OUTCOME EVALUATION

United Nations Development Programme
Maldives

Country Programme 2003-2007

Environment, Climate change

FINAL VERSION

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LIST OF ABBREVIATIONS

ADC	Atoll Development Committee
ADEME	French Environment and Energy Management Agency
CCEAP	Climate Change Enabling Activity Project
CCTT	Climate Change Technical Team
CDM	Clean Development Mechanism
CO_2	carbon dioxide
CoP	UNFCCC Conference of Parties
CRP	climate risk profile
ERC	Environmental Research Centre (of MEEW)
EU	European Union
FRESA	Fund for Renewable Energy System Applications
GEF	Global Environment Facility
GHG	greenhouse gas
ICCS	Integrated Climate Change Strategy
IDC	Island Development Committee
IWMC	Island Waste Management Centre
LPG	liquefied petrol gas
MEEW	Ministry of Environment, Energy and Water
MHAE	Ministry of Home Affairs, Housing and Environment
MYFF	UNDP multi-year funding framework
NCSA	National Capacity Needs Self-Assessment for Global Environment Management
NAPA	National Adaptation Plan of Action
PV	photovoltaic
RE	renewable energy
RET	renewable energy technology
RBM	results-based management
Rf	Maldivian Rufiyaa
RETDAP	Maldives Renewable Energy Technology Development and Application Project
STELCO	State Electricity Company
STO	State Trading Organization
SWM	solid waste management
TTF	UNDP Thematic Trust Fund
TNA	Technology Needs Assessment
UNDAF	United Nations Development Assistance Framework
UNDP	UN Development Programme
UNFCCC	UN Framework Convention on Climate Change
UNIDO	UN Industrial Development Organization
UNOPS	UN Office for Project Services
US$	US dollar
USD	US dollar
V&A	vulnerability and adapation

Exchange rate: 1 US$ = 12 Rufiyaa

EXECUTIVE SUMMARY

In Maldives, the UNDP aims to provide a support role for the country, especially in the area of national capacity building, democratic governance, poverty reduction, crisis prevention and recovery, energy and environment and responding to HIV-AIDS. In the practice area of 'environment and energy for sustainable development', the programme outcome of *environmental management, including climate change and sustainable energy integrated into national development frameworks and sectoral strategies and programmes* was chosen by UNDP for evaluation in 2007.

This report describes the progress toward achievement of the above-mentioned Country Programme outcome; lessons learned for the next Country Programme as well as recommendations for the next Country Programme 2007-2010.

The following specific UNDP projects are analysed as part of the evaluation of this outcome:

- Maldives Renewable Energy Technology Development and Application Project (RETDAP)
- National Framework for Solid Waste Management in the Maldives
- Preparation of National Adaptation Plan of Action (NAPA)
- National Capacity Needs Self-Assessment (NCSA) for Global Environment Management
- Climate Change Enabling Activity Project (CCEAP): Technology Needs Assessment (TNA)

The Republic of Maldives stresses environmental issues in its national development planning. The 7th National Development Plan contains important references to solid waste management, management and control of hazardous waste, adaptation to climate change and natural disasters, energy conservation and efficiency, promotion of indigenously available renewable energy sources, availability of safe drinking water and sustainable transportation.

Findings and conclusions

In some of the areas, notably renewable energy, solid waste management and climate change mitigation and adaptation strategies, UNDP has supported the Government of Maldives in setting up policy and programmes. This progress can be attributed to a commitment of both UN Development Programme (UNDP) and the main partner in this area, the Ministry of Environment, Energy and Water (MEEW) to set up a policy framework that has served for implementing activities in the above-mentioned areas in a coherent way and in mobilising support from other donors.

The Evaluation Team concludes that UNDP's activities in the past 4 years have constituted a significant *contribution* towards achieving the desired environmental outcome of "environmental management, including climate change and sustainable energy integrated into national development frameworks and sectoral strategies and programmes". UNDP has contributed in a most important and significant manner to energy and environment policy development.

UNDP's contribution to the outcome are not limited to the policy documents of the individual projects, but include the broader achievements of formulating a framework for guiding government support and recognition of UNDP as facilitator coordinating activities with other members of the donor community.

These achievements must be qualified, however, as the frameworks are very recent and the implementation has only just started e.g. setting up the renewable energy financial mechanism and piloting of demonstrating projects in energy and SWM. The key challenge now is putting the suggested policy instruments into practice, followed by investment in sustainable energy, waste management and climate-relevant technologies. Or as one MEEW official interviewed put it, we 'have now produced lots of studies and reports, and these should now be followed by concrete action on the ground'.

Recommendations

Having succeeded in setting up frameworks for action in the areas of energy, solid waste management and climate change adaptation, the focus in the sectors will move from upstream policy formulation to more downstream policy implementation (by having appropriate regulations within a legal framework), enhancing capacity, stakeholder mobilisation, private sector involvement and investments in infrastructure. This will involve more interaction with relevant line ministries, private sector and NGOs. UNDP could also consider in its upcoming Country Programme 2008-2010 to continue with supporting policy formulation in new areas within the environment and energy component, such as energy efficiency, sustainable public transportation, sanitation or water supply.

One problem voiced during the interviews with MEEW officials, is the difficulty to attract more senior staff, leaving positions to people that has recently graduated. In this context, having such junior staff to attend specialised meetings or short courses abroad may not be effective, if their knowledge level is not appropriate enough. The alternative of having tailor-made courses on sustainable energy and waste management for selected MEEW staff in the Maldives would be quite expensive and may not be effective as the trained staff may not be retained anyway. Maybe one option is to create some more permanent form of training courses on RE in Maldives.

At the local level, IDCs and ADCs need to integrate energy issues into their short-term training courses on community development, credit management and micro-enterprise development so that local communities are empowered to operate and manage infrastructure (waste, energy, water, sanitation).

Lessons learned

The environmental outcome being evaluated in this report is highly relevant to addressing challenges posed by climate change impacts, fossil fuel imports and waste management. The approach followed is to have a proper analysis of barriers, issues and options in sustainable energy and waste management and in climate change mitigation and adaptation. Based on this analysis a framework of actions in policy formulation, capacity building, institutional strengthening, financial mechanisms and awareness creation is drawn up. UNDP has played a crucial role in setting up this programmatic approach and in mobilization of other donor funds. This lesson learned may be useful to other UNDP Country Offices. However, it should be noted that Maldives is a very small country with relative less layers of bureaucracy as can be seen in larger countries in the region and therefore lines of communications are smaller. Nonetheless, UNDP seemed to have acted in a timely manner when the discussion of having sustainable energy and waste management issues came up.

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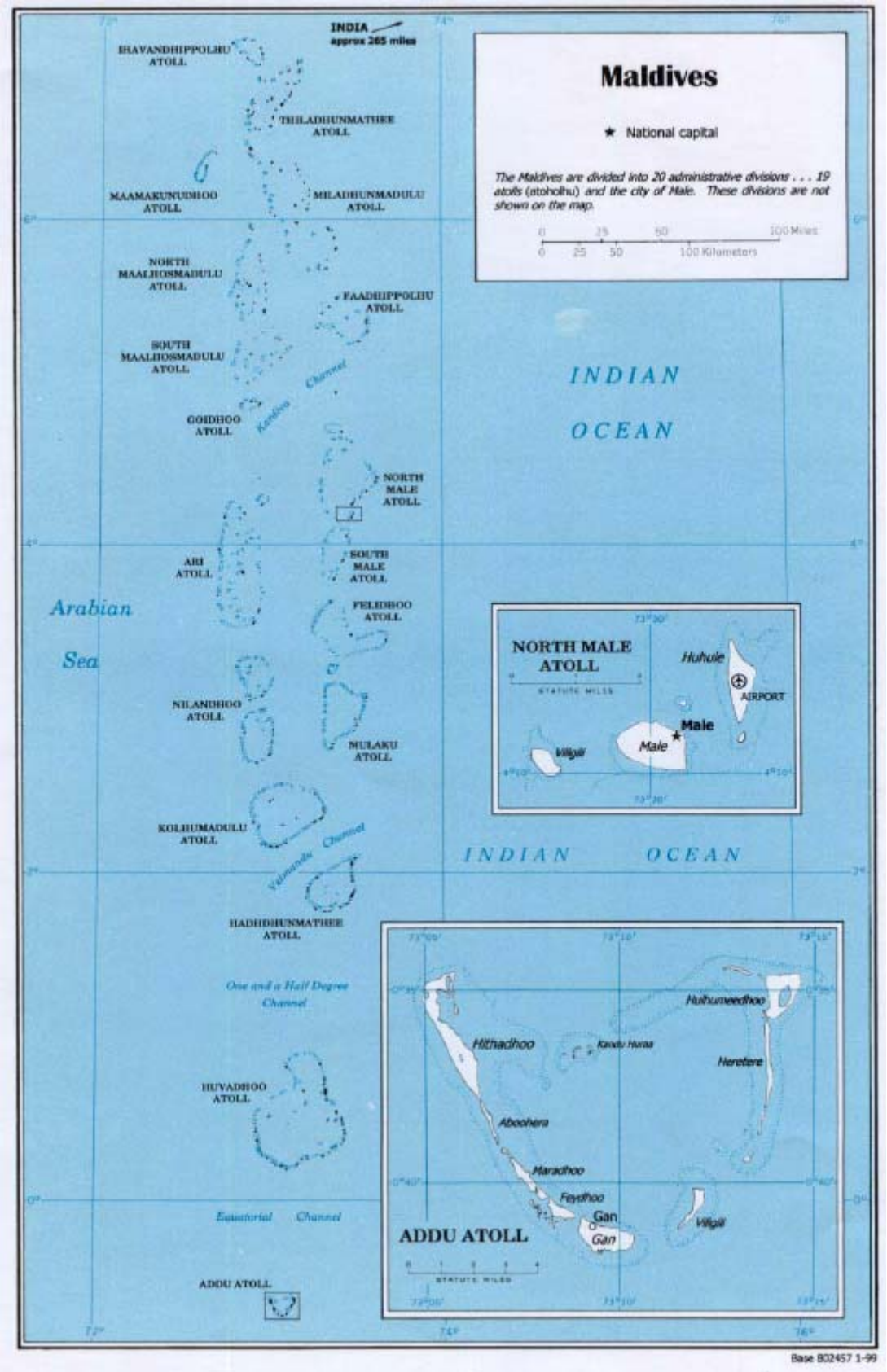

1. INTRODUCTION

1.1 Outcome being evaluated

Results-based management (RBM) has become UNDP's management philosophy. As part of its efforts in enhancing RBM, UNDP has shifted from traditional project monitoring and evaluation towards evaluation of its cooperation in key thematic cluster groups with the host governments on a regular basis in order to asses whether and how UNDP-funded interventions contribute to the achievement of agreed country programme outcomes. An outcome evaluation assesses how and why an outcome is or is not being achieved in a given country context, and the role that UNDP has played. Outcome evaluations also help to clarify underlying factors affecting the situation, highlight unintended consequences (positive and negative), recommend actions to improve performance in future programming, and generate lessons learned.

This report is an 'outcome evaluation' of the environment programme of the United Nations Development Programme (UNDP) in Maldives for the period 2003-2007. In Maldives, the UNDP aims to provide a support role for the country, especially in the area of national capacity building, democratic governance, poverty reduction, crisis prevention and recovery, energy and environment and responding to HIV/ AIDS. Two outcomes relate to the practice area of 'energy and environment for sustainable development':

1. Environmental management, including climate change and sustainable energy integrated into national development frameworks and sectoral strategies and programmes
2. Ecosystem management and biodiversity conservation objectives integrated into productive plans and activities

The first outcome was selected by UNDP for an evaluation in 2007 and is the subject of this report. The evaluation covers the period corresponding to the UNDP Maldives Country Programme (2003-2007). The timing was selected such that the results could feed into the new Country Programme (2008-2010), which is currently under formulation.

1.2 Evaluation objective and approach followed

According to the Terms of Reference (given in Annex A), the **objective of the evaluation** is

> To assess the progress toward achievement of the Country Programme outcome *"Environmental management, including climate change and sustainable energy integrated into national development frameworks and sectoral strategies and programmes"*; to learn lessons for the next Country Programme and to seek recommendations for improving the implementation of interventions under the current Country Programme and corrective actions as may be needed.

The following specific UNDP projects are analysed as part of the evaluation of this outcome:

- Maldives Renewable Energy Technology Development and Application Project (RETDAP)
- National Framework for Solid Waste Management in the Maldives
- Preparation of National Adaptation Plan of Action (NAPA)
- National Capacity Needs Self-Assessment (NCSA) for Global Environment Management
- Climate Change Enabling Activity Project (CCEAP): Technology Needs Assessment (TNA)

For this purpose, an Evaluation Team, consisting of two independent evaluators, Mr. Johannes (Jan) van den Akker (ASCENDIS, Netherlands) and Ms. Mariyam (Marie) Saleem (Male'), was fielded to the Maldives from 12-28 August 2007 to undertake the Outcome Evaluation. In order to maximize synergies and use of resources, the same Evaluation team simultaneously carried out the mid-term evaluation of the UNDP/GEF-funded Renewable Energy Technology Application and Development Project (RETDAP), which falls with the Environment Outcome to be evaluated. During the mission, extensive discussions were held with representatives from UNDP Maldives and MEEW as well as with other stakeholders, including community beneficiaries.

