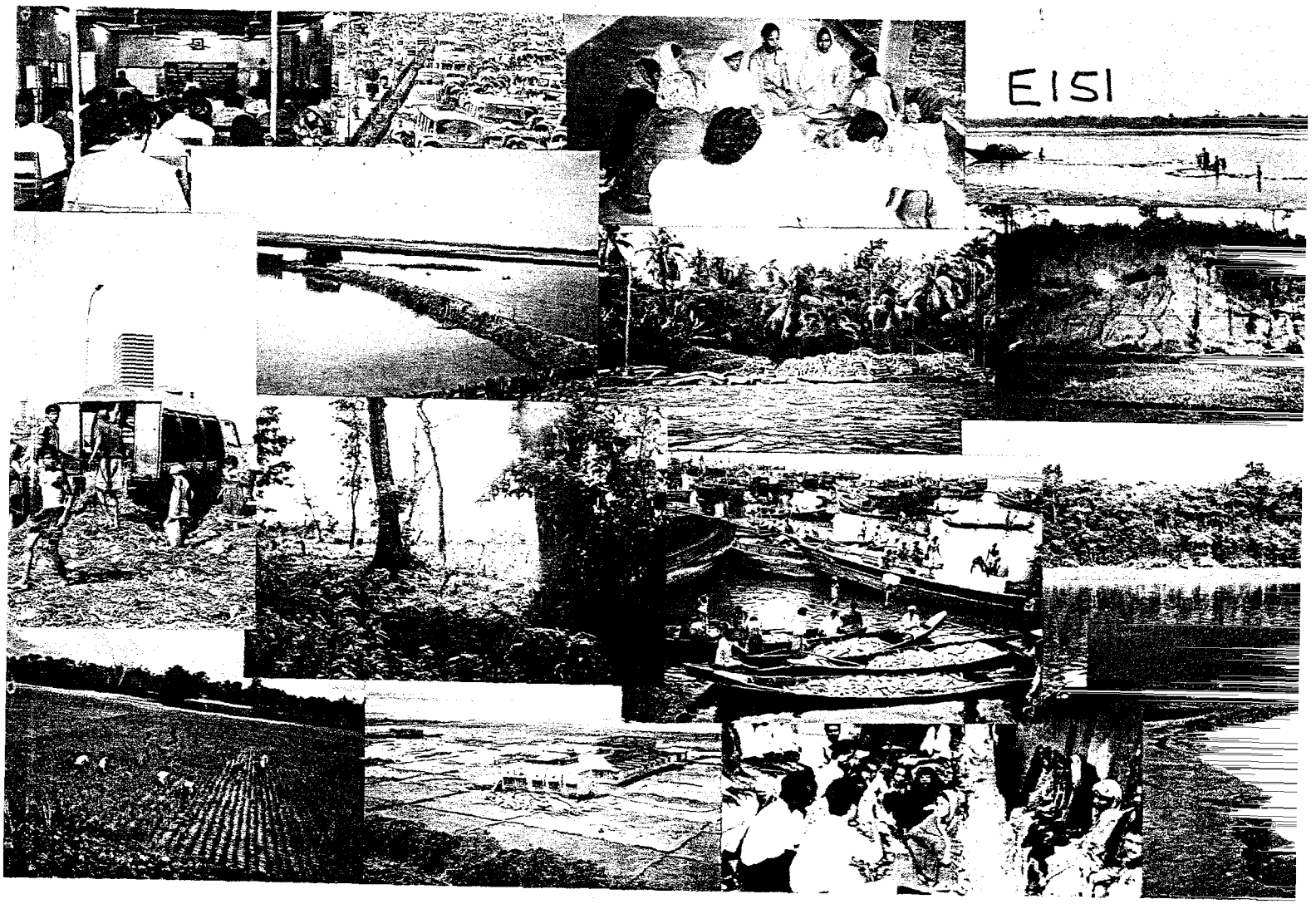
Public Disclosure Authorized

Public Disclosure Authorized

FILE COPY

EIS1

MINISTRY OF ENVIRONMENT AND FOREST
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH



NATIONAL ENVIRONMENT MANAGEMENT ACTION PLAN (NEMAP)

Volume I a : Summary

1995

MINISTRY OF ENVIRONMENT AND FOREST
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

NATIONAL ENVIRONMENT MANAGEMENT ACTION PLAN (NEMAP)

Volume Ia : Summary

1995

NEMAP
VOLUME Ia : SUMMARY

First Published in 1995

Copyright :
© Government of People's Republic of Bangladesh

Computer Composed and
Printed By :
Bangladesh Progressive Enterprise Press Ltd.
46/1, Purana Paltan, Dhaka-1000, Bangladesh

Published by :
NEMAP Secretariat
Ministry of Environment and Forest
Room No: 1303, Building No.6
Bangladesh Secratariate, Dhaka
Fax: 880-2-869210

NATIONAL ENVIRONMENT MANAGEMENT ACTION PLAN (NEMAP)

National Project Directors :

a. Mr. Karar Mahmudul Hasan
Deputy Secretary, Ministry of Environment and Forest (September 1991-September 1995),
Presently, Joint Secretary, Ministry of Communication

b. Dr. Mahfuzul Haque
Senior Assistant Secretary
Ministry of Environment and Forest
(October 1995-)

Assisted by :

Mr. A. T. M. Salahuddin, Assistant Chief, Planning Section,
Ministry of Environment and Forest

National Consultants Team :

Syed Md. Iqbal Ali	National Consultant
Mr. Md. Jahangir	National Consultant
Engr. Saleh Mustafa Kamal	National Consultant
Dr. Babar N. Kabir	National Consultant and Coordinator

Acknowledgement of valuable contribution to the preparation of this report is due to :

Mr. Abdullah Haroon Pasha, former Secretary, Ministry of Environment and Forest. Presently, Secretary, Prime Minister's Secretariat.

Mr. Syed Amir-ul-Mulk, former Additional Secretary -in -Charge, Ministry of Environment and Forest. Presently , Additional Secretary-in-charge, Ministry of Information.

Mr. Syed Marghub Murshed, Additional Secretary-in-Charge, Ministry of Environment and Forest.

Mr. Md. Abdul Latif Mondal, Joint Secretary, Ministy of Environment and Forest.

Mr. Fazlul Huq, former Joint Secretary, Ministry of Environment and Forest. Presently, Director General, Directorate of Youth Development.

Dr. S. Huq, Dr. A. Atiq Rahman of BCAS
Dr. Q. F. Ahmed of CEN-ADAB & Proshika MUK
Ms. Khushi Kabir, Chairperson, Ms. Rasheda K. Chowdhury, Director, Mr. S. K. Saha of ADAB
Ms. Eimi Watanabe, Resident Representative, UNDP
Mr. M. Constable, Dr. S. Nandy, Mr. B. Leservoisier of UNDP
Dr. M. Yousuf Ali, Mr. Rowshan Ali Chowdhury
Mr. C. Mutsuddi of Forum of Environmental Journalists, Bangladesh

NEMAP gratefully acknowledges with thanks generous contributions of the following experts in the very formative stage of NEMAP in 1991 :
Mr. Haroun-er-Rashid
Dr. Ain-un-Nishat
Mr. Sanowar Hossain
Mr. A. B. Chowdhury
Mr. Rezaur Rahman
Dr. Mohiuddin Farooque
Mr. Mark King

The NEMAP process has been made possible due to the contributions of many organisations, amongst which are :

United Nations Development Programme, Association of Development Agencies in Bangladesh and their various local member-NGOs, Coalition of Environmental NGOs and their members, Department of Environment and Bangladesh Centre for Advanced Studies.

Gratitude is expressed to all the local NGOs and above all, to those thousands of people from all over the country without whose active participation and support, the NEMAP process could never have been completed. Similarly, contributions of the facilitators, specially those from ADAB and other NGOs, and the journalists, who acted as the rapporteurs to NEMAP and of the secretarial staff of MoEF, UNDP and BCAS, and the supporting staff of all the involved agencies are acknowledged.

Further, NEMAP is grateful to all those national and international agencies and individuals who have given their inputs in reviewing and commenting on various documents at different stages of development of the NEMAP.

FOREWORD

The National Environment Management Action Plan (NEMAP) has been developed by the Ministry of Environment and Forest with inputs from all sectors of the people including non-government organizations, academics, parliamentarians, lawyers, journalists and grassroots men and women. The process of preparing the NEMAP has been highly participatory with grassroots workshops held in twentythree agro-ecological zones and six regional and national workshops. The Hon'ble Prime Minister of Bangladesh, Begum Khaleda Zia, gave her personal support and encouragement to the process.

At the Prime Minister's direction, the initial NEMAP document was widely shared around the country and with different groups including media, NGOs, academics, government organizations and international development partners. Very substantial and useful feedbacks were received and have, as far as possible, been incorporated in the final report.

The NEMAP is not being regarded as a one-off document or plan, it is rather a living process. It will be continuously improved and updated so that the people of the country themselves will see it as their own plan to be implemented by not only the government or non-government organizations but also by all the conscious citizens of Bangladesh.

We hope all concerned will take NEMAP in that spirit and will join us in our efforts to protect the environment while achieving the goal of development.

Akbar Hossain, (Bir Pratik), M.P.
Minister for Environment and Forest

CONTENTS

	Page
ACKNOWLEDGEMENT	
FOREWORD	5
CONTENTS	7
LIST OF MAPS	8
LIST OF FIGURES	8
ABBREVIATIONS	9
CHAPTER 1 : OVERVIEW	(11-18)
1.1 Introduction	11
1.2 The Challenges	11
1.3 What is NEMAP ?	12
1.4 Objectives of NEMAP	12
1.5 The State of the Environment and Development in Bangladesh	12
1.6 Existing Environmental Policies	14
1.7 History of NEMAP	15
1.8 Public Consultation and People's Participation	15
1.9 People's Concerns	16
1.10 People's Solutions and their Incorporation in Action Plan	16
1.11 The Action Plan	16
CHAPTER II : METHODOLOGY	(19-22)
2.1 Parties Involved	19
2.2 The Process	19
2.3 Geographical Coverage	20
2.4 Analysis, Synthesis and Preparation of Reports	21
2.5 The Synthesis Process	21
2.6 The Document	21
2.7 Preparation of the Action Plan	21
CHAPTER III : INSTITUTIONAL ISSUES AND ACTIONS	(23-26)
3.1 Existing institutions	23
3.2 Intersectoral Issues	25
3.3 Local Environmental Issues	25
3.4 Role of other Non-government Institutions	25
3.5 Implementation, Monitoring and Follow-up of NEMAP	25
3.6 Strengthening of MoEF and DoE	25
CHAPTER IV : SECTORAL ISSUES AND ACTIONS	(27-40)
4.1 Natural Hazards/Disasters	27
4.2 Industry	28
4.3 Water Resources	29
4.4 Energy	30

4.5 Forestry and Biodiversity 31
4.6 Land Resources 33
4.7 Fisheries and Livestock 34
4.8 Agriculture 36
4.9 Housing and Urbanization 37
4.10 Health and Sanitation 38
4.11 Education and Awareness 39
4.12 Transport and Communication 40

CHAPTER V : LOCATIONAL SPECIFIC (LOCAL) ISSUES AND ACTIONS (41-45)

5.1 Charlands 41
5.2 Madhupur Tract 42
5.3 Barind Tract 43
5.4 Wetlands 43
5.5 Hill Cutting 44
5.6 Salinity and Shrimp Cultivation 44
5.7 Coastal and Marine Resources Management 45

CHAPTER VI : LONG-TERM ISSUES AND ACTIONS (46-48)

6.1 Climate Change and Sea Level Rise 46
6.2 Urbanization 46
6.3 Regional Water Sharing 47
6.4 Research and Development 48

CHAPTER VII : CONCLUSION (49-51)

LIST OF MAPS

Map-2.1 Location of Grassroots, Regional, Professional and National Workshops on NEMAP 19
Map-2.2 Spatial Distribution of Levels of Participation in NEMAP Process 21
Map-4.1 Spatial Distribution of People's Concerns Regarding Natural Hazards 27
Map-4.2 Spatial Distribution of People's Concerns Regarding Health and Sanitation 39

LIST OF FIGURES

Figure-1.1 Structure of NEMAP Document 11
Figure-1.2 Schematic Showing of Inputs and Outputs of Previous & Current NEMAP Documents 12
Figure-1.3 Overview of NEMAP Process 13
Figure-1.4 Organizations of NEMAP Consultative Process 14
Figure-1.5 Steps of the Preparation of Action Plan 15
Figure-1.6 Schematic Representation of Main Environmental Issues 16
Figure-1.7 People's Concerns and Solutions 17
Figure-2.1 NEMAP Consultation, Synthesis and Preparation Process 20
Figure-3.1 Proposed Institutional Arrangements for the Implementation of NEMAP 24
Figure-7.1 Schematic Representation of Main Actions of NEMAP 51

ABBREVIATION

ADAB	:	Association of Development Agencies in Bangladesh
AEU	:	Agriculture and Environment Unit
BARI	:	Bangladesh Agricultural Research Institute
BAU	:	Bangladesh Agricultural University
BCAS	:	Bangladesh Centre for Advanced Studies
BDS	:	Barisal Development Society
BELA	:	Bangladesh Environmental Lawyers Association
BFRI	:	Bangladesh Forest Research Institute
BIDS	:	Bangladesh Institute of Development Studies
BIWTC	:	Bangladesh Inland Water Transport Corporation
BJMAS	:	Bangladesh Jatiya Mahila Ainjibi Samity
BoI	:	Board of Investment
BRAC	:	Bangladesh Rural Advancement Committee
BRTA	:	Bangladesh Road Transport Authority
BSTI	:	Bangladesh Standards Testing Institute
BWDB	:	Bangladesh Water Development Board
CDA	:	Community Development Association
CEN	:	Coalition of Environmental NGOs
DLRS	:	Directorate of Land Records and Surveys
DMB	:	Disaster Management Bureau
DoE	:	Department of Environment
DoF	:	Department of Fisheries
EIA	:	Environmental Impact Assessment
ERD	:	Economic Relations Division
FAP	:	Flood Action Plan
FCD	:	Flood Control and Drainage
FCD/I	:	Flood Control, Drainage and Irrigation
FD	:	Forest Department
FEJB	:	Forum of Environmental Journalists, Bangladesh
FIVDB	:	Friends in Village Development, Bangladesh
FRI	:	Fish Research Institute
HYV	:	High Yielding Variety
GIS	:	Geographic Information System
IWTA	:	Inland Water Transport Authority
LGED	:	Local Government Engineering Department
KDA	:	Khulna Development Authority
MoA	:	Ministry of Agriculture
MoDMR	:	Ministry of Director Management and Relief
MoE	:	Ministry of Education
MoEMR	:	Ministry of Energy and Mineral Resources
MoEF	:	Ministry of Environment and Forest
MoF	:	Ministry of Finance
MoHFW	:	Ministry of Health and Family Welfare
MoI	:	Ministry of Industry
MoL	:	Ministry of Land
MoLJPA	:	Ministry of Law, Justice and Parliamentary Affairs
MoLGRD	:	Ministry of Local Government and Rural Development
MoP	:	Ministry of Planning
MoWR	:	Ministry of Water Resources
MoFL	:	Ministry of Fisheries and Livestock
MoCAT	:	Ministry of Civil Aviation and Tourism
MoWCA	:	Ministry of Women and Children's Affairs
NEMAP	:	National Environment Management Action Plan
NEC	:	National Economic Council
PCP	:	Project Concept Paper
RAJUK	:	Rajdhani Unnayan Katripakha
RDRS	:	Rangpur Dinajpur Rural Service
SAARC	:	South Asian Association for Regional Cooperation
SPARRSO	:	Space Research and Remote Sensing Organization
SRDI	:	Soil Resource Development Institute
SWMC	:	Surface Water Modeling Centre
UDD	:	Urban Development Directorate
UGC	:	University Grants Commission
UNCED	:	United Nations Conference on Environment and Development
UNDP	:	United Nations Development Programme
WARPO	:	Water Resource Planning Organization
WASA	:	Water and Sewage Authority

CHAPTER I
OVERVIEW

1.1 Introduction

Bangladesh is one of the least developed countries with a rapidly increasing population (over 120 million). Its meagre resources are either over exploited or used sub-optimally. The pressure of the population on the country's resources makes planning an economic imperative. It is now recognised that for development to be sustainable environmental concerns have to be integrated into the planning process. However, in a country like Bangladesh this is a formidable task.

All planning has to be for the people. Their involvement, therefore, in the identification of issues and finding solutions to them is not only desirable but also essential. As democratic practices and institutions take root in Bangladesh, the participation of the people in the formulation of plans must be considered essential. It is stated in the Constitution that "All powers belong to the people". In conformity with the provisions of the Constitution, the Ministry of Environment and Forest (MOEF), Government of Bangladesh, decided to formulate the National Environment Management Action Plan (NEMAP) involving people at every stage of the planning process. In this process, government agencies, non-government organizations, professional groups and academic researchers worked together through a series of workshops including a national workshop, in which the Prime Minister took part. This helped a consensus to emerge to act as the basis of this Action Plan.

1.2 The Challenges

The participatory planning process, described in the preceding paragraph, though highly desirable has its problems. These include developing appropriate methodologies, making action plan implementable, dealing with issues that are multisectoral and persuading the people to improve and modify practices that are environmentally unsound. The MOEF is relatively a new ministry that is still not adequately equipped to co-ordinate activities of different sectors at national, regional and local levels.

To enable people to participate in environmental planning on a continuous basis, the NEMAP process must adjust to changing environmental conditions. Thus the challenges are :

(a) to ensure involvement of people on a continuous basis; and

(b) to make the process incorporate changing environmental realities in a dynamic manner.

The present NEMAP document is an attempt to respond to these sort of challenges and develop an implementable action plan.

