

REPUBLIC OF THE MALDIVES

TSUNAMI: IMPACT AND RECOVERY

**JOINT NEEDS ASSESSMENT
WORLD BANK-ASIAN DEVELOPMENT BANK-UN
SYSTEM**



ABBREVIATIONS

| | |
|--------|--|
| ADB | Asian Development Bank |
| DRMS | Disaster Risk Management Strategy |
| GDP | Gross Domestic Product |
| GoM | The Government of Maldives |
| IDP | Internally displaced people |
| IFC | The International Finance Corporation |
| IFRC | International Federation of Red Cross |
| IMF | The International Monetary Fund |
| JBIC | Japan Bank for International Cooperation |
| MEC | Ministry of Environment and Construction |
| MFAMR | Ministry of Fisheries, Agriculture, and Marine Resources |
| MOH | Ministry of Health |
| NDMC | National Disaster Management Center |
| NGO | Non-Governmental Organization |
| PCB | Polychlorinated biphenyls |
| Rf. | Maldivian Rufiyaa |
| SME | Small and Medium Enterprises |
| STELCO | State Electricity Company Limited |
| TRRF | Tsunami Relief and Reconstruction Fund |
| UN | United Nations |
| UNFPA | The United Nations Population Fund |
| UNICEF | The United Nations Children's Fund |
| WFP | World Food Program |

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Currency: Maldivian Rufiyaa = US\$12.85

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SUMMARY

The tsunami which hit Maldives on 26 December, 2004 was a nation-wide disaster which caused severe damage to the physical infrastructure of many islands. The tsunami has set back the high levels of social progress and prosperity achieved in recent years. Total damages are estimated to be US\$470 million, 62% of Gross Domestic Product (GDP). Of these losses, direct losses are \$298 million, or about 8% of the replacement cost of the national capital stock. Severe damage was caused to houses, tourist resorts, boats and other fishing equipment, schools, health facilities, transport and communication equipment, water and sanitation, and electricity infrastructure. There has also been substantial damage to agricultural crops and perennial trees. Farms, homestead plots, and aquifers have been salinized. The physical damage has led to severe human suffering inasmuch as large segments of the population have lost their dwellings, lifetime assets, savings, and sources of livelihood. About 7% of the population is now living in temporary shelters or with relatives.

The total damage estimate of US\$470 million does not, however, include a very real and critical cost that would demand additional financing, namely the cost of environmental damage and substantial soil erosion on many affected islands that to a great extent rely for their livelihoods on agriculture and home based market gardening; these costs could not yet be quantified as detailed surveys are still under way.

The transmission of the physical damage into an economic shock occurred to a large extent via contraction of the tourism and fisheries sectors, which sustained the largest losses. Lost tourism and fisheries income will cause GDP growth, employment, and government revenues to contract this year. The revival of the Maldivian economy depends critically on how fast the two leading sectors, tourism and fisheries, recover. Public financing for the reconstruction of lost or damaged assets and infrastructure, and for providing temporary income support to the affected, will be critical.

In terms of impacts on the Government's long-term development strategy, the tsunami has reinforced the established policy of encouraging voluntary population movements to less vulnerable islands, which has now assumed even greater urgency than in the past. This policy aims to mitigate the risks of future tsunamis and rising sea levels, help realize economies of scale in the provision of public and private services in the atolls, strengthen service quality in the atolls, improve welfare, and help retain the population in the atolls.

The government has made a commendable effort to provide swift relief to the affected and is now engaged in planning and executing a reconstruction program. Reconstruction of public assets and restoring lost government revenue will require financing of \$364 million, most of which will need to come from external sources in grants and highly concessional loans. This document spells out in some detail the physical damage and human suffering caused by the tsunami, the recovery strategy, and financing needs. A set of accompanying annexes discuss impacts of the tsunami on individual sectors in greater detail.

INTRODUCTION

Location and Risk Factors

1. *Geography.* The Maldives is a chain of Indian Ocean islands spread over a distance of 900 kilometers, located between northern latitude 4 to slightly south of the equator. The land area, which covers about 26 geographic atolls, is grouped into 20 administrative atolls. The population of the Maldives is about 300,000. The country faces two main geographic challenges: (a) the presence of a highly dispersed land mass of very small size, resulting in a highly dispersed population, and (b) the low altitude of the islands. The country has 1,190 islands, of which 198 were inhabited prior to the tsunami. Of these islands, only 28 have a land area greater than one square kilometer. One-third of the inhabited islands have a population of less than 500 and 70% of the inhabited islands have a population of less than 1,000. This extremely low population density makes the Maldives unique, even among small island archipelagic states. It also raises the cost of delivering social services and of public administration, as there is hardly any scope to generate economies of scale. Because of the low altitude of most of the islands, rising sea levels may cause many islands to disappear, render some inhabited islands ecologically vulnerable, and other islands to become too densely populated to sustain their population. The greater Malé area—already home to 70,000 people or almost one quarter of the population—is of specific concern because of increasing strain on social and public services caused by continuing immigration from other parts of the archipelago.

2. *Risks.* The main risk factor stems from the extremely low elevation of all Maldivian islands: the average elevation is 1.5 meters above sea level. This increases the risks from the tsunami and from global warming. Of 198 inhabited islands, 88 face perennial beach erosion. Wide dispersal of population across very small and remote islands results in diseconomies of scale, high transport costs, and poses unique challenges to development, recovery and relief efforts. Normally, Maldives does not suffer from high risk of natural disasters—the cyclones which affect other parts of the Indian Ocean bypass the Maldives. As a consequence, Maldives has focused on its main perceived long-term risk: global warming and rising sea levels.

The tsunami

3. *The tsunami* traveled at over 700 kilometers per hour and reached Maldives at 9:20 AM on 26 December 2004. From around 9:15 am, tidal waves generated by the tsunami struck the islands. Tidal waves ranging from 4 to 14 feet were reported in all parts of the country. More than 1300 people suffered injuries; 83 people are confirmed dead and another 25 are missing and feared dead. Unlike other countries affected by the tsunami, Maldives experienced a disaster of national proportion. Thirty nine islands were significantly damaged and nearly a third of the Maldives' 300,000 people were severely affected. Fourteen islands were completely destroyed and had to be evacuated. Nearly 12,000 people have been displaced from their islands, and another 8,500 people are temporarily relocated to other places on their own island; thus 7% of the population of Maldives were displaced. The force of the waves caused widespread devastation of shelter and infrastructure in the atolls. Flooding caused by the tsunami wiped out electricity on many islands, destroying also their communication links. Water supply was disrupted in about 15% of the islands and 25% had major damage to the essential infrastructure such as jetties and harbors that links these islands with Malé. Electricity supply in many affected islands has yet to be restored. The impact on an economy largely based on tourism, fisheries, and agriculture will be substantive. Livelihoods of thousands have been undermined and will continue to suffer.

