

MALDIVES - COUNTRY REPORT

Comprehensive Tsunami Disaster Prevention Training Course

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9 July, 2008

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Introduction

The purpose of this country report is to review the tsunami countermeasures in Maldives and Japan, and propose some plans of action to enhance tsunami countermeasure initiatives in Maldives.

The chapter one provides the reader with the disaster preparedness counter measures Maldives has taken and explains the country situation before and after the Indian Ocean tsunami, includes information on the type of cooperation system existing in the Maldives, information on legal institutions, basic plan for disaster mitigation, organizational structures including emergency response. It also contains tsunami structural measures, non-structural measures, restoration, education and succession of disaster experience in the Maldives.

Chapter two reviews the present tsunami countermeasures of Japan based on the five week training. The observations are based on the lectures, technical visits to PARI, JMA, JAXA, on-sight survey and interviews and discussions with city officials and community members along the Sanriku Coast and the coastal towns of the Kii Peninsula. The chapter concludes by highlighting the differences between countermeasures in Japan and Maldives.

Chapter 3 begins with challenges in Maldives in implementing tsunami countermeasures, and provides a summary of the action plans for the individual participants.

1. Review of tsunami countermeasures in Maldives

1.1 Indian Ocean Tsunami

Despite years of concern about the potential danger of climate change and the rising level of the sea to the low lying country, there was no significant disaster preparedness or experience at the national or local level before the 2004 tsunami. Being the first major catastrophic natural disaster in Maldives, the tsunami waves swept across the entire nation, with tsunami waves heights reaching upto 4 meters in some islands. Despite the low casualty rate in terms of human life, loss to the national economy and damage to property, housing and livelihoods left Maldives among the worst hit in the Indian Ocean. There was no policy, no legal or institutional framework or disaster management expertise. There was also no local Red Crescent Society active in Maldives. There were very few international assistance actors at the time of the tsunami, notably United Nations (UN) agencies, and with a focus on development rather than disasters. There were also very few local non-government organisations specialising in relief work, although there are a wide range of community-based associations.

While the 2004 tsunami has been the first major disaster, Maldives has been experiencing frequent flooding caused by sea swells, and some measures have been taken against flood mitigation in Male' the capital and some of the islands. The sea wall and breakwaters in Male' saved the capital from the worst of the tsunami and protected the life line of the entire country, as all critical infrastructures such as tertiary health care, higher education, defence, and all the government key ministries are located in Male'.



Seawall around the coastline of Male'

When the tsunami hit the Maldives, there were no systems developed to deal with a disaster of that magnitude. Yet, the immediate community response was commendable, with volunteers and neighbouring islands rushing to assist the affected people offering food, clothes shelter and

emotional support. However, this was short lived and people became disempowered as soon as external aid arrived and the Relief Task Force was set up as there were poor guidance in the composition and the role of the Relief Task Force. Relief distribution was conducted without prior consultation, and there were gaps and delays in providing some of the relief aid. Not all relief was appropriate; sometimes people received food rations but did not have utensils to cook in or fire to cook on. Some food parcels had cans of fish that people were not familiar with and did not use. Some medical facilities complained that they were given medicines they did not need.

The capacity of the country to issue early warning system was also not adequate, and the awareness level of the communities and the government was not at a level to act on any early warning messages. Further the absence of any higher grounds (the land area in Maldives is flat with less than 2 meters above sea level), and the weak structures of the buildings, especially in the islands will not provide any safe shelters for the residents to evacuate to. Further the national telecommunication system was un-operational for the first twelve hours after the tsunami hit, which made it difficult to assess the impact of the disaster as well as the provision of assistance and evacuation of affected people.

1.2 Key Achievements in tsunami countermeasures

1.2.1 Legal and Institutional Framework Development

Following the tsunami, Disaster management has been identified as a national priority in the 7th National Development Plan, and the groundwork for the preparation of the national disaster management policy and institutional framework has been laid down. A Disaster Management Act has been drafted and is currently being reviewed by the Ministry of Arts and Legal Reform. The Act is expected to be submitted to the Drafting Committee for legal review and would be tabled at the Parliament for passage into law and adoption. This act describes the powers and authority of the national disaster management institution and the responsibilities of other agencies. A National Disaster Management Plan has been developed in consultation with the concerned agencies and final discussions are underway. This plan covers the disaster management activities each national agency is responsible and it describes flow of activities before and after the disaster.

1.2.2 Organizations and systems for disaster management

A nodal agency to deal with natural disasters was established in the aftermath of the 2004 tsunami and was declared as a permanent institution on the first anniversary of the tsunami. The mandate of the organisation is as follows:

- i. To periodically revise the National Plan on Disaster Management and Mitigation
- ii. To strategically plan for mitigating disaster, in line with local and international procedures
- iii. To take steps and implement plans to normalize the situation after a disaster
- iv. To conduct programmes to increase community bond and self dependence after a disaster
- v. To conduct training programs for all those involved from the government and on individual basis, at various levels of relief efforts
- vi. To conduct training programs for government and private agencies at least once a year to increase disaster awareness

The President appoints the head of the National Disaster Management Centre (NDMC) with the advice from the National Disaster Management Council. Presently the Centre is managed by the Minister of Defence as Chief Coordinator. The figure in the next page illustrates the structure of the current framework for disaster management in Maldives.