Relationship with Sustainable Development :

At the UN Conference on Environment and Development (the Earth Summit) in

Figure 1.1 : Structure of NEMAP Document

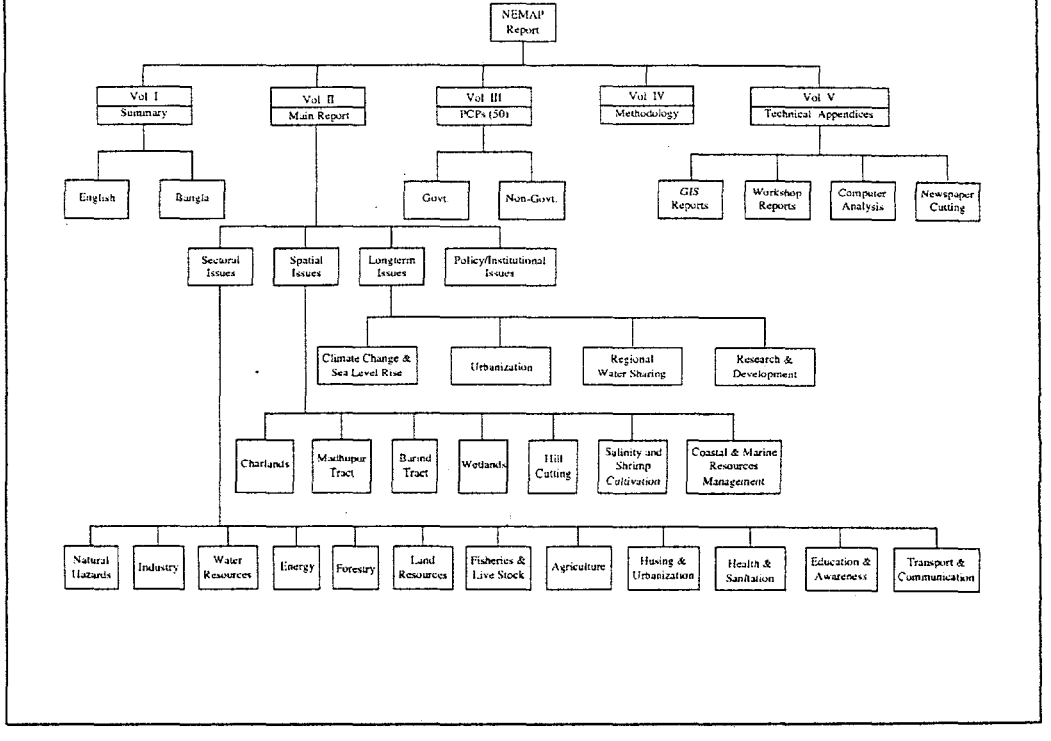
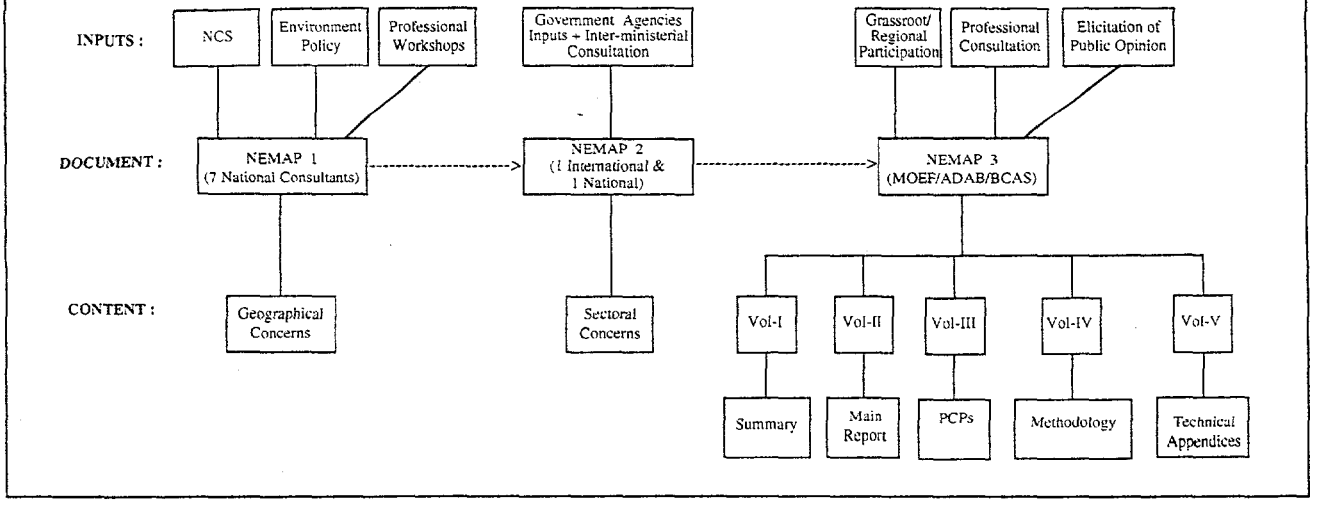


Figure 1.2 : Schematic showing of Inputs and Outputs of Previous & Current NEMAP Documents



Rio, 1992, Agenda 21 was signed by Bangladesh. The Agenda 21 is a basis to attain sustainable development through policies initiated and coordinated at the national level. The second phase of the National Conservation Strategy of Bangladesh (NCS) has begun. The NCS and the Forestry Master Plan are initiatives of the MOEF that reiterate Bangladesh's commitment to Agenda 21. NEMAP and these initiatives are complementary. Agenda 21 envisages the establishment of a sustainable development commission headed by the Prime Minister.

The initiation of NEMAP along with the SAARC Declaration on Poverty Alleviation can be seen as steps reaffirming Bangladesh's commitment to Agenda 21.

1.3 What is NEMAP ?

The National Environment Management Action Plan or NEMAP is a plan of the Government of Bangladesh prepared by the MOEF in consultation with people from all walks of life. It consists of five volumes which include Volume I - Summaries in English and Bangla, Volume II - The main report, Volume III - Project Concepts, Volume IV - Methodological Report, Volume V - Technical Appendices (see figure-1.1). Volume II identifies actions to be implemented, Volume III expands each action into an outline identifying actors, Volume IV speaks about the methodology and Volume V is a collection of technical reports with detailed tables. The last two volumes will be of value to specialists.

As environmental concerns encompass all sectors of the economy multi-disciplinary approaches are therefore needed for the formulation of policies and implementation of programmes related to environmental issues. NEMAP was prepared by the Government of Bangladesh to be the basis for programmes and interventions aimed at promoting better resource management, making people aware of environmental problems and reversing the present trend towards environmental degradation. NEMAP is expected to identify key environmental problems. Since these may change over a period of time, NEMAP will have to evolve in response to the changes.

NEMAP constitutes a synthesis of the perception of the government and the people of Bangladesh regarding environmental issues and what needs to be done to address them.

The structure of the NEMAP document is shown in Figure 1.1 alongwith the sectoral, spatial and long term issues as identified by the people.

1.4 Objectives of NEMAP

NEMAP is expected to identify key environmental issues, conserve, the nature, reduce environmental degradation, promote sustainable development and generally raise the quality of human life. It has to evolve in response to environmental changes. The present document is relevant for the period 1995-2005.

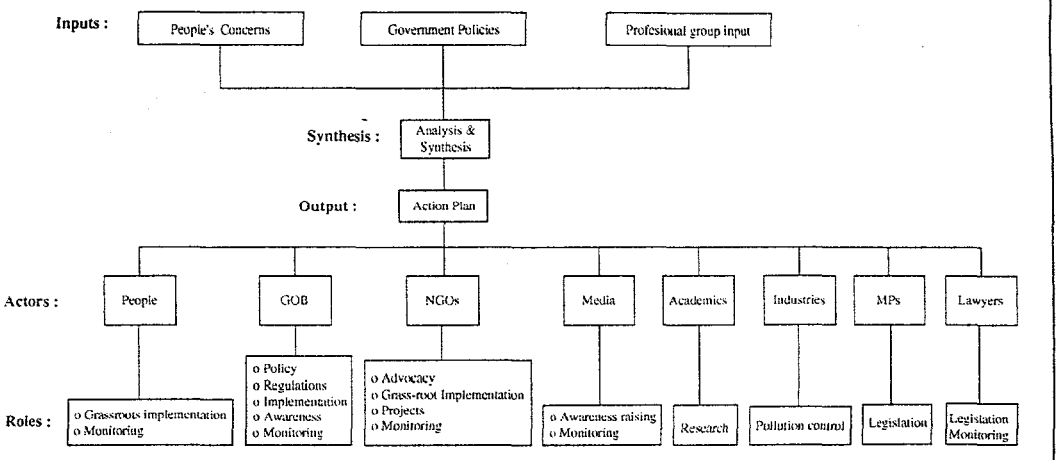
The Action Plan is meant to be implemented not only by the government but by the non-government organizations and individual citizens and communities as well. The management interventions are all essential but the more urgent ones have been given importance.

1.5 State of the Environment and Development in Bangladesh

As the world's most densely populated country with over 800 people per sq. km., Bangladesh's per capita income is a mere US $ 220. In 1994, it was twelfth from the bottom of the world's economic atlas. However, in the recent past, significant progress has been made in certain areas. In 10 years food production has increased by 30% and in 1992 self sufficiency in foodgrains was attained; population growth has fallen from 2.2 to 1.9 percent; through a fair election, democracy was restored in 1991; the government's commitment to the social sector has increased considerably (with the highest allocation to education); export earnings have increased; 38% of the development budget is now funded through resources

mobilized locally; there has been an expansion in the capital market; the government has initiated a participatory planning exercise; NGO's have been working as partners of the government in environmental regeneration programmes (like tree plantation; 2 billion saplings were planted in 93-94).

Figure 1.3 : Overview of NEMAP Process



Inspite of these commendable achievements, over forty percent of the population live in abject poverty (consuming less than 1800 calories a day); Bangladesh's human development indicators are appallingly poor (the literacy rate is 37% - the life expectancy around 52 years); infant and maternal mortality rates unacceptably high; and the urban slum population increasing at the rate of 6% per annum.

The annual growth rate in the agricultural sector was 2.7% - barely enough to keep pace with the population increase. Access to safe drinking water is limited and the incidence of water borne diseases very high. Inspite of rapid and unplanned urbanization, 80% of the people still live in rural areas. With a large percentage of the population relatively young, pressure on educational institutions and the job market will increase in the near future.

Population growth : Bangladesh, as mentioned earlier, is the most densely populated country in the world. The urban population which was 13 million in 1981 will more than treble in 2000 to 41 million. Over 50% of the population is below 15 years of age. The economy is not expected to create employment opportunities that will absorb all those entering the job market. Population growth may be considered the most serious problem inhibiting sustainable development in Bangladesh.

Natural Hazards : Recurrent floods cause serious damages to 30% of the country. The cyclones which hit areas near the coastal belt leave behind a trail of destruction (nearly 1,30,000 were killed in the cyclone of April 1991). The northwest of the country is drought prone while the northeast susceptible to flash floods. Geomorphological instability causes large scale river bank erosion.

Agriculture : Growth in agriculture - particularly food production was made possible by the cultivation of high yielding varieties (HYV) of rice and wheat.

The HYV require intensive agro-chemical use (both fertilizer and pesticides). This has led to soil impoverishment and may in future lead to health hazards.

Water : Water management in Bangladesh is a key environmental issue. Bangladesh is a delta formed by the sediment brought down by rivers that form a part of the Himalayan drainage ecosystem. The coastal zone is very dynamic. Indiscriminate use of ground water for irrigation has led to lowering of the water table. Withdrawal of water by India at the Farakka Barrage is causing water shortage during the dry season in the north, and causing salinity to move further inland in the south. As most of the rivers flowing through Bangladesh originate in neighbouring countries, water sharing is an important environmental concern. Water pollution, which is becoming a major problem, can be divided into 3 categories: faecal pollution causing spread of water-borne diseases; industrial pollution adversely affecting both the terrestrial and aquatic environment; and agro-chemical pollution affecting the food chain (through residues).

The Flood Control Drainage and Irrigation (FCD/I) structures are affecting fisheries by decreasing the spawning grounds and restricting migration as well as affecting inland water navigation and causing increased siltation of river beds.

Land issues : Land related environmental issues are cross sectoral as all sectors compete for the use of it. Erosion of land has increased landlessness as well as over exploitation of common resources. New land is often unconsolidated and underutilized because of ownership disputes.

An integrated planning approach for land reclamation is of importance in a densely populated country where land is scarce.

Forestry : Felling of trees for timber, fuel and encroachment on areas covered by forests has reduced the total reserve forest area in Bangladesh by 50% in the last twenty years. Salinity has effected the coastal mangrove forests. The involvement

of NGOs in social forestry has been a positive development.

Fishery : There has been an overexploitation of fishery resources, (fishing being often the only livelihood for the landless). The productivity of ponds and closed waterbodies is low because of management and tenurial problems. Construction of flood control structures impede water flow causing floodplain fishing to fall by 70%. The prospect for shrimp farming and aquaculture is good but it competes with agriculture and forestry.

Industry : The establishment of industries leads to economic growth and increases employment opportunities. However, industrial and marine pollution adversely affect the environment whenever there is rapid industrial expansion (the fishery sector has been a direct victim of the untreated pollutants released by factories).

Environmental awareness and education : In a country with a low literacy rate, the formal education system cannot adequately create environmental awareness. People are generally perceptive regarding environmental matters. Both government agencies and NGOs can work together to spread environmental awareness among the people.

1.6 Existing Environmental Policies

The Government's Fourth Five Year Plan (1990-1995) described the government's environmental objectives as follows:

a) to control pollution and degradation related to soil, water and air;

b) promote environment friendly activities in the development process;

c) preserve, protect, and develop natural resource bases;

d) strengthen the capabilities of public and private sectors to manage environmental concerns as a basic requisite for sustainable development; and

e) create people's awareness for participation in environment promotion activities.

To further these objectives the Government has undertaken a wide range of initiatives including:

a) Creation in 1989 of the Department of Environment within a new Ministry of Environment and Forest.

b) Approval in 1992 of a National Environment Policy and Action Plan.

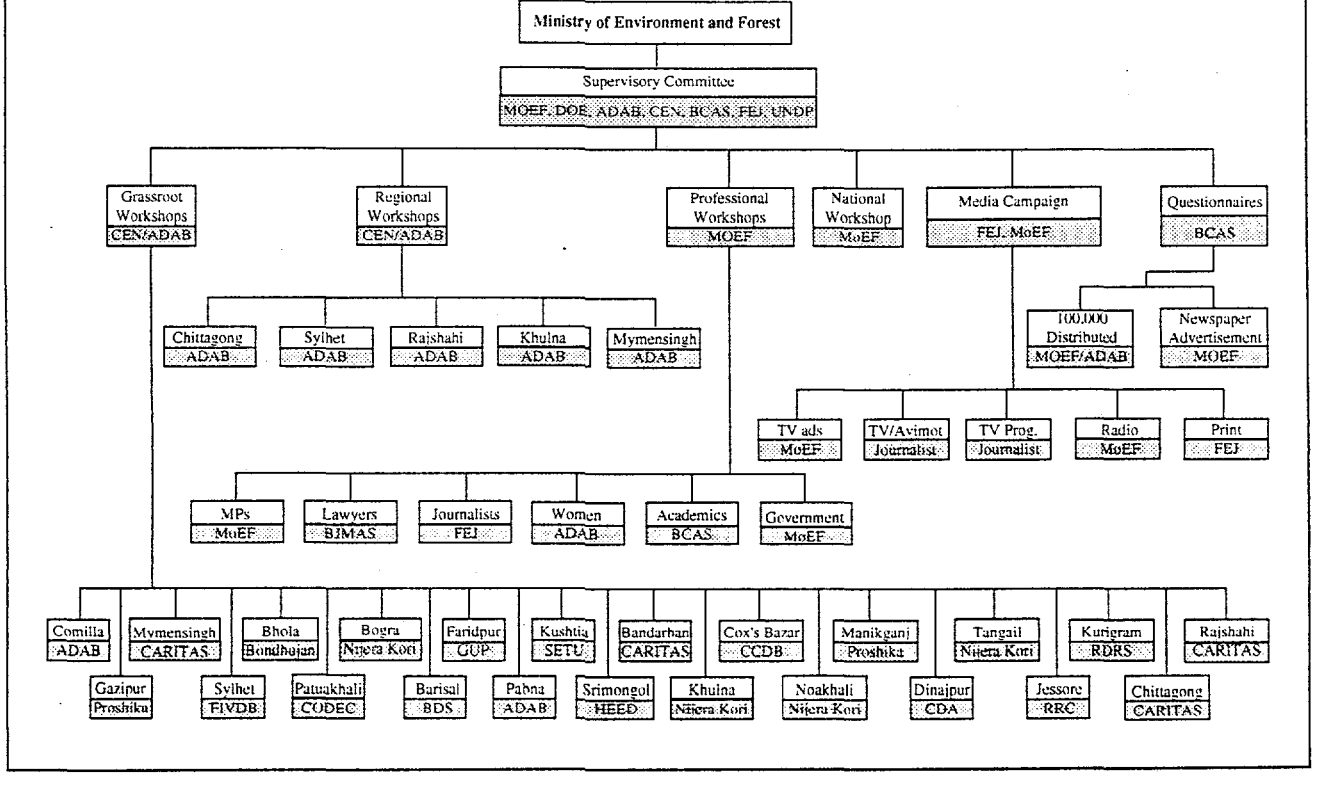
c) Initiation of work on National Environment Management Action Plan (NEMAP), National Conservation Strategy and Forestry Master Plan.

d) Declaration that Environmental Impact Assessments should be carried out for all major development projects.

e) Enacting the Bangladesh Environment Protection Act 1995.

The National Environment Policy sets the policy framework for environmental action in combination with a set of local sectoral guidelines. It emphasizes inter alia:

Figure 1.4 : Organizations of NEMAP Consultative Process



- o Maintenance of the ecological balance and overall progress and development of the country through protection and improvement of the environment;
- o Protection of the country against natural disasters;
- o Identification and control of all types of activities related to pollution and degradation of environment;
- o Environmentally sound development in all sectors;
- o Sustainable long-term and environmentally congenial utilization of all natural resources; and
- o Active association with all environment related international initiatives.

The National Environment Management Action Plan (NEMAP) is being considered as the basis for concretizing programmes and interventions aimed at promoting better management of scarce resources and reversing present trends of environmental degradation. NEMAP is intended to build on the general principles set out in the National Environment Policy by proposing concrete actions and interventions in a number of priority areas.

1.7 History of NEMAP

NEMAP is an environmental planning exercise of the Government of Bangladesh carried out by the MOEF with assistance from UNDP.

The first phase was carried out in 1992 by national consultants who identified certain areas of concern. The second phase was carried out in 1993 by national and international consultants who prepared a list of projects. The order of priorities was arrived at after discussion with government officials.

The third phase was carried out in 1994 through a series of discussions and workshops in which people from all walks of life participated.

Figure 1.2 schematically represents the inputs, outputs and contents of the three phases of the NEMAP process.

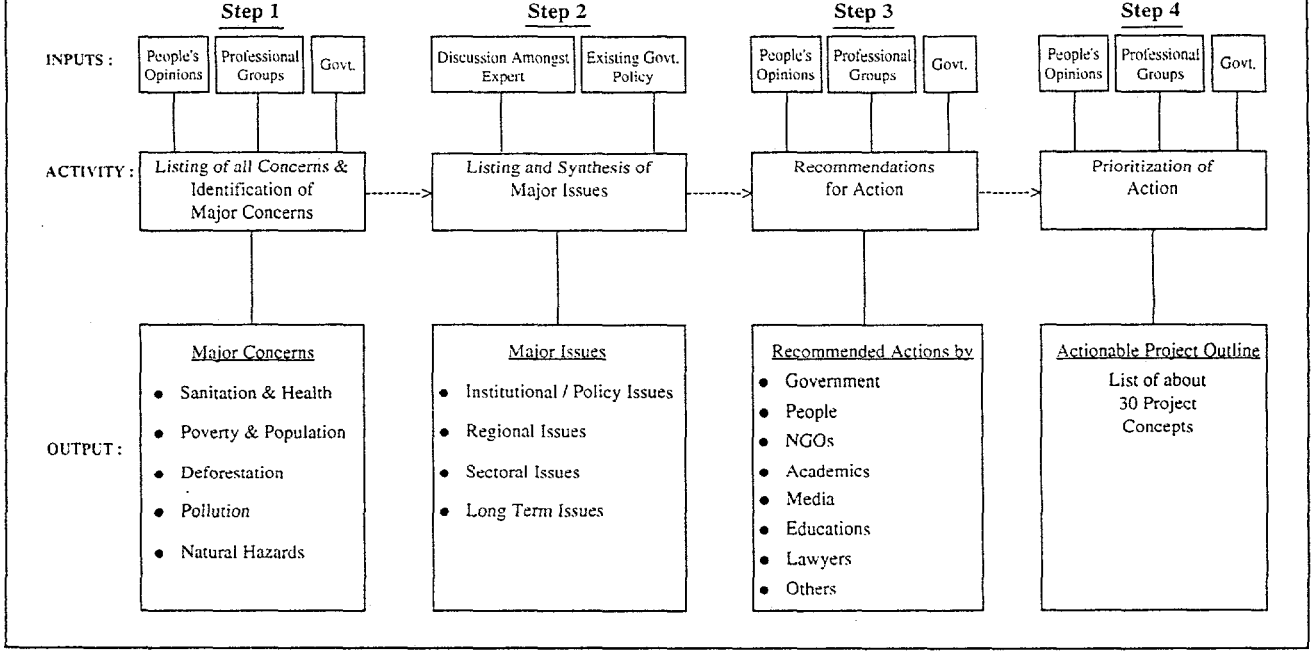
Figure 1.3 is an overview of the NEMAP process. The three major inputs are people's concerns, government policies and professional group inputs. These, through an analysis and subsequent synthesis process was developed into an Action Plan. The figure further identifies the actors and their respective roles.

