

National Biodiversity Strategy and Action Plan of the Maldives

2002

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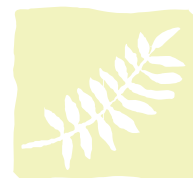
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Executive Summary

The National Biodiversity Strategy and Action Plan (NBSAP) of the Maldives is an essential part of meeting the commitments of the Maldives to the Convention on Biological Diversity (CBD) and it will serve as the guide for conserving biological diversity of the Maldives. Maldives ratified the Convention on Biological Diversity on 28th October 1992, becoming one of the first nations to do so. The world nations brought the Convention on Biological Diversity into force on 29th December 1993, recognizing the great threat global biological diversity was facing and understanding the immense value of biological diversity. It is a pledge to conserve the variety of life on earth.



The NBSAP was formulated with wide consultation and extensive stakeholder participation. A comprehensive approach is adopted where biodiversity conservation issues are integrated into all areas of national development, planning, policy and administration. In addition, importance is given to capacity building, strengthening of laws and regulations, community participation and creating awareness.



The Ministry of Home Affairs, Housing and Environment will be responsible for implementing the strategy and action plan, with other lead institutions taking responsibility for activities which fall within their mandate. These institutions will incorporate the relevant activities into their work programmes. The lead institutions include the Ministry of Fisheries, Agriculture and Marine Resources, Ministry of Tourism, Ministry of Atolls Administration, Ministry of Trade and Industries, Ministry of Education and local institutions such as Island Development Committees and Women's Committees and NGOs.

The National Commission for Protection of the Environment (NCPE) will act as a steering committee to coordinate the implementation programme. It will adopt work plans for various programmes, oversee timely implementation and monitor progress. A technical committee will be established to advise the steering committee on technical aspects of programmes and play a key role in monitoring and reviewing the progress of the NBSAP. In addition, the

priority activities and project profiles presented in the document will guide the implementation of the NBSAP.

The earth's biological systems are of fundamental importance to human society. Global biological diversity is being destroyed at an unprecedented rate through habitat destruction, over-exploitation, pollution and other causes. Habitat destruction and over-exploitation are also some of the major threats to the biological diversity of the Maldives. In addition, effects of global warming are a major concern because of its adverse impact on the reefs. Some of the underlying causes for the loss of biodiversity in the Maldives are the increased demand on natural resources due to population expansion and rapid economic development. The major impediments to biodiversity conservation in the Maldives are the lack of capacity in all areas including human, financial and institutional capacity. Further, biodiversity conservation concerns are not adequately represented in development planning initiatives. In addition, lack of capacity for enforcement of biodiversity conservation related laws and regulations and in some cases want for more effective laws and regulations hinder conservation activities.

Much needs to be done for effective conservation of biodiversity in the Maldives. Capacity building in all areas and increased coordination between relevant sectors need special attention. Strengthening law enforcement is an immediate requirement. Conservation measures need to be integrated into all relevant sectors under a comprehensive plan.

Elements of the National Biodiversity Strategy and Action Plan

The overall **vision** of the National Biodiversity Strategy and Action Plan of the Maldives is:

A nation which appreciates the true value of the natural environment, utilizes its natural resources in a sustainable manner for national development, conserves its biological diversity, shares equitably the benefits from its biological resources, has built the capacity to learn about its natural environment and leaves a healthy natural environment for future generations.

This NBSAP is guided by the **principles** of ecological sustainability, individual responsibility for biodiversity conservation, equitable sharing of benefits, accountability and transparency of decision makers to the public and community participation.

The three **goals** of the NBSAP are:

1. *Conserve biological diversity and sustainably utilize biological resources.*
2. *Build capacity for biodiversity conservation through a strong governance framework, and improved knowledge and understanding.*
3. *Foster community participation, ownership and support for biodiversity conservation.*

The major **objectives** and **actions** of the NBSAP are:

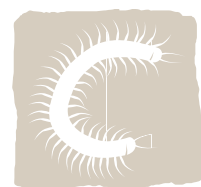
Integration of biodiversity conservation into the national development

process: The objective of integrating biodiversity conservation into the national development process will be achieved through the development and adoption of suitable development planning procedures, formulation of land-use plans and strengthening of the Environment Impact Assessment (EIA) process.

Adoption of policies and management systems for sustainable use:

The objective of adopting appropriate national and sectoral policies and management systems for sustainable utilisation of natural resources will be achieved mainly through the development of consistent and appropriate national and sectoral policies and better management practices. Specific actions in the marine sector are the development of integrated marine policies, which include development of consistent legislature and improved communication between relevant institutions. Policies that support ecological sustainability are to be adopted in the tourism sector. Other actions include setting a standard policy on allocation of land for urban development and strengthening policies for use of timber resources.

With regard to management systems the major actions for the fisheries sector are promotion of co-management with the aim of government institutions



and communities working together for conservation of biological resources and introduction of bio-economic fisheries management tools. Actions for the tourism sector include strengthening management practices by improving capacity and developing limits of acceptable change. Actions for other sectors include establishing better land-use practices through provision of appropriate guidelines and introduction of alternative measures to discourage coastal modifications.



Establishment of measures for in-situ and ex-situ conservation: The objective of developing and establishing effective management measures for biodiversity conservation will be accomplished through means of protected areas, suitable quarantine facilities, strengthened coral reef conservation measures and mechanisms for protecting wetlands and mangrove areas. Protected areas will be managed effectively by establishing a Protected Areas Management Unit, introducing operational guidelines and implementing a framework for long-term financing. Coral reef conservation will be achieved by actions such as use of economic valuation measures and phasing out coral mining.

Management of threatening processes: One of the objectives of the NBSAP is the management of threatening processes at both the national and international level. The major threatening processes identified are the adverse effects of climate change and pollution on biological diversity. At the national level this will be achieved by minimising pollution by developing an integrated waste management system. The actions at the international level include increased efforts to support mitigation of green house gases and to raise the concerns of the Maldives at international forums.



Adoption of economic incentives: Economic valuation, natural resources accounting, and economic instruments such as user pays principle, tradable permits and export quotas will be developed and adopted to ensure that biodiversity is suitably valued.

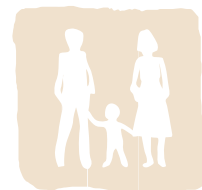
Improvement of knowledge and understanding: Improvement of knowledge and understanding for biodiversity conservation will be

accomplished through several measures. Research to facilitate biodiversity conservation will be carried out by formulating a comprehensive research strategy, human capacity building, infrastructure development and collaborative research. The system for monitoring and forecasting the status of biodiversity will be strengthened. In addition, strengthening and expanding existing information dissemination systems will help realize the objective of improved knowledge and understanding.

Increasing awareness: Regular awareness programmes aimed at all levels of society from grassroots to policy level are measures recommended to create awareness to promote behaviour that conserve biodiversity. The awareness programmes will be conducted through the formal education system using the school curriculum and non-formal education systems. In addition biodiversity conservation issues will be publicized using the media. Most importantly, awareness programmes aimed at policy makers and management level officials in both public and private sectors are recommended.



Strengthening legal framework: The following actions will aim towards strengthening the legal framework for biodiversity conservation. Existing laws and regulations will be reviewed and revised with stakeholder participation. It will be ensured that the laws and regulations reflect the value of biodiversity through fitting penalties for non-compliance. Law enforcement capability will be strengthened while promoting voluntary compliance. The role of Island and Atoll offices in implementing laws and regulations will be expanded by strengthening their institutional framework, building capacity and increasing responsibility and accountability.



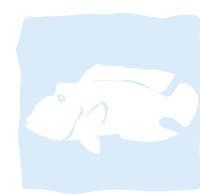
The protection of intellectual property rights will be supported by ensuring that such knowledge is not inequitably taken out of Maldives.

Strengthening institutional framework and development of human resources: Effective communication and co-ordination, increased skills and expertise and better financial mechanisms will help to provide a facilitative and capable institutional environment.

Trained manpower through long-term and short-term programs at national and atoll level in relevant fields will increase human capacity for biodiversity conservation. Proper incentives for biodiversity professionals will also aim towards increasing human capacity.



Building financial capacity: Financial capacity for biodiversity conservation will be built through contributions from the annual government budget, an Environment Conservation Fund and international funding sought from relevant donor agencies.



Increasing community participation: Developing co-management partnerships with appropriate skills development and integrated processes and empowerment and mobilization of local communities is expected to increase community participation in biodiversity conservation activities.

Implementation: The Ministry of Home Affairs, Housing and Environment will take the lead role in implementing the NBSAP with active participation from relevant offices. The implementation of the NBSAP will be guided by the NCPE acting as the steering committee. A technical committee will be established to provide the relevant technical input.



Introduction

I Introduction

I.1 Definition of Biological Diversity or Biodiversity

Biological diversity refers to the total variety of life on earth. It includes genetic diversity, species diversity and ecosystem diversity. The Convention on Biological Diversity (CBD) defines biological diversity as “the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and ecosystems”.

Genetic diversity: Refers to the variety in the genetic information contained in all the living things on earth. Genetic diversity is measured in terms of variation between genes, DNA or amino acid sequences of life on earth.

Species diversity: Refers to the variety of species on earth.

Ecosystem diversity: Refers to the different types of ecosystems on earth. An ecosystem is a dynamic complex of living things including plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. E.g. coral reef ecosystem, mangrove ecosystem.

I.2 Significance of Biodiversity Conservation

The earth is a single functional unit made up of different components; living and non-living, interacting with each other and maintaining the entire system. For this system to function properly a balance within and between all the living and non-living components is vital. Earths’ ecosystems provide the commodities and services that are vital for human well-being and very existence. Both economic and social development of the present and future generations is dependent on maintenance of these systems. Maintenance and improvement of agricultural productivity, which is vital for meeting the food requirement of the world’s growing population, is greatly dependant on maintaining genetic diversity and healthy biological systems. Biological resources are utilized to a great extent in both traditional and modern medicinal products. Further, we

depend greatly on the services that healthy ecosystems provide such as clean air and water.

1.3 Threats to Biological Diversity

In the past century human demands on biological resources for space, commodities and amenities have increased as never before. Earth's biological diversity is being destroyed at an alarming rate through habitat destruction, over-exploitation, pollution, invasion of exotic species and effects of climate change.

The underlying causes for the great loss of biological diversity include increased demand on biological resources because of high population and increased consumption, economic markets and policies that fail to recognize the true value of biological diversity, government policies that fail to address the increased loss of biological resources, and paucity of knowledge on ecosystem dynamics and functions.

Today it is evident that earth's natural systems cannot withstand unlimited stress without threatening the viability of these systems. As a result, in recent years several countries have initiated measures for sustainable development realizing the great necessity for such measures if future generations are to enjoy the commodities and services from natural systems that we enjoy today.

1.4 Convention on Biological Diversity

Recognizing the great need for global scale measures for conservation of the earth's biological diversity the United Nations Environment Programme (UNEP) initiated preparations for an international convention on biological diversity. The Convention on Biological Diversity (CBD) was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development (the Rio "Earth Summit") held in Rio de Janeiro in June 1992. Inspired by the world communities increased commitment to sustainable development the CBD entered into force on 29 December 1993.



The objectives of the CBD are “the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding”.

The Maldives signed the CBD on 12th June 1992 at the UNCED conference at Rio de Janeiro and ratified it on 28th October 1992. Maldives was one of the first nations to ratify the convention.

Among the various obligations on signing the convention is the development of a National Biodiversity Conservation Strategy and Action Plan for the conservation and sustainable use of the biological diversity.

1.5 Biological Diversity of the Maldives

The marine and terrestrial life of the Maldives has been poorly studied. The greatest diversity of life in the Maldives occurs in the coral reefs of the island nation. The life on the reefs is characterized by high diversity and low abundance.

At least 1090 species of fish and 187 coral species have been recorded from the Maldives. The other groups such as molluscs and crustaceans are poorly studied and only a little over 400 species of molluscs, 350 species of crustaceans have been recorded from these diverse groups.

The islands are typical coral islands with limited life on land. About 583 species of plants have been recorded of which 260 are believed to be native or naturalised and 323 are cultivated plants introduced for agriculture and ornamental purposes. Nearly 170 species of birds have been recorded in the Maldives of which few have localised distributions in the Maldives and many are migratory species.

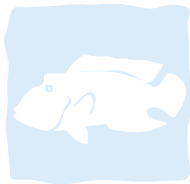
Many islands harbour small wetland areas and sea grass beds. These areas have been poorly studied and the variety of life in these little known.

Endemic species are few in the Maldives. One species of fish the blenny, *Ecsenius minutes* has been recorded only from the Maldives and the anemonefish, *Amphiprion nigripes*, is recorded from the Laccadives and Shri Lanka apart from the Maldives.

Habitat destruction and over exploitation are major threats to the biological diversity of the Maldives. Coastal development activities like harbour development and land reclamation adversely effect the reefs around such areas. Coral mining for construction of buildings and coastal protection is a major concern. Land clearance for housing threatens the scarce terrestrial biological diversity of many islands, especially the highly populated islands. Over-exploitation of high valued reef resources such as sea cucumber, groupers and giant clams has become a major issue in recent years. Timber harvesting threatens the survival of old growth and hardwood trees on uninhabited as well as inhabited islands. In addition, affects of increased sea temperatures, due to global warming, on the health of the coral reefs are a major concern.

The major underlying cause for loss of biological diversity in the Maldives is the increased demand on natural resources due to population expansion and rapid economic development. There are only limited natural resources to cater to an increasing population. Paucity of biological resources results in a few resources being intensively utilized by many user groups. Conflicts between user groups for these limited resources are becoming an increasingly important issue. In addition, there are few alternative income earning opportunities to exploitation of biological resources and marine resources in particular, especially in the islands other than the capital Male' and tourist resorts.

Maldives has taken some initiatives on biodiversity conservation. Several marine species including napoleon wrasse, dolphins, turtles, whales and black coral have been protected. A total of 23 bird species are protected of which 17 are seabirds. A total of 25 marine sites have been declared as protected and only diving and bait fishing are allowed at these sites. In addition, three unique islands are protected.



Some measures have been taken for sustainable use of the biological resources of the Maldives. Several regulations are in place to control the exploitation of some species. A size limit has been placed on lobster harvests and exploitation of sea cucumber using SCUBA gear is not allowed. The export of a number of marine species is prohibited while quotas are in place for species used in the aquarium trade. Coral mining from certain areas is prohibited.



However, much remains to be done for effective biodiversity conservation. Although several regulations are in place for biodiversity conservation and sustainable use the capacity to monitor and enforce these regulations is minimal. In addition, many of the regulations are formulated by different sectors such as fisheries and tourism. Therefore, there is little co-ordination between the various sectors in enforcing and implementing these regulations. Biological diversity is a part of everyday living and if conservation is to be effective conservation measures need to be integrated into all relevant areas under a comprehensive plan. Increased co-ordination between the various organizations is required. Strengthening laws and regulations and their enforcement is an immediate requirement. Capacity building to plan and implement biodiversity conservation activities in all areas is a high priority.

