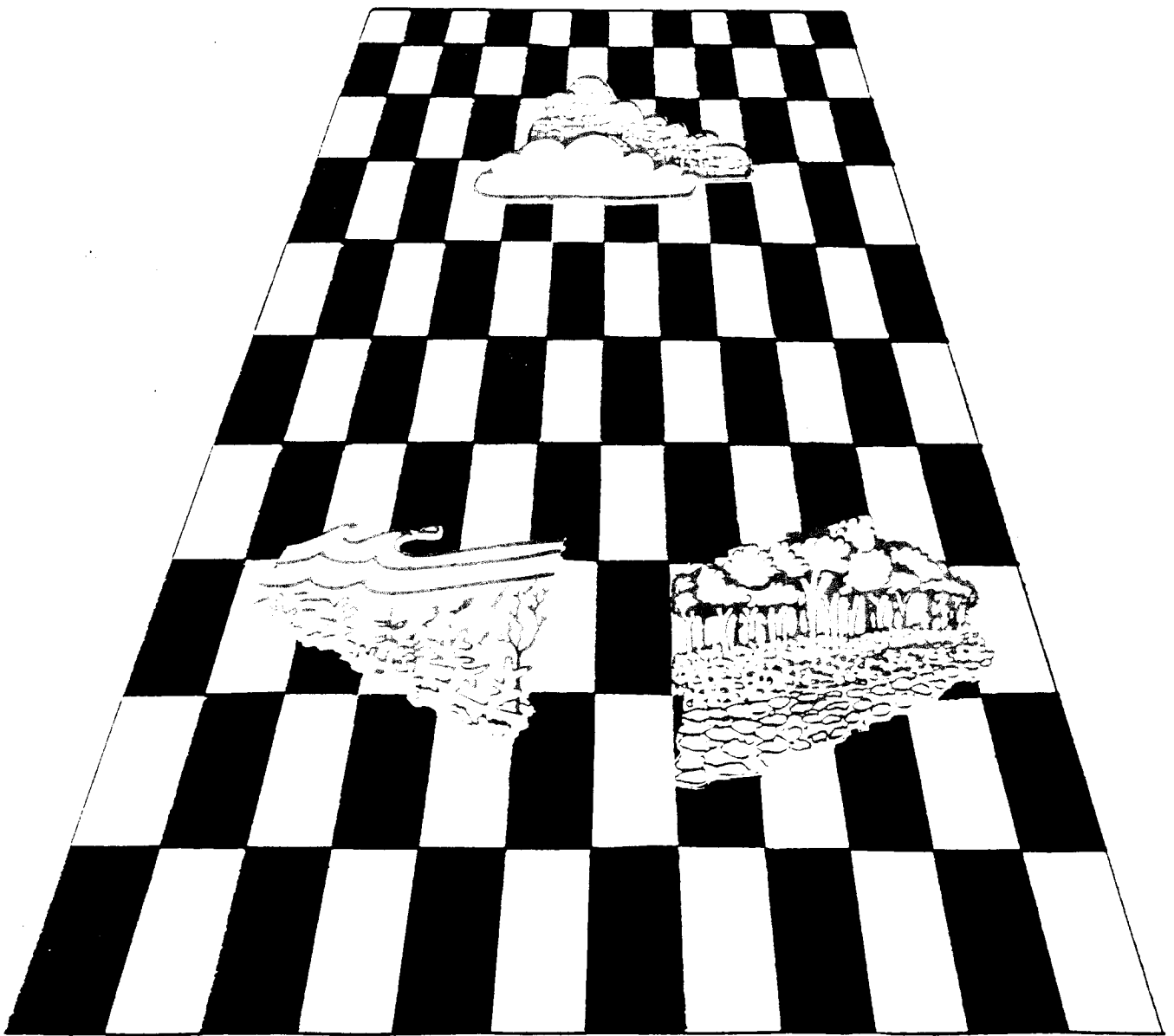




NATIONAL ENVIRONMENT ACTION PLAN



MINISTRY OF PLANNING AND ENVIRONMENT
Male'
Republic of Maldives.

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FOREWORD

The growing importance for protecting the environment cannot be over-emphasized. This particularly applies to small island countries like the Maldives, where daily life is almost entirely governed by the environment. Fishing for instance, is the largest industry, and tourism next, with the highest foreign currency earner. Environmental management is therefore the key to sustain these two very important sectors. With limited natural resources in the country, the future generations has also to depend on them.

In a place, like the Maldives, where life is so intertwined with the complex but delicate ecosystems, the need to protect the environment is utmost. The vulnerability of the Maldives environment is further increased by the threat of global warming and its consequences, in particular that of sea level rise. Sound environmental management to-day, is the key to a safe and sustainable future. Unless action is initiated urgently, it may have disastrous consequences on the country.

It is my firm belief that this Action Plan will work towards laying the necessary foundation to build and strengthen the environmental planning and management capability in the country, taking particular note of the immediate areas and the medium to long term activities.

I take great pleasure in extending a word of gratitude to the United Nations Environment Programme and the United Nations Development Programme, for their kind assistance, and to Dr. John Pernetta in particular, who has contributed significantly in putting this Action Plan together.

FATHULLA JAMEEL
Minister of State for Planning and Environment.

BACKGROUND

The Maldives forms a chain of coral atolls on the Laccadive-Chagos submarine ridge rising from the deep Indian Ocean. Sequential growth of coral has built up the chain of islands. The 1190 odd islands make up less than 2% of the total area of the country. On an average the elevation of the islands are about 1.6m above mean sea level. The surrounding reefs of the islands protect them against the swells, currents and waves of the Indian Ocean.

This fragile nature of the islands, the biological diversity of the marine resources together with the important terrestrial ecosystems and their vital importance to the health and well-being of the people - both present and future generations - have resulted in a demonstrated need for better environmental management and planning in the country. The traditional lifestyle of the people had almost negligible impact on the environment but recent socio economic developments have led to marked deterioration of the environment. The potential impacts of the predicted global climatic change including the threat of a rise in sea level, threatens the environment of the country more than ever before.

To minimize the adverse effects of environmental degradation, a number of activities were initiated by various sectoral agencies of the government. However, the need for an integrated environmental management plan was felt more, to allow for coordination and implementation of such activities. Realising this need, the government sought the assistance of the United Nations, in particular the United Nations Environment Programme and United Nations Development Programme to draw up a management strategy. As a result, with assistance from UNDP, UNEP commissioned a study in December 1988, to identify areas most vulnerable to the natural and anthropogenic changes. The findings and the recommendations were placed before a national workshop held from 28-31 October 1989. This workshop, drew up the National Action Plan, a document aimed at environmental management and planning in the Maldives. The National Environment Council, later approved the activities to be undertaken by the action plan. The wise management of the environment, in order to achieve sustainable development, underlies the rationale for implementing this action plan.

PRINCIPAL AIM AND DIRECTIVE PRINCIPLES

The principal aim of the Action Plan is to help the Government of the Republic of Maldives to maintain and improve the environment of the country, including the marine and ocean area contained within the Exclusive Economic Zone, and to manage the resources contained therein for the collective benefit and enjoyment of present and future generations.

The directive principles of the Action Plan are:

-The continuous assessment of the state of the environment within the country, including the impacts of man's activities on land, in freshwater, in lagoons, reefs and ocean and of the effects of these activities on the quality of the human environment.

-The development and implementation of management methods suited to the natural and social environment of the country, which will maintain or enhance environmental quality, while at the same time utilizing resources on a sustainable basis.

-The preparation and implementation of comprehensive national environmental legislation and participation in international agreements to provide for responsible and effective management of the environment.

-The strengthening of national capabilities, institutional arrangements and financial support which will enable the Action Plan to be implemented in an efficient and economic manner.

In executing individual activities developed to implement the Action Plan, consideration will be given to the potential impacts of global environmental change in particular, the climatic change and its predicted consequences.

FRAME WORK FOR ACTION

In order to achieve the principal aim and in accordance with the directive principles of the action plan, specific work programmes will be developed aimed at achieving the following:

- (i) Assessment of the current state of the environment;
- (ii) Assessment of the impact of marine and land-based activities on the quality of the environment;
- (iii) Assessment of the environmental implications of demographic patterns in the country;
- (iv) Management of marine and land-based development activities which have an impact on environmental quality;
- (v) Management of land and marine resources on a sustainable basis;

- (vi) Development of suitable coordinating mechanisms for the successful implementation of the Action Plan;
- (vii) Development of suitable training and educational programmes to enable the Government to effectively implement all aspects of the Action Plan.
- (viii) Development of education and environmental awareness programmes for the population at large.

All components of the Action Plan are interdependent and provide a framework for comprehensive action which should contribute to both the protection of the environment and the continued development of the country. Thus, no component may be seen as an end to itself.

The work programmes arising from the Action Plan should contribute not only to the resolution of environmental problems within the country, but also should seek to strengthen cooperative programmes with neighbouring states, with other small island states in the Pacific and Caribbean regions; and with overseas institutions and agencies (including the various UN bodies) having an interest in environmental matters relating to the wider Indian Ocean region in general and the Maldives in particular.

ENVIRONMENTAL ASSESSMENT

One of the major constraints confronting the Maldives in making wise use of resources in the development process, is the paucity of environmental and resource information, so necessary for rational decision making. This lack of information is particularly critical in that it relates to issues of fundamental importance such as:

- (i) The future potential of under-utilised resources;
- (ii) The fragility of the islands;
- (iii) The ability of over-utilised or degraded resources to recover or sustain yields;
- (iv) The presence of many islands with limited resources but large human populations.

The environmental assessment work programme is to be initiated through a coordinated resource inventory and environmental monitoring programme based on existing national, regional and international activities in this field.

The specific areas for environmental assessment under the Action Plan are as follows:

1. Assessment of the health of the Maldivian coral reefs including assessment of impacts resulting from crown of thorns predation; coral bleaching; coral mining and sand degrading; coral, and coral reef growth rates; impacts of tourism; and sand production in natural systems.
2. Assessment of the nature and volumes of marine pollution including but not limited to hydrocarbons, solid waste and sewage around Male' and other selected population centres.

