent point will be to ensure that planned recovery program will ensure maintenance of equity in access to recovery efforts and assistance among disaster-affected people, irrespective of ethnic, regional or religious affiliation. This should be closely monitored during the implementation process through consultations with the affected communities and through a well-designed communication strategy and district-level grievance redressal mechanism (reflecting both female and minority group inclusion).

16. ***Involuntary resettlement.*** Relocation of households and whole communities may take place where specific, severely affected locations are declared by authorities as too high-risk to allow further settlement. A measure of voluntary resettlement may also be expected, where affected people have either been squatting or tenants in damaged/destroyed houses.

17. Apart from these situations, relocation should be avoided where possible, and assistance should, to the extent possible, be given to enable people to rebuild their homes to better standards in their old location. This would minimize the need for new land acquisition, which may hardship for those affected by losing land or livelihood opportunities. If land acquisition or displacement of people for new housing or infrastructure is unavoidable, a social assessment process involving all stakeholders should be undertaken. Whether there will be involuntary resettlement (OP 4.12) under the planned recovery operation depends upon the decision of the government regarding future settlement policies in the coastal belt. In 2001, Sri Lanka introduced a National Involuntary Resettlement Policy which will constitute the framework for any land acquisition and resettlement and compensation plan.

18. The approach recommended could be summarized in the following principles:

- To the extent possible, relocation should be avoided. Decisions about relocation should be taken only after full consultation with all affected people, and full disclosure of information and entitlements.
- Where temporary relocation is unavoidable, for example in urban areas, such shelters should be built on government land wherever possible.
- If permanent housing is to be constructed in new areas to improve housing standard and safety, the principle of self-relocation should be followed. The affected population should be given financial and technical support to choose locations and housing based on their own preferences.
- If acquisition of private property is unavoidable, the Government should assist in purchasing the necessary land through the principle of willing seller – willing buyer, rather than to land acquisition under law.
- If land acquisition is unavoidable, the affected people are entitled to full compensation and assistance in regaining livelihoods, as described above. In such cases, an agency experienced in planning and implemented resettlement action plans should be contracted to ensure proper consultation, compensation, and relocation assistance to those displaced by secondary land acquisition.

- In case of land acquisition and resettlement, special efforts should be put in place to ensure equal consultation (and documentation hereof) with the female members of the affected communities and of local religious or ethnic minority groups to ensure equity in interventions.

C. RECONSTRUCTION AND RECOVERY NEEDS

19. **Short term requirements.** Efforts to address immediate needs should be prepared with extensive community input to determine solutions to shelter, possible relocations and reconstruction of housing and recovery of livelihoods and assets.

- **Protection of vulnerable groups.** Immediate initiatives should be taken to improve the physical security of women and children in the temporary camps and shelters. In case of separated children, family reunification efforts have highest priority and for orphans, culturally-sensitive interim and alternative care options need to be provided. Psycho-social support and legal protection should be provided through local capacities. Awareness raising and training on child rights and child protection should be carried out targeting all concerned actors.
- **Restoration of livelihoods.** As employment and income are urgent needs of the affected people, employment opportunities need to be provided. Efforts to utilize local resources and employ local people in the rebuilding activities, including public works programs related to local recovery activities, should to the extent feasible provide local employment opportunities to the most needy. Careful targeting of the most vulnerable groups should be undertaken.
- **Provision of shelter.** Provision of temporary shelter for displaced people need to be addressed urgently through a flexible approach: (i) ***formalizing stay with host families,*** backed up by regular compensation to the host family; (ii) ***extended stay in welfare camps,*** relocated to facilitate people's resumption of pre-tsunami daily routines, and reintegration into their home communities. Proper protection of women and children should be in place in the camps; and (iii) ***individual construction temporary shelter.*** Material support and guidance (technical, location) should be given to individual households with the ability to erect temporary shelter for themselves.
- **Community participation** will be essential in most sectors for the success of the reconstruction efforts. Local communities will need to be actively involved in the decision-making for and implementation of reconstruction activities, including decisions about rebuilding *in-situ*/relocation, housing, location of and types of services and so on. The model for Village Rehabilitation Committees (VRC) used in the NEHRP could be expanded to cover all tsunami-affected areas.
- The communities are clear in their desire to have a say in the utilization of resources and to regain control over their own lives. The frequently heard formulation was '*We are not beggars'*, underlines this as well as people's wish that their dignity and self respect be acknowledged during this time of distress. Community participation would accomplish several objectives in the reconstruction phase.
- A more culturally and socially appropriate solution needs to result. Many externally planned housing schemes have become deserted by the intended inhabitants who have rejected the idea of living in homes which do not meet their social, cultural and economic

needs. In addressing housing recovery, the affected people should be consulted at the community level, as it is essential to preserve existing social networks which form the basis of support and mutual aid among the affected households. It was these social networks and mutual aid which helped the affected communities through the first days of the disaster before government or agency assistance reached them.

- Transparency and accountability must be increased. Communities should be involved in listing beneficiaries and in reviewing damage assessment reports. The continuous social impact assessment (CSIA) followed in NEHRP may be a model to be followed in the emergency recovery program.
- Dependency needs to be reduced. While relief and charity are important in the immediate aftermath of a disaster, they should be replaced as soon as possible with assistance to people in regaining their livelihoods and control over their lives. It would also help to reduce potential conflicts between affected people (receiving assistance) and unaffected people (not receiving assistance) at local level.
- Increase access to, utilization of and effectiveness of services. Community participation in type and location of infrastructure facilities would ensure better access to these, increase their utilization and thus make them more effective in meeting people's needs.
- To save time over the medium term, consultation and participation is required. A lack of consultation and participation in planning could cause more delays in subsequent implementation than participatory processes.

20. Priorities for Medium and Long Term Recovery

- A **Social assessment** should be undertaken to provide sufficiently detailed information about affected population to design recovery efforts in accordance with the specific needs and requirements.
- **Livelihood.** A comprehensive package (grants/loans/microfinance) should be developed to assist affected households in recovering their lost assets and means of livelihood. Single-headed households will need extra support in re-establishing livelihoods, and a certain proportion of households may need support in creating new livelihoods. Community-based approaches may be used to reach the largest number of beneficiaries as soon as possible to reduce dependency effects.
- **Legal rights.** Action to restore lost records of property rights to housing, commercial property, and lands should be launched, with special assistance given to the poor, squatters and widows and orphans in demonstrating legitimate property and inheritance rights. Special attention should be paid to children's inheritance right to land and property, and administration hereof by legal guardian until the child reaches maturity. To deal with the issue of protection of land and inheritance rights as well as land dispute resolution, a multi-disciplinary Land Task Force may be established in each district for a limited period of time in order to facilitate and speed up recovery work.
- **Housing.** Housing assistance packages should be developed based on principles of community consultations and household-driven reconstruction. Community Based Organizations (CBOs) may facilitate the reconstruction process and the interface between households, local governments and locally-based building contractors and suppliers.

ANNEX II - ENVIRONMENT

A. INTRODUCTION

1. Sri Lanka's coastal belt covering the districts of Jaffna, Mullaitivu, Trincomalee, Batticaloa, Amparai, Hambantota, Matara, Galle, Kalutara, Colombo and Puttalam was severely affected by a tsunami on December 26, 2004. The ramifications of the environmental degradation caused by the tsunami and the manner in which it will affect the country and its people in the short as well as long term needs to be considered. The affected region in Sri Lanka harbors many key marine and coastal ecosystems such as coral reefs, mangroves, seagrass beds, coastal sand dunes, mudflats, salt marshes, backwaters and lagoons, environmentally sensitive areas declared as national parks and sanctuaries, which includes a Ramsar wetland site, all of which plays a vital role in sustaining living natural resources on which many people in the affected region depend. The effect of the tsunami on these ecosystems has the potential to be very severe ecologically. In addition, the tsunami has created serious problems arising from adverse impacts to environmental capital or assets which are ecosystems that provide society and economies with environmental goods and services.

2. The mission team consulted with the Government and visited the districts of Colombo, Kalutara, Galle, Matara, Hambantota, Amparai and Batticaloa, which included field visits to protected areas of Yala, Bundala, Hikkaduwa, Kalametiya, Rumassala and Kiralakelle, during the period January 3-13, 2005.

B. DAMAGE OVERVIEW

3. ***Damage to the coastline:*** Although virtually the entire coastline of Sri Lanka has been affected by the tsunami, the impacts vary considerably. The North East coastline appeared to have borne the brunt, with the affected areas reaching 2-3 km inland. Except in extremely small pockets, the tsunami has affected a much narrower strip in the Southern and Western coastlines, with the affected areas limited to approximately 500 meters or less and at elevations below about 2.5 to 3 meters. The property damage on the North East coast line is very significant, with virtually no area being spared. Yet there appears to be little visible impact on the fauna and flora in the affected zone. Ground cover and smaller trees and shrubs have been removed by the tsunami while most larger trees remain intact with little or no damage. It appears that the property damage to the North East coastline was not adequately protected by any natural barriers such as coral and granite reefs, mangroves and sand dunes. The situation in the southern and western coastline is different in that many areas have been protected by natural barriers and there is a visible difference in the level and extent of property destruction in areas protected by natural barriers. Areas protected by mangroves and sand dunes have been left virtually unaffected with minor or no damage to housing. Bays in the entire affected area have suffered devastating property damage, most likely as a result of a "funnel effect" created for the tsunami waters.

4. ***Impacts on protected areas in the coastal zone:*** While there has been no documented loss of fauna in the protected areas affected by the tsunami, there have been significant impacts on flora and biodiversity. Extensive washing off of soils as well as stress and dieback of flora was noted in areas of sea water intrusion. The following protected areas were affected by the

tsunami in varying degrees: Southern coast – Yala, Bundala, Hikkaduwa, Rocky Isles, Kalametiya, Nilwala, Rumassala and Kiralakelle; North East coast – Yala East, Lahugala, Pigeon Island, Chundikulam, Kokilayi, Sagamum, Little Sober Island, Seruwila Alleyi, and Paraithivu Island; Western coast – Wilpattu. Some of these protected areas, in particular Yala East, Yala, Bundala, Kalametiya and Pigeon Island have suffered significant ecological damage, albeit in a relatively narrow strip. The greatest ecological impacts are on freshwater bodies and fishery breeding grounds in the protected areas, which have now been contaminated with saline water. The long term impacts or reversibility of this situation is unknown at this stage. There is also quite significant property damage in certain protected areas especially in Yala National Park and Hikkaduwa National Park with some buildings being completely or partially destroyed.

5. ***Impacts on coral reefs and the marine ecosystem:*** The most significant environmental damage from the tsunami is expected to be marine-related. Based on damage assessments in other tsunami affected countries in the Pacific region, it is expected that the damage to the inter-tidal and sub-tidal area will be extensive. This could result in drastic changes in the coastal marine ecosystems, with potentially irreversible destruction of some areas, as well as immediate loss of living coastal resources such as fish, lobsters and crabs. This will have serious implications on fisheries, as many of Sri Lanka's fishermen are dependent on near-shore resources. The pelagic environment is unlikely to be severely affected.

6. No serious attempt has been made yet by authorities to assess the damage to marine ecosystems. Due to time constraints, the mission was also not able to assess the exact impacts on the marine ecosystem since there is no visible damage. It can be expected that many coral reefs may have lost their structure and biota and may even be reduced to rubble in certain areas due to mechanical damage. The force of the tsunami can move enormous boulders and sections of reef, as well as thousands of tons of smaller fragments, sand and silt, which dislodge, abrade, crush and kill marine biota. There could also be significant contamination by runoff from land, with large quantities of wastes and pollutants, debris, soil and organic matter. Many marine organisms that may have survived the wave itself, may now be adversely affected or killed due to deposition of debris and sand on reefs and seagrass beds. This is a very serious consequence that may have lasting effects. Mangrove areas, while having provided protection for property and life during the tsunami have now been damaged and their fronts have receded. Even coral reefs that may not have suffered structural damage may be adversely affected by suffering from exposure to direct sunlight caused by the receding water as the tsunami approached.

7. ***Debris disposal:*** The extent of debris, particularly from destroyed buildings, requiring disposal is enormous. The disposal of the rubble and waste material is proving to be huge issue because of the sheer volume and associated costs. Emergency clearance efforts have resulted in haphazard disposal of rubble along roads, in open fields, into drainage ditches, low lying lands and waterways, including the beaches. The practice of haphazard dumping of debris in inappropriate locations should stop immediately to prevent long term problems in flood control, clogging of waterways and pollution of beaches.

8. ***Surface and groundwater contamination****:* All dug wells in the coastal zone in areas where the tsunami resulted in sea water coming into land are contaminated by sea water which inundated most low lying areas as well as pollution due to wastewater and septage from septic

tanks that have been affected by the tsunami. This is a serious public health issue since most local water sources have been contaminated. In addition, the pipe borne water supply system in the coastal areas affected by the tsunami is largely out of service due to damage to the distribution network.

C. RECONSTRUCTION AND RECOVERY NEEDS

Short Term Priorities (3-12 months)

9. ***Rubble and debris disposal****:* The tsunami-caused widespread deposition of vegetation, sand, construction debris, municipal waste from open dumps located on or close to the coast line, healthcare waste from affected hospitals and medical centers as well as human excreta from damaged septic tanks. The most immediate problem lies with disposal of such debris as rehabilitation has already commenced in certain affected areas. The amount of rubble is linked directly to the collapse of housing and other structures as well as vegetation that was removed by the tsunami. While a larger area has been affected in the North East coastline, the amount of debris for disposal may be about the same as in the Southern and Western coastlines due to the higher density of built up areas. Disposal of such wastes in an environmentally acceptable way will be a key consideration so that there will be no long term implications on flood retention areas and blocking of natural waterways. Furthermore, the possibility of recycling of rubble in non critical applications should be considered as a means of reducing the disposal volumes and costs. Reuse and recycling of building material from damaged buildings is a way to ensure the poor will be able to afford to rebuild as well as reduce debris disposal costs. Such efforts of reuse and recycling are evident even now in most affected areas. Burning of debris is also evident in certain areas but it is recommended that this practice be stopped immediately due to air pollution impacts. CEA has already issued instructions to stop the burning of debris as well as for debris to be collected and deposited in open areas such as playgrounds until proper sites for disposal are identified. In order to address the debris disposal problem in a comprehensive manner, appropriate guidelines will need to be developed to mitigate adverse environmental impacts. These guidelines need to be promptly issued to avoid haphazard disposal and reduce additional costs through repeated loading and dumping debris. The guidelines should address siting issues and be based on basic principles which minimize adverse environmental impacts. Recycling of building materials should be encouraged wherever possible. Options of using the demolition waste as sub base material for road construction should be explored. Since virtually no industrial facilities have been located in the affected areas, there is no likelihood of hazardous waste disposal being an issue. *The estimated budget for development of guidelines, removal of debris and disposal at suitable sites is US$1.5 million.*

10. ***Study of the role of natural resources in minimizing tsunami damage:*** The pattern of damage, particularly in the southern and western coastline, clearly showed that healthier ecosystems have been less affected due to the tsunami. Observations clearly indicate that coastal destruction is very patchy in some severely affected areas in the southern coast, with less altered and more vegetated areas of the sea-land interface withstanding the tsunami to a much greater extent than areas where vegetation has been removed or the shoreline changed or encroached upon. Areas of healthy mangroves, sand dunes and probably structurally stable coral reefs have protected life and property better than areas of environmental degradation. Structures in more

obviously vulnerable locations, including many hotels and residential areas built too close to the sea or in coastal reservation areas, have fared worse and artificial canals that connect lagoons with the sea appear to have more aggravated damage by funneling water inland. A study of the role that natural barriers played in protecting life and property should be undertaken prior to future reconstruction. This will enable GOSL to better plan land use in coastal areas, rather than relying on a "one size fits all" solution of the proposed setbacks. This study should also take into account the manner in which other tsunami-prone countries in the Pacific region undertakes coastal zone planning. *The estimated cost of the study is US$250,000.*

11. ***Clean up of dug wells and tube wells in affected areas:*** Most of the dug wells and tube wells in the affected areas have been contaminated with sea water as well as polluted by wastewater and septage from septic tanks. It is estimated that there are approximately 62,000 wells that have been affected. Cleaning/flushing of these wells is an urgent public health need prior to communities re-settling in affected areas. *The estimated cost for cleaning/flushing of the existing dug and tube wells is US$3 million.*

12. ***Impacts on Protected Areas and other environmentally sensitive areas affected by the tsunami:*** Several Protected Areas and other environmentally sensitive areas such as mangroves and wetlands in the coastal zone have suffered ecological damage as a result of salt water intrusion. The immediate impacts on vegetation of browning and dieback were visible days after the tsunami. Yet it also appears that vegetation damage may most likely be able to make a natural recovery. It is recommended that a Biodiversity Survey be undertaken to establish the tsunami's impacts on biodiversity in these affected areas. In addition, the tsunami affected areas provide a "living laboratory" for studying natural regeneration after saline intrusion. Fresh water bodies in environmentally sensitive areas and coastal Protected Areas have been contaminated by saline intrusion. A study needs to be undertaken to assess where natural systems are able to flush the salinity out or whether active intervention is needed for clean up. *The total estimated cost for the three studies is US$750,000.*

13. ***Strategic Environmental Assessment of the Rehabilitation and Reconstruction Program:*** The plans and programs for rehabilitation and reconstruction must be subject to an Environmental Assessment. Considering the strategic nature of the proposed plans for rehabilitation and reconstruction, a strategic environmental assessment must be undertaken to understand the individual and cumulative environmental impacts of the proposed policies and programs for rehabilitation and reconstruction. *This study is expected to cost US$200,000.*

Medium to Long Term Priorities (1-3 years)

14. ***Long term environmental impacts on the marine ecosystems:*** Shorelines may already have changed, although may not be drastically. It was evident in the visit to Yala National Park that the shoreline has been reshaped. Sand dunes have been moved around as well as rivulets were running where there was none before. Even for shorelines that have not changed immediately after the tsunami, there is a likelihood that there may be increasing changes if the natural protection systems such as coral reefs, mangroves, seagrass beds have been wiped out. The effect of the loss of breeding fish populations, habitat and nursery grounds have severe implications for nutrition and livelihoods of coastal populations for years to come. Nesting

beaches for species such as globally threatened marine turtle populations in the affected regions may be damaged. Loss of key attractions such as beaches and reefs would also affect tourism which is a vital source of income for much of the coastal population.

15. The coastal ecosystems that may be affected by the tsunami in Sri Lanka are already stressed by unsustainable resource use, such as over fishing and habitat destruction, including development or indiscriminate cutting of mangroves for prawn culture. Further the El Nino related impacts of 1998, caused by elevated sea surface temperatures, has left the regions reefs struggling to recover, a process which has only recently been gaining momentum in parts of the South Asia region. Taking the right course of action is now essential to minimize and manage the ill effects as well as to promote the recovery of natural environments and the livelihoods of the survivors which so often depend on these natural environments. Assessment of the extent of damage caused by the tsunami to the marine ecosystem is essential. This requires the right data and information, and a firm commitment to foresighted, sustainable coastal planning. *The estimated cost of this rapid assessment study is US$1.5 million.*

16. ***Development of sustainable waste management systems for affected areas:*** The present system of "open dumping" municipal solid waste and poorly designed septic tanks is environmentally unacceptable due to potential public health hazards. A sustainable waste management system should be in place for municipal solid waste and other local authority managed environmental services. Based on the principles of the National Solid Waste Management Strategy of GOSL, municipal solid waste should be subject to appropriate re-use and recycling systems and thereafter suitable treatment technologies and disposal systems developed that are affordable to participating Local Authorities in the coastal region. This will prevent the adhoc disposal of municipal solid waste on beaches (reducing the recreational use potential of the beaches) and other low lying lands and water bodies (resulting in the loss of flood retention areas). It is proposed that a Local Environmental Services Innovation Fund (LESIFA) be established for a technical assistance and grant facility, which will provide support for the design and implementation of innovative local environmental management solutions in Sri Lanka. The objective of LESIFA is to provide opportunities to self-selecting local authorities and their constituent communities to design, implement and sustain innovative solutions to local environmental service and management challenges. A combination of knowledge, technical assistance, training and capital grants will be available to local proponents on a competitive, demand driven basis. The outcomes of this work will be a variety of locally owned environmental management solutions throughout the country that will both improve real service delivery and serve as practical models. *The estimated cost for this facility is US$6 million.*

17. ***Health care waste management:*** In the devastated areas of the country, approximately 42 health institutions have been totally destroyed. Another 45 institutions have been partly damaged by the tsunami. With the rehabilitation and reconstruction of these health care facilities, proper management of health care waste is vital to prevent public health impacts and environmental degradation. Appropriate waste treatment systems such as autoclaves for waste sterilization, will be needed for the larger hospitals in urban areas in the districts. In addition suitable waste disposal systems have to be established for disposal of the treated health care waste. In smaller hospitals and health centers where the volume of waste is very small, a treatment and disposal system may not be economically justified. In such instances, deep burial

according to WHO guidelines in specially prepared and secure disposal sites will be needed. *The estimated cost for this facility is US$3 million.*

18. ***Reconstruction of damaged and destroyed buildings in National Parks:*** Several buildings in National Parks – such as in Yala and Hikkaduwa – have been damaged and destroyed, and need to be reconstructed. *The estimated cost of the reconstruction is US$1.25 million.*

D. ENVIRONMENTAL SAFEGUARDS

19. An Environmental Management and Assessment Framework (the Framework) will be required to undertake environmental impact assessments for all rehabilitation and reconstruction activities to ensure adverse environmental impacts are minimized and appropriate mitigation measures are included in project design. The Framework will also assess the institutional capacity to undertake environmental assessments, the GOSL system for review and approval of the EIA's and the capacity to monitor the implementation of environmental mitigation measures. The preparation of the Framework is a pre-requisite to approval of the Emergency Recovery Credit. *The estimated cost of the preparation of the Framework is US$100,000.*

Table 1: Environmental Needs Resulting from the Tsunami Disaster (US$ millions)

Project Proposal	Short Term (3-12 months)	Medium to Long Term (1-3 years)	Total (US$)
Rubble and debris disposal	1.5		1.5
Study of the role of natural resources in minimizing tsunami damage	0.25		0.25
Clean up of dug wells and tube wells in affected areas	3		3
Impacts on Protected Areas and other environmentally sensitive areas affected by the tsunami	.75		.75
Strategic Environmental Assessment of the Rehabilitation and Reconstruction Program	0.2		0.2
Long term environmental impacts on the marine ecosystems		1.5	1.5
Development of a sustainable waste management system for affected areas		6.0	6.0
Health care waste management		3.0	3.0
Reconstruction of damaged and destroyed buildings in National Parks		1.25	1.25
TOTAL	**5.7**	**11.75**	**17.45**

ANNEX III – ECONOMIC ASSESSMENT

A. CONSULTATIONS AND SITE VISITS

1. In preparing this preliminary economic impact assessment, discussions were held with officials from the Central Bank of Sri Lanka, the ministries of Finance, Tourism, and Fisheries; and the resident representative from International Monetary Fund during the period January 10-28, 2005. In addition, site visits of the hard hit districts of Hambantota and Amparai were conducted to inform the assessment.