1.6 Development of the National Biodiversity Strategy and Action Plan

The Maldives commenced work on formulating a National Biodiversity Strategy and Action Plan in 1996. As a result a Global Environmental Facility (GEF) funded project implemented by the Ministry of Home Affairs, Housing and Environment and UNDP to formulate the NBSAP and Country Report, began in 1998. Biodiversity conservation planning began with a review of available literature, assessment of the status and identification of issues involved. In addition to background reports on the status of biological diversity several meetings were held with experts from relevant fields to identify issues involved in biodiversity conservation. Wide-ranging stakeholder consultations were carried out throughout the country. Five regional consultations with stakeholders, including fisherman, farmers, civil servants, womens groups and traditional medicine practitioners were conducted covering all the administrative atolls. A sectoral consultation was held in Male' where

stakeholders from public as well as private sectors participated. In all these consultations background papers were presented to the participants and participants were invited to raise issues and suggest solutions to these. Competent resource persons from relevant fields guided the participants by providing information whenever required throughout the consultations. Reports on all the consultations were produced.

On completion of the assessments and consultations the resource persons with a variety of relevant backgrounds worked together and compiled the Biodiversity Strategy and Action Plan drawing on knowledge gained from the assessments and stakeholder consultations and their own expertise. In addition, government offices and NGO's were invited to produce project profiles for biodiversity conservation to be included in the Action Plan.

This strategy is formulated with the objective of achieving biodiversity conservation and sustainable utilization of biological resources in the Maldives. It is a comprehensive approach where biodiversity conservation is integrated into all areas of national planning, policy development, and administration. Separate measures for protection and conservation of special habitats and ecosystems are suggested. In addition, emphasis is laid on capacity building, strengthening of laws and regulations, and community participation. Improving knowledge and creating awareness are goals to be achieved through this strategy.


Once the strategy is implemented biodiversity conservation principles will be integrated into all areas of national development planning and administration, and matters related to biodiversity conservation and sustainable use will be co-ordinated well between the relevant sectors. The public will be well aware of the significance and value of biological diversity. Finally economic policies and mechanisms will reflect the true value of biological resources.

1.7 Structure of the National Biodiversity Strategy and Action Plan

The NBSAP contains 6 main chapters. Chapter I is the introduction, which includes the background to the Convention on Biological Diversity as well as



that for the NBSAP of the Maldives. Chapter 2 contains the vision, guiding principles and goals of the NBSAP. The objectives and actions needed to attain goals 1, 2 and 3 of the strategy and action plan are outlined in Chapters 3, 4 and 5 respectively. Chapter 3 mainly deals with measures for conservation and sustainable use, Chapter 4 deals with measures for capacity building and Chapter 5 includes those for community participation. Chapter 6 contains the implementation strategy of the NBSAP. Specific project profiles are annexed to the document.

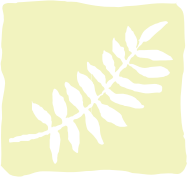


Chapters 3, 4, and 5 are structured in the following style. The relevant goal is presented at the beginning of the chapter. Several objectives to attain the specific goal have been presented. A number of actions necessary to achieve each objective have been identified. More details on how the actions can be carried out are provided in relation to each action. Wherever necessary a short introductory paragraph has been inserted under Goals and Objectives.

Vision, Guiding Principles and Goals

2 Vision, Guiding Principles and Goals

2.1 Vision



A nation which appreciates the true value of the natural environment, utilizes its natural resources in a sustainable manner for national development, conserves its biological diversity, shares equitably the benefits from its biological resources, has built the capacity to learn about its natural environment and leaves a healthy natural environment for future generations.

2.2 Guiding Principles

The guiding principles outlined below will direct actions to achieve the goals of the National Biodiversity Strategy and Action Plan

- Every individual residing in the Maldives depends on the nations biological resources and has a duty to conserve its biotic wealth.
- Benefits derived from the use of biological resources should be equitably shared.
- Decisions regarding policies, plans and projects will be guided by economic approaches which assess the full social and environmental costs and benefits.
- Measures to understand, conserve and use biodiversity will be integrated in all national, sectoral and local policies and planning efforts and during programme and project implementation.
- While government policies and plans will form the basis for biodiversity conservation, community participation is vital for implementing conservation measures.
- Those responsible for making and implementing decisions relating to biological diversity will be accountable to the public for their actions through explicit and transparent processes.
- All Maldivians will be provided with opportunities to understand and appreciate biodiversity and to participate in decisions regarding the

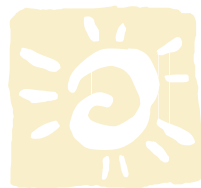
allocation, conservation and sustainable use of biological resources, especially those that affect them directly.

- In cases of significant threat to biological diversity lack of scientific certainty will not be used as a reason for delaying measures to prevent degradation or loss.
- While socio-economic development is essential it cannot be achieved at the cost of the environment. Ecological sustainability must be a major goal in national development.
- Efficient and prudent management of natural resources is fundamental to conservation of biological resources and sound resource management requires an integrated ecological approach that seeks to maintain the dynamics of natural systems and processes.
- Development of the National Biodiversity Strategy and Action Plan will not be an end in itself but rather a part of an interactive process that will be monitored and reviewed regularly.

2.3 Goals

The three goals of the National Biodiversity Strategy and Action Plan are:

1. Conserve biological diversity and sustainably utilize biological resources.
2. Build capacity for biodiversity conservation through a strong governance framework, and improved knowledge and understanding.
3. Foster community participation, ownership and support for biodiversity conservation.



chapter

3

Conservation and Sustainable Use

3 Conservation and Sustainable Use

Goal - I

Conserve biological diversity and sustainably utilize biological resources.

Maldives at present, like other countries of the world, is facing increased loss of biological diversity. The major direct causes of biodiversity loss in the Maldives are habitat destruction and over-exploitation. The root causes, however, are found in rapid population expansion and economic growth associated with development planning and national policies primarily focused on social and economic aspects. However, some measures that promote environmental conservation have been introduced recently. The introduction of mandatory Environment Impact Assessment (EIA) and environmental monitoring procedures for all major development projects was an important step towards conservation in development. In addition sustainable development concepts have been included in the recent National Development Plan and some sectoral plans. Further, declaration of protected areas and species have added to environment conservation efforts in the Maldives.

Terrestrial biodiversity is scarce in the Maldives and loss of terrestrial habitats to housing and infrastructure development is a major issue for biodiversity conservation. Habitat alterations from activities such as harbour development and land reclamation have added to the loss of biological resources. Increased utilization of marine resources for economic benefit imposes additional pressure on this environment and leads to conflicts between different user groups. The reefs of the Maldives, high in diversity and low in abundance, are especially sensitive to over exploitation. Highly significant ecosystems such as mangrove areas are considered as waste lands to be utilized for more “useful” purposes such as land reclamation or waste disposal.

The dependency of the whole population on a very limited resource base makes conservation of biodiversity a significant challenge. Comprehensive planning, management and protection of biodiversity are required to strike a balance between conservation of biological diversity and sustainable utilization of biological resources.

Increased efforts to integrate biodiversity conservation principles into



national development plans and sectoral policies are required. Biological resource utilization needs to be carefully planned and managed, avoiding multi-use conflicts and over-exploitation. In addition, measures for protection of important habitats and species and rehabilitation of endangered species and habitats need to be taken. Comprehensive planning and efficient management is called for to achieve conservation and sustainable utilization of biological diversity.



3.1 Integration of biodiversity conservation into national development process

Integrate biodiversity conservation into the national development policy making, planning and process.

Objective

3.1.1 Development Planning

Develop and adopt planning procedures and processes that take into account biodiversity conservation.

Action I

- ★ Develop and adopt biodiversity conservation principles in perspective plans and strategic planning.
- ★ Undertake strategic environmental assessment of the national development plan and sectoral master plans.
- ★ Ensure that initial environmental impact evaluation is carried out before endorsement of projects in the public sector investment programme (PSIP).
- ★ Ensure effective participation of development planners and town planners in the selection and designation of protected areas.
- ★ Designate focal points for biodiversity conservation from planning agencies and regional development management offices.
- ★ Conduct training programmes on biodiversity conservation for planners, economists and strategists.
- ★ Establish ecological valuation processes in development planning.
- ★ Adopt multi species approach in resource management planning.

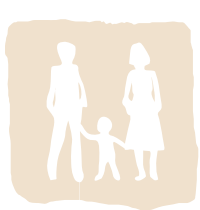


3.1.2 Land-use Plans

Action 2

Formulate and adopt integrated national and regional land-use plans that would ensure appropriate use of natural resources, development of infrastructure, conservation of the natural environment and serve as a guideline for utilization of national resources.

- ★ Develop landuse plans for all the regional growth centres and development focus islands giving due consideration to the protection and preservation of important habitats and species in such islands.
- ★ Review and revise development plans and existing land-use plans as well as regulations and guidelines giving priority to human well-being and protecting the natural environment.
- ★ Review and revise the regional development plans for projects which may have adverse impacts on biological resources, such as creation of ports, harbour facilities, land reclamation and waste disposal sites, to incorporate biodiversity conservation concerns.
- ★ Seek public and private sector involvement in formulating urban and rural development plans.
- ★ Identify and allocate suitable areas for waste disposal and industrial development to reduce the impacts of pollution from these activities.
- ★ Integrate biodiversity conservation principles into existing resettlement plans.
- ★ Give importance to the creation/preservation of green belts around every island that would help to protect the island from storms and other severe natural events.
- ★ Allocate zones and areas for different commercial activities, areas of natural beauty, sites of special scientific interest and conservation areas to preserve the nations' natural heritage.



3.1.3 Environment Impact Assessment (EIA)

Review and strengthen national EIA process to provide for mitigating the possible adverse environmental impacts of policies, programmes, and projects.

Action 3

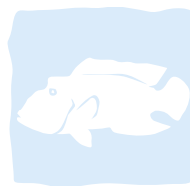
- ★ Ensure that all projects, including public and private sector ones undergo the EIA process.
- ★ Provide for public participation from the early stages of the EIA process and allow public concerns and objections to be raised before final decisions are made including project site selection.
- ★ Develop and provide project specific guidelines focused on key issues and incorporating biodiversity conservation concerns.
- ★ Develop and incorporate biodiversity conservation criteria in the EIA process, incorporating concepts such as endangered species, keystone species and critical habitats.
- ★ Use economic valuation of ecosystems in EIA processes as a determinant in justification of projects.
- ★ Strengthen the monitoring process of environmental impacts stated in EIAs to improve environmental management.

3.2 Adoption of policies and management measures for sustainable use

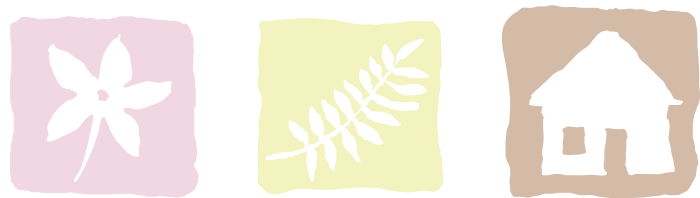
Adopt appropriate national and sectoral policies and management systems for sustainable utilization of natural resources.

Objective

One of the most critical causes of global loss of biological diversity, and natural resource loss and degradation is the failure of policy. Policy failure is typically driven by the pursuit of short-term economic gain and lack of awareness of the long-term implications of non-intervention. Policy failure occurs when policy-making bodies fail to respond to actual or threatened degradation in the natural resource base or the ecosystem, leading to serious environmental, social and economic consequences. This can be addressed through the creation of an appropriate macro policy environment that respects environmental, social and economic diversity. This macro



policy environment would ensure appropriate allocation between various types (or sectors) of resource use while ensuring the sustainability of single and multiple use resources. National objectives would be achieved through sectoral policies set within this macro policy framework. Natural resource management geared towards efficient utilization of resources rather than sustainable utilization has been one of the factors that has led to loss of biological diversity worldwide. In addition management according to economical or ecological principles alone is not sufficient to address the complex issues in resource utilization. An integrated approach in natural resource management that takes into consideration its complexities and is consistent with ecological and socio-economic values is required. Interdependency of many ecological systems and biological processes should be taken into account as management decisions affecting one process or species may have impacts on other components.



3.2.1 National Policies and Resource Management Planning

Action 4

Establish a macro policy environment, guided by principles of biodiversity conservation of and sustainable use of natural resources, that will ensure appropriate allocation between various types (or sectors) of resource use while ensuring the sustainability of single and multiple use resources.

- ★ Review existing (sectoral) policies on natural resource utilization and identify areas of policy and management failure that lead to biodiversity loss, and natural resource loss and degradation.
- ★ Implement a macro strategy for biodiversity conservation and sustainable management of natural resources that optimises environmental, social and economic objectives, while harmonizing sectoral objectives and strategies.
- ★ Establish and adopt mechanisms to absorb this macro strategy into sectoral policies and plans with a view to integrated natural resource use conservation and management.
- ★ Implement a mechanism for regular performance reviews that utilize participatory monitoring and evaluation processes in order to ensure the effectiveness of sectoral policies and strategies to implement the macro strategy, and to ensure their responsiveness to biodiversity conservation needs.



Action 5

Develop national resource management plans and assess economically important biological resources to contribute to sustainable utilisation of biological resources.

- ★ Implement resource use mapping and establish biological reference points for commercially exploited species.
- ★ Assess threatening processes to develop alternatives.
- ★ Adopt an ecosystem management approach in national resource management planning.

3.2.2 Marine Policy

Action 6

Formulate and adopt an integrated marine policy which would facilitate and catalyze actions for effective management of marine resources while strengthening inter-sectoral relationship and ensuring consistency in policies and strategies formulated by various government institutions regarding the marine environment.

- ★ Conduct a review of existing policies and strategies on marine environment with a view changing policies, to accommodate sustainable management of marine resources, if needed.
- ★ Develop consistent legislation to define and apply the principles of sustainable management of marine environment.
- ★ Strengthen communication among various government institutions to minimize overlapping of strategies and programmes formulated towards management of marine biodiversity.
- ★ Seek stakeholder participation in the policy process and harmonize conflicting objectives, strategies and capacities.

3.2.3 Fisheries Sector

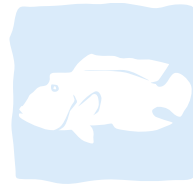
Action 7

Adopt ecologically sustainable fisheries management measures based on best scientific evidence available, to ensure the attainment of maximum economic and social benefit from the sector while conserving resources for future generations.

- ★ Formulate and implement Code of Conduct for responsible fisheries to ensure effective conservation, management and development of fishery resources, with due respect for ecosystem and biodiversity.
- ★ Establish an effective technology-based and effective system for Monitoring, Control and Surveillance (MCS) to ensure that all fishing activities are carried out in a manner consistent with national legislation and in conformity with international laws.
- ★ Promote devolution of management responsibilities to community level with the aim of government institutions and communities working together

to develop conservation and management strategies for the fisheries sector.

