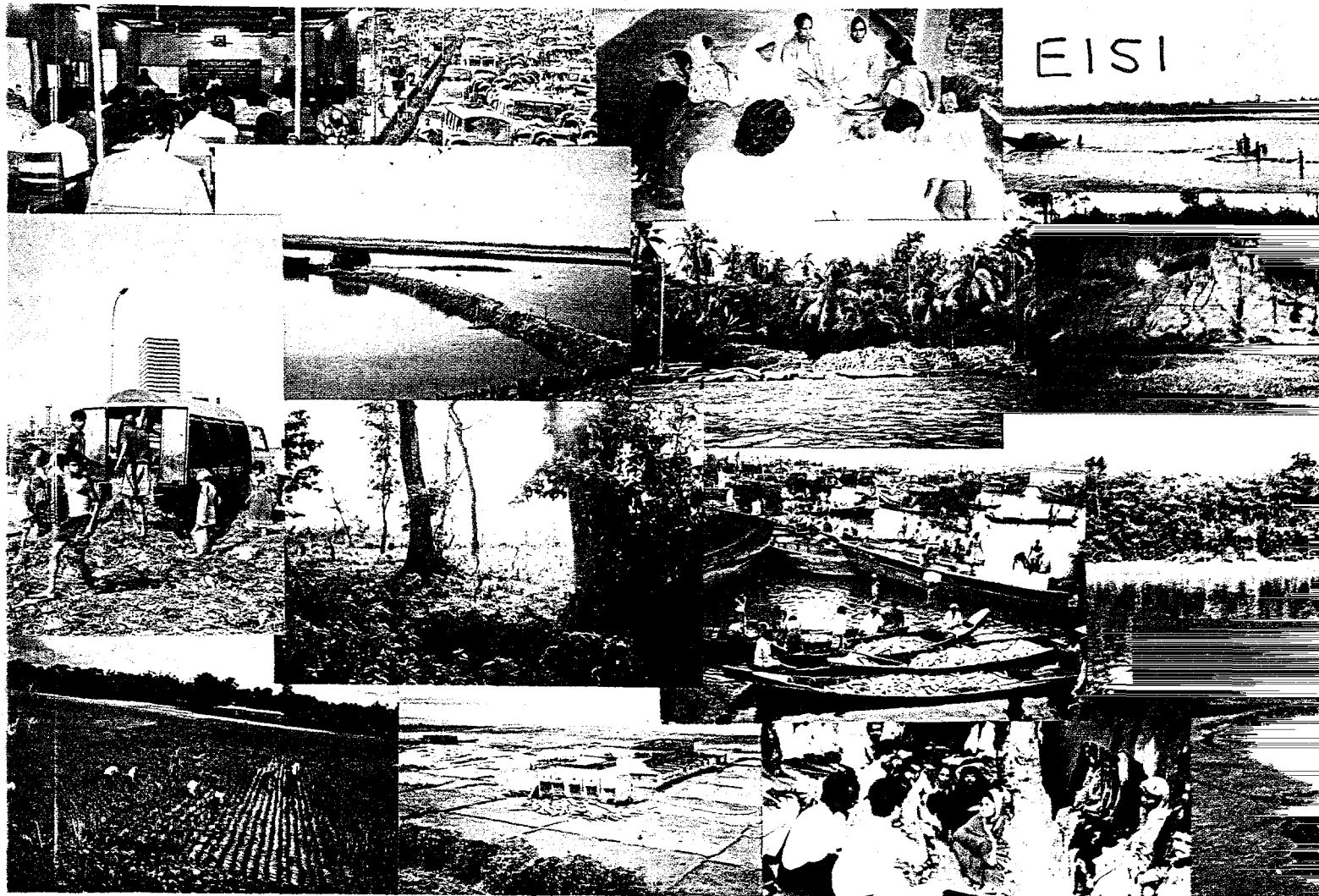




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MINISTRY OF ENVIRONMENT AND FOREST
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH



NATIONAL ENVIRONMENT MANAGEMENT ACTION PLAN (NEMAP)

Volume II : Main Report

1995

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

**NATIONAL ENVIRONMENT
MANAGEMENT ACTION PLAN
(NEMAP)**

VOLUME II : MAIN REPORT

1995

NEMAP

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First Published in 1995

Copyright :

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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 Secretariat, Dhaka

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NEMAP gratefully acknowledges with thanks generous contributions of the following experts in the very formative stage of NEMAP in 1991 :

Mr. Haroun-er-Rashid

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Mr. A. B. Chowdhury

Mr. Rezaur Rahman

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

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

Gratitude is expressed to all the local NGOs, and above all to 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, especially 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 in 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.

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Minister for Environment and Forest*

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1. OVERVIEW

1.1 Introduction

Bangladesh is one of the least developed countries with a low resource base, a burgeoning population with around half the population below fifteen years of age, a very low land - man ratio, often threatened by both natural hazards and anthropogenic stresses. The vast majority of the population live almost exclusively on the natural resource base. While some of these natural resources are over-exploited, others are used sub-optimally. This resource base is under serious threat and environmental planning is essential for the survival with dignity for Bangladesh's over 115 million people and for sustainability of the ecosystems.

Economic emancipation of the ever growing population of Bangladesh is the principal objective of any planning activity. Government of Bangladesh (GOB) has thus identified poverty alleviation as the principal objective and human resources development, through enhanced investment in education, has been prioritized as a means to achieving better human resources. It is increasingly being recognized in Bangladesh, as in other parts of the world, that for development to be meaningful and sustainable over a longer period, environmental concerns must be integrated into all development activities. Further specific environmental actions are also required for a better future development path.

Integrating environment in all development activities and achieving environmentally sound development planning has emerged as the greatest challenge to the dominant development paradigms all over the world and becomes a more formidable challenge for a country, such as Bangladesh, with resource constraints, inherent geomorphological instabilities along with its vulnerability to natural disaster.

Any planning effort must be for the people. People are the users of environmental resources in the final analysis. Peoples' involvement in identification of issues and concerns, finding solutions to myriad of problems faced by them in Bangladesh and their own prioritization of concerns and solution are not only desirable and essential but also cost effective. Further peoples' ownership of the policies, programmes and projects and local level actions can make a fundamental difference between success and failure of a plan. As Bangladesh strives to develop democratic institutions, participation of the people becomes central to planning efforts.

The Constitution of Bangladesh, begins its preamble, "We, the people of Bangladesh having proclaimed our independence". In Article 7(1) of the preamble, the constitution proclaims "All powers in the Republic belong to the people, and their exercise on behalf of the people shall be effected only under, and by the authority of, this constitution".

While the constitutional basis of the supremacy of the people is enshrined, very little effort, if any, has been made to involve the people in all stages of planning. The Government of Bangladesh (GOB) through its Ministry of Environment and Forest (MOEF) decided to undertake the National Environment Management Action Plan (NEMAP) involving a peoples consultation process where people would have an opportunity to define their environment, identify the issues and concerns, prioritize problems and give solutions in three forms:

- (a) What shall we, as individuals and families, do to solve a particular problem ?
- (b) What actions shall the local community, local government agencies and local level NGOs and community groups contribute towards solution of a particular problem?
- (c) What actions shall the central government agencies take to solve a problem?