B. ECONOMIC IMPACT OF THE TSUNAMI

Overview

2. The tsunami tidal waves on December 26, 2004 – that hit several countries in Asia and Africa bordering the Indian Ocean – have taken a heavy toll on Sri Lanka's coastal areas. The burden of the impact of the tsunami on the Sri Lankan economy was focused on the fishing and tourism sectors in parts of the South and North East. In the areas hit, the tsunami devastated lives, social infrastructure, and economic foundations. The losses that have resulted from this disaster include asset losses (direct damage), output losses (indirect damage), and fiscal costs (secondary effects).

3. Quantifying asset losses involves measuring the value of the stocks of buildings, equipment, inventory, and other property lost as a direct result of the tsunami. Measuring output losses involves estimating the value of the goods and services lost as a result of the asset losses and other disruption caused by the disaster. The fiscal costs measure the net additions to the fiscal deficit as a result of revenue lost and additional expenditure incurred as a result of the disaster.

4. Initial estimates place the cost of asset losses at around $1 billion (4.5 percent of GDP), with output losses in the most affected sectors of fishing and tourism estimated at $330 million (or 1.5 percent of GDP), and fiscal costs for 2005 of 2 percent of GDP. Because of the relatively small contribution of the fishing, and hotels and restaurants subsectors to overall GDP (3 percent), the impact of the tsunami will be limited to a reduction in GDP growth by 1 percentage point in 2005.

5. Although the sectors mostly affected by the tsunami do not constitute a large portion of GDP and the affected provinces all together only account for about 17.5 percent of GDP, the affected provinces constitute a large portion of the population (26 percent). Available poverty data for districts in the Southern Province affected by the tsunami show that between one-quarter to one-third of the population in these districts live below the poverty line.[1] This makes it evident that a substantial share of the population in the affected provinces has low per capita incomes. The tsunami disaster increases the vulnerability of this segment of the population, therefore making a case for channeling resources to address the needs of these vulnerable groups.

[1] Data on incidence of poverty in the North East was not available during the preparation of this Assessment.

Asset Losses

6. Preliminary estimates of total direct asset damage place losses around $1 billion (4.5 percent of GDP). Destruction of private assets in the affected districts is substantial, with losses estimated at around $700 million. This figure includes losses in the fishing ($97 million) and tourism industries ($250 million) in terms of infrastructure and equipment. In housing, the asset losses amount to around $306 to 341 million.

7. In terms of some of the nature of the damages sustained by the private sector, preliminary estimates report around 140,000 houses have been partly or fully damaged, over 19,000 private fishing vessels sustained damages, and about a quarter of hotels were affected (58 of the total 242 registered hotels have been fully or partly damaged). While, in the public sector about 97 healthcare institutions; and 190 schools, universities and vocational training institutes were damaged.

Table 1: Estimated Output and Asset Losses from Tsunami Disaster

Sector	Asset Loss ($ Mn)	Output Loss*
Housing	306-344	-
Roads	60	-
Water and Sanitation	42	-
Railways	15	-
Education	26	-
Health	60	-
Agriculture*	3	-
Fisheries*	97	200
Tourism*	250	131
Power	10	-
Envionment	10	-
Social Welfare**	-	-
Excluded Items****	90	-
Total in $ Mn	969-1,007	331
Percent of GDP	**4.4-4.6**	**1.5**

*Includes estimates for 2005 and 2006 and includes from ***livelihoods damage assessment*** of fishermen, small farmers, and small businesses in tourism totalling $ 140 million.

****Includes private assets that perished with devastated houses and buildings and is estimated at about 10% of the total.

Source: Government of Sri Lanka and staff estimates.

Output Losses

8. While the impact of the tsunami on Sri Lanka's gross domestic product (GDP) is not as significant as the extent of asset losses, in the areas that were hit, the tsunami devastated lives, social infrastructure, and economic foundations. It is estimated that around 200,000 people (3 percent of the labor force) might have lost their jobs as a result of the tsunami. This includes 100,000 in fisheries; 27,000 employed in tourism and tourism related activities; and the rest in other informal sector activities. The estimated loss of output in 2005 and 2006 in the most

affected sectors (fishing and tourism) total around 1.5 percent of GDP, but these sectors do not make up a significant portion of national GDP. The hotels and restaurants subsector together with fisheries directly contribute about 3 percent of GDP. Other sectors which will also be negatively affected but to a much lesser extent include telecommunications and transport. On the other hand, the construction sector, which makes up a substantial portion of GDP (7.2 percent) will mitigate part of the contraction in the fishing and tourism industries. Therefore, the tsunami may likely only result in slowing down economic growth by up to 1 percentage point in 2005 (from 6 to 5 percent).

Table 2: Selected Economic Indicators

	Actual		**Estimate**	**Pre-Tsunami**	**Post-Tsunami**
	2002	2003	2004	2005	2005
Real GDP Growth	4.0	5.9	5.2	6.0	5.0
Nominal GDP (Bn. Rs.)	1,583	1,760	1,988	2,297	2,297
Fish production (tons)	302,890	284,960	300,000	300,000	200,000
Tourist arrivals	393,171	500,642	565,000	600,000	425,000
Construction sector growth	-0.8	5.5	5.0	6.0	9.0
Inflation (CCPI annual average)	9.6	6.3	7.6	10.0-11.0	12.0

Source: Central Bank of Sri Lanka for historical data and staff projections.

9. ***Fishing.*** The December 2004 tsunami will worsen the outlook of the already volatile fishing industry in Sri Lanka. The disaster has affected about one-third (or around 1 million) of Sri Lanka's coastal population (totaling 3.2 million) and the fishing industry provides (direct and indirect) employment to around 170,000 people. In addition to the negative impact on the livelihoods of fishermen due to their asset losses, demand for fish will also be limited in the first few months of 2005 and the price of fish is likely to remain depressed in this period. Fish production is expected to reach only 200,000 tons in 2005 (down from the earlier expected 300,000 tons) and to largely recover in 2006 with a production of 270,000 tons. However, since fishing only accounts for 2.4 percent of GDP, the contraction in the sector will not significantly slow down overall economic growth. The value of output loss for fishing in 2005 and 2006 is estimated at $ 200 million.

10. ***Tourism.*** As the benefits of the cease-fire started to bear fruits for the tourism sector beginning in 2002, the tsunami has dampened these prospects for 2005 and to a lesser extent in 2006. Around 565,000 tourists visited Sri Lanka in 2004 and 600,000 arrivals were expected in 2005 before the tsunami hit. Now tourist arrivals are projected to contract to around 425,000 in 2005 and recover in 2006 to 575,000. Around 40 percent of foreign guest night stays in Sri Lanka are spent near the beaches in the South and East coasts of the island, which were among the hardest hit by the tsunami. Hotels and restaurants contribute about 1 percent of GDP and the tourism industry employs around 1 percent of the labor force (130,000 jobs in 2004) both in direct and indirect employment. The tsunami is likely to result in reducing output in the sector by a total of $131 million in 2005 and 2006.

11. ***Construction.*** The construction sector will mitigate part of the contraction in the fishing and tourism sectors in 2005 if substantial reconstruction takes place in the next 3 years, adequate inputs can be sourced, and if the industry has the capacity to expand and restructure quickly to meet demand. The larger hotels already plan to start rebuilding in February. Based on discussions with private sector construction companies, rough estimates indicate an 8-10 percent potential growth in the next three to four years. This sector has growing on average by about 5-5.5 percent in the recent past. Construction also makes up a more significant share of GDP (7.2 percent in 2003) and the labor force (5.3 percent) than the combined total for fishing and tourism. If significant reconstruction takes place starting in 2005, the sector can increase its contribution to GDP to close to 8 percent. Much of this depends on the quick resolution of the policy pertaining to the new buffer zone from the sea.

Inflation and Balance of Payments

12. ***Inflation.*** Average inflation, as measured by the Colombo Consumer Price Index (compiled by the Department of Census and Statistics), has been moderating in the last three years from a high of 14.2 percent in 2001, bottoming in 2003 at 6.3 percent, and increasing slightly to 7.6 percent in 2004. The tsunami is likely to push prices up further throughout 2005 due to the upsurge in demand for consumption goods during the first quarter of the year, increased demand for construction materials in 2005, and the recent hike in international oil prices. Inflation in 2005 is likely to average 12 percent for 2005 compared to the pre-tsunami estimate of 10-11 percent.

Table 3: Selected Balance of Payments Indicators ($ million), 2002-2005

	Actual		Estimate	Pre-Tsunami	Post-Tsunami
	2002	2003	2004	2005	2005
Exports	4,699	5,133	5,787	6,305	6,305
Imports	6,105	6,673	7,957	8.824	9,541
Trade balance	-1,406	-1,540	-2,170	-2,519	-3,236
Current account balance	-236	-76	-626	-824	-1,564
Capital account:					
Direct investment	186	201	178	261	261
Private long term	-21	-33	8	90	90
Government long term	162	449	327	470	470
Disbursements	542	808	655	873	873
Amortization	380	359	328	403	403
Financing gap	-	-	-	-	790
Overall balance	339	428	-212	97	182
Current account balance (in percent of GDP)	-1.4	-0.4	-3.2	-3.8	-7.1
Gross official reserves (end of period)	1,566	2,147	1,825	1,948	2,133
In months of imports	2.4	2.8	2.2	2.2	2.3
Oil price ($ per barrel)	25	28.9	37.7	40.5	40.5

Source: Central Bank of Sri Lanka and staff estimates.

13. ***Balance of Payments.*** Reconstruction efforts to rebuild Sri Lanka following the tsunami will have a significant impact on the country's balance of payments. Rebuilding activities will require a substantial increase in imports (over $700 million in 2005) and a widening in the trade deficit in the next 2 to 3 years. Increased private transfers will contribute to financing increased imports. In 2005, merchandise exports are assumed to grow at the same "pre-tsunami" levels, but services receipts will decline reflecting a drop in tourist arrivals on the order of 175,000 relative to original 2005 projections (600,000). Additional external financing requirements after the tsunami are estimated at $790 million in 2005, which could be provided in the form of new concessional loans, grants, and possibly debt relief. The receipt of large foreign inflows is expected to help mitigate the impact of the tsunami disaster on the external sector.

Fiscal Impact

14. According to the Ministry of Finance measure of the fiscal impact of the tsunami on public sector finances are highly tentative at this point. The impact of the tsunami on revenues is expected to be marginal (0.3 percent of GDP). Revenues from value added tax (VAT) and customs duty from the increased imports in 2005 is expected to compensate for most of the revenue shortfalls from tourism and fisheries. Additional tsunami-related expenditures are estimated at Rs. 50 billion (over 2.2 percent of GDP) to be financed through extraordinary external assistance, including debt relief. Of this amount, Rs. 10 billion will be additional recurrent cost and there rest will go to capital. This will result in the widening of the fiscal deficit from the budgeted 7.6 percent of GDP to 9.6 percent of GDP in 2005. Ultimately, the level of increased expenditures will depend on the ability of the Government to mobilize external resources and the absorptive capacity of the public administration. Unlike asset losses and output losses, substantial fiscal costs for reconstruction will continue to be incurred in the medium-term. However, details on the Government's tsunami reconstruction and recovery program are not available at this point in time.

Table 4:Fiscal Framework (As Percentage of GDP) 2002-2005

	Actual		Estimate	Budget	Post Tsunami
	2002	2003	2004	2005	2005*
Total expenditures and net lending	25.4	23.7	23.7	24.8	26.4
Current expenditures	20.9	19.0	19.2	18.5	18.5
Subsidies and transfers	4.7	4.0	5.1	4.0	5.3
Capital expenditures and net lending	4.6	4.7	4.5	6.4	8.0
Total revenues	16.5	15.7	15.6	17.2	16.9
Budget deficit before grants	-8.9	8.0	-8.1	-7.6	-9.6

**Assumes debt moratorium of 50% on principal and 50% on interest.*

Source: Ministry of Finance estimates.

C. CONCLUSION

15. The tsunami which hit Sri Lanka in December 2004 has resulted in significant asset losses, especially in terms of housing, hotels, and fishing infrastructure and equipment. The fiscal cost of rebuilding in the next four years will also be significant. The output losses, on the other hand, and overall impact on the macroeconomic foundation of the country will not be as

extensive. However, the tsunami has increased the economic vulnerability of the low income communities affected and underscores the urgent need to start developing appropriate safety nets, livelihood support, and recovery efforts. It is important at this stage to enhance Government capacity to implement and support recovery and rebuilding activities to make full use of available donor assistance. The importance of involving affected communities in reconstruction and recovery programs, especially in housing, cannot be over-emphasized. Community involvement will also provide temporary livelihood sources to affected families.

ANNEX IV - EDUCATION

A. INTRODUCTION

1. The ocean waves that swept over the coastal areas of Sri Lanka on December 26, 2004 damaged 168 schools, 4 universities and 18 vocational training and industrial training centers. About 80,000 students, 330 teachers and 50 principals were directly affected by the tsunami. In addition, many more children, teachers and principals in the coastal areas are likely to have suffered psychological trauma, although this is more difficult to measure and quantify. Also, camps were set up in about 275 schools to provide temporary shelter for displaced individuals. The following ADB-JBIC-WB needs assessment analyzes the damage to the capital stock of the education system and the strategy of the Government of Sri Lanka (GOSL), donors and other stakeholders to rebuild and restore the damaged education system in the Tsunami-affected areas.

B. ASSESSMENT MATERIALS, CONSULTATIONS AND SITE VISITS

2. GOSL provided a preliminary estimate of the cost of the damage to the education team. This estimate was based largely on information provided by provincial and zonal education officials in the relevant areas. The estimate is currently being verified and refined by a team of engineers and architects under the leadership of the University of Moratuwa. The assessment team visited and interacted with officials from the Ministry of Education (MOE), Ministry of Finance and Planning (MOF), and provincial and zonal education officials, especially in Amparai and Hambantota. The team also held discussions with other potential donors, including Germany and UNICEF.

C. OVERVIEW OF DAMAGE TO EDUCATION ASSETS

Table 1: Summary of Damage to Schools, Universities and Vocational Training and Technical Education Institutions

Education and Training Institutions	Number damaged	Estimated cost of damage (LKR millions)
Schools	168	2,342
Universities	4	49
Vocational and Technical Institutions	18	300
Total	190	2,691

Source: mission estimates, based on preliminary information from MOE and MOF.

Note: The assessment concentrates only on public schools, as about 97% of enrolment is in public schools. Also, schools often cover both primary and secondary grades, so no distinction is made between primary schools and secondary schools.

3. The total cost of the damage to the education capital stock, according to preliminary estimates, is approximately LKR 2.3 billion. The major proportion of damage has been to primary and secondary schools, which account for over 90 percent of institutions damaged and about 92 percent of the estimated cost. Buildings in about 59 schools have been completely destroyed. Further, according to the MOE, around 91 schools which have been destroyed or damaged and are located too close to the seashore may have to be relocated and reconstructed. The damage to schools includes school buildings, equipment, machinery and tools, furniture, books and other library resources, and consumable teaching materials such as chemicals, chalk

and white-board pens. Universities have suffered damage to lecture halls, administration buildings and hostels. Vocational training and technical education institutions have experienced damage to lecture halls, workshops, equipment, machinery and tools, and residential facilities.

Table 2: Summary of Damage to Schools by District

District	Number of damaged schools	Estimated cost of damage (LKR millions)
Hambantota	6	66
Matara	11	196
Galle	22	378
Kalutara	6	89
Gampaha	2	40
Batticaloa	33	409
Amparai	38	697
Trincomalee	27	285
Mullativu	11	71
Jaffna	12	110
Total	168	2,342

Source: mission estimates, based on preliminary information from MOE and MOF.

4. The regional pattern of destruction shows that the largest number of schools damaged has been in the Amparai district (38 schools), followed by Batticaloa (33 schools), Trincomalee (27 schools) and Galle (22 schools). Also in terms of costs, the Amparai district is the worst affected, with about LKR 697 million worth of damage, followed by Batticaloa with LKR 409 million of damages, followed by Galle with LKR 378 million of damages and Trincomalee with LKR 285 million of damages. Nearly all public schools operate in a matrix management structure between the Ministry of Education and the Provincial Councils.

5. Universities located in four districts, Matara, Batticaloa, Amparai and Jaffna have also suffered damage, with Jaffna Univesity suffering the worst damage in terms of cost. These universities had played a key role in fostering academic excellence in regions with a history of conflict. However, it should be noted that these universities are mapped to the central university grants commission, and do not report to any regional administration.

D. OTHER OBSERVED IMPACTS

6. Other impacts of the tsunami can be observed, but are hard to measure and quantify. Students, teachers, principals, university academics and education administrators have clearly suffered serious psychological trauma, and physical and social losses. Over the short and medium term, considerable counseling will be required, especially among students who have lost family members and in schools which have suffered large losses. In addition, the special learning needs of such children will have to studied, and appropriate remedial teaching introduced to schools. This, in turn, will require training of teachers in the special learning needs of traumatized children.

7. The loss of time spent in classroom learning is also an important loss of output. This is especially serious in grade 11 and 13, where students are preparing to sit the General Certificate of Examinations Ordinary Level (GCE O/L) and the General Certificate of Examinations

Advanced Level (GCE A/L). These are certifying examinations, as well as selection examinations for various types of vocational training, technical education and, at the GCE A/L stage, for university entrance. The damaged schools, as well as schools used as relief centers, have not been able to commence the academic year on schedule. This places students in these schools at a clear disadvantage in sitting for these examinations.

E. RECONSTRUCTION AND RECOVERY NEEDS

8. Clearly, the most urgent need is to repair schools, universities and vocational training and technical education institution wherever possible. All universities can be repaired immediately, as the extent of damage is fairly minor. The financial requirement to repair universities is only LKR 49 million. In addition, undamaged schools being utilized as relief centers for displaced individuals need to be cleared and school recommence as quickly as possible. Where reconstruction of other education institutions is likely to be delayed, either due to the extent of damage suffered or the need to relocate the school/training institution to a new location, alternative arrangements need to be made to accommodate such students in other institutions, and where this is not possible by providing temporary shelters to conduct lessons. The provision of temporary shelters to facilitate schooling is estimated to cost about LKR 20 million. Clearing and repairing schools that are currently being used as welfare camps and preparing them for academic instruction again is estimated by GOSL to cost LKR 1,375 million, although this figure appears very high, and it is likely that these schools can be cleaned and repaired at a fraction of this cost. Revising this cost estimate to a more realistic level is an urgent priority, and MOE is undertaking this task.

9. Over the medium term, the destroyed or badly damaged schools need to be rebuilt. This will involve reconstructing or building new classrooms, science laboratories, libraries, aesthetic units, administration blocks, and furnishing and equipping such facilities with appropriate technology, machinery and tools, and books and providing basic services, such as electricity, water and sanitation. School will also need basic protection, such as gates and walls. The cost of a basic package of such buildings, facilities, furniture, equipment and services would be about LKR 3,903 million.

10. Repairing vocational training and technical education institutions would involve rebuilding lecture rooms, workshops, administration buildings. In addition, furniture, equipment, machinery and tools would have to be supplied to these facilities. The cost of a basic rebuilding package is estimated at about LKR 300 million

F. PROPOSED RECOVERY ASSISTANCE STRATEGY

11. The Government of Sri Lanka is in the process of developing its recovery strategy. First, GOSL plans to repair and restore 77 schools, 4 universities and 18 vocational training and technical education institutions that have suffered damage and can be reconstructed in their current locations. The 77 schools would not merely be repaired according to their previous type plans and original state, but would also be upgraded according to the modern education quality norms and standards developed by MOE as part of its new Education Sector Development Framework and Program (ESDFP), which the World Bank will support through an education

sector development programmatic credit commencing in 2006. Similarly, the 18 vocational training and technical education institutions would be upgraded with modern workshops, equipment and technology, to prepare students for the world of work in a technologically advanced, global economy. The four universities, however, which have largely suffered damage to their dormitories and lecture halls, would be chiefly repaired to their original state.

12. Second, GOSL plans to shift 91 damaged schools from their current vulnerable locations by the sea to safer ground further inland. This would involve the construction of these schools in new locations. Care will need to be taken to ensure ethnic sensitivity while relocating schools with a certain ethnic identity inland where the demographic ratio might well be different. These 91 schools would be also constructed according to the modern education quality norms and standards developed by MOE as part of ESDFP. The ESDFP envisages the construction of child-friendly classrooms in primary grades and classrooms in secondary grades that facilitate active learning. In addition, secondary schools are to receive fully equipped computer learning centers, science laboratories, libraries, agriculture units, home science rooms, multi-media units, facilities for aesthetic studies such as music, art and dancing, and vocational and technical rooms. In addition, all primary and secondary schools would have a full set of basic facilities and services, such as water supply, sanitation, electricity, administrative blocks, and access roads, gates and fences.

Short Term Recovery

13. GOSL, as part of its strategy to restore normalcy and routine, has commenced the school year wherever possible. Textbooks and basic educational kits have been supplied to affected schools with assistance from UNICEF. In addition, trauma counselors have been trained to identify and treat traumatized children and teachers. Schools which are presently used as refugee centers are to be opened as soon as alternative arrangements have been made to house the refugees. Schools that commence late will seek to catch up through double shifts and extended working hours. Cost estimates of school reconstruction and restoration are being refined and fine tuned, while estimates of damage to universities have been completed.

Medium to Long Term Reconstruction

14. There is a sequence of steps required, depending on whether education institutions can be rebuilt on their current locations or in new locations.

15. The 77 schools, 4 universities and 18 vocational training and technical education institutions that can be rebuilt in their current locations require the following activities. First, school sites need to be cleared and cleaned, so that work can commence as soon as possible. Second, reconstruction plans have to be drawn and detailed cost estimates produced, so that tenders can be invited. Sites and locations for upgrading facilities to improve education quality, such as computer learning centers, libraries and science laboratories, also need to be identified. Third, tenders need to be awarded for school reconstruction and expansion and upgrading of facilities. Fourth, the equipment, technology, machinery and tools required for the upgraded education quality development facilities need to be identified, specifications developed and tenders called at the appropriate time, so that the equipment can be delivered when the physical

facilities are ready. Finally, school furniture and books need to be purchased, again in time for the completion of the new buildings and libraries.