- ★ Integrate socio-economic impact assessment (SEIA) into management processes in order to ensure sustainable management of fisheries and to enable the achievement of social and economic objectives.
- ★ Promote the introduction of bio-economic management tools to prevent over fishing and excess capacity and to ensure that fishing effort is commensurate with the productive capacity of the resources and their sustainable utilization.
- ★ Minimise waste, discards, incidental and by catch through adoption of ecologically friendly fishing practices and technologies that are specific to target species.
- ★ Work to regulate fisheries in a manner that minimizes multiple use conflicts and conflicts between fishers using different vessels, gear, fishing methods and fishing for different species.
- ★ Ensure that appropriate research is conducted into all aspects of fisheries including ecology, technology, economics and socio-economics.
- ★ Increase human and research capacity in the relevant institutions for assessing impacts on fishery resources and the environment from fisheries activities.



3.2.4 Tourism Sector

Adopt a policy of ecologically sustainable tourism.

- ★ Review and revise existing regulations, and adopt guidelines to strive towards minimum disturbance and alterations to the environment in construction of resorts, infrastructure development and other activities in the tourism sector.
- ★ Incorporate biodiversity conservation principles into tourism regulations and standards.
- ★ Integrate broad based natural resource stakeholder consultation processes into tourism development and planning to minimise multi-use conflicts.

Action 8

- ★ Review and strengthen EIA processes within the tourism sector to avoid ecologically unsustainable developments and protect ecologically important and sensitive areas when planning tourist facilities.
- ★ Integrate SEIA in tourism planning and development.
- ★ Implement planning controls to establish Ecotourism and specialist tourism instead of mass tourism.

Action 9

Promote biodiversity conservation while maintaining high standards of quality and delivery in providing tourist experiences, through sustainable utilization of natural resources and strengthening management practices in the sector to ensure tourism development is not detrimental to the ecological integrity of the area.

- ★ Improve capacity to assess ecological impacts of tourism developments and operational practices through institutional strengthening and human resource development.
- ★ Resolve multiuse conflicts related to tourism activities including utilisation of uninhabited islands and protected sites.
- ★ Conduct research to monitor environmental impacts and stresses on natural resources from tourism developments and evaluate trends in the tourism industry.
- ★ Develop limits of acceptable change to tourist areas. Review and determine ecological carrying capacity limits on tourist facilities and visiting areas.
- ★ Formulate and implement a code of conduct for responsible tourism incorporating biodiversity conservation principles for tourist facility operations.
- ★ Establish minimum standards, guidelines for wise use and reduce demand for biological resources to prevent waste and degradation, and encourage implementation of environment friendly technologies and materials.
- ★ Promote development of ecotourism as a vehicle for providing



environmental, socio-economic and cultural benefits at both local and national levels through implementation of eco-tourism projects and product marketing.

- ★ Develop and implement a programme to increase awareness of tourists on the vulnerability of the natural environment of the Maldives.

3.2.5 Housing and Physical Development

Ensure biodiversity conservation is integrated into housing, physical development activities and other landuse practices.

Action 10

- ★ Restrict coastal development projects such as ports and harbours only to islands that have been identified in the national/regional development plans.
- ★ Discourage dredging/excavating of small harbour basins for every inhabited island by encouraging the use of natural harbours (*vilu*) and by seeking alternative means, such as jetties, to access the islands.
- ★ Strengthen institutional and human resource capacities of regional and local government bodies that is essential to enforce land-use regulations and guidelines.
- ★ Set a standard policy and written guidelines on allocation of housing plots and urban development areas in all inhabited islands which

- ✿ *Ensures minimum disruption to densely vegetated areas when allocating land for new housing zones or plots and other physical development activities by protecting such areas.*

- ✿ *Ensures retention of shoreline vegetation buffer zone (Heylhi) when allocating land for housing plots and other physical development activities in the inhabited islands.*

- ✿ *Defines and optimises the area of land to be allocated for housing plots and other physical development activities in a way that is most appropriate for conservation of the biological diversity of each island or atoll.*



- ★ Review and revise existing guidelines on management of newly allocated housing plots and encourage retention of vegetation within allocated housing plots whenever plots are allocated within densely vegetated areas.
- ★ Support use of perimeter hedges instead of perimeter walls by providing detail layout plans of housing plots for each island.
- ★ Review and enforce regulations on non-occupation of housing plots to fully utilize housing zones of islands.

3.2.6 Timber Resources

Action 11

Strengthen and implement national policies and regulations for ecologically sustainable use of timber resources.

- ★ Review the appropriateness of existing policies, legislation and current management practices on timber resources.
- ★ Develop policy and legislative frameworks for the utilization of timber resources taking into account conservation of biological diversity.
- ★ Undertake assessments of resource status on uninhabited islands and community land on inhabited islands to identify their value for the conservation of biological diversity.
- ★ Develop and adopt codes of practice to promote efficient management, sustainable utilization and effective monitoring of timber resources.
- ★ Develop and implement rehabilitation programmes to conserve terrestrial biodiversity, including agro forestry and reforestation programmes.

3.2.7 Agriculture

Action 12

Formulate and adopt ecologically sustainable agriculture development and management practices.

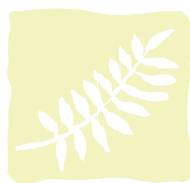
- ★ Develop institutional and legal work frame incorporating biological diversity conservation measures for the agriculture sector.
- ★ Introduce and support adoption of technologies and methodologies for cultivation that are appropriate for the conservation and sustainable use of land and trees.

- ★ Promote participatory approaches that enable local people to be involved in planning and management of agricultural activities, including land allocation for cultivation and crop varieties to be grown, in order to encourage them to work towards enhancing the local environment by themselves.
- ★ Enhance partnerships and collaboration with all the current and potential stakeholders in adopting ecologically sustainable agriculture management practices.
- ★ Minimise use of chemical fertilizers by promoting use of organic fertilizers and green manure application for conservation of soil and soil organisms.
- ★ Collaborate with international agriculture research institutions to strengthen national research systems and to link conservation with national agricultural management practices.
- ★ Implement Integrated Pest Management (IPM) practices for the control of pest and diseases of plants.
- ★ Develop programmes for proactive management of insects and insect ecology in wild lands and agricultural lands in order to diminish the loss of essential ecosystem services such as pollination and decomposition.
- ★ Develop a code of conduct to be used as a set of principles for the distribution, handling and effective use of pesticides and herbicides and create awareness on safe use of pesticides.
- ★ Introduce and adopt appropriate low cost technologies for irrigation to enable efficient harvesting of ground water and thereby minimize salination, salt-water intrusion and other adverse effects on biological diversity.

3.3 Development and establishment of measures for in-situ and ex situ conservation

Develop and establish effective management measures for conservation of biodiversity to ensure ecological processes and systems are maintained.

Conserving biodiversity means taking steps to protect genes, species, habitats and ecosystems. Without conserving important habitats of adequate size it is futile to



Objective

conserve individual species. In view of the unique natural environment of Maldives, it is important that conservation and protection are provided to those natural elements of Maldives that give its distinctive ecological character. A comprehensive assessment of species, ecological systems, bio-regions and their use patterns is needed to enable understanding of the levels of threat posed to individual species and ecological systems for biodiversity conservation. It also requires establishment of effective management approaches. Some of these are the in-situ conservation and management approaches such as the establishment of representative protected areas, and extending protection to threatened species. The existing protected areas in the Maldives require development and implementation of an effective management system, and monitoring and enforcement of moratoriums on protected species.

3.3.1 Protected Areas

Action 13

Develop and implement a national representative system of effectively managed protected areas to ensure biodiversity conservation in the natural environment.

- ★ Identify and map bio-regions for establishing adequate protected areas, and categorise these areas for management.
- ★ Identify keystone species and study their interactions to protect those elements of the ecological systems that are crucial for conservation.
- ★ Establish a Protected Areas Management Unit comprising of technical experts, government and other stakeholders to strengthen institutional capacity to design and manage a system of protected areas.
- ★ Develop and introduce operational guidelines for protected area systems management.
- ★ Identify training needs for the community and institutions and train national co-ordinators, local monitors and wardens for management and monitoring of protected areas.
- ★ Prepare a framework for financing and implement a financial mechanism for the long-term management of protected areas.

- ★ Strengthen protected areas management through community participation and increased awareness.

Identify and develop guidelines for conservation of unique species, and biologically unique features of natural landscapes and seascapes.

Action 14

- ★ Identify, categorise and map unique habitats and species for conservation and protection.
- ★ Identify and protect significant populations of seabird species and their habitats to facilitate conservation.
- ★ Implement measures to preserve nesting vegetation and roosting grounds of bird species including shoreline buffer vegetation.
- ★ Strengthen and implement measures for protection of turtles, including extending protection to turtle eggs and breeding areas.

3.3.2 Coral Reefs

Strengthen conservation and management measures for coral reef ecosystems.

Action 15

- ★ Improve knowledge and understanding on the important ecological and biological processes of coral reef ecosystems by reviewing existing global information.
- ★ Study human-coral reef interactions and improve knowledge on natural and anthropogenic threats to coral reefs of Maldives to support management measures.
- ★ Strengthen monitoring procedures of biophysical and socio-economic aspects of coral reefs.
- ★ Declare and manage protected areas within coral reefs, including no-take zones for coral reef flora and fauna at threat of overexploitation.
- ★ Develop an economic valuation system for coral reefs that can be used in the EIA process.
- ★ Disseminate information on the importance and threats to coral reef ecosystems through public awareness programmes.
- ★ Implement management plans for coral reef associated species that are at threat of overexploitation, e.g: Bêche-de-mer, Groupers etc.



Action 16

Phase-out coral mining to support conservation of the reef ecosystem.

- ★ Conduct awareness programmes and educate the public on the importance of coral reefs to the Maldives and the threat that coral mining imposes on them.
- ★ Initiate the phasing out process by identifying and selecting one reef in each atoll where coral mining will be allowed and ban mining from other areas within the atoll.
- ★ Prohibit the use of coral for building coastal protection such as seawalls and promote use of alternative materials.
- ★ Hold public exhibitions to disseminate information on alternative sources of construction material.
- ★ Assist companies to extend distribution of alternative construction materials to remoter islands by providing incentives such as soft loans.
- ★ Support and encourage use of alternative sources of construction materials through appropriate techniques, research and economic incentives such as reduced import tax on alternative construction material to reduce cost of these.

3.3.3 Conservation of Plants and Mangroves

Action 17

Ensure indigenous plant genetic resources are preserved through an economically efficient and sustainable system.

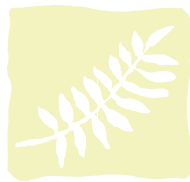
- ★ Identify, inventory and assess threats to endemic plant species.
- ★ Develop cooperation with regional and international centres of gene banks for the ex-situ conservation of plant genetic resources, recognizing that states have sovereign rights over their own plant genetic resources.
- ★ Establish botanical gardens and national parks to conserve vegetatively propagated plants and threatened species.
- ★ Conduct research to develop improved methods of conservation of plant genetic resources, in particular low-cost techniques appropriate to local operating conditions.

- ★ Encourage and support farmers to grow distinct local varieties of food crops, to ensure biodiversity conservation through traditional practices.
- ★ Educate the public of the value of plant genetic resources for their livelihood and thereby importance of conservation of this resource.
- ★ Encourage the public to grow indigenous plant species in home gardens and public areas such as mosques, schools, graveyards etc.
- ★ Promote development of traditional medicinal practices and assist the public to grow traditional medicinal plants.
- ★ Build a comprehensive data base on traditional medicinal plants.

Implement management measures to conserve wetlands and mangrove ecosystems.

Action 18

- ★ Identify wetlands and mangrove ecosystems important for conservation.
- ★ Develop economic valuation system for wetlands and mangrove ecosystems.
- ★ Set aside representative areas of wetlands and mangrove ecosystems for biodiversity conservation.
- ★ Undertake EIA before commencement of projects that involve wetlands, mangroves and seagrass areas.
- ★ Undertake restoration programmes for ecologically important wetlands and mangrove ecosystems that are endangered.
- ★ Protect and conserve mangroves, other wetlands and seagrass areas wherever possible from being landfilled, or being developed without taking conservation into consideration.
- ★ Study the role of seagrass ecosystems in the Maldives and investigate the importance of these ecosystems to the Maldivian environment.

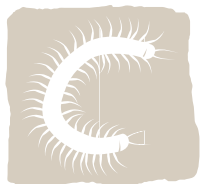


Action 19

3.3.4 Introduction of Exotic Species and Pests

Establish sanitary and phytosanitary measures necessary for conservation of biological diversity, animal and plant life, and health.

- ★ Formulate quarantine laws and other regulations to control import of alien species, pests and diseases.
- ★ Adopt risk assessment techniques developed by international organizations for identification of potentially harmful species, their entry, establishment and control.
- ★ Establish suitable quarantine facilities at entry points.
- ★ Establish appropriate measures for conservation of local biological diversity when transferring species from one locality to another within the country.



3.3.5 Migratory Species

Action 20

Establish management systems for transboundary straddling stocks and highly migratory species.

- ★ Identify migratory species and undertake international data sharing for stock assessments of migratory species.
- ★ Identify and manage nursery areas and habitats that hold significant numbers of migratory species.
- ★ Identify migratory species that are threatened and develop mechanism for their protection, including establishment of links with international funding agencies and interest groups and adoption of appropriate regulations.

3.3.6 Protection and Rehabilitation of Threatened Species

Action 21

Develop and adopt mechanisms for the protection and rehabilitation of threatened components of biological diversity.

- ★ Establish abundance indices for the identification of vulnerable and endangered species.
- ★ Implement and monitor moratoriums on utilization of endangered species.

- ★ Formulate and implement rehabilitation programmes and recovery plans for endangered species and their habitats.
- ★ Establish incentives for utilization of sustainable alternatives for biological components that are threatened.

3.4 Management of threatening processes

Ensure that threatening processes are managed at the national level to minimise their adverse impacts on biological diversity and strengthen efforts to influence the international community to control threatening processes at global level.

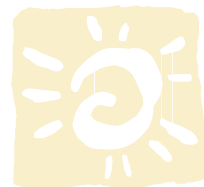
Objective

Pollution of water is a concern to the conservation of the biological diversity of the Maldives. The disposal of solid waste, hazardous waste and sewerage are the main sources of the water pollution in the country. The changing consumption patterns of Maldivians have increased the amount of solid and hazardous waste generation. The small size of the islands and geographical separation of the inhabited islands are barriers for effective disposal of solid waste in the Maldives. The current practices of disposing solid and hazardous waste in biologically sensitive areas like swamps and mangroves, use of septic tanks, and locations of sewerage outfalls need to be assessed to create a suitable environment for conservation of the biological diversity of the country.

The Climate change and the associated sea level rise pose enormous threats to the survival of the small islands system of the Maldives. The latest prediction by the Intergovernmental Panel on Climate Change predicts that the global average temperature will rise by 1.4 to 5.8°C and mean sea level by 0.09 to 0.88m by the end of 2100. It is expected that the predicted climate change would have significant impact on the environment of the Maldives.

One of the greatest threats to the coral reefs of the Maldives is coral bleaching due to increased sea surface temperature. The last coral bleaching event in the Maldives in 1998 reduced live coral cover to a mean of 2.1% as compared with pre-bleaching level of 30-45% live coral cover.

