

PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE

Report No.:72459

Project Name	Ari Atoll Solid Waste Management Pilot Project
Region	South Asia
Sector	Environment (100%)
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Borrower(s)	Government of Maldives
Implementing Agency	Ministry of Environment and Energy
Environment Category	[X]A []B []C []FI []TBD (to be determined)
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I. Country and Sector Background

1. The Republic of Maldives – a small island nation located in the Indian Ocean southwest of Sri Lanka – consists of 26 major atolls and hundreds of smaller islands. Only 33 islands have an area greater than one square kilometer (km^2). The country's total land area¹ is less than 300 km^2 . Maldives possesses more territorial sea than land. Its total population of 324,992 (as of 2009) is highly concentrated in relatively few islands. The atolls are ringed by coral reefs that are the seventh largest in the world and among the richest in terms of species diversity and aesthetic appeal. The reefs host over 1,900 species of fish, 187 coral species, and 350 crustaceans. Tourists are attracted to Maldives for the pristine beaches and dive locations, the latter considered among the finest in the world. An estimated 500,000 tourists – nearly twice the country's population – visit the country annually.

2. There are some 200 inhabited islands scattered across the archipelago, and some 90 additional islands dedicated solely for resort operations. The population of the inhabited islands varies from a few hundred inhabitants to several thousand. Distances between atolls and inhabited islands are great and transport costs are high, depending on sea and air transport. Malé is the location of the country's major port and international airport (the latter located in the adjacent island of Huhulle).

3. The Maldives is largely a service-oriented economy. Due to its small population and sparse land area, the scope for agriculture and manufacturing is limited. In recent years, nature-based tourism has served as the engine of growth and prosperity for the economy, accounting for about 70% of GDP (in terms of direct and indirect contributions), followed by fishing and fish processing (about 10% of GDP). Revenues from these activities have been channeled largely into public investments in education, health and infrastructure, creating an economy that is graduating to middle-income status. For much of the last three decades, economic performance has been robust with growth averaging about 8% per year.

¹ By comparison, the United Kingdom occupies an area of 242,495 km^2 .

4. ***Environmental risks may undermine economic development.*** Like other small island states, Maldives faces daunting environmental risks that threaten to undermine its economic achievements. In recent years, growing environmental pressures have emerged as a consequence of rising population densities, increased tourism and changing consumption patterns. Some islands with high population density² confront growing problems of solid waste management, pollution from sewage and other effluents emanating from urban settlements, hotels, fish-processing plants, ships and other sources. In particular, with growing prosperity and buoyant tourism, the quantities of solid waste generated exceed disposal and treatment capacity. This poses a substantial and visible risk to the country's reputation as an unspoiled tropical "paradise". An estimated 248,000 tons of solid waste was generated in Maldives in 2007 and the figure was projected to rise to 324,000 tons by 2012 (equivalent to a 30% increase).³ Current arrangements for waste management on inhabited islands are inadequate. Most waste are dumped onto the island foreshore and burned at low combustion temperatures. In addition, approximately 510 tons per year of medical waste is estimated to be produced in Maldives. The current uncontrolled disposal of solid waste, including medical waste, is a threat to the coastal, marine and coral reef ecosystems and a blemish on the pristine marine landscape expected by tourists.

5. Sewage disposal is a further, though less visible, problem that can degrade seawater quality, and damage coral reefs – the keystone resource for revenues in the Maldives economy. Of particular concern are the continuing threats to marine assets from habitat degradation by indiscriminate disposal of sewage and solid waste. Coral mining for construction and dredging of lagoons for reclamation have been identified as the most widespread causes of reef destruction. Other pressures include damage caused by divers, illegal collection of corals and unsustainable exploitation of high-value reef resources such as sea-cucumber, grouper and giant clams. On the islands, timber harvesting and the destruction of mangroves threaten terrestrial biodiversity, while pollutants from numerous sources have caused eutrophication of coral reefs.⁴

6. ***Climate induced risks.*** In addition to anthropogenic pressures, climate change poses a more far-reaching source of environmental risk. Geography has rendered Maldives especially vulnerable to the consequences of climate change. Being land scarce (96% of the islands occupy less than 1 km² in area) and low lying (over 80% of the country is less than 1 meter above sea level), the country is exposed to the risks of intensifying weather events such as damage caused by inundation, extreme winds and flooding from storms.