16. The 91 new schools to be constructed needs to follow a similar implementation plan. First, school sites need to be identified. GOSL owns over 80% of the land in the country. Hence, GOSL is encouraged to use state-owned land for new schools if relocation is needed, rather proceeding through financially and socially costly vesting procedures. Second, alternative arrangements need to be made for the education of the children of these schools while the new buildings are under construction. Third, new construction plans have to be drawn and detailed cost estimates produced, so that tenders can be invited. These plans need to include upgraded facilities to improve education

Table 3: District-Wise Summary of Schools Reconstruction, With Quality Upgrading

District	Number of damaged schools	Basic reconstruction cost (LKR millions)	Reconstruction cost with quality upgrade (LKR millions)
Hambantota	6	66	124
Matara	11	196	334
Galle	22	378	720
Kalutara	6	89	139
Gampaha	2	40	67
Batticaloa	33	409	644
Amparai	38	697	1,192
Trincomalee	27	285	544
Mullativu	11	71	123
Jaffna	12	110	232
Total	168	2,342	4,118

Source: mission estimates, based on preliminary information from MOE and MOF.

quality, such as computer learning centers, libraries, science laboratories, home science units, aesthetic units and agriculture rooms. Fourth, tenders need to be awarded for new school construction, with expanded and upgraded facilities. Fifth, the equipment, technology, machinery and tools required for the upgraded education quality development facilities need to be identified, specifications developed and tenders called at the appropriate time, so that the equipment can be delivered when the physical facilities are ready. Sixth, school furniture and books need to be purchased, again in time for the completion of the new buildings and libraries. Finally, a system of appointments and transfers of teacher, principals and other school staff needs to be instituted, to ensure that the newly constructed schools are adequately staffed and operational.

Table 4: Short and Medium Term Requirements for Reconstruction with Quality Upgrading (LKR million)

Education and Training Institutions	Short Term	Medium Term	Total
Schools	1,118	3,000	4,118
Universities	49	-	49
Vocational and Technical Institutions	150	350	500
Total	**1,317**	**3,350**	**4,667**

17. The cost of reconstructing schools and vocational training and technical education institutions with quality upgrading, and restoring the damaged universities, is estimated to be about LKR 4.7 billion. The largest share of these funds, 88%, would be used to upgrade the quality of schools. In terms of district-wise shares, the Amparai district, followed by Galle, Batticaloa and Trincomalee would receive the largest benefits from quality upgrading of schools.

18. An important issue arises in the plan to relocate 91 schools. Schools should only be relocated in line with predicted enrolment patterns flowing from the relocation of the population from which these students are drawn. If such population relocation does not occur, relocating schools should be undertaken with great caution so that children are not denied access to schools. Further, if new land is required for relocated schools, as far as possible the government should utilize state land for the new school sites. This would reduce costs, eliminate lengthy and complicated vesting processes, and forestall the need for social and environmental assessments prior to donor financing of school reconstruction activities.

19. As evident from the post tsunami response and other localised disasters such as the 2003 floods, schools are often used to shelter affected population until other solutions are developed. This is a cost effective approach and in many countries, schools doubled as emergency rescue shelters as part of the local disaster preparedness plans. Additional design and construction standards need to be developed to accommodate large populations over a period of time and to ensure the survival of these buildings in the even of a disaster. International exchange of experiences should also be encouraged on these standards.

20. Resources for the reconstruction could come from several donors, including the World Bank, ADB, JBIC/JICA, donors from the UN system, and bilateral partners. Finally, it is vitally important that reconstruction of all schools, universities and training institutions should be implemented, as far as possible, within the appropriate central and provincial structures of the MOE and Provincial Education Authorities.

ANNEX V - HEALTH

A. INTRODUCTION

1. Health care services in Sri Lanka are mainly provided through a well organized curative and preventive health network in the country. The damage to the health sector resulting from the tsunami is sizable in both the curative and the preventive networks. The damage includes total destruction of approximately 44 health institutions – i.e., a large obstetric and gynaecology teaching hospital, many District hospitals, rural hospitals, peripheral units to small central dispensaries – and loses of medical officers in health clinics, medical equipment, drug stores, district health offices and about 54 vehicles (including ambulances). Another 48 health institutions were partly damaged with loss of medical instruments, equipment and vehicles. This damage was widespread among all affected districts. Furthermore, leading to further immediate and medium-term needs, the demand on nearby health institutions has also suddenly increased due to internally displaced populations.

B. CONSULTATIONS AND SITE VISITS

2. The health damage has been assessed in many different ways. Primarily, the damage assessment documents presented by the Government – Ministry of National Planning and the Ministry of Health (MOH) – were used, as was the needs assessment report from the UN which was prepared with information provided by bilateral agencies, International NGOs and field-based UN agencies. Verification of the proposed damage was carried out through site visits to the most devastated districts in the East and South (Batticaloa, Amparai, Trincomalee and Galle). The team also visited three districts – one in the East (Ampara) and two in the South (Hambantota and Galle) – to meet, observe and verify information with the district health authorities.

3. The team contained members from the WHO, JICA, JBIC and the World Bank. The team met with many personnel both in the UN system (addressing immediate health needs) and officials from MOH and the Finance Commission of the Ministry of Finance.

C. DAMAGE OVERVIEW

4. The damage to the health sector is substantial – loss of health infrastructure and health personnel – creating a total breakdown of the health system in the affected districts.

5. The *health physical infrastructure* losses include at least 92 partially or fully damaged health institutions. These included hospitals, drug stores, cold rooms, preventive health care offices, health staff accommodation facilities, and district health offices. In addition, a large number of vehicles (ambulances, lorries, vans, double cabs, and motor bikes) and majority of the medical equipment and office equipment in the affected areas were totally destroyed.

6. The *loss of health personnel* includes medical officers, nurses, midwives, and other support staff. Furthermore, a large number of health staff were injured and traumatized by the event, many also losing their families, belongings and homes. During the mission, the District

Medical Officer of a major base hospital in the Galle district reported an absenteeism rate of 50% among his support staff.

7. These losses have resulted in a virtual *breakdown of the health system.* This encompasses the inability to deal with the main curative and preventive activities including mental health; the breakdown of the medical supply collection/storage/distribution system; and the disruption of community channels and networks for community care, health promotion and prevention. This affects both the displaced and non-displaced populations living in the coastal areas.

Table 1: Summary of Damage to Health Services in the Affected Districts

Type of health institution	Number damaged (partial and fully)	Estimated replacement cost (LKR millions)
Hospital damage	35	5,106.5
Damage to preventive health sector	57	1,150.5
Total	92	6,257.0

Table 2: Health Infrastructure Damage by Affected District

Province and District	Number of damaged health institutions		Estimated damage cost (LKR millions)
	Fully damaged	*Partially damaged*	
North East Province			
Trincomalee	3	6	1,059.5
Mullativu	6	0	462.0
Jaffna	0	4	17.0
Kilinochchi	1	0	6.5
Batticaloa	9	10	1,268.0
Amparai	11	2	1,183.0
Southern Province			
Hambantota	0	5	22.5
Matara	2	5	230.5
Galle	10	8	1,957.0
Western Province			
Kalutara	2	3	28.5
Colombo	0	5	22.5
Total	44	48	6,257.0

8. The estimated cost of replacing damaged physical infrastructure (totally and fully damaged) has been estimated at approximately LKR 6.2 billion.

9. This estimate does not include the short and medium term costs required to address transitional arrangements that need to be put in place to restore health services. Furthermore, it does not include the cost of loss of health personnel and the traumatized health staff who have survived the ordeal. This cost also does not include the additional service needs required by the majority of affected (including displaced) people (such as for psycho-social support, additional drugs and supplies, additional expenses related to epidemic preparedness and disease surveillance).

D. RECONSTRUCTION AND RECOVERY NEEDS

10. The reconstruction and recovery of the health sector should be addressed in three stages: immediate needs (day 1 – 3 months), short-term needs (3 – 12 months), and medium and long-term needs (1 – 3 years).

Immediate Health Needs

11. ***Basic health care to the affected.*** Immediate health needs include making available immediate basic health care to people displaced by the disaster. Measures also need to be taken to provide clean water into the camp sites, hospitals and other important areas. Establishing temporary water purification systems, cleaning up contaminated wells in camp sites (schools, religious institutions and other public centers) and in homes where both displaced and non-displaced but affected people are living are of prime importance. The MOH further requires 16 water bowsers to continue the supply of clean water for use by seven affected districts. The mission estimates the cost of this at approximately LKR 140 million.

12. Immediately following the disaster, adequate food supplies were needed for the displaced first as cooked food and then in the form of dry rations. The other urgent need was for medical and psycho-social care of the injured and displaced. As it is well documented that communities affected by major disasters experience extreme stressors, immediate support is needed in psycho-social aspects in addition to the urgent medical needs of the injured. These activities have not been budgeted, but care was been and will need to continue to be provided by Government, well wishers, hospitals, NGOs and donors.

13. ***Prevention of Communicable Diseases.*** The prevention of communicable diseases – especially vaccine preventable diseases and vector borne diseases among the displaced and other affected people – is important. Establishment of immunization and vector control measures were initiated with support from the MOH, UNICEF, WHO and the donor agencies. These measures encompass emergency repair of the cold chain, as well provision of fogging devices and insecticides. Addressing the prevention of communicable diseases through strengthening emergency epidemiological surveillance for major communicable diseases is also paramount. This includes the emergency strengthening of the communication system, laboratory support system, transportation arrangements and feed back and preventive arrangements among affected populations.

Short Term Health Needs

14. ***Strengthening existing health institutions.*** Short term health needs include the strengthening of existing non-damaged health institutions to provide curative services to the affected (including displaced) population. This encompasses the renting or setting up of temporary facilities for providing care, providing additional accommodation facilities, improving the existing facilities to accommodate more patients through better laboratory facilities, improving toilet facilities, establishing/improving blood bank, purchase of urgently needed equipment (sterilizers, incubators, etc.). The major hospitals in all affected districts (Jaffna, Trincomalee, Batticaloa, Matara, Hambantota, Karapitiya, Balapitiya, Elpitiya and Kalutara

hospitals) need to be strengthened and supported to accommodate the additional demands on them. Moreover, establishing a patient referral system supplied with ambulances to meet the urgent demands is critically needed to provide essential health services to the most vulnerable. The renovation, strengthening activities need to follow the policies and strategies adopted by the Government for different levels of curative care institutions. The MOH has not estimated these costs as of yet, but a rough mission estimate is at least an additional LKR 750 million will be required.

15. ***Re-establishing preventive health care needs.*** It is also essential to re-establish essential preventive health care needs such as immunization (resources to establish the cold chain), disease surveillance, safe water supply, maternal and child health care, other reproductive health care, mental health, epidemic control measures, vector borne and zoonotic disease control (Dengue, Malaria, Filariasis, Rabies), food and water borne disease control measures (Dysentery, Typhoid, Hepatitis, Cholera) proper sanitation and hygienic practices, nutrition surveillance and supplementary feeding as needed. The costs to put in place these additional preventive health measures are not yet budgeted by the MOH, but have been estimated by the mission at about LKR 500 million.

16. ***Reestablishment of regular drug supplies.*** Measures are also needed to support the re-establishment of the regularized drug supply of the Medical Supplies Division of the MOH. The drugs and medical supplies received from many donor agencies and countries need to be inventoried and computerized for their more efficient future use. Furthermore, destruction of three regional drug stores in the districts of Amparai (Kalmunai), Mullativu and Matara also resulted in the loss of a large supply of drugs. Therefore, there is a short-term need to meet regular drug needs of MOH, estimated at approximately LKR 200 million.

17. ***Psycho-social support.*** There is also a need for planning and implementing a holistic program addressing the psycho-social needs of the affected (including the displaced). Mental health resources in Sri Lanka are limited and have been further damaged by the disaster. Hence, there is a substantial need for enhancing the capacity of the health system to prevent and manage psycho-social and mental health problems to respond to the present challenges. These psycho-social needs will be needed by the traumatized survivors, care providers (medical personnel, teachers, police etc), orphans and other vulnerable groups (i.e., the elderly, survivors of families who have lost many members of their family units and the disabled). The estimated cost for delivering the mental health program is estimated at LKR 130 million.

18. ***Health planning needs.*** The Ministry of Health and the Provincial Health Authorities need additional support to revisit the previous map of health institutions. This need has great importance as the under utilization of lower level hospitals in the country was very high prior to the disaster. Following the disaster, this is further complicated by the temporary demographic changes observed in the affected areas. Furthermore, the resettlement and housing arrangements of the displaced and a potential ban on construction along a 300 meter coastal belt will need to be considered in making decisions regarding building new health institutions. The assessment team estimates the cost to be at least LKR 100 million for these activities.

Medium and Long Term Needs

19. ***Reconstruct and re-equip health institutions.*** In the medium to long-term, the health sector will need to reconstruct and re-equip the health institutions damaged by to the disaster. Building norms should be reviewed to minimize the vulnerability of those constructions to natural hazards. The estimated total cost of reconstruction, including providing all medical and other equipment vehicles for these institutions by the MOH is approximately LKR 6,257.0 million. This estimate is currently being verified by an independent team from the Building Economics Department of the University of Moratuwa.

20. ***Strengthening the health care delivery system.*** It is also essential to further strengthen health care delivery to the affected especially as they move into their own housing and to new communities, villages, etc. It will be important to re-build the health community channels and network for community care, and health promotion and prevention activities in these new surroundings. Furthermore, continuing support to vulnerable groups, psycho-social support to the needy, orphan child care, elderly care, and disabled care will have to be streamlined and continued. The mission estimated these costs to be about LKR 500 million.

21. ***Strengthening the epidemiological surveillance system***. The MOH will also need to strengthen and establish where necessary epidemiological surveillance capacity at the district level in the affected areas. This entails setting up and/or strengthening the district level laboratory network. The mission estimates this cost to be about LKR 100 million.

Table 3: Summary of Health Sector Needs

Item	Need	Estimated cost (LKR millions)		
		Short term	Medium to long term	Total cost
1.1	Basic health care to the affected	140		140
2.1	Strengthening existing health institutions	750		750
2.2	Reestablishing preventive health care needs	500		500
2.3	Reestablishment of regular drug supplies	200		200
2.4	Psycho-social support	130		130
2.5	Health planning needs	100		100
3.1	Reconstruct and re-equip health institutions		6,257	6,257
3.2	Strengthening the health care delivery system		500	500
3.3	Strengthening the epidemiological surveillance system		100	100
3.4	Establishing an emergency prevention and disaster mitigation system		100	100
	Total estimated costs for recovery	**1,820**	**6,957**	**8,777**

22. ***Establishing an emergency preparedness and disaster mitigation system.*** There will also be a need to support and revisit the national emergency preparedness and disaster mitigation system of the health system, the usefulness of which was further strengthened following the disaster. This should include a vulnerability assessment of existing health institutions and the strengthening of the disaster management capacity of the MOH. Technical assistance from WHO and other partners will be required to plan the activity. The mission estimates the cost for this to be about LKR 100 million.

23. The total recovery needs are estimated at approximately LKR 8.8 billion, including the additional essential health needs over and above the reconstruction package estimated by the MOH.

E. ENVIRONMENTAL AND SOCIAL IMPACTS

24. Following the disaster, important social impacts include the short and medium-term needs for orphan care, care for the disabled and the elderly, the care of the other vulnerable survivors.

25. Furthermore, environmental issues related to health care waste management of newly established hospitals will be of concern and should be addressed during the planning stages of these new institutions.

ANNEX VI - HOUSING

A. HOUSING SITUATION

1. In 2001, it was estimated that Sri Lanka had 9.6 million building units of which 4.6 million or 87 percent were used as dwellings. 1.12 million building units (around 12 percent of all building units in the country) are located in administrative divisions along the Sri Lankan coast which was affected by the tsunami. While the Sri Lankan census classifies around 29 percent of all dwellings in the country as "temporary" (based on the use of non-durable construction materials), Hambantota District in the south has a much higher share of temporary houses (38 percent). There is considerable home ownership in the country with only 13 percent of houses occupied by tenants. In some districts 84 to 90 percent of houses are owner occupied. In terms of dwelling size, Sri Lanka has fairly large houses with 62 to 67 percent of the houses having 3 to 6 rooms and almost 95 percent of houses having two rooms or more. Between 60 to 80 percent of all houses have electricity connections (except in Amparai, Hambantota and Puttalam where the figure is less than 60 percent), around 90 percent have access to water supply and 80 percent have sanitation facilities.

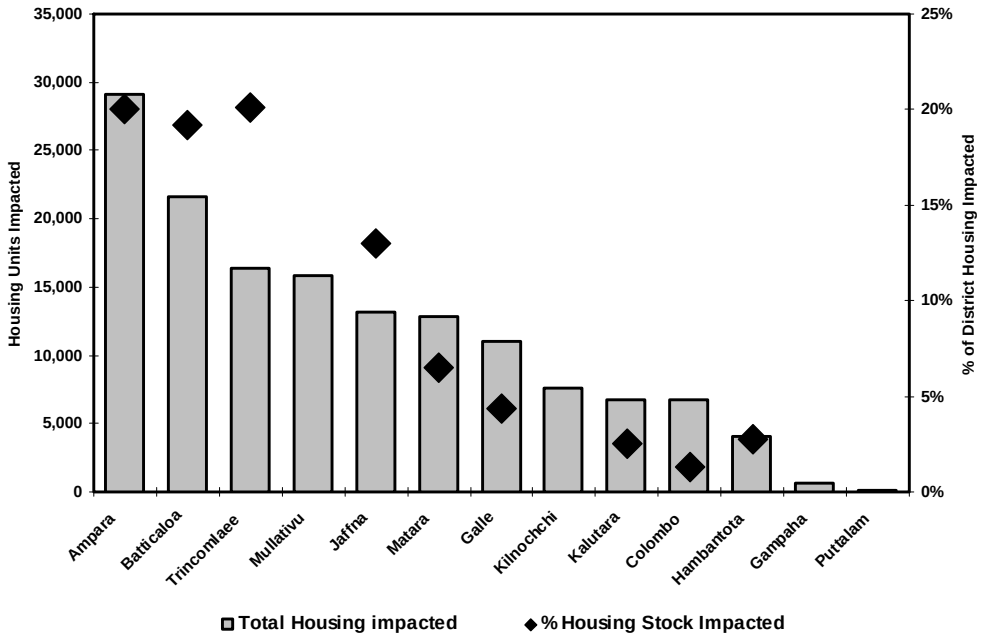
2. A general picture of a typical house along the affected coast would be as follows: generally one floor, on ground structure using shallow foundations with walls made from cement or burnt brick; mostly wooden roof support structures with tiles or cement asbestos roofing sheets. Most had some form of septic tank for disposal of human waste, an electricity connection and access to some form of protected or safe drinking water. However, a large part of what is commonly called "temporary or fishermen's houses" were more modest with unfinished floors, *wattle* and *daub* (mud), wood plank or palm leaf walls and simple roofing, without in-house toilets, water and/or electricity.

B. DAMAGE OVERVIEW

Housing Stocks Destroyed and Damaged

3. The tsunami surge destroyed about 99,478 houses and damaged 46,292 (Source: CNO. *Note: these numbers have fluctuated over the past two weeks*). The damaged houses form about 13 percent of the housing stock of the coastal divisions of the affected districts. Most of the affected housing units were within 500 meters of the coast. The surge was recorded at 15 to 20 feet (5 to 6.5 m) in most of the East, North East and parts of the Southern coast. Most of the places penetrated by the tsunami had a land elevation less than 2 to 3 m above the mean sea level. On the south and south east costs, there were large tracts of the coastline where there are sand dunes which were not at all penetrated by the tsunami surge. The following chart shows the housing stocks in the coastal belt and the total damage in housing by district. The worst affected areas are Amparai and Tricomalee where around 20 percent of the district housing stock was affected. The other districts with significant damage are Batticaloa (19 percent), Matara (7 percent), Galle (4 percent) and Kalutara and Hambantota (3 percent each). The impact on housing stocks in the Puttalam, Mullativu and Kilnochchi districts can not be made as data are not available. At the time of this assessment, figures on the numbers of temporary or permanent building affected are not available.

Housing destroyed or damaged by the tsunami



C. DAMAGE ESTIMATES AND RECOVERY NEEDS (See Table 1)

4. Damage estimates are prepared using a model of high and low value of the houses in the various districts along the coasts. Since the housing stock is composed of temporary and permanent housing, temporary housing was valued at 35 percent of the permanent house based on fact that most temporary housing are much poorer construction and do not have the basic services. The highest values were used for Colombo and Galle and all other places had lower value. Moreover, since most of the affected housing stock was built over a long time period, the value was depreciated by 30 percent. All these value figures were derived from discussions with local architects, quantity surveyors and also comparing the costs of model homes presented on the web. Using the above method, the net damage to housing is estimated between LKR 32 and 36 billion. These estimates are confined to housing damage and do not include commercial properties such as those affected in the coastal cities. The recovery needs are estimated between LKR 46 and 51 billion. Table 1 presents an overview by affected district.

D. RECONSTRUCTION AND RECOVERY STRATEGY

Critical Issues

5. *Dispersed nature of reconstruction*: This disaster has impacted 13 districts along the northern, eastern and southern coastlines. Damage ranges in intensity within and among the different districts. Reconstruction efforts will therefore have to be coordinated and monitored over multiple jurisdictions with varying institutional, human and physical infrastructure capabilities.

Table 1: Housing Damage and Replacement Estimates

Province	District	Destroyed Houses	Damaged Housing	Destroyed Houses	Damaged Housing	Destroyed Houses	Damaged Housing	Total Estimated Replacement Costs		Total Estimated Damage Costs	
								Rs. Million		*Rs. Million*	
		Nos.	*Nos.*	*Low Unit Rates (Rs.00's)*		*High Unit Rates (Rs.00's)*		*Low Estimates*	*High Estimates*	*Low Estimate*	*High Estimate*
Northern	Jaffna	12,000	1,114	4,160	1,456	4,640	1,624	5,154	5,749	3,608	4,024
	Killinochchi	3,400	4,250	3,900	1,365	4,350	1,523	1,906	2,126	1,334	1,488
	Mullaitivu	10,585	5,270	3,900	1,365	4,350	1,523	4,848	5,407	3,393	3,785
Eastern	Trincomalee	5,974	10,394	3,900	1,365	4,350	1,523	3,749	4,181	2,624	2,927
	Batticaloa	15,939	5,665	3,900	1,365	4,350	1,523	6,989	7,796	4,893	5,457
	Ampara	29,097	-	3,640	1,274	4,060	1,421	10,591	11,813	7,414	8,269
Southern	Hambantota	2,303	1,744	3,640	1,274	4,060	1,421	1,060	1,183	742	828
	Matara	7,188	5,659	4,160	1,456	4,640	1,624	3,814	4,254	2,670	2,978
	Galle	5,407	5,628	4,160	1,456	4,640	1,624	3,069	3,423	2,148	2,396
Western	Kalutara	3,100	3,668	3,900	1,365	4,350	1,523	1,710	1,907	1,197	1,335
	Colombo	4,170	2,521	5,200	1,820	5,800	2,030	2,627	2,930	1,839	2,051
	Gampaha	292	307	3,900	1,365	4,350	1,523	156	174	109	122
N.Western	Puttalam	23	72	3,120	1,092	3,480	1,218	15	17	11	12
Total		99,478	46,292					45,688	50,960	31,982	35,672

6. *Conflict and regional sensitivities*: In areas affected by the long conflict, reconstruction activities involving any form of resettlement, if not locally rooted have the potential to affect ethnic ratios further exasperating already tense situations. Moreover, because the tsunami damage has affected neighboring communities (and houses) differently and as recovery assistance will be targeted only to the affected families, tensions between those receiving special assistance and those not part of such programs may become a major issue. This suggests the need for alternate programs to reach the conflict affected families at the same time.