The output of the evaluation exercise is this Evaluation report. Before undertaking the mission, the Evaluation Team drew up a table of contents that covers the issues to be addressed as mentioned in its Terms of Reference (see Annex A) and follows the structure of this report:

- Introduction (evaluation method, UNDP programme description and development context)
- Findings and conclusions
  - Assessment of progress towards programme outcomes
  - Output analysis
  - Assessment of the contribution of UNDP and of the partnership strategy
  - External factors that have affected the outcome
- Lessons learned and recommendations
  - Lessons learned
  - Recommendations for the Country Programme 2008-2010
  - General recommendations.

The Evaluation Team adopted the following methodology of evaluation:

i) Familiarisation with the various UNDP activities by means of review of programme documents (e.g., country programme) and individual project reports (project documents, quarterly financial and progress reports, etc.) as well as background information on energy and environmental issues and options in the Maldives;

ii) Meetings and discussions with the staff of the UNDP Country Office, government partners (MEEW) other stakeholders in the government or private sector, including a presentation of preliminary findings at the last day of the mission;

iii) Field visit to Mandhoo Island to discuss the energy and waste collection activities with island authorities and with beneficiaries.

A list of people met and interviewed is given in Annex B.1 and the list of documents reviewed is given in Annex B.2.

The report is divided into three sections. This first section provides general background of the project, purpose of evaluation and evaluation methodology. The next section dwells on findings from the analysis of documents and reports and from interactions with stakeholders. Conclusions from the observations and findings are given. The report ends with a section on lessons learnt and with recommendations for further direction of the UNDP Country Programme in Maldives.

1.3 Description of the UNDP environment programme in Maldives

In the Maldives, UNDP seeks to provide policy advice to the national authorities on environmental issues such as biological diversity and climate change as well as on energy policy and planning, including renewable energy.

The country programme 2003-2007 was based on the overall goal of United Nations agencies for the Maldives, as laid down in the *United Nations Development Assistance Framework* (UNDAF). The UNDAF 2003-2007 focuses on three strategic areas:

- Support to governance and social mobilisation
- Support to quality social services

- Support to management of development

One of the fifteen key development issues identified under the UNDAF 2003-2007 is environmental threats, including climate change and lack of drinking water and sanitation facilities. In fact, the actual *Country Programme document* does not list the outcome to be evaluated; it only refers to "Ecosystem management and biodiversity conservation objectives integrated into productive plans and activities" as the *intended outcome.* This is strange as even in 2002 the energy project RETDAP and associated activities were already under formulation and UNDP has supported activities related to climate change before, such as the preparation of the National Communications.

The country's *Multi Year Funding Framework* (MYFF, 2004-2007) mentions under its "Goal 3, Energy and environment for sustainable development, Service Line 3.1 - Frameworks and strategies for sustainable development" as the expected *core result*: "Sustainable management of environment and natural resource incorporated into poverty reduction strategies/key national development frameworks and sector strategies". Apart from the outcome on biodiversity, the intended outcome of "Environmental management, including climate change and sustainable energy integrated into national development frameworks and sectoral strategies and programmes" has been added.

The indicator for the outcome to be evaluated in the MYFF is "policies and/or programmes on energy, solid waste management and climate change mitigation and adaptation". The baseline situation in 2003 can be characterised by the lack of such national policies, strategies and or programmes. The target values (as reported in the 2004, 2005 and 2006 results framework of the MYFF) are to have:

- A draft National Energy Policy (2005) as well as having a first hybrid renewable energy system established by 2006 with a financial mechanism for renewable energy (2007, pending);
- A solid waste management policy drafted (2007, pending)
- National strategies formulated on climate change (the draft National Adaptation Programme of Action was formulated in 2006).

1.4 Development context

1.4.1 Maldives and its economy

The Republic of Maldives is an archipelago consisting of about 1,190 tiny low-lying islands dotting the Indian Ocean, grouped into 26 natural atolls, stretching some 820 km from north to south. The sea forms 99% of the Maldives, leaving a total land area of 298 km^2. About 199 islands are inhabited. The country has a small and homogenous population of some 299,000 people (based on the 2006 Census), of which about 103,700 live on the capital island Male'. The land areas of the islands vary considerably, some of them having approximately 5 km^2 whilst other islands are as small as 0.2 km^2. Maldivians, all of whom are Sunni Muslims, share a common history, culture and a common language, Dhivehi.

The Maldives has achieved considerable economic and social progress since the 1970s when it began to diversify its economy from one that was agricultural-based to a services economy. The economy has grown by about 8-10% annually over the past decades, propelled by the growth of the tourism sector and associated industries, including construction and transportation. Tourism now accounts for about 20-30% of GDP and more than 40% of the government's budget. Also, the fishing industry remains vital as it accounts for two-thirds of exports and employs nearly 20% of the workforce. The continuing growth of tourism, largely financed by foreign capital and to a lesser

extent, fishing, has helped improved social conditions. GDP per capita was US$ 2,500 in 2003, the highest in South Asia.

The tsunami disaster in December 2004, for example, badly affected the mainstay of the Maldivian economy, the tourist resorts. By June 2005, bed capacity was still more than 20 percent below that in the two previous years. The tsunami also affected the fisheries industry and thousands of people had to leave their homes. However, people returned fairly quickly to employment and by end of 2006, most of the displaced had permanent residences again. In 2006, tourist flows were the same as in 2004. In short, the country has steadily recovered from the tsunami disaster that temporarily decelerated the growth trend. However, the lopsided dependence on tourism and fisheries implies that a decline in these industries could have a serious impact on the cost and the standard of living, development activities, provision of public services, the level of domestic economic activity and employment in the Maldives.

The tropical island environment and the marine biological diversity of the Maldives have proved to be unique marketable assets, in a country, which has few other commercially exploitable resources. But the environment of the Maldives is extremely fragile and vulnerable to a number of domestic and external threats. The Maldivian coral reefs not only form the very foundations of the country' 26 atolls, but also support globally significant marine biodiversity. This includes over 1,100 species of reef fishes and over 250 species of corals. The Government will have to regulate the exploitation of the country's resource base to ensure the protection of the environment and the sustainability of development. There is very little that domestic policies can do to protect the Maldives' environment from threats such as global warming and sea level rise that are mainly caused by activities elsewhere. In the short run, global warming and sea level rise may subject Maldives to frequent natural disasters and erode the special natural advantages currently enjoyed by the country. In the long run, the very existence of the Maldives will be at stake if global warming and sea level rise continue at the present pace.

1.4.2 Sixth National Development Plan

The 6th National Development Plan (2001-2005) provides the policy framework for the development of sectoral plans and programmes. The overall vision is to make the Maldives into a top-ranking middle-income country, but realising that economic benefits are equitably distributed and environmentally friendly lifestyles should be pursued. Consequently, environment protection is one of the top priorities of the Government. The following policy statements relate to environment water supply and sustainable energy:

- Policy 10 Plan and manage the provision and utilization of energy and the supply of electricity in the country;
- Policy 11 Minimize the dependency on imported sources of energy for generating power;
- Policy 12 Find means to continue providing a regular, reliable and constant supply of electricity to every household and facility in the country;
- Policy 13 Provide adequate clean water, sanitation and waste disposal services, means and facilities to all islands;
- Policy 14 Ensure availability of safe drinking water throughout the country;
- Policy 15 Promote environmentally sound disposal of solid waste;
- Policy 16 Ensure environmentally sound disposal of solid waste;
- Policy 19 Recognise and protect the natural environment including the biological diversity of the regions identified for development;
- Policy 20 Promote sustainable resource management through preservation of natural resources and biodiversity;

- Policy 22 Contribute to the international efforts to find solutions to global environmental threats, especially those pertaining to the vulnerable Small Island Developing Nations;
- Policy 23 Promote integrated planning and administrative practices by developing meaningful principles and procedures for sustainable resource use and environmental protection.

1.4.3 Sustainable energy

Maldives mainly uses fossil fuels in the form of fuel oil, diesel, gasoline, kerosene and LPG for generating electricity, heating purposes and in the transportation sector:

- The majority of Maldivians live in locations with full day availability of electricity. The State Electric Company (STELCO) provides 24-hour electric power to some 24 of the 199 inhabited islands (including Male'), while generators operated by island communities (with the financial assistance of the Ministry of Atolls Development, MoAD) serves an additional 50 islands and private providers serve 6 islands with 24 hours of electricity a day[1]. The remaining islands have at least 5-12 hours electricity service, leaving 4 islands without electricity. Electricity is generated by the burning of fuel oil and diesel. Organizationally, STELCO is a wholly state-owned company. STELCO and the over 200 private and community power providers are regulated by the Maldives Energy Authority (MEA).
- The main source of energy for domestic purposes in the outer islands has been biomass. However, with the depletion of wood resources and subsequent restrictions on tree cutting, more households use kerosene and LPG for cooking instead of biomass materials (shrubs and coconut husks).
- Diesel and gasoline are used to fuel automobiles and marine outboard engines in the transportation sector, while fuel oil is used in industry (e.g., sea water desalinization on Male' and the cement and LPG bottling industry on Thilafushi island near Male').

Maldives has no conventional energy resources (e.g., oil and gas) that it can utilize to meet its energy needs. Basically, the country utilizes imported petroleum fuels to meet all of its energy needs. Although the country is expected to continue to rely on imported fuels, some RE resources are recognized as potential alternatives, being indigenously available, having minimal environmental impacts and contributing to the balanced provision of services to dispersed island communities:

Currently, renewable energy (RE) technology applications are limited to some application of solar photovoltaics in navigation lights and outer island telecommunication systems and modest use of solar water heaters in Male' and in resorts. A recent report[2] has identified the following potentially feasible RE options:

- Hybrid systems (wind and/or solar and/or diesel generators) in the (outer) islands on larger islands (more than 40 households) in the windy belts;
- Capturing and utilization of gas from the Thilafushi island landfill for heat and/or electricity from the biologically degradable waste (from Male' and other islands);
- The use of household or village bio-digesters to produce biogas out of kitchen garbage;
- Use of thermal solar technology in water heating in the households and on the resorts;
- Combined heat-power (CHP) from biomass, if suitable sites are found.

Wind-solar-diesel hybrid systems on the smaller islands in the windy belts and solar PV as stand-alone systems on the resorts are mentioned as options, but would need substantial subsidy.

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1 Of the total installed capacity of 106 MW, 48% is in the resort islands, 35% is operated by STELCO in Male', Vilingili and Hulhumale'and 21 other islands, 13.5% is operated by Island Development Committees and some private operators and 3.5% at the airports (CDE, 2007a)

2 Energy Consulting Network (2004c)

A number of barriers hinder unlocking the potential of the before-mentioned RE technologies:

- Lack of information and essential data on the availability of renewable energy sources;
- Lack of information on appropriate options of RE technologies and their financial viability in the Maldivian context;
- Limited capacity and capability of key players in the government sector in the design, development, implementation and management of RE activities;
- Lack of a framework of the national policy on energy and limited institutional mechanisms to support the development, implementation and management of RE application activities;
- Limited involvement of entrepreneurs and lack of financial and economic incentives to undertake RE ventures;
- Lack of visibility in terms of technical demonstration of RE applications and of established financial viability of RE project ventures;
- Lack of financing and financing mechanisms for RE applications;
- Non-availability of reliable RE technology hardware in the local market.

UNDP is supporting the RETDAP project with GEF co-funding. The project is designed to address the above-mentioned policy, institutional, information, financing and technical barriers, seeking to remove them in order to facilitate the widespread utilization of RE resources in the country.

1.4.4 Solid waste management

Recent years have witnessed a significant increase in the magnitude of waste management problems throughout the Maldives. This has taken place for a number of reasons, including the small size of the islands, the rapid growth in population, changing consumption patterns, and transportation difficulties. Today, problems associated with waste management are a national concern, resulting in increased levels of pollution and a deterioration of public health. If unchecked, the problem may ultimately threaten the economic development of the country, which is intrinsically linked to the tourism and fishing industries.

Improvements in the delivery of solid waste management (SWM) services are met by a number of key challenges:

- Within the islands and atolls there is insufficient funding of waste management infrastructure, equipment and practices. Indeed, the majority of the inhabited islands lack basic waste management infrastructure, such as an engineered disposal site, in conjunction with waste processing equipment such as shredders for green waste and crushers for glass and metal items. It is noted that the case for Male' is significantly better although the landfill site in Thillafushi (which serves Male'), is technically speaking not an engineered waste management site;
- The lack of investment outside of Male' is exacerbated by, or is possibly a function of, an absence of appropriate cost recovery mechanisms. The key factor is that of affordability as the resource base within the islands is very limited. For the application of service fees to be more broadly applied, there is clearly a need for far more attention to be paid to the issue of public education and awareness raising;
- Inadequate institutional capacity within key government agencies, coupled with a lack of clear roles and responsibilities, has resulted in an absence of clear leadership or coordination on the subject. Weak legislative and regulatory framework hinders monitoring and regulatory functions. Monitoring and enforcement of waste management services has been observed to be generally weak. There are a number of government entities with partial responsibility for regulation and enforcement of waste management activities nationally. Within the inhabited islands, this function is the responsibility of staff of the Island Office. However, staff have

received no formal training, and are unclear regarding their rights to impose fines on offenders;

- Limited opportunities for the involvement of the private sector in service delivery. Nationally, there is limited involvement of the private sector in the delivery of waste management services. Where it does exist, there are a number of areas which require attention. Often, as is the case with the waste collection sector of Male', private enterprises operate without the security of a contract. In the absence of a formal agreement private companies are exposed to aggressive competition, and price undercutting which threaten their viability in the long term.