7. With the melting of polar ice caps, Maldives is exposed to the risks of sea level rise. With future sea level projected to rise within the range of 10 to 100 centimeters by the year 2100, the entire country could be submerged in the worst-case scenario. Rising sea temperatures also

² According to the United Nations World Population Prospects Report (2005), the population density in Maldives is 1,005 persons per km².

³ The World Bank. 2008. Project Appraisal Document. Maldives Environmental Management Project. May.

⁴ Eutrophication involves an increase in chemical nutrients—typically compounds containing nitrogen or phosphorus—in an ecosystem. It may occur on land or in water. The term is often used to imply the resultant increase in the ecosystem's primary productivity which translates into excessive and ultimately destructive plant growth leading to decay and mortality which may have even further impacts, including lack of oxygen and severe reductions in water quality and in fish and other animal populations.

threaten the coral reefs and cause bleaching and death, with the most severe damage in areas that are stressed by pollutants, or damaged by physical disturbance.⁵ Coral bleaching events have been observed in Maldives seven times since 1997 and are associated with elevated sea surface temperatures in the Indian Ocean. Recovery of corals from bleaching events has been slow, especially on degraded and damaged reefs.

8. ***Strengthening environmental stewardship.*** With the country's high dependence on a few key environmental assets and as pressure on these assets rises, prudent economic management calls for strengthened environmental stewardship. The substantial environmental challenges facing Maldives could become a formidable brake on economic growth, especially if these undermine tourism. High-end tourism is an inherently fragile activity that depends on consumer perceptions, adequate transport and a continuous effort by the private sector to maintain and improve the quality of the tourism product in a highly competitive global market. To retain its comparative advantage, Maldives needs to maintain a clean and attractive environment for tourists who are mainly well-to-do foreigners. This calls for considerable improvement in environmental management with policy principles being translated into measurable outcomes and an environmental infrastructure that matches the needs of a country on the threshold of middle-income status.

9. Recognizing the economic significance of its environmental assets, the National Planning Council (NPC) – headed by the President of Maldives and mandated to develop national priorities and ensure sustainable development of the nation – has emphasized the need for adopting sound environmental practices that go hand in hand with the country's development. There is an overarching policy framework for environmental protection in the country. Tourist resorts are governed by comprehensive environmental regulations and have a strong economic incentive to protect the environment on the islands on which they hold concessions. Despite government commitment and past efforts, mounting environmental pressures far outpace the country's ability to manage its key natural assets.

10. ***Solid waste management (SWM) in Maldives.*** The Maldives is faced with the challenge of managing increasing quantities of solid waste, which is the country's most visible environmental threat to the tourism and fishery industries. The challenge is compounded in Maldives more than other small island states due to the small island sizes, small populations on these islands and visible lack of economic activities that make any investment in waste management financially unviable. With a population spread across numerous islands, there is little scope for harnessing economies of scale. High costs of sea transport and low volumes of waste raise the costs of service delivery. The amount of waste generated far exceeds the capacity of available landfills, which are basically uncontained open dumps. Improper disposal of solid waste can foul beaches, degrade sea water quality and damage the corals that are a magnet for tourists.

11. Poor management of solid waste is among the most serious immediate threats to the country's reputation as an unspoiled tourist destination which could have a debilitating effect on the economy. Few residential islands have satisfactorily functioning SWM facilities; many of

⁵ Global Climate Change and Coral Reefs. International Union for Conservation of Nature (IUCN) 2003 Report to UNEP-IOC-ASPEI Global Task Team.

them dump waste into lagoons as a crude method of land reclamation while others allow waste to accumulate on beaches, forming rings of trash around the perimeter of entire islands. Resorts are required by law to burn their combustible waste (including plastic bags) in on-site incinerators and to crush cans and bottles. Food waste is disposed of in the deep sea. The non-combustible and non-degradable waste is disposed of by transporting them to the one functioning landfill in the country, Thilafushi. Some allegedly dump residual waste at sea rather than incur the expense of transporting waste hundreds of kilometers to Thilafushi. It is not uncommon for waste to wash up on the shores of other islands, including resorts. Of particular concern are the growing volume of waste in areas visited by tourists and the appearance of debris on dive sites, sand-banks and beaches.