In this NEMAP process the government agencies, the non-government community and other actors of the civil society such as professionals (doctors, lawyers, journalists, academics, grass root activists, researchers), parliamentarians, the business community and the media representatives worked closely together, gave their inputs through structured consultation processes and workshops, written and verbal inputs. Along with the consultation process jointly organized by the Government and NGOs, a massive media campaign was organized to solicit peoples inputs from all levels of individuals, community groups, NGOs, civil society organizations and wide ranging government agencies.

Another significant feature of this NEMAP process was the political commitment behind this consultative and participatory process. The first findings of the participatory and consultative process of 23 grass root workshops, 5 regional workshops and 6 professional or expert group workshops was presented in a National Workshop held in the presence of the Prime Minister, her cabinet colleagues, senior policy makers and civil servants, diplomats and all aspects of civil society and representative participants of all previous grassroots and regional workshops. There was enthusiastic support from political leaders for the process and the preliminary findings of NEMAP. Moreover, the Prime Minister in the National NEMAP workshop instructed the MOEF and involved NGOs, to go back to the people to present the preliminary findings, incorporate any modifications and suggestions and ensure that peoples concerns be adequately represented in the emerging NEMAP draft documents. This resulted in another cycle of focussed consultation based on the preliminary findings.

Thus, the NEMAP process became a pioneering initiative in developing an Action Plan based on issues and concerns identified largely by the people, priority as well as solutions given by people and different actors of the civil society as well as the agencies of GOB.

1.2 The Challenges

Such a participatory planning process, particularly in the area of environment and preferably in all areas of national planning, is highly desirable and efficacious. At the same time, it offers a number of challenges. These include:

1. Challenges regarding developing appropriate methodologies which could represent all sectors of population adequately within the given constraints of time and resources.
2. How to capture the richness of wide ranging discussions and conclusions coming from consultations involving thousands of people. Further, how to develop an implementable Action Plan doing justice to the solutions given by the people. Even more challenging is how to cost each actionable project so as to make them operational.

3. Environmental concerns and solutions are most often multi-sectoral. It was described how to implement actions and projects of multi sectoral character while the traditional mode of implementation of action had been mostly sectoral.
4. People have been making their decision regarding environmental action at different levels such as individual, family, community, public or private organization, enterprises and regional levels. How to develop actions which is supportive of good environmental practices and can improve and modify practices which are not environmentally sound or are unsatisfactory and environment degrading?
5. MoEF is a relatively newly formed ministry having limited capacity and experience in handling environmental issues. How to ensure that all sectors of the government and all actors of the civil society are involved in the implementation of the actions in the plan and can play their roles? How to coordinate activities at different levels, viz national, regional, and local and between different sectors?
6. It has been stated the NEMAP process is a living process which must continue to ensure that people can participate in the environmental planning on a continuous basis. Further the NEMAP is not only a one-shot document but should adjust to changing environmental realities. Thus the challenges here are:
 - (a) How to ensure continuous involvement of the people in the NEMAP process and
 - (b) How to make NEMAP incorporate national environmental dynamics.

As evident, the challenges are many and wide ranging. They include challenges in the realm of methodology, operationalization, participation, resource constraint, institutionalization and the dynamic character of environmental status at different levels. This NEMAP document along with its associated volumes is an attempt in addressing some of these questions and to come up with an Action Plan that can be implemented.

Relationship with Sustainable Development :

The concept of Sustainable Development has been formalized in Agenda 21 which was signed by Bangladesh at the UN Conference on Environment and Development (UNCED), the Earth Summit in Rio in 1992. Agenda 21 as a mechanism to achieve Sustainable Development has a much wider remit and needs to be initiated and coordinated at the highest political level. Poverty alleviation is emphasised as the overarching development objective of Bangladesh also within the context of the SAARC. Under the current chairpersonship of the Prime Minister of Bangladesh, SAARC governments have committed themselves to eradicate poverty in the sub-region by 2002. "The Heads of State or Government accorded the highest priority to the alleviation of poverty in all South Asian countries. They affirmed that South Asia's poor could constitute a huge and potential resources provided that their basic needs are met and they are mobilised to create economic growth. This requires that the poor are empowered and are irreversibly linked to the mainstream of development. It was noted that each South Asian country has had significant success cases of this

approach to poverty alleviation". (Source : Report of Indep South Asian Commission on Poverty Alleviation, within that the text of the Colombo Summit Declaration)

Further the Bangladesh National Conservation Strategy (BNCS) has commenced its second phase and contains a few elements which also contribute to Agenda 21. The BNCS and the Forestry Master Plan are independent initiatives of the MoEF but many of their actions will be supportive of NEMAP.

Agenda 21 envisages the establishment of a Sustainable Development Commission with highest political commitment, participation and mobilization of all aspects of the civil society, with an effective coordination focal point. The SAARC Declaration on Poverty Alleviation and initiation of NEMAP are steps in the direction of addressing some of the issues of Agenda 21, while the remit of Agenda 21 is far wider.

1.3 What is NEMAP

National Environment Management Action Plan (NEMAP) is a Plan of the Government of Bangladesh (GOB) prepared by the Ministry of Environment and Forest (MOEF) with input from all segments of civil society.

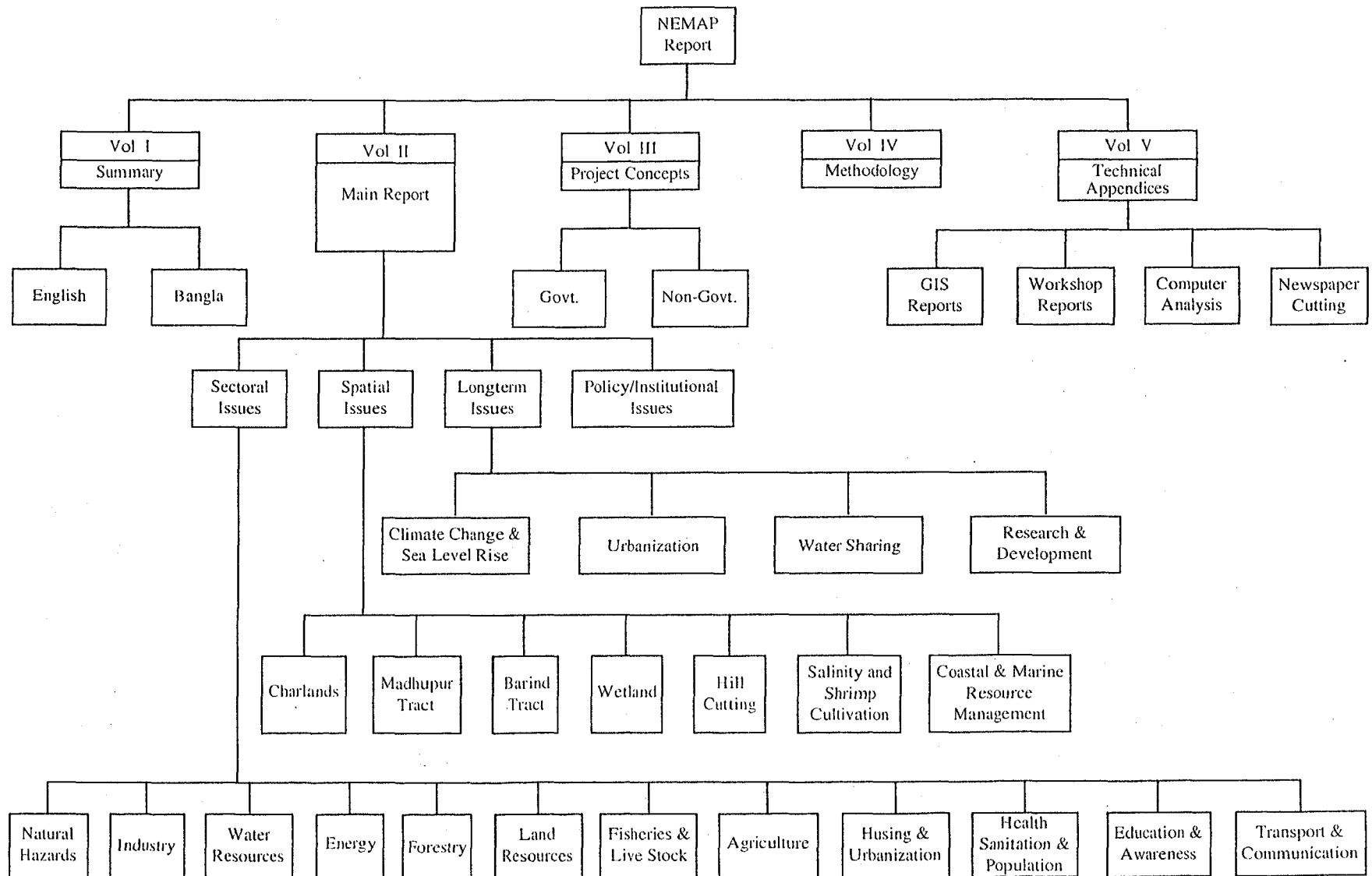
It consists of five volumes.