1.8 Public Consultation and People's Participation

To make the NEMAP document represent all shades of public opinion, the following actions were taken. To obtain public opinion from all parts of the country 23 grassroots workshops were organized; steps were taken to ensure participation of people from every segment of society; efforts were made to ensure that half the participants of these work shops were women; efforts were made to assess the views of all the workshop participants; the workshop participants were asked to identify their own priorities and suggest solutions. They were asked to recommend actions that were to be taken by themselves, by the local authorities, local communities and by the national government.

Regional issues where grassroots representatives discussed in six workshops in which elected local govt. functionaries and appointed govt. officials participated. In these workshops professional groups were encouraged to present their respective inputs. The views of people not participating in the workshops were collected by circulating a questionnaire and eliciting the response of the public in

Figure 1.5 : Steps of the Preparation of Action Plan



general on the subjects discussed in the workshops. These views were consolidated and analyzed in a computer programme. The people were informed of the NEMAP process with help of the media, both electronic and print. The discussions at the various workshops were carefully recorded by trained facilitators and experienced rapporteurs. The draft proposals were discussed at a national workshop in which the Prime Minister of Bangladesh took part-the draft was finalised after prolonged consultations - the concerns of the people being carefully incorporated.

recognition to poverty alleviation got special emphasis during the workshops and consultations.

It is evident from figure 1.7 that sanitation, health, deforestation, pollution, natural disaster, water and flood control drainage and irrigation (FCD/I) projects and agro-chemicals emerged as the major groups of concerns, while the leading seven groups of concerns covered 83%, the residual 17% encompassed all the "other' for convenience of developing an implementable action plan.

offered a series of solutions. Six to eight of the major solutions in each group manages to capture the wide variety of solutions proposed by the people. The major solutions in each group is indicated in Figure 1.7 which thus summarizes the main solutions given by the people to the problems they had identified which have been the key driving force behind developing implementable actions.

1.11 The Action Plan

The Action Plan draws its inputs from the following:

Figure 1.6 : Schematic Representation of Main Environmental Issues

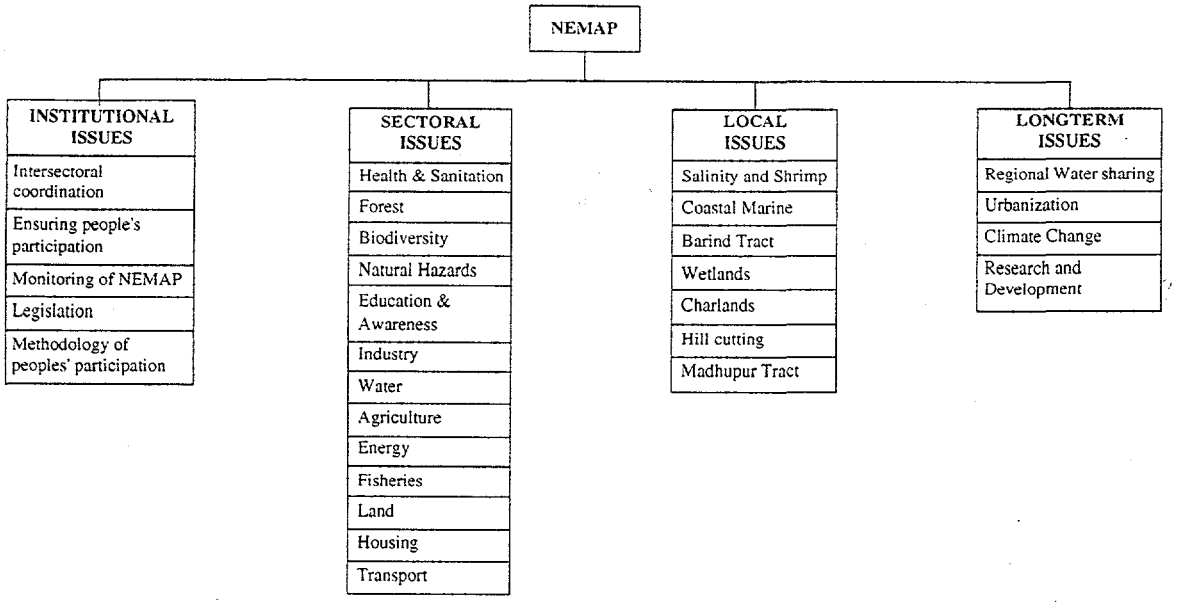


Figure 1.4 summarises the organizations of the NEMAP consultative process. Major activities and actors have also been identified. The NEMAP consultations represented an exemplary process of Government NGO collaboration.

1.9 People's Concerns

Since it was found to be difficult to record the views of all the participants of the workshops separately, major concerns in which the different views were emphasized were identified. The need to give

1.10 People's solutions and their incorporation in the action plan

The types of activities in NEMAP can be classed into three groups:

(a) Policies;

(b) Projects;

(c) Advocacy (of the views of the people).

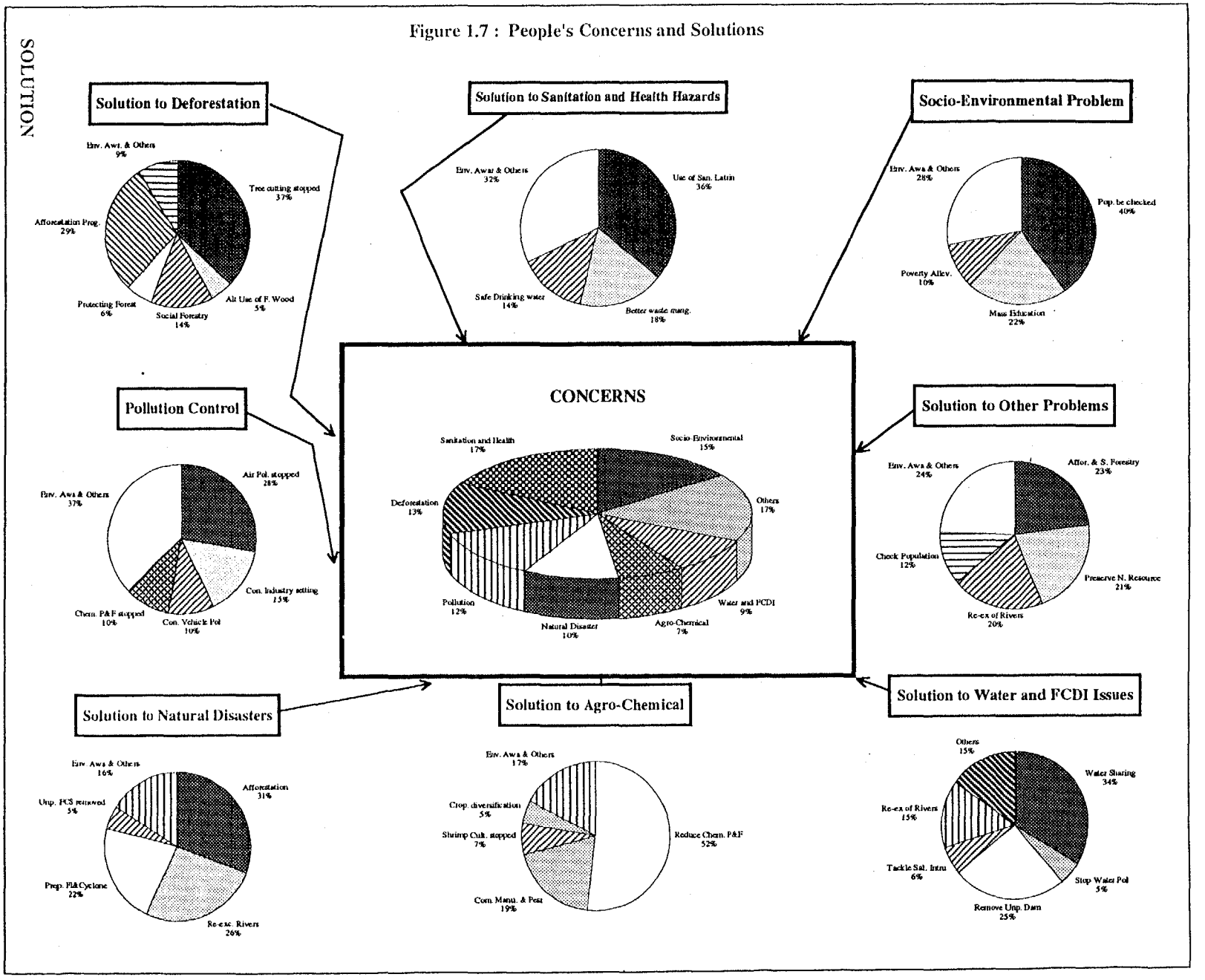
The policies and projects are drawn from the views advocated by the people in workshops and through consultations. For each broad group of concerns, people

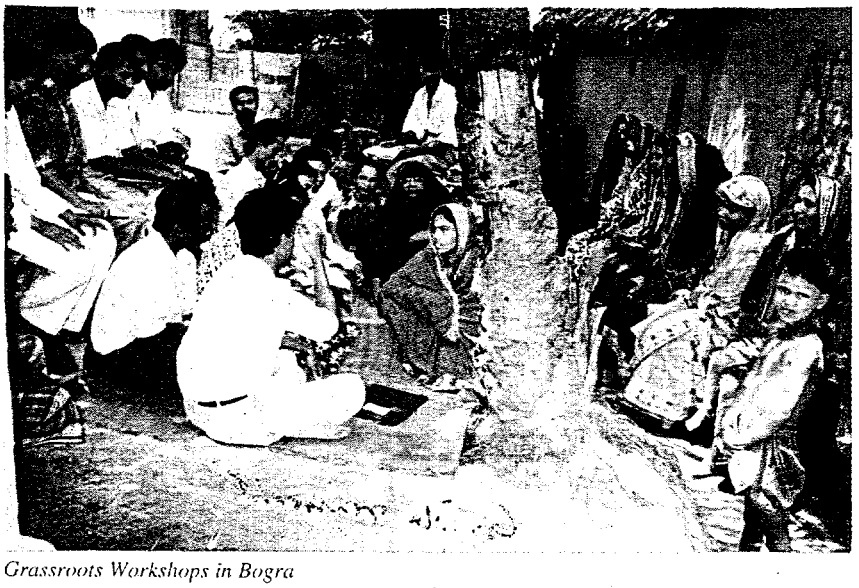
a) The people through consultative process and inputs stimulated by a nationwide media coverage;

b) Government policies and existing documents, sectoral concerns as given through consultations with relevant government agencies;

c) Professional groups' contributions through workshops and written submissions. These inputs have been systematically and subsequently synthesized by a NEMAP synthesis

Figure 1.7 : People's Concerns and Solutions





Grassroots Workshops in Bogra

sub-committee consisting of government and non-government representatives.

For the purpose of management, implementation, acquiring necessary funds and enabling all different agencies to initiate or implement their own programmes singly or in combination with agencies, all the action has been grouped under the following heads.

1. **Institutional** aspects which reflect the need to have intersectoral cooperation to tackle environmental problems which may need new and appropriate institutional mechanisms at national as well as local levels (Chapter 3).

2. **Sectoral** which reflects the way the government ministries and agencies are organized and hence makes it easier to identify the agency to carry out the recommended action (Chapter 4).

3. **Location Specific** which focuses on particularly acute local level environmental problems which will need to be addressed on a surety basis even if these are multisectoral concerns and may need new institutional mechanisms (Chapter 5).

4. **Long Term Issues** which may become much more serious and threatening than they need be if we do not start taking cognizance of them from now (Chapter 6).

Figure 1.5 schematically represents the process in the preparation of the Action Plan, each having inputs, activity and output.

The Action Plan identifies a series of specific actions and respectively designated actions including people, government agencies, NGOs, media, academics, private sector, elected representatives, and professional groups. The roles of each of these groups of actors have also been specified as shown in Fig.1.5. The types of actions again are divided into three categories:

1) Advocacy

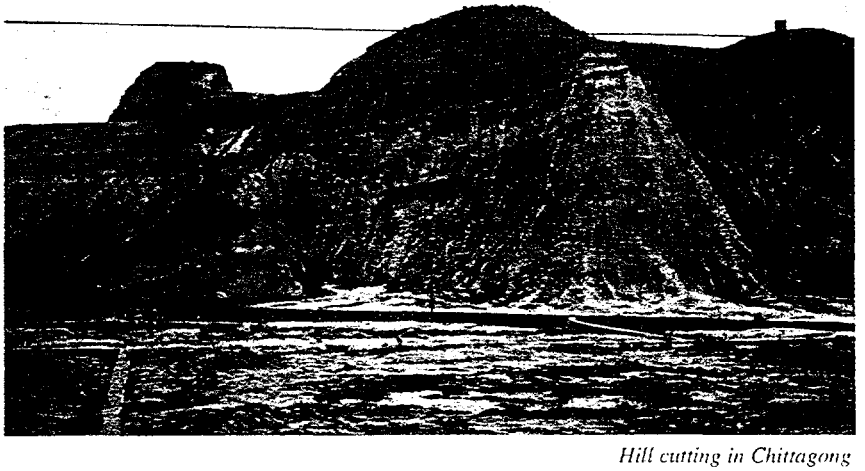
2) Policy and

3) Specific Projects.

Some of the actions combine two or more of the above types, the concluding chapter contains practical actions for immediate implementation by designated actors.

Main issues emerging out of the overall analysis and subsequent synthesis are summarized in Fig. 1.6.

An Action Plan must have implementation activities which contribute towards meeting the objectives of NEMAP. Taking such an approach meant that certain concerns such as pollution had to be segmented into different sectoral issues. The issues were then divided into further subsegments and recommendation for action made. An agency of the government or non-government was identified to carry out the action. The relevant issues are water, urbanization, health and industries for different types of pollution.



Hill cutting in Chittagong

CHAPTER II
METHODOLOGY

2.1 Parties Involved

The NEMAP has been developed on behalf of the government of Bangladesh by the MOEF with assistance from UNDP. A National Project Director has been working with a secretariat within MOEF with the initial assistance of local and expatriate consultants for the first and second NEMAP preparations. In the third and final phase of the NEMAP process and following a decision of the GOB to initiate a consultative process, the input from the non-government sector was sought. Thus a National NEMAP Committee was established to oversee the consultative phase. The committee consisted of the Coalition of Environmental NGO's (CEN), Association for Development Agencies in Bangladesh (ADAB), Bangladesh Centre for Advanced Studies (BCAS), Forum of Environmental Journalists of Bangladesh (FEJB) and others.

2.2 The Process

The consultative process was developed through an intensive dialogue between all partners to allow a maximum coverage of the country and input from as many sectors as possible (See figure-2.1).

a) Grassroot workshops - It was decided to hold 23 grassroot level workshops covering all the main agro-ecological zones of the country (Map 2.1). The responsibility for organizing all the workshops was given to CEN/ADAB which in turn took the assistance of individual NGOs. The format of the workshops were carefully designed to allow maximum inputs from all the participants who were chosen to ensure a balance of women, farmers, fishermen, officials, educationists, NGO workers, businessmen, elected representatives and others. The workshops started with plenary sessions explaining their objectives and formats. The participants were broken into 6 to 8 groups, carefully selected to maintain homogeneity within each group. Each group was asked to identify the important environmental problems they were facing, its causes and to identify the possible actions to address the problems at three levels: (1) by themselves, (2) by the local government (3) by the national government.