3. Assessment of the status of marine fisheries stocks and of the aquaculture potential of appropriate indigenous species of algae, fish and shellfish for local consumption and/or export.
4. Assessment of the status of the aquifer resources outside Male'.
5. Assessment of the current level of coastal erosion problems throughout the country.
6. Assessment of future climate patterns under scenarios of global warming and assessment of relative sea level changes in the Maldives.
7. Assessment of wind and tidally generated current patterns.
8. Environmental Impact Assessment for planned major developments.
9. Assessment of terrestrial resources including soils, vegetation, fuelwood and agricultural production.
10. Assessment of energy consumption patterns and evaluation of non-conventional energy sources and their potential for utilization.
11. National assessment of the vulnerability of human settlements to episodic events such as long distance storm swell induced flooding.
12. Assessment of the availability and suitability of alternative building materials, and alternative building designs which are energy efficient.
13. Assessment of the environmental implications of inter-island transport development.

ENVIRONMENTAL MANAGEMENT

The key to environmentally sound development is the management of resources on a sustainable basis. Environmental management should therefore take into account the carrying capacity of the environment; the goals of development as defined by the Government; and the economic feasibility of implementing management proposals. Continuing socio-economic development in the country can only be achieved on a sustainable basis if environmental considerations are incorporated into the design of developments. Improved knowledge of environmental systems and processes may now enable some environmental errors of the past to be corrected and avoided in the future.

The activities undertaken within the framework of the environmental management component of the Action Plan will be implemented in such a way as to ensure that environmental assessments are effectively carried out and that the results are incorporated into sectoral management programmes. Environmental management activities will be undertaken to devise appropriate ways of using natural resources in a balanced manner taking into consideration the needs of the present population and the needs of future generations.

Specific areas which are regarded as of immediate priority in the country as a whole are:

1. The development of an environmentally sound, national population management policy to assist in achieving sustainable development.
2. To review, actively promote and implement the existing policy of decentralization by the creation of centres of attraction containing necessary services and a sound economic base.
3. To develop a programme of fuelwood management based on the capacity for renewable use of the resource, together with consideration of alternative fuel sources, and their economic and environmental costs.
4. The management of the land/lagoon/reef ecosystem to maintain its health and condition, including the development of coastal zone management schemes for individual islands and atolls.
5. The development of guidelines for the construction and location of coastal structures such as seawalls, groynes, harbours, jetties, piers, gabions and causeways.
6. The development of a national databank of environmental information, and establishment of suitable management procedures to ensure the accessibility of data to all sections of Government concerned with the collection and application of such information.
7. The development of standards and control mechanisms for the regulation of land based sources of pollution.
8. The development of a national programme to control litter problems, giving primary consideration to recycling, re-use and exports of recoverable materials.
9. The auditing of the effectiveness of previous environmental management decisions.
10. The development of national policy guidelines concerning the wise use of aquifer resources.

11. The development and implementation of appropriate guidelines, technologies and practices for waste disposal with particular attention being directed to recycling, and energy generation.
12. Promotion of policies and practices in the field of human settlement which give special attention to the ecological problems of urban and rural developments on small islands.
13. The development and application of suitable guidelines for the implementation of environmental impact assessments for all major developments in the country.
14. The development of an efficient inter-island transport system which will minimize adverse environmental impacts.

DEVELOPMENT OF NATIONAL CAPABILITIES

The Action Plan envisages an intensive training and technical assistance effort, especially in the early stages of implementation of the work programmes. The activities undertaken in environmental assessment and management will include built-in training components which will emphasize the action oriented nature of the plan and the indispensable link between environmental assessment, management and training in the country.

Recognizing the importance of environmental awareness and the need for the entire population to provide adequate care for their shared environment, the Action Plan will emphasize environmental education in schools. The production of public awareness materials and the mounting of public awareness campaigns concerning sensitive aspects of the natural environment will be an integral component of all activities undertaken in implementing the Action Plan.

INSTITUTIONAL ARRANGEMENTS:

For effective implementation of the Action Plan, the Environment Council is responsible for reviewing biennially, the content of the Action Plan; reviewing the substantive progress of activities and work programmes initiated under it; and for deciding upon the nature and mechanisms for implementation of the various activities. These mechanisms will be instituted by the Government to ensure timely and efficient decision making in implementing the Action Plan.

The Individual Ministries and Departments of the Government will be responsible for the collection of environmental information relating to their sectoral responsibilities, and are responsible for ensuring that such information is shared between all Departments involved in executing the Action Plan. Departmental Focal Points will be designated in each Government Department participating in the work of the Action Plan to coordinate the day-to-day inputs of their Departments into the Action Plan and to maintain links with the Environment Section of the Ministry of Planning and Environment. In principle, each of the activities agreed upon as part of the work

programmes undertaken under the Action Plan will be carried out through collaboration between several Government Departments jointly.

The Environment Section of the Ministry of Planning and Environment is responsible for coordinating the implementation of the work programmes by members of its own staff and staff from other Government Ministries as appropriate. The Environment Section is also responsible for the coordination of environmental information and ensuring that environmental considerations are incorporated into the planning process and ensuring the compliance with requirements for Environmental Impact Assessments of all activities affecting the environment.

The activities arising from this Action Plan will be financed by the Government, and by international agencies, such as the United Nations agencies, the Commonwealth, and other international organisations and through bilateral agreements with donor states.

TRAINING:

The lack of adequate man-power and resource-personnel is a major constraint confronting the Maldives as a whole, with respect to developing the specific, professional and research areas. This is more pertinent in the environment field since this is a fairly new development, even in most other countries. What distinguishes the Maldives is the lack of trained personnel in other disciplines too, who could perhaps, with further training, take on a component of the environmental management.

The required training, therefore, has to be initiated from the very basic levels. This requires time, however, if the Maldives is to develop even a very basic environmental management cadre, a multi disciplinary team has to be trained urgently, to handle the evergrowing need for sound environmental planning and management capabilities in the country. The multi-faceted nature of the environment, particularly in an island ecosystem, like the Maldives, makes it even more difficult to specify the training requirements, as most formal training do not necessarily reflect the in-house situation. This has to be developed through experience and on the job training.

As an initial step, the areas for short term training include, training in;

- * The production of awareness and education materials,
- * Categorization and compilation of basic environmental data,
- * Surveying and sampling skills for basic survey works,
- * Assessment and quantification of basic environmental impacts and quality change,
- * Basic data processing and programming,

- * Records keeping and documentation.

Tertiary level training required include, training in;

- * Earth sciences, life sciences and social sciences. In addition Computer Science or Programming is necessary to build the data-base for the country.

Although most of the environmental parameters are quite distinct in their subject matter, a holistic or a well - integrated approach is essential to effectively coordinate the environmental planning and management in the country.

AREAS FOR PRIORITY ACTION IN 1990-1991

The following environmental problems listed in priority order have been designated for immediate consideration in implementing the 1990-1992 work programme:

- 1- Marine environmental problems:
 coral mining
 sewage contamination of coastal water
 sea level rise
 solid waste management
 dredging
- 2- Terrestrial/Human environmental problems:
 Freshwater management
 Migration to Male'
 Population growth
 Solid waste disposal
 Sewage contamination of groundwaters
 Fuelwood supplies and deforestation

Although a number of these problems are under active examination by Government Departments at the present time, it is expected that a full report on work relevant to the above problem areas be submitted to the National Environment Council in the immediate future.

Recognizing the limitations of immediate action, in addressing long-term management problems it is recommended that certain ameliorative actions could be taken immediately to address pressing environmental problems. To help in the process, a public awareness campaign is to be mounted immediately, designed to inform the public of the fragility of the aquifer system and the need for appropriate actions at an individual, household and community level, to address this priority issue.

Individual and community actions to be undertaken for immediate implementation to conserve freshwater in Male' include:

- * directing all rainfall from roofs, not being directly utilized, into the aquifer;
- * designating certain roads as pedestrian areas only, and to reduce compaction, heavy vehicles are to be restricted to certain routes;
- * developing methods to ensure that standing water be directed to aquifer recharge and this to be implemented as soon as possible;
- * investigating the possibility of supplying piped water to the reclaimed area of Male'.and the use of this piped water be monitored and charge for excessive use of water.

Recognising that there are no immediate actions which can be taken to ameliorate the problems of migration to Male' and of population growth, an environmentally sound , national population management policy will be developed to assist in achieving sustainable development. This is to be done while reviewing, actively promoting and implementing the existing policy of decentralisation by the creation of centres of attraction containing necessary services and a sound economic base.

In formulating policies with respect to migration to Male', the full reasons for migration patterns to be investigated in order that the existing policy of decentralization is made more effective.

Actions to immediately address for the mitigation of *marine* environmental problems, are;

- * discouraging the use of coral and coral aggregates for building purposes;
- * adopting a policy of waiving duty on imported aggregate for construction materials that may have a direct impact in mitigating environmental stress on marine resources in particular such as coral and sand.
- * the Government providing a lead in this regard by not using coral in the construction of public buildings; and
- * taking immediate step to ensure the continued survival of threatened marine species.

It is recognised that the problems of *climatic change and sea level rise* need to be addressed through combination of international and national actions. National actions which can be taken are:

- * initiating programmes to measure the relative changes in sea level rise in the Maldives;
- * identifying and implementing appropriate mitigation measures for anticipated potential climatic and sea level impacts;
- * considering the consequences of global climatic change in the planning process; and
- * actively participating in relevant global programmes concerned with addressing this issue.

WORK PROGRAMME

For establishing the medium term environmental planning capability, the following work programme is to be implemented in 1990-1991

ACTIVITY NO:	TITLE	NATURE OF THE ACTIVITY	DEPARTMENT
1.	Establishment of an environmental management and planning capability in the Ministry of Planning and Environment.	Training of environment staff. Coordination & implementation of the work programme.	MPE. NEC. MAA.
2.	Establishment of a Hydrographic Unit capable of monitoring sea level, tidal and wave patterns	Training and monitoring of the ocean environment.	MPWL. MPE. MAA. MM.
3.	Extension of weather monitoring in the Republic of Maldives and assessment of Meteorological/Climatological patterns under conditions of global warming.	Planning and Assessment for future monitoring.	DM. MPE. MPWL. MAA.
4.	Assessment of groundwater resources outside Male'	Training and assessment through aquifer surveys of selected islands	MPE. MAA. MHW/MWSA.
5.	Marine ecosystems and coral reef surveys	Training and assessment of marine environments around selected islands.	MFA/MRS. MPE.
6.	Coastal geomorphology and Sedimentology	Assessment and training in coastal erosion & hydrography.	MPWL.. MPE.
7.	Terrestrial resource surveys of selected islands	Training and assessment in physical, soil and vegetation surveys	MPE. MAA. MFA. OPPD.
8.	Economic implications of climatic change and sea level rise.	Planning for sustainable development.	MPE.