Due to the sea swells that affected a number of islands in 16 Atolls in May 2007, the government reiterated its commitment and interest to strengthen the NDMC as the nodal agency for disaster management. It is envisaged that this would lead to a more functional NDMC which is a critical factor to facilitate the passing of the National Disaster Management Act and put in place the institutional mechanism for disaster management in the country. In parallel, the NDMC is evolving into a fully functioning institution in charge of coordinating all disaster risk management initiatives in the country. The NDMC has been closely working with UNDP and is the focal point for ISDR's HFA initiatives in the country.

National Emergency Centres have also been established and equipped to provide emergency response and hotlines are established. These centres will provide support to their respective region. Presently these centres are managed by the military personal as they the most resourceful institution in the country.

1.2.3 Structural Measures

National Building Code The Ministry of Construction and Public Infrastructure is currently working toward formalizing the national building code. Stakeholder reviews are underway and formulation of a framework for the implementation of the code and the development of compliance documents supplementing the code is expected to start shortly. The implementation of the building code will contribute towards reducing exposure to risk resulting from weaker building structures.

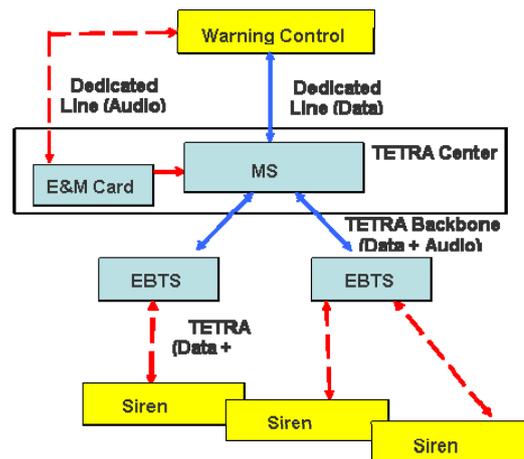
Coastal Forestation and Mangrove conservation: A study is currently underway lead by the Ministry of Environment, Energy and Water to explore the benefits and ways to promote coastal forestation and mangrove conservations in Maldives.

Safe Shelter: Designs to build a tsunami evacuation centre for the island of M. Muli has been developed and is currently submitted for approval. The safe shelter is designed as a multi-functional community centre.

Safe Island Programme: Being a long-term disaster mitigation programme of the Government, the Safe Islands programme, builds on its pre-tsunami goal of increased population consolidation. The existing programme has been adapted to accommodate the need for disaster risk management so that ‘safe’ islands will receive a greater investment in sea walls, more solidly constructed buildings, buffer zones, and drainage systems. Improved standards of housing and infrastructure are also part of the overall plan.

1.2.4 Non - Structural Measures

Emergency Communication System: learning from the failure of communication system during the tsunami, the Government has embarked on a project to develop and install a national emergency communication system with communication towers targeted to be install in all inhabited islands. The project is expected to be completed before the end of the year 2009. The proposed model of the emergency communication system is illustrated below.



Disaster Profile of Maldives: A Disaster Risk Profile of the Maldives was developed in 2006 by the Ministry of Planning and National Development, which is the first ever Disaster Risk Profile of the country. The profile ranks each island in terms of its physical and socio –economic vulnerability.

Community Preparedness Activities & Drills: Community based disaster preparedness plans have been completed in 3 Atolls covering 19 islands, and activities are on-going for a further 16



Participants of CBDP Training of Trainer's of Thaa Atoll doing a mapping exercise (above) and presenting a hazard map

islands in three more atolls. Active community participation in preparation of ‘disaster preparedness plans’ is expected to be carried on for all identified most vulnerable atolls. Volunteers on vulnerable islands were also trained in first aid, psychosocial counselling, and early warning response. Disaster simulation exercises to test the community’s plan were successfully held on two islands.

1.2.5 Early Warning System

Efforts towards strengthening the National Early Warning Systems (EWS) in the country was reiterated with the installation of EW equipment and building in house capacity of the



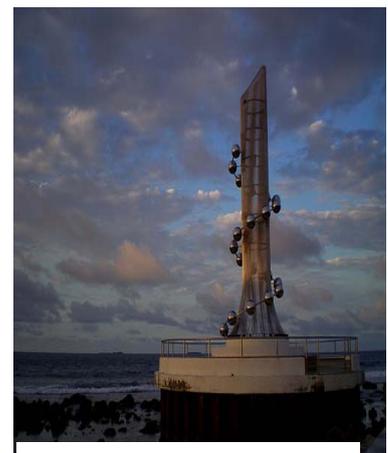
A Doppler radar installed in Hulhule Airport Island

Department of Meteorology to issue warnings and awareness to the general public has begun. Other entities such as the other Ministries will be oriented about the early warning protocol through a series of awareness workshops by the Department of Meteorology. A national EW Standard Operating Procedures development has been initiated starting with the development of agency level SOPs and moving on to the end to end SOP development.

1.2.6 Education and succession of tsunami experience

The disaster information and inventory management system capacity of the nation is currently being developed and maintained in the NDMC, and a disaster resource network has also been set up in the NDMC. This include development of the website and installation of the software which serves as web-based database listing of equipment and human/material resources available and/or required at atoll and island levels in case of a disaster

A tsunami monument has been built in the capital, Male’, where one third of the country’s population lives, to remind the public about the tsunami hazard. However, there are no written messages or



Tsunami Monument in Male’

lessons passed through this monument.