Therefore, the government has recognised the need to address the waste management issues in a more integrated, comprehensive fashion. Hence the desire to develop an integrated National Solid Waste Management Plan which will seek to identify and address all the above-mentioned and other existing barriers within the waste management sector and to allocate priority tasks. UNDP has been supporting the formulation of such a national framework for SWM.

1.4.5 Climate change mitigation and adaptation

Because the Maldives is among the world's most vulnerable countries to the impact of climate change very high priority is given to this issue. The Government signed the United Nations Framework Convention on Climate Change (UNFCCC) on 12 June 1992 and ratified it on 9 November 1992. It signed the Kyoto Protocol on 16 March 1998, one of the first countries to do so, and ratified the Protocol on 30 December 1998.

UNDP is assisting the Government of Maldives to ensure that it meets its obligations under the UNFCCC and it benefits from being a party to the Convention. Maldives started its nationally executed, GEF-funded, Climate Change Enabling Activity Project (CCEAP) in January 1998 and has submitted its first National Communication to the UNFCCC on 3 November 2001.

In the international arena Maldives has ratified most of the important conventions, including the Convention on Biological Diversity, United Nations Framework Convention on Climate Change and the United Nations Convention to Combat Desertification. However, the country struggles to meet the obligations to these conventions due to a severe lack of capacity. While there is a broad environment protection act, adequate policy direction and national strategies in several crucial areas has been lacking, such as in the specific areas of solid waste management, water and sanitation and energy as well as regarding a climate change mitigation and adaptation strategy in general.

2. ANALYSIS

This chapter assesses UNDP's performance in achieving the environmental outcome of its programme in Maldives over the period 2003-2007. The chapter assesses to which extent the outcome has been achieved in terms of baseline (2003) and current status. Next the individual projects are evaluated. Finally the relevance and extent of UNDP's contribution to the outcome is reviewed. The overall results are summarised in an outcome/output table and a results table.

2.1 Assessment of progress towards the outcome

The current Country Programme started in 2003 and will end 2007. Its environmental component focuses on community ecosystem management and coral reef conservation, climate change and renewable energy issues and solid waste management.

As mentioned in the previous chapter, the environment outcome to be evaluated is captured by one indicator, namely "policies and/or programmes on energy, solid waste management and climate change mitigation and adaptation". Table 1 provides a summary of the outcome and UNDP outputs, i.e. the individual projects and project outcomes. The baseline situation in 2003 can be characterised by the lack of such national policies, strategies and or programmes. In comparison with this baseline, substantial progress has been made.

Energy

In the area of energy, a policy analysis document was prepared (Aldover, 2006), including a summary of the policy statements proposed (which is listed in Annex C) and outlining the possible components of a National Energy Action Plan. A draft National Energy Policy is currently under discussion at the President's Office.

Waste

In August 2007, a discussion paper on national SWM policy issues and options was presented at a workshop in Male' (Niras, 2007a). The purpose of the paper was to stimulate public discussion on the contents of a proposed national SWM policy. Main policy issues include the principles on which SWM should be based (such as polluter pays and equity issues); funding for waste management infrastructure; institutional capacity, roles and functions in SWM in Male', outer islands and the resorts as well as private sector participation.

Climate change

The Government is performing a number of climate change studies in an integrated way, referred to as Integrated Climate Change Strategy (ICCS, as discussed in the next paragraph). Main achievement in 2003-2007 was the formulation of the National Adaptation Plan of Action (NAPA). The NAPA presents an analysis of climate change and climate variability, the vulnerabilities and impacts on the Maldives, followed by adaptation need and priority adaptation strategies and providing a list of concrete adaptation projects that could be undertaken. A summary of main findings and recommendations is presented in Annex D.

Table 1 Outcome/output table

Outcome indicators and targets	Associated projects	Resources (US$ million)	Project outcomes
Indicator: Policies and/or programmes on energy, climate change and waste management			
Baseline value (2003): Lack of national strategies and/or programmes on energy, climate change and waste management			
Target value:			
ENERGY: - National Energy Policy (2005, draft) - First hybrid renewable energy piloted (2006) - Financing mechanism established for RE (2007, planned)	Energy demand and resource assessment (TTF & UNOPS) GEF RETDAP	UNDP: 1.119 - GEF: 0.725 - Other: 0.369 Maldives: 1.645 TOTAL: 2.764	UNDP and others: - Advocacy & awareness - Energy demand and RE resource assessment - Strengthening policy and regulatory framework - Technical capacity building - Financing mechanism - Project development and demonstration
WASTE - SWM management policy drafted (2007, pending)	- Nat. framework for solid waste management	UNDP: 0.050 Other: 0.368 TOTAL: 0.418	UNDP: - National SWM policy; improved investment Other: - Institutional strengthening - National SWM policy - Public education and awareness - Improved investment - Encourage private sector participation (PSP)
CLIMATE CHANGE - National strategies on climate change developed o NAPA (2006, to be finalised 2007)	- Preparation of NAPA - NCSA - TNA (national GHG and vulnerability assessment)	UNDP: - GEF: 1.239	- Assessment and prioritization - Proposals for priority activities - Formulation of NAPA - Assess technology needs - Assess capacities - Characterise barriers and opportunities - Recommendations
		TOTAL: 4.790 UNDP/GEF: 2.408 Other: 2.382	

2.2 Output analysis

Under the environment – climate change outcome to be evaluated, UNDP has supported a number of activities that will be discussed in more detail in this paragraph, namely:

- Maldives Renewable Energy Technology Development and Application Project (RETDAP)
- National Framework for Solid Waste Management in the Maldives
- Integrated Climate Change Strategy (ICCS) activities

2.2.1 Maldives Renewable Energy Technology Development and Application Project (RETDAP)

Background

Currently, renewable energy technology applications are limited to some application of solar photovoltaics in navigation lights and outer island telecommunication systems, modest use of solar water heaters in Male' and in resorts. A number of barriers hinder unlocking the potential of the before-mentioned RE technologies, as mentioned in paragraph 1.4.3.

The Renewable Energy Technology Development and Application Project (RETDAP) was designed to address the above-mentioned barriers and to lower them in order to facilitate the widespread utilization of RE resources in the country. The project is co-financed by the Global Environment Facility (GEF) with the United Nations Development Programme (UNDP) as the implementing agency and the Ministry of Environment, Energy and Water (MEEW) as the national executing agency. Implementation started in 2004 and the project is scheduled to end in 2008.

Objective and outcomes

The project development goal is to reduce the growth rate of greenhouse gas (GHG) emissions from fossil fuel using activities that remove the major barriers to the development and application of renewable energy (RE)-based systems that can supplant part of the fossil fuel use in the Maldives.

The project has six outcomes:

1. *RE advocacy and awareness* (to create awareness of the benefits among the citizens of Maldives of utilizing RE to meet their energy needs and to sustain national development);
2. *RE resource assessment* (to conduct a RE resource survey to assess the potential and feasibility of utilizing RE resources available in Maldives);
3. *RE policy development and institutional strengthening* (involving the design, development and implementation of appropriate policies, strategies and interventions addressing the fiscal, financial, regulatory, market, technical and information barriers to RE development and utilization);.
4. *RE technical capacity building* (involving capacity building activities for enhancing the country's capability in establishing workable and viable schemes for supporting RE applications with emphasis on the design, development, financing, implementation and management of such RE projects);
5. *RE Project Financing Schemes (*private and government financial institutions, commercial banks and private entrepreneurs are trained on RE technology business, financing and economic feasibility evaluation. A RE Fund is established, and a clearly defined financing scheme for utilizing the fund is designed and implemented. A RE "one-stop-shop" service at the Energy Department of MEEW is to provide eligible financing assistance to applicants);

6. *RE System Project Development* (techno-economic feasibility of RE-based energy projects in selected demo sites, including the necessary implementation requirements from the MEEW, financing institutions and the national power utility are completed. Baseline performance data and operating performance targets for the planned demo projects are established. Demo plants are constructed and commissioned. Evaluation of operating and economic performances are conducted and documented for dissemination.

Achievements

Given the fact of a baseline of 'almost zero activities on RE in Maldives', the project has started focussing on establishing the basis first necessary for RE development:

- *Outcome 1:* Various advocacy and awareness raising activities have been implemented, including on-the-job training, seminars, study tours and awareness programmes in the atoll islands
- *Outcome 2:* A detailed assessment of wind, solar and biomass resources was carried out, accompanied by in-house training of relevant government officials and a least-cost assessment of RE technologies; see the reports Energy Consulting Network (2004a, 2004b, 2004c)
- *Outcome 3:* The first energy supply and demand balance was constructed for Maldives (Energy Consulting Network, 2003) and the first National Energy Policy was drafted (Aldover, 2006), which is currently considered by the President's Office.
- *Outcome 5:* A setup and guidelines for the Fund for Renewable Energy System Applications (FRESA) have been designed (Salomon-Dealino, 2006)
- *Outcome 6:* Installation of the demonstration solar-diesel hybrid system on Mandhoo Island, after a survey was carried out on six islands.

Now that these 'preparatory and demonstration' activities have been carried out, the project enters a next phase of organising a more focussed technical capacity building for the most promising RE technologies, implementing the financial support mechanisms and supporting the installation of appropriate RE systems on the atoll islands. Thus, RETDAP has arrived in a time-critical way coinciding with the Government's attempt to formulate the first national energy policy. The project has been catalytic in laying the groundwork not only for renewable energy promotion and development, but in setting up a framework for energy policy formulation in general and in mobilising other sources of funding:

- GEF: $ 750,000
- UNDP: $ 199,000 for the policy formulation and RE resource assessment (outcomes 2 and 3)
- UNDP and European Union (solar-diesel hybrid demonstration on Mandhoo Island), and;
- Last but not least, the Maldivian Government itself through the State Trading Organisation (STO) for future investments in RE technologies.

The proof will now be in actually implementing 'RE technologies'. This term actually disguises the fact that RE technologies form quite a diverse group of technology in terms of maturity, financial viability, scale of application and type of application. Most interesting technologies in the context of Maldives are wind-solar-diesel hybrid systems, household biogas digesters and waste-to-energy projects (such as gas recovery from Thilafushi landfill).

It is also noted that persistent understaffing is one capacity problem the MEEW has faced in recent years as staff goes to 'greener fields' or for higher studies abroad. This may ask for a more structured capacity building on sustainable energy to ensure sustainability in capacity (in the Government) in the longer term, e.g. in cooperation with the Maldives College of Higher Education.

Coinciding with this Outcome Evaluation, an in-depth mid-term evaluation was done by the same Evaluation Team. For a detailed description of the project's outcomes, achievements and

recommendations for future action, the reader is referred to the RETDAP Evaluation report (V.d. Akker & Saleem, 2007).

2.2.2 National framework for solid waste management

Background

Solid waste management (SWM) has been a serious issue for many societies, specifically with the increase in population along with the changes in industry and the increase in Gross Domestic Product (GDP). These problems are even more pronounced in small island states such as the Maldives where space is limited and the islands are spread over a large geographical area, making it difficult to implement waste management strategies. Solid and hazardous waste management has recently been identified as one of the greatest environmental challenges in the Maldives (MEC, 2004).

The lead agency undertaking solid waste management activities in the Maldives is the Environment Research Centre (ERC). The ERC has developed a framework for the development of a national SWM policy, based on the identification of existing barriers (listed in paragraph 1.4.4) to the provision of effective SWM services. This document (MHAE, 2004) , also referred to as the "Barriers Report" was developed with funding from UNDP and serves as a framework with defined expected outcomes that have been set very broadly in an aim to cover diverse grounds. As a result it facilitates the requirements of different projects with varied donors in an integrated manner. The document provided the foundation to both the government and UNDP on which to plan future interventions in waste management.

Outcomes and achievements

1. Introducing a national solid waste management policy

In the absence of a national solid waste management policy, the recommendations made in the "Barriers Report" have acted as the key document for defining the future directions in the sector. Efforts have been made to achieve these outcomes and a National Solid Waste Management Policy: Issues and Options paper has been prepared which is being discussed at the national and regional meetings that are being held over the next few weeks. It is a comprehensive document which provides information on the current solid waste management strategies and recent developments in this field. It also identifies the policy issues and include the principles on which SWM should be based (such as polluter pays and equity issues); funding for waste management infrastructure; institutional, capacity roles and functions in SWM in Male', outer islands and the resorts; as well as private sector participation. It should be noted that legislation on waste management is lacking within the existing Environmental Protection and Preservation Act and this, along with funding needs to be established for effective implementation of the policy.

UNDP has supported this outcome by means of the US$ 52,500 project "National Framework for Solid Waste Management" and the resulting report (MHAE, 2004) has acted as the key document for defining the future directions in the sector under the five outcomes mentioned here. A discussion paper on national solid waste management support was presented and discussed at a workshop in August 2007 (NIRAS, 2007a). The service of an Environment Expert was provided through funding from UNDP in 2005 to develop the component on Waste Policy and Financing Options.