12. Waste disposal is likely to become even more challenging in the future as population densities rise and prosperity grows. Prosperity has brought many new consumer products, often contained in non-biodegradable containers or packages that litter the beaches and lagoons. Given the rapid scale of these developments, it is not surprising that there is little knowledge of waste management technology or of the risks of current disposal methods. The problem with SWM was aggravated after the Indian Ocean tsunami hit Maldives in December 2004. As part of the international community's response to post-tsunami reconstruction, development partners like the United Nations Development Program (UNDP), European Union (EU) and other donors and relief organizations, like Australian Agency for International Development (AusAID) and Canadian Red Cross assisted Maldives in developing national SWM strategies and capacity and public awareness programs as well as in constructing island waste management centers (IWMCs) for waste segregation and storage for periodic off-island disposal. Unfortunately, most of the IWMCs have been unsuccessful because of the inability to secure off-island disposal facilities.

13. ***South Ari waste management experience.*** The EU established a World Bank-administered trust fund in September 2006 for post-tsunami recovery and reconstruction. The trust fund provided support to a project which included an environmental component amounting to US\$2.8 million for improving SWM in the Central Province atolls (Alif Alif, Alif Dhaalu, Faafu, Dhaalu, Vaavu and Meemu). The project was referred to generally as the South Ari SWM project. The project aimed to establish 16 IWMCs and one Regional Waste Disposal Facility (RWDF) for off-island waste disposal and to support technical assistance (TA) for capacity building and environmental awareness programs targeted for the island communities. While those programs were implemented successfully, the South Ari SWM project was able to construct only 11 IWMCs due to the shortage of land on some inhabited islands and lack of community interest.

14. Moreover, the cost of constructing the RWDF – in the form of a planned landfill on a small island where the surrounding lagoon – was estimated at more than double the budget available from the EU trust fund. The reason is obvious: land is a premium in Maldives. Not surprisingly, the proposed off-island RWDF had to be abandoned. Although 11 IWMCs were constructed, only two inhabited islands are making partial use of the IWMCs while others have been abandoned due to lack of access to an off-island waste disposal facility.

15. ***Need for scalable and replicable models on integrated SWM on inhabited islands to improve environmental outcomes.*** At present, a fully functioning and properly integrated SWM system – that includes fees collection and payments to service providers – does not exist in

Maldives. It is in this context that this proposed pilot project seeks to develop technical, institutional and human resource capacity in the targeted inhabited islands of the Ari Atoll to manage municipal solid waste in a manner that would strengthen environmental outcomes and reduce the risks posed by climate change. The proposed project intends to make five (5) IWMCs operational on a pilot basis and the demonstration effect from the pilot project would facilitate the process of scaling up an integrated SWM system in inhabited islands and resorts in the Ari Atoll. The success of the pilot project is expected to bring about the participation of the remaining inhabited islands of the Ari Atoll, particularly those where IWMCs were built with EU funding. Thereafter, the project mechanisms and experience could be expanded to the remaining atolls of the Central Province.

16. The proposed Ari Atoll pilot will be particularly useful, if implemented successfully, in the context of the recent decentralized governance framework. Local stakeholders – atoll councils, island councils, civil society organizations, tourist resorts and the local community – have played a limited role in SWM in the islands. Therefore, there is a need to develop models that will actively involve local stakeholders since SWM is a local level responsibility. Local stakeholders need to be sensitized and incentivized to develop a sense of ownership, acceptance and commitment towards effective management of solid waste generated at the island level, thereby reducing the adverse impacts to the unique marine ecosystem vital to Maldives.