With regard to the integration of disaster risk reduction into school curriculum, Ministry of Education (MoE) had initiated school preparedness planning initiatives, and piloted these initiative 15 schools of two atolls. A Training of Trainers on school preparedness planning was held in June 2007. MoE is also in the process of developing a School Emergency Preparedness and Response Guidelines, and discussions and consultations have been on-going with regards review of the school curriculum and integration of disaster risk reduction and climate change into the curricula.

1.2.7 Restoration

Shelter for the internally displaced persons: providing better houses with safe water and sanitation facilities have been a strong policy of the government from the start. The housing project is ongoing and is expected to be completed by the end of 2009.

Livelihoods: Livelihoods of many Maldivians living in affected areas were severely damaged during the tsunami. Livelihood opportunities are fairly limited in the Maldives, especially in the islands, and are mainly targeted around fisheries and tourism, with agricultural activities generally being limited to home gardens. To revive and reduce the vulnerability of the affected communities, coordinated initiatives have been introduced to provide communities with tools to rebuild homes, repair fishing vessel, restart crop production, supporting cash-for-work initiatives to generate income for villagers recovering from tsunami and providing micro credit to assist people to restart small family business.



2. Impression of Tsunami Countermeasures in Japan

2.1 Strengths of tsunami countermeasures in Japan

2.1.1 Presence of strong institutional frameworks, organizational structures and political commitment is the foundation for sustainable efforts to streamline disaster reduction

Japan is a successful example that mitigation and preparedness planning reduces impact of natural disasters to human life, property, infrastructure and livelihoods. Commitment and involvement in disaster prevention and management in Japan starts at the very top with the prime minister and operates with unusual cooperation from across the bureaucracy and with the help of the private sector and the academia. Frequent disasters and strong links with key research institutions allows Japan to continuously learn from past disasters and to lead in technological innovations in countermeasures and ensures a sustainable supply of dedicated experts in the field of disaster management and disaster prevention. Further, the organized disaster management framework and the leadership from the top promotes swift reviews and revisions to key legislations and guidelines winning public confidence and participation to make Japan a safer place to live. This dedication of the government to make Japan a safer place for its residents were expressed very well in the various lectures we have had during the five weeks of study in Japan. Japan's disaster prevention efforts show that commitment from the top and established institutional structures and frameworks are the key to any sustainable development in any country.

2.1.2 Effective and efficient early warning systems and timely evacuation to safer grounds is the only ways to eliminate casualty and death

Japan's sophisticated weather tracking and analyzing system development was accelerated in the 1980s. Time to disseminate warning messages was reduced from 17 minutes to 2 minutes following a tsunami which arrived only 7 minutes after the earthquake and killing over hundred people. The system is now enhanced to assure that warning is given in time to allow residents to evacuate safely. The



current system based on a network of seismometers cabled to onshore monitoring stations and initial warnings are now given under 3 minutes. JMA also has pre-calculated simulation models based on location, depth, and magnitude of the earthquake which allows them to predict whether a tsunami will be generated or not. The early warning system is complimented by a comprehensive information and communication system which allows JMA to transfer real time data to the residents via TV, radio, outdoor loudspeakers and indoor radio receivers, allowing people time to evacuate and the set in motion local disaster mitigation measures. Real time data is also transmitted to the transportation networks and to local fishermen.

Field visits to JMA, PARI and local disaster management offices in the Sanriku Coast and Kii Peninsula provided insightful understanding of the Japanese early warning system. The opportunity to witness JMA in action during our field visit, and on-sight inspection of facilities and discussions with PARI, and observations of early warning systems in coastal towns along Sanriku Coast and Kii Peninsula help put the pieces together and painted a clearer picture of how the system works in Japan.

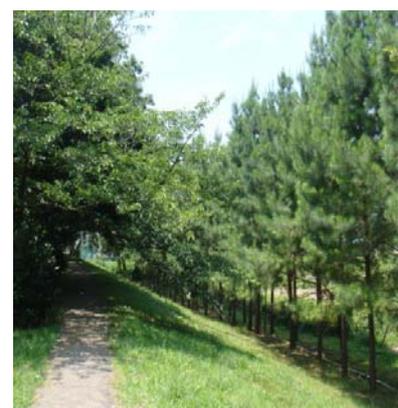
Further, the involvement of community volunteer groups in disseminating tsunami information, establishing tsunami evacuation routes, and providing support to the elderly was very evident in the Kii peninsula area visited.

2.1.3 Structural countermeasures reduces impact to life, property and allows for faster recovery

There are many structural coastal and river mitigation facilities in Japan ranging from breakwaters, levees, revetments, water-gates, embankments, land locks, tsunami resistant



buildings, coastal forests, evacuation routes etc. The fact that Japan has invested heavily on structural measures irrespective of present population size demonstrates the



longer term vision and the painstakingly tedious maintenance of these structures is evidence of Japan's resilience and determination to protect its people.

2.1.4 Tsunami prevention and disaster management should be an integrated approach and should include self help, mutual support and public assistance

The integrated approach of disaster management in Japan includes self help, mutual support and public assistance. A comprehensive system and policy guidance is provided to all parties on their roles and responsibilities. The roles of the national, prefecture and local government are clearly understood by the stakeholders as well as the residents seemed to understand what their roles are. For example, community leaders of Nehama district at Houraikan (on 18 June 2008) indicated that residents were clear that while the building and maintenance of the embankments is the responsibility of the government, it was their responsibility to keep the government informed of any damage to the embankments and to ensure that the coastal forests are not destroyed. As such at the community level, they are working hard to enhance public awareness including awareness for tourists coming to the area by conducting regular drills and community activities to improve the relationship between the community members. In Kesenuma City residents were involved in identifying the dangerous locations, designating evacuation centers, clearing path to move to higher grounds, and are actively leading tsunami evacuation drills and training programmes. Down south, in Hiro, it was inspiring to see how tediously they are maintaining the Hiro Embankment, with coastal forestation to give more strength to the embankment and by using proceeds from the Japanese Wax Trees to fund the maintenance of the embankment.