Context of this report

4. *Context.* Immediately, following the tsunami, the Government contacted the World Bank and the Asian Development Bank (ADB) to request their support in developing a joint assessment of the tsunami damage and recovery needs. The first assessment mission went to Maldives during early January 2005 where it was joined by the UN System, making this a joint assessment by the three organizations. The Japan Bank for International Cooperation (JBIC) joined the latter stages of the mission. A follow-up mission finalized this assessment between February 1-7 2005, revising the initial estimates based on new data and extensive comments received from the Government and other partners. The team would like to thank its principal counterparts in the Government for the cooperation extended. The team's work was also facilitated by visits from senior management including the Secretary General of the United Nations, the President, Vice President and Country Director of the World Bank, and the Country Director of the Asian Development Bank. The Team was led by Qaiser Khan from the World Bank and Meriaty Subroto from the ADB. Moin Karim was appointed as the Coordinator for the UN system. The list of team members is provided at the end of the main report.

Assessment Methodology

5. *Approach.* The overall approach followed was similar to that developed for disaster assessments by the UN Economic Commission for Latin America and the Caribbean. Focus was on costing the loss of physical assets. Direct damages to physical assets were considered separately from indirect damages such as loss of incomes and livelihoods, e.g. income loss from reduced fishing due to loss of fishing equipment. The costs of responding to the disaster include three elements—immediate relief, reconstruction and risk mitigation. In many cases rebuilding to previous standards may not be appropriate because old standards would continue vulnerability. All rehabilitation will have to be according to current standards which in many cases are higher than the standards to which destroyed units were built.

6. *Development strategy.* Before the tsunami, the Government already had in place coherent and well developed long-term strategies for the country and various sectors. This report analyzes what kind of effect the tsunami has on the overall development strategy and on sector strategies.

7. *Human hardship.* The physical damages to various assets and infrastructure has translated into severe human hardship. These include loss of sources of income and the adverse impact on livelihoods, loss of lives and injuries, and losses of personal effects including savings held in cash. While the report discusses some of these human hardships, the costing exercise is confined to physical damages.

GOVERNMENT RESPONSE

Emergency Response

8. *Swift and coordinated response.* The Government of Maldives (GoM) acted quickly, mounting a dynamic relief and rehabilitation operation with support from UN agencies, NGOs, and other development and military partners. On 26 December 2004, a Ministerial Committee and Task Force were set up and all officials were concentrated at the National Disaster Management Center to facilitate response and coordination. Significant achievements were made through dedicated and determined efforts through sea and air transportation. Communication was restored to 11 atolls within the first 24 hours and relief supplies were dispatched from 2:00 am on 27 December. Communities mobilized in support of their neighbors. The private sector

contributed to the relief effort. Despite break down of communication to atolls, within 24 hours information flow and data gathering began and continues. There is frequent contact with the population to understand and address relief and recovery needs.

9. *Coordination.* The Ministry of Defense is coordinating the overall relief effort and the Ministry of Finance and Treasury is coordinating the donor assistance while the Ministry of Planning and Development is coordinating data gathering and long term response. This rapid and coordinated response helped quickly mitigate the worst effects of the tsunami and has allowed the Government to move from the emergency phase to start restoring some semblance of normality. The relief task was rendered difficult by the destruction of some jetties and the loss of transport vessels.

Tsunami Relief and Reconstruction Fund

10. *Transparency.* The Government has been keen to assure transparency and carefully account for funds so that resources are properly and effectively utilized. Every day during the emergency phase, the Auditor General has checked the accounts.

11. *Tsunami Relief and Reconstruction Fund to handle tsunami finances.* To further assure transparency in the long-term, the Government of the Maldives has set up The Tsunami Relief and Reconstruction Fund (TRRF). This fund will receive resources from the budget as well as from local and international sources. TRRF will expend funds for relief, recovery, and reconstruction work to address objectives set by the Government and donors. A Monitoring Board consisting of representatives from the government, the private sector, and donors would monitor and supervise the utilization of the funds. TRRF would be administered by the Government Accounting Bureau of the Ministry of Finance and Treasury. The accounting of TRRF would be maintained as per international accounting standards with proper internal controls. The activities of TRRF would be audited by internal auditors and external auditors engaging international accounting firms. The management, organizational structure and implementation arrangements, including procurement and financial management, will be detailed in the Financial Management Policies, Procedures and Guidelines, and in its Operations Manual. The financial management systems and processes are established in line with the requirements of the International Financial Institutions. Detailed information on funds received by source and expenditures by item, vendor, and destination would be publicly available.

12. *Donor harmonization.* The Government would like donors provide as much of their funding as possible through TRRF to: (a) assure transparency and harmonization; (b) eliminate duplication of efforts; and (c) reduce administrative overheads. The World Bank has already expressed its intention to provide Tsunami support through TRRF. In addition to the resources channeled through TRRF, direct assistance will be provided from the UN agencies and others.

Responses of the International Community

13. *United Nations.* The United Nations Office of Coordination and Humanitarian Assistance deployed a UN Disaster Assessment and Coordination team to the Maldives the day after the tsunami hit to provide technical assistance to disaster assessment and the management and coordination of disaster response. The UN Team released US\$300,000 of immediate emergency funds and other in-kind support. It also provided coordination and logistics support. The United Nations Children's Fund (UNICEF) provided \$100,000 and helped to address food, hygiene, water, sanitation and shelter-related needs, including providing first aid kits for those affected. The United Nations Population Funds (UNFPA) focused specially on the specific reproductive

health needs of women, including pregnant women. Medical supplies were provided by the World Health Organization (WHO). The UN World Food Program (WFP) launched an emergency operation addressing the immediate food needs on December 29, 2004. On 6 January 2005 the UN System launched a Flash Appeal, requesting US\$65 million for the Maldives. Up to the release of this assessment, less than half the target has been met. The shelter and livelihood components of the appeal are completely unfunded.

14. *Bilateral donors.* The response of international community to the Flash Appeal has been positive and rapid. For example, on 30 December 2004, contributions of \$1.4 million had been committed by Bhutan, China, Greece, Japan, the Republic of Korea, and the USA. Norway donated water containers, and a consignment of 16,000 liters of water from DFID arrived at the same time; Germany fielded teams on several islands with water desalination plants. A 17-member Australian Medical Team arrived with supplies in the Maldives on new-year day 2005. Other emergency relief support, including cash donations, were committed or received from a number of government and private institutions and individuals from all over the world within a few days.

15. *NGOs.* Over twenty international NGOs as well as the International Federation of Red Cross (IFRC) have provided direct and/ or indirect assistance in cash and kind. They have been joined by national NGOs. NGOs have been active both in material and psychological support.

16. *Multilateral development partners,* including the international financing institutions, fielded their assessment missions in early January 2005, or pledged to provide grant assistance and/or soft lending to finance emergency and medium term rehabilitation and reconstruction projects. The joint needs assessment mission of the Asian Development Bank, the Japan Bank for International Cooperation (JBIC) and the World Bank was fielded in the first week of January 2005. Apart from the assistance offered by these institutions, the Islamic Development Bank (IDB) offered grant assistance of \$200,000.

17. *Total assistance received and pledged.* As of end-January, total commitments of cash assistance amounted to \$25 million from bilateral, UN, and private sources. In addition, the ADB is preparing grant financing of \$20 million and the World Bank will provide \$14 million in mixed grants and credits. These sums do not include the substantial value of in-kind assistance provided or pledged. However, it appears to be clear that foreign financing received or pledged so far falls far short of the estimated reconstruction needs (see Table 1).

