



Strategy and Program Assessment

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Maldives: Environment Assessment

A. Background

1. The environment is characterised by numerous fringing coral reefs and lagoons, which contain rich biodiversity. The atolls vary significantly in shape and size: the largest being Huvadhu Atoll with an area of 2,800 km² and the smallest being Thoddoo Atoll with an area of around 5.4 km². The islands vary in size, from 0.5 km² to around 5 km², and shape, from small sand banks with sparse vegetation to elongated strip islands. The total land area is estimated to be around 300 km².

2. The 26 geographical atolls are grouped into 20 administrative regions, also referred to as atolls. The capital, Malé forms a separate administrative unit. Out of the 1,192 islands, 197 are currently inhabited. The total population is approximately 300,000, and almost half the population are under 15 years of age. While population growth is high, the rate of growth has slowed somewhat over the last few years from 2.9% in the period 1975–2003 to 1.7%. Malé is currently home to 34% of the Maldives population with the rest scattered over approximately 197 islands, many with fewer than 200 residents.

3. The Maldives' coral reefs are globally significant being the 7th largest in world and covering an area of 8,920 km². Over 1,900 species of fish, 187 coral species, 400 species of molluscs and 350 species of crustaceans have been recorded to date. Limited life on the coral islands accounts for over 583 species of plants of which 260 are considered to be native or naturalised and 323 are cultivated plants for agriculture and ornamental purposes. About 170 species of bird have been recorded in the Maldives of which few have localised distributions in the Maldives and many are migratory species.

4. Protecting the environment and natural resources is critical to sustainable livelihoods and the Maldives economy. Fishing directly employs about 11% of the work force, while 20% of the population is dependent on fisheries for the majority of its income. High quality eco-friendly tourism in the Maldives accounts for around 33% of GDP and is based on the Maldives natural assets including unique geography and coral reefs.

B. Sector Issues and Challenges

5. **Adaptation to Climate Change and Sea Level Rise.** More than 80% of the Maldives land area is less than 1 meter above sea level making the Maldives one of the most vulnerable countries to the impacts of climate change and sea level rise. The small sizes of the Maldives islands coupled with increasing population pressure, force human settlements and infrastructure to be located near the coast and therefore at high risk from sea level rise. Available data indicates that 73% of inhabited islands have buildings less than 100 feet from the shoreline. Tourist resorts on low lying coral islands or located over the lagoon on stilts are also highly vulnerable to predicted future sea level rise. In the near-term, changes in climatic conditions (including increased sea surface temperatures) may affect beach systems, rainfall patterns and coral reef ecosystems, which in turn have impacts on livelihoods, human health and security, and the economy. The Government recognizes that climate change is likely to occur, and that the Maldives must adapt to this new reality. The Government, through its National Implementation Strategy for Addressing Climate Change (NISACC), has defined a framework for responding to the likely adverse consequences of climate change. Key measures identified in the strategy include: (i) coastal protection; (ii) population consolidation; (iii) ban on coral mining; (iv) infrastructure protection; (v) protection of coral reefs; (vi) protection of resort islands; (vii) reduce dependency on diving as primary resort focus; (viii) economic diversification; (ix) improve agriculture and food security; and (x) address the critical issue of water resources

through (a) protection of groundwater; (b) increase rainwater harvesting and storage capacity; (c) solar desalination technology (d) storm water management and (e) allocation of groundwater recharge areas in islands. Building on NISACC, a National Climate Change Adaptation Action Plan has been prepared in 2007, and includes measures to improve awareness, to safeguard critical infrastructure and resorts, to relocate vulnerable populations to safe islands, and to discourage construction of dwellings and other facilities near vulnerable coastlines.

6. **Climate Change and Coral Reefs.** Coral reefs play a key role in the lifestyles of Maldivians through natural protection of the islands and serve as a major resource for the Maldives economy from tourism and fishing industries. The impacts of climate change on coral reef ecosystems depend on the rate of sea level rise, changes in sea-surface temperatures, storminess and pressure from human activities. One of the major stresses to coral reefs is sea surface warming, which results in coral bleaching. Coral bleaching events have been observed in the Maldives seven times since 1997, and are associated with elevated sea surface temperatures in the Indian Ocean that are related to the El Niño Southern Oscillation effect (ENSO).