2.1.5 Integrating tsunami education into the school system is an important element of enhancing disaster awareness and passing on tsunami experiences to the next generation

There is a common proverb in Japan that tsunami's or major disasters happen after people forget about the impact of these disasters. This proverb cautions that tsunami education and awareness should never stop. As tsunami education measures in Ryori Elementary School, where tsunami education is lead by the school principal and is conducted out of the school curriculum. Hashikami Junior High School in Kesenuma City also has similar programmes with disaster prevention drills with residents and parents, as well as disaster management camps and other related training. Further the simulation models and experiencing of mock earthquakes and fire drills (in Disaster Prevention Centre in Kesenuma City) are very practical ways of educating students on how to react in case of earthquake and fire. The tsunami education programme at Hiro Elementary School was very comprehensive starting from the low grades of elementary

school. The historical significance of tsunami countermeasures in Hiro was very evident in the awareness level of students of the 5th grade as well as the enthusiasm of the teachers. Facilities such as Hamaguchi Museum, Disaster Reduction and Human Renovation Institution, Port and Airport Research Institute provides an interesting opportunity for students to learn about the past disasters and how the country has overcome such disasters.

2.1.6 Research and development for tsunami countermeasures should be ongoing and is most successful when carried out at all levels

Research and development is an important component of disaster prevention measures in Japan. The Port and Airport Research Institute (PARI) was established in 2001 as specified independent research institution to improve technologies related to the construction of ports, coasts and airports and is a key player in the research and development efforts related to tsunami countermeasures. The tsunami propagation model, the research on oil pollution and the observation of sea gauges and the wave movements showed the clear relationships between central government agencies such as JMA and research institutions. Further continued research and development at a national level has reduced the early warning dissemination time to two minutes and real time transmission of this information across the media, local public announcement systems, railways and other public transport facilities are all key achievements of the dedication to research and development.

We also witnessed research and development at the community level. Residents of Ohfunato City designed and developed a self made tide and tsunami observation device, with the support of the city officials. The city official at Miyako City is currently involved in developing a cheaper model of home radio receivers. These individual acts shows that research and development does not necessarily have to take place in institutions alone and we should promote community research and development efforts as well. Sophisticated technologies are also integrated into tsunami education measures such as simulation models, tsunami and earthquake museums (in Hiro town and Kobe Disaster Reduction and Human Renovation Institution).

2.1.7 Tsunami Hazard Mapping & Simulation models

Sophisticated Tsunami hazard maps and simulation models were developed for most tsunami prone areas and almost all the areas that we visited in Sanriku Coast and the Kii Peninsula. Officials expressed that hazard maps developed with community participation are more

successful in its role as a tool to educate and aware residents. Hazard maps assist communities to determine evacuation areas and organize themselves to focus on establishing evacuation routes and evacuation boards etc as well as evacuation sites. The use of computer simulation models demonstrating the inundation areas will help the residents visualize the danger of tsunamis and is a useful tool to educate residents.

2.2 Weaknesses in Japan's Tsunami Counter Measures

Although Japan is investing heavily in structural measures, the fact remains that without proper evacuation, life can be lost. With this in mind, the weaknesses of Japan's tsunami mitigation measures can be identified as follows.

- Uneven levels of awareness and education of tsunamis – our experience and observations so far concludes that tsunami education and awareness is not even across the regions. It was observed that while most people were aware of the tsunami danger, they refused to evacuate gaining some sense of false security and safety that the structural measures will save them. Possible dangers or drawbacks of structural measures must be communicated to the residents to increase their response rate to evacuation warnings. More indepth studies maybe needed to understand the positive and negative social impacts of structural measures, relocation policies and other countermeasures to ensure that people fully understand the danger of their decisions not to evacuate.
- Insufficient tsunami evacuation information for non-residents – As coastal areas are often a popular holiday spot for visitors from other cities and countries, it is important to have a uniform sign board for tsunami. The use of Japanese language alone might not be sufficient for areas which are attracting more foreign visitors.
- Insufficient temporary safe shelters – while there were many initiatives, both by prefectural governments. Local governments as well as local residents to identify and construct temporary evacuation sites, these sites are not likely to be sufficient to house the entire community. It was also noticed that all evacuation towers did not have water storage and sufficient sanitation facilities. These two points can be very important given

the fact that tsunami waves can continue for a long time, and immediate return to their homes may not be possible due to the damage to the houses from both the earthquake and the tsunami.

2.3 Most impressive/interesting countermeasure in Japan

Among all the countermeasures, the most impressive countermeasure in Japan is the active roles that community volunteer groups and individuals play in tsunami disaster mitigation and education. The following initiatives are few exemplary cases illustrating the commitment and resilience of individuals and communities to make their homes and towns a safer place.