Map 2.1

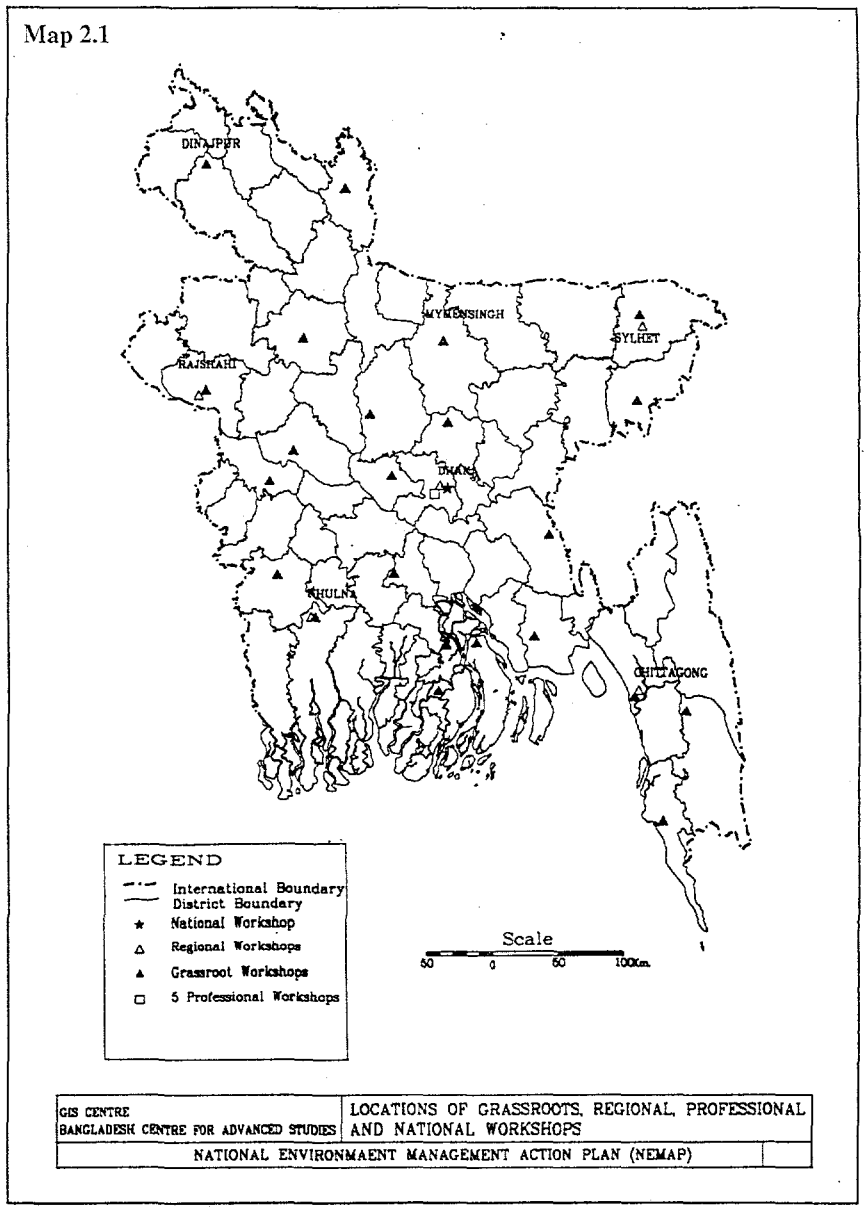
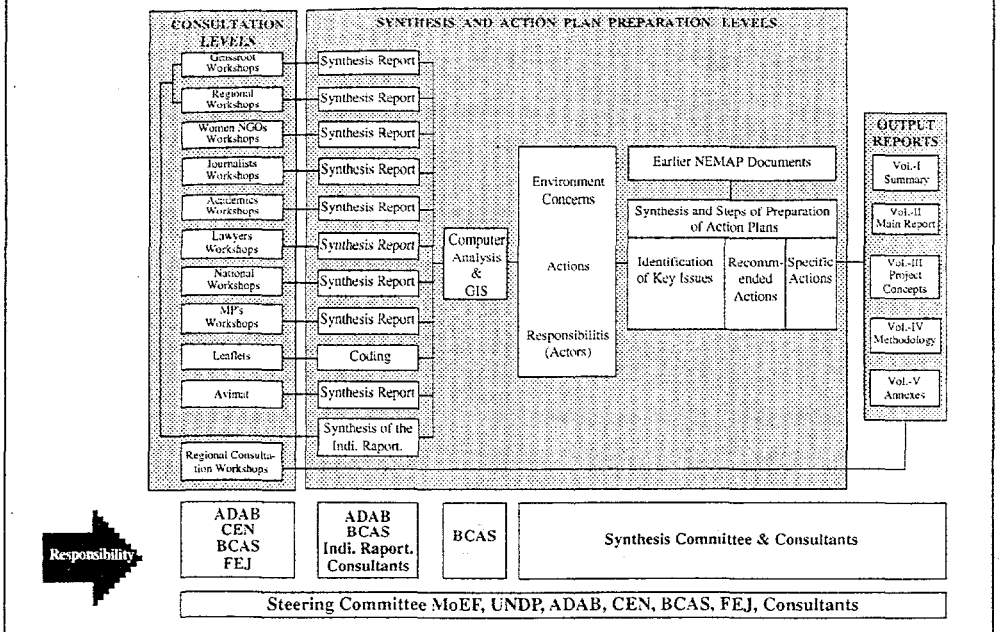


Figure 2.1 : NEMAP Consultation, Synthesis and Preparation Process



b) Regional workshops : Following the grassroot level workshops, six one-day regional workshops were held at Khulna, Sylhet, Comilla, Chittagong, Bogra and Mymensingh.

c) National workshop : On 29th June, 1994 Prime Minister Khaleda Zia inaugurated the National Workshop where she reiterated the determination of the government to carry out people-oriented planning and directed the NEMAP secretariat to take the draft document back to the people again, through follow-up regional workshops.

d) Professional workshops;

e) Government consultations;

f) Media campaign;

g) Questionnaire;

h) Video.

Success and limitations of the Participatory consultative process :

The NEMAP process is the first time where such an effort of public participation has been undertaken prior to any major planning initiative. It is innovative in three ways - (a) For going to the people to get their opinions prior to developing the plan, (b) for the cooperation between government, NGOs and private sector for developing a truly national plan, and (c) for the use of national resource persons in all stages of developing the plan without any expatriate consultants. Although great pains were taken within financial and time constraints only a limited number of people could participate in the workshops. The public awareness raising part of the process has undoubtedly reached a much wider audience through the TV programmes, and advertisements, radio programmes, newspaper advertisements and circulation of the questionnaire.

2.3 Geographical Coverage

Out of the total of 493 thanas in Bangladesh, participants from 291 thanas got involved in the NEMAP consultation process. This means that the process covered 60% of the thanas of Bangladesh. Map 2.2 shows the spatial distribution of participation in the NEMAP processes.

Grassroots workshop in cyclone shelter at Cox's Bazaar

2.4 Analysis, Synthesis and Preparation of Reports

The participatory process of NEMAP was started to reflect views and concerns of the people at various levels of the NEMAP process. A synthesis sub-committee was formed with the representation of MoEF, UNDP, NEMAP consultants, Coalition of Environmental NGO's (CEN) under ADAB, BCAS and the Forum of Environmental Journalists to steer the activities of the public consultation process and finalize the NEMAP documents. The present initiative took into account the two documents prepared earlier under NEMAP. A group of experienced journalists were organised to act as rapporteurs for each workshop, and prepared independent synthesis reports. All information collected from the workshops was synthesized and structured so that the consultants could use the information for the preparation of NEMAP. A series of mass awareness raising activities were also undertaken including special TV programmes, such as Avimat. 100,000 copies leaflets and questionnaire were printed and distributed all over the country through government and non-government organizations and media channels.

2.5 The Synthesis Process

In the process of synthesis of all the outputs, the following criteria were applied;

- The major concerns expressed by the people were incorporated and addressed.
- The major regional or ecosystem specific environmental problems were addressed.
- The major concerns were to be dealt with
- Institutional and policy issues were to be addressed.
- Proposed actions were to allow people's participation.
- Realistic actions were proposed;
- Long term problems were not neglected.
- The people's participation in the NEMAP was adequately described and
- The actions recommended were adequately prioritized.

2.6 The Document

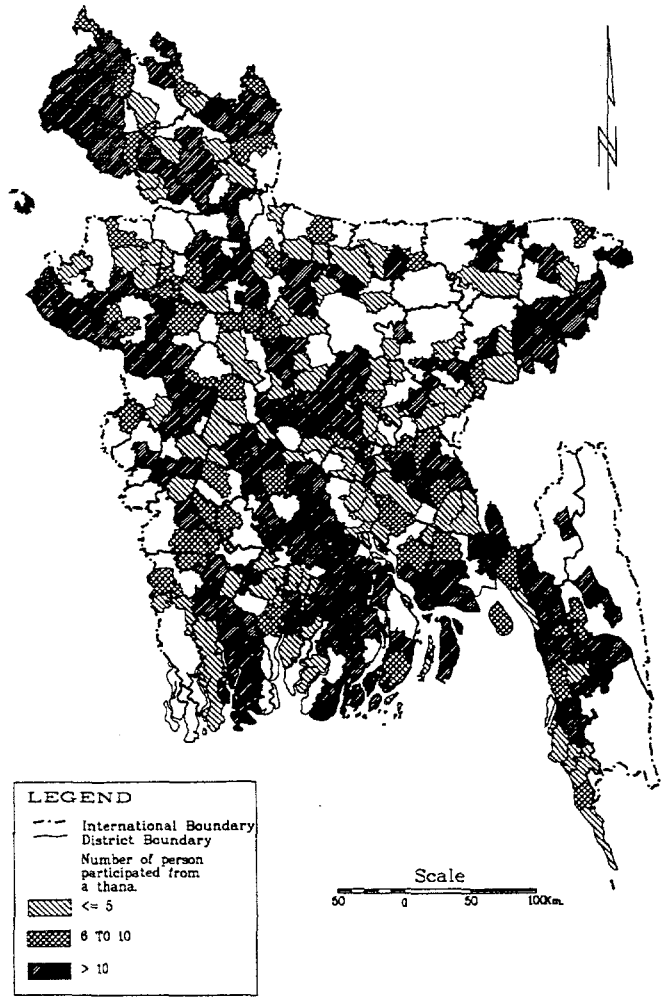
The document consists of 5 volumes with a technical compendium fifth volume giving a description of the data analysis, computer programmes and Geographical Information System used.

2.7 Preparation of the Action Plan

The Action Plan was prepared in four steps :

Step (i) identification of major concerns such as sanitation and health socio-environmental, deforestation, pollution, natural hazards, water related agro-chemicals and others;

Map 2.2



Step (ii) listing and synthesis of major issues;

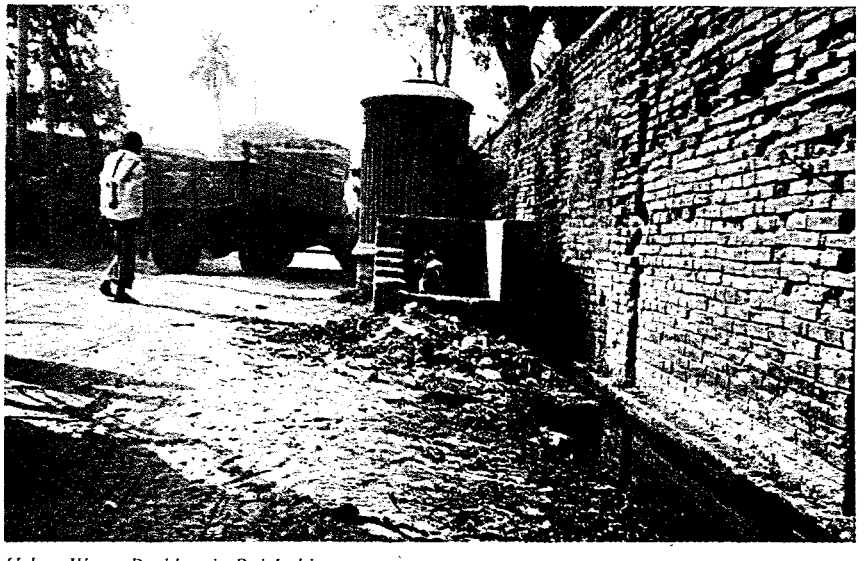
Step (iii) recommendations for action based upon recommendations made by the people themselves as well as professional groups and the government; and

Step (iv) prioritization of actions - based upon views expressed by the people, professionals and government agencies.

It took into account existing government priorities and policies the environmental issue as well as other sectors.

Although the Action Plan might be far from perfect and has probably neglected certain issues and areas which to some groups deserve higher priority, it has nevertheless attempted to be as responsive as possible to the concerns expressed by the different groups of people. The National Environment Management Action Plan, as envisaged, would not be a one-off exercise, but would be a living process which would involve people, providing them the chance to monitor the activities which thereby ensures that their concerns are being genuinely addressed.

NEMAP Regional Workshop at Comilla



Urban Waste Problem in Rajshahi

CHAPTER III
INSTITUTIONAL ISSUES AND ACTIONS

3.1 Existing Institutions

In 1989 a decision was taken to create a Ministry of Environment and Forest with the Department of Forest and a newly created Department of Environment under it. The ministry is responsible for environmental matters at the national level and works with the ministerial agencies to ensure that environmental concerns are taken into account in the formulation and execution of development policies. Besides, the Departments of Environment and Forest, the Ministry oversees the activities of the Bangladesh Forest Industries Development Corporation (BFIDC), the Forest Research Institute, the Institute of Forestry (at Chittagong University) and the National Herbarium.

The newly created Department of Environment, as the technical agency of the ministry, looks after the environmental planning, management, monitoring and enforcement. Recently the Department has been given new extensive powers to deal with air pollution, protecting habitats and conservation of soil, water and other natural resources. The Department of Forest is responsible for the management and development of Bangladesh's forest resources.

The Planning Commission is responsible for preparation, monitoring and approval of all development plans in Bangladesh. On the guidelines contained in the national five year plans it allocates funds and resources to the different sectors of the economy.

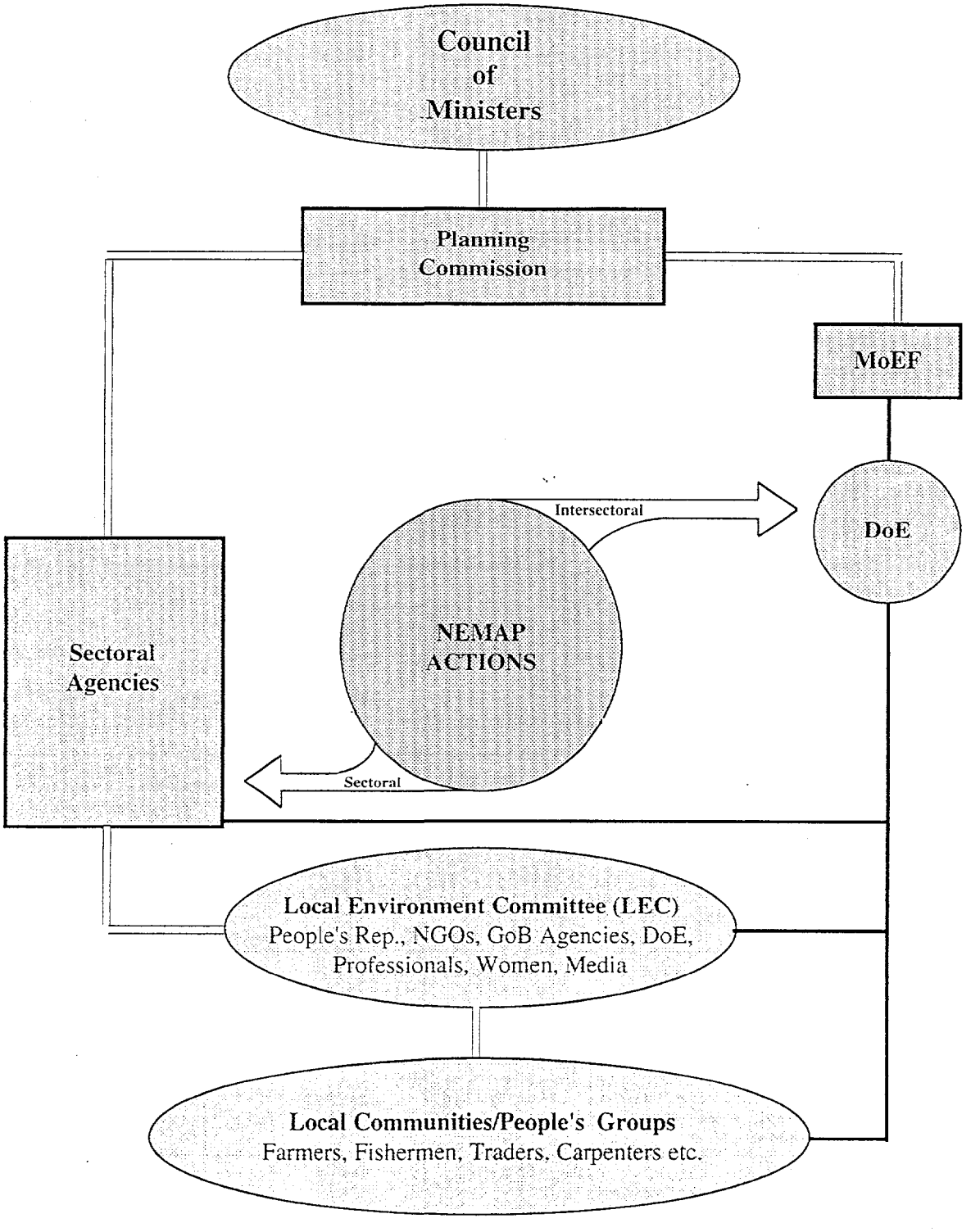
The Ministry of Environment and Forest has certain inadequacies. Being a new ministry it lacks adequate facilities and equipment, proper technical expertise, relevant data and an effective planning cell. The Department of Environment lacks adequate skilled manpower, training facilities for different technical subjects, the capacity to frame and enforce legislation, the capacity to gather information and monitor activities, expertise regarding environmental standards as well as proper equipment and logistics. The institutional capabilities of both the ministry and the department have to be continually reassessed and strengthened.

Under the NEMAP programme the following institutional issues have been considered: Inter-sectoral matters, local environment issues, the role of the NGOs and implementation, monitoring and follow-up of NEMAP and strengthening of MOEF and DoE.

Table : 3.1 Institutional Issues

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Absence of institutional mechanism to deal with inter-sectoral issues at national level	Activation of National Environment Council headed by Prime Minister	Policy	MOEF/PM's office	Arrange meeting of NEC and its Executive Committee to review NEMAP implementation.
Lack of institutional mechanisms at local level to resolve inter-sectoral issues	Activation of Divisional Environment Committees and creation of Environment committees at District and Thana levels with peoples participation	Policy	MOEF/PM's office	Creation and Implementation of Local Environment Committees (LECs) on pilot basis in some selected eco-specific locations.
Need for involvement of all sectors of civil society in NEMAP implementation	Allow every sector of civil society including people, NGOs, academics, media, private sector, youth groups and others to implement parts of NEMAP	Advocacy & Projects	NGOs, Private Sector, Academics, Lawyers, media, youth groups, professionals, others.	Take up specific actions under NEMAP for implementation through different group activities.
Need to implement, monitor and follow-up on NEMAP	Continuation of NEMAP secretariat and steering committee and follow up of NEMAP	Action/Project	MOEF	Adopt and implement NEMAP through preparation of specific costed projects for sectoral and other actions.
Need to strengthen capabilities of MoEF and DoE to address their mandates	Needs assessment and preparation of programmes and projects to strengthen MoEF / DoE	Projects & Advocacy	MoEF / DoE	Assess needs and implement capacity building projects including environmental management

Figure 3.1 : Proposed Institutional Arrangements for Implementation of NEMAP



3.2 Intersectoral Issues

Environmental matters cover a wide range of subjects which extend beyond the jurisdiction of the Ministry of Environment and Forest. There is a need to develop an appropriate institutional mechanism to resolve inter-ministerial subjects. The lack of coordination between ministries and agencies dealing with cross-sectoral environmental issues were discussed during the various consultative NEMAP workshops. It was felt that there was a need to devise ways to settle inter ministerial problems related to environmental issues. At present certain facilities exist where cross sectoral matters can be discussed and resolved. At the national level, there is the National Environmental Council headed by the Prime Minister which is supposed to function through an Executive Ministerial Committee headed by the Minister of MOEF and Divisional Environmental Committees headed by the Divisional Commissioner. To implement approved policies these bodies need to be activated. It is desirable that the MOEF ensures that these committees function effectively and are used for the implementation of NEMAP.

3.3 Local Environmental Issues

At the local level, it is felt that no institution or mechanism exists that can deal with intersectoral issues related to environment. Local government officials and elected representatives acknowledge the need for appropriate mechanisms in this matter. People at different workshops identified the absence of focal points at different levels where environmental issues may be addressed.

There exists at present an Environmental Committee at the divisional level but this is mostly nonfunctional.

It is recommended that Local Environmental Committees (LEC) should be formed at the district and thana levels, in which local representatives are to be involved. Under the implementation follow up of NEMAP a pilot project may be undertaken by MOEF to put in place the proposed committees.

3.4 Role of other Non-Government Institutions

Environmental issues cannot be addressed by the government alone but require the participation of civil society and non-government organizations. In the various NEMAP workshops the need to ensure participation of the NGOs in the formulation and implementation of policies that have a bearing on environmental matters was stressed. At present there is no specific policy regarding NGO participation in developmental activities. The involvement of people from different walks of life is necessary to make all the segments of society conscious of environmental problems. It is therefore desirable that the government should encourage the NGOs to play an active part in the environment sector (including activities under NEMAP).

3.5 Implementation, monitoring and follow up of NEMAP

To make NEMAP an on-going process, it is necessary to have mechanisms to ensure implementation, monitoring and follow up. During consultations the importance of follow up measures was emphasized. It is expected that implementation of NEMAP will become an integral part of the national policy. The participation of various government agencies, the NGOs and representatives of the people from different walks of life, which was successfully tried during the consultative phase of NEMAP has to be ensured while NEMAP is being implemented.