Volume I	:	(a) Summary in English
		(b) Summary in Bangla
Volume II	:	Main Report
Volume III	:	Project Concepts
Volume IV	:	Methodology
Volume V	:	Technical Appendices

This volume is the Main Report (Volume II). This Main Report gives an overview in Chapter 1. Chapter 2 summarizes the methodology of NEMAP. The Action Plan is given in the four following chapters, each chapter addressing a major component of the Action Plan, Chapter 3 addresses the Institutional Issues and Actions, while Chapter 4 considers the Sectoral Issues and Actions. Chapter 5 describes the Location Specific Issues and Actions and Chapter 6 details the Long Term Issues and Actions. Chapter 7 summarizes the main actions prioritized for immediate implementation.

While Volume II (The Main Report) identifies several actions and prioritized a number of actions for immediate implementation, Volume III (Project Concepts) expands each action into an outline or a Concept paper of project(s) and identifies actors. These actors include government agencies, NGOs, private sector, community groups, academics, other professional and people at large. Each action can have multiple actors and components to be undertaken by different actors in a reinforcing way. These actions include advocacy, policy and specific projects.

Figure 1.1 : Structure of NEMAP Document



Volume IV (Methodology) details the methodology adopted in peoples consultation, participation, prioritization and feed back. Also it highlights methodological issues and opportunities for government - NGO collaboration and how to make NEMAP a dynamic and forward-looking process.

Volume V collates the technical appendices, workshop reports, detailed tables and maps which evolved out of the NEMAP process. Volume IV and V will be of special value to specialists and involuted policy makers. The structure of the NEMAP document is shown in Figure 1.1. The figure further the sectoral, spatial and long term issues as identified by the people.

Since environment encompasses almost all sectors of the economy and influences the development process directly or indirectly, multidisciplinary and multi sectoral approach are needed in the formulation of policies, strategies, plans and programmes related to it. Implementation of these in turn is dependent on a number of issues like capacity building, legislative measures, adequate and timely flow of funds, development and transfer of appropriate technologies, generation of awareness and continued political commitment. Some of the issues would be covered while discussing in a more general terms the obligations and actions initiated by the Government of Bangladesh with particular emphasis on the National Environmental Management Action Plan (NEMAP).

The National Environmental Management Action Plan (NEMAP) is being considered as the basis for concrete programmes and interventions aimed at promoting better management of scarce resources and reversing present trends of environmental degradation, as well as increasing awareness about environment. NEMAP considers the commitments made under the Agenda 21, and it may be considered as the first initiative towards the preparation of a National Agenda 21, anticipated to be taken up by GOB in the near future.

The Government of Bangladesh (GOB) has for some time been engaged in the preparation of a National Environmental Management Action Plan in cooperation with UNDP, and decided to finalize it by initiating a pro-active consultation process in association with NGOs, journalists, academics and other segments of the civil society. This is probably for the first time that the government is finalizing a national plan with active participation of people, representing all sectors of the economy and all diverse regions of the country.

1.4 Objectives of NEMAP

NEMAP is expected to identify the key environmental issues, presently of concern to Bangladesh, and the actions required to halt or reduce the rate of environmental degradation, improve the natural and manmade environment, conserve habitats and bio-diversity, promote sustainable development and improve quality indicators of human life. The NEMAP will be formulated, in response to the current and predicted environmental scenario, into specific actions required to mitigate these impacts. Since environmental conditions and policies may change over time, as progress towards sustainable development takes place, the NEMAP should also evolve in response to these environmental changes. The current document is appropriate to the environmental issues, and requirements to address these, during the period 1995 to 2005.

The NEMAP constitutes a synthesis of the Government's and People's perception of environmental issues and the actions required to address them. The importance of NEMAP, even apart from its participatory approach, can be described as a necessity for our future development. NEMAP will determine the major environmental problems, identify their causes and suggest mitigation measures. It will look at the issues not only on a sectoral basis, but search out the inter-sectoral linkages. NEMAP will outline an Action Plan not only for the government, but for the community, the society and suggest what each and every citizen can do to protect the environment.

The management actions considered in NEMAP are all essential to the sustainable development and environmental protection of the natural and human resources of Bangladesh. However, there are certain management actions which are particularly urgent and have, thus, been prioritised.

1.5 State of Environment and Development of Bangladesh : A Summary :

Bangladesh, being the world's most densely populated country with over 800 person per sq. km and a growing population, is also one of the poorest with a per capita income of only US \$ 220 and in 1994, 12th from the bottom in the world's economic atlas. Despite these Bangladesh has made significant progress in several areas in the recent past. These include:

- o Within a matter of 10 years the country's foodgrain production increased by 30 per cent to nearly 20 million tons per annum achieving self sufficiency in food grain in 1992.
- o Despite being one of the poorest and having a very low literacy rate, Bangladesh has made significant strides in family planning, achieving a growth rate between 2.1 and 1.9 per cent.
- o Though democratic institutions are still weak the people of Bangladesh has successfully managed to establish a democratic process through a fair and free election in 1991.
- o The Government has made major commitment to the social sectors with highest investment in education.
- o Bangladesh has increased export earnings to US\$ 2.3 billion for 1992-93 with, stabilization of net aid inflows to US\$ 1.6 billion per annum. The Government has made significant progress in reducing dependence on foreign aid in the last two years. In 1993-94, 38% of the Development Budget is being funded out of Bangladesh's own resources which was at zero percent in the year 1989-90.
- o There has been an initiation of foreign private sector investment and a rapid expansion of the capital market which has crossed US \$ 1 billion in 1994.
- o The Government through its Ministry of Planning has initiated a participatory planning exercise.