- Community lead construction of evacuation route in Kushimoto – leading to the recognition of the community initiatives by the prefectural government and the eventual construction of a stronger and safer evacuation route for the residents.
- Volunteer participation in the relief and rehabilitation efforts in Kobe after the 1995 Kobe Earthquake. The strong participation and commitment of the volunteers and Kobe residents made it possible for them to rebuild the city much stronger and resume life in a remarkably short time. The continued efforts and cooperation of the volunteer groups in educating and sharing their experiences to the local and international community through contribution to the operation of Disaster Reduction and human renovation museum is very inspiring.
- Goryo Hamaguchi's – is another exemplary case where an individual on his own wisdom and aspiration saved the life of an entire community by empowering the community to build embankments and coastal forestation as well as providing them with a livelihood opportunity. The wisdom of Hamaguchi is still continued proudly by



the citizens of Hiro and Japan through the “Inamura-no-hi” story as well as the Hamaguchi Museum.

- The lady hotel owner of Horaikon in Kamaishi – shows individual dedicated to disaster reduction by rebuilding her hotel at her own expense with reinforced concrete to provide a secure shelter for her customers, neighbors and other visitors to the town. The willingness of local hotels and businesses to voluntarily designate their property as evacuation centres is also an extremely remarkable gesture of the community.

2.4 Comparison of tsunami countermeasures in Japan and Maldives

While the 2004 Asian tsunami was the first major natural disaster in Maldives, tsunamis and other natural disasters are much more frequent in Japan. The topographical, geographical and meteorological conditions of the Japan exposes the nation to a large number of natural hazards including earthquakes, tsunamis, typhoons, torrential rains and heavy snow.

Disaster management activities only began in Maldives after the 2004 Asian Tsunami, where as Japan has over hundred years experience in disaster management. Frequent occurrence of disasters allows Japan to learn from past lesson and improve their systems, and incorporate disaster reduction and mitigation into all development activities and to their legal system and framework.

Structural mitigation measures are very successful in Japan due to their continued economic growth, technical expertise and the geographical setting of the country. Meanwhile, most structural measures such as coastal structures along the entire coast of Maldives is simply not feasible due to the natural formation and size of islands as well as the lack of technical capacity and resources in Maldives. Further the development of coastal structures may negatively impact the tourism and fisheries sector which are crucial to the economy.

At present efforts in tsunami mitigation in Maldives should be directed towards strengthening institutional frameworks and structures and enhancing public awareness and education. Disaster

risk reduction is being integrated into the longer term policies of population consolidation, i.e. moving population to larger safer islands.

3. Proposed Activities for Tsunami Countermeasures in Maldives

3.1 Challenges in tsunami Disaster management in Maldives

3.1.1 Natural and geographical conditions of Maldives

Environmental features such as low elevation, beach erosion, high freshwater table, lack of coastal vegetation combined with the populations' dependency on tourism and fisheries, high import dependence and limited transport facilities makes the Maldives one of the most environmentally vulnerable countries in the region. Today the country faces three major disaster risks, climate change, particularly rising sea level, storm surges and tsunami. It is also exposed to droughts heavy rain and high waves caused by cyclones in the southern Indian Ocean.

3.1.2 Capacity Limitations

Although the literacy rate of Maldives is 98%, human resource limitation is a key constraint in almost all development activities in the country. The population is a fairly young with almost half the population under the age of 30 year and access to quality technical education is limited in the country. There is a clear gap between demand and supply of qualified and experience technical experts in the country. Technical expertise for many development activities including disaster mitigation have to be imported from other countries, draining limited resources out of the country. Capacity building for disaster management must be made a top priority to develop the country's capacity to respond and mitigate future disasters.

3.1.3 Financial Constraints

In the context of Maldives, integration of disaster risk reduction strategies with climate change and developing a framework for sustaining ecosystems have been recognized as a key initiative to reduce risk factors. However, studies on climate change adaptation measures and disaster risk information often continues to be remain as recommendations and may not match the development plans. Practical issues such as high cost of providing basic services and lack of land area often times forces the Government to take decisions that may prove detrimental to the fragile environment of Maldives. Adaptation and mitigation measures are time consuming and require long term planning and sustainable sources of fund to continue the mitigation measures.

3.1.4 Logistical Problems

While there is a need to replicate the disaster management efforts across the entire nation, these efforts are slowed down due to logistical problems arising from poor transport system and dependence on the private sector for the services.

3.1.5 Absence of policy, guidelines and frameworks for volunteer workers

While more than 200 staff representing ministries in governments, volunteers in scouts and guides associations as well as island community have been trained to-date, availability of trained persons to assist in local training and integration of local learning into their regular job profiles is a challenge. The lack of policy to guide these groups to practice their skills, and coordinate their activities is missing. The importance of community level volunteers and developing and maintaining a pool of trained people is crucial to widen disaster management activities as well as community awareness at large.

3.1.6 Absence of financing systems to support stronger buildings and other basic social needs

Traditionally, homes in the Maldives are built incrementally, room by room, year by year, as families grow and personal finances permit. Furthermore, homes are often more than a place to live, and often serve as the places of work. A kitchen, for example, is a productive unit where women not only feed their families but process and dry fish to be sold at market. A home's roof is a lifeline, collecting precious rainwater for drinking. A natural disaster such as tsunami can easily destroy the building as well as wipe out the livelihood opportunities. Yet, the lack of awareness, financial constraints and the lower risk of occurrence of tsunamis lead families to prioritize their limited resources to other important social services such as food, utility bills, education etc. With the absence of concrete social security systems and schemes promoting the stronger structures, and provision of basic services such as health and education, educating and empowering community to initiate disaster prevention activities will not be possible.