3.6 Strengthening of MOEF and DOE

(a) Introduction

The Ministry of Environment and Forest (MOEF) has been given wide mandate and responsibilities under the Environment Policy which will increase considerably with the implementation of NEMAP. Both the Ministry and its technical arm, the Department of Environment (DoE), lack adequate manpower, expertise and other resources to fulfil their mandate and responsibilities.

(b) People's Perception

It was felt from various sources that the lack of effectiveness of environmental legislation and other activities was directly related to the inadequacy of capacity to

Air quality being monitored by DoE personnel

Recycling of plastic wastes in Tongi

enforce regulations by the DoE and MoEF. It was therefore generally felt that strengthening the capacity of both MOEF and DoE should be considered a priority.

(c) Existing Policy

The existing Environmental Policy mandates and ascribe responsibilities to DoE. In addition environmental legislation ascribes responsibilities to DoE. In order to fulfil these responsibilities the capacity of both MOEF and DoE need to be strengthened.

(d) Key Issues

The key issues with respect to the MoEF are :

* the Ministry has yet to develop a strong functioning Planning Cell to support its work;

* it lacks essential baseline data on resources and areas of environmental concern;

* although it now acts as a "clearing house" for all development projects put forward by the different line ministries, it lacks the necessary basic technical expertise to assess and monitor projects for their environmental impacts effectively and

* it suffers from a shortage of basic facilities, equipment and logistic support.

The Department of Environment faces these weaknesses:

* shortage of adequate and appropriate manpower;

* shortage of trained and experienced manpower. There is a need for expertise in the disciplines of biological and geo-sciences, hydrology, soil and socio-economic sciences in addition to engineering;

* lack of capacity of planning, monitoring, publicity, and for framing and enforcing legislation;

* lack of information management system supported by a strong data bank to back up planning, policies and monitoring activities;

* lack of expertise on environmental impact assessments and environmental quality standards;

* absence of regular training programme to support staff development; and

* shortage of basic facilities, equipment and logistic support.

Although the broad areas of institutional weakness is known, there has been, to date, no thorough institutional assessment conducted to assist the Ministry in defining its exact requirements and support for planning for the future. With ever-increasing pressure on the Ministry to fulfill its mandate and become active in translating environmental programmes into action, priority must be given to identifying a systematic programme to strengthen the Ministry's institutional capabilities, based on its present and projected requirements.

(e) Recommendation/Action

It is therefore recommended that an immediate assessment of the needs of both MOEF and DoE be undertaken to identify specific actions needed to strengthen their capabilities and capacity of carry out their mandates and responsibilities.

CHAPTER IV
SECTORAL ISSUES AND ACTIONS

The NEMAP process identified a number of key issues, recommendations and specific actions with in the action regime such as policy, advocacy, project etc. in respect to environment management in different sectors. It also identified the actors/agencies to take initiatives in respect to those actions leading to formulation/ initiation of detailed actions or project planning. The following provide summaries of the sectoral issues raised, recommendations made and specific actions required in the NEMAP process.

4.1. Natural Hazards / Disasters

Vulnerability to natural hazards like cyclone, flood, drought, tornado and desertification is a major environmental concerns in Bangladesh. Although the major concern related to natural hazard has been reflected in the existing policies, the institutional arrangements to implement the policy is still lacking. The key issues in the sector as reflected in people's perception and existing policy are :

(i) institutional weakness to address issues like hazard forecasting preparedness, post-hazard intervention and management activities and hazard proofing, unplanned development structures leading to susceptibility to natural hazards, degradation of environment such as silting of rivers, defore station and lack of scientific knowledge on natural hazards. The NEMAP has taken cognizance of the above and accordingly has proposed a number of actions. The prioritized actions are presented in the following table. Map 4.1 shows the spatial distribution of people's concerns regarding natural hazards.

Map 4.1 :

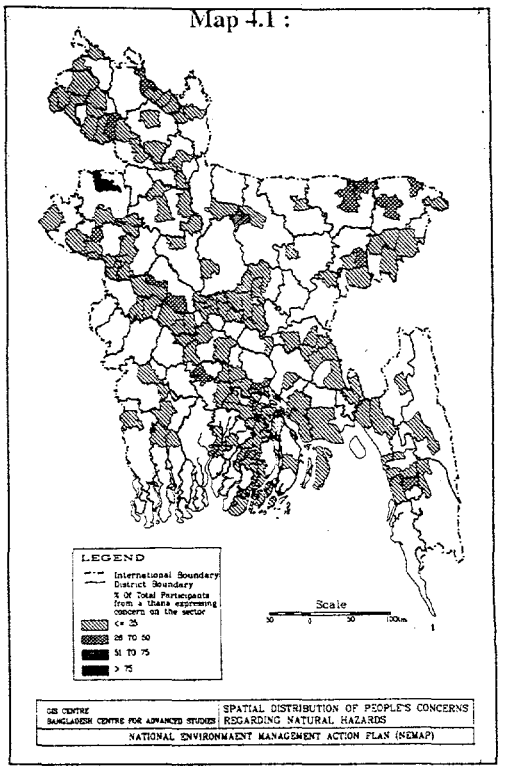


Table 4.1 : Natural Hazards/Disasters

Key Issues	Recommended Action	Type of Actions	Actors/Agencies	Specific Action
Timely and correctly Hazard Forecasting for flood, cyclone & tidal surge and preparations for hazards	Development of capabilities on different natural hazard forecasting and enhancement of coordination within GoB agencies	Project	MoWR, BWDB, Met. Office, SPARRSO, MoDM & R, Cyclone Preparedness Centre	Institutional capability development of the agencies involved in hazard forecasting
				Institutionalization of capability developed in FAP 19, FAP 25, SWMC for using the flood forecasting and disaster management activities
	Training and awareness development	Project/Advocacy	GoB, Media, Community Organizations/NGOs, People	Creating training programmes, preparation of manuals for training
	Community based hazard preparedness programme	Advocacy	Community Organizations/ NGOs, Media, People	Pilot programmes in different hazard prone areas (community based)
Hazard Proofing	Pilot projects	Project	Disaster Management Bureau, MoR&R, People	Conduct studies and pilot projects in different hazard prone areas
Poor/Uncoordinated post hazard intervention and management	Enhancement of coordination during post hazard interventions	Policy	MoDM & R ADAB, Disaster Management Bureau	Formation/enhancement of capabilities of the inter agencies coordination cells including NGOs
	Database on the inventory of hazard mitigation capabilities (for example No. of cyclone centres, school, food storage, fuel etc.) including NGO and Govt. agency's capabilities	Project	Disaster Management Bureau, ADAB	Creation of computerized database on hazards/disaster management by using GIS as a tool

4.2 Industry

Expansion of industrial areas into the agricultural and forest lands and industries based on renewable energy, agricultural resources and non- renewable is likely to pose potential threat to environment and sustainable use of resource base. Existing industries create a number of environmental problems throughout the country, though these are mainly concentrated in Dhaka, Chittagong and Khulna regions. Pollution arising from various industrial processes and plants throughout the country is causing degradation to surrounding environment at different-levels.

Issues and concerns in industrial sectors relate to a general absence of pollution abatement in terms of waste management and treatment; low level of environmental awareness among industrialists and entreprenuers: lack of technology to ensure efficient use of resources and waste minimisation and absence of any guideline for the location of industrial units. Further, the environmental policy and the environmental legislation would not be effective without the pollution abatement regulation and guideline for environment quality standards.

Ship-breaking at Kumira, Chittagong, leaves its despoiling mark on coastal land

Table 4.2 : Industry

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Pollution from the untreated effluents and emissions	Proper treatment of effluent and emissions according to guidelines	Policy	Industrial Units	Installation of effluent/emission treatment plants
			MoI, Private Sector	Classification of industries according to levels of pollution for taking appropriate measures
Lack of appropriate technology for pollution abatement	Technology transfer	Policy	MoI, Private Sector	Projects or technology transfer and training
Lack of environmental awareness among the industrialists & the entrepreneurs	Imparting Environmental Education awareness to industrial sectors	Policy	MoI, BoI, DoE, Chambers	Training Workshops
Lack of guideline/ legislations for the management of effluent and emission and their enforcement	Preparation of guidelines	Policy/Project	MoEF, DoE, MoI, BoI	Preparation of industrial guidelines
				Institutional strengthening of DoE & MoI for the application of guidelines
Lack of incentives in private sector for the abatement of pollution	Financial incentives to Private Sectors for encouraging to take steps for pollution abatement	Policy	MoI, Financial Institutions providing credits to industries	Incentive programmes for the private sectors to support their pollution abatement measures
Occupational health	Preparation of guidelines and setting standards for working environment	Policy/Project	DoE, MoI, MoHFP	Preparation of guideline and its implementation

4.3 Water resources

Water resources need to be exploited most optimally to achieve a bare minimum sustainability to feed the growing population. But, development in this sector has to be made environmentally sound and sustainable. Water development projects might have adverse effects on fisheries, mangroves, wetlands, agricultural land, settlements, water transport and the quality of water supplies. Inadequate planning of the FCD/I projects and failure to consider their wider impacts has, in some cases, led to environmental degradation; poor drainage of wetland, flooding, water logging, siltation and salinisation.

Concerns in this sector relate mainly to flood damages, river bank erosion, degradation of water bodies, increased water pollution, non availability of water for irrigation, drainage congestion and withdrawal of water from the Ganges. Solution to the problems lies in excavation of water bodies, supply of adequate water for irrigation, prevention of deforestation, tree plantation, providing adequate culverts, bridges for the flow of flood water, taking flood proof measures, providing compensation for project affected people, negotiating and sharing of the Ganges water with India. NEMAP has suggested actions to address the issues raised in the water sector and outlined the following specifice action for immediate follow-up.

Table 4.3 : Water Resources

Key Issues	Recommended Action	Type of Actions	Actors/Agencies	Specific Action
Flooding and associated loss of life and property	Flood protection Controlling measure with people's participation	Project	MoWR	Flood protection projects with popular participation and proper environmental impact assessment
	Development of people's participation in water sectoral projects	Policy	*Community Organizations/* NGOs, ADAB, CEN	*Case studies in selected water sector* projects (NEMAP methodology could be used)
General failure to take environmental consideration in the formulation of FCD/I project due to absence of a guideline	Development of guideline for environmental review of water sectoral projects	Policy/Advocacy	MoWR, Universities, Research Organisations, People, MoEF, DoE	Review of FAP 16 guideline for recommendation, its improvement if possible by formulating new guideline
Inadequate participation of people in the FAP	Methodology for adequate scope of participation of people in the FAP process	Policy/Project/ Advocacy	MoWR, FPCO, People	Development of methodology with inputs of ADAB, CEN
			ADAB, CEN, People	Lobbying and advocacy for Govt. & NGO collaboration
Poor designing & planning of FCD/I projects leading to over topping britches	Design review of existing plan and on going FCD/I projects.	Project	MoWR	Design review of FCD/I projects taking environmental concerns under consideration
Draining of Wetlands, water logging, flooding, siltation, salinity & Biodiversity	Mitigation, restoration wherever possible	Project	MoWR, People	Implementation of pilot projects
Absence of database on hydrology and inadequate understanding of the flooding phenomena and floodplain management	A comprehensive plan for the development and management of the water sector database	Project	MoFL, (WARPO), MoEF, DoE	Creation of research centre/institutions dealing with water sector data base backed up by GIS capabilities
Unplanned abstraction of ground water leading to drawdown of the water table, failure of shallow and deep tubewells	Preparation of guideline	Policy/Project	MoWR, LGED (For small scale irrigation project)	Preparation of guideline and its implementation
Reduction of availability of water during the dry season in the Ganges river due to the construction of Farakka barrage	Formulation of strategy at both national and international levels	Policy/Advocacy	MoEF, MoI, MoWR, MoFA	Raising the issue at regional and international forum
			Community Organizations/ NGOs, People	Lobbying & advocacy with the NGOs at regional and international levels
	Detail impact study, monitoring and creation of database	Project	GoB Research Organizations, Universities, Private Sector	Formulation of research project for funding

4.4 Energy

Availability of biomass fuel for domestic need has reached a crisis while commercial and industrial need of energy has been satisfied to a great extent by bio-mass which has been supplemented by non-renewable energy available within the country and through imports. The key environmental issues in this sector may be summed up as :

Large scale deforestation to satisfy rural energy requirements and

Non availability of livestock manure for fuel in rural areas.

Solution to the energy issues should involve people in mass tree plantation, forest conservation and regeneration, the increase in bovine population and by motivating people to use energy efficient chulas (stoves), and also increasing an awareness about the causes of fuel shortage.

Children collecting bio-mass for use as fuel in rural Bangladesh

Table : 4.4 : Energy

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Heavy reliance on bio-fuels, wood, agri-residue, cowdung for fuel	Development of awareness about the alternative use of agricultural residue and animal waste	Policy/Advocacy/ Project	Community Organizations/ NGOs, MoE, MoEF, DoE, People	Media Campaign and demonstration etc. on alternate energy resources
	Developmen of alternate Energy	Policy/Advocacy	Research Organizations, Universities, DoE	Pilot project on solar energy, bio-gass
Large scale deforestation	Afforestation · programme involving the participation of community	Policy/Advocacy	DoF, Local Govt. agencies, Community Organizations/ NGOs, People	Social Forestry, Community Forestry, Agro-Forestry programmes with people's participation*
Lack of Awareness on Energy Conservation	Awareness Campaign	Policy/Advocacy Project	DoE, Community Organizations/ NGOs, People	Awareness raising programme through media
				T.V., Radio programmes
	Efficient Chula	Projects	BCSIR, Research Organizations, DoE, Community Organizations/ NGOs,	Pilot projects
				Research and Development projects on efficient chulas

4.5. Forestry and Biodiversity

Forests, with their great natural ecological resources, are on the decline in Bangladesh and have reached an all time low in recent years. Forests are also important to mankind for the various life forms that it supports including wildlife and biodiversity. Preservation of genetic resources is both a matter of insurance and investment that is necessary to sustain and improve production in agriculture, forestry and fishery.

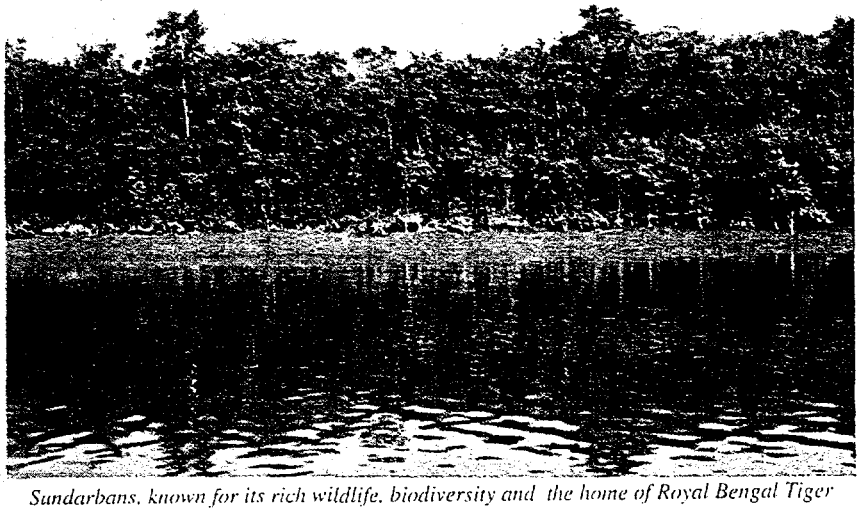
Key issues associated with forests, wild life and biodiversity include - encroachment of forest land for agriculture and human settlement; depletion of forest resources; and replacement by commercial forests, management of wetland within the forest is still poor and should be rehabilitated to develop an ecologically viable and socio-economically acceptable system of management. Salinity in the fresh water flow of the Ganges system due to withdrawal of large quantities of water in the upper riparian reaches is affecting the vegetation of the Sunderban mangrove forest; uncontrolled growth of shrimp farms is encroaching upon forested areas.

Table 4.5 (a) : Forestry and Biodiversity

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Forests : National Forest Policy	Formulation of a new National Forest Policy suited to the present and future social, economic, political and environmental needs of the country together with adequate and appropriate legislations for implementing the policy	Policy/Advocacy/ Project	MoEF, in Collaboration with MoLands, MoEstablishment, MoLaw, MoLGRDC, MoLF, MoE, MoA, MoI, MoP, MoTourism, MoIWDFC, Cabinet division, FD, People's Representatives, Community Organizations/ NGOs, People	Reviewing and Studying existing Forest Policy, Laws, Rules and Regulations, Related Sectoral Study Reports, Draft Forestry Master Plan, Draft NCS, National Environmental Policy 1992, Draft NEMAP and preparation of National Policy with peoples participation.
				Consultations with local people living in and around the forests, private forests owners, homesteads tree garden owners, local landless people, destitute women, marginal farmers, un-employed and under-employed people and taking their opinions and views for formulating the new National Forest Policy.
Institutional Reforms	Separation of authority and enterprise functions in government organizations; providing full fledged (functional and financial) autonomy to the enterprises system; enterprises formed should promote private sector, cooperative sector and organized people's participation	Policy/Advocacy	MoEF in Collaboration with MoEstablishment, MoFinance, MoLGRD MoP, Cabinet Division, FD, People's Representatives, Journalists, and Community Organizations/ NGOs, People	Reviewing and Studying the Draft Forestry Master Plan - 1993/2012, Consultations with all concerned actors, and preparing the PCP
Depletion of Forest Resources	Giving highest priorities to forest conservation, augmentation of forest resources, tree resources development in rural areas, and increasing forest and tree cover of the country	Policy/Advocacy	MoEF, FD, Community Organizations/NGOs	Adopting and implementing adequate and appropriate National Forest Policy through people's participation and participatory enforcement through targeted groups
				Improved management of State Forests and plantations, maintaining sustainability, productivity, environmental soundness, equity based on properly prepared forest management plans and implementing the same through people's participations
				Improved management of homestead forests and providing all sorts of supports for developing private nurseries
				Updating forest and tree resources inventory informations, forest and tree cover maps, and maintaining them on Resource Information Management System (RIMS).

Table 4.5 (b) : Forestry and Biodiversity

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
	Awareness Development	Advocacy/Policy	MoEF, FD, T.V., Radio, Newspapers, Video Film, Community Organizations/ NGOs, People	Media Campaign, Extension, T.V. and Radio Programmes, Short Films, Exhibitions Seminars and Symposia, Newspaper Articles, Essay Competitions at Educational Institutions
Wildlife : Conservation of Wildlife	Giving priority to the protection of wildlife, birds, frogs, lizards and snakes	Policy/Advocacy/ Project	MoEF, FD, DoE, Law enforcing agencies, Community Organizations/ NGOs, Wildlife and Nature Conservation Societies, People.	Inventory to assess the present status of wildlife, birds, frogs, lizards and snakes and evaluate their types and quantities available
				Prohibition on hunting and trapping, of wildlife and their hides; hunting, trapping and disturbances of migratory birds and aquatic birds; large-scale commercial exploitation of selected frog, lizard and snake species through appropriate legislation
Biodiversity : Conservation of Biodiversity	Biodiversity protection	Policy/Project/ Advocacy	MoEF, MoLF, FD, BFRI, People's Representatives, Conservation Organizations, Wildlife and Nature Conservation Societies, Community Organizations/ NGOs, People	Conservation of germ plasm in seed stores, clonal orchards, botanical gardens and zoos
				Awareness development through media, T.V., Radio, Newspapers, Seminar, Symposium
	International Collaboration to conserve biodiversity	Policy/Advocacy	MoEF, MoP, FD, other related institutions and ministries	Development of a Biodiversity Commission with neighboring countries for developing strategies to conserve shared resources and promote genetic interchange



Sundarbans, known for its rich wildlife, biodiversity and the home of Royal Bengal Tiger

4.6. Land Resources

Land is the most important resource in Bangladesh and is under intense use threatening its carrying capacity. Population pressure on land is a crucial factor in the management of land resources in the country. Availability of land is a major constraint in Bangladesh as virtually all available land is utilized for crop production, forestry, fishing and urban development. Major landuse conflict arise from uncoordinated action amongst the ministries and agencies concerned with land management. The country lacks a comprehensive land use policy emphasizing the most appropriate and productive use of land.