2. Institutional strengthening

At present mandates of the government agencies involved in waste management are overlapping, making it difficult to clearly identify the roles of these agencies and assigning responsibilities.

Thus, reviews of the mandates of the stakeholders also need to be carried out for proper implementation of the policy once it is endorsed.

A capacity assessment of Environment Research Centre (ERC) was carried out in 2007, resulting in the report *Capacity Development Strategy 2007 and Beyond*. This study mentions that, while the waste section of ERC was relatively sufficiently staffed compared to other sections within the Centre, it lacked many skills fundamental to the proper implementation of a national waste management policy. The European Union (EU) has recognised this deficiency and is funding the services of a consultant engaged in strengthening the institutional capacity of ERC over the next 12 months. Some training has been carried out on solid waste management. ERC staff and some islanders have been sent overseas to the Asian Institute of Technology with funding from UNDP. In addition, in-house training was provided by the WM consultant and UNDP staff.

3. Enhancing public education and awareness raising

An international consultancy has been employed to prepare a national waste awareness program which includes TV and Radio spots, posters and newspaper stories and a website. This project is funded by the World Bank.

4. Improving investment in SWM infrastructure and promotion of cost-recovery mechanisms

The annual budget of the government has a component allocated to Male' Municipality for waste transfer and disposal operations. It has also recently allotted budget to support the activities of the Waste Section in ERC. In addition, the Public Sector Infrastructure Project (PSIP) assigns some funding to develop waste management infrastructure on inhabited islands.

Significant work has been carried out on the construction of Island Waste Management Centres (IWMC) following the 2004 tsunami. These include:

- 79 IWMCs on 74 islands constructed by the Australian Red Cross/ Canadian Red Cross along with community awareness programs for waste management on these islands
- 20 IWMCs funded by UNDP that are due for completion in 2007
- 18 IWMCs by the Island Development Committees, financed by the Government that are due for completion at the end of this year
- 16 IWMCs under the South Ari Atoll project, financed by the European Union/ World Bank, and that are due for completion in 2010
- 2 IWMCs in Baa Atoll funded by the UNDP-GEF Atoll Ecosystem Based Conservation Project (AEC Project).

An agreement has been signed between the Department of External Resources and the Chinese government for a US$ 3.1 million soft loan to purchase waste management equipment to support waste management on island, atoll and regional levels. The ERC has prepared a list of equipment with specifications to be purchased under the loan.

A study funded by UNDP is underway to assess the feasibility of waste-to-energy. It is being carried out in 5 islands with different geographic characteristics and population sizes to collect baseline data on waste composition. The project will investigate the possibility of recovering costs by the sale of energy to power distributors. It will provide essential information on the most economically and environmentally feasible means of disposing waste. The introduction of incineration of waste with energy recovery is high on the waste hierarchy and would be an optimal waste disposal solution.

A willingness-to-pay survey for waste management was carried out under the before-mnetioned AEC Project funded by UNDP-GEF in 2006. This study assessed the attitudes towards waste management and the willingness to pay by the local communities for waste management services in the atoll. The survey introduced the concept of the "polluter pays" principle for waste management in the islands. ERC is now running cost recovery trials for waste management based

on the 'polluter pays' principle. It uses a financial model which is able to predict the waste quantities likely to be generated by Maldivians, resorts and hospitals until 2020, based on expected increases in GDP, population size and resort population size. It takes into account the costs of collection, transfer and disposal of waste. This facilitates the formulation of different fee structures at the same time providing financial indicators such as net present value and internal rate of return.

A 12-month project on the collection and transport of waste from Kaafu and Vaavu Atolls is in progress by the ERC. The government will pay the total costs associated with transport and disposal of waste in the region during the initial 3 months. The costs will then be shared during the remaining 9 months with the government paying 40% of the cost and the householders paying 60%. This 60:40 ratio is based on a cost-sharing model and the polluter pays principle. It will give valuable insight into the feasibility of such arrangements and the reactions of the public to paying for waste management. It will aid in the design of public sector participation in solid waste management. While this project has been outsourced to a private party, another similar pilot project is being formulated under the AEC Project. In this 12-month project, instead of outsourcing the activities to a private party, it will be carried out by the community. The funding for the initial 3 months will be from the AEC Project while the remaining 9 months will be financed by the government. Discussions are under way to decide on the percentage that will be paid by the households.

A study was carried out by a UNDP supported Senior Environmental Specialist on the financial options for the government for cost recovery of waste management, based on existing studies and models.

5. Introducing greater private sector participation in service delivery

A paper on private sector participation in waste management services has been prepared which explores the types of private sector participation and the areas of service in waste management that are feasible in the Maldives (NIRAS, 2007b). The paper was recently discussed at regional and national workshops.

2.2.3 Integrated Climate Change Strategies (ICCS)

National Adaptation Plan of Action (NAPA)

Background

Maldives is under the process of developing its National Adaptation Plan of Action (NAPA) to climate change and this is being carried out with funding from the Global Environment Facility (GEF) and assistance from the UNDP. The goal of the NAPA formulation is the provision of a framework to guide the coordination and implementation of adaptation initiatives in the country, through a participatory approach and building synergies with other relevant environmental and related programs. At the same time, it will develop a specific priority program of action for adaptation to climate change. The NAPA is an important project for the Maldives given the nature of the country which makes it extreme vulnerable to climate change. The NAPA is one of the three projects that have been included under the Integrated Climate Change Strategy (ICCS) framework given in Figure 1.

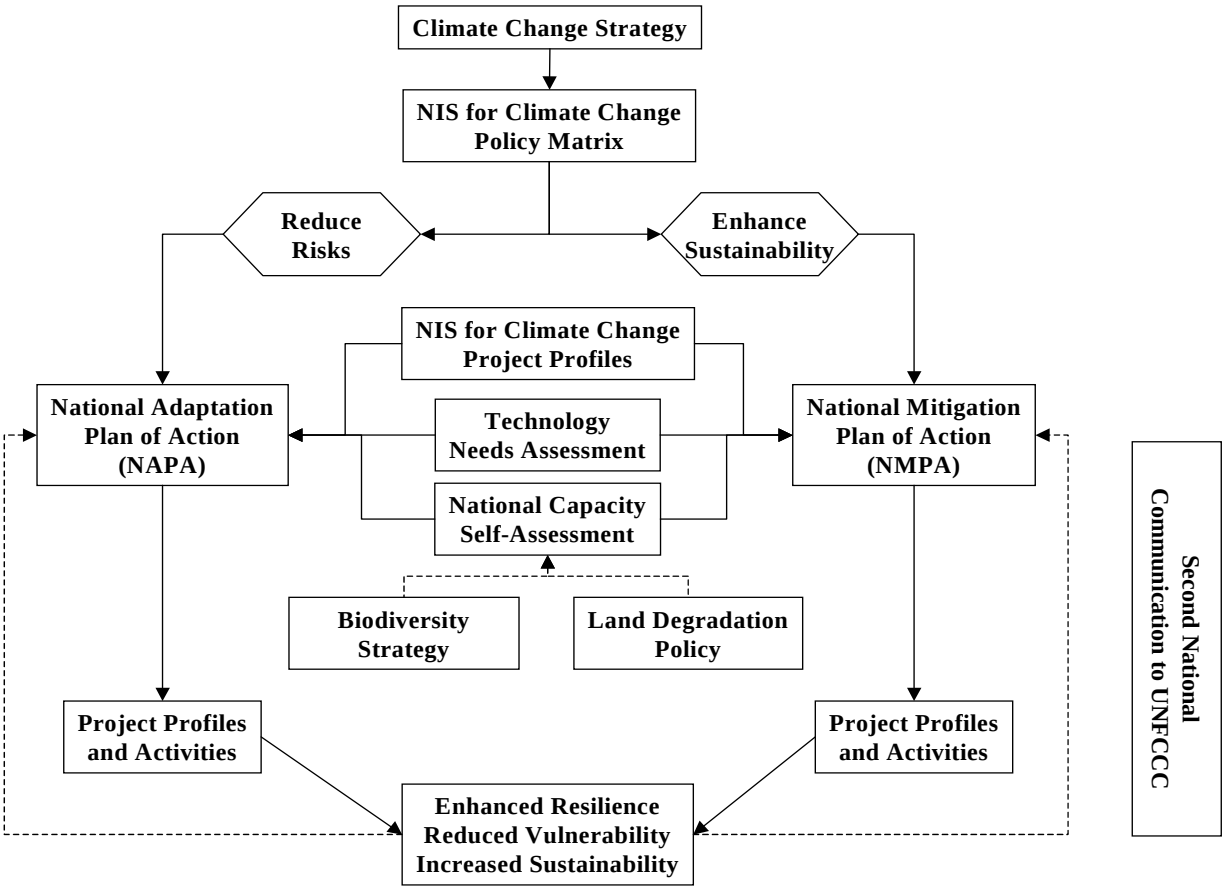
Purpose and achievements

The purpose of NAPA formulation project for Maldives is the development of a countrywide program that encompasses the immediate and urgent adaptation activities to address the current and anticipated adverse effects of climate change, including extreme events.

The following activities were carried out:

- A stocktaking exercise and baseline information gathering was completed for the 3 projects. In the NAPA stocktaking report, the areas related to and most vulnerable to climate change were identified including climate and weather patterns, land and beach, human settlements, economy, food security, and human health among others. As part of the baseline assessment, an activity was conducted under the NAPA project to identify future potential climate risks in the Maldives. The Climate Risk Profile (CRP) looks at long term records of meteorological data including daily rainfall, temperature and wind to identify changes and probability of occurrence of high risk events in the future. The development of the CRP also takes into consideration, climate change models in predicting the climatic risks.
- In the first meeting of the Climate Change Technical Team (CCTT), discussions were carried out on the sectors that required consideration in the Maldives NAPA. The methodology for the Vulnerability and Adaptation (V&A) assessment was developed and adopted in the second meeting of the CCTT. The vulnerable sectors in the Maldives to climate change were identified and a set of locally-driven set of criteria for prioritisation of sectors and adaptation

Figure 1 The Integrated Climate Change Strategy Framework for the Maldives



activities was formulated. In addition, a report on existing vulnerability studies and impacts of climate change was composed.

- The criteria for prioritisation and adaptation activities were discussed in workshop held at Gn. Fuahmulaku, which was attended by 32 members from the community with diverse backgrounds. It was found that the community was receptive to the methodology and agreed that this was a useful process. The criteria and methodology were revised subsequently.
- Detailed assessments on the vulnerability and adaptation within the sectors for coral reef, fisheries, human health, land and beach and critical infrastructure were carried out by national consultants during the 3rd quarter of 2006. However, national consultants could not be procured for the sectors of water, agriculture, food security and vegetation and soil.
- Regional consultations on the identification and prioritisation of adaptation measures were conducted in the north and south of the country during the 3rd quarter of 2006. A high level of participation was observed with 28 participants from 3 atolls represented in the northern workshop and 37 participants from 4 atolls in the southern workshop. Presentations were given in the workshop on science and impacts of climate change and group work was carried out to identify vulnerabilities and adaptation measures for coral reefs, fisheries, human health, land and beach, infrastructure, agriculture and food security.
- An expert group consultation was carried out at the national level in which 30 participants from 20 agencies including the private sector participated. This initiated the prioritisation process for the adaptation measures. The prioritisation of criteria an adaptation exercises were completed during the last quarter of 2006 and the results were used to generate a list of priority activities.
- During the same period, NAPA project profiles were developed by the members of the NAPA working group. Twenty one profiles were drafted and commented across 8 sectors. Meetings and workshops were held subsequently to come up with project components and to incorporate comments to the project profile drafts.

The preliminary findings of the NAPA were presented at the UNFCCC CoP-12, Nairobi in November 2006. The final draft of the NAPA document was completed in March 2007 and circulated among CCTT members and other agencies. International review of the document recommended the need for focussing on the project profiles and consolidating them at the end of the NAPA document. This work will be carried out in 2007 in order to finalise the NAPA. Some assessments from NCSA and TNA reports also need to be incorporated in the NAPA. Once this has been done, the document will be endorsed and disseminated nationally as well as be presented to the UNFCCC, UNDP and Least Developed Countries Expert Group (LEG).

Technology needs assessment

Background

The Technology Needs Assessment (TNA) for Climate change is one of the three projects undertaken within the Integrated Climate Change Strategy (ICCS) under the Climate Change Strategy Framework (see figure 1). Funds remaining from the CCEAP (Climate Change Enabling Activity Project), that produced the GHG inventory and the First National Communication (FNC) to the United Nations Framework Convention on Climate Change (UNFCCC), were utilised to undertake the TNA in Maldives.

Objectives

The activities proposed under the TNA will assist Maldives in strengthening its capacity to participate in, and contribute to, the implementation of the UNFCCC and to cope with climate change and its adverse impacts by integrating climate change concerns into the national development planning process. The goal of the TNA is to present the decision makers with educated information to direct and guide selection, adoption, implementation and use of sustainable technologies that will assist the Maldives to address vulnerabilities related to climate change. The four objectives of the TNA project are as follows:

- Identify, assess and evaluate existing technology needs
- Identify and characterise the opportunities for, and barriers to, the successful identification, development, selection, funding, transfer, uptake and application of sustainable technologies
- Investigate the shortfalls in the capacity to assess technology needs
- Identify and characterise the linkages and synergies with other strategies, plans and programmes designed to facilitate sustainable development of the Maldives.

