

# Part IV

## CONCLUSIONS AND RECOMMENDATIONS

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Being a low-lying island nation, the environment is particularly vulnerable to climate change and its associated ill-effects; particularly sea level rise. In addition to the long-term concern of inundation, the immediate effects climate change, such as the reduction in the precious freshwater aquifers beneath the islands, the increased frequency and intensity of stormy weather, the destruction of the rich coral ecosystem, the negative repercussions on the two main economics mainstays of fisheries and tourism and severe beach erosion are issues that have to be addressed urgently.

Beach erosion can in fact be singled-out as being one of the priority environment issues in the Maldives. At present, nearly 50 percent of all inhabited islands and nearly 45 percent of tourist resorts are facing varying degrees of coastal erosion (MHAHE 2000).

The topography of the Maldives makes the country extremely susceptible to stormy and high wave occurrences. The high wave incident of 1987 flooded nearly a third of the capital Malé, as well as the country's only international airport on Hulhulé. The incident not only took the country by surprise, but it also highlighted the urgent need to develop an effective disaster-preparedness framework. The strong winds and stormy weather experienced across the country in 1991, and in particular the southern-most atoll, added further clout to this point.

In the Maldives, the water resources comprise of freshwater that occurs in the porous coral sediments on many islands. The people have traditionally relied on groundwater from shallow wells dug in the ground. At present, the groundwater in Malé and many other populous islands are only a fraction of what it was before. In recent years, desalination has become necessary when the sustainable yield of the existing groundwater aquifer on some islands was exceeded. In addition, in many islands, rainwater is extensively used for both drinking and cooking. While quality tests have shown rainwater in the Maldives to be of acceptable potable quality, a full analysis maybe required before the impacts of trans-boundary air pollution can be determined.

A major pressure on the environment arises from the wastes and pollutants produced as a by-product

of domestic and industrial activities. Solid waste disposal is now one of the most critical environmental issues in the Maldives. The amount and the rate of solid waste generated vary throughout the country and there is a significant difference between the amount of waste generated in Malé and that of in the atolls. The amount of solid waste generated in Malé has been increasing at an alarming rate over the past 10 years. Environmentally unsound practices in solid waste and sewage disposal pose the most serious threat from tourism to the delicately balanced coral reef ecosystem of the Maldives. Though solid waste is a cause of environmental concern, at current levels it is more of an aesthetic problem. The management of solid wastes is also identified as a key environmental issue in the Second National Environment Action Plan.

Air quality of the Maldives is generally considered to be good and is in pristine state. Trans-boundary air pollution in the Maldives became first known in 1997, when large parts of the country were affected by haze caused by forest fires in Indonesia. The actual state of the trans-boundary movement of air pollutants over the Maldives was measured in the Indian Ocean Experiment (INDOEX). In March and April 1999, the scientists were surprised to find a dense brownish pollution haze layer stretching an area of more than 10 million square kilometres over the Indian Ocean tropical region. Local air pollution in Malé is mainly due to particulate emission from vehicles, power generation, and construction related activities. As air pollution is an emerging environmental issue in South Asia, on the initiative of United Nations Environment Programme a declaration to promote regional co-operation in the area of air pollution was agreed in 1998. The Malé Declaration on Control and Prevention of Air Pollution and its Likely Trans-boundary Effects for South Asia and the 'Air Pollution - National Strategy for Action', which was adopted by the Government in 2001 were two important responses to the problem.

Due to the lack of natural resources and wealth, biodiversity particularly marine biodiversity is the most significant and vital resource base for the country. The second National Environment Action Plan adopted in 1999, recognises biodiversity conservation as one of the priority issues to be addressed to achieve environmental protection and sustainable development.