<i>ACTIVITY NO:</i>	<i>TITLE</i>	<i>NATURE OF THE ACTIVITY</i>	<i>DEPT.</i>
9.	Sociological factors affecting sustainable development in the Maldives.	Planning for sustainable development.	MPE. MAA.
10.	Solid waste management for urban centres and tourist resorts in the Maldives.	Planning assessment and control	MPE. MT. MM. MWSA. MPWL.
11.	Assessment of sewage disposal alternatives in the Maldives.	Planning and evaluation of disposal alternatives.	MPE. MHW/MWSA. MPWL.
12.	Analysis of demographic trends in the Maldives.	Planning and evaluation of migration and demographic trends.	MPE.
13.	Environment impact assessment of the Villingilli resettlement scheme.	Planning and training through implementation of major EIA's.	MPE. SIDU. MPWL. MWSA.
14.	Preparation of public awareness and non-formal education materials.	Preparation and distribution of newsletters & popular booklets.	MPE. ME. TVM/VOM.
15.	Resource inventory for selected islands	Provision of base-line data of islands selected for development.	MPE. MPWL. MWSA. SIDU.
16.	Feasibility study for a National Institute for Natural Resources Research.	Planning and evaluation	MFA/MRS. MPE. NEC.

<i>ACTIVITY NO:</i>	<i>TITLE</i>	<i>NATURE OF THE ACTIVITY</i>	<i>DEPARTMENTS</i>
17.	Establishment of an Environmental data Database.	Provide a centralised environmental information system for use by all Government Departments.	MPE. NCPE.
18.	National Workshop for Midterm review of the work programme	Training in preparation and presentation of scientific reports; review of work programme progress and implementation.	MPE. NCPE.
19.	Terminal seminar and workshop, to review the 1990/91 work programme implementation.	Review of progress and preparation of 1992/93 work programme.	MPE. NCPE.

<u>PROGRAMME AREA:</u>	<u>ACTIVITY NO.</u>
Planning:	1,2,3,8,9,10,12,15,16,17,19.
Assessment:	2,3,4,5,6,7,10,15.
Management:	1,3,10,11,13,14,17,18,19.
Training:	1,2,3,4,5,6,7,10,13,14,17,18.

*Lead Departments are the first listed and those in which the activity is centred, collaborating departments are also indicated.

DM = Department of Meteorology;
 MAA = Ministry of Atolls Administration;
 ME = Ministry of Education;
 MFA = Ministry of Fisheries & Agriculture;
 MH = Ministry of Health;
 MPE = Ministry of Planning and Environment;
 MPWL = Ministry of Public Works and Labour;
 MRS = Marine Reserch Section of the MFA;
 MM = Male Municipality;
 MWSA = Maldives Water and Sanitation Authority;
 NCPE = National Commission for the Protection of the Environment;
 SIDU = Selected Island Development Unit;
 OPPD = Office of Physical Planning and Design;
 VOM = Voice of Maldives;
 TVM = Television Maldives;

WORKPLAN

WORK PROGRAMME 1990/91 FOR THE IMPLEMENTATION OF THE NATIONAL ENVIRONMENT ACTION PLAN

1. INTRODUCTION

1.1 The following list of activities has been compiled on the basis of priorities determined during the UNDP/UNEP/Government sponsored workshop which drafted the National Environment Action Plan; prioritized areas of environmental concern in the country; and discussed ways in which these issues could be addressed in the immediate future.

1.2 The National Commission for the Protection of the Environment approved the list of activities in outline at its meeting on November 2, 1989.

1.3 These activities comprise an integrated work programme for implementation in the 1990/91 biennium. In line with the principal aim of the Action Plan and its directive principles all activities should be viewed as being interdependent in contributing to the establishment of sustainable development in the Republic.

2. NATURE OF ACTIVITIES

2.1 The first activity is designed to strengthen the environmental management and planning capability within the Environment Section of the MPE and to provide scientific guidance in the execution of the various activities contained within the programme. Together with activities 18 & 19 (the midterm and terminal review workshops) and activity 17, the establishment of an environmental data base, this comprises the programme management component.

2.2 Activities 2,4,5,6 and 7 will be executed via a multi disciplinary team approach, centered on islands which have been selected for development. Activity 13, the environmental impact assessment of the Villingili resettlement scheme; and activity 15 the resource inventory for selected islands will result from the assessment activities and are included as separate items in the work programme to clearly indicate the way in which these activities will address priority areas of concern to the Government.

2.3 Activity 2 has the added objective of establishing a hydrographic capability which is currently lacking within the existing Government Departments and which is already the subject of an existing proposal from the Ministry of Public Works and Labour.

2.4 Activity 3,8,9 and 12 address longer term planning issues including the effects of potential climatic change and sea level rise on the environment of the Maldives.

2.5 Activities 10 (solid waste management) and 11 (sewage disposal) address priority areas for action identified by the workshop, their execution would strengthen the management/planning capabilities of the MPE in these areas.

2.6 Activity 14, public awareness, addresses the concern raised in the workshop of the need for the public to be made more aware of the sensitivity of their environment and the need for shared responsibility in maintaining environmental quality.

2.7 Activity 16 is included since the establishment of a research institute has been frequently recommended by visiting experts and is an activity approved by Government for inclusion in the 1988-1990 National Development Plan.

2.8 In line with the National Action Plan the individual activities envisage an intensive training programme for junior and counterpart staff in the application of various methodologies in environmental assessment, management and planning.

3. PROGRAMME MANAGEMENT

3.1 Under the Action Plan the National Commission for the Protection of the Environment is envisaged as the overall coordinating body responsible for the implementation of the Action Plan whilst the Environment Section of the Ministry of Planning and Environment is seen as the principal agency responsible for the co-ordination and management of the work programme.

3.2 It is suggested that the Commission establish a small executive committee composed of four to five principal departments involved in the activities listed in the programme to aid the Programme Coordinator in implementing the activities under the work programme.

1. ESTABLISHMENT OF AN ENVIRONMENTAL MANAGEMENT AND PLANNING CAPABILITY IN THE MINISTRY OF PLANNING AND ENVIRONMENT.

BACKGROUND:

This activity forms the core of the 1990/91 work programme addressing directly the principal aim of the Action Plan by seeking to strengthen the planning and management capabilities of the Ministry of Planning and Environment and to articulate these activities closely with the relevant activities of other Government Departments.

The Government has accepted the need for national manpower training in the field of environmental management by inclusion of the project "Training in Environmental Management" (ID 2IP) in the 1988-1990 National Development Plan, for which funding was not obtained.

AIMS:

- a) Implement the 1990/91 work programme established under the Action Plan;
- b) Establish a unified approach to development planning and environmental management in the Republic of the Maldives through inter-departmental planning and execution of work programme activities;
- c) Establish an in-country capability for managing environmental impact assessment for major development projects;
- d) Establish the nucleus of an environmental database in the Ministry of Planning and Environment.
- e) Enhance the existing capabilities of the Environment Section of the Ministry of Planning and Environment;
- f) Review and revise existing environmental legislation and guidelines where appropriate;
- g) Provide practical training through the implementation of activities in various environmental fields.

METHODOLOGY AND WORK PLAN:

It is proposed that a scientific advisor be appointed to the Environment Section of the Ministry of Planning and Environment initially for 2 years, to provide in-house training in environmental management and planning and to assist in the co-ordination of the work of international and national experts conducting the activities implemented under the 1990/91 work programme. A regular programme of training seminars will be run by the scientific advisor for staff involved in the implementation of activities under the work programme.

Activities concerned with resource assessment will be linked, through the initiation of resource surveys of the islands already selected for development by the government. Such resource surveys will involve national personnel from various government departments operating as a team to inventory ground water, marine ecosystems, vegetation and physical aspects of the environment of the selected islands.

The international expert appointed as scientific advisor to the Ministry of Planning and Environment, from January 1990 will;

- a) advise the environment section on the implementation of the work programme established under the National Environment Action Plan;
- b) co-ordinate, guide, supervise, and participate in the work of individual technical experts implementing various aspects of the work programme, including the preparation of sectoral reports arising from each activity;
- c) participate in the preparation of monthly progress reports on the work programme to the National Commission for the Protection and Preservation of the Environment and for sponsoring agencies;
- d) Assist the environment section of the Ministry of Planning and Environment in general and the National Coordinator in particular in the preparation of the mid-term and consolidated reports of the different activities;
- e) Supervise and foster the transfer of scientific and technical knowledge and expertise from the international experts to their Maldivian counterparts;
- f) co-ordinate and participate in a regular programme of in-house training for Maldivian staff involved in the implementation of work programme activities.
- g) Collect, collate and analyse all scientific and technical reports relevant to the work programme and ensure their appropriate interpolation in the mid-term and terminal reports of the work programme;
- h) participate in the mid-term and terminal review meetings associated with the project;
- i) advise the Ministry of Planning and Environment on the possible implementation of recommendations arising from the various activities initiated under the work programme;
- j) Assist in the planning of future work programmes arising from activities initiated in 1990 under the first Work Programme;
- k) co-ordinate, guide, supervise and participate in the implementation of an environmental impact assessment for the proposed Villingili urban development and initiate environmental impact assessments of other selected islands and developments.
- l) assist the environment staff in the preparation and production of environmental awareness materials for schools and the general public.
- m) co-ordinate, guide, supervise and participate in the implementation of field surveys of selected islands and atolls.
- n) prepare, in consultation with the National Coordinator a consolidated report on the potential impacts of climatic change and sea level rise on the Republic of Maldives including advice for future policy and planning alternatives.

The Environment section of the Ministry of Planning and Environment will:

- a) appoint a national coordinator who will:
 - i) co-ordinate, guide, supervise and participate in the implementation of the work programme adopted under the National Environment Action Plan.

- ii) liaise with Government Departments involved in implementing various activities under the Action Plan.
 - iii) provide guidance and supervision in the preparation of the sectoral reports arising from the activities undertaken in implementing the Action Plan;
 - iv) prepare monthly progress reports for the National Commission for the Protection of the Environment and sponsoring agencies;
 - v) prepare the consolidated report of the work programme;
 - vi) guide, supervise and participate in the work carried out by the technical experts;
 - vii) organise and supervise the printing of reports;
 - viii) liaise with the relevant sections of Government on all financial matters relevant to the project;
 - ix) arrange for appropriate administrative and support staff to be assigned to the various activities.
- b) define the responsibilities of existing officers in the environment section in terms of :
 - publicity/public awareness material
 - creating an environmental database
 - environmental impact assessment
 - resource inventories
 - pollution surveys and assessment.
 - c) prepare in the first quarter of 1990 a detailed manpower plan and training programme for the staff of the Environment Section of the Ministry.
 - d) appoint one full-time clerk-typist.
 - e) appoint three new full-time officers by January 1990.
 - f) prepare a comprehensive and consolidated report on the state of the environment of the Maldives by August 1991, for discussion at the terminal review meeting (Activity 19) in October.