The Maldivian tuna fisheries and the tourism industry are expected to be affected by the predicted rise of global mean temperature and sea level. The implementation of



the national action plan for climate change, which has been developed as part of the climate change enabling activity, would help to conserve the local biological diversity of the Maldives.

3.4.1 Pollution

Action 22

Ensure that adverse impacts of pollution on biological diversity are minimised.

- ★ Adopt a policy of “polluter pays” in cases of significant pollution of the environment.
- ★ Develop a national integrated solid waste management system which incorporates solid waste minimization and reuse methods which are practical for small islands and proper disposal of solid waste with minimal environmental impact.
- ★ Improve current septic tank designs by taking into consideration socio economic factors such as large households, geophysical conditions such as shallowness of the water lens, and climatic conditions such as the high rainfall for the country.
- ★ Develop a safe disposal method for hazardous waste, which is currently disposed with solid waste in open landfills.
- ★ Implement the Addressing Air Pollution – National Strategy for Action.
- ★ Formulate and implement a Marine Pollution Action Plan aimed at combating and reducing marine pollution and dealing with disasters.

3.4.2 Climate Change

Action 23

Develop and implement measures at national level to deal with the effects of climate change and increase efforts internationally to support mitigation of greenhouse gases.

- ★ Make execution of activities proposed in the National Implementation Strategy for Addressing Climate Change a priority.
- ★ Intensify efforts to raise the concerns of the Maldives in international forums regarding the effects of climate change and sea level rise and the threats to the Maldives from the same.

3.5 Adoption of economic incentives for conservation

Develop and adopt suitable economic instruments to ensure that the value of biodiversity is adequately reflected in national development activities and to promote sustainable utilization of biological resources and equitable distribution of benefits from the use of biological resources.

Objective

There is consensus among experts that economic forces are fundamentally responsible for the destruction of biological diversity that takes place in the world today. The case of the Maldives is no exception. The clearance of thick bush to make way for agricultural development, cutting of trees for both boat building and for use as fire wood, targeted exploitation of certain marine species or the introduction of alien marine species for commercial use, for example, are among the factors responsible for the loss of biological diversity in the Maldives today.

Any meaningful policy or plan to tackle the loss of biological diversity due to economic forces requires a clear understanding of the full range of values associated with biological diversity in the country. Prudent decisions between conservation and sustainable development and with respect to prioritising among competing and alternative uses of biological diversity could only emerge from such clear understanding of the economic value of the resources in question. This section does not aim to trivialize the intrinsic value of biological diversity. Rather, the above argument is based on the conviction that a clear understanding of economic values will help in curbing the destruction of biological diversity presently taking place in the country.

The adoption of appropriate economic instruments is essential in addressing the destruction of biological diversity through economic forces. This section will discuss economic instruments such as ‘user pay’ principle, tradable permits, export quotas, and improvement of processing and marketing of resources, which are presently in use in many parts of the world and which could be effectively utilized in tackling the loss of biological diversity in the Maldives.

In addition, this section will discuss the importance of integrating sustainable income generation into conservation efforts to ensure long-term success. This section will also highlight the importance of making available adequate financial resources to help start new and innovative projects for conservation of biological diversity and the inclusion of conservation components into existing projects.



3.5.1 Economic Valuation

Action 24

Develop valuation systems for ecologically and socially important components of biodiversity through appropriate monetary valuation methods.

- ✦ Utilize biodiversity valuation within feasibility studies, including cost benefit analyses, for all infrastructure and development projects and economic activities.

Action 25

Develop a natural resources account incorporating biodiversity values, that complements standard national income accounts, to reflect costs of ecosystem degradation, loss of species and genetic diversity and resource depletion.

3.5.2 Economic Incentives

Action 26

Adopt suitable economic incentives according to conservation needs of the component of biological diversity being utilised.

- ✦ Introduce the concept of 'user pays' principle for biological resource utilization.
- ✦ Introduce tradable permits to promote economically efficient and sustainable utilization of resources.
- ✦ Introduce export quotas to promote sustainable utilization of those components of biodiversity the exploitation of which are mainly for export.
- ✦ Obtain optimal economic benefit of biological resources through improved processing and efficient marketing.
- ✦ Ensure that economic instruments (e.g., licenses, quotas, taxes, etc.) utilized in biological resource use promote equitable distribution of benefits from the use of biological resources and do not favour other nationalities over Maldivians.



Integrate sustainable income generation into conservation efforts to ensure long-term conservation.

Action 27

Make available access to adequate financial resources to help start new and innovative projects for conservation and to include conservation components into existing projects.

Action 28

3.6 International co-operation

Support and participate in international efforts to conserve local and global biodiversity.

Objective

Maldives has showed its commitment to conservation and sustainable utilization of global biological diversity by ratifying the Convention on Biological Diversity. Being a signatory of this convention provides the Maldives with significant support, which it cannot otherwise obtain, that helps the country to pursue conservation activities that are vital for its long-term progress.



Maldives needs to consider signing other such initiatives that are related to biodiversity conservation and will be useful for the nation. The opportunities provided by such initiatives can be utilized to build capacity and promote other biodiversity conservation work. Maldives should form regional ties with other nations that it shares its biological resources with to ensure that these resources are conserved and used in a sustainable manner.

In addition to obtaining the benefits of international support Maldives in her turn must support and aid other nations to conserve their biological diversity by respecting initiatives of other countries although Maldives may not be a party to these.

Action 29

Join in international conventions that promote biodiversity conservation and ensure that every effort is made to meet the objectives of these conventions.

Action 30

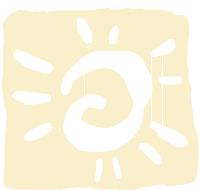
Utilize the opportunities offered through the Convention on Biological Diversity and other such initiatives to obtain technical, financial, research and other assistance for national biodiversity conservation activities from international agencies.

Action 31

Contribute to regional bodies that are related to conservation of biological resources through data sharing and resource management programmes.

Action 32

Collaborate with the international community to utilize genetic resources of the Maldives that have potential medicinal or other value in a manner that is sustainable and beneficial to all.



Capacity Building

Capacity Building

Goal - 2

Build capacity for biodiversity conservation through a strong governance framework and improved knowledge and understanding.

The severe lack of capacity in all fields and locales for biodiversity conservation is an important issue to be addressed in the Maldives. There are acute shortages of human and financial resources to plan and implement necessary programmes. Manpower, trained or otherwise, to deal with natural resource management and conservation is in effect nonexistent in the outer islands of the Maldives. The financial constraints of a developing country, with most of the available finance diverted to providing basic services, leaves very little resources for nature conservation. The institutional framework for facilitating conservation is weak and, therefore, cannot effectively address the issues involved.

A general lack of awareness and appreciation at all levels of society of the implications of biodiversity loss and the true value of biodiversity lead to conservation and sustainable use of biological resources being considered a minor issue in the national context. In addition, the limited knowledge and understanding of biodiversity and its status in the Maldives exacerbates the situation.

Maldives needs to address these issues if biodiversity conservation and sustainable use is to be achieved. Capacity building is the one area that requires urgent action for implementing biodiversity conservation measures. This section covers strategies and actions for capacity building through increased knowledge and understanding, institutional strengthening, human resource development and financing mechanisms.



4.1 Improvement of knowledge and understanding

Improve knowledge and understanding of biological diversity and resource management to promote conservation and sustainable use of biodiversity.

Objective

Marine and terrestrial life in Maldives has been poorly studied. The existing knowledge has come mainly from studies related to commercial activities such as fisheries and agriculture, or foreign scientific expeditions or from the work of individual researchers. Research bodies are few in the country and these were established only around the mid 1980s. The existing research bodies and, as in the past, collaboration between local and foreign research bodies, and work of individual researchers can be used to generate new knowledge on biological diversity. Without further knowledge conservation of biodiversity is unthinkable. Along with acquisition of new knowledge, it is useful to document how the biological resources and biodiversity knowledge have traditionally been managed and used.

Currently, continuous information on biological resources is available mainly from the data collection systems of fisheries, agriculture and tourism sectors. These sectors themselves need to improve their data collection systems constantly to meet the changing needs of the expanding sectors. While improving the sectoral data collection systems, the sectors can consider other related biodiversity data needs. Introducing a specific data collection system for biodiversity can expand the current collection of data, which are being attained mainly from commercial activities. Along with the strengthening of data collection, it is important to analyse and interpret the data to assess and forecast the biodiversity situation and organise the monitoring of the situation.

At present biological resource management concerns are limited to commercially important resources. Hence, information dissemination and awareness building are also centred on the management of commercial resources. It is necessary to widen the scope of management, information dissemination and awareness building to include all biological resources, both commercial and non-commercial. Unlike the present awareness campaigning, which is mainly focused on individual species, the future campaigning has to be focused on the management and conservation of ecosystems, of which biological resources are a part.



4.1.1 Assessing, Monitoring and Forecasting

Action 33

Strengthen the system for assessing, monitoring and forecasting the status of biological diversity.

- ★ Strengthen the existing system of collecting fisheries, agricultural and environmental data from resource users, such as fishing vessel owners, dive schools, farmers and uninhabited island leaseholders by making data collection regular, timely and reliable.
- ★ Establish a data collection system specific for biodiversity so that data from this system combined with resource use data will give a better picture of biodiversity status.
- ★ Analyse and interpret data from present fisheries, agricultural and environmental data collection systems in order to assess the level of resource utilization and status of biodiversity.
- ★ Establish a biodiversity database for continued storage and analysis of biodiversity related data.
- ★ Undertake regular analysis and forecasting of biodiversity status in light of available stock assessment, resource use, environmental and meteorological data so that if future remedial measures are required they can be taken with minimum negative socio-economic impacts.
- ★ Establish and maintain a GIS database of national biological diversity to enable scenario generation on biodiversity status, support decision making and promote wide dissemination and sharing of information.
- ★ Establish monitoring systems for threatening operations and processes such as land reclamation, dredging, deforestation and pollution, with the aim of assessing the status and taking timely and appropriate mitigation measures.

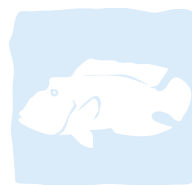


4.1.2 Research

Conduct research and develop appropriate technology to facilitate biodiversity conservation.

Action 34

- ★ Formulate and implement a comprehensive research strategy, with the participation of relevant agencies, to facilitate and support biodiversity conservation, taking into account available resources and explicitly stated realistic time frames.
- ★ Establish a suitable set of indicators to use in biodiversity conservation and natural resources management such as ecological indicators, human development indicators, environmental indicators and performance indicators. In doing so, utilize indicators which have already been developed in other countries and modify to fit local conditions.
- ★ Expand research and development capacity through human resource and infrastructure development.
- ★ Initiate collaborative research with regional and international research bodies and expand and strengthen current collaborative research activities.
- ★ Assess the biological diversity of the Maldives at genetic, species and ecosystem levels as a phase out activity.
- ★ Utilize rapid assessment methods to assess the status of biological diversity.
- ★ Undertake a species inventory of the Maldives taking into account species abundance and distribution, initially by reviewing and revising the taxonomy of the known species to conform to current systems and then by identifying new ones through collaboration with international organisations and/or experts.
- ★ Undertake surveys of intensively exploited biological resources by assessing the stocks of exploited species, and environmental and socio-economic impacts of activities.



- ★ Assess the vulnerability of Maldivian biodiversity, most of which is characterised by low abundance and low tolerance to environmental changes, in the face of increasing resource exploitation, environmental degradation and habitat modification.
- ★ Collect, document, and disseminate ethno-biological and traditional knowledge and develop appropriate models and tools for biodiversity conservation in current conditions through the use of ethno-biological knowledge and indigenous resource management practices.
- ★ Undertake a programme to screen flora and fauna for medically active substances by utilizing traditional knowledge and through collaboration with international institutions.
- ★ Improve knowledge on coastal ecological systems to help in formulating coastal development plans where coastal modifications are necessary.

4.1.3 Information Dissemination

Action 35

Strengthen and expand existing information dissemination systems to facilitate easy public access to information related to biodiversity.

- ★ Collect literature related to biodiversity conservation and make it easily accessible to the public.
- ★ Establish and develop a national library system easily accessible for local communities through the use of mobile libraries, community libraries and school libraries.
- ★ Provide technical, financial and infrastructure support to local communities for the adoption of information technology in natural resource management and biodiversity conservation.
- ★ Undertake a programme of information dissemination through the use of all media (radio, TV, internet), public information sessions, public information centres and direct contact in order to mobilize community involvement.
- ★ Undertake a programme to translate existing resource and status studies

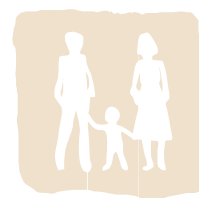
into Dhivehi so as to support community learning and self-development for biodiversity conservation and resource management.

4.2 Increasing awareness

Create awareness to change attitudes and practices that harm biological diversity, develop behaviour that promote biodiversity conservation, and create public support for biodiversity conservation.

Objective

Although general environmental awareness is on the increase true awareness on the significance and value of biological diversity, at all levels of society is generally insufficient and, therefore, considerable effort is not put in to actively conserving biological diversity. The general lack of awareness manifests itself in societal values, which do not consider the detrimental impacts of human activities to be as major issues and a society in which human activities are geared towards unsustainable use of biological resources. Importance given to conserving biological diversity for the next generation is not enough, as people are not sufficiently aware that conservation is a must at the rate biological diversity is being affected at present levels of utilization.



Creating awareness on the importance of biological diversity at all levels of society, from high-level officials to grassroots level, using a variety of tools including school curriculum and adult education programmes is suggested.

Spread awareness on biodiversity conservation principles, issues and methods at all levels of society including grassroots level, through formal, non-formal and adult education systems.

Action 36

- ★ Introduce biodiversity conservation topics into staff development programmes at educational institutions to increase their appreciation of the issues and thereby enable them to enhance student awareness.
- ★ Introduce biodiversity conservation principles and issues into the school curriculum in relevant subject areas at a suitable standard to each grade, incorporating local environmental issues as examples.
- ★ Create a sense of ownership for biodiversity conservation by concentrating on local issues when planning and conducting awareness programmes.

- ★ Employ methods such as participatory learning models that encourage critical consciousness in order to spread awareness at grassroots level.
- ★ Establish ways and means of continuous learning on biodiversity conservation within the non-formal and adult education systems.

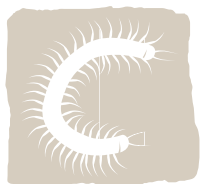
Action 37

Utilize popular culture to heighten awareness on biodiversity conservation.

- ★ Develop and broadcast/telecast public service announcements and special programmes on biodiversity conservation.
- ★ Incorporate biodiversity conservation programmes (including relevant programmes or documentaries in other languages which have been translated to Dhivehi) into current environment awareness programmes broadcast/telecast through popular media.

Action 38

Conduct regular awareness programmes for policy makers and management level officials of both public and private sectors to update them on current issues and promote integration of biodiversity conservation principles into relevant programmes.



4.3 Legal framework

Establish and strengthen legal framework for biodiversity conservation.