- o A successful example of peoples participation in environmental regeneration has been a massive tree plantation programme which was undertaken jointly by the Government, NGOs, community groups and people themselves, where 2 billion samplings have been planted in the financial year 1993-94 from an equally significant 1.3 billion in FY 1992-93.

Notwithstanding these commendable achievements the state of environment and development offers tremendous challenge and some opportunities.

Poverty and Malnutrition

It is estimated that over 40 per cent of the population regularly consume less than the absolute critical minimum of 1800 calories per day. These 50 million people are amongst the world's poorest by any standard of development. Furthermore, others have estimated that the numbers of absolute poor have risen significantly. The poverty of these deprived people is deep rooted, pervasive and multi-faceted, relating not just to the absence of reliable incomes and productive assets, but also to food, safe water, sanitation, education, shelter, inequities, injustice and lack of power. These most deprived persons of the world are also extremely vulnerable to disaster and disease. The challenges posed by this mass of poverty are enormous for a country which is now populated in total by over 120 million, on a land base which is already the most densely populated in the world at over 800 persons per sq.km., with accelerating environmental degradation.

The Human Development Indicators for Bangladesh are also staggering. Bangladesh has an Adult literacy rate of 37 percent and life expectancy of 52.2 years, mortality rate of 109 and maternal mortality rate (in 1986) was 650, and a morbidity rate of 18 per cent for female and 15 per cent for male. By the year 2001, it is forecast that a quarter of the population will live in urban areas. Urban slum dwellers now account for some 15 per cent of the population and still grow by 6 per cent p.a.

Some 60 per cent of the total land area is cultivated, one of the highest percentages in Asia. Agriculture represented slightly less than half of the GDP in 1986, and average annual rate of growth in agricultural production was about 2.7 per cent from 1980-86, which was barely enough to keep pace with population growth. In 1992 the country was for the first time self-sufficient in rice, the main staple diet. Food shortages affect more than half the population and food imports were rising to keep abreast of demand. Export volumes are relatively small and not well diversified. However, in 1992 food (grain) self sufficiency was attained, thanks to a disaster-free year.

Access to clean water is problematic for many households and as a result of contaminated drinking water, lack of sanitation and poor hygiene practice, gastro-enteritis and other water-borne diseases are common. The effect of these diseases, together with chronic malnutrition and inadequate health services is a high rate of infant mortality; 25 per cent of infants die before the age of 5. Maternal mortality rates are nearly 100 times greater than the rates for Scandinavian countries.

Despite relatively high growth rates for urban areas over 80 per cent of the population still resides in rural areas. Because of the relatively high population growth rates a large proportion of the population is young and will soon greatly increase the ranks of those needing schooling and employment.

Population Growth

Bangladesh's population is about 120 million confined within 144,000 km², making its population density the highest in the world.

Over 50 per cent of the population is below 15 years of age and hence in the next 10 years, there will be a dramatic rise in demand for employment. Employment opportunities in agriculture appear to be limited and other sectors are not creating sufficient new jobs. The urban population was 13 million in 1981. It is expected to reach 41 million in 2000.

Population growth is identified as perhaps the most serious problem inhibiting a sustainable use of resources. Conversion of the vast population to productive human resource remains the greatest development challenge. Increases in development or productivity are eroded by population growth. A very low land/man ratio intensifies the competition of the very limited land resources for different uses.

Natural Hazards

Recurrent floods cover large areas, often up to 30 per cent of the country. They affect and damage crops, seeds, trees, livestock, housing and infrastructure. Floods can enhance erosion by the rivers with consequent loss of valuable arable land. Areas hit by cyclones are not very large, but the devastation can be enormous. For example the cyclone of April 1991, killed an estimated 130,000 people. The north-west part of the country is vulnerable to drought and north-east to flash floods. Geomorphological instability and river bank erosion dislodges large areas and devastates thousands of families every year.

Agriculture

Data on the chemical composition of soils suggest a state of impoverishment. The low organic matter content, higher cropping intensity, improper cropping sequences and faulty management practices cause depletion of soil fertility.

Most of the agricultural growth has come from dry season irrigated agriculture by using high yielding variety of rice and wheat. There is an emphasis on increasing acreage under "High Yielding Varieties" (HYV) of rice, in many cases, displacing traditionally adapted and resistant varieties. The bias towards HYV rice increases agro-chemical use including both fertilizers and pesticides. Further the yield of HYV rice is showing alarming trends of decrease. Micronutrient deficiency is becoming a major concern. Deficiency in zinc and sulphur has been well established and iodine deficiency is a major health hazard.

Water

The location of Bangladesh makes water management the key issue in its environmental plans. Bangladesh is mostly a delta formed by sediments brought from the Himalayan drainage ecosystem and deposited along river banks and in the flood plains. Its coastal zone is extremely dynamic and at the inter-action zone where fresh water from precipitation and snow meets the saline sea water,

there is an increase in the use of water for irrigation, often from ground water sources. There are indications of lowering of the water table, due to indiscriminate use of ground water.

Shortages of water in river systems during the dry season are thought to be causing the saline belt to move northward. Withdrawal of water from the Ganges by India at Farakka Barrage has major impacts on lean-period water availability, increased salinity and threatens ecosystems. Most of the rivers flowing through Bangladesh comes from neighbouring countries, mostly India, hence equitable sharing of water remains a major environmental concern. Drought-proneness of the north western region is also a major problem.

Water pollution, which is increasingly becoming a major problem may be categorized into three groups:

- Faecal pollution is widespread and has a strong negative impact on human health. Pollution continues unabated causing a number of water-borne diseases.
- Industrial pollution is localized but untreated, industrial waste is dumped into rivers causing pollution of both the terrestrial and aquatic environments.
- Agro-chemical pollution also feared as residues are expected to enter the food chain.

Though little detailed information was available, and more information is emerging the existing Flood Control Drainage and Irrigation (FCDI) structures appear to affect several areas e.g:

- Impact on fisheries by restricting migration, spawning grounds and decreasing flood plain availability for fish.
- Impact on inland water navigation.
- Increased siltation of river beds.

Land Issues

Major environmental issues relating to land are cross-sectoral, in as much as, almost all sectors including agriculture, water, forests, habitat, industry, horticulture compete for the use of it. Issues relating most directly to the resource are the continual erosion of old land by the rivers, the existing pattern of ownership of land, particularly, new land, and the low level of year round land utilization. The erosion of land has created increasing landlessness and potential over-exploitation of common resources such as fisheries and forests. New land which is often unconsolidated is highly underutilized because of ownership inequalities which stem from the existing power structure in the rural areas (particularly in the coastal areas).

Of major importance is the issue or need for a more integrated multi sectoral planning approach for land utilization and land reclamation. Of particular importance are the coastal land areas which are extremely vulnerable and currently the most underutilized. There is also a lack of collective management of water and land resources which has inhibited optimum sustainable utilization. In the final analysis, the land is in short supply and land remains the base of production and also to support the burgeoning population.

Forestry

Commercial felling of timber for fuel and other uses together with encroachments for agricultural and settlement purposes have substantially reduced the area covered by forests. Total Reserve Forest area has been reduced by 50 per cent during the last 20 years. There is a continuous loss of valuable mangrove forest in the Sundarban of Khulna and Chakoria and saline front is ingressing northward. The initiation of social forestry and involvement of NGOs in this sector are positive developments.