7. *Beneficiary identification*: With around 235,000 families displaced and currently living under a range of arrangements from living with hosts (such as family and friends) and in several welfare camps, it is obvious that finalization of a list of affected families and individuals will be a daunting task. It is possible that some families may be left out of the initial lists. Therefore, the preparation of an as accurate as possible list of reconstruction beneficiaries and a system for appeal for inclusion and procedures for removal from the list need immediate attention.

8. *Supporting decentralization*: Reconstruction over the dispersed locations provides an opportunity for Sri Lanka to deepen its on-going decentralization efforts and further assisting the affected people in interacting with the tier of government which is closest to them. Moreover, this huge task also provides a learning and strengthening opportunity for the provincial and local levels of government. Therefore, reconstruction activity should be designed and implemented at the lowest tier of government which is competent for that particular activity. This will allow for locally appropriate solutions and enable a range of sub-national structures to channel and monitor funds and ensure that they are used to get the best local advantage.

9. *Coastal conservation zone*: Acknowledging the need to reduce risk from wave damage and protect coastal ecology, it is imperative to bring a quick resolution to the question of "no development" zones of 100 to 300 meters along the coast. *Left pending, this issue poses the single most critical threat to the entire recovery and reconstruction process*. Among others, the main areas of concern are: (i) the status of the fishing communities which have lived for decades close to the beach and whose livelihoods depend on their location; (ii) the economic and financial cost as well as feasibility of ever successfully implementing and sustaining such a

policy; and (iii) the effectiveness of ever being able to successfully manage the political, legal, administrative and logistical requirements associated with such a policy. In our opinion, to be effective, the implementation of a blanket "no development zone" would require intense preparation and extensive public consultations along the entire 800 kilometer coastline. Both of these would require considerable time and resources. Given the intense pressure for rapid reconstruction in the post-disaster situation it is advisable to explore alternative ways in which the objectives of minimizing risk and protecting the coastal ecology can be achieved. A pragmatic approach would be to appoint a committee consisting of regional, district, local authorities, and the local community to determine *high priority no-construction zones*. These localized areas are relatively easy to identify based on the extent of damage caused by the tsunami. For example, in the South there are only a handful of specific areas where there is nominal distance between the coastal road and the sea. In such areas, there has been considerable damage. The committee should be empowered to conduct transparent consultations with affected residents before considering these specific areas for declaration as "no construction zones". In these zones, relocation would be facilitated following widely known principles. If there is political ownership for this approach, the entire process could be completed within a month.

10. *Transparency and accountability in reconstruction*: All reconstruction formulation, as well as implementing modes and procedures, will have to be designed to be as transparent as possible. Absence of such transparency will affect the success of all reconstruction efforts. Of particular concern are the listing of beneficiaries, arrangements for and actual disbursement of assistance and the monitoring of reconstruction progress. To ensure accountability, for each component of the reconstruction process, precise responsibilities will have to be assigned and made widely known. Needless to say, fiscal transparency and accountability are of utmost importance.

E. APPROACH TO HOUSING RECONSTRUCTION

10. The geographical spread and varying localized scale of this disaster demand the encouragement of support to multiple parallel reconstruction responses as outlined below.

11. *Household-driven housing reconstruction*: Experience from Gujarat and Turkey (rural) as well as Colombia and Mexico in post-disaster reconstruction indicates that, to the extent possible, the most feasible and sustainable option is *in-situ* reconstruction managed by affected households assisted by a combination of cash grants and access to loans. Sri Lanka's own experience with housing reconstruction after large scale flooding in the Southern Province (where around 17,000 houses are currently being assisted through cash grants) and lessons learned during the preparation of the World Bank supported North East Housing Reconstruction Project (NEHRP) and its related pilot project, support the rationale and feasibility for adopting such an approach. Affected families in eligible locations will be provided a phased payout of cash grants (different grant amounts for completely damaged and partially damaged houses) and assisted to opt for additional housing loans if they so desire. The timing, pace, content and extent of reconstruction will be managed by individual families who will be provided relevant information on possible house type plans, construction costs and techniques, and access to demonstration units. Locally-based civil society organizations will be invited to become involved in enabling the progressive housing reconstruction process and in the interface between households, local governments, building material suppliers and locally-based micro and small scale building contractors. In addition to being the method preferred by individual households,

the approach described above revives local economies through the creation of jobs for locally-based skilled and unskilled labor in schedules best suited to the patterns of local labor demand. In addition, becoming actively involved in and having control over the reconstruction of one's own home is in itself an important part of healing post-disaster trauma.

12. *Community-centered relocation and resettlement in select locations:* It is quite clear that in select locations (such as in the "no construction" areas described above) it will not be advisable to reconstruct affected housing *in-situ*. Moreover, in some locations reconstruction may require the use of more centralized and larger scale building contractors with limited involvement of affected families. Under such circumstances, relocation of the affected community may become necessary. In such cases, the guiding principles will be, to the extent possible, to keep affected communities intact while at the same time providing for individual families and or sub-sets of the community to opt out of such initiatives. In addition, renters and families without tenure will be treated on par with owners who have clear titles.

13. While implementing the above, the following operating principles will be applied:

a. In all relocation/resettlement cases: Affected communities will have to be actively involved in the confirmation of new locations, and provide inputs in layout and infrastructure design. This process must be facilitated by a civil society organization of the community's choice.
b. In cases of new sites where families are assigned land plots: In addition to following the process mentioned in A (above), the preferred method will be for households to manage and supervise house construction as described above.
c. In case of new sites where flats or mass scale construction is required: In addition to following the process mentioned in A (above), community input will be essential in building type, floor plan type selection and involvement in supervision construction.

14. *Assistance to vulnerable groups*: Elderly, disabled, female-headed households and/or households who express inability to manage cash grants or cash grants plus loans will be assisted through select civil society organizations in the management of the housing reconstruction process. Such households will not be isolated, but to the extent possible, but will be encouraged to remain with their original communities.

15. Streamlining regulation of the housing construction process: Three issues are critical: (i) there are very high chances that considerable numbers of affected families may have lost their official documents proving their ownership/tenure status. This situation may be compounded by the fact that in some districts (e.g., Matara) the land registry buildings and their records have been affected. In such cases, a mechanism needs to be put in place to ensure that this does not unduly delay reconstruction; (ii) concise, clear and simplified building codes applicable to the reconstruction process need to be developed, adopted and widely disseminated; and (iii) an accelerated process for the issue of building permits /permissions needs to be institutionalized at the appropriate local, district, and provincial government levels.

16. Assistance to affected local and municipal councils: In all affected coastal locations, local and municipal councils have traditionally not had the requisite institutional capacity and the wherewithal to effectively manage growth. This disaster has compounded the problem. As part of the recovery process, these units of local government will be assisted to develop and mainstream consultative and inclusive recovery strategies including local area redevelopment

plans. Resources for the design, rehabilitation and/or reconstruction of local infrastructure such as internal minor roads, pathways, solid waste management and street lighting will also be required.

17. *Construction sector facilitation*: The localized nature of the tsunami has not severely impacted the overall construction sector. However, three issues are critical: (i) as reconstruction activity has momentum, it is quite possible that availability of skilled labor may pose problems. Initiatives will be required to support the training of skilled construction workers (such as masons, carpenters, plumbers and electricians) through the existing vocational training institutional network and through civil society inputs such as on-the-job training on reconstruction sites; (ii) the country will require assistance to facilitate construction materials and equipment supply chains (*e.g*., import tariffs/duties, policy support for housing component production systems); and (iii) a well developed and appropriate environmental management response for sand mining and lime production is essential.

F. RECOVERY STRATEGY

Immediate Policy Decisions

18. The following immediate policy decisions are necessary:

- *Beneficiary identification***:** A clear national system of identifying affected families and who are eligible for receiving assistance is required. The system has to be fair, accurate, verifiable and able to be monitored.
- *Assistance policy:* Questions such as: (a) who will be eligible for government and public support (will everyone affected be assisted or will there be means testing?); (b) how will donor and NGO support be incorporated; (c) what mechanisms will be put in place to allow donors to pool resources and/or "top up" assistance to affected families; (d) how will affected renters and tenants be assisted?.
- *"No development zone"*: Any blanket "No development zone" will impose multiple critical impacts. A policy is required which scientifically studies localized risk assessment with considerations for: land elevation; social; economic and financial implications; possibilities for realistic and sustainable enforcement; and extensive consultations with affected property owners.
- *Donor coordination*: damage to the housing sector has attracted the attention to a wide range of international and national donors. To avoid duplication of efforts and wastage, it is necessary for the government to put coordination systems for efforts in this sector.

Short Term Recovery (3-15 months)

19. To be effective, formal reconstruction efforts need to commence as soon as possible. We envisage this to be structured as preliminary activities; rural *in-situ* construction and urban construction without any major resettlement. It is expected that at least 10 percent of all housing should be completed during this period.

Preliminary Activities

- Registration of all affected families
- Formalization and public announcement of beneficiary families

- Consultation with families on mode and nature of reconstruction
- Formalization of partnerships with international and national NGOs and public announcement of the nature of their involvement in reconstruction and their respective geographical areas of work

Rural In-situ Construction
- Dissemination of housing and construction technology alternatives
- Temporary shelter for owner-managed
- Community infrastructure construction
- Commencement of household-driven and managed reconstruction
- Facilitation of housing reconstruction process through NGOs and local governments
- Contractor housing construction

Urban Construction Without Resettlement
- Community infrastructure rehab or reconstruction
- Commencement of household driven and managed reconstruction
- Facilitation of housing reconstruction process through NGOs and local governments
- Contractor housing construction

Medium to Long Term Priority (15-60 months)

20. During this period, all activities started in the previous phase will need support and facilitation. In addition, the more complex areas – such as the resettlement of areas where future development is deemed to be risky – would begin reconstruction activities. The overall period would be around 45 months.

Preliminary Activities
- Continued dialogue with and facilitation of families who have commenced reconstruction
- Consultations with communities and families regarding the mode and nature of construction
- Planning and design of settlements and housing to be resettled with inputs from beneficiary communities and families

Rural In-situ Construction Continued
- On-site and related linking infrastructure construction
- Temporary shelter for household managed
- Household-driven and managed construction
- Facilitation of housing reconstruction process through NGOs and local governments
- Contractor housing construction with household supervision

Urban Construction Without Resettlement
- Community infrastructure rehab or reconstruction
- Household-managed and driven reconstruction
- Facilitation of housing reconstruction process through NGOs and local governments
- Contractor housing construction with household supervision

Urban Construction With Resettlement

- Consultation (and agreement) with community and households on the proposed relocation sites
- Community infrastructure construction
- Household-managed and driven construction
- Facilitation of housing construction process through NGOs and local governments
- Contractor housing supervised by community

ANNEX VII -AGRICULTURE AND LIVESTOCK

A. INTRODUCTION

1. A majority of people of almost all the districts affected by the tusnami, (with the exception of Colombo) depend on crop agriculture, livestock and sea fishing both as primary and secondary income sources. The main crop grown is paddy mostly under irrigated conditions. In addition, vegetables and field crops are grown in paddy fields during the dry season and in home gardens both under rain-fed and irrigated conditions. The major field crops grown include chillies, red onion, maize, ground nut, green gram, black gram, gingelly, etc. In Batticoloa and Ampara,there are kadju and beatle are grown both in medium size farms and home gardens. However, most of these are operated as subsistence level income sources and not on commercial scale.

2. Similarly, the livestock sector in the affected districts is not well organized or commercially-oriented. People raise cattle, buffaloes, poultry etc. as a small scale secondary household income generating activity. Scarcity of high quality breeds, lack of commercial feeds, marketing networks and facilities are the inhibiting factors for commercial development of this sector. There are a very few large commercial settled livestock farms in the affected area. Consequently the overall damage to the national economy is not significant although a large number of households have shared the overall loss.

B. DAMAGE OVERVIEW

3. This assessment is based on the preliminary damage assessment data collected both by the Central Government and the concerned Provincial Council authorities, field visits to Galle and Matara district and meetings with the provincial authorities.

Crop Agriculture

4. The tsunami has almost destroyed the entire sea fishing industry as assessed in Annex XIII. A distinct feature of the agriculture sector is that a large majority of paddy tracks and the irrigation supply sources (such as reservoirs, diversion weirs and canal systems) in the affected area are located inland and not along the coastal belt. As a result, the overall damage to agriculture sector is significantly lesser than that of the sea fishery sector.

5. The damage to the agriculture sector is mainly confined to the destruction to standing crops in the paddy and other crop fields and home gardens along the entire coastal belt and washing away of parts of kadju and beatle cultivations along the Eastern coast. Entry of sea water to productive fields has induced high level of soil salinity and consequently the affected people will not be able to grow crops on those soils for about 3-4 years until the salinity is naturally flushed off by the seasonal monsoon rains. The mostly affected districts are Matara, Hambantota, Ampara, Batticoloa, Trincomalee, Mualitivu and Jaffna. A total of about 2,308 ha of lands, including 1,047 ha of paddy lands, 589 ha of other field crops, 473 ha of vegetable cultivation, and 201 ha of fruit crop area got destroyed. In addition about 2,500 home gardens, mainly in the North East have washed off. The total damage to the agricultural farms (without

allowing for the cost of salinization and loss of production for 3-4 years) is about LKR 23 million.

Table 1: Estimated Damage
(LKR Millions)

Description	Quantity	Estimated Cost
Crops		**22.7**
Paddy (ha)	1,047	9.4
Field crops (ha)	589	6.0
Vegetables (ha)	473	4.7
Fruit crops (ha)	201	1.2
Home gardens (ha)	2,500	1.4
Livestock		**106.4**
Poultry (Nos)	62,900	31.5
Cattle (Nos)	6,560	65.6
Gotas (Nos)	3,090	9.3
Irrigation/drainage		**40.0**
Canals (systems) (nos)	15	15.0
SWE* and other structures (nos)	10	25.0
Crop/livestock service facilities		**27.5**
Buildings and office equipment (nos)	03	12.0
Farms/dispensaries (nos)	03	9.0
Vehicles (nos)	02	6.5
Other related public buildings, vehicles & service facilities		**107.0**
Buildings and office equipment (nos)	40	102.0
Vehicles (nos)	7	5.0
TOTAL		**303.6**
* Salt Water Exclusion Structures (and embankments)		

6. No damages to irrigation water sources are reported. However, there are a large number of Salt Water Exclusion (SWE) Structures along the coastal belt from Kalutara to Hambantota and from Batticoloa to Jaffna across various drainage canals and natural streams that carry away rainwater and agricultural drainage from the highlands and agricultural lands to sea. These drainages are also used by the farmers inland to irrigate paddy lands during dry periods. The function of the salt water exclusion structures is to prevent salt water entry into the drainage canals and flush of rain/flood water to the sea to facilitate farming. The tsunami has caused most of the drainage canals eroded and clogged up with debris. Most of the SWE structures, their earthen embankments and control gates and devices are either fully destroyed or severely damaged. In addition, parts of irrigation canal systems close to the sea in Ampara (in *Senanayake Samudra, Weeraadi schemes and a few small tanks*), Batticoloa (*Navakiri, Thumpankerny, Unnichchai, Vakaneri schemes),* Trincomalee (*Kantalai and Allai schemes*) are damaged. The total estimated damage is about LKR 40 million.

Livestock Sector

7. The damage to overall livestock sector is not significant, although poor families have lost their domestic livestock. This will have a negative impact on their livelihoods as domestic livestock-raising served as a safety net against their vulnerability to crop failures, provided mostly supplementary incomes, and added nutritional inputs to their daily diet. The largest damages are reported from Ampara, Batticola, Trincomalee and Mulaitivu. About 63,000 birds, 6,500 cattle and 3,100 goats are reported to be killed. The total loss of production is in the range of about LKR 106 million. This is significantly higher than the estimated damage to the crop fields.

Service Facilities and Buildings

8. The tsunami damaged a large number government buildings belong to the Departments Animal Production and Health, Agriculture, Irrigation, Agrarian Services, etc. These provide housing for the staff that are responsible for providing technical assistance and extension services to the people engaged in irrigated agriculture and livestock production. The total estimated damage to physical service infrastructure is about LKR 135 million.

C. RECONSTRUCTION AND RECOVERY NEEDS

9. Reconstruction and recovery should be undertaken in two phases. The first or the short term phase (3-12 months) should focus on helping the affected families to recover from the loss. This can be done by ensuring that those who dependent on crop husbandry and livestock-raising should be included in the cash grant assistance programs. In addition, they should be provided with micro-credit facilities through community-based revolving fund mechanisms to restart the lost income sources. The rehabilitation of damaged structures and agriculture/livestock service facilities should be started immediately not only to reduce the potential adverse environmental impacts of not restoring the infrastructure but also to provide immediate wage labor employment opportunities in the villages. The Agriculture Department should carry out testing of the salinity affected agricultural fields, take all remedial measures and provide technical guidance for a speedy recovery of those fields. There is also a need to restore the buildings and other public facilities damaged by the Tsunami to enable a fast resumption of the service to the affected people. These interventions should focus on the assessments already done and needs identified and using community structures already in place.

10. In the medium term (1-3 years), as a part of the country's Development Plan, agricultural productivity should be further strengthened through diversification and commercialization of agriculture from the subsistence farming. Immediately, there is a need to re-examine the strategies and availability of funds under the ongoing donor programs such as World Bank-funded NEIAP, Gemi Diriya and ADB-funded NECROD. etc. and use those windows to help the affected communities for more productive agricultural and livestock farming. The long-term recovery plan includes detailed assessment of status of land and water resource, strengthening marketing and support services, strengthening institutional capacity, and development of agricultural infrastructure. The estimated cost of these programs needs to be worked out in detail later.

Table 2: Needs Assessment for Agriculture Sector
(LKR Million)

		Phase I 3-12 months	Phase II 1-3 years	Total
1	Micro-credit facilities to reestablish lost agriculture and livestock dependent livelihoods.	110	100	210
2	Replace damaged agriculture facilities and infrastructure	50	100	150
3	Rehabilitation of soil and water resource in affected area and provision of extension services to facilitate recovery phase	2		2
4	Restoration of damaged SWEs, embankments and drainage canals	15		15
5	Strengthening marketing and support services		10	10
6	Human capacity building, training etc.		20	20
7	Strengthening institutional capacity (adaptive research, multiplication of planting material, etc.)		10	10
	Total	**177**	**250**	**427**

D. OTHER OBSERVED IMPACTS

11. The tsunami has destroyed the small agricultural enterprises. The other impacts of the disaster are very difficult to quantify. It has destroyed the main and supplementary household incomes to many affected victims. Sea water intrusion has damaged the standing crops and salinized about 2,300 ha of paddy lands along the coastal belt. While the salinity would be flushed off after 2-3 heavy rainy seasons, the affected farmers would not be able to grow crops until the salinity disappears. Therefore, the impact of the disaster on agricultural farming will be felt by the victims for a longer period until their farms recover from salinity. The loss of home gardens, farm lands, their productive capacity, and livestock is likely to affect the nutritional intake of the affected families.

12. Most of the drainage canals are clogged up with debris and need to be cleaned. These drainages are used by the farmers inland to irrigate paddy lands and the function of the salt water exclusion structures is to prevent salt water entry into the drainage canals and flush of rain/flood water to the sea to facilitate farming. Most of these structures and the control gates and devices are damaged. If these structures are not repaired and the drainage canals are cleaned, the livelihoods of some farmers inland will be affected due to inadequate drainage. In addition, water logging and stagnation of water may favor mosquito breeding.

13. It is also reported that due to flood and sea water seepage, the cattle grazing areas along the sea shore, particularly in Hambantota, Ampara, Batticoloa, Trincomalee, Mulativu and Jaffna districts are affected. This may pose a threat to cattle to meet their supplementary food requirements.

Appendix 1
Details of Damage to Crop Agriculture Sector

Dsistrict	Paddy Area (ha)	Other Field Crops (ha)	Vegetables (ha)	Fruit Crops (ha)	TOTAL (ha)
Colombo	na	na	na	na	-
Kalutara	5	3	.	5	13
Galle	55	-	15	8	78
Matara	124		15	18	157
Hambantota	143	19	23	20	205
Ampara	290	31	41	28	390
Batticaloa	41	35	119	106	301
Trincomalee	60	410	260	10	740
Mulaitivu	73	36	-	-	109
Jaffna	254	55	-	6	315
Puttlam	na	na	na	na	-
TOTAL	1,047	589	473	201	2,308

Note: In addition about 2500 home gardens mainly in NE have been destroyed. A large number of buildings, vehicles and office equipment and furniture belong to the main public sector service departments of the Crop agriculture sector (Departments of Irrigation, Agriculture, and Agrarian Services) are either fully destroyed or partly damaged. About 40 public buildings and their office furniture and equipment and seven vehicles are reported destroyed/damaged.

Appendix 2
Details of Damage to Livestock

District	Poultry	Cattle	Goats	Damaged Service Facilities
Colombo	-	-	-	
Kalutara	-	-	-	
Galle	-	-	-	Habaraduwa VS office damaged
Matara	-	-	-	Weligama VS office damaged
Hambantota	-	100	100	-
Ampara	29,520	3,420	1,110	Pothuvil milk collecting centre and veterinary dispensary fully destroyed
Batticaloa	17,290	425	439	Kalladi poultry farm fully destroyed
Trincomalee	5,760	275	240	-
Kilinochchi	-	-	100	-
Mulaithivu	9,100	2,050	950	-
Jaffna	1,230	290	150	-
Total	62,900	6,560	3,089	

Note: In addition, the following Government service facilities belong to the Department of Animal production and Health are damaged and not operational.

Muallaitivu Veterinary Dispensary in Malativu District.
Pothuvil Veterinary Dispensary in Ampara District
Pothuvil Milk Collection Centre in Ampara District
Kalladi Poultry Hatchery farm in Batticoloa District
Habaraduwa Veterinary Suregon's Office/dispensary in Galle District
Weligama Veterinary Suregon's Office/dispensary in Matara

ANNEX VIII – LIVELIHOOD

A. INTRODUCTION

1. This annex: (i) describes and estimates the damage to the assets of self-employed and small businesses; (ii) assesses the short term and long term priorities of the assistance to this sector; and (iii) proposes implementation strategies and mechanisms for this assistance.