3.2 Proposed Activities for Tsunami Mitigation in Maldives

Maldives action plan for tsunami mitigation has been developed from a coordinators point of view and from one of the funding agency's point of view, and have been developed by using the Project Cycle Management using the problem analysis (see Annex 1) and objective analysis (Annex 2).

Based on the problem analysis and objective analysis, and our exposure to the countermeasures in Japan, the proposed activities for tsunami mitigation at least in the immediate term will be directed towards building the coping capacity of the country. NDMC being a coordinating agency for disaster activities, will focus on the national capacity building; and UNDP being one of the donors as well as continuing direct execution programmes will target more towards the enhancement of community and public awareness and education in tsunami mitigation. Action plan for the country will comprise of the two individual action plans given below.

3.2.1 Action Plan for NDMC:

- i. Enhance National Capacity for disaster management (see Annex 3)
- ii. Promote and mobilize funds for the development of a policy on building safe evacuation centres, and identify strong buildings suitable for evacuation in coordination with Ministry of Construction and Infrastructure Development.
- iii. Encourage resort owners to put in place tsunami countermeasures such as coastal forestation, construction of multipurpose evacuation buildings and take measures to protect their lifelines and communication systems around tourist resorts by coordinating with the relevant agencies
- iv. Support the development of standard operating procedures for early warning by coordinating with the relevant government agencies
- v. Develop measures in coordination with Ministry of Transport to remove vessels and large ships off shore when early warning is issued.
- vi. Take measures to protect lifelines in all islands in coordination with Ministry of Environment, Energy and Water.

- vii. Propose to install early warning system in every house and install early warning towers to alert people working at the cost.
- viii. Propose to build costal forest around fuel tanks and water tanks in all islands including resort islands to reduce damage to them from floating debris and causing fire.
- ix. Propose to take measure to reduce debris from floating by keeping the islands clean.
- x. Educate general public on tsunami and other natural disasters.
- xi. Propose to develop media programmes to training general public on first aid.
- xii. Carry out awareness programmes through media and on all islands regularly.
- xiii. Draw out hazard maps by involving the community to create public awareness and identify areas that need more protection.

3.2.2 Action Plan for UNDP

The action plan herewith is aligned within UNDP's current programme cycle which runs from 2008 to 2012. The action plans attempts to re-strategize the current and expected projects to refocus attention on disaster mitigation measures with specific objective of integrating Tsunami Countermeasures into ongoing and planned activities.

- (i) Support National Disaster Management Centre (NDMC) to strengthen the institutional and structural framework of disaster management in Maldives
 - support sensitization of policy makers in importance of disaster prevention through workshops, seminars and conferences
 - advocate the integration of comprehensive tsunami countermeasures to the roadmap of NDMC for the next 5 years and the strategic national action plan (SNAP)
- (ii) Enhance the Community Based Disaster Risk Management (CBDRM) Programme of UNDP (see Annex 4-a)

- revise existing CBDRM manual to introduce comprehensive tsunami mitigation measures such as coastal forestation and community based awareness building and volunteerism to enhance the capacity of communities to respond to disasters in general and tsunami's in specific.
 - improve the current hazard mapping exercises to include tsunami hazard maps and promote island level dissemination of these hazard maps
 - mobilize funds to encourage island communities to develop tsunami monuments
 - promote building of safer stronger community centers
- (iii) Integrate elements of tsunami countermeasures into the ongoing development of school curriculum for disaster management (see Annex 4. b)
- advocate for the integration of mitigation into the disaster management curriculum
 - prioritize funds towards development of materials on history of world tsunamis disasters, motivational stories (such as translation of Roy Hamaguchi's story to local languages etc)
 - integrate tsunami countermeasures at school level into the school preparedness guideline.
 - promote school preparedness activities involving students, parents, teachers and residents
- (iv) Provide support to the government in implementation of the national building code
- advocate for the development of safety guidelines for tsunami evacuation centres
 - prioritize funds for the development of compliance documents focusing on strengthening building structures
- (v) Prioritize future support to the government more towards disaster mitigation rather than rehabilitation and response activities
- prioritize funding towards the mitigation activities in safer islands for better safety measures and climate change adaptation measures