Fishery

Fish is the major supplier, over 80 per cent, of animal protein. More and more people, particularly the poor, rely on fishery as their main or supplementary incomes. This causes over-exploitation of the fishery resource and challenges the sustainability. Fishery is often the only livelihood open to the landless and unemployed.

Management and tenurial issues are the main reasons for the very low productivity of ponds and closed water bodies. Prospects are good for aquaculture and shrimp farming, but sometimes, the activity competes with agriculture and forestry, particularly, in the coastal areas.

Construction of indiscriminate flood control structures and impede the flow water and consequently flood plain productivity. It is feared that some structures have reduced indigenous flood plain fisheries by over 70%.

Industry

Bangladesh has welcomed the establishment of industries which can contribute to economic growth and increase employment opportunities. A few national and international companies have capitalized on the near total lack of enforced industrial and marine pollution regulations to exploit natural resources such as fuels, minerals, timer, fish, shrimp and leather at the expense of the environment. Open water fishery has been a direct victim of industrial expansion through its untreated pollutants.

Biodiversity

Bangladesh is rich in plant and animal biodiversity. Traditional practices of communities is losing out against onslaught of development needs of agriculture and industrial development. The flood plains and wetlands, and particularly the mangrove forests of Sunderbans are the storehouses of biodiversity but are under increasing threat. Bangladesh has signed the UN Biodiversity Convention but very few practical steps have been taken to protect biodiversity.

Global Climate Change

Studies on Vulnerability Assessment to Global Climate Change has shown that Bangladesh is extremely vulnerable to sea level rise in the South and increased aridity in the North west. Extreme events such as cyclones are expected to increase and make Bangladesh even more vulnerable. The

stark conclusion of the analysis of several scenarios shows that if sea level rise of one meter were to materialize and if there is no agreement on equitable water sharing with co-riparian neighbours, then most of the development achievements of the next three decades will be negated by the combination of the pro exogeneous factors (a) Global Climate Change and (b) Water Sharing.

Environmental Awareness and Education

Environmental awareness cannot be addressed adequately through the formal education system. Awareness must also be created through non-formal means since the national overall literacy rate is around 35 per cent, with female literacy is estimated at only around 20 per cent.

People are, in general, articulate and perceptive as has been evident from NEMAP process. They have traditional knowledge and a feel for environmental issues, particularly, as these affect their daily life. But little formal information reaches the rural population. An environmental awareness drive is urgently needed and the government and the NGO's could share the burden. Some effort have been made, mostly by NGO's.

1.6 Existing Environmental Policies

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

- * to control and prevent pollution and degradation related to soil, water and air ;
- * promote environment-friendly activities in the development process ;
- * preserve, protect and develop natural resource bases ;
- * strengthen the capabilities of public and private sectors to manage environmental concerns as a basic requisite for sustainable development ; and
- * create people's awareness for participation in environment promotion activities.

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

- * Creation in 1989 of a Department of Environment within a new Ministry of Environment and Forest ;
- * Approval in May 1992 of a National Environment Policy and Guidelines for an Environmental Action Plan ;
- * Initiation of work on National Environment Management Action Plan (NEMAP), National Conservation Strategy and Forestry Master Plan;
- * Declaration that Environmental Impact Assessments should be carried out for all major development projects.
- * Enacting the Environment Protection Act, 1995

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

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

The National Environmental Management Action Plan (NEMAP) is being considered as the basis for concrete 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

The National Environment Management Action Plan (NEMAP) is an environmental planning exercise initiated by the Government of Bangladesh through the Ministry of Environment and Forest following the commitments made under Agenda 21 at UNCED in Rio de Janeiro in June 1992. The exercise has been carried out in phases with the support of UNDP.

- o **The first phase** carried in 1992 out by a team of national consultants identified a number of areas and ecosystems undergoing rapid environmental degradation and prepared project briefs to stop the environmental degradation of those areas.
- o **The second phase** carried out in 1993 by a national and an international consultant had detailed discussions with different government agencies and ministries in order to prioritize the sectoral issues and developed a list of sectoral projects for the government agencies.
- o **The third phase** carried out in 1994 by local consultants as well as NGOs, journalists, academics, lawyers and other professionals consisted of an elaborate public consultation exercise to ascertain the people's own concern and priorities so that these could be reflected in the plan. This exercise also served a dual function of raising people's awareness about environmental issues.

Although these phases were not clearly identified at the beginning of the exercise they became a gradually expanding process of consultations in developing the plan and ensuring the widest possible participation in the process within time and budget constraints.

This document describes briefly the process of consultation and participation, the awareness raising component, the process of synthesis of the action plan, the different volumes of the plan and the major outcomes of the Action Plan itself.