The National Commission for the Protection of the Environment shall:

- a) Establish a 4/5 member executive committee to assist the co-ordinator in the execution of his responsibilities.
- b) Review the progress of implementing the work programme on a regular basis.

INSTITUTIONAL FRAMEWORK:

Lead agency: Ministry of Planning and Environment
 Collaborating agencies: All member departments of the national Commission for the Environment.

OUTPUTS :

- 1) trained national expert in the management of the Environmental Impact Assessment;
- 2) a number of national environment officers trained in resource survey techniques;
- 3) the nucleus of an environmental database;
- 4) a consolidated report on the state of the environment of the Maldives, together with an evaluation of the effectiveness of the initial work programme.
- 5) public awareness material including a regular environmental newsletter and booklets in English and Dhivehi;
- 6) a consolidated report on the potential impacts of climatic change and sea level rise on the Republic of the Maldives including advice for future policy and planning alternatives.
- 7) a recommended future work programme (1992-93) for implementation under the National Environment Action Plan.
- 8) a series of site surveys and resource inventories of selected atolls and islands.

BUDGET:

	1990	1991	total
Cost to external agency (in cash):			
Equipment:			
2 IBM PC's plus software	6,000		
Laser printer, fast printer	4,000		
Map cabinet	4,000	2,000	
Materials & Supplies			
Boat fuel & field survey costs	10,000	10,000	
Computer stationary, diskettes	2,000	2,000	
Personnel			
International advisor	80,000	80,000	
Travel			
Internal Travel	5,000	5,000	
International travel (advisor)	8,000	8,000	
International. travel (coordinator)	8,000	8,000	
Reporting costs	1,000	2,000	
Sub-total	<u>128,000</u>	<u>117,000</u>	<u>245,000</u>
Cost to Government of the Maldives (in cash & kind):			
Boat	15,000		
Office space and logistic support	12,000	12,000	
Counterpart staff	4,500	4,500	
New staff	3,000	3,000	
Materials & supplies	2,000	2,000	
Sub-total	<u>36,500</u>	<u>21,500</u>	<u>58,000</u>
Total	<u>164,500</u>	<u>138,500</u>	<u>303,000</u>

2. ESTABLISHMENT OF A HYDROGRAPHIC UNIT CAPABLE OF MONITORING SEA LEVEL, TIDAL AND WAVE PATTERNS.

BACKGROUND:

The flooding events of 1987 and 1988 demonstrated clearly the need for an in-country capability in measuring various hydrographic and oceanographic parameters to provide base-line information for incorporation into the planning of coastal developments. Interim arrangements in the Ministry of Public Works and Labour need to be replaced by a more self-sufficient capability.

The 1988-90 National Development Plan included project ID1OP "Development of National Surveying capability" covering both land and lagoon surveying under the Male Municipality. The Ministry of Public Works and Labour currently has a UN volunteer hydrographic surveyor but the unit is understaffed and lacks much basic equipment.

AIMS:

- a) Establish an in-country capability for monitoring sea level, tidal and wave patterns in the Ministry of Public Works and Labour.
- b) Establish the basis for an oceanographic and hydrographic database in the country.
- c) Provide training in simple oceanographic and lagoon hydrographic investigations.

METHODOLOGY AND WORK PLAN:

Following a preliminary visit in 1989 an international expert will be appointed to install the necessary equipment and provide training in its use. Through retrospective analysis of data sources such as satellite imagery the expert will produce a review of the major oceanographic and hydrographic conditions in the Indian Ocean. The expert will participate in site surveys and design a programme of ongoing work for the national trainees which will be integrated with other site surveys and supervised in the absence of the international expert by the scientific advisor to the Ministry of Planning and Environment.

The International expert will visit the Maldives for a period of one week in 1989 to :

- a. assess and review the existing in-country capabilities in the field of oceanography and hydrography and the work currently being undertaken by the Ministry of Public Works and Labour in association with Lanka Hydraulics;
- b. advise on the selection of a suitable equipment package for measuring oceanographic, hydrographic and meteorological parameters for immediate purchase;
- c. recommend an appropriate system for data collection, processing and management that is compatible with leading international agencies; and
- d. recommend ways in which the data processing functions may be integrated into the present organisational structures of the Ministry of Public Works and Labour and into the Ministry of Planning and environment.

The international expert will subsequently:

- a) assemble published data concerning the oceanographic conditions of the Indian Ocean in general and the Maldives area in particular;
- b) visit the Maldives for 10 weeks in 1990 to install the equipment;
- c) initiate training of national experts in the collection, storage and analysis of tidal and other oceanographic information;
- d) prepare and undertake a programme of field observations and measurements around selected islands to examine the wave and current patterns in the vicinity of modified and unmodified islands;
- e) prepare a comprehensive training and manpower development programme and programme of future development for the unit over the next five years; and
- f) visit the Maldives for four weeks in 1991 to participate in surveys of selected islands and review and assist in analysing data collected during 1990.
- g) participate in the final review meeting of the programme.

The Ministry of Public Works and labour will:

- i. provide office space and consumables to the unit;
- ii. provide a secretary, initially on a half time basis;
- iii. provide two full-time trainees with suitable academic background;

INSTITUTIONAL FRAMEWORK:

Lead agency:	Ministry of Public Works and Labour.
Collaborating agency:	Ministry of Planning and Environment. Ministry of Atolls Administration. Male' Municipality

OUTPUTS

1. Establishment of an in-country hydrographic capability.
2. Trained national experts in the collection, storage and analysis of tidal data and enhanced monitoring capability on the part of the Ministry of Public Works and Labour.
3. A five year development plan for ocean monitoring in the Maldives.
4. A review of current knowledge concerning oceanographic conditions in the Maldives area.
5. A sectoral report on the possible impacts of climatic change and sea level rise and oceanographic conditions around the Maldives.
6. Data relevant to suitable design suitable wave heights for coastal structures.
7. Detailed site reports on the hydrography of selected atolls and islands.

BUDGET:

To external agency(in cash):

	1990	1991	TOTALS
Equipment:			
IBM PC AT, co-processor & software	8,000		
Tide Gauging equipment	10,000		
Wave rider buoys, current meters & other items	10,000		
Materials & Supplies	1,500	1,000	
Personnel			
International expert	10,000	4,000	
Travel & per diem			
National trainees	10,000		
International Expert	10,000	5,000	
Reporting costs	500	1,000	
Sub-total	<u>60,000</u>	<u>11,000</u>	<u>71,000</u>

	1990	1991	totals
Cost to the Government of Maldives (in cash and kind):			
Office space & logistic support	12,000	12,000	
Secretarial salary	300	600	
Materials & supplies	400	400	
Counterpart salaries	2,000	2,000	
Sub-total	<u>14,700</u>	<u>15,000</u>	<u>29,700</u>
TOTAL	<u>74,700</u>	<u>26,000</u>	<u>100,700</u>

3. EXTENSION OF WEATHER MONITORING IN THE REPUBLIC OF THE MALDIVES AND ASSESSMENT OF METEOROLOGICAL/CLIMATOLOGICAL PATTERNS UNDER CONDITIONS OF GLOBAL WARMING.

BACKGROUND:

Weather patterns are an extremely important component of the physical environment involving wind, rain, temperature and humidity phenomena some of which vary in different parts of the Maldivian archipelago. Increased frequency of air transport in the Maldives and construction of new airstrips emphasizes the need for adequate weather monitoring. In addition an analysis of the climatological and meteorological features of the wider Indian Ocean are required to provide an understanding of the relationship between oceanographic /climatological patterns and episodic events such as the recent flooding events.

AIMS:

- a) provide a development plan for the Department of Meteorology;
- b) Provide a review of current knowledge concerning the climatology and meteorology of the Indian Ocean and an assessment of likely changes which might be expected as a consequence of predicted climatic change under the influence of global warming.

METHODOLOGY & WORK PLAN:

An international expert will be appointed for two months who will collaborate closely with national experts in the production of a national development plan for the weather service. The experts visit to the Maldives will be timed to overlap with the 1990 visit of the expert in Oceanography in order to facilitate the exchange of ideas and information.

The International Expert will:

- a) assemble published information relevant to the meteorology and climatology of the Indian Ocean;
- b) analyse existing data with a view to detecting evidence for climatic change (if any);
- c) in consultation with the oceanographic expert and with the Department of Meteorology analyse the causes, nature and frequency of episodic events such as extreme flooding, tropical storms and drought periods;
- d) prepare, in consultation with the Department of Meteorology and other relevant Government Departments an evaluation of the needs of the Republic in the area of collection of weather data in the country. This evaluation should include: an analysis of trained manpower needs; recommendations on the siting of future weather stations (if any); recommendations on suitable training programmes for staff of the Department; a programme of the phased acquisition of necessary monitoring equipment; and a fully costed budget; and,
- e) participate in the final review meeting of the programme.

INSTITUTIONAL FRAME WORK:

Lead Agency: Department of Meteorology.
 Collaborating Agencies: Ministry. of Planning & Environment.
 Ministry. of Public Works & Labour.
 Ministry. of Atolls Administration.

OUTPUTS:

1. A review of current knowledge concerning the climate of the Indian Ocean and the Maldives, including episodic events and their causes;
2. A sectoral report on the possible impacts of climatic change and sea level rise on future climates in the Maldives, and an assessment of impacts on human comfort;
3. A development plan for future meteorological monitoring in the Maldives.

BUDGET:

Cost to External Agency (in cash);	1990	1991	Totals
Personnel			
International Expert	8,000		
Travel & per diem	8,000		
Reporting costs	500		
Sub-total	<u>16,500</u>		<u>16,500</u>
Cost to Government of Maldives (in cash & kind)			
Office space & logistic support	2,000		
Counterpart salary	500		
Sub-total	<u>2,500</u>		<u>2,750</u>
TOTAL	<u>19,000</u>		<u>19,000</u>

4. ASSESSMENT OF GROUND WATER RESOURCES OF SELECTED ISLANDS

BACKGROUND:

Whilst several surveys of the Male' aquifer have been conducted since the early 1970's and monitoring of this lens is currently in hand, few surveys have been conducted to establish the extent of ground water resources on other islands. It is clear that a need exists to establish the baseline condition of aquifer resources on islands scheduled for development.