7. **Waste Management.** Solid and hazardous waste management is recognized as a critical environmental issue. The average rate of solid waste generation in Malé is 0.8-1 kg/person/day; in atolls it is 0.3-0.5 kg/person/day, and in the resort islands 2.5kg/person/day. There is generally no solid waste collection in the islands, with less than 2% of islands having a fee for service waste management system. In general, waste is taken by households to designated disposal sites or to the edge of inhabited areas. Disposal sites are typically uncontrolled and unmanaged and located along vegetation lines or shorelines where the waste is frequently burnt at low combustion temperatures. Leachates and unconsolidated wastes enter the lagoon systems and airborne contaminants are released into the atmosphere. In addition, there are no provisions for collection, treatment and disposal of hazardous wastes.

8. **Freshwater Availability and Quality.** The Maldives has very little in terms of freshwater resources. Rainwater harvesting is the primary source of drinking water in 90% of the outer islands with groundwater used for washing, agriculture and other domestic uses. Groundwater accumulates in rainwater recharged aquifers which lie at a depth of 1-1.5 meters below the surface where they are highly vulnerable to: (i) contamination from inadequate sanitation facilities and other human activities; (ii) solid waste run-off; (iii) over exploitation; and (iv) saline intrusion through soil erosion and flooding (storms, tsunami etc). Prior to the tsunami, only 39 of the inhabited islands had groundwater that was suitable for drinking. Following the tsunami groundwater on most of the islands showed a high degree of saline and faecal contamination.

9. The management of freshwater resources is closely linked to sanitation practices. In Malé, universal access to sanitation has been achieved with all households connected to a sewage system with pumping stations to dispose untreated sewage to a deep sea outfall. Sanitation on most islands consists of flush latrines connected to septic tanks. The septic tanks are largely soak pits from which sewage leaks through the porous soil and contaminates the aquifer. Seven islands have central small-bore systems with minimal, if any, secondary treatment disposing raw sewage into the coastal waters, rendering the waters unfit for swimming or general use.

10. **Biodiversity Loss.** The main threats to biological diversity in the Maldives are habitat destruction and overexploitation. Habitat destruction arises from coastal development activities such as harbour development and land reclamation. Coral mining for construction and dredging of lagoons for reclamation fill are a major concern. Scarce terrestrial biodiversity is threatened

by land clearance for housing especially on populated islands. Over-exploitation of high valued reef resources such as sea cucumber, grouper and giant clam has become a major concern in recent years. Timber harvesting threatens the survival of hardwood trees on uninhabited islands. Run-off from pesticides and fertilisers used in agricultural activities is becoming an increasing problem and threatens the eutrophication of coral reefs.

11. **Air Pollution.** Air pollution is an emerging issue in the Maldives and is confined largely to the densely populated island of Malé. Local air quality in Malé is poor, largely due to pollution from vehicle emissions and is exacerbated by a very congested population of around 100,000. Other pollution sources include diesel combustion emissions from the STELCO powerhouse and diesel combustion and dust emissions from construction related activities. Ambient air quality is currently not monitored in Malé and the available indicators of air pollution include: (i) an increase in vehicle numbers; (ii) the rising quantity of imported fuel; (iii) a positive trend in recorded respiratory disease; and (iv) the number of buildings constructed over the years. Available data shows that between 1997 and 2002 the total number of vehicles (cars and motorcycles) almost trebled from 6,106 to 16,196 and the trend is continuing. Roads and streets are very congested and the resulting air pollution is noticeable. Although the link between respiratory diseases and ambient air quality in Malé has not been formally studied, over recent years there has been an increase in the reported cases of respiratory diseases. Available data shows that to 2003 over 52,000 cases have been recorded.

C. Government Strategy

12. Environmental protection and sustainable development are important elements of the Maldives Government's policy. The country's aspiration for environmental protection and preservation is expressed in the Vision 2020 of the Maldives of which one of the six long term goals envisioned is that "protective measures will be taken to combat global environmental threats and environmentally friendly lifestyles will be adopted." Successive national development plans over the last decade have stressed the importance of sound practices for environmental and natural resources management. These plans have been developed based on the first *National Environmental Action Plan* (NEAP) formulated in 1990 and the *2nd National Environmental Action Plan* (NEAP II) formulated in 1999.