2. Livelihood not only focuses on income generating capacity, but also people's social links, capacities and skills, financial assets (such as savings, remittances, etc.), transport, access to social services and drinking water, etc. For the purpose of the needs assessment, livelihood restoration focuses on small-scale business entities (comprising of self-employed and small businesses) and those employed in the informal sector. While the disaster imposed significant losses also to businesses with larger assets, this group of enterprises is not included in the strategy and recovery part of the assessment. This group has a better financial and other capacity to cope with the damage and to reestablish the business. Above all, they are in a much better position to mobilize credit from commercial banks and their business partners. Some will also recover their losses from insurance companies.

3. Damage to livelihoods and businesses is both direct and indirect. While there is a possibility that the indirectly affected may be less visible and therefore receive less assistance, we assume that if the missing link is restored within a reasonable timeframe, the indirectly affected businesses will almost automatically recover as well. However, income transfers and other methods would, in the meantime, have to support this category of affected people.

B. DAMAGE OVERVIEW

4. The team undertook the following consultations and site visits:

- Chief Secretary's office of Southern Province, meeting with provincial secretaries in the areas of rural development; cooperative development; lands, agriculture and irrigation; health; and education.
- Sewa Lanka and selected NGOs in Amparai and Batticaloa district
- Site visits to villages Talpe (Galle district) and Kapparatota, Pelena and Totamuna (Matara district), as well as Amparai and Batticaloa and Mullaitivu.
- District secretaries in Hambantota, Amparai and Batticaloa.
- Meetings with TAFREN taskforce members and ILO.

5. About 200,000 people lost their jobs.[1] The disaster has hit those that were already poor the hardest – fishermen and other informal traders and micro enterprises that were located closed to the sea, housed in often ramshackle conditions. Fishermen and related small-scale food processing were affected the most. The fishery sector in Sri Lanka contributes 2.4% of GDP and employs about 148,000 persons directly, and 20,000 indirectly. About 90,000 to 100,000 active

[1] This figure may be revised with more precise data coming in.

fishermen lost their livelihoods. 27,000 lost jobs in tourism or tourism related industries, while small businesses lost 25,000 jobs. Job losses in agriculture, approximately 30,000 are anticipated to be temporary, until damaged infrastructure has been repaired and paddy fields desalinated. The largest job loss stems however from informal jobs spanning a range of informal activities, discussed in more detail below. Here the job loss is an estimated 40,000.

6. The coastal belt ravaged by the tsunami is largely inhabited by the poorer segments of the population in fishing villages and communities. The North and East was doubly hit, since it was just starting a slow economic recovery, beginning with the signing of the cease-fire in 2001, after 20 years of civil war. Some villages and communities in the North and East have been almost completely wiped out. Many families lost all or almost all members which will lead to a severe weakening of coping mechanism and support not only now, but also in future. In less badly affected areas, the economic cycle has been disrupted and cannot resume unless it is kick-started and some cash injected quickly.

7. Not only physical assets were destroyed by the tsunami. The destruction of public buildings means the loss of legal records, mortgage and other details. Banks and other financial institutions are now faced with customers who have lost everything; or they have lost a large number of their clients.[2] Moreover, the informal nature of trading in small market places ('pola') has been disrupted, and many grocery shops destroyed. Means of transport, ranging from bicycles and three-wheelers, to busses and lorries, have been lost, and bus terminals destroyed. Many of the affected families and businesses, having lost their savings which was held in jewelry or the literal 'cash stashed under the mattress', do not have cash and cannot start rebuilding their livelihoods. Businesses that should be in high demand (such as boat builders, carpenters, cement brick producers, etc.) have lost most, or all of their tools, but also face a clientele that has lost everything. For example, fishermen cannot pay boat builders in advance to enable them in turn to buy new tools, as they need boats to start earning money. Damaged cottage cement industries can also not satisfy demand, and sand and cement prices have already started to increase.

8. *Rural industries job loss:* An estimated 25,000 jobs were lost. Few businesses, be they informal or formal, have been reported destroyed in the north and north east, but the number is considerably larger in the towns of Amparai, Matara and Gall. These cover a range of activities from carpentry to cement brick producer, to batik and weaving as well as wooden toys producers and the coir industry. The boat building industry, often small informal workshops, has also been decimated.

9. *Informal, cross sectoral sector jobs*: These 40,000 lost jobs involved very informal activities and were likely to be in fish selling/transporting and drying, agri-business, agro processing, food and beverages services, trading and manufacturing. The job losses for those are likely to be temporary. Examples of livelihood opportunities would include fish mongers[3],

[2] If the Government does not enforce an appropriate social safeguard policy to deal with lost legal documents, these persons may not be able to obtain loans fast enough to recover their lost livelihoods. Debt write-offs will also have to be an option.

[3] Often these traders would not sell more than LKR 800 worth of fish per day.

poultry, paddy, milk, vegetable, maize, wood carving, bakeries, rice mills, livestock, and vehicle hire for transport to market places, often in three-wheelers. Even the most affluent entrepreneurs (incomes greater than LKR 30,000 per month) are largely involved in similar activities though they tend to have more land and/or a greater number of activities rather than large scale single activities. A prosperous family may earn income from a basket of activities including paddy, cattle, garden vegetables and wages. In general, these enterprises produce for local and domestic markets, not for exports.

10. There are some differences in informal activities from region to region, primarily depending on the availability of raw materials. In the coastal belt of the southern province, coir products dominate the informal job market. Bricks and tiles are mostly seen in the district of Puttalam, and rice processing is dominant in eastern provinces.

11. *Tourism job losses:* Total job loss in the tourism industry is estimated at 27,000. The damage to hotels varies sharply district by district. Out of 105 registered hotels in the affected areas, 8 have been completely damaged, and 40 partially, leading to a room loss of 4,000 out of a total of 14,000. An estimated 8,000 staff catering for damaged registered hotels (internet cafes, diving shops, taxi drivers souvenir etc), and the future of at least 6,000 more jobs in tourist hotels is uncertain. Total damage for larger hotels and guesthouses is estimated at $250 million. The number of unregistered hotels and guesthouses are estimated in the region of 3,000 establishments, employing 28,000 people (both directly and indirectly). An estimated two-thirds (19,000) of these 28,000 have lost their livelihoods.[4] Many small businesses and informal traders cater to the tourism industry, ranging from dive, souvenir, and handicraft shops to internet cafes. These were also partially damaged, and are now facing a sustained period of time with far fewer, if any customers.

12. Much depends on how quickly tourists return to the country. Most western countries have lifted their travel restrictions by the end of January, and past experience seems to provide some reason for optimism – tourists returned to the Caribbean 3 months after it had been ravaged by a hurricane. However, in the case of Sri Lanka this still means the main tourism season of January to March, where 150,000 arrivals were expected (out of 650,000 last year) will be lost. Therefore, the loss of livelihood, while not permanent, but be too long for most independent small traders and service providers, as well as hotel employees, to survive on their own savings, and short term coping mechanism will have to be provided to them as well. The formal tourism sector has already submitted plans and strategies on how to recover quickly, among them publicity campaigns in key countries, requests for tax exemptions of imports, and discussion with key package operators who have pledged to ‘put Sri Lanka back on the tourism track’ by the end of February.

C. RECONSTRUCTION/RECOVERY NEEDS AND THE PROPOSED ASSISTANCE STRATEGY

13. The affected population needs immediate help which requires support on non-commercial terms for a defined period and with a clear exit strategy. The loss of assets and livelihoods is in many areas almost total; the quicker cash is injected into the affected communities, the stronger

[4] Damage to restore hotels is estimated at $250 million for the registered hotels.

the ability of the target group to help themselves. This will help the victims regain their dignity, and reduce their dependency on aid.

Table 1: Immediate and Medium Term Costs of Livelihood Restoration (in US$ Millions)*

Item/Urgency	Immediate	Medium Term	Total
Micro-credit and grants to restore productive capacity	70	50	120
Training – reskilling and business development	5	10	15
Public works**	2-5	-	2-5
Total	**77-80**	**60**	**Max 140**

* This table estimates the costs to restore jobs/businesses, and provide employment, in the affected sectors of tourism, fisheries and agriculture, as well as own account workers. It does not include the costs of repairing large registered hotels.

** This excludes the costs for public works in the housing/road sectors, but focuses on municipal facilities such as cleaning wells and repairing bus terminals.

14. Speedy targeting, however, is difficult and will be the key challenge the government and development partners will face. A balance between transparency and speed will have to be found. Existing institutions, NGOs and other agencies might, while highly capable, be unable to cope with this sudden, and substantial, demand for their services. Their capacity would have to be strengthened on a priority basis. At the same time, mechanisms to target the 180,000 informal workers whose job loss might be temporary will also be found. There is a risk that these people, already among the poorest, will fall between the cracks.

15. In the short term it is important to: (i) create and restore income-generating capacity of self-employed and small businesses affected by tsunami; (ii) offer job opportunities to all individuals living in tsunami-affected areas; and (iii) provide training and business-development services to self-employed and small businesses affected by tsunami.

16. In the medium and long term, micro-credit interventions will emphasize assistance to self-employed and small businesses to take advantage of new business opportunities and the adoption of modern, higher productivity technologies. This applies especially to the heavily affected sectors of fisheries, but also affected micro-enterpreneurs, where large potential for efficiency increases exist. Micro-finance could also move towards offering insurance, especially life, crop and productive assets. And last, but not least and crucial to prevent the grant/subsidized loan scheme from eroding the financial viability of micro-finance institutions, a credible exit strategy – moving away from the highly subsidized and grant approach – will also have to be formulated and implemented.

17. To address the above short term livelihood needs, three aspects need to be looked at:

(i) *Grants/loans:* This might be limited to rural industries, small businesses and own-account workers (as defined above) whose assets were destroyed or substantially damaged (some types of entrants into self-employment would also be considered). The selection of grant recipients/borrowers, the size of the grant/loan, and the terms and conditions of loan repayment, will have to be determined. One option would be that a grant should be equal in size for all, while different packages might be offered for those who require assistance above that level. These decisions could be made by a committee

formed at micro-finance/rural finance level, or any other agencies/ committee, depending on the approach adopted.[5] The financial sector in Sri Lanka – especially the rural finance (RF) system – is the densest in the region. For instance, the number of savings accounts with Regional Development Banks, Cooperative Rural Banks, SANASA, Samurdhi, SEEDS, etc. exceeds the number of households by about 2-3 times. This extensive network could be effectively utilized by pooling the efforts of the multi-agency financial system. Banks might also be involved, and targeting of customers outsourced to existing NGOs.

(ii) *Public works:* In principle, jobs will have to be provided to anyone willing to work in the affected areas. Public works should not just focus on temporary job creation (for which there might be a high demand, given the large number of people who will have lost their jobs on a temporary basis), but explore options such as labor-based equipment supported (LBES) approaches to rehabilitating infrastructure, thereby creating sustainable jobs. Close coordination is necessary also with rehabilitation work going on in housing and the road sector, where there is definite scope for adopting labour intensive reconstruction efforts.

(iii) *Business training/re-skilling:* A certain, but presumably small percentage of affected people might for various reasons not be able to return to their previous profession. These people would need help and training. At the same time, the anticipated surge in demand for housing construction might call for some basic, simple 'crash courses' in carpentry, masonry, etc. In the medium term, strategies would have to be refined to perhaps help those in very marginal jobs move into the realm of micro-enterprises.

[5] It is proposed that the outstanding loans of tsunami-affected persons be addressed through a bank-or microfinance rehabilitation project.

ANNEX IX - POWER

A. INTRODUCTION

1. ***Overview of power sector in the tsunami-affected area.*** In the coastal area of Sri Lanka affected by the tsunami, Ceylon Electricity Board (CEB) and Lanka Electricity Company Ltd. (LECO) provide their services in energy sector. CEB is a vertically integrated public governmental institution operating all over Sri Lanka in generation, transmission and distribution, while LECO provides services only in distribution sub-sector in two separate areas to the south and north of the capital city of Colombo (Moratuwa, Kalutara, and Galle in the south and Negombo in the north)[1]. In the tsunami-affected area, there were no major transmission lines, grid sub-stations, and power plants, and only the distribution lines and sub-stations were located to provide electricity to customers in the coastal area.

2. Immediately after the tsunami struck on December 26, 2004, CEB completed a report 'Rebuilding of Power Supply to the Tsunami-Affected Area' and submitted it to TAFREN on 10th January 2005. This comprehensive report covers a preliminary estimate of damages in power sector, short-term plan to rehabilitate damaged infrastructure, and a medium to long term reconstruction plan for the affected coastal region.

3. Based on the CEB's report and information gathered from Ministry of Power and Energy, CEB and LECO, the ADB-JBIC-WB assessment team conducted the needs assessment in the energy sector. The team visited and interacted with district secretariats in Amparai and Hambantota on January 12, and conducted site survery in Galle and Matara on January 14 to hold discussions with CEB's regional offices. The team also held discussions with other potential donor agencies such as KfW.

B. DAMAGE OVERVIEW

4. It appears that despite the unprecedented scale of loss of human life, the impact of the disaster on power sector is rather limited and marginal. The total cost of damage to the assets owned by CEB and LECO, according to the preliminary estimate, is approximately LKR 1.04 billion. The damage is largely confined to the medium and low voltage distribution lines and related transformers located in the coastal areas, while other infrastructure such as grid-substations, major transmission lines, and power plants are not directly damaged by the tsunami.

5. ***Categories of damage.*** The number of households to which electricity supply was interrupted is approximately 62,500[2] in CEB's operating area (about 2% of the total number household customers of CEB) and above 7,800 in LECO's operating area (above 2% of the total household customers of LECO), respectively.

6. The major items destroyed are summarized below (Table 1). About 48 km of medium voltage distribution lines (11kV and 33kV) and 405 km of low voltage distribution lines (400V

[1] LECO provides services to 391,000 customers, while CEB to about 3,567,000.

[2] According to CEB, the number of households which need to replace meters and service wires is 62,542 out of 3,175,000, the total number of CEB service recipients as of October 2004.

and below) are destroyed and needed to be replaced. About 70,000 sets of meters and service wires connected to households are also damaged, as the tidal wave washed away houses, distribution poles and wires. 88 sub-stations located in the distribution networks were also damaged as well.

Table 1: Major Damage Caused by the Tsunami

Item	Quantity	Unit	Cost of Damage (LKR million)
Medium Voltage Line (33kV, 11kV)	48	km	46.4
Low Voltage Line	405	km	299.6
Service Wire and Meter	70,342	house	461.0
Stock, Tool and Building	1	set	65.8

Source: Mission estimate, based on preliminary information from CEB and LECO

7. Other assets such as CEB area office building and housing complex in Hambantota, telecommunication systems in local offices of CEB, and vehicles were damaged. The customers database for Matara district was also lost. In addition, eight CEB employees from Galle, Matara, Colombo, Batticaloa, and Amparai were killed and some employees were injured by the disaster.

8. ***Damage by district.*** In CEB operating areas, distribution lines of almost all the districts were damaged. Out of six districts where LECO provides services, distribution lines and service connectors in four districts (Galle, Kalutara, Moratuwa, and Negombo) were damaged. The regional pattern of damage shows that the assets in the Southern and Eastern Provinces (Batticaloa, Amparai, Galle, and Trincomalee) suffered most, while the Northern Province (Jaffna and Mullaitivu) suffered less. This geographical difference in degree of damage is due to the electrification rate in the Southern and Eastern Provinces being higher than that of the Northern part[3]. However, more information regarding damages in Northern Province is necessary to evaluate the impacts accurately.

10. Loss of asset is highest in Galle district with an estimated cost of LKR 318 million, followed by Amparai district which suffered LKR 236.2 million and Hambantota district with LKR 177.8 million. The number of affected customers is largest in Galle district with nearly 20,000, followed by Amparai district with 14,000.

11. ***Immediate actions taken by CEB and LECO.*** Immediately after the tsunami disaster, CEB started damage assessment and commenced temporary repair works while shifting its labor force and inventories from the unaffected areas to the affected areas. During the temporary repair works, CEB gave priority to recovery of service to water supply facilities, street lights, hospitals, and shelters to meet immediate humanitarian needs. In continuing the temporary repair of the distribution lines, CEB's immediate problem is shortage of working capital to purchase necessary materials.

[3] The average electrification rate in each district as of October 2004 is 46% in Trincomallee, 44% in Baticaloa, 57% in Amparai, 57% in Hambantota, 74% in Matara, and 85% in Galle. The rate in the coastal area is regarded to be higher than that of the district average due to the high density of households in the coastal area. The electrification rate in northern area is envisioned to be around 30-40%.

12. LECO, being operated in a relatively small area compared to CEB, completed temporary repairing and resumed its operation in the affected areas.

Table 2: Summary of Damage to Power Sector by District[4]

District	Number of Consumers Affected[5]	CEB (LKR millions)	LECO (LKR millions)	Total Loss (LKR millions)
Colombo	1,238	1.4	7.5	8.9
Kalutara	1,491		15.0	15.0
Galle	19,582	268.0	50.0	318.0
Matara	11,900	91.1		91.1
Hambantota	8,650	177.8		177.8
Amparai	13,500	236.2		236.2
Batticalloa	6,590	121.7		121.7
Trincomalee	6,000	55.8		55.8
Jaffna	1,300	17.5		17.5
Gampaha	91		0.5	0.5
Total	**70,342**	**969.5**	**73.0**	**1,042.5**

Source: Mission estimate, based on preliminary information from CEB and LECO

C. RECONSTRUCTION AND RECOVERY NEEDS

13. Based on the information gathered from CEB and LECO, and the findings from the site survey, recovery and reconstruction needs for the next three years include:

- Emergency procurement of tools, materials, vehicles, equipment, and office furniture to reestablish the operational capability at regional CEB offices, including replacement of material already used from other projects;
- Rehabilitation and emergency repairs of the damaged power infrastructure in particular the distribution system; and
- Upgrading and expansion of power infrastructure to improve access of the poor to electricity and to promote economic development in the Tsunami-affected area.

14. ***Short Term Priority (3 to 12 months).*** The most urgent need is to resume power supply to the affected customers as soon as possible. Short-term priority should be, therefore, placed on repair and rehabilitation of the existing damaged distribution lines and service connections particularly in CEB operating areas. Thereafter, expansion of the distribution network will need to supply power to new houses which will be provided to the Tsunami-affected people by the Government. This investment should be made in a timely manner to correspond to the progress of the housing plan. The short term financing needs by district is shown in the below table (Table 3).

[4] Unit costs are estimated based on the latest procurement by CEB.

[5] Consumers affected are those who need replacement of integrating watt meters.

Table 3: Short Term Needs of Power Sector (3 to 12 months)
($ millions)

Province	District	Short term needs
Northern	Jaffna	2.3
	Killinochchi	1.2
	Mullaitivu	0.8
Eastern	Trincomalee	0.8
	Batticaloa	4.0
	Amparai	5.3
Southern	Hambantota	3.1
	Matara	2.9
	Galle	3.5
Western	Kalutara	1.7
	Colombo	1.1
	Gampaha	0.2
North Western	Puttalam	0.1
Total		**27.1**

Source: Mission estimate, based on preliminary information from CEB and LECO

15. ***Medium to Long Term Priorities (1 to 3 years).*** To address energy demand growth in the affected areas, the medium voltage distribution network and transmission network will need to be strengthened and expanded. For expansion of the transmission network, CEB has identified new transmission lines between Rantembe - Amparai and Habarana - Valachchena (Batticalloa) as priority projects. However, it should be noted that necessity of these projects within the next three years is to be further scrutinized through a review of a medium to long-term demand forecast of the affected areas as well as generation capacity.

16. The table below (Table 4) shows cost estimate for short term and medium to long term needs. The cost estimate of medium to long term needs will vary depending on the necessity of expansion of transmission networks.

Table 4: Estimate of Total Needs of the Power Sector
($ millions)

	Total Needs
Short term needs (3- 12 months)	27
Medium to long term needs (1-3 years)	40-50
Total Needs	67-77

Source: Mission estimate, based on preliminary information from CEB and LECO

17. CEB estimates that $158.8 million would be required for the next 10 to 15 years, including $81.9 million beyond the next three years. This additional investment beyond 3 years cannot be justified by foreseeable demand growth in the tsunami-affected areas only. It will also depend on overall demand growth of the Northern, Eastern, and Southern Provinces including the affected area. Necessity of these longer-term investments should be carefully examined in the master plan of transmission and generation that will be prepared under JICA funding starting from February 2005.

D. OTHER OBSERVED IMPACTS

18. According to the estimate by CEB, loss of energy supply to consumers is roughly estimated at 120 million kWh in 2005, 75 million kWh in 2006, and 27 million kWh in 2007[6] respectively. Consequently, it is forecast that CEB will suffer revenue loss of about LKR 910 million in 2005, LKR 580 million in 2006, and LKR 209 million in 2007 respectively[7].

19. It is difficult to measure and quantify the economic impact caused by the energy failure due to the tsunami. The opportunity cost of the power failure is calculated using 'the cost of power not served', which is the average loss to the economy due to electricity not supplied. In Sri Lanka, 'the cost of power not served' is estimated to be LKR. 72 per kWh[8]. Based on the CEB's forecast, opportunity cost of energy failure is roughly estimated to be LKR 8.6 billion for 2005, LKR 5.4 billion for 2006, and LKR 1.9 million for 2007, respectively.

E. ENVIRONMENTAL AND SOCIAL ASPECTS

20. Immediate restoration of the power supply in the affected areas requires rehabilitation of the existing distribution network, and therefore, no significant adverse environment and social impact is anticipated. However, in implementing medium to long term reconstruction of the power sector, an appropriate environmental and social assessment will be required.

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6 CEB estimated the loss of energy with following assumption; loss of energy demand will recover 10% in the 1st month after the Tsunami, 30% in next 3 months, 60% in next 8 months, 70% in the 2nd year, 90% in the 3rd year, and fully recovered from the 4th year.

7 CEB adopted the average tariff rate (LKR 7.70/ kWh) for the estimation. The actual revenue impact on CEB might be less than the CEB's estimation as the customers affected are highly subsidized.

8 'Cost of Energy Not Served' is estimated by CEB, based on the study "Assessment of Economic Impact of Poor Power Quality (USAID-SARI/E Programme, October 2002)".

ANNEX X – WATER SUPPLY AND SANITATION

A. INTRODUCTION

1. The needs assessment team, which consists of JBIC, JICA, the World Bank and ADB, held consultations with personnel from the government ministries/agencies, projects at various levels, who served as a base in formulating the initial damage and needs assessment report. The team also consulted with numerous affected people, NGOs, donors assisting the management of temporary refugee camps. The team visited Hambantota, Batticaloa and Trincomalee by air for a general overview, and then to the eastern coast by land. The latter involved detailed discussions with the above stakeholders in the district capitals of Ampara, Batticaloa and Trincomalee with site inspections covering such areas as Pottuvil, Tirukkovil, Akkaraipattu, Kalmunai, Paddiruppu, Kattankudi, Passikudah and Kinniyai.