Project HSO9P, "Geology and ground water assessment" in the 1988-90 National Development Plan calls for a comprehensive review of current capabilities and existing data and the formulation of development plans including the design of a water control laboratory. This project was initially scheduled for two years and the present activity envisages an extension of the baseline survey and strengthening of existing capabilities in the field of ground water assessment.

AIMS:

- a) Initiate a national programme to survey the ground water resources of the country and enhance the capability of the Water and Sanitation Authority in this regard.
- b) Establish the basis for a ground water database in the country.
- c) Provide training in water resource assessment and management.

METHODOLOGY AND WORK PLAN:

As part of integrated resources assessment of selected islands a ground water survey will be conducted by bores and measurements of water quality and volume taken. The costs of establishing bores are high, estimated costs for a single island survey varies between twenty and thirty thousand USD thus full surveys will only be conducted on two islands to establish permanent monitoring points.

An international expert will visit the Maldives for 10 weeks in 1990 and 4 weeks again in 1991 to liaise with other members of the resource assessment team and will:

- a) assemble the published data pertaining to ground water resources of the Maldives;
- b) design and undertake a programme of ground water assessment in selected atolls and islands;
- c) provide basic training to Maldivian experts in water resource assessment and management;
- d) model ground water flows and volumes for selected islands, and on the basis of studied aquifers provide preliminary projections of likely ground water resources for unstudied islands.
- e) participate in the final review meeting of the programme.

INSTITUTIONAL FRAMEWORK:

Lead Agency: Ministry. of Planning & Environment.
 Collaborating Agencies: Ministry of Health and Welfare.
 Maldives Water and Sanitation Authority.
 Ministry of Atolls Administration.

OUTPUTS:

1. A review of current knowledge concerning the ground water resources of the Maldives;
2. A sectoral report on the possible impacts of climatic change and sea level rise on the ground water resources of the Maldives.
3. Trained national experts in water resources assessment and management.
4. Detailed site reports on the ground water resources of selected islands.

BUDGET:

	1990	1991	TOTALS
Cost to external agency (in cash):			
Equipment:			
Establishment of bores	30,000	20,000	
Materials and supplies	8,000	8,000	
Personnel			
International Expert	10,000	4,000	
Travel & per diem	10,000	5,000	
Services			
Computer models	10,000		
Reporting costs	500	1,500	
Sub-total	<u>68,500</u>	<u>38,500</u>	<u>107,000</u>
Cost to Government of Maldives (in cash & kind):			
Office space & logistic support	6,000	6,000	
Counterpart salaries	1,500	1,500	
Sub-total	<u>7,500</u>	<u>7,500</u>	<u>15,000</u>
TOTAL	<u>76,000</u>	<u>46,000</u>	<u>122,000</u>

5. MARINE ECOSYSTEM AND CORAL REEF SURVEYS

BACKGROUND:

The Marine Research Section (MRS) of the Ministry of Fisheries and Agriculture is currently operating a programme of coral reef studies centered in North Male' Atoll. As part of the resource inventories of selected islands it is intended that assessment of their reefs should be undertaken, thus extending the geographic coverage of the work of the MRS. A considerable body of information has been collected during previous surveys and some assistance with the analysis and compilation of these data will be provided. The present activity also seeks to initiate a programme of retrospective analysis of coral growth to provide semi quantitative, baseline information on sea level changes during the recent past.

AIMS:

- a) Expand the current activities of Marine Research Section into the field of coral growth studies.
- b) Extend the coverage of the present survey programme to other islands and atolls.
- c) Assistance in collating and analysing existing coral reef data.
- d) Provide preliminary estimates of recent sea level changes.

METHODOLOGY AND WORK PLAN:

An international expert will be appointed to visit the Maldives for a period of ten weeks in 1990 and a further 4 weeks in 1991 to work in close co-operation with the staff of the Environment Section and the Marine Research Section, including experts working under the proposed ICOD joint programme of cooperation. Given the present manpower constraints in the Marine Research Section the Government should appoint an additional national staff member to act as counterpart during the visit of the International expert and to continue aspects of the programme under the joint supervision of the Marine Research Section and the Environment section of the Ministry of Planning and Environment.

The international expert will:

- a) assemble published information relating to the coral reefs, and marine resources of the Maldives;
- b) prepare and undertake a programme of field observations and measurements at selected islands and atolls designed to characterize the biological communities in relation to the physical environment and anthropogenic influences and provide field training to national officers in such survey techniques;
- c) initiate in cooperation with the Marine Research Section a programme of measurement of coral growth rates, past and present;
- d) prepare in collaboration with national experts of the Marine Research Section a sectoral report on the potential impacts of climatic change and sea level rise on the marine resources and ecosystems of the Maldives;
- e) participate in the final review meeting of the programme.

INSTITUTIONAL FRAMEWORK:

Lead Agency: Marine Research Section, Ministry of Fisheries and Agriculture.
 Collaborating Agency: Ministry of Planning and Environment.

OUTPUTS:

1. A review of current knowledge concerning the marine ecosystems of the Maldives.
2. A sectoral report on the possible impacts of climatic change and sea level rise on the marine ecosystems of the Maldives.
3. Trained national experts in coral growth assessment.
4. Detailed site reports on the marine communities of selected atolls and islands.

BUDGET:

	1990	1991	Totals
Cost to External Agency (in cash):			
Personnel			
International Expert	10,000	4,000	
Materials & supplies (resins, diamond saw blades)	5,000	5,000	
Travel & per diem	10,000	5,000	
Reporting Costs	500	1,500	
Sub-total	<u>25,500</u>	<u>15,500</u>	<u>41,000</u>
Cost to the Government of Maldives (in cash and kind):			
Office space and logistic support	12,000	12,000	
Counterpart salary	1,000	1,000	
Sub-total	<u>13,000</u>	<u>13,000</u>	<u>26,000</u>
TOTAL	<u>38,500</u>	<u>28,500</u>	<u>66,000</u>

6. COASTAL GEOMORPHOLOGY AND SEDIMENTOLOGY.

BACKGROUND:

An issue of fundamental concern to the Maldives is coastal erosion of the small islands which make up this archipelagic state. There exists a need to not only establish the causes and extent of present erosional processes within the country but to assess the suitability and availability of lagoonal sediments for use in the construction industry. Information on sand resources and the stability of islands is urgently required in a number of planning sectors.

AIMS:

- a) Establish a capability for the rapid assessment of coastal processes in the Ministry of Public Works and Labour.
- b) Establish an in-country capability for the rapid survey of lagoonal sediments;
- c) Provide training in simple procedures for assessing sediment distributions, type and movements.

METHODOLOGY AND WORK PLAN:

As part of the integrated resource assessment of selected islands a sediment and coastal erosion survey will be conducted to assess the extent of erosion and the origin and movements of sediments around the coastal and lagoonal areas of selected islands.

An international expert will visit the Maldives for 10 weeks in 1990 and 4 weeks in 1991 to liaise with other members of the resource assessment team and will:

- a) assemble the published data pertaining to lagoon sediment genesis, distribution and movements in Male' and other atoll lagoons;
- b) design and undertake a program of sediment surveys in selected atolls and islands;
- c) provide basic training to maldivian experts in sediment survey and analysis;
- d) participate in the final review meeting of the programme.

INSTITUTIONAL FRAMEWORK:

Lead Agency:	Ministry of Public Works & Labour.
Collaborating Agency:	Ministry of Planning and Environment.

OUTPUTS:

1. A review of current knowledge concerning the sediments and sedimentary processes in Maldivian lagoons, including an assessment of the possible impacts of climatic change and sea level rise on sedimentary processes in Maldivian lagoons;
2. Trained national experts in sediment surveys and coastal process assessment;
3. Detailed site reports on the sedimentary characteristics of selected atolls, and islands.

BUDGET:

	1990	1991	TOTALS
Cost to External Agency (in cash):			
Equipment, (grabs, sediment, traps, sieves)	10,000		
Personnel			
International Expert	10,000	4,000	
Travel & per diem	10,000	5,000	
Reporting costs	500	1,500	
Sub-total	<u>30,500</u>	<u>10,500</u>	<u>41,000</u>
Cost to Government of Maldives (in cash and kind)			
Office space and logistic support	12,000	12,000	
Counterpart salary	1,500	1,500	
Sub-total	<u>13,500</u>	<u>13,500</u>	<u>27,000</u>
TOTAL	<u>44,000</u>	<u>24,000</u>	<u>68,000</u>

7. TERRESTRIAL RESOURCE SURVEY OF SELECTED ISLANDS

BACKGROUND:

As with other resources of the Republic little information is available concerning terrestrial resource abundance or availability. Such data are needed both as a nucleus for a national database and for planning future developments.

Project AD19P, "Land use planning and mapping of islands" sought to facilitate the mapping of all inhabited islands in order to plan future land use and prepare proper maps. This activity would therefore meet in part the requirements of this project.

AIMS:

- a) establish a capability for the rapid assessment of terrestrial resources including soils and vegetation in the Environment Section of the Ministry of Planning and Environment.
- b) establish an in-country capability for the rapid survey and mapping of small islands;
- c) provide training in simple survey and mapping procedures and enhance the existing capabilities of the Ministry of Public Works and Labour in this regard.

METHODOLOGY AND WORK PLAN:

As part of the integrated resource assessment of selected islands a topographic, soil and vegetation survey will be conducted to map soil and vegetation types and present land use patterns of the selected islands.

An international expert will visit the Maldives for 10 weeks in 1990 and 4 weeks in 1991 to liaise with other members of the resource assessment team and will:

- a) assemble the internationally published data pertaining to the terrestrial environment of the Maldives and other similar atoll states and islands;
- b) design and undertake a programme of soil, vegetation, land use and physical surveys in selected atolls and islands;
- c) provide basic training to Maldivian experts in survey techniques;
- d) participate in the final review meeting of the programme.

INSTITUTIONAL FRAMEWORK:

Lead agency:	Ministry of Planning and Environment.
Collaborating Agency:	Agriculture Section, Ministry of Fisheries and Agriculture. Office for Physical Planning and Design. Ministry of Atolls Administration.

OUTPUTS:

1. A review of current knowledge concerning the terrestrial environment of atoll islands in general and of the Maldives in particular; an assessment of the possible impacts of climatic change and sea level rise on terrestrial ecosystems;
2. Trained national experts in soil, vegetation and physical surveys;
3. Detailed site reports including maps of the soils, vegetation and land use on islands of selected atolls.