Gradual loss of agricultural land, loss of soil fertility, soil degradation, landlessness, distribution of khas land and cumbersome land registration system etc. are the major issues which have been addressed by the NEMAP and a number of specific action in this regard have been proposed.

Table 4.6 : Land Resources

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Unsustainable Landuse	Development of sustainable landuse management	Policy	MoLand, Agricultural Research Organization, Universities, Community Organizations / NGOs	Action Research/Farm level research
	Study on indigenous sustainabele landuse practices	Project	Research Organization, Community Organizations / NGOs, People	Study to increase efficiency of the production system and its application
Loss of soil fertility	Soil fertility status survey and classification of soil-according to fertility and taking care of appropriate soil nutrient deficiencies	Project	SRDI, Research Organization, Universities.	Survey projects on soil fertility conservation and mapping
Management of degraded land	Inventory of degraded land, its mapping and recommendation for appropriate use	Project	SRDI, SPARRSO, Research Organizations	Survey and mapping
Status of land resource : inventory classification and legal status	National Landuse Survey in collaboration with research institutions and private sector	Project	Directorate, DLR, Research Organizations, Private Sector	Landuse survey land classification on the basis of physical uses and legal status and formulation of recommendation for subsequent replication
Age old land registration and records of land right system	Modernization of land registration and land right recording system with the help of computer assistance such as GIS	Policy/Project	DLR, MoLand, Research Organizations	Pilot study and formulation of recommendation for subsequent replication
Absence of land policy providing provision for landuse planning and addressing the policy of land reform/land fragmentation/land tenure/ landlessness/land settlement, such as distribution of khas lands	Formulation of comprehensive Land Policy	Policy	MoLand	Formulation of Landuse plan
				Land reforms in corporating with agrarian and tenurial structure
				Programmes for giving khas lands for settlements to the poor and encouraging environmentally sound and sustainable landuse pattern
Soil Conservation issues	Soil conservation measures in areas with high soil erosion such as Modhupur Tract, Hill slopes of Chittagong and Sylhet	Project	DoF, CHTDB, Community Organizations/ NGOs, People	Pilot project to develop appropriate Agro-forestry practices, plantation and landuse practices for the conservation of soil with active participation of the local people in the areas mentioned

4.7 Fisheries and Livestock

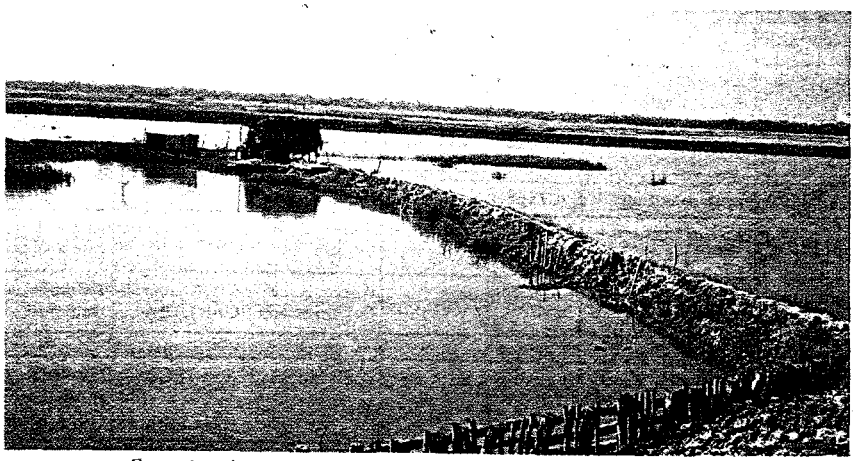
Fisheries play a dominant role in nutrition, employment, foreign exchange earnings and other areas of Bangladesh's economy. Fishes provide 80% of the nation's animal protein intake. Livestock remains a crucial sector in the agrarian and largely subsistence economy of Bangladesh. Interference with the hydrological systems particularly in the form of FCD/Is, coastal embankments have led to the depletion of fish production, degradation of fishing environment and loss of biodiversity in the open water fisheries of Bangladesh. Further, increased and unrestricted use of pesticide and agrochemical and discharge of untreated industrial effluents into the open water system etc. are also causing harm to the fisheries of Bangladesh. Non availability of feed is a major concern which is arising out of non sustainable use of land. The NEMAP has identified the major issues in this sector and has outlined the actions required.

Table 4.7. (a) : Fisheries and Livestock

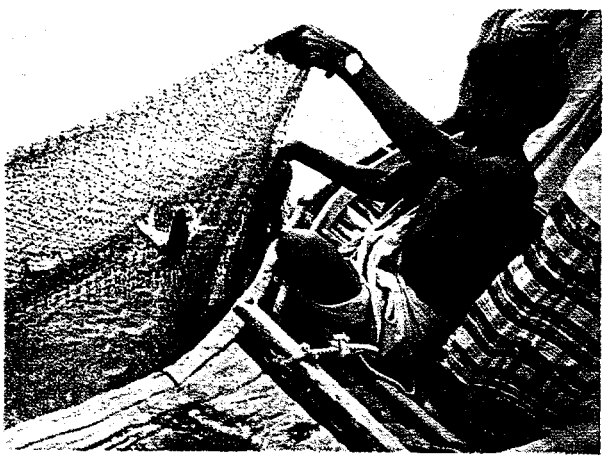
Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Loss of open water fishery habitats	Allocation of requisite quantities of water with requisite hydrological conditions for fish and other aquatic animals and plants be made.	Policy	MoEF, MoIWDFC, MoFL	Ministry of Environment and Forests may initiate policy papers for approval by the Council of Ministers to allocate and sustain different components of openwater habitats for use by fish, prawn and other aquatic animals
	Prefeasibility and feasibility studies on FCD, FCD/I and other water resources development project must provide for comprehensive fisheries biological studies.	Policy	MoWater Resources, MoFL	Policy papers to be initiated by the Ministry of Water Resources in consultation with the Ministry of Fisheries and Livestock.
	Prepare plans to examine possibilities for restoration of some of the lost fish (aquatic) habitats in different components of the openwater system.	Project	MoWater Resources, MoFL, NGO	Case studies in selected completed water resources dev. projects (NEMAP methodology could be used)
Adverse impacts of coastal embankment on estuarine fish	Possibilities for restoring the tidally inundated nursery grounds for marine and estuarine fishes and prawns are to be examined and restored as far as possible	Project	MoFL, MoWater Resources, NGO, People	Ministry of Fisheries and Livestock should develop and execute projects to study the impacts of coastal embankments on the population sizes of different marine fish and prawn.
Pollution and degradation of open waters	Discharge of untreated solid, liquid and gaseous wastes from industries should be prohibited and prohibitory measures should be strictly enforced	Policy	MoEF, MoI, MoFL, DoE	Project concepts on preparation and enforcement of law may be initiated by the Ministry of Environment and Forest in consultation and coordination with all the relevant Ministries
	Law to install proper waste treatment plants in all industrial units should be enacted and enforced	Project	MoI, MoEF	
	Inclusion of waste treatment plants should be made obligatory by all new industries to be permitted	Project	MoI, MoEF, DoE	
	Oil spillage on to marine and inland water should be made a punishable offence.	Project	MoEF, DoE	Project for monitoring and quantitative assessment of oil spillage by oil tankers, ship breakers etc. in different areas should be implemented by Deptt. of Environment
	Dumping of raw sewage and other human wastes as well as other raw organic wastes into the open waters should be discontinued	Project	MoEF, Local Government	Laws to be formulated and enforced by the Ministry of Environment
	Run off of poisonous agrochemicals should be prevented/reduced by resorting to integrated pest management practices and by using less lethal chemicals	Project	MoEF, MoH, MoLocal Government MoA	Project to monitor volumes of organic wastes being dumped into water may be developed and implemented by Deptt. of Environment
			MoAgriculture, MoFL, MoEF	Prepare and implement projects to assess level of agro-chemical pollution on different rivers, streams and other standing water bodies and recommend measure to eliminate/reduce levels of such pollution

Table 4.7 (b) : Fisheries and Livestock

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Loss of aquatic biodiversity	Continuous monitoring of the species of fish, shrimps and prawn, crabs, mussels, oysters, turtles and tortoises and other aquatic living organisms should be carried out to locate species becoming rare or extinct with a view to restoring and preserving them	Project	MoFL, Universities, NGOs, People	A project concept paper to be initiated by the Department of Fisheries and Fisheries Research Institute
Poor Management of open water fisheries (Floodplain/Riverine)	In place of revenue oriented management, scientific management of the populations of different species of fish, prawn and commercially harvestable aquatic animals occurring in the openwaters under the control of Ministry of Land and in the Sunderbans under the Ministry of Forests should be introduced.	Policy/Project/ Advocacy	MoFL, DoFisheries, FD	Department of Fisheries should prepare a project on scientific management of the fish, prawn, crab, oyster, mussel etc. resources in the government owned inland waters and their exploitation at a predetermined level of intensity by fisherman.
Overfishing of marine fish	Extent and impacts of overfishing on populations of different fish and prawn species should be assessed quantitatively and regulatory measures are to be enforced in the form of catch quota, size limit of fish/prawn in the catch and other similar management measures including fishing efforts regulation	Policy/Project	MoFL	Projects may be formulated and implemented by the agencies under the Ministry of Fisheries and Livestock



Extensive shrimp cultivation in the coastal belt aggravates salinity

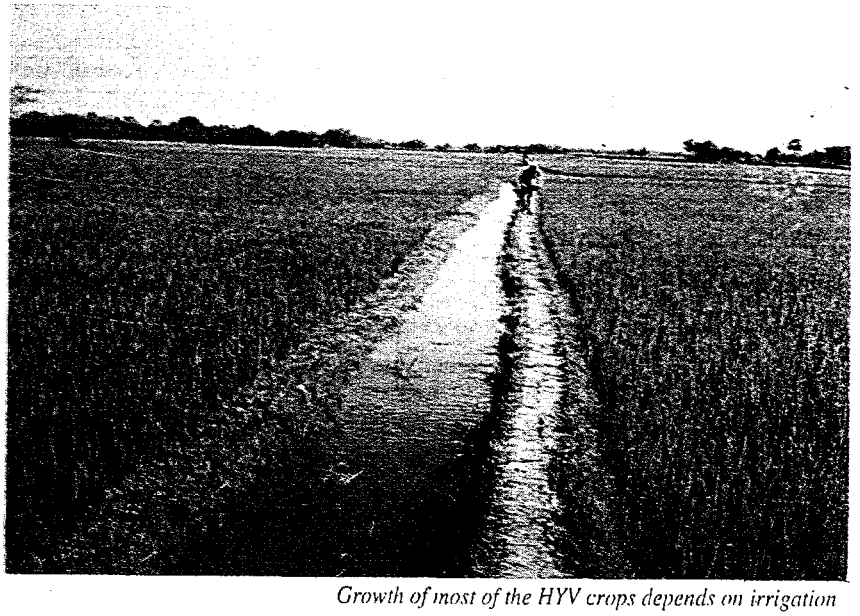


Fish - the major source of animal protein in Bangladesh

Livestock is extensively used as draft-power

4.8. Agriculture

The NEMAP has identified the key environmental problems in the agricultural sector. Agricultural intensification and the increase in irrigated area have led to a number of environmental problems i.e., loss of bio-diversity through the conversion of forest land into agricultural land, abandonment of many indigenous crop varieties in favour of HYV's leading to irreversible loss of the country's genetic resources, depletion of soil nutrients and organic matter due to intensive cropping, loss of wetland habitats through abstraction and drainage resulting in depletion of aquatic fauna and flora and reduction in water availability to the rural poor, desertification (in the Barind Tract), increased use of agro-chemicals raising the pollution potentials of surface and ground water.



Growth of most of the HYV crops depends on irrigation

Table 4.8 : Agriculture

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Loss of genetic resources due to introduction of HYV	Preservation of Genetic Resources	Project	GoB, Agriculture Research Organization, BAU	Establishment of gene bank and local genepool inventory on wild relatives
	Change in cropping pattern and agricultural landuse patterns	Policy/Project	Agriculture Research Organization (GoB), BAU, Universities	Research and development on cropping pattern for sustainable landuse
Loss of agricultural land fertility due to overuse of agro-chemicals leading to increasing dependence on these chemicals	Appropriate regulation for the use of pesticide and agro-chemicals and its enforcement	Policy/Advocacy	GoB, MoEF, MoA, BARC	Formulation of legislation/rules and regulations
	Use of sustainable agriculture	Policy/Project	Community Organizations / NGOs, Research Organizations	Pilot Study and Field research
				Extension programme
Non-availability of irrigation water during the dry season due to reduction in river flows and abstraction of ground water	Sustainable use of ground and surface water	Policy	MoAgri, BARC	Formulation of appropriate rules and regulations
			LGED, Community Organizations / NGOs	Development of sustainable minor irrigation scheme
Incidence of pest attack and diseases	Integrated pest management	Policy	GoB, Agriculture Research Organizations	Pilot Project, Research and Development works
			Community Organizations / NGOs	Action Research Programmes
Adverse effect on land fertility due to crop intensity/cropping pattern	Development of appropriate landuse management practices through farm level research	Policy	GoB Agri-Research Organizations, Community Organizations / NGOs, People	On farm research on appropriate landuse management
Removal of agricultural residue leading to reduction of soil fertility	Development of efficient chulas and alternate fuel with resources with use of agricultural residue as fuels	Project	Research Organizations, Community Organizations / NGOs	Research and development works for appropriate technology innovation

4.9 Housing and Urbanization

The key issues identified by the NEMAP process in this sector are - unplanned and unregulated urban growth, high density of population often with poor provisions for sanitation causing high incidence of disease, and inadequate facilities for disposal of waste and sewage treatment and management.

Actions suggested by NEMAP to address the environmental issues in this sector relate to strengthening of local government institutional capacity for integrated planning, creating better housing facilities for the urban poor, middle class and working women, enacting appropriate legislation for landuse, building standards, zoning and town planning.

Table 4.9 : Housing and Urbanization

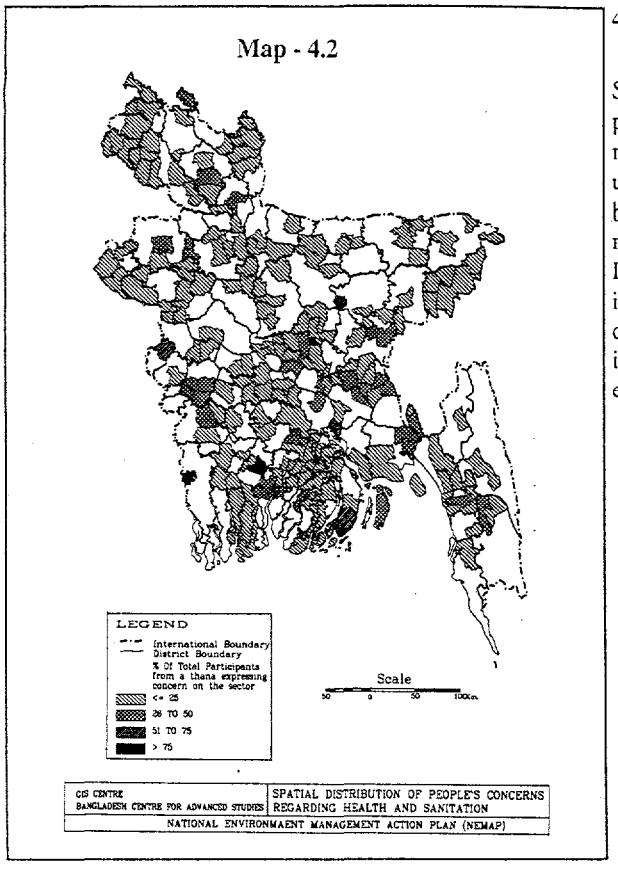
Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Unplanned and unregulated urban growth	Formulation of landuse guideline for urban areas	Policy	MoWorks, MoLocal Govt. UDD, LGED, RAJUK, CDA, KDA, Pouroshava	Formulation of landuse guidelines
	Regional planning	Policy	UDD	Preparation of project proposals for regional planning
Unplanned high rise building	Setting up planning criteria for building standards under strict supervision	Policy	RAJUK, CDA, KDA	Formulation of planning criteria and building standards under strict supervision
Urban Flooding	Flood proofing and protection measures	Project	RAJUK, CDA, KDA, LGED	Flood protection programmes for big cities and small towns
	Application of strict zoning law in the highly vulnerable areas	Project	RAJUK, CDA, KDA, Local Govt. agencies (Municipalities Pourashava)	Institutional strengthening
Sewerage & garbage disposal problem	Better provisions and facilities for disposal of garbage and sewerage treatment	Project	Municipal Corporations, WASA	Development of garbage disposal and sewerage treatment capability
	Recycling and economic use of garbage through participatory management involving community	Project	Community Organizations / NGOs, Municipal Corporation	Development of Pilot Project involving Govt. and Community Organizations / NGOs
Inadequate & unhealthy housing facility	Improve housing facilities particularly for the less wealthy section	Policy/Project	RAJUK	Planning more residential areas with multistoried buildings
			Private Sector, Community Organizations / NGOs, People	Providing incentives to the private sector & NGOs to undertake housing projects
	Financing Urban housing	Policy	Financial Organization, Private Sector, Community Organizations / NGOs	Low cost house building loan programmes
Shortage of Water Supply	Ensure sustainable supply of clean water	Project	WASA, Local Government agencies	Proper Water supply projects
Rural-Urban migration	Creation of job opportunities in the rural areas	Project	GoB, Community Organizations / NGOs, People	Employment generation activities
Weak local government organization	Strengthening organizational capacity	Advocacy/Policy	GOB, Community Organization, People	Campaign, Policy actions

4.10 : Health and Sanitation

The National Environment Management Action Plan outlines the policies of the Government of Bangladesh relevant to health, sanitation and population control and identified the key environmental problems in this sector. The generally inadequate state of human health in Bangladesh is the result of inextricable linkage between over population, poor nutritional status, unsuitable potable water and poor sanitary provisions. The key concerns/sectors are - inadequate provision for safe drinking water, using open places for defecation and urination, lack of mother and child health care facilities, poor quality of drug, malnutrition, unhealthy condition of workplaces, narcotics and drug abuse. NEMAP has suggested specific actions to address these concerns which are as follows. Map 4.2 shows the spatial distribution of people's concerns regarding health and sanitation.