STRATEGIC CONTEXT

Development Strategy of the Maldives

18. *Development achievements.* The Maldives has enjoyed rapid economic growth over the past 25 years, based on the highly successful development of a tourism industry aimed at the upper end of the global tourism market, a prosperous fishing industry, and an expanding service sector. Since 1980, per capita incomes tripled, reaching \$2,400 in 2003. The literacy rate among females aged 15 and above has reached 97%, and the net primary school enrolment rate has risen rapidly, from 38% to 93% over the last three decades. The health status of the population has also improved considerably. The average life expectancy at birth grew from 50 years in 1970 to 72 years in 2002.

19. *Geographic challenges.* The unique geography and vulnerability poses two key development challenges for the country. First, the dispersion of the population across the

archipelago raises the cost of delivering social services to the population, as it is difficult to realize economies of scale in service provision. Second, some inhabited islands have become ecologically uninhabitable and the Government has recognized that many islands are threatened by global warming. The long term strategy of the Government to address rising sea levels attributed to global warming has been to attract parts of the population to so-called focus islands; focus islands have been selected, among other criteria, based on the ability to defend them in the future. The basic strategy to respond to the tsunami remains the same; indeed, the tsunami has resulted in greater impetus to implement this strategy of population consolidation more rapidly. The continuing immigration to Malé from other parts of archipelago in response to ecological vulnerability in the outer atolls and better job opportunities and superior social and public services in the Malé region has severely increased population pressure in Malé. Addressing these challenges is an important thrust of the Government's poverty and development strategy described below.

20. *Addressing regional disparities.* The government has developed a two-pronged strategy to distribute the benefits of economic growth to all parts of the country. The first element of the strategy is to develop two regional centers, one in Addu Atoll in the far south and the second in Haa Dhalu Atoll in the far north. These centers are designed to have airports, good ports, and other social and infrastructure facilities. The regional centers are to be complemented by safe islands (also termed focus islands) on different atolls to act as atoll service hubs and growth centers. The second part of the strategy seeks to distribute the benefits of tourism to all atolls by allowing new resorts to be opened in the atolls which currently lack resorts. The opening of the new international airport and international port in Addu Atoll will bring tourism and other economic opportunities within reach of the more isolated southern atolls. The government is also improving domestic maritime transport and other public infrastructure in selected atolls. It expects these developments to reduce regional differentials and promote growth and employment opportunities outside of Malé.

21. *Public service provision.* The provision of social services in the Maldives poses special challenges given the dispersion of its population. The country has high public expenditures, in line with other small island economies with dispersed populations, at 40% of GDP. Improving public expenditure management is major challenge. The Government's previous strategy to widen access to services across the archipelago consisted of creating facilities and providing services on all islands, including those with small populations. In the education and health sectors, this approach has led to the establishment of a primary school and a primary health post on each inhabited island. Each island has its own Island Office and Court. Youth Centers and Women's Centers have also been established in a number of islands. However, establishing and maintaining secondary schools and more advanced health facilities on each island would be extremely expensive given the current population dispersion. In addition, public expenditure of 40% of national income currently supports only a basic level of local government services to the atolls, with advanced services concentrated only in the central Malé region. Widening access to high quality local government services to the atolls is also likely to be extremely costly. Hence, the government needs to maximize cost effectiveness in developing strategies to improve access and develop the quality of education, health care and local government services in the outer atolls.

22. *Telecommunication.* The development of a national broad-band network to provide access to internet based public services within atolls is also an important element of the government's strategy to improve the coverage and quality of local government. Currently, the cost of intra-atoll and inter-atoll communication and information transmission is severely constrained by the high cost of telecommunications and the absence of adequate transmission capacity. The Government strategy is to develop a broad-band network which would enable focus

islands to supply services to the primary islands within their atolls more cheaply and effectively. In addition, a broad-band network would facilitate inter-atoll communications by substantially reducing costs and increasing the volume of information that can be transmitted.

Impact of the tsunami on the Government's development strategy

23. *Population concentration.* The principal impact of the tsunami on the Government's development strategy will be to accelerate the process of population concentration. The tsunami lent new urgency to the policy of population concentration, which will go a long way to reduce diseconomies of scale in service provision and will provide protection against sea-level rise. Another impact of the tsunami has been a rethinking of environmental measures needed to defend focus islands; a new plan for creation of safe focus islands has been proposed. The proposed safe island design would involve elevated zones, high buildings, special drainage zones, and sloping revetments for environmental protection. These measures could add considerably to the costs of establishing focus islands. For fiscal reasons, the number of safe/focus islands on which these types of public investments are concentrated will need to be limited. Ideally, there should be at the most one safe/focus island per atoll. The success of the population concentration policy will depend on ensuring the socio-economic viability. The Government has re-stated its policy against forced resettlement in a recent communication to donors.

24. *Financial markets.* The tsunami revealed under-insurance of private assets such as houses, fishing boats, and tourism resorts which has led to the government becoming the *de facto* insurer of last resort. Furthermore, many families lost their savings kept in homes that were destroyed. The disaster has highlighted the need to extend insurance cover and to make banking services more accessible.

SUMMARY OF TSUNAMI DAMAGES

Estimated Damage and Financing Needs

25. *Total damages* are estimated to be about \$470 million, close to 62% of GDP (see Table 1). About \$298 million of this are direct damages, and the rest are indirect losses. Although the cost of damages appear high, the direct damages amount to about 8% of the replacement cost of the entire national capital stock, estimated at around \$3.8 billion at 2004 prices. Compared to the other tsunami affected countries, Maldives has higher per capita income and greater capital stock in relation to their affected population. Moreover, there has been heavy investment in high-end tourist resorts. The tourism sector has the largest direct damages, with losses of \$100 million (of which half is insured), followed by the housing sector with losses close to \$65 million.

26. *The indirect damage estimates* need to be treated with caution, particularly when it comes to tourism and livelihood. The largest indirect losses occurred in the tourism sector which has seen a sharp drop in tourist arrivals (as of end-January 2005, 7600 tourists are in Maldives as compared to 17,000 at the same time one year back).

**Table 1: Estimated Losses and Financing Needs
(in US\$ million)**

| Sector | Losses | | | Cost of reconstruction (2) | | | |
|--|---------------|---------------------|--------------|----------------------------|------------------------|--------------|----------------------------|
| | Direct losses | Indirect losses (1) | Total losses | Needs for next six months | Medium terms needs (3) | Total costs | Public financing needs (4) |
| Education | 15.5 | | 15.5 | 8.4 | 12.7 | 21.1 | 21.1 |
| Health | 5.6 | | 5.6 | 4.9 | 7.3 | 12.2 | 12.2 |
| Housing | 64.8 | | 64.8 | 22.2 | 51.8 | 74.0 | 74.0 |
| Water and sanitation | 13.1 | | 13.1 | 18.4 | 27.2 | 45.6 | 45.6 |
| Tourism | 100.0 | 130.0 | 230.0 | 10.0 | 90.0 | 100.0 | 0 |
| Fisheries | 13.2 | 11.9 | 25.1 | 5.8 | 8.3 | 14.1 | 14.1 |
| Agriculture | 10.8 | 0.3 | 11.1 | 4.8 | 6.3 | 11.1 | 11.1 |
| Transport | 20.3 | | 20.3 | 2.0 | 25.0 | 27.0 | 24.9 |
| Power | 4.6 | | 4.6 | 1.9 | 2.8 | 4.6 | 4.6 |
| Livelihoods | | 30.0 | 30.0 | 17.4 | | 17.4 | 17.4 |
| Environment | | | | 3.7 | 6.1 | 9.8 | 9.8 |
| Disaster risk management | | | | 0.7 | 3.7 | 4.4 | 4.4 |
| Other costs for new host islands (5) | | | | 5.0 | 10.0 | 15.0 | 15.0 |
| Administration etc. (5) | 50.0 | | 50.0 | 15.0 | 35.0 | 50.0 | 50.0 |
| Total | 297.9 | 172.2 | 470.1 | 120.1 | 286.2 | 406.3 | 304.2 |
| Losses / costs as percent of GDP (2004 est.) | | | 62% | | | 54% | 40% |
| Estimated revenue loss (5) | | | | | | | 60.0 |
| Total financing gap including revenue loss | | | | | | | 364.2 |
| Total financing gap including revenue loss as percent of GDP | | | | | | | 48% |