The first National Biodiversity Strategy and Action Plan (NBSAP) of the country has been adopted in 2001. Recognising the importance of healthy coral reefs to the two major industries of the Maldives, the Ministry of Fisheries, Agriculture and Marine Resources with assistance from the Bay of Bengal Programme (BOBP) initiated the Integrated Reef Resources Management programme. The Government has also initiated several measures for the protection of important habitats and threatened species. 25 marine areas, 2 islands and numerous birds and marine species have been protected. A number of marine species have also been banned for export and shark fishery has been regulated as well. In order to protect and conserve biological diversity of the country, a pilot project on the establishment and management of protected areas has been initiated with the assistance of the Government of Australia through AUSAID.

In a competitive and uncertain global economy, the need to achieve the best possible return from the limited resource base of Maldives remains strong. This enhances the vulnerability of the fragile ecosystem in the Maldives. The preservation of the ecosystem and the natural resources will require to look into the environmental dimensions of socio-economic development and the socio-economic dimensions of environmental degradation. The Government will have to regulate the unsustainable exploitation of the country's resources to ensure the sustainability of development.

The domestic policy alone can not protect the Maldives's environment from threats such as global warming and sea level rise that are mainly caused by activities elsewhere. Global warming and associated sea level rise would subject Maldives to frequent natural disasters and a number of environmental problems.

In order to effectively deal with the issue of climate change and sea level rise, this chapter has recommended a number of project proposals for consideration by the Donor Agencies (See in Annex 2).

## RECOMMENDATIONS

*Contribute to the international efforts to find solutions to global environmental threats, especially those pertaining to the vulnerable Small Island Developing Nations*

- Utilise opportunities to address the international fora to call attention to the fragile nature and the

vulnerability of Small Island Developing Nations.

- Continue the timely implementation of commitments by the Maldives under international conventions and organizations to which Maldives is a party.
- Promote wider participation of the community in research, data collection and awareness creation regarding the fragile environment of the Maldives.
- Develop long term mitigating and adaptive response strategies in dealing with the question of possible sea level rise and climatic change.
- Set up a National Task Force, equipped with appropriate expertise, to conduct international negotiations relating to the environment as they impinge on the interests of the Maldives.

*Promote integrated planning and administrative practices by developing meaningful principles and procedures for sustainable resource use and environmental protection*

- Strengthen the implementation of a comprehensive framework of laws pertaining to natural resources and environment, together with means for enforcement.
- Establish ownership of resources through establishment of property rights and the introduction of
- resource rent.
- Review the adequacy of institutional mechanisms and administrative arrangements and promote wider participation in the implementation of environmental policies and strategies.
- Incorporate the principles of sustainable regional development into the mandates and procedures of all institutions dealing with developmental planning and resource management.
- Strengthen the submission of proposed policies, development programs and projects for Environment Impact Assessment (EIA) procedures.

*Ensure adequate water supply, sanitation, safe and environmentally sound management of sewage and solid waste disposal facilities to all islands*

- Formulate a plan to provide safe water, sanitation and waste disposal to all islands with defined needs and priority actions
- Develop a national waste management strategy and facilitate its enforcement

- Encourage and facilitate private sectors to become more involved in providing sanitation and waste management services
- Promote the inclusion of sanitation issues not only in planning health services but also in planning and provision of education, infrastructure development and construction activities
- Promote land use planning to protect freshwater aquifers
- Continue to raise awareness on solid waste management
- Promote the use of cleaner technologies and encourage safe use and disposal of hazardous materials
- Develop and enforce guidelines and operational procedures for sewerage projects

*Ensure the availability of safe drinking water throughout the country*

- Prepare a strategic plan for the development, improvement and construction of public water supplies.
- Encourage and promote community participation in water management.
- Ban the use of harmful materials for roofing, gutters, pipe works and for storage tanks.
- Enforce guidelines and standards and address complaints regarding the misuse of water.
- Continue to monitor the quality of drinking water in all islands.
- Formulate and enforce regulations, standards and guidelines for the design, construction and maintenance of water supply services.
- License all water supply undertakings that supply water to more than 500 people and require such supplies to monitor the performance of the water supply system and to keep records of the monitoring process.
- Monitor all water supply undertakings by periodic inspection, sampling and analysis.
- Eliminate/ban the collection of rainwater from roofs with asbestos cement sheets.
- Regulate and control abstraction and dewatering.
- Strengthen the regulator to enforce standards and monitor compliance.