BUDGET :

	1990	1991	totals
Cost to External Agency (in cash)			
Equipment			
Surveying Equipment	10,000		
Materials and supplies	5,000	3,000	
Personnel			
International Expert	10,000	4,000	
Travel & per diem	10,000	5,000	
Reporting costs	500	1,500	
Sub-total	<u>35,500</u>	<u>13,500</u>	<u>49,000</u>
Cost to Government of Maldives (in cash & kind):			
Office space & logistic support	12,000	12,000	
Counterpart salary	1,500	1,500	
Sub-total	<u>13,500</u>	<u>13,500</u>	<u>27,000</u>
TOTAL	<u>49,000</u>	<u>27,000</u>	<u>76,000</u>

8. ECONOMIC IMPLICATIONS OF CLIMATIC CHANGE AND SEA LEVEL RISE.

BACKGROUND:

Considerable concern has been expressed world wide about the possible economic impacts of climatic change and sea level rise on developing countries and in particular on small island states. To date few studies of the economic implications of such changes have been made. UNEP sponsored studies in the Pacific highlighted the atoll island states as being the most vulnerable to global change and placed priority on providing detailed planning and policy alternatives for such states. There is therefore a demonstrated global need to provide economic planning and policy alternatives to Government for coping with the potential impacts of climatic change.

AIMS:

- a) Review the likely consequences of climatic change and sea level rise on the economy of the Maldives.
- b) Advise the Government of the Maldives on policy issues which should be taken into consideration in planning future activities to achieve sustainable development.

METHODOLOGY AND WORK PLAN:

Following the reviews of other experts on the resources and physical environment of the Maldives and their assessment of the likely impacts of global climatic change an international expert will be appointed to work closely with national experts in analysing the policy and planning alternatives available to the Republic of Maldives in defining their development strategies.

The International expert will:

- a) assemble published information relevant to the economy of the country.
- b) examine the past, present and future development plans, both sectoral and national and provide an evaluation of the current state of the economy and its possible future development.
- c) examine, in close co-operation with the Ministry of Planning and Environment, the prospects of the present and planned development activities from the standpoint of sustainable development.
- d) evaluate in close co-operation with the expert on sociology and with relevant national experts, the socio economic trends and impacts of present and planned development.
- e) prepare in consultation with the national expert a sectoral report on the potential impacts of climatic change and sea level rise on the economy of the Maldives, including recommendations for future planning and policy decisions by the Government of the Republic which may avoid or mitigate the potential impacts of climatic changes on the future economic development of the country.
- f) participate in the final review meeting of the programme.

INSTITUTIONAL FRAMEWORK:

Lead Agency: Ministry of Planning and Environment.
 Collaborating Agency.

OUTPUTS:

1. An overview of the current state of the economy and its possible future development including a review of the past, present and proposed development activities, in the light of the possible impacts of climatic change on the economy of the Maldives.

BUDGET:

	1990	1991	TOTALS
Cost to External Agency (in cash):			
Personnel			
International Expert		12,000	
Travel & per diem		12,000	
Reporting costs		1,000	
sub-total		<u>25,000</u>	<u>25,000</u>
Cost to Government. of Maldives (in cash and kind)			
Office space & logistic support		4,000	
Counterpart salary		500	
sub-total		<u>4,500</u>	<u>4,500</u>
TOTAL		<u>29,500</u>	<u>29,500</u>

9. SOCIOLOGICAL FACTORS AFFECTING SUSTAINABLE DEVELOPMENT IN THE MALDIVES.

BACKGROUND:

Considerable concern has been expressed world wide about the possible social and cultural impacts of climatic change and sea level rise on developing small island states. To date a few studies of the social and cultural implications of such changes have been made. There is demonstrated need to provide social planning and policy alternatives to Government for coping with the potential impacts of climatic change.

AIMS:

a) review the past and current social trends in the Maldives and their possible future development in the light of climatic change and present development strategies.

METHODOLOGY & WORK PLAN:

Following the reviews of other experts on the resources and physical environment of the Maldives and their assessment of the likely impacts of climatic change, an international expert will visit the Maldives for 10 weeks in 1991 to work closely with national experts in analysing the policy and planning alternatives available to the Republic of Maldives in defining their development strategies.

The international expert will:

- a) assemble published information relevant to the sociology of the Maldives;
- b) examine the past, and current social trends in the Maldives and their possible future development.
- c) examine in close co-operation with the project team, present and future social trends from the standpoint of sustainable development as well as the socio-economic impacts of the present and planned development activities in the Maldives.
- d) prepare in consultation with the national expert a sectoral report on the potential impacts of climatic change and sea level rise on the social and cultural environment of the Maldives, including recommendations for future planning and policy decisions by the Government which may avoid or mitigate the potential impacts of climatic changes.
- e) participate in the final review meeting of the programme.

INSTITUTIONAL FRAMEWORK:

Lead Agency:	Ministry of Planning and Environment.
Collaborating:	Ministry of Home Affairs and Sports.
	Ministry of Atolls Administration.

OUTPUTS:

1. A overview of the current social and cultural environment of the Maldives and its possible future development in the light of proposed development activities and the possible impacts of climatic change on the social and cultural environment of the Maldives.

BUDGET:

	1990	1991	TOTAL
Cost to External Agency (in cash)			
Personnel			
International Expert		10,000	
Travel & per diem		9,000	
Report preparation, printing		1,000	
Sub-total		<u>20,000</u>	<u>20,000</u>
Cost to the Government of Maldives (in cash & kind)			
Office space & logistic support		4,000	
Materials & supplies		250	
Counterpart salary		350	
Sub-total		<u>4,600</u>	<u>4,600</u>
TOTAL		<u>24,600</u>	<u>24,600</u>

10. SOLID WASTE MANAGEMENT FOR RURAL ISLANDS, RESORTS AND FUTURE URBAN CENTRES IN THE MALDIVES.

BACKGROUND:

The problems of solid waste disposal in Male' are currently critical whilst the extent of similar problems elsewhere in the country is undocumented. Various proposals for disposal of solid wastes in Male' have included dumping, incineration and others. No substantial database exists on the situation outside Male' on which to base a rational choice of available alternatives for overall national planning. The practicality has not yet been adequately evaluated of alternative disposal methods which may be more appropriate for the Maldives than those proposed to date.

The "Male' sewage and solid waste treatment and disposal study" being undertaken as a consultancy by GITECH aims to evaluate sewage impacts in the marine environment; evaluate the present fresh-water supply and demand; and assess the nature of solid wastes and evaluate alternative disposal mechanisms for the capital. The proposed activity aims to extend this evaluation to other islands.

AIMS:

- a) To review current solid waste management problems countrywide;
- b) To extend the present capability of relevant Government Departments to monitor and enforce appropriate waste disposal standards; and,
- c) To recommend waste disposal methods for implementation resorts, rural communities and future urban settlements.

METHODOLOGY AND WORK PLAN:

This activity will be initiated by means of an extensive review of current problems, and practices, and a critical examination of alternative methods of disposal which might be adopted in rural communities, resort islands and future urban settlements. In addition the volumes and nature of wastes produced in rural and resort islands are inadequately documented at the present time and the Environment Section should initiate activities designed to produce a semi-quantitative database for future planning purposes.

Initially an expert would be appointed for a ten week period in the second half of 1990 to work in close co-operation with the Ministry of Planning and Environment, the Water and Sanitation Authority, The Male' Municipality, and the Ministry of Tourism to:

- a) review existing information concerning solid waste problems in the Maldives.
- b) evaluate on behalf of the Government of the Maldives the findings and recommendations produced by GITECH concerning solid waste disposal alternatives for Male';
- c) assess in consultation with the relevant Government authorities the volume and nature of solid wastes being generated in selected resort and rural islands.
- d) in consultation with the environment section of the Ministry of Planning and Environment, review existing legislation controlling disposal of solid wastes and assist in drafting amendments or new legislation as appropriate.

e) review current waste disposal practices and recommend the adoption of appropriate handling and disposal systems paying particular attention to the possibilities of recycling and energy generation where appropriate.

f) provide preliminary cost-benefit analyses for the various alternative methods of disposal considered in d) above.

g) establish a programme to be operated by the Ministry of Planning and Environment to collect and evaluate data on the nature and volumes of solid waste generated over two years, and provide training to the national officers responsible for implementing the survey.

The Environment Section of the Ministry of Planning and Environment will:

a) initiate early in 1990 a detailed survey of solid wastes in selected resort and rural islands.

b) Prepare a dossier of relevant legislation, guidelines and standards currently in operation.

INSTITUTIONAL FRAMEWORK:

Lead Agency: Ministry of Planning and Environment.
 Collaborating Agencies: Water and Sanitation Authority.
 Ministry of Public Works and Labour.
 Male' Municipality.
 Ministry of Tourism.
 Ministry of Atolls Administration.

OUTPUTS:

1. A comprehensive review of solid waste disposal problems and potential solutions.
2. Recommendations concerning solid waste disposal alternatives and appropriate draft legislation.
3. An evaluation of the GITECH assessment and recommendations relating to solid waste disposal problems in Male'.

BUDGETS:

Cost to External Agency in cash:	1990	1991	TOTALS
Personnel			
International Expert	10,000		
Travel and per diem	9,000		
Reporting costs	10,00		
Sub-total	<u>20,000</u>		<u>20,000</u>
Cost to the Government of Maldives: (in cash and kind)			
Office space and logistic support	4,000		
Counterpart salary	1,500	1,500	
Sub-total	<u>5,500</u>	<u>1,500</u>	<u>7,000</u>
TOTAL	<u>25,500</u>	<u>1,500</u>	<u>27,000</u>

11. ASSESSMENT OF SEWAGE DISPOSAL ALTERNATIVES IN THE MALDIVES.

BACKGROUND:

The extent of potential problems resulting from sewage contamination of the coastal zone, particularly in the vicinity of Male'. Contamination of near shore waters by human pathogens, including faecal coliforms and problems resulting from nutrient enrichment in shallow water lagoon areas needs to be assessed particularly in relation to rural communities and resort islands. In addition the applicability of recent developments in sewage treatment to produce biogas and fertilizer should be evaluated for use in future urban developments in the Maldives.

AIMS:

- a) to review current problems;
- b) to evaluate on behalf of the Government of the Maldives the findings of GITECH relating to sewage pollution problems in the vicinity of Male';
- c) to produce a fully costed proposal for the establishment of a sewage pollution monitoring capability in the Water and Sanitation Authority;
- d) to investigate the feasibility of alternate methods of sewage treatment and disposal for adoption in rural and resort islands and future urban developments.