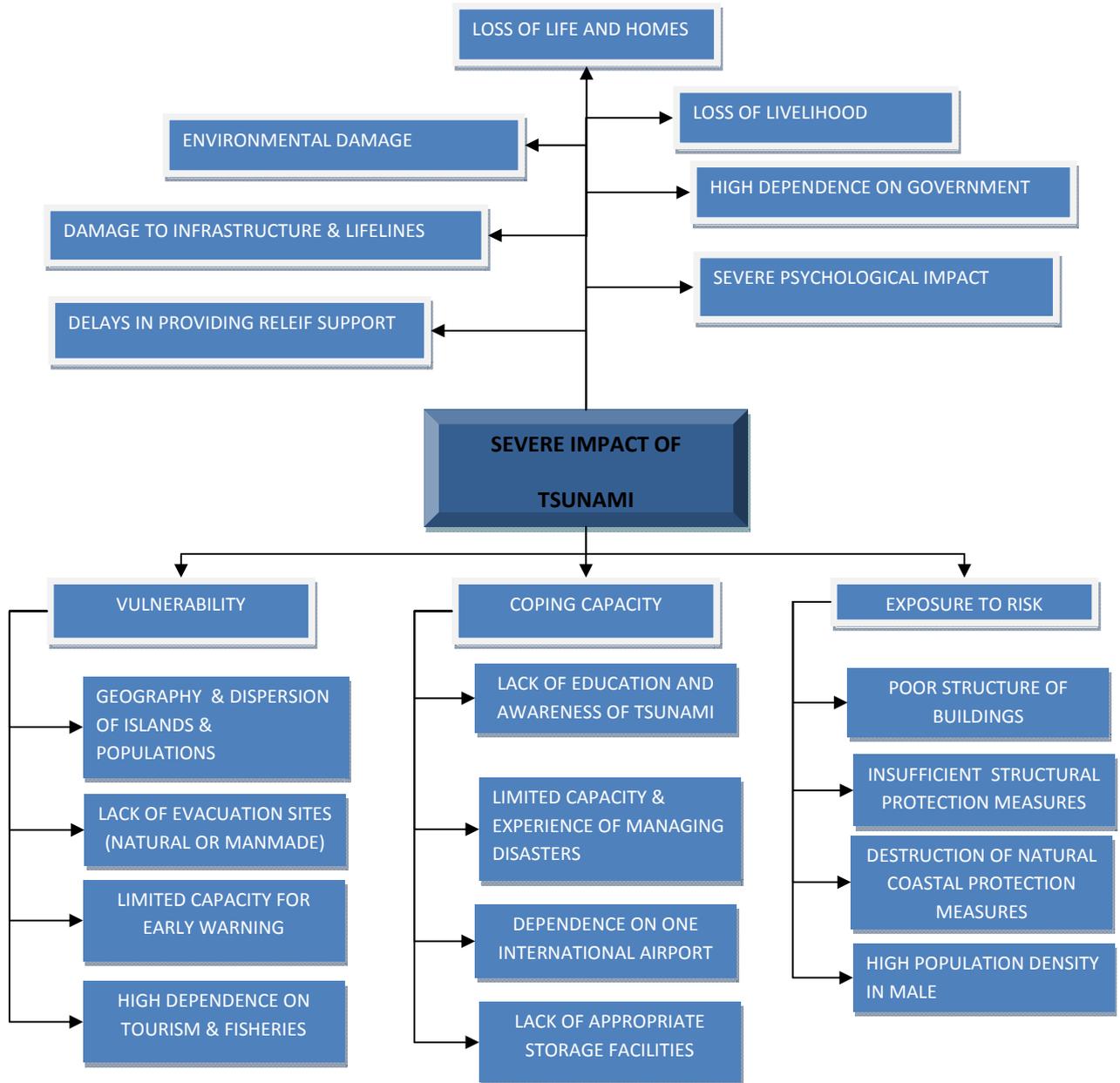
3.3 Time Schedule for Proposed Activities