*Develop and manage the marine resources of the country in a sustainable manner*

- Strengthen the Ministry of Fisheries, Agriculture and Marine Resources (MOFAMR) to effectively co-ordinate the regulation and management of offshore and coastal fisheries.
- Explore the possibility of assigning the responsibility for offshore fisheries licensing, monitoring control and surveillance to MOFAMR.
- Establish a unit in the MOFAMR to support local management, at the island and atoll level, of reef and bait fish resources, coral reef management and protection.
- Participate in regional fisheries management bodies to present the interests of Maldives a genuine stakeholder in the pelagic marine resources of the Indian Ocean.
- Revise and implement management plans for marine protected areas.
- Formulate and adopt an integrated marine policy that will harmonise policies and strategies formulated by different Government Ministries/ Departments with respect to the marine resources and environment.
- Develop and strengthen the existing marine research centre.
- Ensure the availability of the most current scientific knowledge and advice to enable the conservation, sustainable management and development of marine resources and the habitats, which sustain those resources.

*Promote environmentally sound disposal of solid waste*

- License all solid waste collection and disposal undertakings that serve a community of more than 500 people.
- Require all solid waste undertakings to monitor the performance of the waste management system and to keep adequate records.
- Maintain surveillance of all solid waste undertakings by periodic inspection of facilities and records.
- Minimize import of non-biodegradable plastic products.
- Provide incentives for biodegradable packaging, composting and recycling, as well as utilization of innovative technologies.
- Designate waste disposal areas at atoll and island levels.

*Ensure safe management of hazardous waste*

- Develop and enforce appropriate environmental health codes as well as guidelines and operational procedures for collection, handling, sorting, use and disposal of solid waste.
- Monitor and control the movement of hazardous waste and prevent illegal traffic.
- Establish a national reporting system to report information on the generation and movement of hazardous waste.
- Empower a regulatory authority to oversee the disposal of hazardous waste.
- Develop institutional and technical capabilities by soliciting regional and international cooperation
- for training and technology transfer.
- Develop emergency procedures and measures to deal with accidental spills.

*Recognise and protect the natural environment including the biological diversity of the regions identified for development*

- Map the significant nature conservation areas in the regions and continue to maintain and update relevant data.
- Develop regional conservation strategies and facilitate conservation.
- Undertake detailed flora and fauna surveys of the regions, and use this information to develop management plans for vulnerable and endangered species and habitats.
- Develop lists of sites requiring re-vegetation and rehabilitation, and provide information on local trees and their suitability for different areas and landscape settings.
- Provide financial and technical assistance to NGOs, CBOs and other regionally active organizations involved in habitat management and rehabilitation activities.
- Promote the establishment of regional nurseries to produce locally occurring native trees for habitat rehabilitation programs.

*Promote sustainable resource management through preservation of natural resources and biodiversity*

- Continuously monitor and update the natural resources inventory including flora and fauna, in order to preserve the biodiversity of the nation.
- Implement an Integrated Resources Management Strategy to ensure sustainable use of extractive and non-extractive resources.
- Promote the use of alternative materials for economic and infrastructure development in order to minimize damage to the environment.
- Strengthen policies and implementing procedures to protect and preserve the environment by establishing protected area management systems.
- Develop and implement a Forest Resources Management Strategy, which promotes reforestation schemes including agro-forestry.
- Develop and implement management plans to protect the productive capacity of mangrove areas, mass spawning marine habitats, roosting sites and such unique and vulnerable habitats.

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