2. In the water and sanitation sector, the tsunami disaster affected 14 districts in the Northern, Eastern and Southern Provinces, mostly in the areas where dependency on wells was high. Due to the water resource scarcity and the water deliver system damaged by the conflict, most of the tsunami-affected areas had suffered water shortage even before the tsunami. Although the detailed surveys on water situation in the affected areas are being undertaken, it is estimated that more than 60,000 of wells were abandoned or damaged by salinity or high infiltration of sea water. Quick repair works on the damaged distribution system and water delivery through tankers has been initiated by NWSDB & donors to meet daily water requirements. However, the delivery of water has been hindered due to lack of access in some camps. In short term, restoration of services should be needed through rehabilitation of the damaged water distribution network. This needs to be accompanied by sanitation improvement and hygiene education programs. Over the medium to long term, water supply service needs to be expanded in the affected area as water demand grows.

B. DAMAGE OVERVIEW

3. ***Institutional Framework for the WSS Sector.*** The Ministry of Urban Development and Water Supply (MUDWS) is responsible for the WSS sector at the national level, while local authorities are mandated under the Local Government Act to ensure that all citizens have adequate and safe water and sanitation facilities. Technical guidance and approval of household sanitation, particularly in urban areas is the responsibility of Ministry of Health.

4. The National Water Supply and Drainage Board (NWSDB) is the key agency under MUDWS with overall mandate to ‘develop, provide, operate and control water supply and sewerage services’. To operate within a specified area, the NWSDB has to legally declare (through Gazette notification) such an area ‘under its authority, for the provision of water supply and/or sewerage services’ on behalf of a local authority. NWSDB has a decentralized system of six regional offices, each covering from one to three provinces.

5. The Rural Water Supply and Sanitation Unit (RWSSU), which was set up directly under the MUDWS, to implement policy and provide monitoring oversight in the

implementation of rural community systems through a decentralized community-based approach, with technical assistance provided by NWSDB.

6. The World Bank, ADB, JBIC and several other bilateral agencies have supported the sector through sector/multi-sector investment projects implemented through NWSDB or directory through Provincial/District level authorities.

7. The sector has two distinct areas of service delivery: (i) pipe-borne systems, mostly operated by NWSDB; and (ii) household/community systems – small systems operated by communities, and individual household wells and latrines.

Table1: Summary of Damage to Water & Sanitation Sector (mil LKR)

District	Damage to Structure (Replacement Cost)			Indirect Loss			Total Damage Cost
	Pipe-System	Dug-well	Sanitation	Equip	W/S to camps	Survey	
Puttalam		0.4	0.3	0.1	0.1	0.0	0.9
Gampaha	2.7	5.6	3.6	0.9	1.8	0.2	14.6
Colombo	6.5	79.3	50.8	12.6	25.2	2.4	176.7
Kalutara	1.3	59.0	37.7	9.3	18.7	1.8	127.9
Galle	30.2	102.8	65.8	16.3	32.6	3.2	250.9
Matara	39	136.7	87.5	21.7	43.4	4.2	332.4
Hambantota	15.2	43.8	28.0	6.9	13.9	1.3	109.2
Ampara	67.2	553.4	354.2	87.7	175.5	17.0	1,255.0
Batticaloa	53	303.1	194.0	48.1	96.1	9.3	703.7
Trincomalee	104.8	113.6	72.7	18.0	36.0	3.5	348.7
Mulativ		201.3	128.9	31.9	63.8	6.2	432.1
Killinochchi		64.7	41.4	10.3	20.5	2.0	138.8
Jaffna		228.2	146.1	36.2	72.4	7.0	489.9
Total	319.9	1,892	1,211	300	600	58	4,380.9
						US$ 39.8Mil	

Note: *The above cost is based on NWSDB's estimate. Damage cost is calculated as the repair cost of the damaged portion of the existing water supply and sewerage systems.*

8. ***Pipe-borne Water Supply and Sewerage Systems.*** The physical damage to the existing water supply schemes by the Tsunami is principally restricted to the distribution networks adjacent to the shoreline. In order to respond to the urgent need to supply water, temporary measures to restore the water supply service delivery have been made by repairing of some damaged pipelines, water delivery through tankers, etc. Nine systems are reported to have been damaged (see Table 2).

9. NWSDB has to date completed immediate repairs to all the systems to restore them to operable levels. However, supplies are restricted due to i) only partial repairs having been done at some intake works, ii) higher demand arising from density of displaced persons in some areas, and iii) some distribution networks requiring major

replacement. The total cost for restoring the existing systems is in the region of $2.9 million. However, with the restoration of communities inland from the shoreline, some systems would need to be expanded inland, with parts of existing networks becoming redundant. In addition, some new systems would be required.

Table 2: Damage to Pipe-borne Systems

District	Extent of Damage
Gampaha	3 pipelines at bridge crossings
Colombo	Distribution network in coastal areas; sewage pump house
Kalutara	Pipeline at bridge crossing; pump house
Galle	Distribution networks
Matara	1 pumping main; distribution network
Hambantota	Pipeline at bridge crossing; distribution network
Ampara	3 distribution networks
Batticaloa	Intake works; pump house and pumping main
Trincomalee	1 distribution network (office building, billing system, computer, vehicles, etc)
Sub-total	LKR 319 million **($2.9 mil)** (for repair to existing systems)

10. ***Household/Community Systems.*** Portable water is currently provided through bowser supply to the areas where pipe-borne systems are not in operation and wells are yet to be cleaned. An estimated number of dug wells affected by the tsunami is 62,000 wells, out of which at least 12,000 wells (and probably more) need to be cleaned. So far around 850 have been cleaned to date.

11. Some wells have been found to be beyond recovery, with high pollution of the aquifer and/or irrecoverable physical damage due to changed topography. There is an urgent need to assess the physical damage to wells and water quality of wells in affected areas including privately-owned wells. Some of the wells are recoverable by extraction of saline water although a careful attention should be paid not to over-extract as it may cause further penetration from sea water. Other wells contaminated heavily by sea water should be abandoned and an alternate water resource, (in some cases through new pipe-borne systems) should be secured. But it is noted that the well supply will not be a significant water resource in the coastal area of the Southern region. Damage to sanitation facilities include latrines in abandoned individual households.

13. Sewerage pump house at Mt. Lavinia, which is part of the Colombo sewerage system, is damaged. Other than Colombo sewerage system, sewage throughout the affected areas was disposed through household systems. A few housing schemes have their own sewage treatment systems. That are operated mostly by private parties.

14. A large number of low income families who lived on the coastal belt did not have proper sanitary facilities prior to the disaster. This has necessitated the inclusion of hygiene education with the installation of sanitary latrines in the welfare camps. An estimated number of 30,000 latrines (including 16,000 in transit camps) will need to be repaired/replaced.

15. ***Urgently Needed Items/Equipment***. Water bowsers, Gully emptiers, water meter, crew cabs, polyethylene pipes, water disinfection kits, generators, water quality testing kits, water purification kits, sludge pumps, water pumps, electric gears, etc.

C. RECOVERY AND RECONSTRUCTION NEEDS

16. ***Short-term Priority (3-12 months).*** Generally, the population has moved out of the tsunami affected areas to live with relatives or into many small scattered emergency camps established inland. The water demand of the emergency camps is principally being supplied to small storage tanks by water bowsers. There is a scarcity of water supply to those camps and areas where access is limited due to the bad road condition.

17. In the immediate aftermath of the disaster, NWSDB played the lead role in organizing a response system for the WSS sector, i.e. coordinating and/or directly setting up temporary water supply and sanitation systems in the welfare camps; cleaning of wells and disinfection; and immediate repairs to the pipe-borne systems to bring them to operating status.

18. UNICEF has been working closely with NWSDB in collating information and coordinating current activities, which includes interventions by various local and international NGOs, and private sector agencies (more than 20 partners). The World Bank and ADB-supported ongoing projects, and other bilateral and aid organizations have provided materials and equipment (tanks, pumps etc) for the welfare camps and for well cleaning. Around 850 wells have been cleaned and disinfected to date (7%).
Currently, aid agencies directly supporting projects being implemented through the decentralized administration, particularly in the North and East (ADB, World Bank and others), have sanctioned the use of ongoing project funds for the procurement of materials and equipment for the immediate needs in the North and East. The most difficult area to address during the relief phase has been the provision of adequate sanitation facilities. Around 8,000 toilet units are required for the welfare camps. UNICEF has ordered 8,000 squatting pans, of which 3,000 have been delivered and 500 installed. In addition, about 20 gully emptiers have been assigned for sewage collection.

19. Provision of temporary/semi-permanent water supply and sanitation systems in assigned transit camps with possible continued use of water supply and sewage disposal bowsers in some camps should continue.

20. ***Recovery phase (in one year).*** The recovery phase will cover (i) well cleaning/

Table 3 Short-term Needs for WSS Sector

Component	Cost Estimation Base	Estimate (mil LKR)
1) Project	Service Restoration (Hikkaduwa, Galle, Hambantota, Batticaloa, Potuvil, Trincomalee, Point Pedro, Mulaitivu, Kalutara, etc.)	6,600
2) Service to camps	Repair/construction of sanitary facilities in transit camps and returnee areas (appx. 20,000 latrines) and hygiene education	110
3) Study	Water situation assessment and water quality tests	(58:immediate relief)
	Feasibility studies on priority projects	-
		Total **LKR 6.7 bil ($61mil)**

repairs/new construction and provision of sanitation facilities in areas where communities can return to their homes, together with systematic water quality testing over a reasonable period; and (ii) rehabilitation of damaged water distribution networks and headworks. Physical rehabilitation works will be complemented by hygiene education programs, particularly in the transit camps.

21. ***Medium-term Priority (1-3 years).*** Due to the insufficient water delivery system damaged by the conflict or the lack of adequate water resource, most of the affected areas had suffered water shortage even before the Tsunami. NWSDB has planned a range of medium/long term measures to provide sustainable and reliable drinking water supply to affected areas and has carried out a quick assessment of the rehabilitation/augmentation requirements of existing systems, with a breakdown into 20 packages covering the Southern, Northern, Eastern and Western Provinces.

22. As medium- to long-term plan includes various water supply & sanitation development projects, the cost estimate is much higher than the Tsunami damage cost, because of the following reasons;

Some of the affected people depended on dug wells. Due to high contamination of seawater in some of the wells, an alternate water resource should be secured mainly through connecting to new pipe-borne water supply schemes.
Relocation policy by the Urban Development Authority will lead to more dense population in town areas where a dug well system is not recommended due to high possibility. This will require expansion and augmentation of the existing systems.
New water supply schemes will be needed to ensure minimum water requirement for the communities in the Northern, Eastern, and Southern provinces including the Tsunami affected areas.

23. It is recommended that GOSL develop a strategy for medium-to long –term development by assessing the water supply need to meet both the present and future demands, and in the context of new settlement developments in line with the on-going development initiative. Additionally, NWSDB has proposed the implementation of sewerage systems for critical areas near the coast, with a very tentative estimate of US$93 million. This component would possibly need to be considered for the far long-term and not as part of the emergency long-term package (1-3year). Taking into account the importance of the sanitation, it is recommended that NWSDB include the sanitation component at the preparation/design stage of water supply projects. However, considering the high density population in Galle, a piped sewer system can be taken up for the priority program to secure the good sanitation condition to the residents in Galle city including the affected people, together with the development of water supply system.

Table 4 Medium-term Needs for WSS Sector

Component	Estimate (LKR million)
1) Water supply (incl. household sanitation) (Galle W/S, Ampara W/S, Trincomalee W/S)	4,200
2) Sewerage (Galle piped sewer system)	1,300
Total	**SLR 5,500 mil (USD 50mil)**

D. OTHER OBSERVED IMPACTS

25. As NWSDB provides water to the displaced people free of charge, it is losing the revenue for the time being. In addition, it has lost the billing system in some areas. Due to the immediate need to maintain the relief work to provide water to affected people, NWSDB is operating the machinery and equipment procured or provided by donors. The additional operation cost for fuel, electricity, disinfectant arising from the relief work will give extra financial burden on NWSDB.

E. ENVIRONMENTAL AND SOCIAL ASPECTS

26. Together with preventive health care, sanitation will play an important part in the emergency program, which will not only involve human waste, sewage and solid waste disposal but also community education and mobilization. Proper planning in resettlements will need to be done to identify methods of and sites for treatment and disposal of waste.

27. *Lack of hygiene practices.* Many of the refugees in the camps who were originally living in coastal areas are not accustomed to sanitation facilities. It was observed in the camps, their hygiene practices are not satisfactory, and which may lead to health problems, such as skin diseases, vector- and water- born diseases. To prevent these problems hygiene education to ensure use of toilets, washing hands and cleaning of the living environment is necessary. Appropriate number of field workers should be trained so that they can visit each camp to instruct and monitor hygiene practices. In addition, materials such as posters and leaflets can reinforce the activities.

28. ***Gender and social issue.*** In some camps, the women feel embarrassed or unsafe to use the temporary latrines which are just covered by plastic sheets and without locks. They normally go to the neighboring houses to use the latrines. Nevertheless, this can also be another factor of embarrassment for the users and bother for the house residents. To make latrines women friendly, separate use of latrines between men and women is recommended. And a latrine for women should have a door and lock. If such structure is not available immediately, a signboard to indicate if the latrine is in use can improve the facilities. Likewise, bathing facilities should also have such separation by sex. There must be a consensus in a community to rule the use of sanitation and bathing facilities to protect the privacy of women.

ANNEX XI – TRANSPORTATION - RAILWAYS

A. INTRODUCTION

1. The mission met with officials of Sri Lanka Railways (SLR) and performed a joint field survey with SLR staff of the southern rail corridor, which extends approximately 170 km from Maradana in Colombo to Matara, to determine the extent of the damage caused by the events of December 26, 2004, and review SLR's plans for repairing and redeveloping the corridor.

B. DAMAGE OVERVIEW

2. Operational rail corridors in Sri Lanka extend from Colombo to Vavuniya in the north, Trincomalee in the northeast, and Batticaloa in the east, and Matara in the south. The events of 26 December caused disruption to rail services in the northeastern, eastern and southern corridors.

3. The tracks were damaged in the northeastern corridor between China Bay and Trincomalee; tracks and a bridge were damaged in the eastern corridor between Valachchanai and Batticaloa. The damages in these corridors were repaired and full services restored during the week of 10 January 2005.

4. In the southern corridor the dual track portion between Maradana in Colombo and Kalutara suffered minor damage that was quickly repaired. Beyond Kalutara on the single-track section an approximately 20 km length has suffered severe damage to embankments, track work, bridges and culverts, signaling and communication systems, buildings and rolling stock. Services remain suspended beyond Kalutara and full resumption of service is not anticipated until May 2005 with partial services possibly resuming at the end of February. The damaged rolling stock will remain out of service for some time, as it cannot be returned to the Colombo workshops for repair until the track is restored.

C. RECONSTRUCTION AND RECOVERY NEEDS

Short Term Needs

5. SLR's survey and the Mission's field visit revealed that the following rail system components need to be repaired to enable services to be restored to the pre-tsunami levels:

1. Track-bed, rails and sleepers
2. Bridges and culverts
3. Railway stations and substations
4. Railway employees quarters, dwelling and relay houses
5. Automated signaling system
6. Advance communication system
7. Locomotives
8. Power Sets (Multiple Train Units)
9. Coaches (passenger carriages)
10. Construction equipment

6. The estimated cost of these short term needs is summarized in Table C1. A four month program for reconstruction and procurement is required. This repair work commenced on December 27, 2004 and is on-going. Partial services between Kalutara and Ambalangoda, and Galle to Weligama are expected to resume by the end of February 2005. This initial work is expected to permit the disabled locomotives and rolling stock to be hauled to the maintenance depot for repairs.

7. It should be noted that new locomotives and rolling stock may be required to replace the damaged and isolated equipment. A minimum of three months from firm order to delivery is required to procure new locomotives and rolling stock.

Medium Term Needs

8. While the above short term repairs and replacements will enable services to be resumed to pre-tsunami levels, the SLR consider that operational, economic and social benefits would accrue if the above short term repairs, on the 20km long damaged section, were combined with rehabilitation of the whole 160 km long southern rail corridor. These rehabilitations would include track work, stations, building, signaling and communications systems, procurement of locomotives, multiple train units (MTUs) and passenger carriages.

9. The estimated cost of the medium term needs – including the costs of the short term needs – is summarized in Table C1. SLR considers that these works and procurements could be accomplished over a 12 month period.

Long Term Needs

10. In the long term the capacity of the Southern Rail Corridor would be considerably increased by constructing a second track from Kalutara to Galle. There is significant demand over this section. This demand is restrained by the capacity of the existing single track. The second track can be constructed within the existing right of way and would require additional rolling stock as well as expansion of, and improvements to, stations, signaling and communication systems. There is also a long term plan to extend the Southern Rail Corridor by 110 kms from Matara to Kataragama and to construct a new twin track electrified railway from Colombo to Matara. These long term developments and extensions are not being considered in this current needs assessment as they are related to national strategic transport planning and not to the tsunami.

D. OTHER OBSERVED IMPACTS

11. SLR operates 102 trains per day in the southern corridor, which carry about 78,000 passengers (28 million passengers annually) and bulk freight. The passengers are mostly commuters, while freight traffic largely comprises petroleum products to and from the Port of Galle.

12. Over half the regular rail passengers are now enduring severe hardships due to the absence of rail services in the corridor. Alternative public transport in the corridor is constrained due to the significant losses of the regional bus fleets. Although freight traffic in

the corridor is not significant, service cancellations are reportedly causing shortages in fuel and food items.

Table 1: Summary of Estimated Costs
(Millions)

Item	Short Term		Medium Term	
	LKR	US$	LKR	US$
Civil Works	700		2,000	
Signaling and Communications	250		1,800	
Locomotives + Multiple Train Units	100		1,450	
Passenger Wagons	60		1,125	
Locomotive spares	135		270	
Station equipment	15		40	
Construction equipment	100		100	
Contingencies	272		1,018	
Rounded Totals	**1,600**	**15.0**	**7800**	**71.0**

13. Given the traditional reliance of many commuters in southern cities on rail transport and the lack of alternatives modes of transport, SLR and the Government have set restoration of basic services within 60 days as its highest priority. SLR is also examining the feasibility of combining restoration to normalcy with strategies to enhance rail services and increase the economic benefits of re-building the southern coastal belt.

14. The short-term loss of rail service will occasion travel time and travel cost losses to passengers, economic loss to Government and commercial losses to the rail operator and freight users.

E. ENVIRONMENTAL AND SOCIAL ASPECTS

15. Adverse environmental impacts are not anticipated for the short or medium term works. SLR report that sections of the Southern Corridor right of way are occupied by squatters. Their presence affects train speeds and safety and a resettlement program is indicated. Resettlement is not an essential prelude to the short and medium term works.
The installation of automated signaled level crossings in the Southern Corridor would greatly enhance both road and rail safety.

Implementation

16. SLR would implement the works using their direct labour force and specialist contractors and suppliers. Rolling stock would be procured from India, which country has a similar broad rail gauge.

Attachment 1
Estimated Cost of Restoration –Short Term

	Item	Quantity	Restoration Cost (LKR Million)
1.	Relaying of track on reconstructed or rehabilitated embankments and track/sleeper replacement	Approximately 20 km	600
2.	Bridges	10 including 2 which have to be reconstructed due to the widening of the span from severe abutment erosion and scouring	50
3.	Buildings	35 railways stations, 34 substations, and 32 railway employees quarters, dwellings and relay houses	50
4.	Automated signaling system	Southern corridor	
5.	Signal & telecom system repair	Southern corridor	250
6.	Advance communication system	Southern corridor	
7.	Diesel locomotives (maximum 18 ton, 1800-2000 horsepower)	2 units	50
8.	Diesel-electric 1000-1100 horsepower Power Sets (Multiple Train Units)	2 units	50
9.	5 ft 2nd class carriages (capacity 56 passengers)	5 units to be repaired	20
10.	55 ft 3rd class carriages (capacity 80- passengers)	10 units to be repaired	40
11.	Spare locomotive engines	1 new unit	75
12.	Spare MTU engines	1 new unit	60
13.	Railway station equipment (Generators, trolleys, etc)	30 each	15
14.	Construction equipment	Backhoes and trucks	100
	Contingencies	20%	272
	Total Cost		**1,632** US$ 15 million

Attachment 2
Estimated Cost of Repair /Rehabilitation – Medium Term

	Item	Quantity	Restoration Cost (Rs.Million)
1.	Relaying of track on reconstructed or rehabilitated embankments and track/sleeper replacement, bridge replacement/rehabilitation	Approximately 160 km	1600
2.	Buildings	Stations, substations, and railway employees quarters, dwellings and relay houses	400
3.	Automated signaling system	Southern corridor	800
4.	Signal system repair	Southern corridor	200
5.	Advance communication system	Southern corridor	800
6.	Diesel locomotives (maximum 18 ton, 1800-2000 horsepower)	4 new and 1 rehab	1000
7.	Diesel-electric 1000-1100 horsepower Power Sets (Multiple Train Units)	3 new and 1 rehab	450
8.	55 ft 2nd class carriages (capacity 56 passengers)	20 new + 5 rehab	450
9.	55 ft 3rd class carriages (capacity 80- passengers)	30 new + 10 rehab	675
10.	Spare locomotive engines	2	150
11.	Spare MTU engines	2	120
12.	Railway station equipment (Generators, trolleys, etc)	40 each	40
13.	Construction equipment	Backhoes and trucks	100
Contingencies			1018
	Total Cost		**7803** US$ 71 million

ANNEX XII – TRANSPORTATION - ROADS

A. INTRODUCTION

1. The mission met with representatives of the GOSL, LTTE, the Roads Development Authority (Classes A and B roads) and the Provincial Roads Administrations in the Tsunami affected Districts (classes C,D and E roads). Field inspections were undertaken by road and air in the Southern, Uva and North East Provinces.

Sri Lankan roads have a three tier hierarchy namely:

1) National roads, comprising classes A and B and assigned to the Roads Development Authority (RDA) under the Ministry of Highways.
2) Provincial roads, comprising classes C, D and E and assigned to the Provincial Councils.
3) Local government roads, both urban and rural and assigned to the urban or municipal councils and the Predeshya Sabha (rural council).

B. DAMAGE OVERVIEW

Background

2. Until recently there has been no significant investment in the road network of Sri Lanka for a very long time. Maintenance of the road network was neglected during the 20 years of Civil war and a number of roads suffered conflict damage to bridges and causeways. The result is a substandard road network whose condition has severely deteriorated due to maintenance neglect. Operating conditions and speeds are poor on many roads due to deteriorated road surfaces and reduced carriageway width. Some roads remain impassable due to conflict damage and erosion. Road conditions in the North East Province are particularly bad.

3. It is necessary to place the tsunami damage into the context of the pre-tsunami road conditions. It is estimated that approximately 60% of the entire road network was damaged due to maintenance neglect during the conflict years. The tsunami event caused damage to less than five percent of the rational roads network and approximately two percent of the provincial and local government road network. This damage occurred to roads that, in the main, were already severely damaged by lack of maintenance. In the east damage has been caused to coastal roads by heavy rain and severe flooding immediately before and after the tsunami. On most roads it is not possible to segregate tsunami damage from flood damage and from conflict related damage.