Laws and regulations incorporating concepts of biodiversity conservation are scarce and scattered in the Maldives. Moreover, they are ineffective in deterring persons from continuously breaching them. Therefore, to establish a regulatory framework conducive to conservation of biological diversity and in order to strengthen its enforcement capability, the existing laws and regulations relating to biodiversity conservation need to be reviewed, shortcomings identified, and hindrances to their enforcement removed. In formulating new regulations or reviewing existing ones, the focus will be to involve all relevant stakeholders in the process in order to ensure that regulations are practical and allow enforcement. Furthermore, the strategy will also incorporate ways of making the general public aware of the rationale behind the laws/regulations designed to conserve biological diversity, in order to strengthen enforcement through increased voluntary compliance.

Objective

4.3.1 Strengthening Legal Framework

Review and revise existing laws and regulations relating to conservation of biological diversity and formulate regulations with provisions for implementing them.

Action 39

- ★ Identify loopholes and shortcomings of existing laws and regulations relating to biological diversity and strengthen these to support biodiversity conservation effectively.
- ★ Formulate and periodically review regulations on the conservation of biological diversity.
- ★ Ensure that existing and/or new regulations are transparent and unambiguous.
- ★ Involve stakeholders in reviewing existing regulations and formulating new regulations.



Action 40

Ensure laws and regulations relating to biodiversity conservation reflect the value of biological diversity.

- ✦ Ensure that laws and regulations are formulated in such a way that they effectively deter persons from engaging in conduct that harms biological diversity.
- ✦ Ensure that penalties for non-compliance adequately reflect the cost to biological diversity.
- ✦ Make it an offence not to disclose information regarding or report a breach of a law/regulation relating to biodiversity conservation.

Action 41

Strengthen law enforcement capability while undertaking management systems designed to promote voluntary compliance.

- ✦ Increase awareness of the general public regarding the existence, substance and rationale of laws and regulations relating to biological diversity by publicising through the media.
- ✦ Strengthen coordination and cooperation between parties responsible for regulating and monitoring compliance.
- ✦ Strengthen law enforcement by encouraging parties responsible for regulating and monitoring to take initiative in enforcing laws/regulations established for conservation of biological diversity.

Action 42

Ensure legal recognition for conservation of all living things in relevant laws and regulations.

Action 43

Expand the role of island and atoll offices in implementation of regulations related to biological resource conservation.

- ✦ Strengthen institutional framework at atoll and island level by building capacity that is required to implement laws/regulations designed to conserve biological diversity.
- ✦ Ensure greater consultation with atoll and island offices in formulation of the regulatory framework for conservation of biological diversity.
- ✦ Ensure atoll and island offices, under the supervision of relevant government offices, are made responsible and accountable for enforcing laws/regulations relating to the conservation of biological diversity at atoll and island level.



4.3.2 Intellectual Property Rights and Use of Genetic Resources

Presently there is no established legal framework for intellectual property rights (IPR) protection in the Maldives. Therefore, to provide protection for IPR associated with biological diversity new legislation and regulations must be established or related legislation and regulations must be reviewed to incorporate protection for IPR. IPR associated with biological diversity such as biotechnology and ethno-biological knowledge needs to be protected by incorporating suitable concepts of IPR protection in existing law/regulations or by establishing new laws/regulations since existing categories of copyright protection and patenting would not be able to protect such knowledge. At the same time such protections must allow for access and equitable sharing of IP knowledge, and facilitate transfer of technology and capacity building.

Genetic resources patenting cannot always ensure a wide distribution of the benefits which arise from a given research, mainly due to the fact that patent law is designed to protect technical inventions, procedures, etc. Patent law makes a clear distinction between discovery and invention. 'Biological inventions' often lack such an inventive step since they only involve a recombination of genetic material that already exist in novel ways.

Since the Convention on Biological Diversity builds upon the principle of national sovereignty of genetic resources, it infers that states have authority to determine access to genetic materials. However, CBD also obliges the contracting party to facilitate access to genetic resources and states that access, where granted, shall be on mutually agreed terms. Also under Article 15.7 contracting parties are to take legislative, administrative or policy measures with the aim of sharing, in a fair and equitable way, the results of research and development and benefits arising from the commercial and other utilization of genetic resources.



Action 44

Protect intellectual property rights.

- ✦ Ensure that local/indigenous knowledge about living organisms and their use is protected by establishing other more appropriate forms of IPR protection.
- ✦ Ensure such IP knowledge is not inequitably taken out of Maldives by screening research proposals made by foreign companies or private parties and entering into contract with parties whose research proposals are accepted in a manner that protects IPR.

Action 45

Ensure that the benefits derived from the use and development of the genetic resources of the country serve national interests and are shared fairly and equitably.

- ✦ Introduce appropriate legislation setting out terms of access to genetic materials of/in Maldives to control access to genetic resources and ensure that Maldivians get their fair share of any benefits derived from the utilization of these resources.
- ✦ Establish a system of screening all research activities that are to be conducted in the Maldives and monitoring these activities.

4.4 Institutional capacity building

Objective

Provide a facilitative and capable institutional environment to ensure that biodiversity conservation and sustainable resource management goals and objectives are achieved.

Action 46

Establish institutional arrangements that are facilitative, responsive and support biodiversity conservation and sustainable management of natural resources.

- ✦ Conduct an institutional capacity analysis of existing institutions and organizations in order to identify their strengths, weaknesses, synergies, conflicts and gaps in relation to biodiversity conservation and sustainable management of natural resources. In doing so, assess institutional capacity gaps in:
 - ✦ national or sectoral policy, laws and regulations;



- ✿ institutional mandates and inter-institutional relationships;
 - ✿ internal organization (distribution of functions, organization and management framework physical and financial capacity);
 - ✿ skills, expertise and information in relation to mandate;
 - ✿ financial resources and mechanisms available to the respective institutions; and
 - ✿ the quality of their response to issues related to biodiversity conservation and sustainable management of natural resources.
- ★ Review and restructure overall institutional framework for resource management, use and conservation in a manner that:
- ✿ takes into account identified institutional capacity gaps;
 - ✿ provides clear institutional mandates that complement each other;
 - ✿ ensures inter-agency co-ordination and collaborative partnerships; and
 - ✿ optimises use of available institutional, financial and human resource capacities.
- ★ Establish effective channels of communication and co-ordination between institutions to:
- ✿ ensure information sharing and transfer;
 - ✿ joint education and training (where appropriate);
 - ✿ learning from policy experience; and
 - ✿ joint project and policy monitoring and evaluation.



Undertake institutional strengthening and capacity building to facilitate, provide timely response, and support biodiversity conservation and sustainable management of natural resources.

- ★ Formulate an institutional development strategy for each line institution aimed at overcoming any identified deficiencies and institutional capacity

gaps in the distribution of functions, internal organization and management and physical and financial capacity of the institution with respect to biodiversity conservation.

- ★ Adopt an equitable and efficient decision-making process that is informed by stakeholder input and utilizes best available knowledge.
- ★ Provide education and training to build skills and expertise on participatory management and regulation, integrated natural resource management, conflict resolution, institutional supervision, and ability to implement economic policy instruments strategically.
- ★ Establish financing mechanisms to fulfill institutional functions and build capacity for revenue management.
- ★ Implement public sector investments that support biodiversity conservation and sustainable management of natural resources.

4.5 Human resource development

Objective

Develop and increase human resources to plan and implement biodiversity conservation measures and assess conservation needs.

Human resources, both at national and local level, to support biodiversity conservation activities are very limited in the Maldives. Only a handful of trained persons are present in government institutions at national level who are trained in suitable fields either in research, planning or management. At island level, with the exception of a few field officers especially trained for specific purposes such as fisheries data collection there is no manpower except in the capital Male'. In addition limited financial capacity hinders the employment of more people in fields such as conservation. Some NGO that obtain finance for specific projects lack suitable manpower which forces the NGO's to employ foreign experts especially if the work to be carried out is technically complex. Also the remuneration for work in such fields of work is generally unsatisfactory and, therefore, there is little incentive to join these fields of work.

Measures to train and appoint additional people in biodiversity conservation and create suitable conditions to attract people to this field are needed.

Assess national human resources development needs for biodiversity conservation in relevant areas of public as well as private sectors.

Action 48

Train biodiversity professionals to develop manpower in a variety of relevant fields including natural resource planning, conservation biology, natural resource economics, bioregional management, community organisation, and marine and terrestrial ecology and taxonomy.

Action 49

Train and appoint people at atoll and island level through short term training programmes to evaluate biodiversity conservation needs and assist in implementing conservation measures.

Action 50

Build indigenous capacity in communities through participatory techniques that create conditions for the exchange of knowledge, and through assistance to develop managerial and organisational skills adapted to current practice.

Action 51

Create suitable positions for biodiversity professionals both nationally and locally with incentives to work in difficult conditions.

Action 52

4.6 Financial capacity

Ensure that funds essential to achieve biodiversity conservation objectives are secured and allocated in a manner that maximises benefits.

Objective

Allocate funds explicitly for biodiversity conservation and sustainable use from the annual budget of concerned government offices and ensure that these funds are utilized fully for that purpose.

Action 53

Establish a national Environment Conservation Fund (ECF) with the support and participation from all levels and sectors of the government.

Action 54

- ★ Determine the most suitable structure for the ECF taking into consideration the various options available such as endowment funds, sinking funds, revolving funds or a combination of these.
- ★ Manage the ECF through a Board of Trustees represented by relevant government offices, private sector, NGOs and donor agencies.



- ✦ Establish systems of banking, auditing and contracting including appropriate legislation and oversight.
- ✦ Establish guidelines for managing the fund including acceptable funding sources, criteria for project proposals and allocation of funds.
- ✦ Ensure a large continual funding base through assistance from international donors as well as financing mechanisms at national level.
- ✦ Market the ECF to publicize the fund and give recognition to sponsors through websites, popular media and awards.
- ✦ Establish precedents for a governance structure to ensure transparency between ECF donors and beneficiaries.

Action 55

Seek financial assistance from relevant international organisations by pursuing conservation goals that they support.



Community Participation

5 Community Participation

Goal - 3

Foster community participation, ownership and support for biodiversity conservation.

Given the geographic dispersal of the population and the coral island based natural resource system of the Maldives, community participation in biodiversity conservation is important to the long-term success of the programme. Community participation refers to situations in which some or all of the relevant stakeholders are involved in a substantial way in management/decision-making activities. The underlying basis behind these approaches is that the goal of effective biodiversity conservation is beyond the reach of any one institution or community. No such institution or community working alone has the resources, such as expertise, funds, labour, and authority, which are required to implement a biodiversity conservation programme the job done in the most effective manner. By working together, pooling resources and knowledge, the possibilities for conservation are maximized. Also implicit in the term partnership is the concept of common good which fosters a trust that makes it possible to follow a course of action that harmonizes different interests while responding, at least to some extent, to all of them. Typically such arrangements are also consensus-based with decision-making power being shared in some way among the various stakeholders. This means that line ministries responsible for the conservation and management of biological resources must develop and enter into a range of partnerships, as appropriate, with resources users for the conservation and management of resources.

Historically Maldives did adopt a participatory approach in management of natural resources. Under this system of self-governance known as 'vaaru' the individual atoll's natural resources are shared between the local inhabitants of the atoll and the government. Through this system of resource management no natural resources within a natural atoll remained unpreserved. Property rights and access rules were well established. Although this system has disintegrated, some communities still follow self-initiated management practices.

5.1 Co-management

Establish an institutional framework in which property rights are devolved to a defined user group, with concomitant responsibilities and obligations for biodiversity conservation and natural resource management.

Objective

Develop and implement integrated processes and mechanisms for continuous and sustained co-management partnerships through stakeholder consultation, collaboration, and devolved management.

Action 56

Establish a network (or management group) that has stakeholder support and trust, consisting of relevant line agencies of the government and resource use groups.

Action 57

Develop appropriate skills and disciplines amongst co-management partners and adopt sound management principles, rules and regulations, and best practices.

Action 58

Empower local communities through community organisation, environmental education and institutionalisation.

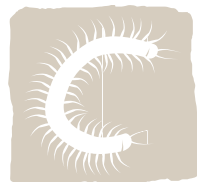
Action 59

Provide extension services, training, scientific and technical advice and information to co-management partners.

Action 60

Integrate conflict resolution techniques (facilitation, conciliation, negotiation, mediation and arbitration) into the management process to minimize infringements of rules and regulations.

Action 61



5.2 Community Mobilization

Objective

Mobilize communities to actively become involved in biodiversity conservation.

Action 62

Develop and adopt tools and participatory techniques to enhance public involvement and strengthen user group teamwork.

Action 63

Undertake programmes of social communication and information dissemination through the use of all media, public information sessions, public information centres and direct contact in order to mobilize community involvement.

Action 64

Introduce rapid rural appraisal systems at community level to improve assessment of the status of biodiversity.



Implementation of the Biodiversity Strategy and Action Plan

6 Implementation of the Biodiversity Strategy and Action Plan

6.1 Implementation, monitoring and review

Objective

Ensure that the activities in the National Biodiversity Strategy and Action Plan are implemented according to priority and within specified time frames by the concerned agencies and establish regular monitoring and review mechanisms for the Biodiversity Strategy and Action Plan.

Maldivian biodiversity strategy has been developed with broad participation, through workshops involving stakeholders from government, private sector, island communities, local NGOs and other interest groups. Therefore, the main focus for implementing the strategy should be to adopt a bottom up approach by involving a range of stakeholders from the outset, and by building capacity at the government and grass root level as well as in local institutions (Atoll and Island Development Committees, Women's Committees, Clubs, NGOs).

Once the strategy is adopted nationally, a sensitisation programme needs to be undertaken throughout the country. The purpose of this programme will be to let the public know what the biodiversity strategy means to the different stakeholders, what role it will play in biodiversity conservation and what kind of time frame can be expected for the implementation of various activities under the strategy. For the successful completion of the sensitisation program a focus group that comprises of various government institutions, private sector, NGOs and media can be established.

The Biodiversity Strategy and Action Plan will be an integral part of the existing policies of various institutions and will be incorporated into the ongoing and planned biodiversity related programmes and projects.

6.1.1 Prioritising and Sequencing of Activities

Maldives has enjoyed remarkable economic growth during the last two decades. While the entire country has benefited from this economic growth and social improvements, most of the developmental activities have in one way or another affected the biodiversity of the country. This is reflected in

the wide range of themes and objectives outlined in this Strategy and Action Plan. It is evident that these objectives and activities will not contribute equally to the sustainable management of the biological diversity nor are they equally urgent. Furthermore, many of the objectives such as the sustainable management of marine resources are already being pursued by other sectoral strategies. Scarcity of financial and human resources will make it impossible to address all the issues and objectives at once. Therefore, it is important to prioritise and sequence various activities which have to be implemented under this strategy. Activities which are not being addressed presently but are identified as having the potential to make significant impacts on preventing the loss of biodiversity need to be undertaken first. During the process of formulating of the Strategy and Action Plan, a number of such activities have been identified and prioritised. The prioritised activity list is presented in Annex I.