Table 4.10 : Health and Sanitation

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Inadequate provision for safe drinking water	Mass scale service support coverage for safe drinking water	Policy/Project	GoB agencies, Community Organizations / NGOs	Programmes for sinking tubewells at community levels
				Programmes for credit support for sinking tubewells
				Community based water supply programmes in rural areas and slums
Inadequate provision for latrine	Mass scale service support coverage for latrine	Policy/Project	GoB agencies, Community Organizations / NGOs	Programmes for installing latrines at community levels
				Programmes for credit support for establishing latrines
Using open places for defecation and urination	Public toilet in convenient public places	Advocacy	GoB, Private Sector, Community Organizations / NGOs	Public toilet in both rural and city areas
Lack of Mother and Child Health Care facilities	MCH programmes		GoB, Community Organizations / NGOs	Increase coverage of MCH programmes
Quality of Drug	Strict application of drug policies		MoHealth	Empowering/delegating power to appropriate agencies
	Strengthening drug administration department and BSTI		MoHealth, BSTI	Strengthening and equipping laboratories for carrying out necessary analysis
Malnutrition	Awareness and Health Education		GoB, Community Organizations / NGOs, WASA	Radio, T.V., Media campaign, Rally, Seminar, Symposium etc.
	Crop Diversification		MoAgri, Community Organizations / NGOs	Pilot projects with emphasis on indigenous rabi crops
	Food Security measures as opposed to cereal security section		Community Organizations / NGOs, GoB	Advocacy and lobbying
				Policy Formulation
Unhealthy condition at work place	Preparation of Guideline, Rules and Regulations		MoI, DoE, MoLaw	Study and recommendation
Lack of awareness in health, sanitation and nutrition	Awareness building programmes		GoB, Community Organizations / NGOs	Campaign using T.V., Radio, newspaper, seminar, symposium, rally etc.
	Health Education		GoB, Community Organizations / NGOs	Training Programmes



4.11 Education and Awareness

Since only 30% of the population are literate, major efforts have to be undertaken to provide basic education to the remaining population. Low literacy rate greatly impedes the dissemination of information on environmental health, nutrition, mother and childcare.

The coverage given to environmental issues in the press and the information media is sporadic and insufficient. There is no co-ordination of approaches to environmental awareness training by various Ministries and NGOs which compromises their effectiveness and cost efficiency. NEMAP has proposed actions to improve environmental awareness among people and the development of the study of the environment at all levels of education.

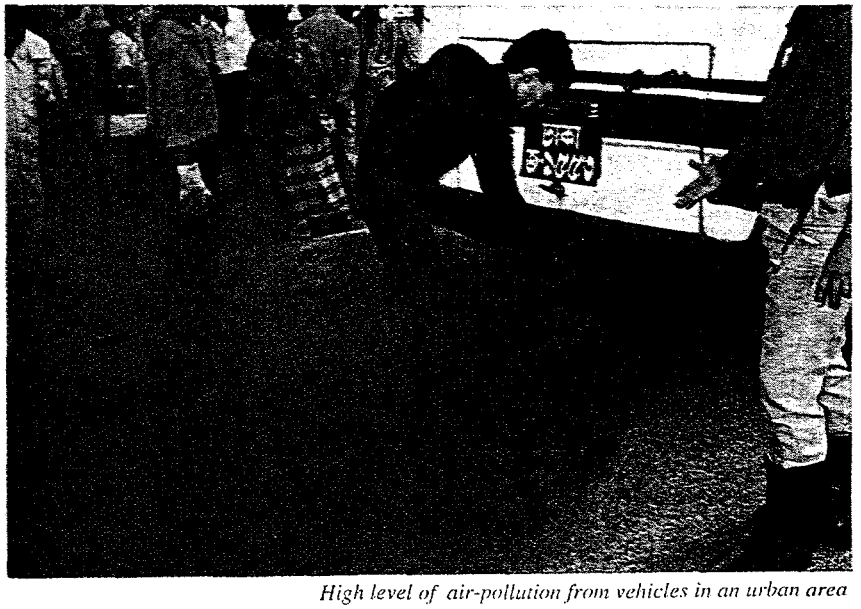
NEMAP facilitators discussing environmental issues with grassroots groups

Table 4.11 : Education and Awareness

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Inadequate emphasis on environmental education at all levels	Upgrading of syllabus at primary and secondary levels to incorporate environmental education including madrasas	Policy/Project	MoEducation	Improvement and revision of the curriculum and syllabus
	Introduction of specialized courses on environmental aspects at university levels	Policy/Project	Universities	Improvement and revision of the curriculum and syllabus
Inadequate facility/ capability (manpower, library & equipment for imparting education in the institutions)	Increasing trained manpower on environmental education	Project	Educational Institutions, Universities	Training programmes on environmental aspects
	Increasing laboratory & library facilities	Project	Educational Institutions, Universities, UGC	Development of laboratories and libraries
Inadequate Research Grants for conducting research in the educational institutions	Allocation of research grants, scholarships for carrying out research on environment	Policy	UGC, MoEducation	Allocation of project grants for research and higher educations on environment (Ph.D., M.Phil.)
Lack of general awareness on major environmental concerns	Environmental programmes in Radio, T.V. and other medias	Policy/Project	Radio, T.V.	Mass Scale Programmes on environment awareness
			Bangladesh Open University	Introduction of courses for different levels on environment
			NGOs	Awareness campaign programmes
				Incorporation of environmental awareness issue in the non-formal education programmes

4.12 Transport and Communication

The policies and issues related to transport and communication have been identified in NEMAP. The key environmental issues in the transport and communication sector are : water pollution arising from inland and coastal shipping, lack of facilities to treat ship wastes, air pollution in localised urban areas and along major roads, urban transport planning and management appears inadequate for the volume of traffic in many urban areas resulting in traffic jams, road and rail road construction lead to permanent loss of agricultural land, inadequate attention to natural drainage patterns often due to insufficient culverts.



High level of air-pollution from vehicles in an urban area

Table 4.12 : Transport and Communication

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Unplanned road development	Planned road network development with people's participation	Policy/Project	Roads and Highway, LGED	Development and application of guidelines to ensure environment soundness of the plan through the participation of people
Inadequate infrastructure for facilitating floodwater drainage along roads and railways	Keeping adequate provision of infrastructure in the road/railway facilitating fish passes	Project	Roads and Highways, LGED	Development of design criteria for en sound transport network infrastructure*
	Reviewing the designs of the existing networks in order to facilitate drainage fish passes	Project		
Air pollution	Application of existing law	Policy	DOE, BRTA, IWTA	Application of existing rules and regulations
Situation of major water ways	Dredging whereever possible	Policy/Project	IWTA	Dredging programmes
Oil pollution due to mechanized boats and launches in the inland water way	Enforcement of existing law	Policy/Project	IWTA, Law Enforcing Agencies	Review of existing law to assess the adequacy to abate pollution from mechanized boats and launches
				Enforcing of existing law
Pollution due to oil spill from ocean going ships in the territorial waters of Bangladesh	Enforcement of existing law	Policy	IWTA, Bangladesh Navy	Strengthening capability of the law enforcing agencies with training man power and speedy coastal water transport
Loss of valuable agricultural land due to transport development	Landuse planning	Policy	DoE, MoLand	Formulation of landuse plan
Closure of water ways due to infrastructure development	Development of guideline for infrastructure development	Policy	BWDB, LGED, Roads & Highways	Development of guideline and its enforcement

CHAPTER V

LOCATION SPECIFIC (LOCAL) ISSUES AND ACTIONS

In the NEMAP participatory process several regional issues were raised locally by the participants. There was an emphasis on developing and implementing environmentally sound local level development projects in different ecosystems. These were obvious concerns about environmental degradation in certain well defined regions which represent part or whole of some ecological unit, of these the most critical have been considered for the action plan. Such environmental problems cannot be addressed by a single sectoral agency alone but requires integrated environmental management interventions. Therefore, these issues have been treated separately as regional issues - identified as 'Local Issues and grouped under the following heads :

Charland Issues

Madhupur Tract Issues

Barind Tract Issues

Wetland Issues

Hill cutting

Salinity and Shrimp Cultivation Issues

Coastal and Marine Resources Management Issues

5.1. Charland Issues

There are sand bar, locally called charland in all the large rivers. These chars are usually unstable but some of them are observed to remain stable for a long time. The charlands of the major rivers of the country (Meghna, Padma and Jamuna) are quite long and have settlements. These charlands are important habitats of some birds and aquatic animals. There is a need to develop an understanding of the ecosystem of the charlands, including their soil formation processes and then develop recommendation for their environmentally sound management programme. NEMAP has proposed to select several chars in the following category - newly formed and unstable, relatively stable, old and stable, inhabited and un-inhabited, and small, medium, large. Existing ecosystem will then be studied to recommend ways and means of exploiting the land resources on a sustainable basis.

Table 5.1 : Charlands

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Instability of charlands due to erosion	Management measures to reduce erosion and instability such as afforestation, landuse control and engineering measures	Policy/Project	MoLand	Landuse control
			Community Organizations / NGOs, FD, Local Govt. agencies, People	Afforestation programmes along with the shore lines. Appropriate engineering measures for selected char lands
Scarcity of vegetation	Afforestation Programme	Policy/Project	Community Organizations / NGOs, FD, Local Govt. agencies, People	Afforestation programmes along with the shore lines
Uncontrolled landuse	Charland management and landuse control	Policy	MoLand	Charland management plan with landuse component
Untimely and improper survey of settlement and registration of rights	Timely char survey operation	Policy	MoLand, DLR, People	Revision of char survey and settlement procedure
Corruption in char survey and its settlement leading to social conflict	Proper survey of the charland appropriate procedure for registration and recording of right	Policy	MoLand, DLR	Revision of char survey and settlement procedure
	Management of settlement in charlands with the participation of the community	Policy/Project	MoLand, Community Organizations / NGOs, People	Charland settlement programme with the participation of Community Organizations

5.2. Madhupur Tract

Madhupur Tract has undergone serious environmental degradation which calls for immediate intervention. The dissected area of Madhupur is highly degraded. The organic matter content, soil moisture retaining capacity and soil fertility is very low and as a result, yield is low and cannot sustain its productivity during the dry season. Natural vegetation is sparse and rapidly declining. In terms of biodiversity the area suffered heavy loss of indigenous plants and animal species for the last 100 years. Homestead trees are fast depleting and there is an acute shortage of fuel wood and lack of initiative at replantation. Due to lack of soil conservation practices, topsoil is being constantly eroded. Madhupur Tract serves as a water catchment for the Turag, Banar, Bangshi rivers and due to soil erosion sedimentation has increased. As a result, the river system of the Madhupur tract has been silted up causing increased flood vulnerability.

Indiscriminate felling of trees degrades the forest resource base in Madhupur Tract

To prevent environmental degradation as well as to maintain sustained agricultural of production, it is necessary to reduce soil erosion, enhance vegetative cover and increase productivity of upland agriculture. In order to achieve this it is proposed to take up a pilot project in a demonstration site to apply the concept of environmental management. initially, which will then be replicated throughout the area.

Table 5.2 : Madhupur Tract

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Illegal encroachment upon Forest land	Enactment of law and its implementation	Policy/Project	MoEF, FD, People	Enactment of Forest law with appropriate provisions for the control of encroachment providing scope of participation for the encroachers in the forest management
Deforestation and transformation of Forest land (agricultural land for urbanization, infrastructural development, industrial use etc.)	Zoning and Landuse control	Policy	MoEF, MoLand	Formulation of management plan incorporating landuse and zoning control
Loss of Biodiversity (Plants and animals)	Measures to conserve rare species through the creation of protected areas in Madhupur forest	Policy/Project	MoEF, FD, NGOs, People	Providing provisions for conservation of area in the management plan of the Madhupur Tract
Degradation of soil (soil erosion, loss of soil fertility)	Control of soil erosion through afforestation and application of zoning and landuse law	Policy	MoEF, FD, NGOs, People	Keeping provisions for landuse zoning in the management plan
Complex legal status of land and forest resources	Resolve complex legal issues in respect of ownership of forest land	Policy	MoEF, FD, MoLand	Quick disposal of pending cases in consultation with the MoLand

5.3. Barind Tract

Barind Tract, located in Nawabganj, Naogaon and Rajshahi districts, is the driest part of the country which experiences frequent drought and has shown signs of desertification. The area is considered as an ecologically fragile zone with extremely low vegetative cover. The soil is very low in organic matter and devoid of minerals. It is subjected to sheet and gully erosion. Groundwater abstraction has affected irrigation.

The key environmental issues are : large scale deforestation, large scale groundwater abstraction resulting in increasing uncertainties of availability of water for irrigation, loss of wild life, degradation of a large number of ponds, loss of soil fertility and removal of agriculture residue. NEMAP has proposed projects to increase the vegetation cover, reduce sheet and gully erosion, improve the organic contents of cropland soil and increase the surface area of water bodies by excavating ponds and small lakes along existing seasonal stream beds, improve water management and research on desertification problems.

Table 5.3 : Barind Tract

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Large scale deforestation	Large scale afforestation	Policy/Advocacy	FD, Local Govt. agencies Community Organizations / NGOs, People	Afforestation programme with people's participation
Ground water abstraction	Ground water survey and environmentally sound ground water development programme	Policy/Project	Barind Development Board, Local Govt. agencies, BWDB	Ground water survey
				Formation of environmentally sound ground water abstraction plan
Degradation of ponds	Re-excavation of ponds for pisciculture and irrigation	Project	Barind Development Board, DoF, Community Organizations / NGOs, Grameen Bank, People	Food for work support for the re-excavation of the derelict ponds
				Credit support for pisciculture
Degradation of soil	Soil conservation measures	Project	SRDI, Barind Development Board, Community Organizations / NGOs, People	Proper soil conservation measures
Signs of desertification	Conducting research	Project	Research Organizations, Universities	Study programme on desertification

5.4 Wetland Issues

The reduction of wetlands is one of the marked features of environmental degradation in Bangladesh. The reduction has been partly due to natural causes, partly due to human interference and partly to a combination of both. The shrinkage of wetlands has affected the breeding of open water fishes, and has also reduced other wetland values. Places where wetlands have completely dried up, there has been an adverse effect on drinking water supply and a long term effect on the sustainability of the ecosystem. The key issue affecting the wetlands is reduction of area of the major wetlands. This has been due to increased agricultural practice, loss of wetland biodiversity, unplanned infrastructure construction leading to increasing floodability and drainage problems, pollution of water due to the use of agro-chemicals, absence of integrated wetland management approach. NEMAP has proposed actions which include enforcement of law, conservation and management intervention.

Table 5.4 : Wetlands

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Reduction of Wetland area	Wetland management plan incorporating landuse control	Policy/Project	Moland, MoIWDFC	Preparation of Pilot scale management action plan for selected wetland *
Loss of wetland biodiversity	Biodiversity conservation	Policy/Project	FD, DoF, NGOs, People	Declaration of sanctuaries under wetland management action plan
Lack of integrated wetland management policy	Development of a comprehensive wetland management policy	Policy/Project	DoE, WDB, NGOs, People	Integrated wetland management plan *

5.5 Hill Cutting Issues

Hill cutting as an environmental issue came up in Sylhet, Cox's Bazar, Chittagong, Mymensingh and Dinajpur districts. Hill cutting due to development works such as construction of roads; expansion of settlement areas etc. are continuing in these areas resulting in siltation of small drainage streams, increased drainage congestion and flooding; soil erosion and instability of hill slopes; destroying scenic beauty; loss of wildlife and bio-diversity. Hill cutting associated with stone quarrying in the foothills of Mymensingh district has resulted in loss of forest cover, erosion and drainage problems in the down stream area. NEMAP process has noted these issues and has suggested the following actions.

Table 5.5 : Hill Cutting

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Increase in siltation & drainage congestion and flooding	Conservation of hillslope and enforcement of hill cutting regulation	Policy/Advocacy	DoE, MoLaw, Municipalities MoEF, MoLand	Enforcement of hill cutting regulation
Increased soil erosion and slope instability and loss of forest coverage	Management of hill slopes with proper afforestation programme	Policy/Project/ Advocacy	Community Organizations / NGOs, GoB agencies, FD, Private Sector, People	Increased support for Food for Work in afforestation programmes in hilly areas
Removal of forest cover due to forest cutting and stone quarrying in the foothills of Mymensingh districts	Environment friendly leasing contracts for stone quarries in foothills of Mymensingh district	Advocacy/Policy/ Project	DoE, Community Organizations / NGOs	Media, T V , Radio campaign, Newspapers, Training and awareness raising Programme by Community Organization
			MoL	Research on leasing arrangement
	Afforestation of already degraded hill slopes through FD and Community organizations / NGOs	Policy/Project	FD, Community Organizations / NGOs, Moland, People	Afforestation programme on GoB Khasland, FD lands by FD, Community Organization through the participation of people

5.6 : Salinity and Shrimp Cultivation Issues

Shrimp cultivation has emerged as one of the significant sectors for earning foreign exchange in Bangladesh resulting in wide physical expansion of shrimp farming area in recent times. Unplanned expansion of shrimp area has caused degradation of environment, particularly increase in salinity in the coastal area of Bangladesh. The NEMAP process has identified the key environmental issues in the sector and has suggested following specific interventions :

Table 5.6 Salinity and Shrimp Cultivation Issues

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Increase in salinity due to shrimp culture resulting in reduction of agri-production	Zoning control on shrimp cultivating area	Policy	WDB, Moland, Private Sector MoF	Preparation of guideline and its implementation
Conflict between shrimp culture and agriculture	Zoning control on shrimp cultivating area	Policy	WDB, Moland, Private Sector MoF	Preparation of guideline and its implementation
Loss of biodiversity due to shrimp fry collection	Awareness and Training	Advocacy/Policy	DoF, Fisheries, Community Organizations / NGOs, People	Programme on environmental awareness for shrimp fry collection
	Shrimp Hatchery	Project	DoFisheries, Private Sector	Establishment of shrimp hatcheries both in public & private sector
				Extending credit facility to Private Sector for the establishment of the hatcheries

5.7 Coastal and Marine Resources Management Issues

Many single sector activities such as fisheries, forestry, industry, transport and tourism etc. exert influence on marine and coastal natural resources. The key environmental issues pertaining to coastal and marine resource management which the NEMAP seeks to address are as follows: Pollution of marine and coastal environment due to disposal of untreated municipal and industrial waste, lack of regulatory control and facilities for disposal of ship wastes; deforestation of mangroves due to shrimp farming, lack of coastal zone management strategies, loss of wildlife and biodiversity, degradation and decrease of mangrove forests, natural hazards and water resource development. NEMAP has listed a number of actions to address the issues as shown in the following table. However, it may be emphasised that many of the actions could be implemented through the application of the concepts of Integrated Coastal Zone Management and NEMAP has prioritized its application.