METHODOLOGY AND WORK PLAN:

This activity will be initiated by means of an extensive review of current problems, and practices, and a critical examination of alternative methods of disposal which might be adopted in rural areas and future urban developments. In addition the capability for monitoring marine and coastal pollution problems arising from the present method of untreated sewage disposal are inadequate and need to be upgraded.

Initially an expert would be appointed for a two months period to work in close cooperation with the Ministry of Planning and Environment, and the Water and Sanitation Authority to:

- a) review existing information concerning sewage disposal problems in the Maldives;
- b) recommend a programme of coastal water monitoring and assessment to ascertain the scale of pollution problems arising from the discharge of untreated sewage wastes. The recommended programme to include a realistic programme for the acquisition of equipment, facilities and man power phased over a period of three years;
- c) review current disposal practices and recommend the adoption of appropriate treatment and disposal systems for rural islands and future urban settlements, paying particular attention to the possibilities of biogas and / or energy generation;
- d) provide preliminary cost-benefit analysis for the various alternative methods of disposal considered in c) above.

INSTITUTIONAL FRAMEWORK:

Lead Agency: Ministry of Planning and Environment.
 Collaborating Agency: Ministry of Health and Welfare.
 Maldives Water and Sanitation Authority.
 Ministry of Public Works and Labour.

OUTPUTS:

1. Comprehensive review of sewage disposal problems and potential solutions .
2. A phased plan for the development of a monitoring capability in country to assess the human health and eutrophication risks of present sewage disposal practices.

BUDGET:

	1990	1991	TOTALS
Cost to external agency (in cash)			
Personnel			
International Expert	8,000		
Travel and per diem	8,000		
Reporting costs	5,00		
Sub-total	<u>16,500</u>		<u>16,500</u>
Cost to the Government of Maldives (in cash and kind)			
Office space and logistic support	1,000		
Materials and supplies	1,50		
Counterpart salaries	3, 50		
Sub-total	<u>1,500</u>		<u>1,500</u>
TOTAL	<u>18,000</u>		<u>18,000</u>

12. ANALYSIS OF DEMOGRAPHIC TRENDS IN THE REPUBLIC OF THE MALDIVES

BACKGROUND:

Considerable concern has been expressed world wide about the possible social and cultural impacts of climatic change and sea level rise on small island states. One major characteristic of demographic patterns in atoll and other small island states is the tendency for migration of the population within the country in response to perceived benefits including access to health and education. To date few studies have been made to evaluate the underlying causes of such movements in the Maldives. There is a demonstrated need to evaluate demographic trends in order to establish island carrying capacities and provide planning and policy alternatives to Government which may assist in coping with the additional strains which might be imposed as consequence of the potential impacts of climatic change.

AIMS:

- a) review the past and current demographic trends in terms of population growth and migration in the Maldives and their possible future development;
- b) review the possible implications of current development plans for future demographic trends;
- c) recommend a substantive programme of population management to achieve sustainable development for implementation by the Government.

METHODOLOGY AND WORK PLAN:

Following the completion of the national census in 1990 an international expert in demography would be appointed for a period of ten weeks to work in close collaboration with a national demographer in the Ministry of Planning and Environment, and with the sociologist in analysing present demographic trends and patterns.

The international expert will:

- a) assemble published information relevant to the demography of the Maldives;
- b) examine the past, and current demographic trends in the Maldives and their possible future development;
- c) examine, in close cooperation with the sociologist, present and future demographic trends from the standpoints of:
 - i) sustainable development;
 - ii) the potential impacts of present and planned development activities in the Maldives; and ,
 - iii) the potential impacts of climatic change and sea level rise on the present social, cultural and demographic patterns of the country; and,
- d) recommend future courses of action for adoption by the Government which may avoid or mitigate demographic problems hindering sustainable development.
- e) participate in the final review meeting of the programme.

The national counterpart will:

- a) assemble relevant unpublished or locally available information.
- b) actively participate in the collection, analysis and synthesis of the available information.
- c) participate in the preparation of and take joint responsibility for the production of the final sectoral report.

INSTITUTIONAL FRAMEWORK:

Lead Agency: Ministry of Planning and Environment
 Collaborating agency:

OUTPUTS:

1. An overview of the current demographic patterns in the Maldives and their possible future development in the light of proposed development activities and the possible impacts of climatic change.
2. A recommended programme for implementation by the Government of courses of action which may avoid or mitigate against demographic problems hindering sustainable development.

BUDGET:

	1990	1991	TOTALS
Cost to External agency (in cash):			
Personnel			
International Expert		10,000	
Travel and per diem		9,000	
Reporting costs		1,000	
Sub-total		<u>20,000</u>	<u>20,000</u>
Cost to the Government of Maldives (in cash and kind):			
Office space & logistic support		2,000	
Counterpart salary		350	
Materials & supplies (photocopies & office supplies)		150	
Sub-total		<u>2,500</u>	<u>2 500</u>
TOTAL		<u>22,500</u>	<u>22,500</u>

13. ENVIRONMENTAL IMPACT ASSESSMENT OF THE VILLINGILI RESETTLEMENT SCHEME

BACKGROUND:

In the light of the Government decision to proceed with the Villingili resettlement scheme, the Selected Island Development Unit (SIDU) has initiated planning for the implementation of this project. SIDU has approached the Environment section of the Ministry of Planning and Environment to seek assistance in the design and implementation of an environmental impact assessment of this project.

AIMS:

- a) to provide the Government and the Selected Island Development Unit with a comprehensive evaluation of alternative development scenarios covering the Villingili Resettlement scheme.
- b) To provide training to the staff of the environment section in aspects of environmental impact assessment.

METHODOLOGY AND WORK PLAN:

Villingili will be the first island for implementation of a comprehensive resource survey and the activities of all international experts will be directed in the first instance to conducting surveys of this island. The scientific advisor to the Ministry of Planning and Environment will, in collaboration with the National Coordinator of the work programme, guide, supervise and participate in all aspects of the assessment. Initially the scientific advisor will be responsible for developing, in consultation with SIDU and the National Work Programme Coordinator a detailed work plan and framework for the execution of the EIA, and will jointly with the staff of the Environment Section produce quarterly progress reports on the activities undertaken and the implications of the results for planning the development. By including this island as one to be examined in the framework of other activities the bulk of the costs will be met through the budgets for these activities. An external expert will be brought in to evaluate the progress and recommend on any modifications to the programme in early 1991.

INSTITUTIONAL FRAMEWORK:

Lead Agency:	Ministry of Planning and Environment.
Collaborating Agency:	Selected Islands Development Unit. Maldives Water & Sanitation Authority. Ministry of Public Works and Labour.

OUTPUTS:

- 1) Quarterly progress reports on the execution of the various resource assessments.
- 2) A consolidated report on the environmental impacts of development alternatives by mid-1991.

BUDGET:

	1990	1991	Totals
Cost to External agency (in cash);			
Personnel			
International Expert		5,000	
Travel & per diem		5,000	
Materials and supplies	5,000	1,000	
Reporting costs	300	1,000	
Sub-total	<u>5,300</u>	<u>12,000</u>	<u>17,300</u>
Cost to the Government of Maldives (in cash and kind):			
Office space & logistic support	2,000	2,000	
Counterpart salary	1,500	1,500	
Materials & supplies (photocopies & office supplies)	500	200	
Sub-total	<u>4,000</u>	<u>3,700</u>	<u>7,700</u>
TOTAL	<u>9,300</u>	<u>15,700</u>	<u>25,000</u>

14. PREPARATION OF PUBLIC AWARENESS AND NON-FORMAL EDUCATION MATERIALS

BACKGROUND:

Whilst the level of environmental awareness is generally high amongst educated Maldivians there is a lack of material available in Dhivehi for circulation and use in the atolls. The Ministry of Fisheries and Agriculture produces regular newsletters on fisheries matters and distributes them widely throughout the country. In addition they have produced and are producing short video taped documentaries on various environmental issues such as the crown of thorns starfish. The need for a more broadly based set of materials relating to current issues of environmental concern in the Maldives is apparent. The Environment Section of the MPE will collaborate with TV Maldives and the Voice of Maldives in producing radio and television programmes relevant to the activities undertaken under the work programme, and on general environmental issues as appropriate.

AIMS:

- a) To produce 1,000 copies of an eight sided quarterly environment newsletter in Dhivehi for distribution to schools and atoll administrative centres.
- b) To produce 1,000 copies 16 pages each of 6 popular booklets in Dhivehi and English on important environmental issues for distribution to schools throughout the country.
- c) To produce relevant radio and television programmes on environmental issues in the country.

METHODOLOGY AND WORK PLAN:

Expertise currently exists within the environment section of the Ministry of Planning and Environment to produce such materials. It is proposed therefore that the scientific advisor to the Ministry of Planning and Environment collaborate with the Environment staff in the selection of items and topics and that the Ministry staff are responsible for the production of the Dhivehi texts. The substantive results of activities within the work programme will be incorporated into these materials. Distribution will be via NGO's and the offices of the Ministry of Atolls Administration.

INSTITUTIONAL FRAMEWORK:

Lead Agency:	Ministry of Planning and Environment.
Collaborating Agency:	Ministry of Education. Non Governmental Organizations. Ministry of Atolls Administration. Television Maldives. Voice of Maldives.

OUTPUTS:

1. Eight issues of an environment newsletter.
2. Six popular booklets covering: Climatic change and sea level rise impacts in the Maldives. Coral reefs of the Maldives. Coral mining and sand dredging. Terrestrial environments of the Maldives. Coastal erosion and deforestation problems in the Maldives.
3. Ad hoc radio and television programmes as appropriate.

<u>BUDGET:</u>	1990	1991	TOTALS
Cost to external agency in cash			
Printing costs			
Newsletter 8 at 175/issue	700	700	
booklets 6 at 250/booklet	750	750	
Materials and supplies	1,000	1,000	
Sub-total	<u>2,450</u>	<u>2,450</u>	<u>4,900</u>
Cost to the Government of Maldives. in cash and kind			
Personnel			
Authors time	1,000	1,000	
Translators time	700	700	
Art work and layout	500	500	
Typists time	300	300	
Materials and supplies	500	500	
Sub-total	<u>3,000</u>	<u>3,000</u>	<u>6,000</u>
TOTAL	<u>5,450</u>	<u>5,450</u>	<u>10,900</u>

15. RESOURCE INVENTORY FOR SELECTED ISLANDS.

BACKGROUND:

In the light of the Government selection of nine islands as future centres of development it is proposed to proceed with the resource inventory of these islands to provide baseline data on the state of the environment and resources prior to developments taking place .