Notes:

(1) Indirect loss estimates particularly in tourism and livelihoods are not robust.

(2) Reconstruction costs in some sectors are higher than damages because (a) some partially damaged houses will need to be fully rebuilt because the original islands are not livable anymore; and (b) new environmental standards apply to new facilities.

(3) Medium term covers the period from 6 to 36 months.

(4) Public financing needs differ from reconstruction costs because certain losses may be covered by insurance and financial resources available to owners.

(5) Preliminary estimates.

Source: These estimates were arrived at jointly by the Mission and the Government.

Estimated Reconstruction Costs

27. *Overall Needs.* Reconstruction costs for some sectors may be higher than total losses due to the need to rebuild to higher standards to reduce vulnerability (e.g. housing) and because current construction or environmental standards are higher than when original facilities were built (e.g. sanitation), or because modern equipment or supplies are of higher quality and provide improved services (e.g. health, education). Some of the indirect losses cannot be recovered: production losses from fishing, agriculture, and tourism cancellations cannot be restored. The financing needs have been divided into short-term and long-term needs. The short-term needs reflect investments needed urgently within the next six months; the long-term needs cover the period from six months to three years. The overall financing needs for the next three years is expected to be \$406 million; of this, \$120 million would be needed within the next six months (that is, first half of 2005).

28. *Public Finance Needs.* The needs for public financing are lower than the overall financing needs because parts of the reconstruction cost will be absorbed by the private sector (insurance, households, and businesses). Estimated needs for public finance include the costs of restoring basic services, infrastructure, and housing, as well as the cost of certain mitigation measures made urgent by the tsunami. In addition, the tsunami has led to a government revenue shortfall that needs to be financed. Most recent estimates put this at \$60 million. Total public financing needs are expected to be about \$304 million; of this, housing is the largest component. More detailed sector-specific estimates are provided below, following the discussion of cross-cutting issues (macroeconomic impact, social and livelihood impact, environmental issues, and disaster risk management).

MACROECONOMIC IMPACT

29. *Impact.* The tsunami will have a major impact on the Maldivian economy, much of which will become manifest over the next 6-12 months. The most likely effects in 2005 include: a severe economic slowdown with low real GDP growth of about 1% of GDP for 2005, a doubling of the current account deficit from 12% of pre-tsunami GDP to 25% for 2005, and a significant widening of the fiscal deficit to about 14% of GDP. Employment has been adversely affected by the low tourism occupancy rates and the losses of fishing vessels, equipment, agricultural crops, and other productive assets. Banks will need to reschedule loans to many of their clients and ensure adequate finance for ongoing operations and rebuilding. Overall, the reconstruction effort is likely to encounter constraints in timely financing, and there are potential bottlenecks in transportation and labor.

30. *Tourism and macroeconomic impact.* There is uncertainty about the growth impact of the tsunami. The slowdown in GDP growth has been estimated to around 1% in 2005 (as compared to a pre-tsunami forecast of 7.5); However, it is also possible that the GDP outlook could be even worse. To a large extent, the macroeconomic impact will depend on the speed at which tourism recovers. As of end-January tourist arrivals were picking up strongly, suggesting that supply constraints (bed nights available) will be a key factor determining tourism sector growth in addition to demand constraints. Most of the resorts did not sustain serious damages, and as of January 31, 2005 a large part of damaged resorts have already been repaired. By April 2005, bed night capacity will likely recover to 95% of its pre-tsunami level. However, given that the slump in tourism has occurred in the months that normally would have had peak occupancy rates, the tourism sector is likely to experience a 25% decline in bed nights in 2005 relative to 2004. Given that tourism represents directly one-third of GDP, and has an even greater indirect impact, this decline causes concern regarding the economic prospects for 2005. However, the sector will likely recover its pre-tsunami capacity towards the latter part of 2005, resuming its role as the

country's prime engine of economic growth. Economic growth has been projected by the IMF to recover strongly in the 2006-2010 period to 6-9% per year.

31. *Mitigating the economic downturn.* Key measures to mitigate the adverse macroeconomic impacts of the tsunami include:

- Income support to the affected population, as is being done through cash transfers, which also help maintain adequate liquidity in the atolls.
- Supporting the affected populations restore their livelihoods by financing the replacement of key assets and tools and by employing local labor in rebuilding infrastructure.
- Encouraging the resumption of tourism activity by conveying a clear message to the rest of the world that (a) serious damages were limited to a few islands, (b) key infrastructure, like the airport, is safe and functioning normally, and (c) the impact of the tsunami was minor on most of the resorts, which are open for business.
- Ensuring that the reconstruction effort is consistent with macroeconomic stability over the medium term, by containing the fiscal deficit, maintenance of the fixed exchange rate, and price stability.

SOCIAL AND LIVELIHOOD IMPACT

Social Impact

32. *Community mobilization.* The social fabric of the tsunami hit islands in the Maldives has been seriously impacted by extensive physical damage, loss of life and livelihoods, and displacement of people. Most affected people lost savings kept in cash in the house. The affected communities have a heightened vulnerability to poverty. The impact of the losses has been exacerbated by the shock and fear caused by the tsunami. Although traumatized, island communities have demonstrated a strong sense of independence, resilience and cohesion in mobilizing themselves into groups to remove rubble, initiate small scale reconstruction activities on mosques and houses, distribute relief supplies, and sheltering those made homeless. In a country of many small islands, community organizations have traditionally played an important role in providing public and collective services as in many other areas of local life. The capacity of communities to mobilize themselves represents one of the most important assets for the reconstruction work ahead. Community mobilization and self-help needs to form a cornerstone and a key organizing principle for demand-driven local recovery programs, and strengthening of community capacity is important to assist them play their role effectively.

33. *Gender.* The planned reconstruction activities will take into account women's needs and utilize their skills. Moreover, interventions to support livelihood recovery will also support women's income generating work, for example, in fish processing, handicrafts, agriculture, tailoring, food processing and catering, retail, and many other activities. Every effort is being made to prevent school dropouts and other interruptions to children's education.

34. *Support needs.* Following a disaster such as the tsunami, family and social support networks can sometimes weaken, leaving women and children more vulnerable to psychological and emotional stress. The government is providing immediate psycho-social support services to affected families, especially traumatized children and is also training new trauma counselors. Management of temporary shelters for the displaced persons are providing for safety and privacy.