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

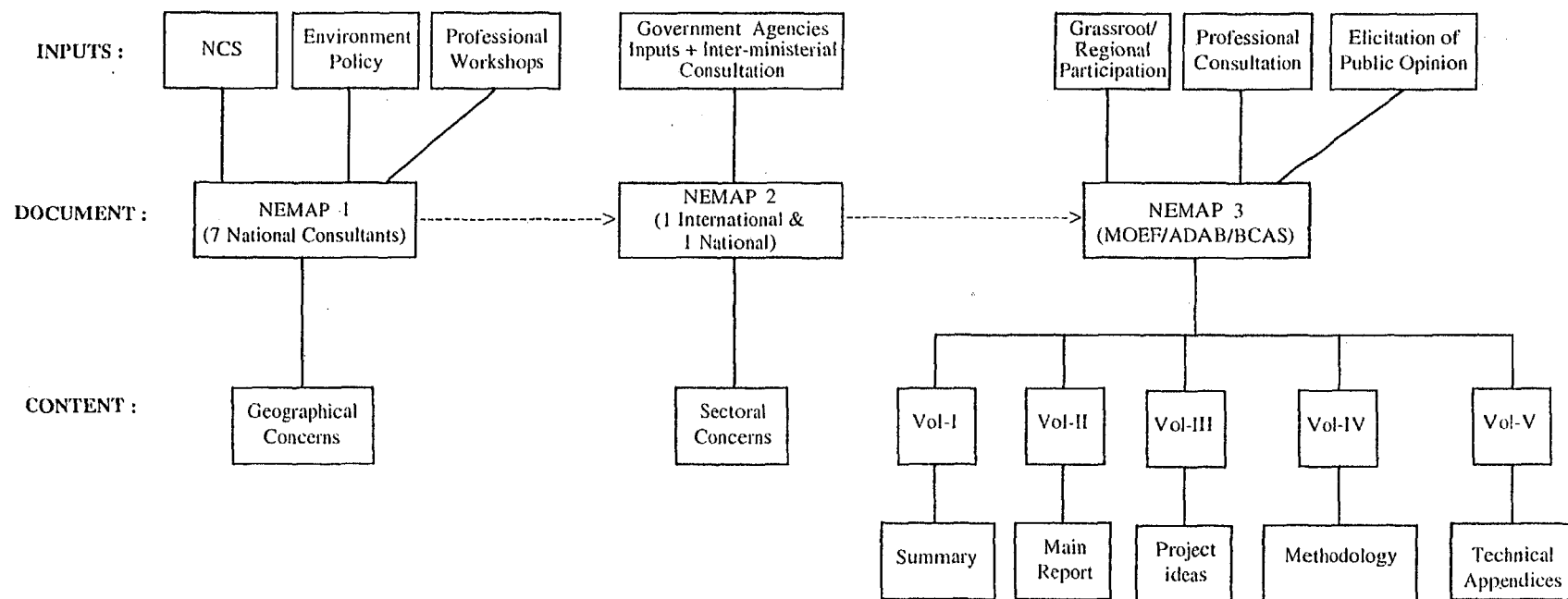


Figure 1.3 : Overview of NEMAP Process

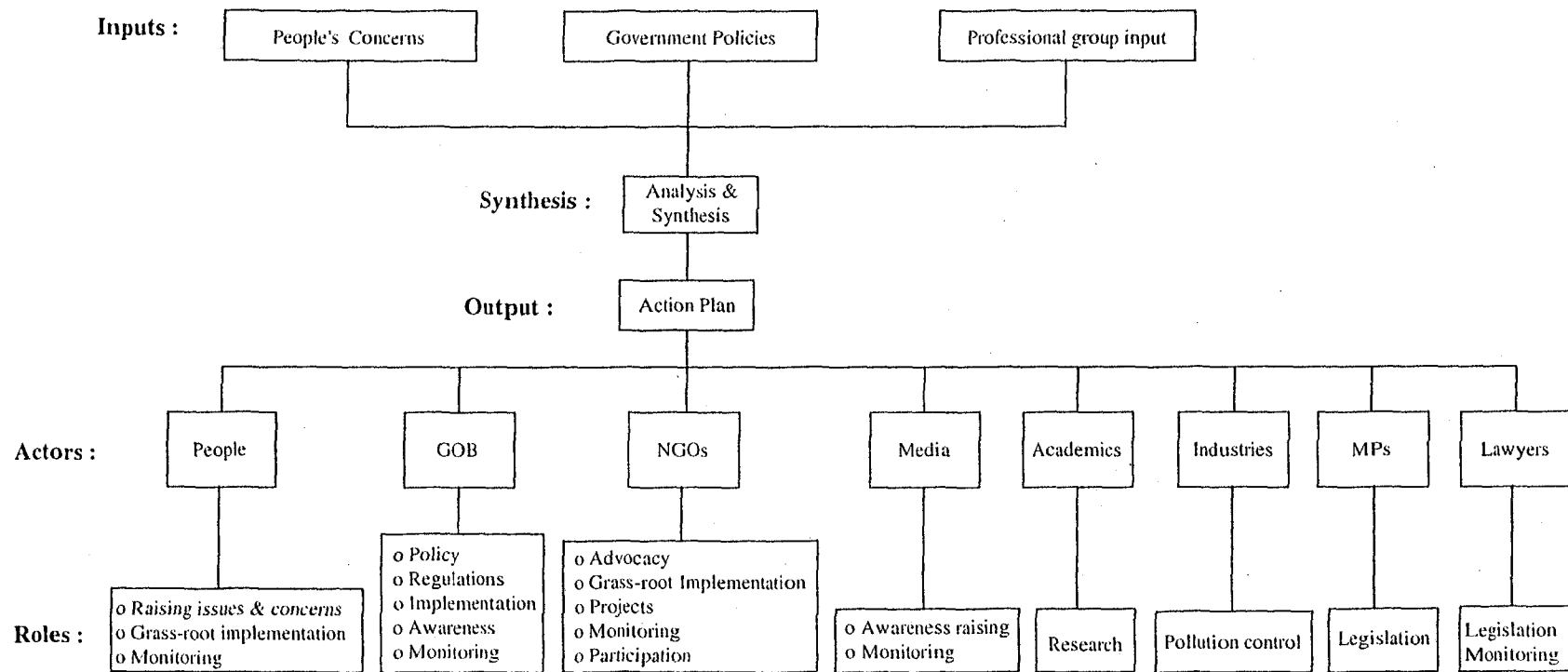


Figure 1.2 schematically represents the inputs, outputs and contents of the three phases of the NEMAP process.

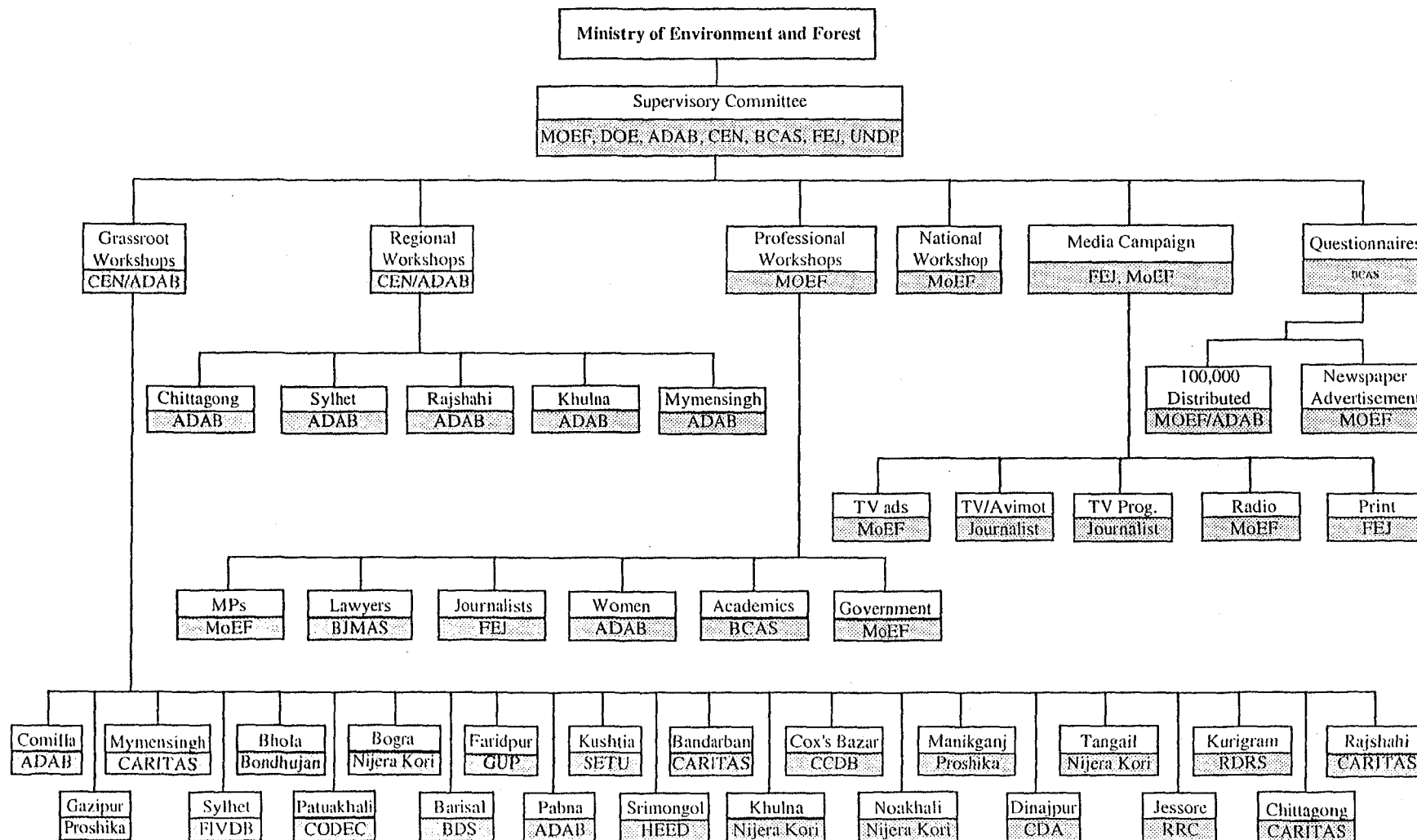
Figure 1.3 is an overview of the NEMAP process. The three major inputs are peoples concerns, government policies and professional group inputs. These, through an analysis and subsequent synthesis process develops an Action Plan. The figure further identifies the actors and their respective roles.