13. A key achievement of the first NEAP was the establishment of the regulatory and institutional framework for environmental protection through enactment of the *Environmental Protection and Preservation Act* (EPPA) in 1993 (The "Environmental Law"). The Act contains provisions for conservation of biological diversity, protected area management, environmental impact assessment (EIA), waste management and trans-boundary movement of hazardous wastes. Following on from the achievements under the first NEAP, formulation of NEAP II was based on the need to take an integrated approach to the management of the environment and to continue working towards the goal of sustainable development. NEAP II identified "principal and immediate priorities" as: (i) sea level rise due to climate change; (ii) coastal zone management; (iii) biodiversity conservation; (iv) integrated reef resources management; (v) integrated water resources management; and (vi) solid waste and sewage management. Strategies or action plans were proposed for each priority issue. In addition, NEAP II calls for specific strategic action including: (i) strengthening environmental legislation to provide a comprehensive and clarified law and policy framework, (ii) developing human and institutional capacity; (iii) continually assessing the state of the atolls ecosystem environment; (iv) devising effective and appropriate management methods suited to the social and natural environment; (v) conducting broad based consultations with and participation by civil society; and (vi) providing effective long term financing to support these actions.

14. The 7NDP emphasizes eight goals for the national development agenda and identifies performance targets under the eight goals that by 2010 will become the measurable key results of the 7NDP. Key environmental concerns are articulated in Goal No. 7: "Protecting the environment and making people and property safer". Performance targets under this goal include: (i) 100% of the atoll population have access to safe drinking water; (ii) 75% of all inhabited islands have adequate solid waste management facilities; (iii) 5% of the coral reef areas given protected status; and (iv) all regional focus islands have tertiary level sewage and wastewater treatment facilities. Adaptation to climate change has been mainstreamed in the 7NDP as one of the top environmental management priorities, and includes a series of measures aimed at safeguarding strategic infrastructure, population consolidation, and measures to protect and bolster seawalls and reefs.

15. Recognising the need to urgently address the waste management issue in a more integrated and comprehensive way, the Government of the Maldives with the assistance of UNDP, is currently developing an integrated National Solid Waste Management Policy (NSWMP) as a key component of the National Framework for Solid Waste Management in the Maldives Project (NFSWMMP).

16. The Maldives has long recognised the significance of its biological diversity and has been committed to its conservation. The Maldives is a party to the *Convention on Biological Diversity* (ratified in 1992) and, as part of its obligations under the Convention, prepared a *National Biodiversity Strategy and Action Plan* (NBSAP) in 2002. Continued implementation of the NBSAP remains a major government policy to achieve biodiversity conservation and sustainable utilization of biological resources.

17. Air pollution was identified as an emerging regional issue in 1998 when the *Malé Declaration on Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia* was adopted by the Ministers of Environment at the seventh meeting of the Governing Council of SACEP. Since 2001, the Government has highlighted air pollution as an emerging national issue and adopted the Air Pollution – National Strategy for Action.

18. Whilst there is a generally a strong policy framework for environmental protection and conservation, the legal framework is weak. Sectoral legislation has not been enacted in key areas including solid waste, hazardous waste, wastewater, air, drinking water, protected areas, biodiversity protection, physical planning and coastal zone management. As a result there is a corresponding lack of capacity to monitor and enforce compliance with environmental policy. Moreover, the legal framework is weak and lacks the cohesiveness to bring together the disparate sectoral environmental policies and regulations under one "roof". There is a lack of clarity regarding the division of responsibilities of the sectoral agencies with responsibility for environmental protection. This has hindered inter-ministry co-ordination on environmental issues. Added to this there is very limited capacity within government ministries which have environmental functions, to enable them to undertake their respective mandates. Thus, monitoring and enforcement of environmental laws and regulations is rarely undertaken.

D. ADB's Experience

19. ADB's strategy in relation to environmental issues over the last five years has been to mainstream environmental sustainability into all ADB's investment operations. Environmental impacts of ADB-funded projects are routinely assessed through ADBs environmental assessment procedures at each stage of the project cycle with mitigation measures identified, implemented and monitored. Environmental enhancement measures are also identified and

wherever possible incorporated into the project designs. This helps to compensate for the relatively weak level of environmental assessment associated with the Government funded public works projects.