17. **Climate Change Trust Fund (CCTF).** A multi-donor Maldives CCTF was established in December 2009 to address the climate related risks facing Maldives and to strengthen the country's resilience to those threats. The majority of the resources (approximately US\$9.8 million) will be used by the Government of Maldives (GOM) to carry out priority projects relating to climate change adaptation and mitigation. With support from CCTF, GOM proposes to undertake a pilot project in integrated SWM in the Ari Atoll to demonstrate island level management of solid waste with an aim to reduce greenhouse gas (GHG) emissions and improve environmental outcomes.

18. The CCTF's project selection process was applied to the Ari Atoll pilot project which is being led by the Environmental Protection Agency (EPA). The selection is consistent with the arrangements provided in CCTF's legal agreements and took into account the role of the CCTF governance structure, namely, the National Planning Council (NPC), Climate Change Advisory Council (CCAC) and the Technical Committee (TC). In compliance with the CCTF's governance mechanism, the pilot project was vetted in the following manner:

- First, the CCAC members reached agreement on CCTF's priority areas: wetland conservation, coral reef monitoring, clean energy and a pilot program in integrated SWM in the Ari Atoll.
- Second, EPA submitted a concept note for the SWM pilot – through the Ministry of Environment and Energy (MOEE) – to CCTF's governance structure.
- The proposal was reviewed by the Technical Committee for strategic and technical merit, endorsed by NPC, and finally submitted to the World Bank with a request to initiate project preparation.

II. Objectives

19. The development objective of the project is to build technical and human resource capacity to effectively manage solid waste generated in selected inhabited islands of the Ari Atoll, thereby reducing the environmental risks to marine habitats and GHG emissions. The pilot project will develop and implement an integrated SWM system in selected inhabited islands of the Ari Atoll and also build the capacity of the Island Councils and communities to manage solid waste.

III. Rationale for Bank Involvement

20. The proposed project is strongly aligned with GOM's priorities and the World Bank's FY08-FY12 Country Assistance Strategy (CAS).⁶ ⁷ The Bank's CAS acknowledges the significant threats to economic prosperity posed by environmental degradation and the risks of climate change. A strategic priority of the CAS is to selectively target limited resources where assistance is most needed and effective. Accordingly, strengthening environmental management and building greater resilience to climate variability and change have been identified as major pillars of the CAS.

21. Climate change has emerged as an important priority in the Bank's deepening engagement in promoting responsible stewardship of global public goods. The Maldives represents the iconic case of a small island economy facing unprecedented threats from climate change and sea level rise. How the country approaches these challenges could have important lessons for other small island developing states that depend on coastal resources for economic development and environmental security. This project therefore would have important demonstration effects for better management of solid waste to minimize GHG emissions and conserve the integrity of marine and coastal ecosystems

IV. Description

22. The proposed project will have three components that have been designed in consultation with GOM, civil society and other stakeholders, as well as technical assessments undertaken and lessons learnt from the EU-financed, partially abandoned South Ari SWM Project. Component details are provided in Annex 2.

Component 1: Development and implementation of an island level integrated SWM system

23. This component aims to build the institutional capacity of the Island Councils and communities in the five islands to plan and implement an island level integrated SWM program in order to minimize the environmental risks to the country's marine and terrestrial assets while reducing greenhouse gas (GHG) emissions. In addition, support will be provided to the development of a strategy to operationalize the remaining EU-financed IWMCs in the atolls of

⁶ The CAS was endorsed by the World Bank Group Board of Executive Directors in December 2007. (CAS Report Number: 41400-MV).