35. *Capacity building.* The recovery effort offers an opportunity to enhance capacities of the stakeholders. In view of the massive efforts to be undertaken for reconstruction, it is vital to ensure that all concerned, and particularly government departments and island communities have the necessary support to play their role effectively in the planning and implementation of the recovery effort. The need for capacity strengthening should therefore be taken into account into the recovery programs.

Displacement

36. Given the spatial dispersion of the population and the absolute scarcity of land, some people, including those whose islands are no longer habitable have shifted either temporarily or on a permanent basis to new islands. Many of the internally displaced people (IDP) have been housed in the homes of host families. This arrangement is now leading to increasing uneasiness on both sides, as IDPs feel they have overstayed their welcome. Most of the affected are returning to their original islands; some communities however will be resettled either out of choice (the community anyway desired to shift to a larger or safer island) or out of necessity (the home island has been completely destroyed, submerged, or rendered uninhabitable). The government has clearly stated that nobody will be forced to relocate against their wish. When relocating, island communities jointly decide where to go to and move together as a community.

Safety nets, employment, and livelihoods

37. *Vulnerability and chronic poverty.* In Maldives, recent vulnerability analysis has shown that there are vulnerable groups which even prior to the tsunami were under-served by public safety nets. The poor and vulnerable groups include large families with no breadwinner, most of whom are headed by single women (divorcees and widows), and certain single elderly. The large majority of the poor and vulnerable groups are located in the atolls. These groups are in need of support both before and after the tsunami. The imperative of providing immediate support to the tsunami affected population should not undermine the financing and implementation of a medium-term social protection strategy designed to combat chronic poverty and vulnerability among groups located in all atolls, both affected and unaffected.

38. *Tsunami-induced vulnerability.* The tsunami created new vulnerable groups, i.e. those who lost their houses and other assets (in-kind or cash) and livelihoods. In the absence of targeted public support for asset restoration, recovery of lost livelihoods may take very long. Creating employment and restoring livelihoods are critical dimensions of the reconstruction process and will kick start the economy of the tsunami affected islands, restore a sense of normalcy, and support the social and economic inclusion of the displaced populations. Such support will need to be rapid if it is to be effective. It will need to be well targeted if it is to be affordable. Reconstruction efforts should be undertaken involving the affected communities directly.

39. *Livelihood support.* The government has decided on a policy of urgent support for livelihood restoration, termed the Island Livelihood Revitalization and Development Program. This program comprises of (a) in-kind equipment (e.g. fishing equipment, fish processing equipment, start-up packages of seeds and tools for agriculture); (b) small and short term cash grants for working capital; (c) subsidized micro credit for agricultural and other producers; (d) government financing of repairs to fishing vessels; and (e) procurement of new cost-effective fishing vessels to replace those that were lost. The procurement of new fishing vessels is proposed to take place under a pre-existing government-run program in which the Government procures the vessels (from domestic shipyards) and delivers them to fishermen. The restoration of livelihoods of the affected producers will be speedy and efficient.

40. *Targeted cash assistance to tsunami-affected groups.* However, some affected households—including families without able-bodied members such as single mothers with many children, the disabled, the elderly—may not benefit from the livelihood assistance and need to be helped through targeted interventions. In the very short term, the main need is to provide shelter and income support to the displaced. This is already well underway, inasmuch as Rf.30 million (\$2.3 million) has been disbursed to the affected population under an emergency cash transfer program; the program disburses Rf.1500 (\$117) per family member to those who completely lost their houses; Rf.1000 (\$78) per person to those whose houses were damaged and needed repairs; and Rf.500 (\$39) per family member to those whose houses were flooded and therefore lost their belongings. This program is still undergoing and it is estimated that an additional Rf.20 million (\$1.6 million) will be disbursed shortly. Once complete, this program will have reached approximately 63,000 beneficiaries. Multisectoral teams from Malé together with island committees identified the beneficiaries, registered them, and disbursed the assistance as a one-time cash transfer. The government is aware that not all affected have yet been served, and efforts are ongoing to cover all the affected. The Ministry of Gender, Family Development, and Social Security has also proposed an additional follow-up income support program for affected individuals not covered by livelihood restoration programs, i.e. the elderly and people with disabilities. This new proposed scheme would give Rf.500 (\$39) per month per person for a period of 10 months, confined to a select target group of around 2000 individuals, with total cost Rf.10 million (\$780,000). Free health care might also be provided. These programs are commendable and deserve full support.

41. *Public works.* The restoration of damaged housing and other infrastructure such as island offices and courts in the affected islands represents an opportunity to provide short term employment to the affected population. Launching of such programs would require rethinking and modification of the current policy of contracting out housing and other construction to private sector professional contractors. Some of the activities currently planned to be given to private contractors could be executed by the affected communities through paid labor. However, the feasibility and desirability of public works involving local paid employment depend crucially on whether there is a pool of excess unemployed labor available in the affected islands.

ENVIRONMENTAL ISSUES

42. *Environmental impact.* Even more than most island nations, the Maldives are highly dependent on the fragile ecosystem of their coral reef islands. The tsunami has proven once again the extreme vulnerability of small island states. It was reported that 35% of the 198 inhabited islands were subject to high or very high impact by the Tsunami with major physical damage to buildings, infrastructure, crops and natural vegetation. The tsunami generated a range of environmental problems with the potential to harm human health and damage the environment. The tsunami caused widespread deposition of coral sand, vegetation, municipal waste from dump sites, healthcare waste, human excreta from damaged septic tanks, hazardous substances (oils, asbestos, batteries, etc.) and demolition waste (concrete, coral fragments, timber, etc.) from destroyed buildings waste across the impacted islands. The tsunami resulted in saltwater intrusion into fresh water lenses on almost all of the 1,200 islands, resulting in vegetation browning and dieback. It is likely that the coral reefs around the islands have been damaged by sedimentation and excessive amounts of debris. In addition, the tsunami resulted in beach erosion and soil wash-off.

43. *Chronic environmental issues.* The response to the tsunami has highlighted a number of chronic environmental issues. Current waste management practices on the islands are poor, and include open burning of waste, stockpiling of hazardous waste including clinical waste, dumping

of waste on islands, beaches and the open sea. The Maldives has no regulations for the use, procurement and disposal of hazardous substances including asbestos, polychlorinated biphenyls (PCBs), anti-fouling paints (used on fishing boats), batteries and pesticides.

44. *Environment Act.* In accordance with Law No. 4/93, the Environment Protection and Preservation Act of Maldives, all activities to be implemented as a result of tsunami damage should take due consideration of the guidelines provided by the government authorities, and specifically the Ministry of Environment and Construction (MEC). MEC and other concerned government authorities shall provide the necessary guidelines and advice on environmental protection. As most reconstruction involves replacing damaged assets and construction materials are imported, environmental impacts are not expected to be large and can be easily addressed. Exceptions are disposal of waste water and solid waste where past practices were inadequate and where upgrading during reconstruction is warranted.

DISASTER RISK MANAGEMENT

45. *Need for a risk management system.* The recent disaster has increased Government awareness to the risk exposure of Maldives and the measures needed to manage risk. The Government is starting preparation of a risk management system to reduce the human and economic impact of future disasters. The three pillars of a risk management strategy consist of risk information, risk mitigation, and risk transfer.