20. ADB's central focus on regional development through provision of essential infrastructure with an emphasis on community participation has provided a unique opportunity to introduce an integrated environmental approach to sustainable development. Protection and conservation of the environment were central to the design and implementation of the Regional Development Project (RDP) Phase 1 (2000–2005) and RDP Phase II-Environmental Infrastructure and Management (2005–2010). Specifically, the project addressed the need for sustainable drinking water supplies through protecting the freshwater aquifer and providing rainwater collection infrastructure combined with managing solid waste and waste water through appropriate technologies. Phase II follows in a similar vein focussing on three central regions islands, and has three components: (i) improving environmental infrastructure including sanitation, improvements, water supply and integrated solid waste management; (ii) strengthening planning and environmental management including land use planning and management, developing an environmental awareness program and environmental monitoring; and (iii) building management and implementation capacity which covers community mobilization and institutional strengthening for improved project management.

21. **Development Partners.** UNDP provides support to the Maldives in (i) solid waste management; (ii) promoting renewable energy; (iii) atoll ecosystem conservation; and (iv) climate change adaptive measures. UNDP takes the lead in institutional and specialist technical support in these areas, complementing the more project-based mainstreaming approach of ADB and other development partners. The IsDB provides support in the education, finance, health and regional development sectors with the latter comprising water supply and sewerage facilities in the atolls and infrastructure development for poverty alleviation. The Government of Japan has provided significant support for coastal protection infrastructure. Other bilateral development partners in the environment sector include Australia (protected area systems and management) and Canada (atoll waste management and water tank projects).

E. ADB's Strategy

22. The effects of the tsunami highlight the need to address immediate environmental priorities such as solid waste management, water supply and sanitation, coastal protection and disaster preparedness. Such issues require urgent attention to protect the environment including the health and livelihoods of the population. To ensure the sustainability of environmental improvements, interventions should: (i) be in step with the prevailing and emerging national policies and strategies; (ii) have a strong capacity development focus (managerial, technical, entrepreneurial skills training within key institutions); (iii) have community support and participation (involving awareness raising, community mobilisation and empowerment); (iv) facilitate private sector participation; and (v) be adaptable and responsive to local conditions.

23. **Mainstreaming Environmental Considerations in ADB Projects.** Pro-poor development and environmental conservation must go hand in hand, as continued depletion and degradation of the natural resource base will lead to loss of livelihoods and a higher incidence of poverty and deprivation. ADB will adopt a selective approach and will focus mainly on environmental issues specific to the sectors where ADB is actively engaged and has the knowledge to be effective. For example, the Outer Island Electrification project will include a specific component on renewable energy. At the same time, policy dialogue would be

undertaken to ensure that existing power generating stations, currently using furnace oil, adopt energy efficient measures and incorporate other eco-friendly features. In addition, under the ongoing Regional Development-II project which would assist the provision of water supply and sanitation in selected islands, environmentally-friendly designs that take into account the country's vulnerability to sea level rise would be pursued.

24. **Climate Change Adaptation.** The tsunami of 2004 highlighted in a catastrophic way the Maldives vulnerability to natural disasters and has focused attention on the imminent threats posed by climate change and sea level rise. ADB will explicitly integrate adaptive measures to climate change into project designs and all its operations in the Maldives. In addition, working in close coordination with the Government and UN agencies, ADB will provide support to build capacity in the areas of disaster management and climate change adaptation. Regional TA on climate adaptation will help adopt investment programs, plans, policies and/or other actions to adapt development to expected future climatic conditions. These will build on Government's existing strategies and action plans for climate change adaptation, helping to translate those into a series of actionable policies, programs and projects. These will be developed in close co-operation with international organizations and other development partners to complement or supplement relevant existing adaptation plans and activities. It is expected that the regional TA will also help better align external assistance to meet the country's investment needs given the risks from climate change.

25. **Mainstreaming Environmental Safeguards in Development Projects and Programs.** ADB will continue to support the Government's efforts to mainstream environmental considerations in development projects and programs. Environment and social safeguards will be applied, as required, from the early stage of the ADB project cycle. Assistance will be provided to build capacity for mainstreaming environmental safeguards into development projects and programs by: (i) undertaking strategic environment assessments for the important economic sectors such as power and transport; (ii) including capacity development as an integral part of environmental management plans prepared for environmentally sensitive projects, as required, and (iii) contributing to improved country safeguard systems.