⁷ "World Bank", "Bank", International Development Association and "IDA" are used interchangeably throughout the document.

the Central Province. The project would support the following activities:

- Community participation in source segregation of solid waste
- Implementation of an island level recycling and composting program at the IWMCs
- Institutional capacity building of the Island Councils and communities for planning and managing an effective island level integrated SWM system
- Development of a strategy to operationalize the remaining EU-financed IWMCs in the atolls of the Central Province

Sub-component 1.1: Community participation in source segregation of solid waste

24. The inhabited islands that participated in the EU-financed South Ari SWM Project prepared island waste management plans that called for community participation in the source separation of household solid waste prior to collection and transport to the IWMCs. Although basic community awareness was initiated under that project, virtually no source separation of household waste is taking place in the islands. This could be attributed to two factors: (i) inadequate community commitment to participate in island level SWM; and (ii) lack of a waste transfer and disposal system for residual waste from the inhabited islands for ultimate disposal. This sub-component is designed to address the lack of community commitment to participate in island level SWM while Component 2 of the project will address the issue of the transfer of residual waste from the IWMCs for ultimate disposal at the Thilafushi disposal facility.

25. This sub-component will create community awareness on the environment and public health implications of poor SWM in the respective islands and solicit community participation for source segregation of household level solid waste. This will be achieved through: (i) a capacity building program that involves strengthening community awareness and initiating active community participation in source separation of waste at the household level; and (ii) an effective waste collection and transport system in the inhabited islands. The program will be designed to involve the participation of all households in the selected islands as well as the Island Councils.

Sub-component 1.2: Implementation of an island level recycling and composting program at the IWMCs

26. Because of the high population density in inhabited islands and the dispersed geography of Maldives, conventional approaches to SWM are not applicable. Most inhabited islands have inadequate land available for solid waste disposal and therefore off-island disposal is often the only available alternative. Ocean transport is the only mode of transport for the transfer of disposable solid waste to an off-island facility. Since transport costs are prohibitively expensive in Maldives, it is in the interest of any inhabited island to minimize the waste that would require off-island disposal. Approximately 70% of the solid waste stream is composed of biodegradable organic matter and could be managed at the island level through low cost, low technology composting at the IWMCs, thereby minimizing the amount of waste that would have to be transported to an off-island waste disposal facility. The non-degradable residue would be baled and stored under a protective cover at the IWMC site until the Thilafushi Island facility is rehabilitated.

27. The IWMCs that were constructed on inhabited islands presently do not have provision for composting. Hence, this sub-component would finance: (i) the construction of a concrete pad for composting with a drainage system for leachate collection at each of the IWMCs; and (ii) training of staff to undertake simple windrow composting at the IWMCs.

Sub-component 1.3: Institutional capacity building of the Island Councils and communities for planning and managing an effective island level integrated SWM system

28. While GOM assigned the responsibility for SWM to the regional utility companies in six out of the country's seven provinces, an arrangement has not been made for the Central Province, which includes the capital island, Male'. SWM services for the Central Province have been assigned to the newly created Waste Management Corporation WMC). The Ari Atoll is part of the Central Province and therefore, SWM is WMC's responsibility. However, the Island Councils are responsible for *intra-island* SWM while WMC is responsible for *inter-island* SWM.

29. This sub-component will build the institutional capacity of the Island Councils and Island Offices to effectively manage intra-island solid waste, including the development of a viable institutional mechanism for cost recovery through the introduction of user fees.

Sub-component 1.4: Development of a strategy to operationalize the EU-financed IWMCs in the atolls of the Central Province

30. As previously mentioned, the EU trust fund aimed to support the construction of 16 IWMCs in inhabited islands in the atolls of the Central Province. However, for reasons described above, only 11 IWMCs were constructed and just two inhabited islands are making partial use of the IWMCs. Under the proposed project, the results – i.e., the development and implementation of an integrated SWM system in five pilot islands – would subsequently be scaled up in the other inhabited islands of the Central Province. This sub-component would support the development of a strategy to operationalize the remaining EC- financed IWMC in the Central Province atolls. The key output of this sub-component is a strategy for operationalizing the remaining EU-financed IWMCs in the atolls of the Central Province.

Component 2: Development of institutional arrangements and implementation of a waste transfer system for off-island disposal of residual solid waste

31. The objective of this component is to develop an effective, working institutional model to transfer residual waste from the participating islands of Ari Atoll to the Thilafushi Island facility and to demonstrate the use of this model for residual waste transfer for all atolls of the Central Province.