46. *Risk exposure.* Maldives has suffered various extreme events such as storms and floods, but the risk is low due to their low frequency. Historical records show that in the last two centuries the northern part of Maldives has experienced five major storms. The last one, in 1991, was recorded as the most severe with winds reaching 90 km/hr. Floods were also reported in some islands, with the island of Foamullah experiencing nine such events between 1977 and 1989. Nevertheless, the impact of storms are not as severe as the potential impact of global climate change. The coastal setting of Maldives makes it highly vulnerable to effects associated with sea level rise and potential increased risk from global climate change such as flooding and storm. Among the priority vulnerabilities of Maldives are land loss and erosion, infrastructure damage, and damage to coral reef. The risk linked to tsunamis exists even if the probability is very low.

47. *Disaster Risk Management Strategy (DRMS).* Developing a DRMS would aim at reducing the country's vulnerability and reduce the potential effects of risks on the national economy. In Maldives, risk reduction is strongly linked to the GoM's long-term strategy to regroup the population into selected focus islands. The first pillar of this strategy is risk information. This would ensure a good understanding of risk, gathered from a vulnerability assessment. GoM would participate in a regional warning system and develop a national communication program to inform all layers of stakeholders from the government to the island representatives and the local communities. A program would be developed on preparedness planning to organize first response and emergency relief. The development of a broad band network, as planned by the Government, could contribute to this program. Finally, updated information based on a comprehensive risk mapping should be made available to the population.

48. *Risk Mitigation and Transfer.* The second pillar, risk mitigation, includes non structural as well as structural measures. The non structural actions include the adaptation of the legal and regulatory system, with land use planning and the building code to reduce the risk in the reconstruction process. The land use plans should incorporate the risk mapping information to identify the different levels of risk in the zoning. The building code should introduce the

appropriate measures of construction to limit the vulnerability of built environment. Structural measures should also participate in enhancing resilience of the main sectors, tourism, fisheries and key infrastructure to disaster, and could include sea defense works, adapted road and water networks. The development of the strategy, linked to the focus island policy, must be complemented by the identification of shelters, with construction, or retrofitting, of multi purpose shelters. The third pillar would be risk transfer which would ensure distribution of risk between the government, households, and insurance companies. Sectors such as tourism, fisheries, and banking, in particular, could benefit from insurance against risk.

49. *Institutional Organization and Legal Framework.* It would be advisable that the National Disaster Management Center (NDMC) continues as an institution to address disaster management program in the country. To start with, the National Disaster Management Center would focus on ensuring that in the reconstruction process, risks are not rebuilt. It would also help in developing guiding principles for reconstruction and further development in key sectors such as housing and critical infrastructures which have a strong role in vulnerability reduction. As often in similar cases, the recent disaster has increased Government awareness to the risk issue and developed its willingness to reduce potential effect of future disasters on the economy. The Government could consider the opportunity of the reconstruction period to start the preparation and implementation of such a Risk Management system. The paragraphs below will detail the risk exposure of the country and the three pillars of a risk management strategy, risk information, risk mitigation, and risk transfer.

DAMAGE AND RECOVERY NEEDS BY SECTOR

Education

50. *Damages in the education sector.* Damages sustained in the education and training sector range from damaged school infrastructure to insufficient teaching staff as expatriate teachers left. Sixty-three percent of schools in the atolls have been spared, with minimal or no damage and are immediately ready to open. However, the remaining 37% of the schools require varying degrees of repair and rehabilitation to be functional. Six schools have been completely damaged. The damages include collapsed boundary walls, water storage facilities, toilets, and septic tanks. Although some buildings may be intact, they may have developed cracks or their foundations made unstable. School provisions and equipment (textbooks, stationery, uniforms, blackboards, library books, computers and printers), school records, and teaching and learning materials are damaged and rendered unusable, if not swept away. Despite these problems, all schools managed to start their next academic session on time. However, replacement of provisions for the affected schoolchildren is an immediate priority, along with the repair and rehabilitation of damaged school facilities and construction of temporary/additional classrooms in host islands, and providing technical support to untrained teachers. Teachers and schoolchildren have also been traumatized by the disaster and need psychosocial support.

51. *Recovery Needs.* Recovery of damaged education sector infrastructure will cost \$21.1 million excluding the postsecondary education sub-sector.

Health and Nutrition

52. *Emergency health arrangements.* Discussions with the Ministry of Health (MOH) team, UN agencies and field visits to islands in Thaa Atoll (Madifushi and Buruni) revealed that critical emergency needs such as safe drinking water, food, and emergency medicines are essentially in place in those islands. Populations who lost their homes have been provided temporary shelters

either in their own or in other host islands, and those reporting major injuries have been promptly attended to. The MOH has put in place a disease surveillance system to monitor outbreaks of communicable diseases and respond to emergency health needs. Teams of counselors and volunteers are visiting relief camps and affected islands to provide psychosocial support. The MOH has authorized the health facilities to locally procure emergency medicines. The critical challenge now is to sustain these inputs until more permanent arrangements are in place, and to render the damaged health facilities functional as early as possible. Also, the essential public health programs that were formerly run very efficiently in Maldives need to be put back on track. More importantly, the psychosocial support initiative now needs to move to a long-term operational framework; as a first step, a training program in psychosocial first aid has been started. The MOH in consultation with the partners is putting together a comprehensive medium-term plan for the health sector. The preliminary estimates suggest that about \$7 million would be required over the medium term.

53. *Damage Assessment and Recovery Needs.* The total cost to get the health sector back to their pre-tsunami state is expected to be \$12.2 million.

54. *Nutrition.* Malnutrition rates among children were high prior to the tsunami. The causes of malnutrition include problems with food accessibility in terms of availability and affordability, food utilization, water and sanitation, health status, and the social and care environment. In order to address these factors, a holistic approach involving multiple sectors is required with training and support to build local capacity as key areas to help ensure broader development objectives.

55. *Other Food Security Issues.* Food security is a particular challenge in the Maldives given the logistical and transport complexities as well as the high dependence of island communities on food imports. Findings from the Rapid Vulnerability Assessment carried out by the World Food Program (WFP) indicate a need for targeted food assistance for displaced families in 13 islands in the short term. Food assistance is recommended only as a stop gap measure during the time it takes to recover livelihoods and establish cash based safety net programs, including cash based employment schemes, such as those linked to reconstruction, which are considered the most appropriate medium and long-term response.

Housing

56. *Damage Assessment.* Private housing suffered severe damages, with preliminary damage assessment of \$65 million. The wave damaged directly structural and non structural elements of the houses, breaking boundary walls and facades, and indirectly, subsided land, leading to the collapsing of houses in the absence of foundations. The day after the Tsunami, 29,000 persons were displaced, and 13,000 remain in temporary shelters as of today. Some homeless families have been sheltered by friends or relatives. The preliminary assessment reports 1847 houses totally destroyed and 3500 partially damaged. It will be revised after a technical survey carried out by engineers on the islands. The damage assessment has included the direct cost of housing damage, and indirect cost of emergency shelters. The cost of debris removal has been considered marginal.