6.1.2 Administration, Coordination and Review

A key to the success of the Strategy and Action Plan will be the continuation of an administrative structure that will ensure its implementation and subsequent monitoring and review, which reflect progress made through completion of activities and allows for the identification of new actions to be undertaken. A number of government institutions have mandates to undertake programmes related to the conservation of biological diversity. Hence one of the biggest challenges facing the successful implementation of the strategy would be to foster better communication between various government institutions to minimize overlapping of programs outlined in the strategy. It has to be stressed that the issues outlined in the strategy do not focus on a single area, or institution relating to biodiversity conservation. Therefore, the implementation of the strategy will require full participation of inter-sectoral institutions. This document outlines the broad linkages that have to be developed between various government institutions during the process of implementation of the strategy. Ways and means of involving NGOs and community stakeholders have to be developed and institutionalised through a gradual process once the implementation commences.



6.1.3 Implementing Agencies

Ministry of Home Affairs, Housing and Environment

The Ministry of Home Affairs, Housing and Environment will act as the central coordinator and lead institution for implementing the Maldivian Biodiversity Strategy and Action Plan. The Ministry of Home Affairs, Housing and Environment will be responsible for implementing the following activities:



- ✦ Coordinate the involvement of other institutions.
- ✦ Administer the formulation of a Technical Committee for the implementation of the strategy.
- ✦ Assist relevant ministries in detailed preparation of individual project proposals.
- ✦ Assist in obtaining international funding for activities outlined in the strategy.
- ✦ Oversee the promotion of the strategy at national and international level.
- ✦ Administer the monitoring and review process.

Apart from the Ministry of Home Affairs, Housing and Environment, the following institutions with biodiversity related mandates will play key roles in implementing the strategy.

- Ministry of Fisheries, Agriculture and Marine Resources
- Ministry of Tourism
- Ministry of Planning and National Development
- Ministry of Construction and Public Works
- Ministry of Atolls Administration
- Ministry of Information, Arts and Culture
- Ministry of Trade and Industries

- Ministry of Education
- Ministry of Transport and Civil Aviation
- Ministry of Finance and Treasury
- Ministry of Health
- Ministry of Defence and National Security
- Ministry of Foreign Affairs
- Local Institutions (ADCs, IDCs, WDCs and Clubs)

The above lead institutions will take the responsibility of implementing various programmes identified in the Strategy and Action Plan which fall within their jurisdiction, incorporating the programmes into the work plan. The biodiversity related mandates of the lead institutions are listed in Annex 2.

To facilitate better coordination and communication between different institutions involved in the implementation process, a Steering Committee and a Technical Committee will be utilized.

The Steering Committee will:

- ★ oversee the timely implementation of the Biodiversity Strategy and Action Plan,
- ★ adopt terms of references and work-plans for various programmes proposed under the Action Plan,
- ★ identify project partners,
- ★ reflect progress made through completion of tasks,
- ★ identify new actions to be undertaken,
- ★ identify co-funding options,
- ★ provide overall direction.



The Steering Committee will be the main decision making body for the Strategy and Action Plan. The committee will comprise of senior officials from all the lead institutions. Instead of formulating a new committee the responsibilities of the Steering Committee should be included in the mandate of the National Commission for Protection of the Environment.

The Technical Committee will be a multidisciplinary committee which comprises of professionals from all major institutions involved in the implementation of the Strategy and Action Plan. The main function of the Technical Committee will be to advise the Steering Committee on technical aspects of various programmes and activities outlined in the strategy. The initial task of the committee will be to undertake a review of ongoing programmes undertaken by different institutions, targeted towards biodiversity conservation. The Technical Committee will also play a key role in monitoring and reviewing the progress of the National Biodiversity Strategy and Action Plan. The review process will be the principle occasion to examine the progress of various programmes, identify the difficulties faced by various programmes and initiate remedial actions. After each review process a meeting of the Steering Committee will be held. A full review report will be presented to the committee.

Another important aspect, which has to be considered for successful implementation is fostering international assistance for various programmes formulated under the Biodiversity Strategy and Action Plan. Maldives has neither the financial resources nor technical capability to implement all the programmes outlined in the strategy. Hence the only way of accomplishing the objectives of the strategy would be through assistance from the international community. In consultation with other relevant institutions, the Ministry of Home Affairs, Housing and Environment will identify areas of the strategy which require international assistance and with aid of Department of External Resources, tap the international organizations for possible assistance. The presence of a representative of UNDP in the Steering Committee could facilitate in establishing a link between the international community and the Steering Committee.



Glossary of Terms

Abundance indices: Information obtained from samples or observations and used as a measure of the weight or number of organisms which make up a stock. Provides a measure of the size of a stock.

Anthropogenic: A situation that occurs because of, or is influenced by, the activities of humans.

Biological reference points: indicators or signposts against which the status of a stock can be judged. Reference points can be either desirable targets (target reference points) or minimum biologically acceptable limits (limit reference points).

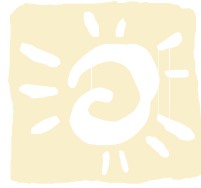
Bio-regions: Areas defined by a combination of biological, social, and geographic criteria, rather than geopolitical considerations generally, a system of related, interconnected ecosystems.

Carrying capacity: The population that an area will support without undergoing environmental deterioration. It is a function of site characteristics, management goals, and management intensity. Human activities in sanitation and expanding agricultural production have elevated the human carrying capacity in contrast, exploitation of natural resources and pollution will lower the human carrying capacity.

Community (Human): A social group of any size whose members reside in a specific locality.

Co-management: The sharing of authority, responsibility and benefits between government and local communities in the management of natural resources.

Conflict resolution techniques: Development interventions often change power relationships between groups in society. Some groups stand to lose while others gain from such interventions and as a result, conflicts may emerge. Effective mechanisms and techniques for conflict prevention, management and resolution are necessary for resolving conflicts or keeping them within acceptable limits. Transparency and information-sharing can eliminate conflicts caused by incomplete or distorted knowledge. Acceptance and ample space for expression of different



viewpoints can prevent the development of more destructive forms of conflict. E.g. facilitation, conciliation, negotiation, mediation and arbitration.

Conservation: The management of human use of the biosphere so that it may yield the greatest sustainable benefit to current generations while maintaining its potential to meet the needs and aspirations of future generations: Thus conservation is positive, embracing preservation, maintenance, sustainable utilization, restoration, and enhancement of the natural environment.

Cost-benefit analyses (CBA): An economic technique applied to public decision making that attempts to quantify in dollar terms the advantages (benefits) and disadvantages (costs) associated with a particular policy.

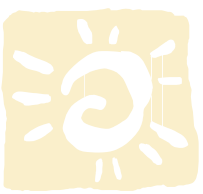
Ecological Indicator: A characteristic of an ecosystem that is related to, or derived from, a measure of biotic or abiotic variable, that can provide quantitative information on ecological structure and function. An indicator can contribute to a measure of integrity and sustainability.

Economic incentives: Economic measures, such as reductions in import duties for some products, directed at encouraging a certain course of action by individuals or businesses.

Economic instruments: Taxes, duties, interest rates, and other economic incentives or disincentives used to influence actions by individuals or businesses. E.g. user pay principle, tradable permits, export quotas.

Ecological valuation: In the context of this plan economic valuation refers to valuation by attaching monetary values to biological diversity. Such valuation does not take into consideration moral and ethical principles and values, which seek to protect biological diversity for the sake of protection.

Economic Value: Defined in strict economic terms as aggregate willingness-to-pay in dollars for the stream of services expected from an ecosystem. The full economic value of an ecosystem expressed in absolute (dollar) terms would be the sum of each person's willingness to pay for each service generated by each ecosystem function. In most cases this is impossible or impractical to measure. As a second-best alternative, the economic values of ecosystem services can be expressed in relative terms using indicators of willingness to pay. These indicators can be used to prioritise and compare ecosystems on



the basis of their relative economic value and are based on the six factors that determine aggregate willingness to pay. These are: 1) the expected mix and level of services provided by the ecosystem; 2) the number of people who benefit from these service; 3) their incomes; 4) their preferences; 5) the cost of gaining/keeping access to the service; and 6) the availability and cost of substitutes. Preferences are subjective values expressed in relative terms such that one thing is deemed to be more desirable or important than another.

Ecosystem: The organisms of a particular habitat, such as a pond or forest, together with the physical environment in which they live; a dynamic complex of plant, animal, fungal, and micro-organism communities and their associated non-living environment interacting as an ecological unit. Ecosystems have no fixed boundaries. Instead, their parameters are set according to the scientific, management, or policy question being examined. Depending upon the purpose of analysis, a single lake, a watershed, or an entire region could be an ecosystem.

Ecosystem diversity: Refers to the different types of ecosystems on earth. An ecosystem is a dynamic complex of living things including plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. E.g. coral reef ecosystem, mangrove ecosystem.

Ecosystem management: An ecological approach to natural resource management to assure productive, healthy ecosystems by blending social, economic, physical, and biological needs and values.

Ecosystem services: the beneficial outcomes, for the natural environment or for people, that result from ecosystem functions. Some examples of ecosystem services are support of the food chain, harvesting of animals or plants, clean water, or scenic views. In order for an ecosystem to provide services to humans, some interaction with, or at least some appreciation by, humans is required.

Ecotourism: Travel undertaken to experience sites or regions of unique natural or ecological quality, or the provision of services to facilitate such travel.

Empower local communities: Refers to the enhancement of the assets and capabilities of diverse individuals and groups to engage and influence



economic and social institutions, and to increase the accountability of public institutions. It is a participatory process which places or transfers decision-making responsibility and the resources to act into the hands of those who will benefit.

Endangered species: A species facing very high risk of extinction in the wild in the near future.

Endemic: Restricted to specified region or locality.

Endowment fund: A fund that spends only the income from its capital, preserving the capital itself as a permanent asset.

Environmental Indicator: A measurement, statistic or value that provides a proximate gauge or evidence of the effects of environmental management programs or of the state or condition of the environment.

Environment Impact Assessment (EIA): A method of analysis which attempts to predict the likely repercussions of a proposed major development upon the social and physical environment of the surrounding area.

Ethno biology: Study of the way plants animals and micro-organisms are used by humans.

Exotic /Introduced species: A species occurring in an area outside its historically known natural range as a result of intentional or accidental dispersal by human activities (including exotic organisms, genetically modified organisms and translocated species).

Ex-situ conservation: Keeping components of biodiversity alive away from their original habitat or natural environment.

Genetic diversity: The array of genetic traits that exists within a population which enables it to adapt to changing conditions. Refers to the variety in the genetic information contained in all the living things on earth.

Geographical Information System (GIS): A computer mapping system that links databases of geographically-based information to maps that display the information.



Geographic information system (GIS): A computer system capable of storing and manipulating spatial (i.e., mapped) data.

Goal: General statement of outcome sought.

Grassroots: People or society at a local level, rather than at the center of major political activity.

Habitat: The local environment in which an organism normally lives and grows.

In-situ conservation: A conservation method that attempts to preserve the genetic integrity of gene resources by conserving them within the evolutionary dynamic ecosystems of the original habitat or natural environment.

Indicators: An indicator is a quantitative measure (i.e. distance from a goal, target, threshold, benchmark) against which some aspects of policy performance can be assessed. The use of a reference point allows us to gauge the significance of a statistic, for example, the extent to which an objective is met. It is also a measurement that reflects the status of a system.

Intellectual property rights: A right enabling an inventor to exclude imitators from the market for a limited time.

Inventory: A detailed, complete list.

Keystone species: Species that have a major effect on other species in the community. Loss of such species from an ecosystem results in an excessively large change in the ecosystems processes. Their activities are critical to the structure of the community in which they live.

Land use plans: Plans that adopt land use options which are most beneficial to land users without degrading the resources or the environment, together with measures most likely to encourage such land uses. These are produced after systematic assessment of land and water potential, alternative patterns of land use and other physical, social and economic conditions.

Monetary valuation: An economic method that is often used to quantify non-market values in monetary terms in order to quantify the benefits (or costs) of an environmental policy.



National Income Account: System of record by which the vigor of a nation's economy is measured. (Results are often listed as Gross National Product or Gross Domestic Product).

Natural resources account: Accounts for state and quality of the environment and the natural resource base by deducting from national accounts such as GDP various aspects of environmental degradation such as the value of pollution abatement and control expenditures, the cost of environmental damage, and the depletion of natural resources. Natural resource accounts strive to determine the costs of depleting natural resources and damage to the environment.

Non-compliance: Environmental non-compliance means to be out of strict compliance with an environmental law, regulation, or other regulatory condition imposed on an operation via a licence, approval, consent, environmental impact assessment or other regulatory process.

Objective: A statement about what is to be achieved in relation to a goal. Includes a time frame, target or the resources to be used in relation to an outcome.

Performance indicators: Diagnostic tools that can be used to regularly review achievement on projects and programmes.

Pests: Organisms capable of causing material damage. They consume agricultural products or destroy their marketability or cause human disease or discomfort.

Policy: Course of action adopted by a government, party, organization, or individual.

Property rights: The conditions of ownership of an asset, the rights to own, use and sell. The right to use or consume something or trade the right away in return for something else.

Public Sector Investment Programme (PSIP): A programme compiled each year by the Government of Maldives revealing the government funding priorities for development projects from both domestic and external sources.

The programme also facilitates co-ordination of development initiatives of Ministries and their formulation of projects.

Public sector: Everything that is publicly owned and controlled, including government (national, provincial and local), state-owned companies, public schools etc.

Quarantine: Official confinement of regulated articles for observation and research or for further inspection, testing or treatment.

Revolving fund: A fund that receives new income on a regular basis-such as proceeds from special taxes, user fees, etc. to replenish or augment the original capital.

Recovery plan: A document that serves as a guide for activities to be undertaken by the government or private entities in helping to recover and conserve endangered or threatened species.

Sinking fund: A fund that disburses its entire principal and investment income over a fixed period of time, usually a relatively long period.

Socio-economic impact assessment: A technique that estimates the impacts of a management scenario on income and employment within specific communities, regions, or the province and identifies and assesses demographic, local government and community concerns.

Species diversity: The number and variety of species existing in a given area.

Stakeholder: A large group of individuals and groups of individuals (including governmental and non-governmental institutions, traditional communities, universities, research institutions, development agencies, banks, donors, etc.) with an interest or claim (whether stated or implied) which has the potential of being impacted by or having an impact on a given development. Stakeholder groups that have a direct or indirect “stake” can be at the household, community, local, regional, national or international level.

Straddling stocks: A term used to describe migratory species that spend



part of their lifecycle in two or more jurisdictions; especially those that migrate between EEZs and the high seas.

Threatened species: Species that are often genetically impoverished, of low fecundity, dependent on patchy or unpredictable resources, extremely variable in population density, persecuted or otherwise prone to extinction in human-dominated landscapes.

Tradable Permits: The government specifies an overall level of pollution that will be tolerated, then gives each polluter a “permit” for its portion of the total. Firms that keep emissions below their allotted level may sell or lease the surplus to other firms that can use the permits to exceed their original allotment.

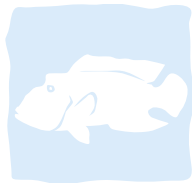
Valuation: This is a method for determining the importance of environmental consequences of economic activity that are not taken into account in market transactions.