3.3.1 Time Schedule for Action Plan for NDMC (See Annex 3)

3.3.2 Time Schedule for Action Plan for UNDP - (see Annex 4)

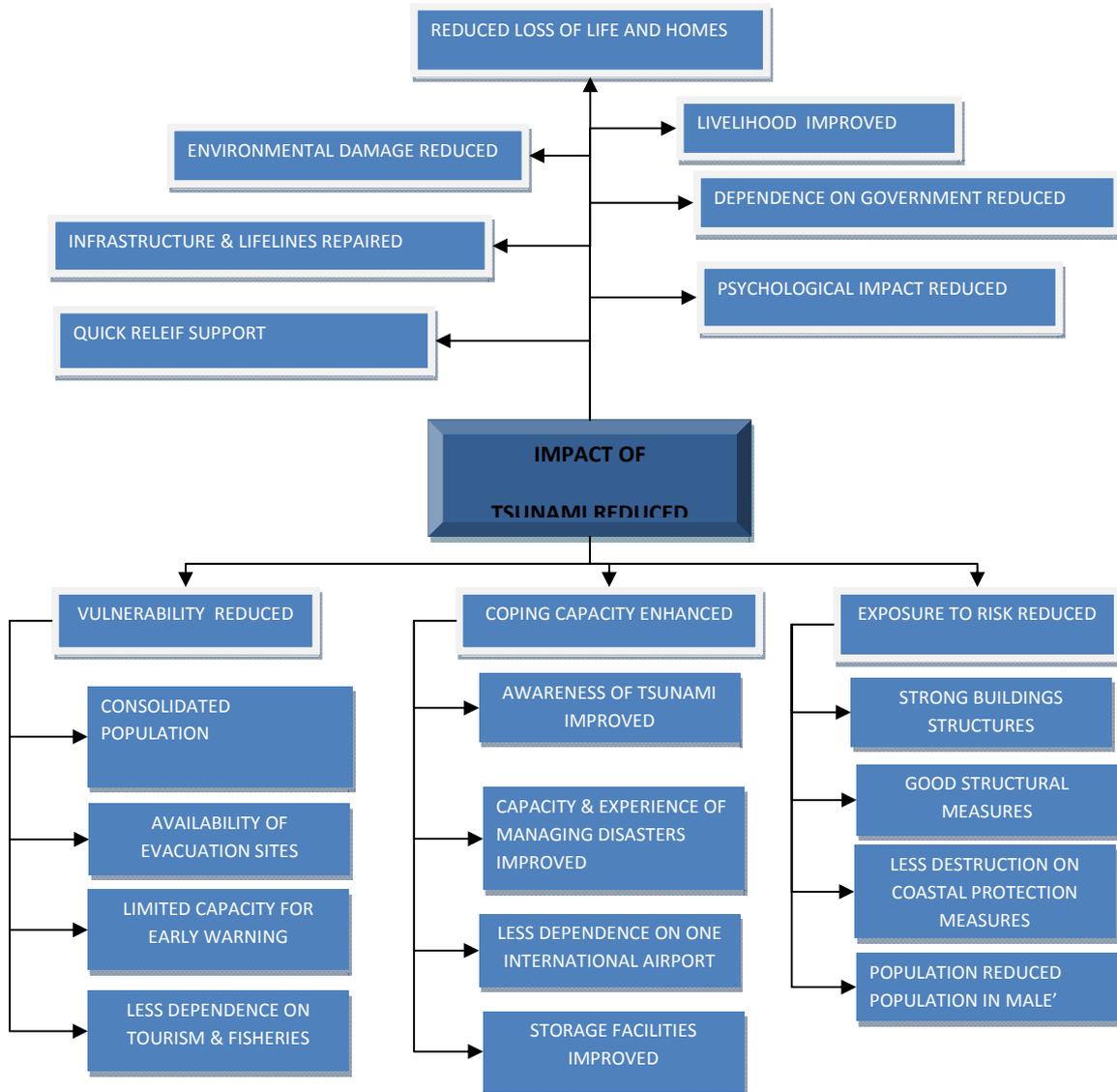
Annex 1: Problem Analysis

CAUSE & EFFECT RELATIONSHIP



Annex 2: Objective Analysis

MEANS & ENDS



Annex 4 A – Time Schedule for Action Plan

Action Plan

Name of the Person In Charge: Asiath Rilweena

Count Maldives (UNDP) Date: 9-Jul-08

Operation	Indicator	Year 1 (July 08 - June 09)	Year 2	Year 3
Enhance capacities of communities through the Community Based Disaster Risk Management Programme (CBDRM)	• Operational Manual for Trainers Developed			
	• No of master trainers			
	• No of Island Disaster management plans			
	• No of volunteers trained			
Activities	In charge	Year 1 (July 08 - June 09)	Year 2	Year 3
1. Resource Mobilization for revision of CBDRM programme	UNDP/NDMC Stakeholders			
1.1 Project conceptualization and designing				
1.2 Preparation and Formulation of Project Budget				
1.3 Submission and Review of Project				
1.4 Project Finalization				
2. Revision of CBDRM Manual	UNDP/NDMC Stakeholders			
2.1 Review existing manual & identify areas for improvement				
2.2 Consult with related agencies to finalize the manual				
2.4 Develop and Publish Manual & design training programme				
2.5 Evaluation & Revision				
3. Train Master Trainers	UNDP/NDMC			
3.1 Selection of master trainers from coordinating agencies				

Activities	In charge		Year 1 (July 08 - June 09)												Year 2				Year 3																
6.4 Conduct Mockdrill																																			
6.5 Evaluation of Mock Drill																																			
< In put > Human Resources Training Materials and Venue Transport Costs Budget																																			

Annex 4 B – Time Schedule for Action Plan

Action Plan

Name of the Person In Charge:

Asiath Rilweena

Count Maldives (UNDP)

Date: 9-Jul-08

Operation	Indicator	Year 1 (July 08 - June 09)												Year 2												Year 3													
Integrate Disaster Education into the School System	• School Curriculum for disaster reduction developed																																						
	• Instructional Materials Developed																																						
	• No of hours given for disaster education																																						
	• No of Drills Conducted in Schools																																						
	• No of School Disaster Management Plans																																						
	• No of Students trained in disaster response skills																																						
Activities	In charge	Year 1 (July 08 - June 09)												Year 2												Year 3													
1. Develop Curriculum for Disaster Management	Ministry of Education/ UNDP	Education Development Centre (EDC)																																					
1.1 Develop Terms of Reference for consultant																																							
1.2 Recruit Consultant for Ministry of Education																																							
1.3 Review existing curricula to identify gaps in DRR education																																							
1.3 Review existing extra-curricula activities to identify areas to incorporate DRR education																																							
1.4 Develop framework for integration of DRR into school system																																							
1.4 Curriculum Development & Publication																																							
2. Revise/Develop instructional materials for Disaster Education	Ministry of Education/ UNDP	Education Development Centre (EDC)																																					
2.1 Review existing materials to identify gaps																																							

Activities	In charge		Year 1 (July 08 - June 09)	Year 2	Year 3
2.2 Develop learning materials for teachers					
2.4 Develop and Publish Manual & design training programme					
2.5 Evaluation & Revision					
3. Train Resource Persons	Ministry of Education/ UNDP	Education Development Centre (EDC)			
3.1 Develop module to train resource persons					
3.2 Develop Manual for Training of Resource persons					
3.3 Selection of teachers to train					
3.4 Organize training					
3.5 Conduct Training					
3.6 Evaluation of Teacher Training					
4. Develop School Preparedness Guidelines	Ministry of Education/ UNDP	School Health Unit			
3.1 Develop manual for National School Preparedness Guidelines					
3.2 Provide support to target schools in using manual and developing school preparedness					
3.4 Organize emergency response skills for target islands					
3.6 Evaluate and Revise Manual periodically					
<p align="center">< In put ></p> <p align="center">Human Resources/International & Local Consultants Training Materials and Venue Transport Costs</p>					