32. This would be achieved through the following activities:

- Development of a viable institutional mechanism which could include a public-private partnership (PPP) for the transfer of residual waste to the Thilafushi Island facility
- Development of a cost recovery mechanism for the residual waste transport system
- Procurement of a barge and associated equipment for the transfer of residual waste

- Transfer of residual waste from the participating pilot islands to a regional SWM facility, like the Thilafushi site

33. The Thilafushi facility has been identified by GOM as the ultimate disposal facility for solid waste in the Central Province until other regional waste disposal facilities are established in the future. Therefore, the residual waste from the islands participating in this project will use the Thilafushi facility for ultimate disposal of the waste. In the past, Thilafushi operated as an “open dump” with no precautions taken to minimize adverse environmental impacts from solid waste disposal. Recently, GOM assisted by the International Finance Corporation (IFC),⁸ privatized the operations and management of the Thilafushi site. The private sector operator is contractually bound to improve the site’s conditions and operations in order to conform to guidelines on environmental safeguards of IFC’s as well as GOM. While this project will not support nor be involved in the operation of the Thilafushi site, the developer’s legal obligation to conform to IFC’s and GOM’s environmental guidelines renders the use of Thilafushi for residual waste disposal from islands participating in this project acceptable.

34. The privatization of the Thilafushi facility provided for the rehabilitation of the site, and under current projections, the process will take another 18 months. Until such rehabilitation is completed, the non-degradable residue from the IWMCs in the five pilot islands will be baled and stored under a protective cover in the respective IWMCs. In the unlikely event that the rehabilitation of the Thilafushi facility takes longer than anticipated and storage space for the baled waste becomes a problem at the IWMCs, it is proposed that the baled waste would be transported to Thilafushi and stored on site until proper disposal is possible.

35. The potential adverse environmental impact of the residual waste is significantly reduced when compared with mixed solid waste because the organic fraction of the waste has been removed from the waste stream and subjected to composting at the island level. Studies have shown that the removal of the organic fraction of the waste from the residual waste stream reduces the pollution potential (as measured through the biochemical oxygen demand (BOD) of the waste) of the residual waste stream by about 90%. Therefore, the adverse environmental impact of residual waste disposal from the participating islands would be minimal compared to that of mixed waste disposal at the Thilafushi site at present.

Component 3: Project Management

36. The objective of this component is to establish an effective mechanism for project implementation, including monitoring and reporting of the implementation progress. An existing Project Management Unit (PMU) in MOEE manages the implementation of the IDA-financed Maldives Environmental Management Project (MEMP). While MOEE will have overall responsibility for implementing and ensuring that the project objective is met, it will execute the project through the EPA. The SWM Coordinator for MEMP in the PMU will be responsible for day-to-day technical coordination of this project with support from EPA’s SWM staff. Also, implementation support would be provided by EPA staff posted at the Island Offices of the five

⁸ IFC, a member of the World Bank Group, is the largest global development institution focused on the private sector in developing countries.

targeted islands through technical oversight and coordination among the participating Island Councils that will have the primary responsibility for island-level implementation.

V. Financing

Source:	(\$m.)
Borrower/Recipient	0.00
Maldives Climate Change Trust Fund	1.236
Total	1.236

VI. Implementation

37. The governance arrangements for CCTF would apply to this project as well. They comprise the NPC and CCAC led by the Office of the President and a Technical Committee of national experts. While MOEE has overall responsibility for this project, implementation will be carried out by EPA and the Island Councils in the targeted islands. The PMU will coordinate project activities and be directly involved with EPA in executing some specific sub-component activities. It will be responsible for the fiduciary aspects (financial management and procurement) of implementation. The PMU will be responsible for monitoring progress and evaluating the project's outcomes.

38. EPA will provide technical oversight and coordination support to the participating Island Councils that will have primary responsibility for island-level implementation. At the island level, an IWMC Coordinator will be designated from existing Island Office staff and trained in managing the operations of the IWMC on a day-to-day basis. WMC will be responsible for the waste transport system and the PPP arrangement.