Annex I - Priority Activities

This section lists the action that have been identified as priorities activities. Further details of each action is given in the main document.

- Develop and adopt planning procedures and processes that take into account biodiversity conservation. (Action 1)
- Formulate and adopt integrated national and regional land use plans that would ensure appropriate use of natural resources, development of infrastructure, conservation of the natural environment and serve as a guideline for utilization of national resources. (Action 2)
- Formulate and adopt an integrated marine policy which would facilitate and catalyze actions for effective management of marine resources while strengthening inter-sectoral relationship and ensuring consistency in policies and strategies formulated by various government institutions regarding the marine environment. (Action 6)
- Adopt ecologically sustainable fisheries management measures based on best scientific evidence available, to ensure the attainment of maximum economic and social benefit from the sector while conserving resources for future generations. (Action 7)
- Promote biodiversity conservation while maintaining high standards of quality and delivery in providing tourist experiences, through sustainable utilization of natural resources and strengthening management practices in the sector to ensure tourism development is not detrimental to the ecological integrity of the area. (Action 9)
- Ensure biodiversity conservation is integrated into housing, physical development activities and other landuse practices. (Action 10)
- Strengthen and implement national policies and regulations for ecologically sustainable use of timber resources. (Action 11)
- Develop and implement a national representative system of effectively managed protected areas to ensure biodiversity conservation in the natural environment. (Action 13)



- Strengthen conservation and management measures for coral reef ecosystems. (Action 15)
- Phase-out coral mining to support conservation of the reef ecosystem. (Action 16)
- Ensure indigenous plant genetic resources are preserved through an economically efficient and sustainable system. (Action 17)
- Implement management measures to conserve wetlands and mangrove ecosystems. (Action 18)
- Establish sanitary and phytosanitary measures necessary for conservation of biological diversity, animal and plant life, and health. (Action 19)
- Develop and adopt mechanisms for the protection and rehabilitation of threatened components of biological diversity. (Action 21)
- Ensure that adverse impacts of pollution on biological diversity are minimised. (Action 22)
- Develop and implement measures at national level to deal with the effects of climate change and increase efforts internationally to support mitigation of green house gases. (Action 23)
- Adopt suitable economic incentives according to conservation needs of the component of biological diversity being utilised. (Action 26)
- Strengthen the system for assessing, monitoring and forecasting the status of biological diversity. (Action 33)
- Conduct research and develop appropriate technology to facilitate biodiversity conservation. (Action 34)
- Strengthen and expand existing information dissemination systems to facilitate easy public access to information related to biodiversity. (Action 35)
- Spread awareness on biodiversity conservation principles, issues and methods at all levels of society including grassroots level, through formal, non-formal and adult education systems. (Action 36)
- Conduct regular awareness programmes for policy makers and management



level officials of both public and private sectors to update them on current issues and promote integration of biodiversity conservation principles into relevant programmes. (Action 38)

- Review and revise existing laws and regulations relating to conservation of biological diversity and formulate regulations with provisions for implementing them. (Action 39)
- Expand the role of island and atoll offices in implementation of regulations related to biological resource conservation. (Action 43)
- Establish institutional arrangements that are facilitative, responsive and support biodiversity conservation and sustainable management of natural resources. (Action 46)
- Assess national human resources development needs for biodiversity conservation in relevant areas of public as well as private sectors. (Action 48)
- Train biodiversity professionals to develop manpower in a variety of relevant fields including natural resource planning, conservation biology, natural resource economics, bioregional management, community organisation, and marine and terrestrial ecology and taxonomy. (Action 49)
- Train and appoint people at atoll and island level through short term training programmes to evaluate biodiversity conservation needs and assist in implementing conservation measures. (Action 50)
- Allocate funds explicitly for biodiversity conservation and sustainable use from the annual budget of concerned government offices and ensure that these funds are utilized fully for that purpose. (Action 53)
- Develop and adopt tools and participatory techniques to enhance public involvement and strengthen user group teamwork. (Action 62)



Annex 2 - Mandates of the Lead Institutions Related to Biodiversity Conservation

The following are responsibilities officially assigned to government agencies related conservation of biodiversity.

MINISTRY OF HOME AFFAIRS, HOUSING AND ENVIRONMENT

1. Formulate, implement and monitor the government's environmental protection policy, environmental legislation and ensuing regulations.
2. Strengthen national environment protection efforts by obtaining necessary experience, training required personnel, seeking technical assistance and other such activities.
3. Collect and maintain information on environmental and weather condition changes of the country and conduct research activities to obtain additional information.
4. Seek information on the erosion of islands and the environmental impacts of severe natural phenomena and man-made disasters, and seek solutions for these problems through collaboration with relevant institutions.
5. Plan and implement all activities and undertake all actions related to the protection of the Maldivian environment in addition to those actions outlined above.
6. Conduct research required for the formulation of the government's policy on land use.
7. Formulate, implement and monitor guidelines and regulations on the allocation of land for residential use and the construction of residential buildings.

8. Formulate, implement and monitor regulations on allocation and use of land.

MALDIVES HOUSING AND URBAN DEVELOPMENT BOARD

1. Ease the shortage of housing and land for residential purposes in Male' by identifying areas nearby Male' which can be reclaimed and populated, planning projects for this purpose, and implementing such projects in coordination with relevant government sectors.
2. Formulate a national physical development plan for effective land use, advise and instruct relevant government authorities regarding such land use, and assist in such planning processes through provision of technical assistance and information.
3. Allocate land for parks, open spaces, as well as buildings for recreational and social purposes created by government offices for the physical development of Male'.
4. Allocate reclaimed land and areas marked for population according to the government's land use policy and assign the development of such land to the concerned government authorities.
5. Study and assess needs of islands with large populations and which are socio-economic hubs, develop plans to address identified needs, and assign implementation of such developmental plans to the relevant bodies.
6. Establish guidelines on optimal land use for housing and infrastructure development in all inhabited islands, formulate regulations pertaining to those guidelines, and monitor implementation.



ENVIRONMENT RESEARCH CENTRE

1. Plan and implement biodiversity protection and preservation activities.
2. Plan and implement research activities to study environmental impacts of land reclamation, lagoon dredging, channel blasting in reefs and harbour development.
3. Plan and implement activities related to geographical information.
4. Plan and implement environmental education and extension activities.

MINISTRY OF FISHERIES, AGRICULTURE AND MARINE RESOURCES

1. Formulate, implement and monitor laws, guidelines and regulations to develop fisheries, marine resources and agriculture in a sustainable manner.
2. Formulate, implement and monitor regulations pertaining to reefs, ring reefs, patch reefs, lagoons, and other such places.
3. Formulate government policy and plans to develop agriculture with special focus on varieties of timber producing trees.
4. Control import and export of plants and plant life.
5. Leasing of uninhabited islands.
6. Formulate and implement guidelines and regulations on permits to study the sea, seabed, and land areas (above and below ground) of the country.
7. Work to improve the environment of islands through planting of flora and fauna.

8. Utilize uninhabited islands, agricultural land on habited islands and other such areas under the Ministry to obtain maximum benefit for the people and the government.
9. Plan and implement fisheries, marine resources, and agriculture projects for socio-economic development.
10. Collect and publish statistics and socio-economic information required for developmental planning with respect to fisheries, marine resources and agriculture.
11. Establish infrastructure required for fisheries, utilization of other marine resources, and agriculture.
12. Explore means of maintaining high quality in products obtained from fisheries and utilization of other marine resources as well as agriculture.
13. Study the sustainable development of fisheries and utilization of other marine resources.
14. Compile and maintain a catalogued reference collection of marine life.
15. Establish ties with individuals and centres recognised as experts in various fields of marine study at regional and international level.
16. Establish a mechanism to study and monitor sustainable use of land and marine resources.
17. Protect and preserve marine life.
18. Protect and preserve endangered plant species in the country.



MARINE RESEARCH CENTRE



1. Collect and study data on marine resources, and expand research capabilities to study fisheries and marine resources.
2. Collect data needed for the sustainable development of fisheries and marine resources and develop these resources accordingly.
3. Create awareness amongst the people and the government on fisheries and the utilization of other marine resources.
4. Conduct research into the development of fisheries and utilization of other marine resources for economic purposes.
5. Undertake all necessary activities at sites designated for fisheries and marine resources survey and study and compile information obtained from all such surveys and studies.
6. Maintain data on fisheries and marine resources and provide data to parties requiring such information.
7. Conduct research into the optimum utilization of fisheries and other marine resources, keep informed of new findings in the field and introduce such findings to the country.
8. Compile books and other information sources on fisheries and other marine resources and make these available to the public.
9. Conduct research, collect data and take necessary action to revive reef growth and to maintain reefs in a manner that benefits fisheries.

MINISTRY OF TOURISM

1. Seek means of promoting tourism and increasing government revenue from tourism, and establish and implement rules and regulation pertaining to tourism.

MINISTRY OF PLANNING AND NATIONAL DEVELOPMENT

1. Develop the national economy, and plan and implement national development projects.

MINISTRY OF CONSTRUCTION AND PUBLIC WORKS

1. Monitor physical survey activities at national level and maintain related statistics.
2. Formulate construction regulations and undertake all related monitoring activities.
3. Conduct research into native and other building materials suitable for the local environment, and undertake activities to produce such material.
4. Construct and maintain the seawall and *eggamuthoshi* of Male’.
5. Undertake all activities pertaining to the harbours of Male’.
6. Design high quality roads in consultation with relevant government authorities, and undertake the construction and maintenance of such roads.
7. Formulate proper waste disposal guidelines in consultation with relevant government authorities, establish waste disposal mechanisms in line with such guidelines, and monitor implementation.



MINISTRY OF ATOLLS ADMINISTRATION

1. Undertake activities for the socio-economic development of all atolls.
2. Design and implement projects for planned development of newly inhabited islands resulting from migration of island communities.
3. Design and implement projects for planned development of islands and regions marked as growth centres under the decentralisation policy.
4. Undertake activities necessary to achieve the government's developmental plans for designated islands and regions, and co-ordinate with relevant government bodies in establishing socio-economic activities and basic services in such islands and regions.

MINISTRY OF INFORMATION, ARTS AND CULTURE

1. Disseminate information on government policy matters.
2. Study national culture and carry out related work.
3. Implement and monitor culture related clauses in bilateral agreements.
4. Establish and implement regulations pertaining to libraries and issue permits to establish public libraries.
5. Register ownership of national arts (artwork, film, music, songs, literature, etc) and media utilized for such production.

NATIONAL LIBRARY

1. Collection and maintenance of all literature such as books, magazines and newspapers published in the Maldives.

MINISTRY OF TRADE AND INDUSTRIES

1. Oversee trade of domestic and imported products.
2. Formulate and implement regulations pertaining to import and export of goods.
3. Undertake activities to protect trademark, logo, design, patent rights and other copyrights according to international standards, and investigate disputes relating to such rights.

MINISTRY OF EDUCATION

1. Formulate educational policy based on national policy.
2. Provide educational opportunities to the extent made by the economic development of the country.
3. Approve all books, except for religious books, produced in the Maldives.

Educational Development Centre

1. Develop school curriculum according to the guidelines set up by the Ministry of Education, and produce textbooks and other teaching/learning materials.
2. Produce educational audio-visual programmes.
3. Conduct curriculum related research.

Non-formal Education Centre

1. Conduct courses to increase awareness and teach skills for youth and



adults, and produce newspapers, magazines, posters and other such materials to increase awareness.

MINISTRY OF TRANSPORT AND CIVIL AVIATION

Maldives Airports Company Limited

1. Establish, operate, develop and maintain airports in the country.
2. Make optimum use of land and lagoons allocated to the Authority by the government for aviation related purposes, establish guidelines for allocating/leasing land/sea areas to companies providing aviation related services and undertake such allocation/leasing.

Maldives Ports Authority

1. Undertake activities to develop local harbours in co-ordination with relevant government bodies and oversee those harbours.

MINISTRY OF FINANCE AND TREASURY

1. Maintain statistics on national revenue and expenditure and draft the annual budget.
2. Identify economic framework changes that need to be implemented in order to analyse changes to the national economy, advise relevant authorities regarding such changes, and undertake necessary actions to bring about these changes in co-ordination with relevant authorities.

Maldives Customs Service

1. Undertake all matters pertaining to import and export as well as record keeping in this area.

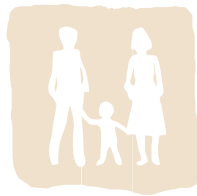
2. Monitor incoming and outgoing vessels to/from the country, and traffic of people and goods between the vessels and land.

Department of Inland Revenue

1. Formulate and implement government taxation policy.
2. Undertake activities to expand the government's revenue base.

MINISTRY OF HEALTH

1. Plan and execute policies, provide services and undertake activities to develop modern and local medicine in order to improve the health of the people.



Maldives Water and Sanitation Authority

1. Plan for the sustainable and safe use of the underground water reserves of the islands, ensure that the water consumed by the people is safe and sanitary, and formulate and implement guidelines as well as regulations pertaining to proper disposal of sewage.
2. Issue licenses to private parties for the provision of water and sewage disposal services according to the guidelines, regulations laid out according to Number 1 above, and revoke licenses on breach of same.
3. Monitor mechanisms established for provision of water and sewage disposal, as well as services and/or facilities provided by the licensed parties and their adherence to regulations, and undertake all necessary action pertaining to these matters.
4. Establish pricing guidelines for service providers who wish to commercialise the provision of water and sewage disposal services, authorise such services, and arbitrate in disputes between service

providers and recipients.

5. Implement and co-ordinate projects to provide safe water and sewage disposal services.

Male' Water and Sewerage Company Limited

1. Provide safe drinking water for the inhabitants of Male' and establish sanitary and environmentally safe sewage systems, and provide these services on a commercial basis.

MINISTRY OF DEFENCE AND NATIONAL SECURITY

1. Monitor the country's economic zone, prevent illegal fishing or other illegal activities by foreign parties in this zone, and undertake all necessary actions in such situations.
2. Monitor all foreign aircrafts and vessels in the economic and political zone of the country to ensure compliance with the law, and undertake all necessary action upon breach of the law.
3. Undertake all necessary actions in emergency situations posing danger to Male' or the atolls.
4. Undertake necessary action in response to reports made by individuals or government authorities regarding breach of law or regulations of the country.
5. Undertake defence and national security matters as mandated by the constitution and laws of the country.



MINISTRY OF FOREIGN AFFAIRS

1. Represent the country in the international forum, present the country's policies, and advocate to the benefit of the country.
2. Implement and co-ordinate activities relating to international conventions and treaties as well as bilateral agreements between Maldives and other countries, and undertake actions in the country's best interests as and when problems occur in foreign affairs.

Department of External Resources

1. Work in collaboration with foreign parties to obtain foreign aid for national developmental projects.
2. Work to obtain aid from all foreign parties, except from international financial and economic institutions.



Annex 3 - Project Profiles

PROJECT PROFILES

Title: National Annual Coral Reef Monitoring

Responsible Agency: Marine Research Centre

Participating Agencies: Ministry of Fisheries, Agriculture and Marine Resources, Ministry of Tourism, Ministry of Home Affairs, Housing and Environment.