Achievements

Activities of the add-on TNA commenced by early 2005 in conjunction with the National Adaptation Plan of Action (NAPA) and the National Capacity Self Assessment (NCSA) under an integrated framework with a single Project Manager. The core management team was sent on a capacity building programme and intensive orientation for project implementation at the University of Christchurch, New Zealand at the onset of the project with the purpose of training the team to carry out activities of the 3 projects in an integrated manner. The key project coordination bodies including the Project Steering Committee (PSC) for the three projects, CCTT and Project Management Team were also setup during the 1st half of 2005.

A stocktaking exercise and baseline information gathering was carried out during the second half of 2005 and finalised in early 2006. The stocktaking for TNA reviewed the key sectors vulnerable to climate change and investigated the required technologies available for both mitigating GHGs as well as adaptation technologies. In many instances, it is not the availability of an appropriate technology, but rather lack of technical know how when it comes to implementation. The report recommended the need for staff training and the implementation of pilot projects to find out the feasibility of the technologies in the Maldivian context.

A TNA resource kit was developed which enables compilation and analysis of baseline data on greenhouse gas emissions in the Maldives and which was used to identify priority sectors and sub sectors for TNA. This resource kit also provided background information which was essential during the formulation of the TNA methodology for Maldives.

The contents of the proposed ICCS website were developed during the 3rd quarter of 2005 and awareness materials were prepared to be used in the stakeholder consultations and awareness raising component. Local consultants were also appointed during this period to identify the technology needs of the country.

Several study tours were also undertaken to gain more knowledge on Climate Change issues. One of these was a study tour to India in collaboration with Indian Organization TERI which took place in August 2006, in which eleven participants from seven stakeholder ministries participated.

A Maldives Climate Change Chronology was drafted in 2006 in collaboration with two schools in Male'. The objectives of this exercise were to raise awareness among school students on climate change issues in the Maldives and the collection of information on major events related to climate change. In addition to this the *Nakaiy* e-newsletter (the official newsletter of the national climate change project of Maldives) has been circulated on a monthly basis for the past year.

Discussions on the TNA methodology and criteria were carried out during a series of CCTT meetings held during the latter part of 2006. These discussions resulted in sector prioritization and recommendations on the criteria to be used for the prioritisation of technology needs. Due to limits in resources and time, it was decided to focus on two urgent sectors namely 'energy' and 'transport'. This prioritization was based on their high level of GHG emissions as well as their potential for emission reduction using available technologies. The subsectors selected within 'energy' are energy generation and energy use and in 'transport' land and marine transport. More details can be found in the reports CDE (2007a) and CDE (2007b). Such prioritization is also in line with the 7th National Development Plan (7NDP) identifies high dependency on imported fuel

and the nature of the remote and widely dispersed communities as two of the greatest challenges to sustainable development in the Maldives.

National Capacity Self-Assessment (NCSA) for global environmental management

Background and objective

The National Capacity Self Assessment (NCSA) is the third project carried out under the framework of an ICCS, together with the preparation of the NAPA and the TNA. The overall objective of the project is the identification and assessment of the critical capacity constraints and development of a prioritised overview of capacity needs in the area of global environmental management in the Maldives. This activity is essential to the process of meeting its obligations under the Conventions on climate change, biodiversity and land degradation. The overall expected outcome of the project is that ecosystem management and biodiversity conservation objectives are integrated into productive sector plans and activities.

This project is expected to identify country-level priorities for capacity building in addressing environmental issues in an integrated manner. While the issues faced by Maldives are diverse, it will focus on biological diversity, climate change and land degradation/ sustainable land management. A facilitated stocktaking and stakeholder consultation exercise comprising of key technical government agencies as well as stakeholders at the atoll and island level will be used to prepare the NCSA. Based on this, the cross-cutting issues and synergies in the capacity development needs will be identified and thematic reports prepared. The intended output of the project will be an assessment of the capacity needs at the individual, institutional and systematic levels and a national strategy and action plan to address the capacity needs.

The indicative activities for the project have been identified as follows:

- Project Inception:
- Baseline Assessment/ Taking Stock of Existing Capacity Development Activities:
- Stakeholder Consultation and Awareness raising:
- Priority setting in a national Workshop
- Formulation and Adoption of Needs Assessment and Action Plan:
- Pilot Implementation of the Action plan
- Monitoring and Evaluation:

The project document was signed in the last quarter of 2004 and project activities commenced during the second quarter of 2005. A project manager was hired for the 3 projects under the ICCS. Due to staffing constraints at MEEW, the initial focus was on completing first the other 2 projects, especially the NAPA and thus NCSA activities have been lagging behind.

The NCSA inception workshop was held on 30 May 2005 and an agreement was reached on the institutional roles and responsibilities for the project and initial annual work was finalised and vulnerable sectors identified during this workshop. A stocktaking exercise and baseline information gathering was carried out and the report was finalised in early 2006. The stocktaking exercise investigated the existing capacity, or more precisely the lack of capacity in the government agencies to address environmental issues, especially the capacity to deal with the vulnerabilities to climate change. During the first meeting of the Climate Change Technical Team (CCTT), discussions were carried out on the sectors that should be considered in the NAPA in the field of Climate Change which would then assist in the identification of thematic areas for NCSA.

After a period of dormancy, a new Project Manager for the project was employed at the end of 2006. An international consultant was commissioned to kick-start the project and a workshop was held in Male' in July 2007. The next step for NCSA is one-on-one consultations with the line Ministries and the assessment of capacity needs along with the preparation of the National Strategy and Action Plan to address capacity needs.

2.3 Assessing the contribution of UNDP and partnership strategy

UNDP's activities in the past 4 years constitute a significant contribution towards achieving the desired environmental outcome of "environmental management, including climate change and sustainable energy integrated into national development frameworks and sectoral strategies and programmes". This is evidenced by the formulation of frameworks for policy and planning in the energy and waste management sectors as well as on climate change adaptation, as discussed in detail in the previous paragraphs 2.1 and 2.2. The key role played by UNDP to ensure that support is received in a timely and coordinated manner and within a general framework that is applicable by the government should be highlighted.

The UNDP technical assistance programme in the energy and waste sectors is directly relevant as the Government is increasingly putting more emphasis on sustainable development in its national development planning, in particular on finding alternatives for imported fossil fuels, on proper and cost-effective waste management in Male' and the islands as well as on participating in the conventions on global environmental issues, such as climate change, biodiversity and land degradation.

In this, UNDP has partnered with the Ministry of Environment, Energy and Water (MEEW). First, in the area of energy planning a dedicated programme of training has enhanced national capacity to formulate energy policy and introduce renewable energy technology. The UNDP/GEF supported RETDAP has been instrumental in setting up a framework for a much broader sustainable energy programme which includes financing from several multilateral and bilateral sources (including European Union, French energy agency ADEME, UNOPS, UNIDO, UNESCAP, DANISH funds, local private funds). Being part of an overall framework implies that financing from all these sources can be used more effectively.

A similar approach has been followed in solid waste management (SWM) where UNDP has supported the formulation of a framework for the provision of effective SWM services. This framework also puts strong emphasis on developing public-private partnerships. Under this project, UNDP in partnership with UNOPS mobilised Swedish funds for drafting the waste policy and the private sector participation options. In this regard, UNDP has collaborated closely with the European Union, the World Bank, UNOPS and GEF to ensure that efforts were not duplicated and that support was provided to the relevant areas in a well-timed manner. UNDP used Tsunami recovery funds from EU to work on island waste management in 16 islands. UNDP worked with UNEP on hazardous waste clean up. It has also worked with the Australian and Canadian Red Crosses to ensure that the lessons learnt and their experiences were fed into the formulation of the waste management policy.

UNDP highlighted the need to implement the three climate change projects (NAPA, NCSA and TNA through an Integrated Climate Change Strategy. This reflects the general idea of integrating individual project activities to enable the creation of synergies. It also reflects the capacity problem in the government in terms of understaffing, so human resources have to be used effectively with sufficient inputs to the required projects. Inputs from the the Climate Change Technical Team (CCTT) is also worthy of mention here as the input from the team enabled the efficient formulation of the NAPA and TNA synthesis report. Technical teams such as the CCTT play a major function in bringing together the knowledge and expertise from all areas of concern.

In the next country programme period, activities in energy, waste management and climate change adaptation will slowly shift from policy formulation to actual implementation of policy instruments and of investments in specific measures. In this respect, it will be important to

strengthen partnership with other Ministries, NGOs or private sector stakeholders and to launch joint programmes.

2.4 External factors and driving forces

The above-mentioned understaffing in the government and the high staff turnover in general is one contributing factor to the delay in implementation that some of the specific projects under the environment outcome have met. The climate change projects have had 3 different project managers in 3 years. This implies that more time is lost while the new staff familiarises with the projects thus delaying the achievement of the project outputs. It has also means that the institutional memory and capacity built through the project is lost.

The NCSA, for example, has only recently been initiated as limitations in the number of staff in MEEW working on climate change issues implied that attention could be given to the NAPA only. Similarly, the high turnover of project staff in RETDAP has also led to delays in implementation of a number of activities. It has been proposed therefore to extend RETDAP by one more year into 2008.

The changes in the government structure over the past few years have also hindered project progress. Sine the projects were initiated, the ministry structure has changed quite a few times as it has been grouped with Home Affairs and Housing, then with Construction and more recently with Energy and Water. The RETDAP project has also been changed from the Ministry of Communication, Science and Technology (MCST) to MEEW following the dissolution of the MCST. This led to reshuffling of personnel as well as an increase in the burden felt on Energy section due to their new responsibilities for the electrification project. The relocation of office and equipment in 2006 was also expressed as a hindrance which caused interruption to the IT support. The delay in launching the MEEW website was also stated as a limitation as it acted as an essential tool to disseminate information to the CCTT and other experts.

The 2004 tsunami has also meant that in 2005 priority in the government was on dealing with the immediate impacts of the disaster, putting other activities on hold.

The staffing constraint has also implications for the capacity building efforts that are part of the environmental programme. Since many staff is formed by trainees, identifying courses that can accommodate only a basic level training is seen as a problem. When training is carried out in-house, it is generally considered as being more effective. While in-house tailor-made training with a professional educator may be preferred to short-term courses abroad, it is constrained by the fact that these are expensive and linked to a specific project that funds them. This calls for setting up more permanent courses in Maldives to built technical and managerial capacity with respect to renewable energy waste management and environmental issues in general.

2.5 Summary of findings

The preceding paragraphs have shown that Maldives have made significant progress in policy frameworks for energy, waste management and climate change adaptation. This progress can partly be attributed to the UNDP's efforts, directly by the support provided to set up these frameworks and indirectly as the frameworks are being used to mobilise financial support from other sources. In summary, UNDP has managed to contribute in a significant manner to energy and environment policy development, as is detailed in Table 2.

Table 2 Synopsis of findings

Outcome indicator	*Baseline (2003)*	*Result (2007)*	*Influencing factors (drivers)*	*UNDP contribution*	*Partnerships*	*UNDP impact and rating*
Policies and/or programmes on energy Policies and/or programmes on energy	No policy frameworks for energy, solid waste management or climate change strategy exists	• First National Energy Policy drafted • National SWM Policy drafted. • Draft NAPA Report. • Draft TNA Synthesis •	• 2004 tsunami • Government restructuring • Understaffing in some government ministries	• Energy policy produced with funding from UNDP under the RETDAP umbrella • The SWM framework produced by UNDP is acting as the key document in the absence of a policy • UNDP has funded all the major climate change studies (Nat. Communic., NAPA, TNA, NCSA) so far	• RETDAP and the SWM framework have been used as umbrella activities attracting other sources of funding (UNOPS, Danish Funds, EU, WB, GEF) • Leveraged private sector and community participation (e.g., Maldive Gas Guaranteed Fibre, SWM Ari Atoll)	Impact : significant Rating : positive

UNDP's contribution to the outcome are not limited to the policy documents of the individual projects, but include the broader achievements of formulating a framework for guiding government support and recognition of UNDP as facilitator coordinating activities with other members of the donor community.

These achievements must be qualified, however, as the frameworks are very recent and the implementation has only just started e.g. setting up the renewable energy financial mechanism and piloting of demonstrating projects in energy and SWM. The key challenge now is putting the suggested policy instruments into practice, followed by investment in sustainable energy, waste management and climate-relevant technologies. Or as one MEEW official interviewed put it, we 'have now produced lots of studies and reports, and these should now be followed by concrete action on the ground'.

The monitoring framework for UNDP's upcoming country programme reflects this shifts towards implementation. Currently, the environment outcome for 2003-2007 has one indicator that refers to having policies and/or programmes in place (on energy, solid waste management and climate change mitigation and adaptation). The new Country Programme 2008-2010 mentions the following outcomes under the programme component of 'disaster management and environment for sustainable development' (see Table 3):

- Environment services and protection measures accessed by more communities with greater participation of youth in planning and implementation
- Communities enabled to manage impacts of climate change and reduce disaster vulnerabilities

It is expected that with activities going from policy formulation to implementation the partnerships with private sector and atoll communities will be developed further.

