

**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  
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**SRI LANKA 2005 POST-TSUNAMI RECOVERY PROGRAM**  
**Preliminary Damage and Needs Assessment**  
**Joint Asian Development Bank,**  
**Japan Bank for International Cooperation,**  
**and World Bank Draft Report**  
**January 10-28, 2005**

**A. INTRODUCTION**

1. At the request of the Government of Sri Lanka (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)**

Sector	Losses		Financing Needs		
	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
<b>Total (\$ Millions, rounded)</b>	<b>970-1,000</b>	<b>330</b>	<b>500</b>	<b>1,000-1,100</b>	<b>1,500-1,600</b>
<b>Percent of GDP</b>	<b>4.4-4.6</b>	<b>1.5</b>			<b>7.0-7.3</b>

\*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.<sup>1</sup> 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

<sup>1</sup> 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 billion (\$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.

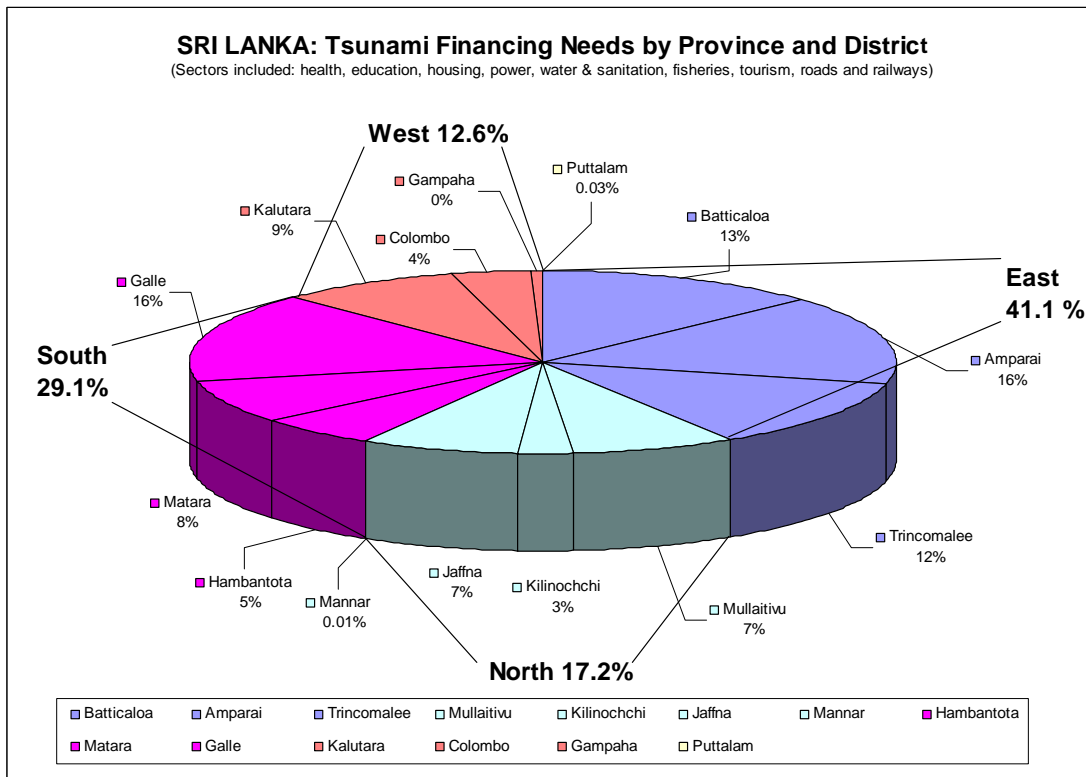
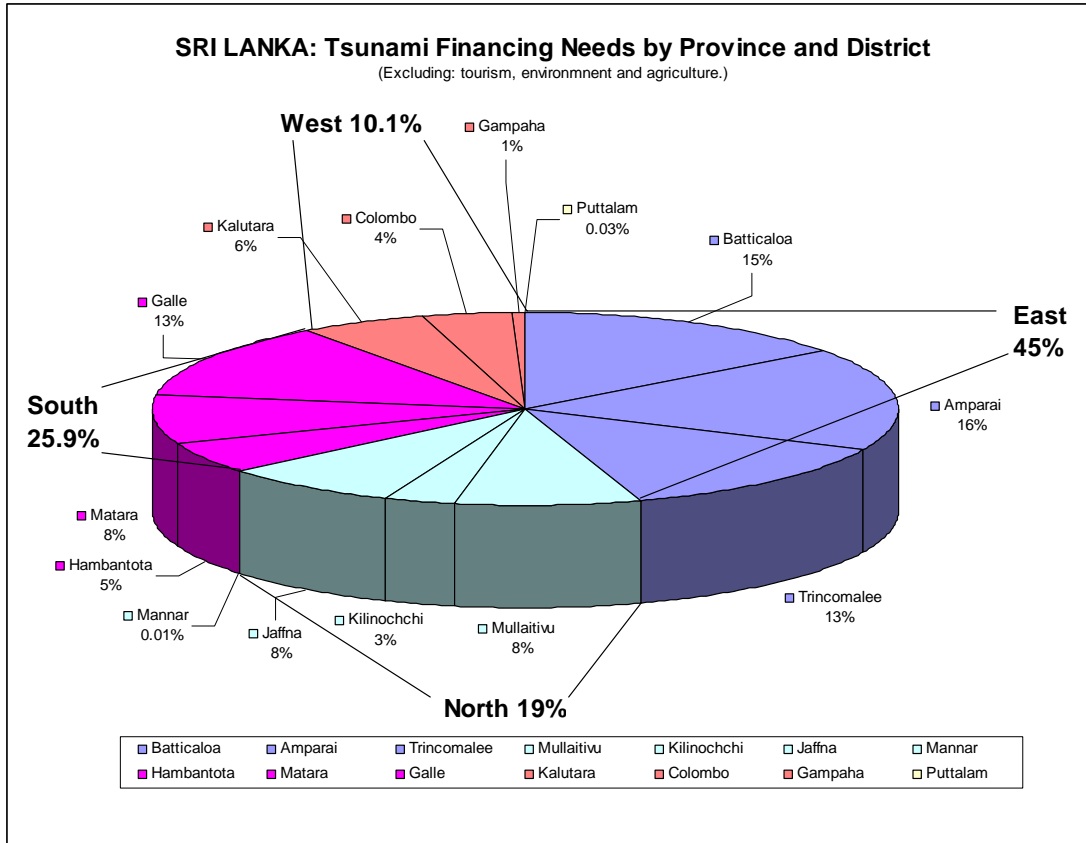
### **Damages and Needs by Region**