Objectives:

- To collect data on coral reefs in order to provide information to the National Coral Reef Database.
- To monitor the coral reefs of the Maldives in order to understand the biological and physical processes and factors affecting the health of the reef to aid resource management decisions.
- To document temporal and spatial changes in coral reef systems.

Justification:

At present a comprehensive database on the coral reefs of Maldives is being produced under the Global Coral Reef Monitoring Network (GCRMN) Phase 2 and will be available for use around June 2001. Such a database is very important to assist in resource management and planning. Presently, many coral reef species are at threat of overexploitation and such data is essential to manage the resources. Therefore, it is necessary to set up a continued coral reef monitoring programme in order to collect annual data to input into the database.

Outputs:

- To make available information on state of coral reefs and associated flora and fauna of Maldives.
- To identify species at threat of overexploitation and provide information on coral reef resource use in the Maldives.
- To produce a team capable of carrying out coral reef monitoring at MRC.
- To provide information needed to set up marine protected areas in the Maldives.

Activities:

- Carrying out annual coral reef monitoring fieldwork to collect data from selected sites.
- Data compilation and analysis.
- Production of an annual publication presenting results of the monitoring to aid resource management.

Timing: 2-3 years

Budget: US\$ 8500 / year

Title: Assessment of bait fishery**Responsible Agency:** Marine Research Centre**Participating Agencies:** Ministry of Fisheries, Agriculture and Marine Resources, Ministry of Atolls Administration; Ministry of Home Affairs, Housing and Environment.**Objectives:**

- To carry out an intensive monitoring programme to initiate a bait fishery data collection system through community participation.
- To carry out research in order to assess the status of live bait fish stocks and their sustainable yields.
- To carry out an impact analysis of live-bait collecting methods.
- To study the interactions of live-bait fishes with groupers and sharks.
- To identify a suitable management strategy for bait fish fishery.

Justification:

The livelihood of the community depends on the sustainable use of the surrounding marine resources. Maldivian fishing communities primarily depend on pole and line fishing. The success of pole and line fishery and hence, the livelihood of rural communities depend on regular and substantial supplies of live-bait. Being the most important and the largest reef fishery, it is crucial to sustain and manage the fishery. Information on the bait grounds of Maldives is being documented. A GIS database needs to build up on the documented bait grounds indicating regional and seasonal variations in bait abundance. Assessment of baitfish utilization and appropriate management measures are important for sustaining this ecologically and economically important resource.

**Outputs:**

- To Establish of a data collection system with community participation.
- To make available information on the status of bait.
- To Introduce of legislations based on the impact analysis of live-bait collecting methods.
- To establish a participatory management regime for bait fishery.

Activities:

- Conducting field work to gather required information.
- Regional workshops to train the community in data collection procedures and to establish participatory systems of data collection and management.
- Data compilation and analysis.
- Preparing a summary report with recommendations for the follow-up.

Timing: 3 years

Project Title: Biodiversity Study of Mangrove Ecosystem in the Maldives

Responsible agency: Environment Research Centre, Ministry of Home Affairs Housing and Environment.

Participating Agencies: Environment Research Centre, Ministry of Fisheries Agriculture and Marine Resources.

Objectives:

- To undertake a comprehensive biological, geological, topographical, ecological and hydrological research of mangrove ecosystems, including traditional uses and beliefs associated with mangrove ecosystems of Maldives.
- To assess the level of exploitation and review the status and conditions of the existing mangrove forests, including anthropogenic and natural threats to mangroves.
- To determine the importance of mangroves for biodiversity conservation in the Maldives.
- To establish a database on the mangroves of the Maldives.
- To determine possible conservation measures that could be undertaken to conserve mangrove biodiversity in the Maldives.

Justification:

At present very little is known about the mangroves of the Maldives. Published literature on mangroves of the Maldives is scarce and far from complete. No study has indicated the exact number of mangroves species and the associated mangrove fauna. The rapid expansion of population and developmental activities in the atolls and the lack of any management plan aid the rapid degradation of several important mangrove areas in many islands. Mangroves are not only considered an important source of food and wood for Maldivians, every mangrove is unique. Conducting site-specific scientific research on the above aspects is important in order to formulate management plans for mangrove conservation. Further, there is an urgent need to collect and preserve ethno-biological knowledge associated with mangroves as such knowledge is rapidly vanishing. Thus, conserving mangrove stands should be a priority.

Outputs:

- Full information on several important aspects of mangroves such as the total area of mangrove areas, different species of flora, fauna, their abundance, floral zonation patterns, level of exploitation and traditional knowledge associated with mangroves.
- Potential sites for protection and to act as source areas for reforestation programmes.
- Integrated mangrove management plan for sustainable use of mangrove ecosystems of the Maldives.

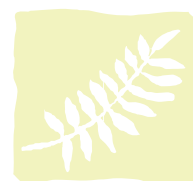
Activities:

- Collect all existing literature on the mangroves of the Maldives.
- Procure necessary references on mangroves.
- Prepare and send out a questionnaire to all atolls to find out the islands with mangroves.
- Prepare a questionnaire to collect information on ethno biological aspects of mangroves.

- Determine the area of each mangrove area using aerial photographs.
- Produce a mangrove distribution map of the Maldives.
- Organize field visits to significant mangrove areas to conduct scientific research on various aspects of mangrove flora and fauna.
- Identify potential sites for protection that would act as a source of mangrove seedlings for possible restoration and rehabilitation programmes.
- Produce educational materials on mangroves of the Maldives.
- Produce a publication on the findings.
- Develop a GIS database on mangroves.

Duration: 2 years

Provisional Budget: US\$ 300,000.00



Project title: Seagrass Ecosystem Conservation in the Maldives

Responsible Agency: Environment Research Centre, Ministry of Home Affairs, Housing and Environment

Participating Agency: Environment Research Center, Marine Research Center, Ministry of Tourism and Ministry of Atoll Administration.

Objectives:

- To establish significance of the sea grass ecosystem of the Maldives nationally and globally.
- To identify the economic benefits which can be derived from the sea grass ecosystem.
- To understand proliferation of sea grass beds in tropical shallow coastal areas and their role in coastal dynamics such as beach erosion/accretion and sediment trapping.
- To research association of the sea grass ecosystem to other ecosystems.
- To investigate the effect of various anthropogenic activities such as dredging, sewage and solid waste disposal on proliferation and growth of sea grass beds.
- To create awareness among coastal establishment developers as well as locals and students about the importance of conservation of the sea grass ecosystem.

Justification:

In the Maldives large areas of the shallow lagoons in almost all the atolls are extensively covered by sea grass beds, usually close to agricultural islands. Many of these sea grass beds are at their climax of ecological progression and provide habitat for a wide variety of marine flora and fauna.

Only a few studies have been conducted on sea grass beds in the Maldives and very little is understood in terms of the biodiversity, the role of sea grass in the protection of shoreline, primary production and associated food chain in the coastal areas. Although not documented, various observations have shown that in many cases sea grass beds in the Maldives play an important role in the coastal dynamics and stability of the islands by entrapment of sediment within the sea grass beds and giving protection to shorelines from erosion, which is of great concern to many of the islands in the Maldives today.

Outputs:

- An atlas of sea grass distribution in the Maldives.
- Field guide to sea grass ecosystem in the Maldives.
- Aspect for further research in sea grass ecosystem in the country.
- Guideline for management of sea grass ecosystem in the country.
- Six posters on importance of sea grass ecosystem.
- Leaflet on importance and scientific value of sea grass ecosystem.
- Handbook on potential value of sea grass in the Maldives.

- Comprehensive list of sea grass sites in the country for protection/conservation.

Activities:

- Develop methodologies which are practically applicable to accurately assess the spatial scale distribution patterns of sea grass beds in the country.
- Collect existing literature on sea grass in the Maldives and in this region.
- Produce an atlas of sea grass distribution by type, which could be used for further research.
- Assess biological diversity of pioneering, transient and climax sea grass ecosystem and local and regional variations in a range of representative areas.
- Carry out a study on growth rate of different species of sea grass and their primary productivity.
- Conduct research on factors contributing proliferation and growth of sea grass and study the effects on nutrient inputs such as sewage and other organic waste disposal on growth of sea grass beds.

Duration: 3 years

Provisional Budget: USD 300,000.00



Title: Study of elements of biology and biological diversity of molluscs through spat collection

Responsible Agencies: Marine Research Centre, Ministry of Fisheries Agriculture and Marine Resources.

Objective: Acquire knowledge of mollusc resources of Maldives in order to add to biodiversity inventory and to assess the potential for sustainable commercial utilization.

Justification: Biodiversity of Maldives has been poorly studied. The available documented marine biodiversity knowledge is mostly that of economically important resources such as fish and corals. Information about non-commercial or potentially commercial biological resources is almost non-existent. Therefore, it is necessary to gradually accumulate knowledge of such biological resources for biodiversity conservation and fisheries diversification. The proposed study of mollusc resources will contribute to the achievement of this biodiversity and fisheries objective.

The project aims to achieve a biodiversity and fisheries objective simultaneously because of the limited availability of trained human and financial resources in the Maldives. Under the present circumstances in the country, a combined biodiversity-fishery study is more practical than conducting a pure biodiversity study within the fisheries sector.

Molluscs are exploited for hobby collection, souvenirs, and jewellery trade. Due to the diverse utilization and possible widening of the exploitation of the resource, the proposed mollusc resource study has been given priority over the study of other biological resources, which also require urgent attention.

Marine Research Centre has tested spat collection in the Maldives. It is a very effective and cheap method of obtaining molluscs. This method allows collection of molluscs that are not usually seen in snorkelling or diving. It enables the gathering of a wide range of information about molluscs, such as their relative abundance, depth and substrate preference peak settlement/spawning season, and growth and survival rates. Spat collection is very suitable as the main technique for obtaining molluscs for the proposed study.



Outputs:

- To create a catalogue of molluscs found in Maldivian waters.
- To generate a report on the potential commercial utilization of mollusc species occurring in Maldivian waters.

Activities:

- Setting spat collectors at different locations and identifying species settling on the collectors.
- Establishing depth and substrate preference of the species.
- Establishing peak settlement season for each mollusc species.
- Estimating the abundance and growth rate of the species.
- Estimating survival rate during spat growth.
- Collecting mollusc by snorkelling and diving.
- Examining available hobby collections of molluscs.
- Reviewing available literature on spat collection.

Timing: Two years

Budget: US\$ 300,000



Annex 4 - List of Participants in Stakeholder Consultations

Community Consultation – Alifu Dhaalu Mahibadhoo

Adam Areef: *K. Himmafushi*
Ahmed Jawaadh: *Dh. Kudhahuvadho*
Hassan Saeedh: *Dh. Emboodho*
Namla Rasheed: *Dh. Kudhahuvadho*
Ahmed Zahir: *F. Feeali*
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Shiyama Naseer: *AA. Feridho*
Nashah Imad Thoufeeg: *K. Thulusdho*
Hussain Ibrahim: *Dh. Rinbudho*
Ahmed Ibrahim: *Dh. Vaanee*
Yumna Hameed: *Gh. Kudhahuvadho*
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Abdhu latheef Ibrahim: *F. Nilandho*
Mohamed Ibrahim: *A.A. Thohdho*
Gasim Hassan: *A.Dh. Mahibadhoo*
Sobira Moosa: *A.Dh. omadhoo*
Mohamed Majudhee Ibrahim: *AA Maalhos*
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Mohamed Khalidh: *AAUkulhas*
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Mohamed Hassaan: *A.Dh. Dhagethi*
Ibrahim Adam: *Mahibadhoo*
Maimoona Ahmed: *A.A. Mathiveri*
Abdhu Wahhab Mohamed: *F. Nilandho*
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Community Consultation – Haa Dhaalu Kulhudhuffushi

Hassan Moosa: *H.Dh. Kulhudhuffushi*
Hussain Ali: *H.Dh Vaikaradhoo*
Dhaaudhu Gasim: *H.Dh Neykurendho*
Hussain Mohamed: *H.Dh. Finey*
Mariyam Ibrahim: *H. Dh. Kulhudhuffushi*
Adam Abdhu Latheef: *H.A Ihavandho*
Adam Mohamed: *H.A. Filladhoo*
Abdullah Zahir: *H.A Vashafaru*
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Aishath Adam: *Komandhoo*
Mohamed Naseer: *Sh. Feevah*
Mohamed Hassan: *Sh. Maakandoodhoo*
Mohamed Zakariyya: *Sh. Maaugoodhoo*
Mohamed Shiyam: *Sh. Feevah*
Abdhu Salaam Gasim: *H.Dh. Makunudhoo*
Mohamed Fayaaz: *H.Dh Nolvivaranfaru*
Mohamed Iqbal: *H.Dh Kulhudhuffushi*
Aishath Mohamed: *H.Dh. Kumundhoo*
Moosa Ali: *H.Dh Kulhudhuffushi*
Mohamed Naseer: *H.A Dhihdhoo*
Ahmed Zahir: *H.A Hoarafushi*
Mohamed Rasheed: *H.A Kelaa*
Ibrahim Moosa: *H.A Maarandhoo*
Abdhu Rahman Ageel: *H.A Utheem*
Agleema Ali: *Sh. Maakandoodhoo*
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Mohamed Areef: *Sh. Goidhoo*
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Community Consultation – Seenu Atoll

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Community Consultation – Baa Eydhafushi

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Ahmed Adam: *Lh Naifaru*
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Ahmed Moosa: *R. Madhuvaree*
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Ibrahim Abdul Rahmaan: *N. Manadhoo*
Ibrahim Zaki Hijura: *N. Velidhoo*
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Zareena Yoosuf: *B. eydhafushi*
Mohamed Abubakr: *B. Ungoofaaruu.*
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Hassan Muneer: *Th. Veymandhoo*

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Mahmoodh Ali: *Th Buruni*
Moosa Abdhu Raheem: *Th Guraidhoo*
Ibrahim Alifulhu: *L. Mundhoo*
Abbas Mohamed: *L. Maamendhoo*
Dhonkanbulo: *L. Maabaidhoo*
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Sectoral Consultation – Hulhule’ Island

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Ahmed Zahid: *Ministry of Health*
Ali Amir: *Ministry of Construction and Public Works*
Ali Rilwan: *Blue Peace*
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Ishaq Abdul Razzaq: *Ministry of Atolls Administration*
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Maizan Hassan Manik: *Studio-1 Maldives*
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Mohamed Shaahir: *Ministry of Transport and Civil Aviation*
Mohamed Yoosuf: *Crown Company Pvt. Ltd*
Abdulla Naseer: *Veshi*
Saudullah Ahmed: *Amin Construction Pvt. Ltd*
Shaahina Ali: *Sea Explorers Associates Pvt. Ltd*
Ismail Rafeeu: *Bukhaaree Enterprises Pvt. Ltd*
Mohamed Ivan Latheef: *Veshi*

National Consultation – Male'

Abbas Mohamed: *L. Maamendhu*
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Ahmed Saleem: *Ministry of Home Affairs, Housing and Environment*
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Ahmed Shareef: *Aafathis Daily*
Ahmed Shareef: *Male' Municipality*
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