Table 3 Results framework of the UNDP Maldives Country Programme 2008-2010

Programme component	*Country Programme Outcome*	*Outputs*	*Outcome indicator*
Disaster Management and environment for sustainable development	2. Environment services and protection measures accessed by more communities with greater participation of youth in planning and implementation	2.1 National environmental standards/guidelines on solid waste management (SWM), water & sanitation (W & S), environmental health, land management, and coastal modification formulated to guide sectoral policies, programmes and local practices, and related capacity enhanced. 2.2 Economic Assessment of the contribution of atoll ecosystem to the national economy, available to guide policy decisions regarding key sectors, and related capacity enhanced. 2.3 Atoll Ecosystem conservation practices in place in pilot Atoll. 2.4 Empower local communities on sustainable operation and management of infrastructure, on waste management, water and sanitation and renewable energy (RE) installed during the tsunami recovery; and progressively devolve key management responsibilities to pilot communities within a strategy agreed with Community Based Organizations (CBOs), and particularly youth.	*Indicator:* Percent of community based and youth organizations aware of and utilizing national environment standards. *Baseline*: No formal Standards Available. *Target:* 20% of community based and youth organizations aware of and utilizing national environment standards. *Indicator:* National Environment standards and guidelines developed; Percent of community based organizations aware of and utilizing national environment standards. *Baseline*: No formal Standards Available. *Target:* Formal Environment Standards available, issued and in use by 2010. *Indicator:* Managed Protected Areas in Baa Atoll. *Baseline*: None. *Target:* 3 managed protected areas by 2010. *Indicator:* Number of SWM, W&S and RE systems established with UN tsunami funding operated by local communities; *Baseline*: 1 SWM Centres in 1 island community. *Target:* 16 island communities managing and served by systems established during Tsunami.
	3. Communities enabled to manage impacts of climate change and reduce disaster vulnerabilities	3.1 National, atoll, island and sectoral disaster management plans and climate change adaptation plans developed and implemented in pilot areas, and related capacity enhanced. 3.2 Increased knowledge base of communities on appropriate options and mechanisms for mitigation of, and adaptation to climate change and related disasters.	*Indicator:* Percent of population trained for sustainable disaster management (age/sex); percent of trained persons who apply their new skills. *Baseline:* 8667 people in Vaavu Atoll and seven islands in Meemu. Atoll trained in disaster management in 2007. *Target:* Around 92,684 people in up to 7 atolls identified under the safe shelter program. *Indicator:* Number of islands with climate change adaptation measures integrated into development programmes. *Baseline*: 1 island with higher elevation. *Target*: 2 islands with climate change adaptation measures integrated into development programmes. *Indicator:* National, Atoll, Island and sectoral disaster management plans developed; Number of established Emergency Operation Centres with fail safe communication at national and regional level. *Baseline:* one disaster risk profile map and ranking of inhabited islands by vulnerability to disaster in 2007. *Target:* Devise and implement disaster management plans for key vulnerable islands by 2010.

3. LESSONS LEARNED AND RECOMMENDATIONS

3.1 Lessons learned

The following lessons may be useful for other UNDP country offices.

1) The environmental outcome being evaluated in this report is highly relevant to addressing challenges posed by climate change impacts, fossil fuel imports and waste management. The approach followed is to have a proper analysis of barriers, issues and options in sustainable energy and waste management and in climate change mitigation and adaptation. Based on this analysis a framework of actions in policy formulation, capacity building, institutional strengthening, financial mechanisms and awareness creation is drawn up. UNDP has played a crucial role in setting up this programmatic approach.

2) While the outcome of having policies and frameworks on energy, SWM and climate change is laudable, more elaborate frameworks of indicators and targets should be set up to measure the impacts. It is necessary to have 'plans and policies formulated' (the main indicator of the outcome in the 2003-2007 country programme), but not sufficient, i.e. plans should be 'implemented' as evidenced by other impact indicators, such as having public and private finance mobilised and financing mechanisms in place, having stakeholders engaged, having sufficient capacity in terms of human resources and knowledge and having a good regulatory framework.

3.2 Recommendations for the country programme 2008-2010

Capacity building

One problem voiced during the interviews with MEEW officials, is the difficulty to attract more senior staff, leaving positions to people that has recently graduated. In this context, having such junior staff to attend specialised meetings or short courses abroad may not be effective, if their knowledge level is not appropriate enough. The alternative of having tailor-made courses on sustainable energy and waste management for selected MEEW staff in the Maldives would be quite expensive and may not be effective as the trained staff may not be retained anyway. This issue should be carefully considered when further implementing the technical capacity building components of the environmental cluster of projects.

Maybe one option is to create some more permanent form of training courses on RE in Maldives, for example in cooperation with the Faculty of Engineering Technology of the Maldives College of Higher Education (which, for example, has conducted some short courses on energy transmission and distribution in the past).

At the local level, IDCs and ADCs need to integrate energy issues into their short-term training courses on community development, credit management and micro-enterprise development so that local communities are empowered to operate and manage infrastructure (waste, energy, water, sanitation).

Focus of country programme

Having succeeded in setting up frameworks for action in the areas of energy, solid waste management and climate change adaptation, the focus in the sectors will move from upstream policy formulation to more downstream policy implementation (by having appropriate regulations within a legal framework), enhancing capacity, stakeholder mobilisation, private sector involvement and investments in infrastructure. This will involve more interaction with relevant line ministries, private sector and NGOs.

In parallel, UNDP could also consider in its upcoming Country Programme to support policy formulation in new areas within the environment and energy component, such as energy efficiency, sustainable public transportation, sanitation or water supply.

Relevance for national development priorities

Both options would be in line with the Seventh National Development Plan (2006-2010, currently in draft form), which, among others, stresses the following policy guidelines on environmental and sustainable energy issues:

- Proper management of waste to prevent impact on human health and environment
- Reduction of waste generation at all levels and promotion of cost-recovery mechanisms
- Proper management and control of hazardous waste
- Protect and minimise adverse impacts of development on the environment, human health and livelihoods
- Position Maldives to respond adaptively to the impacts of climate change and sea level rise
- Improve the quality of environmental services to the islands
- To provide a continuous and economically viable energy supply to all islands
- To strengthen the institutional framework of the energy sector
- To promote energy conservation and efficiency without lowering the quality of services provided
- To enhance national energy security by promoting indigenously available renewable sources of energy
- Establish standards to monitor, regulate and evaluate energy usage in the country
- To ensure the availability of safe drinking water and environmentally sound sewerage disposal facilities throughout the country
- To ensure sustainable availability of water for socio-economic development
- To ensure effective development of the water sector
- Recognizing the need to protect the environment, measures shall be adopted aimed at reducing air pollution from vehicle and vessel emissions, conservation of energy, and the use of alternative sources of energy.

ANNEX A. TERMS OF REFERENCE OF THE EVALUATION

Independent Evaluation of Climate Change / Renewable Energy Project, Maldives

Project Title:	Renewable Energy Technology and Application Project (RETDAP)
Functional Title:	International Consultant for Independent Evaluation
Duration:	May to June 2007
Travel costs:	The costs of in-country mission(s) of the consultant are to be included in the lump sum.

1. Purpose of the Evaluation

In accordance with UNDP/GEF M&E policies and procedures, all regular and medium-sized projects supported by the GEF should undergo a Mid Term Evaluation.

The Mid Term Evaluation is intended to assess the relevance, performance and success of the project up to date. It looks at signs of strength, weakness and impact and sustainability of results, including the contribution to capacity development and the achievement of global and national environmental goals.

The Mid Term Evaluation also identifies/documents lessons learned and makes recommendations to improve implementation of the project.

The Mid Term Evaluation will feed into management and decision making processes of UNDP, Government and national stakeholders. Furthermore, it will give important inputs to the Country Office Environmental Outcome Evaluation to be carried out simultaneously.

2. Project Description

The Renewable Energy Technology Development and Application Project is a Global Environment Facility (GEF) co-financed project, implemented by the United Nations Development Programme (UNDP) and executed by the Ministry of Environment, Energy and Water (MEEW) in the Maldives.

The development goal of this project is the reduction of the growth rate of GHG emissions from fossil fuel demanding activities, particularly diesel power generation through the removal of major barriers to the development and application of renewable energy-based systems that can replace part of the fossil fuel use in the Maldives. The project has assessed the potential for implementing renewable energy (RE) applications for electricity and non electricity production according to the native sources of energy available in the country and has produced a comprehensive set of energy statistical data currently being updated.

Furthermore, RETDAP is promoting the widespread implementation and ultimately commercialization of RE technologies, as well as the establishment of an environmental incentive for the adoption and commercialization of RE in the country. It involves the design, development and implementation of appropriate policies, strategies and interventions addressing the fiscal, financial, regulatory, market, technical and information barriers to RE development and utilization.

It also involves the development of interventions for strengthening of the relevant institutional structures and national capacity for the coordination and sustainable management of RE initiatives in the country.
This project also involves capacity building activities for enhancing the country's capability in establishing workable and viable schemes for supporting RE applications with emphasis on the design, development, financing, implementation and management of RE projects, taking into consideration relevant lessons from past RE projects in other Small Island Developing States (SIDS).

The project was designed as a four year project and was signed in May 2004. The project schedule was affected due to the 2004 Asian Tsunami when government and UN work was focused on Tsunami relief work for the greater part of 2005. The Mid Term evaluation originally planned for in 2006 is therefore being carried out in 2007.

4. Evaluation objectives and scope

The objective of the Mid Term Evaluation is to assess the achievement of project objective up to date, identify strengths and weaknesses and suggest actions to improve project implementation, the contribution to the general goal/strategy, and the project partnership strategy.

The Evaluation will focus on the following aspects:

A) Project design and its relevance in relation to:
   1. Development priorities at the national level;
   2. Stakeholders – assess if the specific needs are being met;
   3. Country ownership/drivenness – participation and commitments of government, local authorities, beneficiaries and private sector;
   4. UNDP mission to promote Sustainable Human Development (SHD) by assisting the country to build its capacities in the focal area of environmental protection and management;

B) Performance focusing at the progress that has been made by the project relative to the achievement of its objective and outcomes:
   1. Effectiveness - extent to which the project is achieving its objectives and the desired outcomes, and the overall contribution of the project to national strategic objectives;
   2. Efficiency - assess efficiency against overall impact of the project for better projection of achievements and benefits resulting from project resources, including an assessment of the different implementation modalities and the cost effectiveness of the utilisation of GEF resources and actual co-financing for the achievement of project results;
   3. Timeliness of results.

C) Management arrangements focused on project implementation:
   1. General implementation and management - evaluate the adequacy of the project implementation structure, including partnership strategy and stakeholder involvement from the aspect of compliance to UNDP/GEF requirements and also from the perspective of "good practice model" that could be used for replication;
   2. Financial accountability – extent to which the sound financial management is being an integral part of achieving project results, with particular reference to adequate reporting, identification of problems and adjustment of activities, budgets and inputs;
   3. Monitoring and evaluation on project level – assess the adoption of the monitoring and evaluation system during the project implementation, and its internalization by competent authorities and service providers; focusing to relevance of the performance indicators, that are SMART, i.e.:
      - Specific: The system captures the essence of the desired result by clearly and directly relating to achieving an objective and only that objective.

- Measurable: The monitoring system and indicators are unambiguously specified so that all parties agree on what it covers and there are practical ways to measure it.
- Achievable and Attributable: The system identifies what changes are anticipated as a result of the intervention and whether the result(s) are realistic. Attribution requires that changes in the targeted developmental issue can be linked to the intervention.
- Relevant and Realistic: The system establishes levels of performance that are likely to be achieved in a practical manner, and that reflect the expectations of stakeholders.
- Time-bound, Timely, Traceable and Targeted: The scheme allows progress to be tracked in a cost-effective manner at desired frequency for a set period, with clear identification of particular stakeholders group to be impacted by the project.

In addition to a descriptive assessment, all criteria should be rated using the following divisions: Highly Satisfactory, Satisfactory, Marginally Satisfactory, and Unsatisfactory with an explanation of the rating.

5. Evaluation methodology

The evaluation will take place mainly in the capital city Male', within the Ministry of Environment, Energy and Water (MEEW) and UNDP, with occasional travel to the field. The evaluator is expected to follow a participatory and consultative approach ensuring close engagement with the government counterparts, the members of the project team, and direct beneficiaries.

The evaluator is expected to consult all relevant sources of information, such as the project document, project reports – incl. Annual Reports, project budget revision, progress reports, project files, national strategic and legal documents, and any other material that s/he may consider useful for evidence based assessment.

The evaluator is expected to use interviews as a means of collecting data on the relevance, performance and success of the project. S/He is also expected to visit the project sites and some new sites, where the technology has been replicated.

Although the mission should feel free to discuss with the authorities concerned all matters relevant to its assignment, it is not authorized to make any commitment or statement on behalf of UNDP or GEF or the project management.

This Mid Term Evaluation should link in closely with the planned UNDP outcome evaluation. The RETDAP project is one of the main contributors to the UNDP outcome: Environmental management, including climate change and sustainable energy integrated into national development frameworks and sectoral strategies and programmes, which will be carried simultaneously with the RETDAP midterm evaluation.

The Consultant should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

6. Deliverables

The output of the mission will be the Mid Term Evaluation Report.

Initial draft of the Mid Term Evaluation Report will be submitted to MEEW and UNDP for review. After incorporation of comments, adjusted draft will be submitted for final review. The comments will be incorporated and the report finalised. One mission to the Maldives will be conducted.