National Roads

4. Of the three categories of roads, the national roads suffered the most significant damage. Sections of these roads run close to and parallel with the coast. Bridges on these

roads span rivers and inlets draining to the sea. Damage has occurred over a total length of 690 kms of national roads. This damage is in spot locations or in discrete sections and not over the entire length of 690 kms. The sections not affected by the tsunami remained passable but in a deteriorated condition due to the conflict. Damage typically comprises bridges washed off their abutments, bridge abutment scour and displacement, culvert blow out, embankment scour, wearing surfaces unraveling and loss of road furniture. Additionally road ferry piers have been damaged and ferry vessels destroyed.

Provincial and Local Government Roads

5. Provincial roads connect smaller towns and villages to the national road network. In coastal regions, these provincial roads tend to be aligned at right angles to the coast. These roads therefore presented less of a barrier to the advancing and retreating tsunami and consequently suffered less severe and extensive damage. It is estimated that a total length of 300 kms of provincial roads has been extensively damaged, including damage to ferry piers and loss of ferry vessels.

6. Local government roads connect to provincial roads or are the urban roads in towns and municipalities. As with provincial roads, damage was less severe and a total length of approximately 1180 kms was affected by the tsunami.

Immediate Response to Damage

7. The RDA and Provincial Road Authorities have been quick to respond to the tsunami damage and temporary road repairs and placement of temporary Bailey bridges has enabled the South Coast Highway and Northern Coastal Roads to be re-opened to traffic within a week or so of the tsunami event. Immediate temporary repair works are proceeding on the East Coast Highway and most sections were opened to traffic by the second week of January 2005. The multi span steel Arugam Bay Bridge, near Puttuvill, suffered extensive embankment washout on its approaches and one pier is displaced. Temporary repairs involving a floating pontoon roadway and ramps to the bridge are being attempted and a temporary detour route has been constructed. It is planned that the remaining severed sections of the east coast roads will be temporally repaired by the end of January 2005.

8. These immediate repairs are being funded from current budget and budget deficits are likely to accrue.

C. RECONSTRUCTION AND RECOVERY NEEDS

9. ***Short Term Needs.*** In the short term there is an urgent need to consolidate the temporary road and bridge repairs before onset of the next northeast monsoon season. If this is not done then there is a grave danger that further damage may occur and that temporary repairs may fail. The work would comprise embankment stabilization, replacement of temporary bridges with permanent bridges, structural repairs to damaged bridges, drainage and culvert repairs and enlargement, abutment slope protection, reinstatement of damaged pavements, and replacement of road furniture. The road works

could be mainly completed over a six month contract period following specification of the work and contractor procurement. Permanent bridge replacement would, however, probably extend into the 2006 construction season. It would therefore be necessary to include in the short term works contracts for strengthening and protecting the temporary Bailey bridges.

10. The damaged steel multi-span Arumgam Bay Bridge is over 60 years old and is significantly corroded. It may be uneconomical to effect repairs to this bridge and a new replacement bridge is indicated. It is doubtful that this new bridge construction could be started in the short term due to lead in time for site investigation, design and procurement. This replacement bridge is therefore included in the medium term needs. Estimates of costs for the short term needs are presented for each category of road in Table C1. These costs include the costs of the immediate and temporary repair works now being undertaken. It is anticipated that these short term road and bridge works will not require resettlement or land acquisition, and that there will not be any adverse environmental impacts.

11. ***Medium Term Needs.*** Following the short term work it will be necessary to put the national roads into a uniform and maintainable condition free from seasonal flood damage and erosion. Embankments and carriageways would be widened to a uniform width to meet the national standard for that class of road, and pavements would be reinstated. Embankments would be elevated above the seasonal flood levels and protected, and drainage systems would be improved. The hydraulic capacities of culverts and bridges would be checked and where deficient larger culverts and higher, longer span bridges would be constructed. It is anticipated that the medium term works could commence in the 2006 construction season and would continue for two to three years. Investigations, designs, contractor procurement and resettlement/land acquisition procedures would commence in 2005. In the main the medium term works would follow the line of the existing road and be within the existing right of way. Environmental impacts, resettlement and land acquisition is expected to be minor.

12. Cost estimates for this medium term work are presented in Table C1. The medium term needs include the reconstruction of provincial and local government roads that join the national roads to be reconstructed. These roads, while not being damaged by the tsunami are in a much deteriorated state. The reconstruction of these roads is considered vital to extend the economic, commercial and social benefits of the national road reconstructions into the adjoining coastal and agricultural communities.

13. ***Long Term Needs.*** It is recognized that these would be a long-term need to improve the capacity and operating speeds on the national road network. These long-term improvements would reflect national and regional development planning. A National Roads Master Plan is currently being drawn up to guide network improvements and establish priorities for investment. The long-term needs of the coastal national roads affected by the tsunami are not considered in this needs assessment.

TABLE C1
Summary of Estimated Costs

Road Category	Short Term Needs		Medium Term Needs	
	LKR Millions	US$ Millions	LKR Millions	US$ Millions
National (Classes A & B)	1600	15	15,300	140
Provincial (Classes C, D & E)	300	3	1,200	11
Local government	300	3	600	6
Total	**2200**	**21**	**17,100**	**157**

D. IMPLEMENTATION

14. Conventional contract documentation and procurement procedures will militate against a rapid start to the short-term works. An innovative approach to financing, procurement, project management and supervision is required for these works. The objective would be to enable a start during the 2005 dry season. It is anticipated that nationally registered contractors would carry out the National Roads program, possibly with the aid, assistance, management skills and equipment availability of international contractors.

15. The provincial roads work program should be carried out by local contractors with the bidding, project management, procurement, and supervision procedures already established for on-going multi-lateral funded projects in the North East.

16. Local government works program are an excellent opportunity for labour intensive construction and community involvement in construction. There are already good examples of local road rehabilitations carried out by these methods. Significant social and livelihood benefits would accrue to the affected coastal communities through their direct participation in road construction.

17. For the medium term works, provincial and local government road rehabilitation can be implemented as above. The scale of expenditure on the national road network would, however, demand a more conventional approach to investigations, designs, contract preparation, contractor procurement, project management and construction supervision. Efforts must be made to secure funding to enable these procedures to commence in the short term with a view to procuring contractors and works commencement, for the medium term works, early in 2006.

18. Finally, there has to be a mechanism for determining a priority for investment in these tsunami affected road rehabilitation programs. At national regional district and local levels, consultations will be necessary to establish needs, priorities for reparations and mechanism for implementation.

Attachment 1

Damages Caused By Tidal Wave (Tsunami)
To National Road Sector- Short Term Repairs

Cost Estimate for carrying out repairs to the damaged roads and bridges immediately and for the reinforcing such temporary work

Road	Current Status	Action	Id No	Approximate Cost (Rs.Mn)
Southern Province:				
Colombo-Galle- Hambantota-Wellawaya Road (A2):				
Akurala Bridge	Damaged	Bailey bridge installed	**1**	
Seenigama and Hikkaduwa Sections (96-99 km)	Breached (30-40m long)	Filling completed	**2**	
Magalle Bridge	Damaged	Bailey bridge installed	**3**	
Goiyapana Bridge	Damaged	Bailey bridge installed	**4**	500.00
Weligama Bridge(145/3 &145/5)	Damaged	Repairs attended	**5**	
Dondra Bridge (166/1)	Approaches damaged	Repairs attended	**6**	
Talalla	Bend Damaged	Repairs attended	**7**	
North -East (East) Province:				
Ambepussa-Kurunegalla- Trincomalle Road (A6):				
197th km	Retaining wall (20m) damaged. The road is passable	Being repaired	**8**	1.00
Trincomalee-Pulmoddai Road				
22nd km- Salappawaru bridge	Approach (200m) washed off. The road is impassable	Repairs attended	**9**	2.00
Beach Road				
1st km	Culvert damaged. Half the carriageway (75m) washed off. The road is impassable	Repairs attended	**10**	2.00
Batticaloa-Trincomalee Road (A15)				
116-121 km	Washed off The road is impassable	Being repaired (25% (2km) completed)	**11**	30.00
126th km	Half the carriageway (100m) washed off. The road is impassable	Repaired attended	**11**	1.00
Thampalakamam- Kinniya Road				
8th km	Bailey bridge damaged	Repairs attended	**12**	2.00

Colombo-Ratnapura-Wellawaya -Batticaloa Road				
334/1 Bridge (Komari Bridge)	Collapsed	Bailey bridge being installed	**15**	50.00
362-364 km	Washed off	Repairs attended	**14**	18.00
375 km	Washed off	Repairs attended	**14**	6.00
380 km	Washed off	Repairs attended	**14**	6.00
392 km	Washed off	Repairs attended	**13**	6.00
393 km	Washed off	Repairs attended	**13**	6.00
394 km	Damaged	Repairs attended	**13**	2.00
394/1 culvert	Washed off	Repairs attended	**13**	1.00
394/2	Washed off	Repairs attended	**13**	1.00
395/1	Washed off	Repairs attended	**13**	1.00
Road	**Current Status**	**Action**	**Id No**	**Approximate Cost (Rs.Mn)**
396/3-Periyakallar br.cum causeway	Washed off	2-Bailey bridges being installed. 75% of the parts transported to site	**13**	3.00
398/1-Koddaiakallar br.cum causeway	Washed off	3-Bailey bridges being installed. 75% of the parts transported to site	**13**	5.00
409/5 & 410/1 Culverts	Washed off	Being repaired	**13**	5.00
412 &415 km	Part of the carriageway is damaged	Being repaired(60% completed)	**13**	6.00
Batticaloa-Trincomalee Road (A15)				
42/1 Bridge	Bailey bridge damaged	Repairs attended	**17**	50.00
46-59 km	Damaged	Being repaired(50% completed)	**17**	6.00
59/1 Bridge (Panichchankeni)	Washed off	2-Bailey bridges to be installed.	**18**	2.00
60-78 km	Washed off	Being repaired(10% completed)	**19**	54.00
Bar Road				
4/2 bridge	Washed off	Bailey bridge to be installed.	**20**	20.00
5/2 Bridge	Damaged	Bailey bridge to be installed.	**21**	20.00
3-5 k.m	Damaged	Being repaired(30% completed)	**21**	9.00
Pottuvil -Panama Road				
1-3 km	Washed off	Repairs attended	**22**	50.00
Bridge No 3/4 (Arugambay)	Damaged	Being repaired	**23**	10.00
Peradeniya-Badulla-Chenkaladi Road				
282/2 Bridge	Damaged	Being Repaired	**33**	60.00
North-Eastern (North) Province:				

Paranthan- Mukkaitive Road				
48-52 13 km & 50/1 Causeway	Damaged	To be repaired	**24**	
Beach Road				
0.9 km	Washed off & still submerged	To be repaired	**25**	
Mankulam-Mullaitivu Road				
42-49.25 km	Damaged	To be repaired	**26**	
Soran pattau-Thalayadi Road				
6.5-7.2 k.m	Damaged	To be repaired	**27**	
Point Pedro- Maruthankeny Road				
19-30 km	Damaged	To be repaired	**28**	
East Coast Road				100.00
0.8-4.74 km	Damaged	To be repaired	**29**	
Jaffna-Ponnalal- Point Pedro Road				
42.6.55.4 km	Damaged	To be repaired	**30**	
Point Pedro-Maruthankeny Road				
0.8-4 km	Damaged	To be repaired	**31**	
Mullaitivu-Kokalai Road				
0-16 km	Damaged	To be repaired	**32**	
18/1 Br.(Nayaru Bridge)	Damaged	Bailey bridge to be installed	**32**	
		Total		**1,035.00**
Approximate cost for damaged buildings in all affected areas				200.00
Approximate cost for damaged vehicles and ferryboats in all affected areas				100.00
Approximate cost for temporary works, to make all the damaged roads passable				200.00
		Grand Total		**1,535.00**
approximate cost for damage =Rs.1600 Mn.				

Attachment 2

COST OF MEDIUM TERM REPAIRS AND REHABILITATION TO TSUNAMI DAMAGED NATIONAL ROADS			
a. Southern Coast Highway		**Distance (KM)**	**Cost (Rs.Million)**
Package I:	Panadura to Galle Section	92	3500
Package ii	Galle –Hambantota, Tissa Kirinde Section	163	3600
b. East Coast Highway		**Distance (KM)**	**Cost (Rs.Million)**
Package iii	Potuvil to Batticaloa	106	1600
Package iv	Batticaloa to Trincomalee	132	1600
Package v	Trincomalee- Mullaitivu	92	2500
c. Northern Coast Highway		**Distance (KM)**	**Cost (Rs.Million)**
Package vi	Soranpattu- Jaffna	105	2500
Total Cost for Reconstruction /Rehabilitation of Tsunami affected Highways: LKR 15.3 Billion USD 140 Million			

ANNEX XIII – FISHERIES

A. INTRODUCTION

1. The fishery sector in Sri Lanka contributes 2.4 percent of GDP. Sea fishing and fishery-related services provide employment and livelihood for a larger proportion of the rural communities living around the island's coast. The sector employs an estimated 142,500 active fishermen and about another 20,000 people indirectly. For the most part, these people were living in 1,333 fishery villages and used 703 boat landings, including fishery harbors, along the coast. The tsunami had a severe impact on undiversified and already impoverished economies, especially in the conflict-affected North East, where fishing and agriculture were the main economic activities.

2. Prior to the tsunami, there were about 29,700 boats in business. Of the country's boat fleet, around 65 percent (approximately 19,110) has either been fully destroyed or damaged to varying degrees, including 594 multi-day boats, 7,996 motorized day boats and about 10,520 traditional non-motorized boats. Fishing implements such as out board motors, ice storages, fishing gear and nets also have been destroyed. The fisheries sector in the North East was relatively unsophisticated, with few MDBs, storage facilities, fishery harbors and relying mostly on small vessels. Across the country, only a few individuals owned more than 1-2 boats and 2-6 people used to go on fishing in a single boat, depending on the type and size of the vessel, either with or without the boat owner on the basis of some pre-agreed fish catch sharing arrangements among them. Entire fishing communities were dependent on the fishing boat fleets that were in operation prior to the tsunami. The sector is intimately integrated with rural livelihoods and income. For the most part, the MDB fleet is majority absentee-owned employing skippers and crews. However, the fleet has a high level of debt, low quality product, high-levels of by-catch (dolphins and turtles) and poor working conditions and payment terms to the crews. All MDBs and majority of day boat landings are commercial in that fish catch is auctioned at port landings for entry in to distribution chains and markets.

3. The sector produced about 300,000 metric tons of sea fish annually. This output per boat or per fishermen, when compared to outputs of other countries is low. For example, in Norway, 12,000 fishermen produce 2 million tons of fish annually.

B. DAMAGE OVERVIEW

4. This damage assessment was carried out mainly on the basis of the discussions with and the data and information shared by the FAO team of consultants who carried out a preliminary damage assessment of the sector. The FAO team carried out the assessment on the basis of the data and information provided by the Ministry of Fisheries and field visits to all the districts of the South and North East. In addition, the assessment benefited from the field visits of the Bank team members to the affected districts.

5. Sea fishing is the most severely affected subsector. In ten of the fourteen coastal districts, the damage to the industry, fishing boats and implements, fishing communities and livelihoods is enormous. The damage to the industry and the fishing vessels in Colombo, Gampaha, Puttlam and Mannar districts are less than the other districts. The disaster has almost

paralyzed the industry and livelihoods of the dependent communities. It is reported that about 27,000 fishermen and their family members died, with the largest number [approximately about 20,000 – source Liberation Tigers of Tamil Eelam (LLTE)] in the North East. In addition, a large number of fisher communities have been displaced due to the loss of housing and other household assets.

6. Of about the total 29,700 pre-tsunami boat fleet, a large number of boats have either been fully destroyed or damaged. This includes mainly single day motorized boats and traditional non-motorized boats, but also a considerable number of MDBs. It is estimated that a total of about 19,000 boats are destroyed or damaged. Fishing implements – such as out board motors, ice storages, fishing gear and nets – also have been destroyed. Most of the damaged boats have been washed ashore by the powerful sea tides and are lying scattered on the adjoining coastal lands. Owners of these boats will have to incur additional costs to hire heavy mechanical equipment to transport the displaced boats back to the shore and fishery harbors. The total estimated cost of the damage to boats and fishing implements (including beach seines) in terms of replacement and repair costs is LKR 7,974 million.

7. To varying degrees, several of the large fishing harbors and small boat landings in Hambantota (*Kirinda, Tangalle harbors*), Matara (*Kudawella, Puranawella, Mirissa*), Galle (*Galle, Hikkaduwa*), Kalutara (*Beruwala, Panadura*) and Trincomalee (*CodBay*) have been destroyed. There is comparatively less damage to the fishery harbors and boat landings in the other districts. The damage to marine structures and service facilities, and equipment of the harbors (including shore structures, dredgers and heavy mechanical equipment, ice plants, buildings, breakwater boulders, ice plants, boat repair yards, and pumps and distributor systems, etc.) is enormous. Most of these components are beyond repair. All of the severely damaged fishery harbors and small boat landings may require extensive dredging and removing debris and sand from the basins. The total estimated cost of the damage to infrastructure of the fishery harbors/ports is LKR 1,333 million.

8. In addition, there has been severe damage to buildings and assets (including vehicles) that belong to the National Aquatic Resources Agency (NARA) headquarters, Coast Conservation Department, National Institute of Fisheries and Nautical Engineering (NIFIN), Ceynor Foundation and the monitoring, control and surveillance system of the Ministry of Fisheries and Aquatic Resources. Some private ice plants also got damaged. The replacement and repair cost of this damage is LKR 825 million.

9. Based on these estimates the total damage is about LKR 10.1 billion, excluding the damage to housing and personnel assets of the victims, which have been included in the damage assessment of the housing Sector. A breakdown of the overall damage to the sector is in Table 2.

D. OTHER OBSERVED IMPACTS

10. Several side-impacts of the tsunami will make a quick recovery of the fishery sector relatively difficult. First, the proposal to relocate the affected people outside a 100 meter coastal reservation may have adverse social and economic impact on the fishing communities. Traditionally local fishing communities have strong community bonds and help each other in their day-to-day fishing activities. There is a risk that this community bond may be disrupted if

the relocation and resettlement is not managed diligently with due attention to the associated socio-economic implications of the policy.

11. Second, the tsunami had other adverse social impacts on the fishing communities. Most of the boat owners had obtained bank loans to purchase the destroyed capital assets. About 90 percent of them still have to repay substantial amounts of the loans. The tsunami has not left them financially able to repay the loans and at the same time, mobilize own resources to acquire the capital assets required to re-establish businesses.

12. Third, rural communities rarely use banking facilities to deposit savings and instead keep their cash savings in their homes. Most of them lost their savings together with jewelry, land, and property deeds. Most of the affected people do not have the ability to mobilize formal bank loans because co-laterals (such as property deeds and jewelry) were lost. In addition, informal money sharing practices such as "*Sittu* system" (which is prevalent in rural communities) have been disrupted. However, the owners of the MDBs are less affected and they seem to be on a better financial footing and have better access to formal credit and insurance facilities.

13. Fourth, the tsunami has destroyed most of the local boat repair shops together with repair toolkits in the affected villages. Although there is a heavy demand for minor repairs to the damaged boats, the service is now not available. In addition, the large commercial scale local exporters, manufacturers and boat repair yards will not be able to meet the demand for new boats, fishing gear and implements, and construction and repair material (e.g., fiber glass and resins) in the forthcoming recovery period.

14. Fifth, in the short term there is a drastic reduction of demand for locally caught fish due to the mistaken belief that the fish are contaminated. Consequently, less affected fishermen and many other people who depend on various inputs and output market related services have lost employment. While those fishermen families whose boats are intact and houses not destroyed may be able to restart beach landings and limited use of damaged fishery ports, most of the fishermen and their families will require several months of support to recover their livelihoods.

15. Sixth, if the disrupted fishing industry does not recover soon, there is risk that migrant fishermen from other areas, including neighboring countries, may encroach on the traditional fishing areas. This problem is relevant to some affected districts where open water shrimp fishing is at its peak during this period. Fishermen in these districts usually earn substantially more during the first 3 months of the year.

D. RECONSTRUCTION AND RECOVERY NEEDS

Short Term Needs

16. The reconstruction and recovery efforts should be carried out in two phases. In the short term phase (1-12 months) a coordinated national effort should be made to bring the industry back to operation as early as possible. Commencement of the rebuilding and renovating the urgently needed infrastructural facilities (such as ports and anchorages, boats, small port landings, etc.) is absolutely essential. However, the completion of the reconstruction would extend beyond the short term phase. During this phase, the focus should be on helping the affected families recover

from their losses. This can be done by ensuring that those who depended on sea fishing are included in the general housing, food and cash grant assistance programs. It may also be useful to hold discussions with the commercial banks about the possibility of providing concessions to those who have already taken loans and other affected people. In addition, the affected should be provided with micro-credit facilities through community-based revolving fund mechanisms to restart the lost income sources. Regarding the latter, funds may be used that are already available through some on-going government and donor-funded programs with related assistance components.

17. In the short term, there would be a huge demand for the boats, the local market may not be able to supply. As such, there would be a need to review the feasibility of working with the private sector to import certain types of boats of an agreed design. Rebuilding the damaged boat fleet through local boatyards may also substantially delay the reconstruction efforts. In this regard, there is a need to work closely with the large local, as well as overseas commercial boat yards, facilitating and providing necessary assistance to them, to assist them in managing risks.

18. Until the fishermen are able to repair their damaged boats or acquire new ones, they need to have an alternative source of income. Also, if the rebuilding of the boat fleet is substantially delayed, there would be a need to extend support programs for the affected fisher families. There are other rehabilitation and reconstruction activities that are needed urgently at the village level (including repairing damaged village roads, cleaning up of drainage canals, clearing debris and rubble, etc.). These works should be started as early as possible to provide immediate local wage labor employment opportunities. [See Annex VIII on Livelihoods.]

Medium and Long Term Needs

19. At present, the management of the sector is weak with poor regulation, surveillance and monitoring; under-developed infrastructure; low vessel efficiency; and consequently, low total annual production. A more detailed assessment of the damages and issues is needed to improve the productivity and efficiency in the long run.

20. This opportunity should be used to rationalize and modernize the sector with a long term vision. An essential element of such a vision should be to make the sector more productive and efficient. In this regard, strategies should be adopted for improving the fishing vessel design, fish handling and packaging techniques, quality assurance, fishery information management, licensing and regulating fishing crafts and use of fishing gear, surveillance fishing zones and boundaries and providing vocational training to fishermen. Sri Lanka has a long history of heavy investment in shore-based facilities (including ports and boats) but catches per boat and vessel income have been modest as fish resources have been excessively exploited. This situation will require a closer analysis of the ideal fleet size, composition of fleets, design of the fishing vessels, and the shore-based fishery infrastructure that would lead to a sustainable balance between the resources base and the fish harvests while optimizing the catches per boat. A longer term rebuilding of the sector and its physical and economic infrastructure should be based on a detailed technical study. With regards to fishery harbors, a strategy should be adopted to improve their management, in particularly, through exploring public-private partnerships.