1.8 Public Consultations and People's Participation

It was recognized that environmental issues, concerns and problems could not be addressed by the Ministry of Environment or for that matter by the government alone but needed active participation of the people of all walks of life. It was therefore decided to involve the people in the planning process itself so that the plan should reflect their own concerns and priorities. It was also recognized that such a public consultation where practically all the country's citizens are stakeholders (where the interest of the people are at stake) would be an impossible task so a Coordination and Review Committee was set up with representatives from different concerned government agencies as well as NGOs, journalists, academics, lawyers, etc to develop a process of public consultation which would ensure the following minimum criteria :

- o **Obtain opinions from all parts of the country :** This was achieved by holding 23 grass-root level workshops around the country including every significant ecosystem (see figure 1.4).
- o **Ensure the participation of people from all walks of life :** This was achieved by ensuring at least 5 to 8 representatives from each category. Ensured the participation of people from all walks of life including labourers, farmers, fishermen, businessmen, elected representatives, government officials, educationist and others at every grassroots meeting.
- o **Ensure participation of women :** This was done by ensuring that at least half the participants in each grassroots workshop were women. Although this was not always possible in practice, by and large it was achieved, and in some of the workshops the women were the majority.
- o **Ensure that every individual and group gets a chance to give his or her opinion :** This was done by holding each grassroots workshop over a period of two days to allow maximum participation and by breaking up into small group discussions where each group member was asked to give their opinion by trained facilitators and which was recorded by the rapporteur.
- o **Allow people to identify their own priorities and suggest solutions :** This was done by allowing each workshop member to first identify all the environmental concerns they could and then asking each small group to prioritize the ten most important ones in their opinion with the reasons for why they were considered to be such a problem. They were then asked to suggest solutions and actions which could be taken at three

Figure 1.4 : Organization of NEMAP Consultative Process



different levels, namely (i) by themselves, (ii) by the local government and (iii) by the national government.

- o **Allow regional issues to be discussed :** This was done by holding six major one day workshops in the different regions with over 100 participants in each representing some of the grassroot workshop participants plus many more from the divisional level including elected representatives and divisional level government officials.
- o **Ensure inputs from different professional groups :** This was done by holding separate one day workshops for different professional groups including lawyers, academics and researchers, women, members of parliament, journalists and industrialists to get their opinions and inputs.
- o **Enable people not participating in the workshops to give their opinions :** This was done by distributing 100, 000 leaflets with a questionnaire throughout the country and also by publishing the questionnaire in leading English and Bangla newspapers, which reach several hundred thousand people. In addition special television and radio programmes were run advising people to write in with their opinions. Thousands of people were thus able to send in their opinion which were analyzed in a computer programme.
- o **Let people know about the NEMAP process :** This was achieved by producing several special television programmes on the subject including a phone-in programme "Avimat". In addition special short and attractive advertisements were made for both television and radio which were repeated several times every day over a period of months. The advertisements were primarily to raise awareness about environmental issues in general but each one ended with a short message on NEMAP asking people to send in their opinion. For the print media special arrangements were made for reporters from both national as well as local newspapers to participate in all the workshops and then to write articles for their newspapers. Many thousand column inches of reports appeared about NEMAP in the national and local press. The public awareness raising part of the exercise is thus considered to have been one of the most successful of its kind.
- o **Ensure that the discussions and outputs of the workshop were well recorded :** This was done by having a group of trained facilitators and rapporteurs contributed by the NGOs taking part in each workshop and being present in every small group discussion to record the outcome of the discussions. These discussions were recorded and passed on to the synthesis and writing group. In addition to the NGO rapporteur, a group of selected journalists also attended the workshops and submitted their own reports on each workshop.
- o **Ensure national discussion of concerns :** This was done by holding a major National Workshop at the International Conference Centre in Dhaka with several hundred participants including grassroot and regional workshop participants together with government officials, members of parliament, donors and others from Dhaka. The workshop was inaugurated by Prime Minister Khaleda Zia herself who commended the Ministry of Environment and Forest as well as the NGOs on their efforts at participatory

planning. She further directed that the outcome of the exercise in draft should be taken back to the people to ensure that they felt their concerns had been adequately dealt with.

- o **Consultation of the Draft was ensured :** This was done by holding a series of six workshops around the country where a large number of participants of all the previous workshops were invited to discuss the preliminary outcome of the NEMAP process. This consultation phase was an extremely useful part of the exercise as the feedback allowed major modifications of the Draft to be made.
- o **Prepare the final NEMAP Document taking into consideration the people's concerns :** This, extremely complex, task was achieved by setting up a synthesis group to assist the consultants with the assimilation of such a wealth of inputs. The synthesis group consisted of experts from different disciplines as well as the rapporteurs and facilitators from the NGOs who gave their time and expertise.

Figure 1.4 summarises the organization of the NEMAP consultative process.

1.9 People's Concerns

The list of all concerns expressed by the people easily exceeded 100 which would be too cumbersome to deal with separately. So they were aggregated under seven major concerns each with its sub-components (see figure 1.5). The percentages refer to the number of responses out of all responses which mentioned a particular concern. It is clear that the most important environmental concern related to lack of sanitation and clean drinking water. This was strongly reflected all over the country and particularly from the women. It reflects a widespread realization of the connection between lack of sanitation and environmental health problems. This helps to highlight the importance of the national drive by both government and NGOs to enhance coverage of sanitation throughout the country by showing the inherent demand for this service which people recognize as an important environmental problem. However, since the national efforts towards increased sanitation coverage already exists, no specific activities are incorporated under the purview of NEMAP except to reinforce the ongoing national efforts in this regard.