7. Indicative activities

- Development of methodological instruments for the evaluation

- Setup the mission dates and detailed mission programme preparation in cooperation with UNDP and MEEW.
- Review of all available materials
    - Acquaintance with the project document and other relevant materials with information about the project;
    - Familiarization with Maldives energy efficiency policy framework;
- Briefing with UNDP and MEEW, briefing with the project management and project staff
- Interviews with key beneficiaries and stakeholders.
- Visits to project sites (Mandhoo, selected islands where awareness was conducted, etc.)
- Analysis of collected data
- Structuring and development of a draft report
- Completing of the draft report
- Presentation of draft report for comments and suggestions
- Briefing with UNDP, project management and project staff;
- Review of additional information;
- Elaboration of final report)
    - Incorporation of comments and additional findings into the draft report
    - Presentation of adjusted draft report for comments and suggestions
    - Finalization of the report
- Submission of final report

ANNEX B. ITINERARY OF THE EVALUATION TEAM; LIST OF DOCUMENTS

B.1 Mission schedule and list of people met

In the two weeks from 13 to 28 August, the same Evaluation Team not only evaluated the RETDAP project, but also evaluated the Outcome of the Environment-Climate Change cluster of activities of UNDP. The following table shows the meetings held by the Team for both the RETDAP and the Outcome Evaluation.

Mon 13/08	• Arrival of Mr. J.H.A. van den Akker (international consultant) in Male' • Meeting of international consultant and national consultant (Ms. Marie Saleem) at UNDP with Ms. Melaia Vatucawaqa (Deputy Resident Representative), Mr. Juan Gollan (Energy and Environment Officer), Ms. Hudha Ahmed (Assistant Resident Representative, Environment) and Ms. Aminath Shooza
Tue 14/08	• Meeting with Energy Department staff of Ministry of Environment, Energy and Water (MEEW), Mr. Abdul Razzak Idris (Deputy Minister of Energy and RETDAP Project Director), Mr. Ajwad Musthafa (Deputy Director), Mr. Haikal Ibrahim (acting RETDAP Project Manager) and Mr. Jadulla Jameel (RETDAP Assistant Project Manager) • Meeting with the Integrated Climate Change Strategy (ICCS) team of MEEW (responsible for NAPA, NCSA and TNA studies), Mr. Athif Saleem (Project Manager for TNA and NAPA) • Meeting at MEEW's Environment Research Centre (ERC), responsible for the National Framework for Solid Waste Managementr, Mr. Gordon Ewers
Wed 15/08	• Meeting at MEEW with Mr. Abdullahi Majeed (Deputy Minister of Environment) and Mr. Amjad Abdulla (Assistant Director General)
Thu 16/08 - Sat 18/08	• Report writing
Sun 19/08 – Mon 20/08	• Travel to Mandhoo Island in Ari Atoll, site of solar-diesel hybrid system and a waste management centre
Tue 21/08	• Report writing
Wed 22/08	• Meeting at Maldive Gas (Mr. Hussain Zahir, Managing Director)
Thu 23/08	• Meeting at MEEW (Mr. Yooshau Saeed, Project Manager NCSA)
Fri 24/08 – Sun 26/08	• Report writing
Mon 27/08	• Presentation on preliminary findings and recommendations on the RETDAP and Outcome evaluations
Tue 28/08	• Departure of Mr. Van den Akker from Male'

B.2 List of documents

Renewable Energy Technology Development and Application Project (RETDAP)

1. *Progress Reports* (2004-2005) and *Project Monitoring forms* (first and second quarter of 2007)
2. *Minutes of meeting* of the Inception Workshop (November 2004)
3. *Minutes of meeting* of Project Steering Committee (July, August and November 2004)
4. *UNDP Project Document of RETDAP*
5. *Project Document* of "Assistance to Maldives in Developing the Energy Sector through Energy Resource Assessment leading to Sustainable Energy Formulation", UNDP Thematic Trust Fund on Energy for Sustainable Development (Energy TTF)
6. Terms of Reference of the "Assessment of Least-Cost, Sustainable Energy Resources – Maldives", funded by UNDP Nordic Fund and implemented through UNOPS
7. *Annual reports* (2003 and 2004) of the Energy TTF/UNOPS activities
8. *Biomass Survey, Technical Report* (Energy Consulting Network, 2004a)
9. *Final Report: Landfill Gas* (Energy Consulting Network, 2004b)
10. Final Report, Assessment of Least-Cost, Sustainable Energy Resources, Maldives (Energy Consulting Network, 2004c)
11. Energy Supply and Demand, Technical Report (Energy Consulting Network, 2003)
12. *National Energy Policy – Maldives*, Final draft (Aldover, 2006)
13. *Maldives, Energy Balances and Indicators 2003-2005* (Energy Consulting Network, 2006)
14. *Fund for Renewable Energy System Application (FRESA), Financing Scheme, Financing Application Guidelines and Operational Plan*, by A. Solomon-Dealino (2006)

Other documents:

15. *Wind Energy Resource Atlas of Sri Lanka and the Maldives,* by D. Elliott, M. Schwarz, G. Scott, S. Haymes, D. Heimillier and R. George, National Renewable Energy Laboratory (NREL, 2003). Available at www.rsvp.nrel.gov/wind_resources.html
16. *Maldives Climate Change In-Depth Technology Needs Assessment – Energy Sector*, by Commerce Development and Environment (CDE, 2007a)
17. *In-Depth Needs Assessment on Transport Sector* (CDE, 2007b)
18. *State of the Environment- 2004*.Ministry of Environment and Construction (MEC, 2004)
19. *Identification of Existing Barriers to the Provision of Effective Solid Waste Management Services within the Maldives and Recommendations for their Removal* (MHAE, 2004)
20. *Solid Waste Management Policy & Support to Private Sector Participation in Waste Management Services: Issues and Options Discussion Paper,* NIRAS (2007a). Project UNOPS 30525 (INT/01/R13) - 06 MDV 3110.

21. *Solid Waste Management Policy & Support to Private Sector Participation in Waste Management Services: Private Sector Participation in Waste Management Services in the Republic of Maldives,* NIRAS (2007b). Project UNOPS 30525 (INT/01/R13)-06 MDV 3110

22. *Country Programme outline for Maldives (2003 – 2007)*. UNDP (2002a)

23. *United Nations Development Assistance Framework Maldives 2003–2007*. UNDP (2002b)

24. *Seventh National Development Plan 2006-2010, Volume I, Policies and Strategies; Volume II, Sector Roadmaps* (7NDP, first working drafts, January 2006)

ANNEX C. DRAFT ENERGY POLICY STATEMENTS

In view of the foregoing discussions and situational analyses, the following policy statements for the Government of the Maldives (GoM) to adopt for each sub-sector/activity are hereby put forward and listed below:

Energy Policy Statements
National Energy Policy – Maldives 2006

Energy Policy No.	Section Location	Issue/Energy Policy Statement
EPS.1	1.5	Vision Ensuring that the socio-economic development goals of the country are met through the sustainable supply and use of energy.
EPS.2	1.6	Goal Availability, reliability, accessibility and affordability of energy to fuel the socio-economic development requirements of the Maldives in a sustainable and environmentally friendly manner
EPS.3	1.7	Policy Objectives ▪ Ensure a continuous and economically viable diversity of energy supplies to sustain socio-economic development. ▪ Guarantee accessibility of affordable and reliable energy services to all people. ▪ Enhance national energy security by promoting indigenously available renewable sources of energy while creating new jobs and strengthening the economy. ▪ Protect the environment and health of the people by ensuring environmentally sound energy supply and usage. ▪ establish and implement the energy conservation and energy efficiency program and institutional arrangements to achieve optimum economic use of renewable and non-renewable sources of energy and reduce consumption without lowering the quality of service rendered. • Ensure transparency of energy sector planning and operations to attract both national and international investors where appropriate.
EPS.4	2.1.3	**Transport Sector** GoM will adopt a national transport plan that will integrate and harmonize planning and implementation of transport-related national policies, incorporating rationalized use of fuels.
EPS.5	2.1.3	GoM will develop and facilitate an inter-atoll and inter-island public transportation with the full participation of the private sector through possible tender in delivery of services for better utilization of energy resources and convenience of all.
EPS.6	2.1.3	GoM will establish and disseminate goals and plans in energy efficiency in transport through education and awareness program in all sectors of society.
EPS.7	2.1.3	GoM will identify all areas for improvement and provide technical advice in fuel conservation and efficiency in different modes of transport that have established fuel economy and environmental acceptance, as well as complying with improved and consistent fuel quality standards and diligent operation and maintenance.
EPS.8	2.1.3	GoM will identify technology options and provide technical and financial support for application and use of more energy efficient and environment-friendly modes of transport and alternative fuels.
EPS.9	2.1.3	GoM should adopt standards for exhaust emissions for all vehicles, including those used for public transportation, in an effort to improve air quality.

Energy Policy No.	Section Location	Issue/Energy Policy Statement
EPS.10	2.2.3	**Manufacturing, Commerce and Services Sector** GoM will establish guidelines and monitoring system for adopting energy efficient practices, such as cogeneration, etc. in all public buildings, industrial plant, desalination, cold storage and other energy consuming facilities.
EPS.11	2.2.3	GoM will establish and implement a program for enhancing awareness and capacity among personnel of utilities, commercial energy plants and other relevant organizations in promoting and implementing the energy efficiency and conservation program.
EPS.12	2.2.3	GoM will adopt a policy and provide support to the establishment of private sector energy service providers such as Energy Service Companies (ESCOs) to provide consulting and engineering services in assessment, development and assistance as well as implementing energy efficiency and conservation projects.
EPS.13	2.2.3	GoM will implement a program for a national demand-side management (DSM) and performance standards for industry and commercial energy consumption.
EPS.14	2.2.3	GoM will develop and implement a public transportation network system and post-harvest facilities for better utilization of energy resources in producing, transporting and processing of agriculture and fisheries products with the cooperation of the private sector.
EPS.15	2.3.2	**Household Sector** GoM to establish and implement the government's goals and plans in energy efficiency in households through education and awareness program and distribution of campaign materials and practical energy saving tips.
EPS.16	2.3.2	GoM establish and implement the program of energy labeling and performance standards in energy-consuming devices and appliances and the education and awareness campaigns.
EPS.17	2.3.2	GOM will establish and implement a program for encouraging the use of all renewable energy systems by providing technical assistance and incentives such as microfinance facilities.
EPS.18	2.3.3.2	Fuel Wood Conservation GoM will establish and implement programs specifically to designate areas and responsible agencies and private sector participation in planting of trees for firewood purposes and conserve trees that serve to protect the foreshore and minimize erosion.
EPS.19	2.3.3.2	GoM will establish a program and provide support for the proliferation of efficient cooking stoves, that have been used in other countries and can be developed and produced locally, to conserve wood for fuel..
EPS.20	2.3.3.2	GoM will establish and implement programs and activities that will involve participation of the members in the selection and use of energy options in the household.
EPS.21	2.3.3.3	Energy Substitution in Rural Household GoM will evaluate technology options and provide support for the dissemination of alternative household energy systems that are practical, efficient, environment-friendly and affordable.
EPS.22	2.3.3.3	GoM shall provide needed support by establishing facilities that will allow access to financial mechanisms such as microfinance and other credit schemes and to technical assistance in alternative energy options.
EPS.23	2.3.3.4	Cooperation in Rural Development GoM will ensure that needed interventions by different stakeholders are properly coordinated and integrated and that resources are pooled and complemented to derive optimum outcomes of various initiatives and using energy as an important input for productive application.
EPS.24	2.3.3.5	Knowledge Transfer and Information Dissemination GoM will identify and establish institutional and coordinating mechanisms

Energy Policy No.	Section Location	Issue/Energy Policy Statement
		among various energy-telated program participants in order to mobilize a unified and integrated approach to linking energy to overall economic development and knowledge transfer.
EPS.25	3.2	Oil Market GoM will closely monitor the oil market and pricing issues in practice and evaluate the need for adopting regulation of the petroleum product prices.
EPS.26	3.2	GoM will continue studies and consultations regarding deregulation options for the sector in the medium to long term.
EPS.27	3.2	GoM will develop means of ensuring adequate availability and access to petroleum products in a participative process.
EPS.28	3.2	GoM will develop effective means of ensuring affordable access to petroleum products, including rationalized subsidy during very high fuel prices, in cooperation with the oil industry.
EPS.29	3.2	GoM shall continue to ensure diversifying of the sources of petroleum products so as to enhance security of supply as well as take advantage of market competition.
EPS.30	3.3.3	Indigenous Resources GoM will ensure increase in awareness on the overall goals and plans of the government and capacity for implementing the RE program through active participation of all sectors including civil society in assessment and selection of RETs for development.
EPS.31	3.3.3	GoM will establish the Fund for Renewable Energy System Applications (FRESA) for Outer Islands and Atolls (OIAs) that provides concessional financing for RE project feasibility studies and investment with support from national and international funding institutions.
EPS.32	3.3.3	GoM will establish comprehensive RE regulation and institutional support to harmonize related policies and governing regulations of other organizations.
EPS.33	3.3.3	GoM to identify all relevant mechanisms and modalities to achieve maximum penetration of RE in the electricity generation mix through the establishment of a Renewable Energy Portfolio Standard (RPS) for the Maldives which will impose a minimum of 12% contribution in the overall energy mix by the year 2015 through identification and development of innovative approaches such as 100% RE Islands.
EPS.34	3.3.3	GoM to introduce, establish and disseminate information on mechanisms for the incorporation of useful economic concepts such as opportunity cost, social cost, and shadow price that will incorporate marginal costing to establish average costs of electricity supply before looking at the need for cross subsidies among consumers.
EPS.35	3.3.4	GoM will assess and adopt relevant policies and guidelines to make independent private power development viable including innovative applications of RE in various commercial, industrial and private installations.
EPS.36	3.3.4	GoM in coordination with private sector will assess, identify and establish mechanisms and modalities to enable RE-based self-generation, hybrids and cogeneration that permits sale of excess electricity generation to the utility with feed-in capabilities whenever possible.
EPS.37	3.3.4	GoM will assess, identify technology options and provide technical and financial assistance for the widespread installation and use of individual solar photovoltaic home lighting systems, solar water heating systems, household biogas systems and other practical RE technologies considering, among other conditions such as the material selection to prevent rapid corrosion and equipment degradation.
EPS 38	3.3.5	GoM will assess and identify capacity building needs and provide budgetary and organizational support to enhance awareness, skills and knowledge of human resources in support of the development and application of energy efficiency and RE technology options for the widespread development,