Table 5.7: Coastal and Marine Resources Management

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Absence of coastal zone management strategy	Integrated coastal zone management and pilot projects	Policy/Projects	MoEF, FD, MoLand, NGOs,	Preparation of a integrated coastal management action plan and pilot projects
Deforestation of mangrove vegetation	Afforestation	Project	FD, Community Organizations/ NGOs, People	Plantation programmes with peoples participation
Marine pollution by ship	Enforcement of existing law within the territorial water	Policy/Advocacy	GoB agencies, MoShipping	Strengthening the law enforcement capabilities of relevant agencies
Concentration of polluting industries along the shore including ship breaking	Enactment of appropriate landuse law/zoning and its enforcement	Policy/Advocacy	MoEF, DoE and other government agencies, Private Sector, MoI	Landuse/zoning control through coastal zone management
Susceptible to natural hazard	Better warning system, Hazard protection and proofing	Policy/Advocacy	Disaster management Plan, Community Organizations / NGOs, People	Community based hazard management programme
				Hazard protection measures
	Awareness development	Advocacy	Media, T.V, Radio, Community Organization (NGO), People	Training and awareness on hazard management
Increasing human economic activity, shrimp cultivation etc along the shore and recently formed off shore islands	Landuse/zoning regulation under coastal zone management	Policy	MoEF	Coastal management strategy incorporating landuse and zoning regulation
	Environmentally sound land settlement policy in the newly formed off shore islands	Policy/Advocacy	Moland (DLR)	Preparation of environmentally sound land settlement policy for newly formed offshore islands, accreted land in the coastal area
Construction of water development structures resulting in adverse environmental effect	Incorporation of environmental concerns in the design of the water development projects which are under consideration	Policy	MoIWD FC, BWDB	Development of environmental guide lines
	Environmental impact studies on the already constructed water development projects & recommend actions for mitigative measures	Policy/Project	MoIWDFC, Research Organization, Universities	Pilot study in selected water development project in the coastal areas
Depletion of wildlife	Declaration of wildlife sanctuaries/protected areas in relevant coastal areas	Policy	MoEF, FD	Inventory of wildlife habitat for necessary action
	Awareness development	Advocacy/Policy	GoB agencies, Community Organization, People	Media, Radio, T.V, campaign
				Awareness Raising workshop
	Participatory wildlife protection activity	Advocacy/Policy	Wildlife societies, Community Organization, People	Programme supporting wildlife protection activities with participation of communities

CHAPTER VI

LONG TERM ISSUES AND ACTIONS

6.1. Climate Change and Sea Level Rise

Over the past 100 years, the broad region encompassing Bangladesh has warmed by 0.5°C. The warming trend is consistent within the Northern Hemisphere as a whole. Bangladesh is projected to be 0.5° to 2.0°C warmer than today by the year 2030 although the uncertainties are very high. The institutional structure for efficient planning and implementation of decision is often incomplete and not operational as they deal with long range changes beyond the time limits of their immediate concern and interest such as climate change. The potential for long term development in Bangladesh depend on such uncertain issues which are expected to change the inundation and drought condition in the country affecting the potential for agriculture while an increased intrusion of saline water is likely to have an adverse effect on soil and water for ordinary human consumption. Having signed the Framework Convention on Climate Change, Bangladesh has confirmed its intention to meet a number of commitments particularly the development of a national inventory on the sources and sinks of greenhouse gases, formulation of programmes containing measures to mitigate climate change and to facilitate adaptation.

Priority should therefore be given to research that will help determine the magnititude of the natural and anthropogenic sources and sinks of greenhouse gases in Bangladesh. Develop integrated impact models for Bangladesh that link existing climate condition. The following actions have been proposed in the NEMAP in respect of climate change.

Table 6.1 : Climate Change and Sea Level Rise

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Uncertainities arising from the impacts of sea level rise on different sectors	Scientific study on the impact of sea level rise	Projects, National and Regional	DoE, Research Organizations, Universities, NGOs	Vulnerability study due to sea level rise on the basis of IPCC scenarios studies, modelling
Uncertainities arising due to the impact of drought and desertification on different sectors	Scientific study on the impact of drought and desertification	Project	DoE, Research Organizations, Universities, NGOs	Modelling studies
Lack of general awareness	Advocacy and awareness raising	Project	NGOs, media	Advocacy publications and media events

6.2 Urbanization

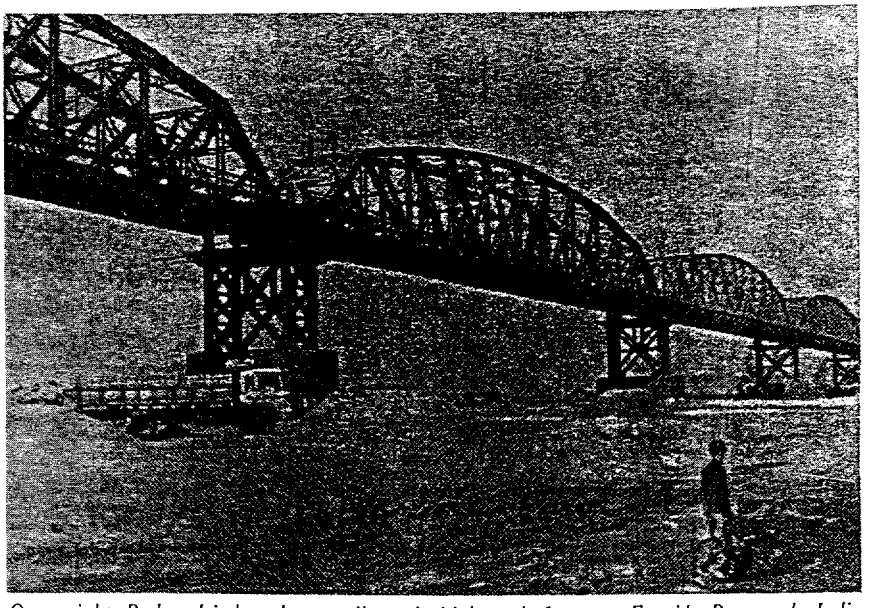
Although, a small proportion of the total population of Bangladesh live in cities, the growth of the urban population has been significant over the past several decades. In 1951, the population of Dhaka was 336,000 which has increased to 6,100,000 in 1991 and Dhaka is expected to have a population of 12,500,000 in 2025. By the year 2025, the physical expansion will cover most of the low lying areas. The process will produce a single ecological system. Under such conditions, the city service facilities will be heavily burdened unless large investments are made in this sector. Urbanization of Dhaka should trigger tremendous opportunities leading to further growth and development but the expansion would be probably increase the risk of environmental hazards and degradation. NEMAP has prioritized the following actions keeping the long term urban expansion issues in view.

Table 6.2 : Urbanization

Key Issues	Recommended Actions	Actors/Agencies	Specific Action
Degradation of environment and urban services and facilities with urban expansion of the major urban centres of Bangladesh beyond 2000 A.D. particularly Dhaka (when Dhaka will become a Mega City)	Studies on urbanization process on major urban centres	UDD, Universities, Research Organizations, NGOs	Study on urbanization process in Rajshahi, Chittagong, Khulna
	Vision exercise on Dhaka as a Mega City	RAJUK, Universities, Resource Organizations, NGOs	Vision exercise on Dhaka as Mega City

6.3 Regional Water Sharing

Bangladesh, being the downstream and delta portion of a huge watershed is naturally vulnerable to the water quality and quantity that flows into it. All major rivers flowing into Bangladesh have their origins outside her borders. Bangladesh through its complex network of river system drains about 1.76 million square kilometers of catchment areas of the Ganges, Bahramputra and Meghna rivers of which only 7% lie in Bangladesh. Water resources development in Bangladesh faces a critical situation as the surface water system of the country is undergoing rapid hydrological, morphological and ecological changes due to natural and anthropogenic reasons. Further, the regional water sharing issue is a major factor which dominates the sectoral development.



Once mighty Padma dried up due to unilateral withdrawal of water at Farakka Barrage by India

An answer to the problem is the formation of regional water management plans which should be based upon adequate hydrological, hydrogeological and agro-ecological data. Bangladesh's requirements for the sustainable management of transboundary water resources and the preservation of natural ecosystem should be identified and the cooperation of neighbouring countries sought through binding agreements. NEMAP has suggested the following actions on regional water sharing issues.

Table 6.3 : Regional Water Sharing

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Uncertainties, poor understanding in respect of upstream intervention in the regional watersheds including Farakka	Conduct studies on regional water shed	Project	MoIWDFC, MoEF, NGOs	Programme for better knowledge base
	Collect information on the proposed upstream intervention	Project	MoIWDFC, MoEF, NGOs	Programme for data collection
Poor understanding and database on downstream effect of upstream intervention in major regional rivers including Farakka	Study programme in the impacted area	Project	DoE, Research Organizations, Universities, NGOs	Survey and mapping of the impacted area
Absence of efforts to take the water sharing issues to the people of the regional countries	Advocacy and lobbying with the Regional NGOs	Project	Community Organizations / NGOs, People	Advocacy and lobbying with the regional NGOs through regional workshop, seminars etc.

6.4 Research and Development

In a densely populated country, education becomes the most important tool for conservation of material resources. Education is an important factor for population planning, public hygiene, health and the environment. Development of environmental science as a specialized subject at secondary and higher education level is needed. Educational institutions including universities need to expand and to create courses on environmental management in Bangladesh. The University Grants Committee should be given mandate to provide funds for environmental research.

The selection of specific environmental research programme and the consideration of environmental aspects in other research will be facilitated by a Research Evaluation Committee chaired by the MOEF.

The resource limitation of Bangladesh makes it imperative that maximum output is achieved from minimum resources without endangering the environment. The scientific and research community of Bangladesh need to evolve new environment friendly technology to help sustain national growth. To maintain sustainable development in Bangladesh introduction of bio-technology has become imperative, specially for the agricultural sector. NEMAP has suggested actions for institutional strengthening of different research organization to address the issues of research and development which are as follows :

Table 6.4 : Research and Development

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Knowledge base of the life history and behavioural patterns of majority of the fishes and prawns is lacking	Knowledge base has to be improved, consolidated and expanded through proper field study and research	Project	MoFL and Fisheries agencies attached to it, DoE, NGOs	Projects to develop and expand current research facilities of Fisheries Research Institute in terms of additional man power and their training procurements of necessary tools and transport facilities
Presently fisheries management is based on the assessment of stocks, their behaviour and their response to different fishing pressures and intensities resulting in their depletion	A comprehensive programme for biological assessment of the stocks of all the commerically important fish, prawn and other aquatic animal population under exploitation in the inland and marine waters of Bangladesh	Project	MoFL, DoFisheries, NGOs	Formulation and implementation of projects for fish and prawn assessments in Bangladesh
Aquatic environmental needs for different fish and prawn population in the inland and marine waters are unknown	Hydrological chemical and biological environmental needs for different fishes and prawns ought to be ascertained through field and laboratory research including the use of stimulation models	Project	MoFL, FRI, DoFisheries, NGOs	Development of projects
Inadequate project funding to undertake research activities by the research institute such as Forest Research Institute, Fisheries Research Institute, BARI, BIRRI, DoE, etc.	Securing fund for funding research activities	Project	GoB	Preparation of research projects
Inadequate manpower and laboratory facilities for DoE for carrying out research activities	Institutional development including trained manpower and laboratory facilities	Project	MoEF, DoE	Institutional capability development project

CHAPTER VII
CONCLUSIONS

Sustainable development in Bangladesh depends on development of citizens measured by the Human Development Indicators - integrating environmental issues in all development activities at all levels - an administrative structure in which environmental concerns are key subjects and in which people are the ultimate decision makers. The key actors in the decision making process are all of the members of society (government agencies, people's representatives, civil society groups and individuals). In the Action Plan, MOEF has to coordinate activities of the different actors and act as an information clearing house. To enable the different organizations to identify the prioritized actions for them a separate list of actions for different government as well as non-government organizations are shown in Table 7.1 and 7.2

Table 7.1 : Institutional Distribution of Actions

Actors	Recommended Actions	Type of Action	Specific Action
1. Government			
1.1 Policy level	o Need to coordinate inter-sectoral issues which cut across different Ministries and agencies	Policy	o Activation of National Environmental Council
1.2 Ministry of Environment and Forest	o Strengthen capabilities to coordinate environment related activities	Project	o Institutional strengthening of MoEF
	o Implement and monitor NEMAP including pilot projects at local levels	Project	o Specific pilot projects in different localities to be resolved with people's participation
	o Carry out obligations under international treaties	Project	o Develop actions to fulfill obligations under relevent international treaties (e.g.Climate Convention,Biodiversity Treaty,Montreal Protocol, CITES, etc)
	o Integrated Coastal Zone Management involving people	Policy/Project	o Implement ICZM pilot project
1.3 Forest Department	o Improve forest management with people's participation	Policy	o Increase activities for involving people (including NGOs) in forest management
	o Increase efforts at afforestation with people's participation	Advocacy/Policy	o Involve people (including NGOs) in all afforestation projects
1.4 Department of Environment	o Increase pollution monitoring capabilities	Project	o Institutional and laboratory strengthening to monitor air, water and soil pollution
	o Acquire capability to carry out and assess Environment Impact Assessment	Project	o Training and expert inputs on EIA
	o Increase awareness on environmental issues	Advocacy	o Develop a publication and media campaign on environment
	o Keep a repository of data, documentation and other environment related information	Project	o Develop a documentation centre with all national and international documents on environment
	o Carry out investigations of environmental problems	Project	o Develop in house expertise
	o Ensure environmental quality standards	Policy	o Develop and pass Environmental quality standards
1.5 Other Ministries (e.g. Water, Agriculture, Industries, Planning, etc.)	o Ensure environmental considerations are incorporated into plans and projects	Project	o Develop institutional capacity within Planning Cells to incorporate environmental concerns
	o Liaise closely with MoEF on cross- sectoral environment related issues	Policy	o Have an on-going coordination role with MoEF
	o Ensure sectoral environmental guidelines	Policy	o Develop sectoral environmental guidelines in consultation with MoEF and DOE (e.g. for water, industries, agriculture etc.)
1.6 Research Institute (e.g. BCSIR, BARC, BARI, BRRI, BIRI etc.)	o Ensure environmental issues are incorporated in research plans and projects	Policy	o Develop environment related expertise within each research institute
	o Develop specific research projects on environmental issues	Project	o Develop research programmes on major environmental issues e.g. salinity intrusion, mangrove depletion, pollution, desertification etc.

Table 7.2 : Institutional Distribution of Actions

Actors	Recommended Actions	Type of Action	Specific Action
2. Educational Institutions (e.g. Universities, Colleges, Schools, etc.)	o Ensure environmental topics are taught at all levels	Policy	o Develop curricula on environment at all levels
	o Involve students in environment related studies and activities	Project	o Develop programmes for student involvement in environment e.g. sanitary latrine awareness drive, tree planting, pisciculture etc.
3. Non-Government Organizations (NGOs)	o Incorporate environmental awareness in training of staff and beneficiaries	Policy	o Develop and implement training modules on environment for staff and group members
	o Ensure environmentally sound practices by group members	Advocacy	o Prepare awareness and projects e.g. tree planting, sanitary awareness, pisculture, organic farming, fishery management etc.
	o Develop eco specific environmental intervention	Project	o Pilot project in different ecosystem
	o Ensure institutional capability within NGO associations to give support to environment issues	Project	o Institutional strengthening of ADAB and CEN
	o Follow up of NEMAP by NGOs	Advocacy	o Implementation of programmes and projects identified in NEMAP and monitor process.
4. Youth Organizations (e.g. Boy Scouts, Girls Guide, etc.)	o Involve youth in environmentally sound activities	Policy/Project	o Develop pragrammes and projects involve youth in awareness raising and other activities, e.g. tree planting, pisci-culture etc.
5. Media (e.g. TV, Radio, daily newspapers, weeklies, etc.)	o Ensure awareness on environment	Policy	o Include more coverage of environmental issues
		Project	o Prepare special programmes and articles on environmental issues
6. Industrialists and private sector (private and public sector and financial institutions)	o Ensure proper waste management and control of pollution	Policy/Project	o Develop proper waste management in existing and planned industries
		Policy	o Financial institutions may give incentives for including waste management in projects
	o Ensure worker safety within each industry	Policy	o Have a programme on worker safety in industry
	o Carry out Environmental Impact Assessments	Policy	o Develop EIA capabilities
7. Members of Parliament	o Ensure environmental legislation Policy	Policy	o Passage of bills having no contradiction to environment

Prioritization

In the proposed Action Plan some prioritization has been done keeping in mind the following :

* people's interests and recommendations;
* government policies;
* institutional set up;
* practicability of an action;
* the identification of the right agency for implementing an action.

All the actions of NEMAP have been prioritized on the basis of the following criteria :

- where large numbers of people are likely to be affected;
- where urgent action is needed, as ecosystems may be adversely affected if prompt action is not taken and where appropriate institutional arrangements are essential;
- where people's participation needs to be ensured; and
- where pilot projects are feasible.

Although the prioritized list has focused more on the role of the MOEF and the Department of Environment it identified actions that can be taken by others outside the government. Emphasis has been placed on the participation of the people in the implementation and monitoring of the NEMAP.

Based upon these criteria a prioritized list of Actions has been developed as shown schematically in Figure 7.1, where each of these proposed actions are further elaborated into useable project concepts with an identification of the relevant agency or organization. In the Volume III of NEMAP these will be described further.

The Way Ahead

The NEMAP document represents an attempt to bring together the interests and priorities of people from every walk of life and from every region of the country. It is expected that the people who participated in the planning phase of NEMAP will also play a part in implementing and monitoring.

NEMAP's success will depend on the continuity of the consultative process. The

specific steps to be taken immediately are activating the National Environmental Council headed by the Prime Minister and its Executive Committee retaining the NEMAP secretariat in the MOEF; ensuring the dissemination of information and monitoring public awareness about NEMAP; assisting sectoral agencies in preparing their own environmental guidelines; setting up of local environmental committees to deal with selected ecosystems (pilot scale projects).

Social afforestation has become a nationwide movement in Bangladesh in recent years

Figure 7.1 : Schematic Representation of Main Actions of NEMAP

NEMAP

INSTITUTIONAL

ISSUES	ACTIONS
Inter-sectoral coordination	Mechanism for coordination
Ensuring people's participation	Local level committee
Monitoring of NEMAP	Monitoring cell and committee
Legislation	Enactment of proposed legislation
Methodology of people's participation	Pilot scale projects

SECTORAL

ISSUES	ACTIONS
Health & Sanitation	Continue emphasis on sanitation and clean water supply
Forest	Management of forests and afforestation with people's participation
Biodiversity	Conservation programmes with people's participation
Natural Hazards	Improve forecasting and coordination of responses
Education	Include environment as a subject in all levels
Awareness	Include more environment coverage in all media
Industry	Pollution control through incentives and regulations
Water	People's participation in water sector planning
Agriculture	Development and extension of sustainable agriculture practices
Energy	Focus on renewable energy development and improved efficiency
Fisheries	Protection and management of open water fisheries with people's participation
Land	Develop landuse plan with pilot projects on restoration of degraded lands
Housing	Development and extension of low cost housing
Transport	Environmentally sound mass transport development

LOCATION SPECIFIC

ISSUES	ACTIONS
Salinity and Shrimp	Integrated Coastal Zone Management
Coastal Marine	Afforestations and enforcement of regulations
Barind Tract	Soil conservation and afforestation
Wetlands	Integrated wetland management
Charlands	Charlands Management Plan
Hill cutting	Awareness raising and enforcement of regulations
Madhupur Tract	Conservation and afforestation

LONGTERM

ISSUES	ACTIONS
Regional Water sharing	Advocacy and lobbying
Urbanization	Studies and planning
Climate Change	Vulnerability assessment and advocacy
Research and Development	Environment and development linkages