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<sup>2</sup>, 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.

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<sup>2</sup> 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.





**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
<b>North East</b>	<b>30.2</b>	<b>56.2</b>	<b>317.6</b>	<b>27.6</b>	<b>87.6</b>	<b>62.6</b>	<b>7.2</b>	<b>132.3</b>	<b>53.1</b>	<b>774.4</b>	<b>58.3</b>	<b>North East</b>
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
<b>South</b>	<b>12.3</b>	<b>31.1</b>	<b>75.9</b>	<b>37.6</b>	<b>18.0</b>	<b>42.8</b>	<b>76.6</b>	<b>46.9</b>	<b>46.1</b>	<b>387.3</b>	<b>29.1</b>	<b>South</b>
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
<b>West</b>	<b>2.5</b>	<b>0.7</b>	<b>42.9</b>	<b>1.6</b>	<b>8.3</b>	<b>12.5</b>	<b>46.3</b>	<b>21.7</b>	<b>30.8</b>	<b>167.3</b>	<b>12.6</b>	<b>West</b>
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
<b>North West</b>	<b>0</b>	<b>0</b>	<b>0.14</b>	<b>0</b>	<b>0.03</b>	<b>0.18</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.35</b>	<b>0.03</b>	<b>North West</b>
Puttalam	0	0	0.14	0	0.03	0.18	0	0	0	0.35	0.03	Puttalam
<b>Provinces Total</b>	<b>45</b>	<b>88</b>	<b>437</b>	<b>67</b>	<b>114</b>	<b>118</b>	<b>130</b>	<b>201</b>	<b>130</b>	<b>1,329.3</b>	<b>100.0</b>	<b>Provinces Total</b>

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 from 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.