Energy Policy No.	Section Location	Issue/Energy Policy Statement
		installation and use of these technologies through training and education at various levels.
EPS.39	3.4.3	Power Generation/Conversion GoM will develop and implement a program for energy conservation and efficiency for the power generation sector that will employ energy management and auditing to evaluate options on energy savings and efficiency.
EPS.40	4.1.3	Energy Supply Security GoM in coordination with the private sector will ensure that strategic and emergency reserves and required logistics for petroleum products are in place in selected supply centers.
EPS.41	4.1.3	GoM will implement contingency plans to ensure that potential supply problems as well as emergency preparedness and for oil spills and gas leaks within the handling protocols are dealt with beyond normal levels.
EPS.42	4.1.3	GoM will require manufacturing and commercial companies as well as relevant government operations to provide for their minimum strategic reserves.
EPS.43	4.1.4	GoM will develop and implement a national energy efficiency and conservation program in all sectors of the economy, particularly for the high consumers of fuels and electricity not only as a hedge to alleviating concerns on possible energy shortfall but also as a sustained program of energy supply security.
EPS.44	4.1.5	GoM will continue to provide direction and support for private sector participation in the search and use of all possible indigenous energy resources, like renewable energy, in applications particularly in areas where they are available and especially where traditional energy and fuel supplies cannot reach or meet expanding demand.
EPS.45	4.2.2	Energy Pricing GoM shall adopt an energy pricing philosophy and establish databank and information systems to bring about useful economic concepts that will reflect and value the true costs of energy and stimulate energy conservation and efficiency in all sectors of the economy, particularly small and medium scale firms.
EPS.46	4.2.2	GoM will establish a standard and pricing scheme likewise for alternative energy in selected applications in order to develop its market and sustainability.
EPS.47	4.3.3	Environmental Protection GoM will establish and implement a plan to provide technical and financial incentive support to the use of environmentally complying fuels, energy products and processes in cooperation with private sector.
EPS.48	4.3.3	GoM shall ensure that all energy and energy-using projects should follow a thorough environment impact assessment and environmental management and establish required mechanism.
EPS.49	4.3.3	GoM will ensure that environmental standards, principles and operating guidelines are included in mandates of the energy regulatory body.
EPS.50	4.3.4	GoM will continue its plan to identify sources of harmful emissions and develop and implement a program to mitigate them.
EPS.51	4.3.5	GoM will continue to support the development and application of waste-to-energy systems that will involve also private sector participation.
EPS.52	4.3.5	GoM will pass laws and regulations at the national,local, atoll and island levels to ensure that all concerned in the oil and transport industry and the general public manage their spent oil in the proper manner.
EPS.53	4.4.2	Health and Safety GoM will assess and identify measures to ensure the health, safety and energy secutrity in the use, storage, transport and disposal of fuels and by-

Energy Policy No.	Section Location	Issue/Energy Policy Statement
		products and in installation of energy facilities, that address all kinds of risks, as well as energy access for emergency preparedness during disasters and other major disruptions, and establish and enforce an oil spill contingency plan, consistent with relevant national policies such as safer island concept and population consolidation.
EPS.54	4.5.3	National Energy Efficiency and Conservation Program GoM will plan, launch and implement advocacy and awareness programs on fostering the right attitude and determination to undertake energy saving projects at the national and local level for all sectors by effectively employing multimedia approaches.
EPS.55	4.5.4	GoM will identify needs, implement a training plan and provide assistance in developing energy management skills in different organizations in all sectors.
EPS.56	4.5.5	GoM will develop a building standards and regulations program which will achieve energy savings in all types of buildings as an energy code to be incorporated with the existing building code and other permitting procedures of the government.
EPS.57	4.5.6	GoM will identify areas for improvement, recommend measures and establish an energy efficiency program throughout all sectors in their operations, energy consumption in public buildings, transportation requirements and other applications , including provision of tax and duty incentives for energy efficient equipment and appliances
EPS.58	4.5.7	GoM will assess, develop, establish and implement the development of an energy appliance and equipment energy-labeling program.
EPS.59	4.5.8	GoM will develop a program to systematically remove barriers to the implementation of the national energy policy.
EPS.60	4.6.3	Low-Income Households GoM will develop and implement a comprehensive plan which is linked to socio-economic development of rural communities by providing access to reliable and affordable sources of energy and by allocating rationalized financial assistance for low-income households.
EPS.61	4.6.4	GoM will provide support for developing and implementing financing schemes and credit facilities intended for providing energy access for for low-income households and educate and provide technical assistance for productive applications of energy
EPS.62	4.7.2	Gender and Energy GoM will ensure that equal opportunities of participation in all possible and practical aspects of the energy programs and activities.
EPS.63	4.8	Quality Assurance GoM will establish the means of providing quality assurance programs to support the effective implementation of the national energy policy.
EPS.64	4.9.3	R&D and Technology Transfer GoM shall issue guidelines in the conduct of R&D and technology transfer program for innovative ideas to support the effective implementation of the national energy policy.
EPS.65	4.10.3	Energy Trade and Cooperation GoM will actively participate in international trade and cooperation activities and join in international and regional energy organizations to augment the country's capabilities by sourcing technical and financial assistance in developing and applying RE and energy efficiency technologies.
EPS.66	5.4	Institutional Framework GoM will develop and establish the institutional framework and continue to strengthen the MEEW to implement the National Energy Policy.
EPS.67	5.5.2	Strengthening of the MEEW and Establishment of Intra-government Coordination linkages GoM will be responsible for the overall governance of the energy sector and

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		will establish and give authority and responsibility to the MEEW with the required financial and manpower resources and the intra-government coordination, executive and supervisory mandates.
EPS.68	5.5.3	Establishment of an Energy Inspection and Quality Asurance Body GoM will establish a mechanism under the MEEW that will oversee energy inspection, regulatory and quality assurance
EPS.69	5.5.4	Establishment of Financial Support Facilities for Energy Policy Implementation GoM will develop and establish financial support facilities for the development and implementation of all qualified renewable energy and energy efficiency projects in coordination with international and local funding agencies and banks, as well as the private sector.
EPS.70	5.5.5	Strengthening Local Energy Organization GoM will ensure that capacity of local organizations in support of the National Energy Policy are strengthened.
EPS.71	5.6	Integrated National Energy Planning, Monitoring and Evaluation for Sustainability GoM will develop and establish an integrated national energy planning, monitoring and evaluation by MEEW in coordination with relevant government agencies and verified by an independent auditing body to ensure that the development goals and purposes of the country are met through the sustainable supply and use of energy for the greater benefit of all secotr of the economy and all citizens.
EPS.72	5.6.1	Energy Auditing to Identify Energy Saving Opportunities GoM will be responsible for the performance monitoring of the energy policy implementation in general and provide technical support and financial incentives for private companies rendering energy auditing services to big energy consumers to ensure that the goals and objectives of the national energy policy will be met for the socio-economic benefits for the country.

ANNEX D. NATIONAL ADAPTATION PLAN OF ACTION

In its chapter VI, the National Adaptation Plan of Action (NAPA) lists the following key adaptation needs and priority adaptation strategies.

Adaptation needs

Land, beach and human settlements

1. Consolidate population and development.
2. Acquire support for the speedy and efficient implementation of Safer Island Strategy.
3. Strengthen land-use planning as a tool for protection of human settlements.
4. Build capacity for coastal protection, coastal zone management and flood control.
5. Protect beaches through soft and hard-engineering solutions.
6. Protect house reef to maintain natural defence of islands.
7. Improve building designs and regulations to increase resilience.
8. Integrate climate change adaptation into national disaster management framework.

Critical infrastructure

1. Develop coastal protection for airports and development focus islands.
2. Strengthen capacity for planning and design of infrastructure to ensure development of resilient infrastructure.
3. Protect powerhouses and utilities.
4. Protect telecommunication infrastructure.

Tourism

1. Protect beaches and tourist infrastructure.
2. Develop climate change adaptation policy and strategy for tourism.
3. Diversify the tourism product to reduce over-dependency on marine environment.
4. Strengthen tourism institutions to coordinate climate response in the tourism sector.
5. Incorporate climate change adaptation measures to upcoming

Fisheries

1. Improve fish finding and fish harvesting.
2. Establish aquaculture/mariculture as an alternative to natural breeding to reduce the economic and social impacts of changing tuna abundance.
3. Undertake research and disseminate information on fisheries and climate change.
4. Experiment new and alternative species and breeding methods for livebait.
5. Integrated reef fishery management.
6. Exploit new species and promote poultry farming as alternative sources of protein to reduce over-dependency on tuna for protein.

Human health

1. Strengthen regulatory and institutional capacity for vector control.
2. Streamline the planning of healthcare services and strengthen medical emergency response.
3. Promote healthy lifestyles, healthy islands and healthy buildings.
4. Strengthen the capacity for healthcare delivery.
5. Undertake research and disseminate information on climate change related diseases.
6. Increase nutrition promotion campaigns.

Water resources

1. Acquire appropriate sewage treatment and disposal technologies to protect water resources.
2. Increase safe rainwater harvesting.
3. Acquire desalination technologies appropriate for small islands.
4. Undertake recharging of aquifers to reduce salinisation from saltwater intrusion and storm surge flooding.
5. Protect and preserve natural water catchment areas.

Agriculture and food security

1. Develop a national food security strategy.
2. Secure trade agreements with foreign trade partners to ensure food security.
3. Establish capacity for emergency food storage in development focus islands at regional level.
4. Introduce new technologies to increase local food production.
5. Strengthen marketing and sale of local food items.
6. Improve allocation of land for agriculture.
7. Promote traditional food preservation and storage practices for local food.
8. Enforce and strengthen quarantine and integrated pest control to prevent pests and diseases.
9. Introduce new irrigation technologies.

Coral reef biodiversity

1. Provide alternatives to coral and sand as construction materials and enforce the ban on coral mining.
2. Enhance the capacity for waste management to prevent pollution of marine environment.
3. Formulate and implement an oil pollution contingency plan.
4. Acquire appropriate sewage treatment technologies.
5. Establish marine protected areas.
6. Establish an information base on coral reefs and climate change.
7. Undertake monitoring and research to prevent coral diseases and rehabilitate coral reefs.
8. Develop measures to protect coral reefs from development activities.

Priority adaptation strategies

- Build capacity for coastal protection, coastal zone management and flood control.
- Consolidate population and development.
- Introduce new technologies to increase local food production
- Acquire support for the speedy and efficient implementation of Safer Island Strategy.
- Develop coastal protection for airports and development focus islands.
- Integrate climate change adaptation into national disaster management framework.
- Strengthen tourism institutions to coordinate climate response in the tourism sector.
- Improve building designs to increase resilience and strengthen enforcement of building code.
- Acquire appropriate sewage treatment and disposal technologies to protect water resources.
- Incorporate climate change adaptation measures to upcoming resorts
- Promote healthy lifestyles, healthy islands and healthy buildings.
- Enhance the capacity for waste management to prevent pollution of marine environment.
- Provide alternatives to coral and sand as construction materials and enforce the ban on coral mining.
- Integrated reef fishery management.
- Streamline the planning of healthcare services and strengthen medical emergency response.
- Increase safe rainwater harvesting.
- Develop measures to protect coral reefs from development activities

- Undertake recharging of aquifers and other measures to reduce salinisation from saltwater intrusion and storm surge flooding.
- Undertake research and disseminate information on climate change related diseases.
- Strengthen the capacity for healthcare delivery.
- Strengthen capacity for planning and design of ports, harbours and jetties.
- Develop climate change adaptation policy and strategy for tourism.
- Protect house reef to maintain natural defence of islands.
- Protect and preserve natural water catchment areas.
- Experiment new and alternative species and breeding methods for livebait.
- Enforce and strengthen quarantine and integrated pest control to prevent pests and diseases.
- Strengthen regulatory and institutional capacity for vector control
- Protect beaches and tourist infrastructure.
- Review the marketing strategy of tourism to diversify the tourism product and reduce over-dependency on coral.
- Acquire desalination technologies appropriate for small islands.