AIMS:

a.) To provide the government and the Selected Island Development Unit with an evaluation of the current state of the environment and their resources for the nine islands selected for future development.

METHODOLOGY AND WORK PLAN:

Comprehensive resource surveys are made to be under various activities within the current work programme. These surveys will be directed in the first instance to the following islands: Kela, Hanimaadhoo, Maafilaafushi, Meerufenfushi, Isdhoo, Gan, Hithadhoo and Thoddoo. Priorities will be determined in consultation with SIDU and on the basis of logistic and financial considerations. Whenever practical additional islands within the same atolls will also be surveyed during the course of each field work period.

A scientific advisor to the Ministry of Planning and Environment will, in collaboration with the National Coordinator of the Work Programme, guide, supervise and participate in all the aspects of the assessments. Initially the scientific advisor will be responsible for developing, in consultation with SIDU and the National Work Programme Co-ordinator, a detailed work plan and the time table for the implementation of these resources inventories and will jointly with the staff of the environment section produce consolidated reports for each island or atoll, which will include a summary of implications of the findings for the development of the island. By targeting these islands as sites for the various assessment activities the bulk of the costs will be met through the budget for these activities.

INSTITUTIONAL FRAME WORK:

Lead Agency:	Ministry of Planning and Environment.
Collaborating Agency:	Selected Islands development Unit. Maldives Water and Sanitation Authority. Ministry of Public Works and Labour.

OUTPUTS:

1. Resource inventories and reports on the state of the environment for each selected island, together with an assessment of the implications for development.
2. Consolidated reports covering all islands surveyed.

BUDGET:

	1990	1991	TOTALS
Cost to external agency(in cash):			
Reporting costs		1,000	
Sub- total		<u>1,000</u>	<u>1,000</u>
Cost to the Government of Maldives (in cash and kind)			
Boat operation and field costs	10,000	10,000	
Sub- total	<u>10,000</u>	<u>10,000</u>	<u>20,000</u>
TOTAL	<u>10,000</u>	<u>11,000</u>	<u>21,000</u>

16. FEASIBILITY STUDY FOR ESTABLISHMENT OF A NATIONAL INSTITUTE FOR NATURAL RESOURCES RESEARCH.

BACKGROUND:

A number of experts have recommended the formation of different kinds of institutes to foster research into the natural resources of the Republic. The Government included an evaluation study for the establishment of a Marine Research Institute in the 1989 - 1990 National Development Plan. In the light of these developments and recommendations it is suggested that the brief for the initial evaluation study be broadened to include consideration of all aspects of research into the physical and biological environment of the Maldives.

AIMS:

a). To evaluate the practicality of establishing an institute for research into the natural resources of the Maldives.

METHODOLOGY AND WORK PLAN:

An international expert in the operation of research stations on small isolated islands will be invited to visit the Maldives and conduct a feasibility study of establishing some form of research institute in the country. The scientific advisor will actively participate in this feasibility study and the views of all member departments of the Commission for the Protection and Preservation of the Environment will be sought concerning the location; scope of work and methods of financing such an institute.

INSTITUTIONAL FRAMEWORK:

Lead Agency:	Marine Research Section, Ministry of Fisheries and Agriculture.
Collaborating Agency:	Ministry of Planning and Environment. All members departments of the National Commission for the Protection of the Environment.

OUTPUTS:

1. Consolidated report on the feasibility of establishing a natural resources research institute including:
 - i. Recommendations concerning the possible scope of work of such an institute;
 - ii. An analysis of alternative sites and recommendations concerning their suitability;
 - iii. An initial budgetary assessment of the capital and recurrent costs of establishing and running such an institute over a five year period.
 - iv. A cost benefit analysis including possible cost recovery mechanisms for the recurrent budget; and
 - v. An assessment of possible international researcher use of such an institute.

BUDGET:

	1990	1991	TOTALS
Cost to external agency (in cash):			
Personnel			
International Expert	8,000		
Travel and per diem	8,000		
Reporting costs	1,000		
Sub-total	<u>17,000</u>		<u>17,000</u>
Cost to the Government of Maldives (in cash and kind)			
Internal travel	5,000		
Counterpart salary	500		
Sub-total	<u>5,500</u>		<u>5,500</u>
TOTAL	<u>22,500</u>		<u>22,500</u>

17. ESTABLISHMENT OF AN ENVIRONMENTAL DATABASE.

BACKGROUND:

Numerous reports have stressed the need for the establishment of an environmental database in the environment section of the Ministry of Planning and Environment. Few such recommendations have distinguished between primary and secondary data sources. There exists a substantial amount of published information concerning the natural environment of the Maldives which is currently not available within the country. Unpublished data sources such as aerial photographs, satellite imagery and maps, charts and navigational data are also available elsewhere. Published and unpublished information within the country is also not readily accessed since it is held in a variety of departments and no centralised system exists to record what is and what is not available.

AIM:

a). To establish the nucleus of an environmental data base in the environment section of the Ministry of Planning and Environment.

METHODOLOGY AND WORK PLAN:

Each international expert will be required to conduct computerized literature searches prior to visiting the Maldives, to acquire where possible hard copies of relevant articles and data sets not currently held in country and to transport them on visiting the Maldives. The environment section of the Ministry of Planning and Environment will prepare a computerized listing of all materials both published and unpublished currently held in different Government Departments and will enter additional items as they are received from the international experts. Periodically MPE will issue for member departments of the National Commission for the Protection and Preservation of the Environment a listing of all the environmental materials held in the country. Individual Departments will be held responsible for assisting in updating these lists as appropriate.

INSTITUTIONAL FRAMEWORK:

Lead Agency:	Ministry of Planning and Environment.
Collaborating Agencies:	All member departments of the National Commission for the Protection of the Environment.

OUTPUTS:

1. Initial listing of secondary sources of environmental data and their location in-country.

BUDGETS:

Cost to External Agency (in cash):	1990	1991	TOTALS
Materials and supplies (hard copies computer stationary)	5,000	5,000	10,000
Sub-total	<u>5,000</u>	<u>5,000</u>	<u>10,000</u>
Cost to the Government of Maldives (in cash and kind)			
Office space and logistic support	6,000	6,000	
Personnel			
salary	1,500	1,500	
Sub-total	<u>7,500</u>	<u>7,500</u>	<u>15,000</u>
TOTAL	<u>12,500</u>	<u>12,500</u>	<u>25,500</u>

18. NATIONAL WORKSHOP FOR MID TERM REVIEW OF THE PROGRAMME

BACKGROUND:

At the end of October 1990 a training workshop will be held during which the results of the studies undertaken up to that point will be presented by the national experts participating in the activities, and the details of the work plan for the subsequent year will be formulated for approval by the National Commission for the Protection of the Environment. At this time a budgetary review will also be undertaken in order to revise financial schedules in the light of the previous ten months cash flow situation.

AIMS:

- a) To consolidate and review the substantive outputs of the various activities
- b) To review and finalise the Work plan for 1991.

METHODOLOGY AND WORK PLAN:

Each national expert will be expected to make a formal presentation of the results of the work undertaken up to that point for critical peer review. The workshop and its preparation will involve in-house training in scientific report writing and presentation.

INSTITUTIONAL FRAMEWORK:

- Lead Agency: Ministry of Planning and Environment.
- Collaborating Agency: All member Departments of the National Commission for the Protection of the Environment.

OUTPUTS:

- a) Consolidated mid term report of the Work Programme for consideration and approval by the National Commission for the Protection of the Environment and sponsoring agencies.
- b) Revised budget and work plan for 1991.
- c) Recommendations for additional items for inclusion in the 1991 work programme in the light of recommendations from the sectoral reports.
- d) Recommendations for action by the National Commission for Protection of the Environment in implementing the concrete recommendations of the sectoral reports.

BUDGET:

Cost to external agency (in cash)	1990	1991	TOTALS
Materials and supplies	1,000		
Sub-total	<u>1,000</u>		<u>1,000</u>
Cost to the Government of Maldives (in cash and kind)			
materials and supplies	1,000		
participants time	2,000		
sub-total	<u>3,000</u>		<u>3,000</u>
TOTAL	<u>4,000</u>		<u>4,000</u>

19. TERMINAL SEMINAR AND WORKSHOP TO REVIEW THE 1990/91 WORK PROGRAMME IMPLEMENTATION AND ACHIEVEMENT

BACKGROUND:

In October 1991 a workshop and seminar will be held at which the national and international experts will present and discuss their findings. The conclusions of the workshop will be presented to the National Commission for the Protection of the Environment in the final terminal report of the project.

AIMS:

- a) to review the substantive findings of the various activities.
- b) to evaluate the success or otherwise of the programme
- c) to formulate the work programme for the implementation in 1992- 1993.
- d) to recommend on the mechanisms for the management and implementation of future work programmes.
- e) to recommend if necessary, amendments to the National Environment Action Plan.

METHODOLOGY AND WORK PLAN:

The activity will be divided into two one week sections. During the first week presentations of the results of the various activities will be made by the national and international experts in the form of seminar presentations open to the public. During the second week a working meeting will discuss the details of the management and nature of future activities and draft the necessary documents and recommendations for consideration by the National Commission for the Protection of the Environment. National and international experts who participated in the implementation of the initial work programme will attend this meeting as scientific advisors. Sessions will be open to other interested individuals as observers.

INSTITUTIONAL FRAMEWORK:

Lead agency:	Ministry of Planning and Environment.
Collaborating agency:	All member Departments of the National Commission for the Protection of the environment.

OUTPUTS:

- a) Final consolidated report of the 1990-1991 work programme.
- b) Work shop report including recommendations
 - i) on the mechanisms for management and implementation of future work programmes.
 - ii) amendments (if necessary) to the National Environment Action Plan.
- c) an evaluation of the successes and failures of the programme elements.
- d) The work programme for implementation in 1992- 1993.

BUDGET:

Cost to external agencies (in cash):	1990	1991	Totals
Material and supplies		5,000	
Travel and per diem (8 international experts):		28,000	
sub- total		<u>33,000</u>	<u>33,000</u>
Cost to the Government of Maldives			
(in cash and kind)			
Materials and supplies		5,000	
Participants time		8,000	
sub- total		<u>13,000</u>	<u>13,000</u>
TOTAL		<u>46,000</u>	<u>46,000</u>