VII. Sustainability

39. The project is designed with an inherent emphasis on sustainability as it addresses some of the root causes of poor SWM in Maldives, such as the lack of systems for community involvement in SWM, local level solutions, limited technical capacity and an off-island waste disposal facility. Sustainability of IWMCs is one of the fundamental aspects of the project design as it incorporates community ownership, leadership and participation, training, capacity building in order to ensure financial viability. *In the final analysis,* However, the project's long-term sustainability will depend on the participation of the other inhabited islands in the Ari Atoll and the acceptance by the resorts of the business value of participating in the SWM system and protecting the environment.

40. The project will finance the cost of construction of the composting pad, requisite equipment and training of island communities, Island Council officials and IWMC workers. In virtually all countries, SWM is recognized as a public good requiring government support to meet the full operational costs. It is anticipated that full-cost recovery for operations and maintenance (O&M) of IWMCs is possible from user fees. However, the costs of waste transfer and disposal may be beyond the level of affordability of the island communities due to excessively high sea transport costs. Therefore, it is anticipated that resorts would cross-subsidize the costs of the waste transfer vessel. Such cross-subsidization is especially needed in

Maldives where the island geography drives costs higher than in other context. It was agreed with GOM that it will be necessary to ascertain and provide support for O&M. Since GOM already covers part of the operational cost of waste management, it is expected that such support will be forthcoming.

VIII. Lessons Learned from Past Operations in the Country/Sector

41. SWM in the context of the Maldives is unique because of the dispersed population on small islands, with acute scarcity of land on inhabited islands. The islands are marked by considerable variation in local conditions with differences in: (i) the composition of waste between resort islands and inhabited islands; (ii) customs including the extent of community participation; and (iii) economic enterprise. Consequently, there is no “one-size-fits-all” solution to SWM at the island level.

42. Past endeavors have failed because of inadequate consultation, insufficient assessment of local conditions and the lack of appropriate and simple waste management technologies that are accessible and understandable to the island residents. The design of this project benefited from the experiences of activities supported by AusAID, Canadian Red Cross and EU. Four important lessons have emerged from these operations. First, there is a need for programs to consider the local conditions which vary widely across atolls and within atolls. Second, strong consultation and community buy-in are key elements for the successful operation and sustainability of the system. IWMCs cannot operate satisfactorily unless agreement has been reached with each participating community regarding the modality of waste management and unless islanders have agreed to cooperate. Third, it is essential that the IWMCs are linked to a regional SWM facility through a regular waste transfer system. Finally, given the high cost of transportation, the waste volume needs to be reduced by carrying out composting of organic waste on the islands.⁹ With careful attention to the lessons learned from previous experiences and local authority-led, low cost, low technology composting projects in Sri Lanka, a viable SWM system for the participating islands can be implemented successfully.

43. In designing the project, considerable weight has been given to local preferences by carrying out a participatory rural appraisal process and public awareness programs, including a communications campaign. The technical, financial and social assessments conducted under the Tsunami Emergency Recovery Project (when the IWMCs were constructed) ensured that the Island Waste Management Plans reflect local conditions and needs. The experience from the existing IWMCs in Maldives shows that community participation in the recycling and resource recovery program is poor in most islands because of the need for an attitudinal change among the communities, the lack of a mechanism for the resale of recyclables, and the absence of facilities to transport residual waste to a regional SWM facility. In some instances, this has created a serious environmental and public health problem on inhabited islands, with waste accumulation spilling onto beaches. In other cases, island communities dump mixed solid waste along the shoreline with adverse consequences for reef habitat. Since the public awareness and communications campaigns were conducted a couple of years ago, a renewed program will be

⁹ While composting can be done at the household level or at the community level, experience in South Asia indicates that community or island level centralized composting systems would be the most appropriate. But for such a system to work, training and outreach are necessary to show islanders and IWMC workers how to properly compost organic waste.

carried out under this project to encourage community participation. The availability of an off-island disposal facility for the removal of residual waste from the participating islands under this project would address the biggest constraint to the successful operations of the IWMCs.