57. *Reconstruction strategy for housing.* Prior to estimating the reconstruction costs, GoM needs to formulate a reconstruction strategy. The Government is willing to absorb a large share of the housing reconstruction costs, providing the families whose houses were destroyed or damaged with built-up houses. For the houses to be built anew, GoM has proposed a two-stage housing reconstruction plan. In the first stage, a basic dwelling unit of 61 square meters comprising of two bedrooms, one living room, one toilet, and a kitchen will be constructed according to standards

stipulated in the building code. Construction will be carried out by contractors with scope for local communities to participate in construction activity and benefit financially (contract selection gives weight to use of local labor and sub-contractors). In the second stage, financial incentives will be provided for households to extend/modify/improve the basic unit according to their individual needs. The scheme has several merits: it is faster; it is relatively easy to enforce quality standards and building code regulations; it is particularly convenient for labor-short households such as single women with many children and busy fishermen; it does not interfere with normal economic activities in fishing and agriculture; and, to the extent the economies of scale in construction are passed on by contractors to the government in terms of lower unit costs, it could be cheaper. Its disadvantages appear to be the lower level of community participation and involvement especially in the first stage, and high level of government financial support.

58. *An alternative approach to housing* could seek greater involvement of local communities in housing reconstruction. For example, every affected household could be provided with building materials and some cash on the condition that within a stipulated time a basic structure (foundation and load bearing walls) will be ready, to be approved by certified building inspectors to ensure compliance with building codes. The main disadvantage of opting for approaches with greater community self-help and participation is that it could potentially take much longer to complete the houses; and it may place undue burden on some labor-short households. Thus different approaches have different merits and demerits; it appears desirable to consult with communities on the kind of approach they want, though it would be necessary for each affected community as a whole to adopt one single approach to reap economies of scale.

59. *Reconstruction costs.* The mission has estimated reconstruction to be US\$74 million, of which immediate needs of \$22.2 million. The unit costs per house are about Rf.250,000 (\$20,000) based on the first round of bidding. A 15% price contingency has been added to this in case the volume of construction and transport congestion results in an increase in real unit costs. The mission suggests some recommendations (detailed in annex) to overcome the potential constraints imposed by a limited capacity of the construction sector. The mission also recommends adapting the building code to improve construction standards.

Fisheries

60. *Fisheries losses—damages (asset loss):* Rf.321 million (\$25 million). Based on data from the Ministry of Fisheries, Agriculture, and Marine Resources (MFAMR), 120 fishing vessels were lost or totally damaged. 50 fishing vessels were partially damaged or lost equipment. 5 reef fishing boats lost equipment and 16 ocean cages were lost. In particular, 374 fish processors lost equipment, while 8 boatsheds and 2 fishery institutes were damaged.

61. *Recovery Needs—Rf.180 million (\$14.1 million).* The estimated recovery cost for the damaged or lost vessels and provision of necessary equipment is about 7% higher than the actual replacement cost given by MFAMR. This is in order to allow for the costs of assessing impacts on reefs and marine resources, and provide micro credit to cottage fish processors in the form of operational capital to restore their livelihoods. Some of the immediate works have already been undertaken at a cost of Rf.12.0 million, financed through the government budget.

Agriculture

62. *Damage (asset loss) —Rf.142 million (\$11 million).* Based on data from MFAMR, the tsunami damaged field crops in 2,103 farms; destroyed backyard crops and agricultural tools in 11,678 homesteads; and damaged more than 700,000 fruit trees and 840,000 timber trees in

inhabited islands. The damage to land and groundwater resources is severe in 35 agricultural islands, and saline water intrusion has affected 112 inhabited islands. A detailed damage assessment is required to prepare an immediate recovery plan for the agriculture sector.

63. *Recovery Needs*—Rf.143 million (\$11.1 million). The reestablishment of the agricultural crops will involve improvement of soil, forestry, and water resources, importation of planting material, and provision of extension services, some of which will have to be obtained from other countries. The agricultural sector should be reestablished in a sustainable manner by strengthening institutional capacities and providing support services.

Water Supply, Sanitation and Solid Waste Management

64. *Damage (asset loss)*— Overall damage due to loss of assets is estimated to be Rf. 168 million (US\$13.1 million). Preliminary estimates suggest the potential loss of up to 1000 community rainwater tanks, 6000 household rainwater tanks and 20,000 m³ of rainwater supplies. Roof water harvesting piping and gutter systems are also expected to be damaged affecting an estimated 5000 households. The team has estimated that up to 850 well-pumps are estimated to have been lost as a result of flooding. In addition the quality of groundwater supplies in 36 islands may have been compromised due to saline and sewage contamination. There is no assessment of the number of damaged toilets, but based on coverage and housing destruction, it is estimated that an approximate 5000 toilets and 3500 septic tanks may need to be provided, whilst small bore sewer and outfall loss in highly affected areas needing replacement could be as high as 126 km and 2.4 km, respectively.

65. *Recovery Needs* – Rf..584 million (US\$45.6 million). Short-term needs (Rf.235 million, US\$ 18.4 million) should focus on (i) the provision of immediate safe water to affected areas, (ii) provision of basic temporary sanitation facilities and rehabilitation of existing sanitation infrastructure, (iii) initiating a solid waste management program for clearing and recovery of debris material, as well as (iv) attending to immediate community awareness and capacity building required to undertake the above tasks. The Government in coordination with agencies such as UNICEF is already providing packaged water and reverse osmosis units, which should be followed by the supply of household and communal rainwater tanks. Detergent and disinfectants, as well as water chlorination tablets are being provided where water from wells is to be used. Temporary sanitary latrines, septic tank desludging systems and the construction of temporary sludge drying beds must be provided to communities in substantially to very high impact areas. This is to be coupled with a solid waste management program for the safe and optimal solid waste disposal of tsunami resulting debris, including the provision of communal wheel bins and selected equipment (shredders, glass crushers and composting bins).

66. *Medium term needs* (Rf..349 million, US\$ 27.0 million) and associated strategy will focus on (i) rehabilitation and reconstruction of infrastructure damaged by the tsunami and (ii) upgrading, introduction and development of sewage treatment and disposal facilities in islands where rebuilding or potential relocation is required, (iii) introduction and development of solid waste management systems, including formalization of solid waste management centers, (iv) institutional strengthening and capacity building for environmental management. This shall include new sewerage systems (potentially attached to cost-effective locally-adapted treatment facilities), and the formalization of solid waste management centers and services in affected atolls.

Tourism

67. *Background.* Tourism is the main industry in the Maldives and has enjoyed strong growth over the past decade with arrivals reaching 615,000 in 2004. For the 87 resorts, bed occupancy rates averaged a very strong 85% for the year with high average room rates. Total receipts from the industry, including multiplier effects, are estimated at about \$415 million in 2004. The industry accounts for approximately 33% of GDP directly; considering indirect impacts, tourism contributes an estimated 60-70% to GDP. The tourism industry, directly and indirectly, also accounts for a high portion of government revenues. Lease payments from hotel projects were \$48 million in 2004 with bed and departure taxes contributing \$41 million and custom duties another \$43 million. This excludes tax revenue generated from landing fees, telecommunication taxes, much of which is tourism related, and other miscellaneous charges. The hotel sector alone accounts for 17,000 jobs; when consideration is given to other tourism businesses and multiplier effects, the tourism industry is likely responsible for well over 25,000 jobs.