Table 1: Needs Assessment
(LKR Million)

No.	Activity	Phase I Short term	Phase II Mid term	Total
1	Providing new fishing boats or repairing damaged boats, including fishing gears	6,000	2,000	8,000
2	Reconstruction of fishery ports/harbors, anchorages and landing center facilities, provision of machinery and equipment.	500	1,200	1,700
3	Desilting/dredging of harbor basins and removing and cleaning of sand and debris from harbor and boat landing basins		550	550
4	Micro credit schemes		110	110
5	Reconstruction and repairs to ice plants other fishery related small service infrastructure.	500		500
6	Repairing public buildings and replacing damaged office facilities	200	700	900
7	Technical and financial assistance for modernizing the sector	50	500	550
8	Vocational training and skill development		55	55
	Total	7,250	5,115	12,365

Table 2: Estimated Damages to the Fisheries Sector from the Tsunami

DISTRICT	Estimated damage to boats & fishery harbors LKR million	Estimated damage to buildings LKR million	TOTAL LKR million	TOTAL US$ million (LKR 104.65)
Jaffna	994	88	1082	10.34
Mulaitivu	1103	98	1201	11.48
Kilinochchi	80	7	87	0.83
Trincomalee	1559	138	1697	16.22
Batticaloa	648	58	706	6.75
Ampara	540	48	588	5.62
Hambantota	846	75	921	8.80
Matara	1256	111	1367	13.06
Galle	1273	113	1386	13.24
Kalutara	688	61	749	7.16
Colombo	25	2	27	0.26
Gampaha	269	24	293	2.80
Puttalam	15	1	16	0.15
Mannar	10	1	11	0.11
TOTAL	**9306**	**825**	**10131**	**96.81**

ANNEX XIV – TOURISM

A. OVERVIEW

1. The tourism sector is estimated to contribute 2 to 4 percent of GDP including direct and indirect effects. It generates direct employment for about 50,000 and indirect employment for an additional 65,000, and over $350 million in foreign exchange earnings. The tourism sector started to pick up following the cease-fire and peace negotiations in 2002 reaching a historical record of 565,000 arrivals in 2004.

Table 1: Tourism Statistics

	2001	2002	2003	2004	2005
Tourist arrivals	336,794	393,171	500,642	565,000	400-500,000
Tourist guest Nights ('000)	3,342	3,989	4,700	5,000	-
Room occupancy rate	42.1	43.1	53.2	59.5	51.8
Gross tourist receipts (Rs Mn)	19,034	23,724	31,209	38,420	34,000
Total employment	80,904	87,600	115,000	130,000	115,000
Direct	33,710	36,500	50,000	60,000	50,000
Indirect	47,194	51,100	65,000	70,000	65,000

Source: Central Bank of Sri Lanka and staff estimates.

B. OVERVIEW OF DAMAGE

2. ***Tsunami effects.*** The tsunami that hit several countries in Asia and Africa resulted in extensive asset losses for the tourism sector (250 million). About $200 million damages to hotel rooms was sustained and $50 million in tourism related assets (souvenir shops, restaurants, vehicles). About 50 hotels were partially damaged and 8 hotels were fully damaged of the 105 hotels located in the tsunami affected areas and total 242 registered hotels in the country. In terms of rooms 3,500 out of the total 14,000 rooms in medium to large scale hotels are currently not in operation. Some of these could be back in operation in a few weeks or month. In the small guest houses about 1,200 rooms out of a total of 4,000 rooms have been affected. There are also indirect effects (such as loss of revenue, cash flow, etc.) on the economy which will have a multiplier affects on employment and other businesses that support tourism, which are difficult to quantify at this point.

3. ***Status.*** Tourist arrivals were poised to reach 600,000 in 2005 before the tsunami with 150,000 arrivals expected during the first 3 months of the year. This estimate has now been revised downwards to 400-500,000 arrivals resulting in an estimated output loss for the sector of $65-130 million in 2005. Minimal disruption to the tourism sector is expected beyond 2005. For some of the hotels in the affected regions that were not damaged (Lighthouse), occupancies are high as 'tourists' are replaced with aid workers and damage assessment teams, at least on a temporary basis. While other undamaged coastal hotels (Taj Exotica) the occupancy is under 10 percent. Hotels in the interior are also suffering low occupancies due to the drastic downturn in 'tourists.' While Colombo

hotels are full with regular business travelers and damage assessors. Sri Lanka also has significant tourist resources, which were not affected such as the cultural triangle and hill country. Sri Lanka is not entirely dependent on beach tourism, although most tourists prefer the combined beach/cultural sites package. Around 40 percent of the foreign guest nights stays in Sri Lanka are spent along the beaches of the island's Southern and Eastern coasts, which were among the hardest hit by the tsunami. In addition, the tsunami is expected to have an indirect negative effect on tourism in non-beach areas.

4. ***Insurance.*** It is unfortunate that after two strong years for the industry, many hotel owners had just recently completed renovation works. It is unclear at this point, just how much of the damage will be covered by insurance. Many hotels, particularly the smaller ones, did not have good insurance or no insurance at all. Insurance companies seem to be willing to pay if the hotel is covered by earthquake insurance, but not flooding. Many properties were probably not insured for full replacement value. Some insurance policies have caps that apply. The hotel association plans to hire an insurance expert to provide advice on these matters. In most cases, the larger hotel companies either have good insurance or are supported by companies with diversified holdings such that financial needs can be managed making the tsunami more devastating for the smaller companies.

5. ***Reconstruction.*** The larger hotels already have plans of starting reconstruction work as early as February. However, the majority of the asset losses are not covered by insurance. The Ministry of Tourism plans to assist the tourism sector by helping manage the negative perception caused by media reporting, providing for duty free import privileges of necessary equipment for reconstruction, and providing concessionary loans to businesses. Already, the Central Bank of Sri Lanka has announced a loan facility for small and medium scale enterprises which some enterprises in the tourism sector are starting to investigate.

C. ISSUES

6. It is difficult to say at this point when tourists will return, but the expectation for 500,000 arrivals in 2005 would appear optimistic given the loss of high season, magnitude of cancellations, and overall devastation in important tourism destinations which may make them incongruent with a beach holiday atmosphere. Many tourists like to combine the cultural triangle in the interior with the beach. Even if hotels along the coast are fully repaired, the overall attractiveness/charm of these destinations has diminished and may take some time to recover. Travelers may opt to skip Sri Lanka this year and choose another destination.

7. There are a number of policies or policy interpretations which are hindering the recovery process, including:

- The 100 meter rule – not clear who this applies to so some businesses are not motivated to repair; police are stopping some repair work.

- For local workers, whether working for one of the organized clean up efforts will mean loss of refugee or other benefit status.
- If people clear debris from their shop there is a fear they may lose the land to rebuild.
- There needs to be a coordinated approach with different agencies such as the Tourism Ministry and Tourism Board, the private sector, and public sector working together to speed up recovery efforts.
- There seems to be no shortage of labor in coastal areas given job loss. This needs to be better organized to help the clean up and rebuilding effort.
- Erosion from the tsunami may be a problem in certain areas such as Golden Mile. Hoteliers are very concerned that the beach is slipping away which could jeopardize their entire future. This needs to be looked by a geologist, marine engineer, and possible remedial action taken.
- Dumping debris in the sea could have detrimental environmental impacts in the long run.
- For some of these coastal towns that rely almost entirely on tourism, there are concerns that any prolonged downturn in arrivals will lead to serious social problems: depression, unemployment, crime, hopelessness.
- It is probably worth noting that the private sector has played a major role in the relief efforts and is continuing to do so.

D. INITIAL RECOMMENDATIONS

Short Term

8. In the short term, the following are key recommendations:

- Marketing and promotional activities to bring tourists back. This should have input from private and public sector and organizations such as Pacific Asia Travel Association (PATA) which has vast experience developing tourist marketing programs in crisis situations. Marketing efforts should include a focus on potential repeat travelers, domestic travelers, and possibly more regional travelers.
- Consider soft loans for SMEs to help rebuild and or address cash flow shortfalls (Government is apparently considering $100-125 million facility). The difficulty will be on how to distribute and control. Lending criteria may need to be relaxed.
- Assess impact from tsunami on erosion, reefs, marine life.
- Clean debris from tourist towns to make them more attractive.
- Allow duty-free importation of re-construction materials.
- Clarify (or reconsider) the 100 meter setback policy.
- Encourage professional input on insurance situation.

Long Term

9. In the longer term, it will be important to:

- Track industry's benefits.
- Take the opportunity to develop master plan of some of the resort towns and allow for sufficient infrastructure to increase attractiveness.
- Be careful not to overtax this industry.
- Develop "Tourism Crisis Management" should be at the country, destination, and company level. PATA can help here as well.

Note: A team from the World Tourism Organization (WTO) is due to travel to all affected countries next week and may be able to do a more detailed assessment of the impacts and provide recommendations. A meeting, sponsored by WTO and PATA, will be held in Phuket Jan 31-Feb1 to discuss the crisis for the various destinations and action plans to move forward.

ANNEX XV - HAZARD RISK MANAGEMENT

A. DISASTER RISK EXPOSURE

1. Sri Lanka experiences mostly weather-related hazards resulting in localized and seasonal floods, landslides, cyclones and droughts. Floods occur during the two monsoon seasons. The flood plains of Kalu Ganga and Kelani Ganga are the most vulnerable areas. East and north-eastern coastal areas are vulnerable to cyclones, but parts of north-central and north-western areas have also been subject to occasional cyclone impacts. Droughts occur in the south-east, north-central and north-western areas. Monsoon associated landslides occur in the districts of Badulla, Nuwara Eliya, Ratnapura, Kegalle, Kalutara, Kandy and Matale; and have recently occurred in Galle, Hambantota and Matara districts.

2. Large scale disasters such as tsunamis or earthquakes are very rare, but medium and localized small scale disasters cumulatively can result in sizable loss of life and economic assets. Floods and associated landslides in May 2003 alone destroyed and damaged up to 35,000, affecting 137,000 families and costing LKR 5.5 billion in economic losses.

3. In Sri Lanka, vulnerability to hazards is related to physical, environmental and legal-institutional weaknesses. Land use patterns, human settlement developments and construction practices that are not sensitive to weather related hazards contribute significantly to unsafe conditions. Recurrent patterns include encroachments into flood plains and substandard construction on unstable slopes. Land use practices that do not respect natural resource protection, as well as environmental factors such as depletion of forests and mangroves, coastal erosion, siltation, and inadequate water and water-shed management, may further exacerbate the impacts of natural hazards. It is anticipated that changes in demography and climate, and the continuation of unsound environmental practices and development patterns may increase frequency and losses from small and medium size disasters.

B. INSTITUTIONAL ARRANGEMENTS

4. Multiple agencies and specialized technical bodies have a direct or indirect role in emergency and disaster risk management in Sri Lanka. The overall responsibility at the national level for disaster management officially lies with the Ministry of Women Empowerment and Social Welfare exercised through the National Disaster Management Centre (NDMC). The Human Disaster Management Council (HDMC) under the Presidential Secretariat has the coordination role in relation to war and conflicts. The draft Disaster Management Bill which would clarify the role of NDMC and provide legal and administrative powers is still under review.

5. The Reconstruction and Rehabilitation Authority, Essential Services Department, the District Secretariats, Divisional Secretary offices and Grama Niladhari (government officer at the lowest administrative level), Provincial Councils and local authorities participate in various aspects of disaster management in their jurisdictions. Specialized institutions such as National Building Research Organization, Center for Housing Planning and Building, Urban Development

Authority, Central Environment Authority, Coast Conservation and Irrigation Departments and Universities provide technical inputs to building standards, land use planning or drought management. Line ministry units carry out specific technical services, for example in meteorological services, landslide mapping and warning, epidemic surveillance. Local and international NGOs have been actively involved in relief and recovery activities after disasters.

6. Due to the unprecedented scale of the tsunami relief operation in Sri Lanka, and the need to coordinate numerous government actors, international donors and organizations, a special unit called Centre for National Operations (CNO) was created under the direct purview of the President.

C. CRITICAL ISSUES

7. Recognizing the challenges exposed by the recent tsunami, Sri Lanka should develop a Risk Management Approach based on the principles that:

- The post-tsunami reconstruction program, and in general, all development programs should be guided by multi hazard risk considerations;
- Improved institutional capacities are required for better management of emergency response, particularly at the local level;
- The interest expressed by the international community to support an advanced early warning system in the region should be seized, as it provides an opportunity for better forecasting and early warning of disasters to save lives and livelihoods.
- Risk transfer mechanisms should be considered to mitigate the financial impact of disasters on the economy and future development.

8. Based on these principles, the following areas have been identified where further improvements can significantly contribute to protecting communities, their livelihoods, and environment, as well as national infrastructure and economy, from future disaster impacts.

Risk Identification

9. *Multi hazard risk assessment:* Understanding where the risks from natural hazards are concentrated in the country, what population, physical and economic assets would be at risk from future disaster events and what factors would contribute to creating these risks is central to all actions to reduce future life and economic losses from disasters. Such a comprehensive assessment of the location and potential impact of the multiple-hazards facing Sri Lanka does not exist; therefore, the potential economic and social losses from disasters are not fully known. A nationwide, multi hazard risk mapping from existing data and further local assessments should be undertaken to inform reconstruction decisions as well as underpin future development plans and risk transfer mechanisms such as insurance. Environmental factors that exacerbate the impact of hazards should also be factored into this assessment. For this comprehensive assessment to be achieved, an institutional arrangement and establishment of a central database would be necessary to bring together relevant sectors and administrative levels and information.

Emergency Preparedness

10. *Early warning systems (EWS):* In Sri Lanka, most disasters are weather related which can be forecasted and monitored. Therefore, a well functioning early warning system can improve effectiveness of emergency response and save lives and property. The recent tsunami once again revealed the importance of EWS in emergency preparedness. Development of a proposed Indian Ocean Tsunami Warning system would take several years. In the meantime, existing national systems to monitor regular hazards needs to be strengthened and upgraded to be integrated with the proposed regional system. Improved equipment, increased national coverage, and training of staff in new techniques would all help to enhance emergency preparedness capacity.

11. *Emergency information and communication systems:* Bringing the right information to the public and authorities is crucial to mounting a swift emergency response operation in order to save lives and property. The technical improvement of the EWS needs to be backed up by an information dissemination system that provides timely, accurate and coordinated information flow to emergency management agencies, press, local administration and the public. In Sri Lanka, dissemination of the early warning to relevant government agencies, to the press and the public is undertaken by the national bodies in charge of early warning. This system needs to be strengthened in the light of recent disaster experiences. Special attention should be given to strengthening the information flow of early warning messages to communities and linking such information with local emergency preparedness activities.

12. *Decentralized emergency preparedness:* To act upon early warning information, there is need for decentralization of emergency response capacity to the local level where disasters occur. Communities and local level governments have always been the front line responders to localized disasters in Sri Lanka, and the tsunami was no exception despite its scale. The enhancement of emergency preparedness capacity of the communities, District and Grama Niladhari level administration in high disaster risk areas would be the most effective way of improving public resilience and rapid response to future events.

Investment in Risk Reduction

13. *Reducing risks in post-tsunami reconstruction:* Post-tsunami reconstruction is a major investment in rebuilding the country. While the probability of another tsunami of equal magnitude is rare, the opportunity to protect this investment from other types of disasters Sri Lanka faces should not be missed. Experience from the tsunami should be captured. Such lessons combined with the findings from the rapid multi hazard risk assessment should be fed into reconstruction planning and future risks reduced through improved building standards and design considerations.

14. *Protection of public infrastructure:* Safety of public buildings such as schools and hospitals is particularly important as they house large numbers of the people, and are critical in emergencies. Medical and educational facilities built in high risk areas should incorporate improved standards to reduce their risks to hazard impacts. Educational buildings rebuilt after the tsunami should also be located in safe locations and use design specifications to double as

cyclone and tsunami evacuation centers for the affected population, particularly in low lying cyclone areas.

15. *Legislations and standards for future safety:* A significant number of ordinances, acts and laws exist in Sri Lanka that relate to construction standards, land use planning, human settlements, development and conservation of natural resources. While some include practical measures that could reduce damaging impact of disasters, recent floods and the tsunami revealed the difficulties in enforcing such legislations and standards. Some difficulties relate to the overlaps, contradictions and complicated procedures while others to weak institutional arrangements for their policing. A comprehensive risk reduction strategy should review existing legislations and standards from a risk reduction perspective, and address the simplification of procedures for their implementation. Institutional arrangements for their implementation should be clarified.

16. *Local risk management strategies:* As hazards in Sri Lanka are very localized and vary from place to place, risk reduction measures should be carefully tailored to local areas rather than imposed in a blanket fashion. While, for example in drought areas, water resource management options could be explored, in cyclone areas sound land use planning and safe construction would be a priority. However, strengthening local institutions and community capacity for effective disaster mitigation is a longer-term investment that justifies careful assessment, design, and a longer implementation schedule.

Institutional Capacity Building

17. Current capacities in disaster management are largely centered around emergency response and post-disaster recovery. A comprehensive risk reduction strategy and an institutional framework to address long term disaster risk reduction issues should be systemized.

18. *Disaster Management Authority and a system for coordination:* Major national and international level coordination and support have rarely been required in Sri Lanka, since most disasters have been managed at the lower administrative levels. Coordination capacity at the local level varies across districts. The tsunami revealed the need to establish a National Disaster Management Authority to coordinate relief and oversee recovery with legal and administrative powers. Currently the CNO under the Presidential secretariat serves this function well, but it is an ad-hoc arrangement. The draft Disaster Management Bill under envisages this role for the NDMC located under a line ministry. The lessons and experiences of the tsunami relief and recovery coordination should be distilled in developing an appropriate disaster management mechanism and an authority that reflects the risks faced by Sri Lanka. A National Disaster Management Plan would clarify roles, responsibilities and streamline coordination across administrative levels and various stakeholders. An emergency relief fund could support the plan for the speed of action in emergencies. Review of different systems from other countries and multi stake holder consultations could assist in determining the most effective model for Sri Lanka.

19. *Education and training:* Training and exercising of disaster management plans help to maintain a well functioning system to respond and should involve national, provincial and

municipal staff, NGOs and the public. The NDMC has training as part of its mandate. Some sector training takes place, but systematic human resource development for emergency management is not undertaken in Sri Lanka. A facility to train relevant officers and authorities in disaster management at all levels should be established. National and local authorities should be routinely trained both on emergency preparedness and principles of how to reduce risks. Professional education, short training courses and primary and secondary school books should also raise awareness and knowledge of hazard risk reduction. Basic training of contractors and builders on safety measures for construction should also be considered as part of the post-tsunami reconstruction plan.

20. *Creating a culture of safety through awareness-raising:* While public awareness of disaster risks is high due to the tsunami, in general there is limited public understanding of the local risks, or the actions that can be taken to reduce their impact. This is evident in the encroachment of settlements onto flood plains and protected coastal areas despite legislations to control such action. Loss of life and assets in medium size disasters also indicate that public awareness is low. Information packages should be updated and communication strategies improved. A major public awareness campaign on various hazards should start while the memory of the tsunami is still recent.

21. *Knowledge sharing*: Sri Lanka does not have significant experience with large scale emergency response and reconstruction planning, or with disaster risk management practices. International exchange of best practices and knowledge sharing among practitioners, authorities and NGOs, particularly from the region, can significantly contribute to capacity building at all levels. Priority should be given to capturing experiences of relief and its sharing with other countries in the region and learning from other major reconstruction programs.

Mechanisms for Risk Transfer and Financing

22. To ensure that both the local people and the national economy can recover quickly following a disaster, it is important to consider the benefits of risk transfer and financing mechanisms. In Sri Lanka larger businesses in tourism and industry are insured, middle class families have some insurance policies covering certain assets such as cars; however, insurance penetration is inconsistent and individual housing and livelihood insurance against losses caused by natural disasters is not widespread.

23. Poor families do not have access to insurance but also have no means to recover from the impact of the tsunami due to loss of livelihood, breadwinners, housing and assets. As most households have been all affected at the same time, pooling of family or neighborhood networks is also difficult. In the case of small and medium size enterprises (SME) loss of basic means of production, customer base and interruption to business will delay their recovery. International donors and Government will assist the poor to recover but their recovery can be at risk from future disasters. Risk transfer through insurance allows for the burden of reconstruction to be shared among public and private actors, saving valuable resources after a disaster that can assist other recovery priorities.

24. At the micro level, options for transferring risks include insurance, micro credit, and micro-finance. An insurance package to the poor that addresses their main post-disaster risks can indemnify against the risk of loss of life, loss of property, loss of livelihood, and the cost of living for a few months. SMEs can be compensated separately for the loss of their business assets. At the macro level, national governments should consider investing in ex ante risk reduction measures, such as insurance pools and reserve funds that can be mobilized rapidly. Donor capital injection and creation of a regional insurance facility could also be considered.

25. Such a scheme would be feasible for low frequency, high intensity (catastrophic) disaster events. It will be closely linked with the comprehensive risk assessment of the country and potential impact from various hazards on different social groups. While linking insurance with risk reduction and management is desirable monitoring of compliance and quality control of risk reduction actions would require availability of large cadre of technical people. Frequent and moderate intensity disasters will need to be approached differently. The feasibility of these options should be further investigated in the context of Sri Lanka.

D. PROPOSED STRATEGY

Short Term Actions

1. A rapid multi hazard disaster risk mapping to be integrated into relocation and reconstruction strategy.
2. National and international knowledge sharing to capture emergency response experiences from the tsunami including review of damage and loss assessments, as well as sharing of international knowledge from recent large scale recovery and reconstruction operations.
3. National level policy consultations and international knowledge sharing to start on the formation of a national disaster management authority.
4. Participation of Sri Lanka in planning process for Indian Ocean Tsunami Early Warning System.
5. Incorporate into the design of schools to be rebuilt the necessary site, construction and design standard for their doubling as evacuation centers.

Medium Term Actions

6. *Strengthen the forecasting and early warning systems,* establish an information dissemination system that links with community based disaster preparedness.
7. *Establish a national disaster management system* and a Disaster Management Authority.
8. *Establish a mechanism for risk transfer and financing* through insurance and regional reinsurance pool.
9. *Strengthen a decentralized local level emergency preparedness system,* in the first phase, along the tsunami affected areas as a means to raise awareness, and disseminate information regarding reconstruction and relocation strategies among the public and the authorities.
10. *Start the multi hazard risk mapping* and the necessary database, establish a Task Force for this purpose, equip and train the staff.