44. The financial sustainability of the operations of the IWMCs is the next most significant constraint to a fully functioning integrated SWM system. Attempts to achieve full cost recovery from island communities have typically failed. It is uncertain whether all islanders will be willing to pay a fee for SWM. Their reluctance is due to: (i) skepticism about the capabilities of service providers; (ii) perception by communities about lack of affordability vis-a-vis user fees; and (iii) misinformation that waste collection in Malé is provided free of charge. In order to overcome these concerns, the island communities must be convinced that reliable services can be provided at a reasonable rate and those services are tailored to the needs and preferences of the islanders. The social mobilization and outreach to be carried out by EPA and NGOs are intended to give island communities a sense of ownership. The project will begin SWM service on each island with at least a token payment from each household. With the provision of satisfactory service, the public would be encouraged to pay for the service they receive. Although recognizing that SWM is a public good, it is not expected that full operating cost recovery will be achieved and, as elsewhere in the world, a public subsidy will be necessary.

45. On the positive side, at least one community in the targeted region is already paying modest fees for waste disposal and this experience can serve as a model for other communities. The financial sustainability of the waste transfer system and tipping fees at the Thilafushi Island facility would be assured through cross-subsidies from commercial enterprises, including resorts, with the shortfall financed by GOM.

IX. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP 4.01)	X	
Natural Habitats (OP/BP 4.04)		X
Pest Management (OP 4.09)		X
Physical Cultural Resources (OP/BP 4.11)		X
Involuntary Resettlement (OP/BP 4.12)		X
Indigenous Peoples (OP/BP 4.10)		X
Forests (OP/BP 4.36)		X
Safety of Dams (OP/BP 4.37)		X
Projects in Disputed Areas (OP/BP 7.60)*		X
Projects on International Waterways (OP/BP 7.50)		X

46. Overall, the proposed project activities will contribute towards improved SWM in Maldives. The technical, financial and institutional model implemented under the project will serve as a suitable model for future SWM in inhabited islands of the Central Province. The project is classified under Safeguards Category "A" primarily to reflect the risks involved in SWM both at the island level and at the Thilafushi Island facility. Under the PPP contract, the

* By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas

private concessionaire of the Thilafushi Island facility is contractually bound to conform to IFC environmental safeguards. The project will involve community-based waste recycling and resource recovery facilities, composting of the organic fraction as well as off-island regional waste disposal at Thilafushi Island for residual waste. Because the country's ecosystems are fragile and the atolls are ringed by coral reefs, the operation of these facilities could generate further environmental impacts although the project's net environmental impact will be strongly positive.

47. Given that nature-based tourism is the primary driver of the economy, the economic and social well being of the population depends largely on maintaining a high level of environmental integrity. Sound environmental management in Maldives is, therefore, essential to ensuring continued growth and development. Maldives established a regulatory and institutional framework for environmental protection in 1993 by enacting the Environmental Protection and Preservation Act (EPPA). A National Environmental Action Plan (NEAP) and an update to the EPPA were completed in 1999. Several NEAPs have been implemented and they have served as GOM's comprehensive framework for ensuring environmental protection and sustainable development during the years of implementation.

48. Environment plays a key role in national development as articulated in the Strategic Action Plan. A Ministry responsible for the subject of Environment was established in 2004 with the mandate for environmental protection and management. The EPA was established in December 2008 as the environmental regulator. Therefore, the institutional and regulatory framework for environmental management in Maldives is in place, although institutional capacity for effective regulation and enforcement is weak and requires strengthening. One component of MEMP is directly aimed at addressing this weakness and the capacity building program is progressing satisfactorily. One of the greatest threats to public health from environmental-related issues is ad hoc disposal of solid waste on inhabited islands. The Ari Atoll SWM pilot project will provide a model for replication in other islands/regions of Maldives.

X. List of Factual Technical Documents

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