68. *Impact.* The impact from the tsunami is significant for both the private and public sectors. Direct damage to the tourism infrastructure and other related businesses is estimated at over \$100 million, some of which will be covered by insurance. Approximately 30% of beds are currently not in operation. More significant is the loss of revenue from the downturn in tourist arrivals. Airport arrivals were 5,625 for the first 11 days of January 2005 compared to 20,308 for the first 11 days of January 2004. Assuming that tourists return gradually with a rebound close to pre-tsunami projections by July, the loss in total tourism receipts is preliminarily estimated at \$80 to \$100 million. With large fixed costs, cash flow problems are likely at in some resorts and in other businesses serving the tourism sector. It is unclear at this point how large the impact on employment will be: much depends on how quickly the industry recovers. For employees that depend on the 10% service charge for the majority of their income, even if jobs are maintained, the financial impact of lower occupancies will be significant. On the Government side, tax revenues will suffer considerably with an estimated loss of \$25 million just considering the departure and bed tax, a portion of the customs duty and some waiving of lease fees on beds not in operation.

69. *Measures to mitigate the impact.* The key to minimizing the financial impact is to bring tourists back as quickly as possible. This requires a focused marketing effort to get the message out to the travel trade and to tourists that the tourism sector is up and operating, that most resorts were unaffected, that it is safe to visit the Maldives and that visitors are welcome. \$2 million is recommended for this marketing effort. To relieve the financial burden on resort owners, a partial waiving of lease payments for beds not in operation and the duty free importation of needed construction materials for the rebuilding process are recommended. There may be aid available from various aid organizations to channel through financial institutions for on-lending to SMEs in tourism and other sectors to ease cash flow problems. The International Finance Corporation (IFC) of the World Bank Group may be able to assist with financial packages for some of the larger companies. Other recommendations can be found in the Annex.

Transportation and Communications

70. *Damage (asset loss) – \$20.3 million.* The damage to transport and communication infrastructure (harbors, jetties, causeways, navigational aids, airports, telecoms) was less than originally feared. This can largely be attributed to the facts that ports and maritime facilities are generally located at the inner side of the atolls, away from the direct tsunami impact and that the airports are located on islands where the tsunami had limited impact (Malé and Gan). About 4,200 m length of quay wall, and 15,000 m of harbor/sea walls and breakwaters have been

damaged or destroyed, and about 370,000 m³ of dredging will be required to remove tsunami-inflicted siltation of harbor basin and approach channels. Five causeways have been partly damaged. While the telecom sector initially completely failed, all connections were restored by 7 January 2005. It is estimated, though no hard data is available, that about one third of the navigation aids were damaged or destroyed.

71. *Immediate needs—\$2.0 million:* as immediate needs, the navigation aids system needs to be restored and transport equipment such as landing barges should be procured to prevent surging prices in the construction sector.

72. *Recovery needs—US\$24.95 million:* The above listed damage to the infrastructure should be restored within a one-to-two year period to remove bottlenecks and inefficiency in the transport chain which would have direct impact on commodity prices and living standards.

Power

73. *Damage.* The tsunami had damaged the electric power supply system in 95 islands (about 48% of the islands with electricity) and left the populations without electricity for several days.

74. *Government's Immediate Response:* The Government instructed the State Electricity Company Limited (STELCO) to send teams to 53 most affected islands to collect information related to the damage as well as temporarily restoring electricity. STELCO has been able to restore the power supply in many islands if only to a bare minimum in terms of providing electricity in the islands' offices and the temporary tents in the evening. The STELCO teams repaired a number of damaged generators and installed small temporary generators in a few islands.

75. *Government Recovery Program:* The Government is planning to restore the electricity supply systems in all affected islands to pre-tsunami level. The immediate program, to be implemented over the next 6 months, will prioritize the replacement of the damaged distribution network and the repair of damaged generators. The next step, to be completed in 1.5 to 2 years, will be the installation of new generators, construction of powerhouses, installation of new switchboards, and streetlights.

76. *International Community Response:* the International Federation of Red Cross (IFRC) has provided 22 generators of 20 to 150 kW capacity each, with cables and distribution boxes. The generators have been installed in 22 islands and have been operating since 29 January 2005. The value of the IFRC contribution was about \$0.6 million. The British Royal Navy sent teams to repair the generators in a few islands. The United Nations Development Program (UNDP) will replace damaged electricity cables in some islands using \$0.3 million from the United Nations Foundation.

77. *Damage (asset loss) – Rf.49.5 million (US\$4.65 million).* Based on data received from the National Disaster Management Center (NDMC) and STELCO, the power supply system in a total of 95 islands was damaged. The damage facilities include: 24 power houses; 104 generators, 652 streetlights, 34 switchboards, 632 distribution boxes, and more than 121 kilometers of cables.

78. *Recovery Needs – Rf.49.5 million (US\$4.65 million).* It covers the installation of new equipment including generators, cables, distribution boxes; reconstruction of a number of power houses, and connection to the households consumers. The cost estimates cover the reconstruction works for the period of 18-24 months, of which \$1.86 million is required over the next 6 months.

Public administration

79. *Damages* are estimated at \$50 million (preliminary estimate, subject to change). An assessment of the damage to other public offices such as island offices and courts may be required to establish the extent of damage and the recovery needs. Several island courts suffered damage, equipment destroyed, and court records lost. Repair of these public offices are vital to enable them to function effectively in support of the recovery efforts. It is likely that there would be an increased demand for their services due to the processes involved in reconstruction efforts where legal and other public administrative issues can arise.

CONCLUSION

80. The tsunami caused severe damage to the physical infrastructure of several islands in Maldives and has set back the high levels of economic growth and social development achieved in recent years. Total losses are estimated to be \$470 million, or 62% of GDP. Of the total losses, damage to assets is \$298 million, or about 8% of the replacement cost of the total national capital stock. The damaged assets include tourism resorts, houses, schools, health facilities, boats, transport and communication equipment, water and sanitation, and electricity infrastructure; there has also been substantial damage to agricultural crops and lands. The destruction of houses, livelihoods, household items, and loss of lifetime savings has had a traumatic impact on many Maldivians. In economic terms, the largest damages were sustained in the tourism sector and housing. Lost tourism income and destroyed livelihoods will cause GDP growth, employment, and government revenues to contract this year. The damages to assets and incomes will translate into severe economic and social distress; rapid public action to provide assistance to the affected communities could however avert some of this distress and prevent severe shocks to private consumption and further hardship to the affected Maldivians. Reconstruction of public assets and restoring lost government revenue will require financing of \$364 million, most of which will need to come from external sources.

81. The strong Maldivian tradition of community cohesion and support, coupled with swift and well-organized government response supported by the donors, has resulted in a speedy and successful relief effort. Such community involvement can and should continue during the recovery phase. While the efforts of the Maldivians are commendable, this Needs Assessment has demonstrated the urgent need to support the reconstruction efforts of the government with adequate foreign assistance in grants and highly concessional loans in order to restore the damaged infrastructure and rebuild people's livelihoods.

Attachment 1**LIST OF TEAM MEMBERS OF THE EMERGENCY TSUNAMI DISASTER NEEDS ASSESSMENT MISSIONS****World Bank**

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