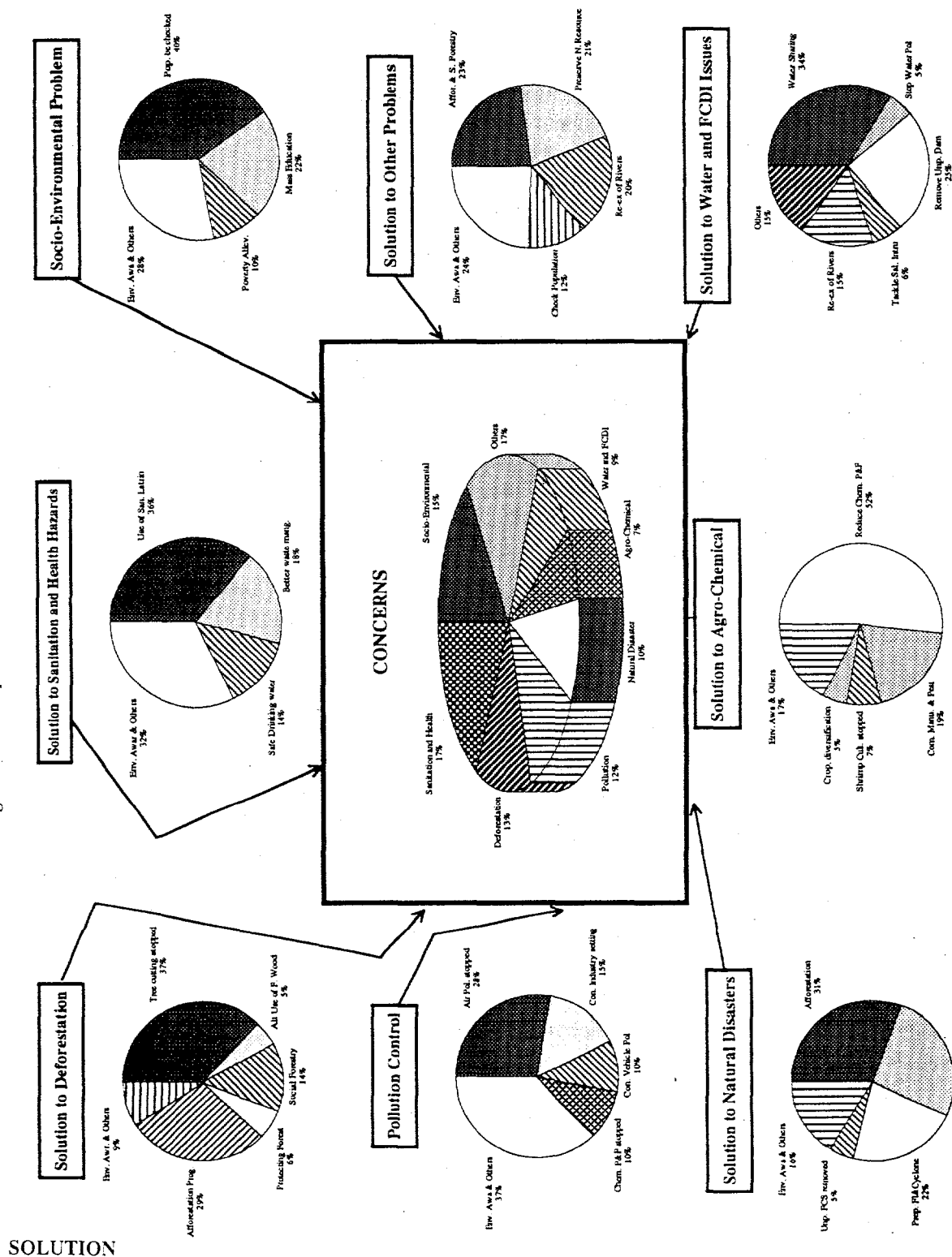
Similarly, the second most important concern expressed by the people are lumped together under socio-environmental and consist of poverty, illiteracy, unemployment and lack of awareness. Again, it should be emphasized that the people identified these as environmental concerns and thus saw a clear connection between the alleviation of these social problems and the environment. This was very clearly reflected in the speech of the Minister for Environment, Col (retired) Akbar Hossain at the National NEMAP Workshop with the Prime Minister, where he said "any management plan without adequate recognition of the need for poverty alleviation will be mutually exclusive and shall, therefore, not be sustainable". Thus, there is a clear connection between social and development concerns and environment. However, again since there are already underway major activities by both government and NGOs for poverty alleviation, population planning, literacy etc., these were not considered to be the primary responsibility of NEMAP itself, except to reiterate their importance and add that they are also considered to be environmental concerns.

As evident from Figure 1.5, deforestation, pollution, natural disaster, water and flood control drainage and irrigation (FCD/I) projects and agro chemical emerged as the other groups of concerns. While the leading seven groups of concerns covered 83%, the residual 17% encompassed all the "others" for convenience of developing an implementable action plan.

1.10 Peoples Solutions and their Incorporation in Action Plan

The people have given their input through workshops, questionnaire filling, discussions and media input. They not only identified the problems but also gave their perspective on the solutions and in many cases have identified actors for actions related to each solution. This is summarily represented in Figure 1.6 which shows the different solutions suggested against each of the problem groups. For example, taking the issue of health and sanitation 35% favoured use of sanitary latrines (by making them easily available through loan support, technology, availability, maintenance and social mobilization) while 18% people indicated better waste management as a solution to the concern of health and sanitation. Safe drinking water availability at homes has been identified as the third major solution by the people. This can obviously be done by tubewells availability and methods of water purification available within the means of the poorest. Environmental awareness raising has also been highlighted by the people (13%). This is a leading

Figure 1.7 : People's Concerns and Solutions



common solution to all groups of concerns. Hence use of both formal and informal education for environmental awareness deserves to be given priority. Some people (5%) also identified drive against smoking as a requisite health related environmental action.

People have similarly identified several solutions to each of the group of concerns. These are detailed in sections 3, 4, 5 and 6. The solutions given by the people for each aspect have been incorporated in the relevant sections of each of the four action components. Thus priorities set by the people and the government have been the basis of developing individual actions with specific identification of actor wherever possible. Types of activities in NEMAP has been classed into three groups :

- a) Policy
- b) Advocacy and
- c) Projects

For each broad group of concerns, people have offered a series of solutions. Six to eight of the major solutions in each groups manages to capture the wide variety of solutions proposed by the people. The major solutions in each group is indicated in Figure 1.6, which summarizes the main solutions given by the people to the problems they had identified. Peoples solutions have been the key driving force behind developing implementable actions.

1.11 The Action Plan

The Action Plan draws its input from the following :

- (a) The people, through the consultative process and input 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 sub committee consisting of Government and non-government representatives.

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

1. **Institutional** aspects which reflect the need to have inter-sectoral cooperation to tackle environmental problems which may need new and appropriate institutional mechanisms at national as well as local level (Chapter 3).
2. **Sectoral** which reflects the way the government's 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 priority basis - even if these are multi-sectoral concerns and therefore 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).

Each of the chapter of the Action Plan (chapter 3 to 6) addresses one of the component series of actions.

Figure 1.7 schematically represents the process in the preparation of the Action Plan. The four step process each having inputs, activity and output.

The Action Plan identifies a series of specific actions and respectively designated actors 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 Figure 1.7. The specific actions have been classified into four groups as follows which are detailed in the four subsequent chapters (chapter 3 to 6). The types of actions again are divided into three broad categories.

1. Advocacy
2. Policy and
3. Specific Projects.

Some of the actions combine two or more of the above types. The concluding chapter is the prioritized actions for immediate implementation by designated actors.

Main issues emerging out of the overall analysis and subsequent synthesis are summarized in Figure 1.8. These issues are classed into the four heads discussed above.

An Action Plan must have discrete implementation actions which are reinforcing to contribute towards meeting the objectives of NEMAP.

Taking such an approach meant that certain concerns, such as pollution, have been segmented into different sectoral issues such as water, urbanization, health, land, industries etc. for the different types of pollution. The issues were then broken down into further sub-components and recommendations for action made with some specific actions identified along with the agency (government as well as non-government) which may be most appropriate to carry out that action. Finally, the prioritization of the actions were taken on the basis of people's concerns and solutions and government priorities.

FIGURE 1.7 : PREPARATION OF THE ACTION PLAN

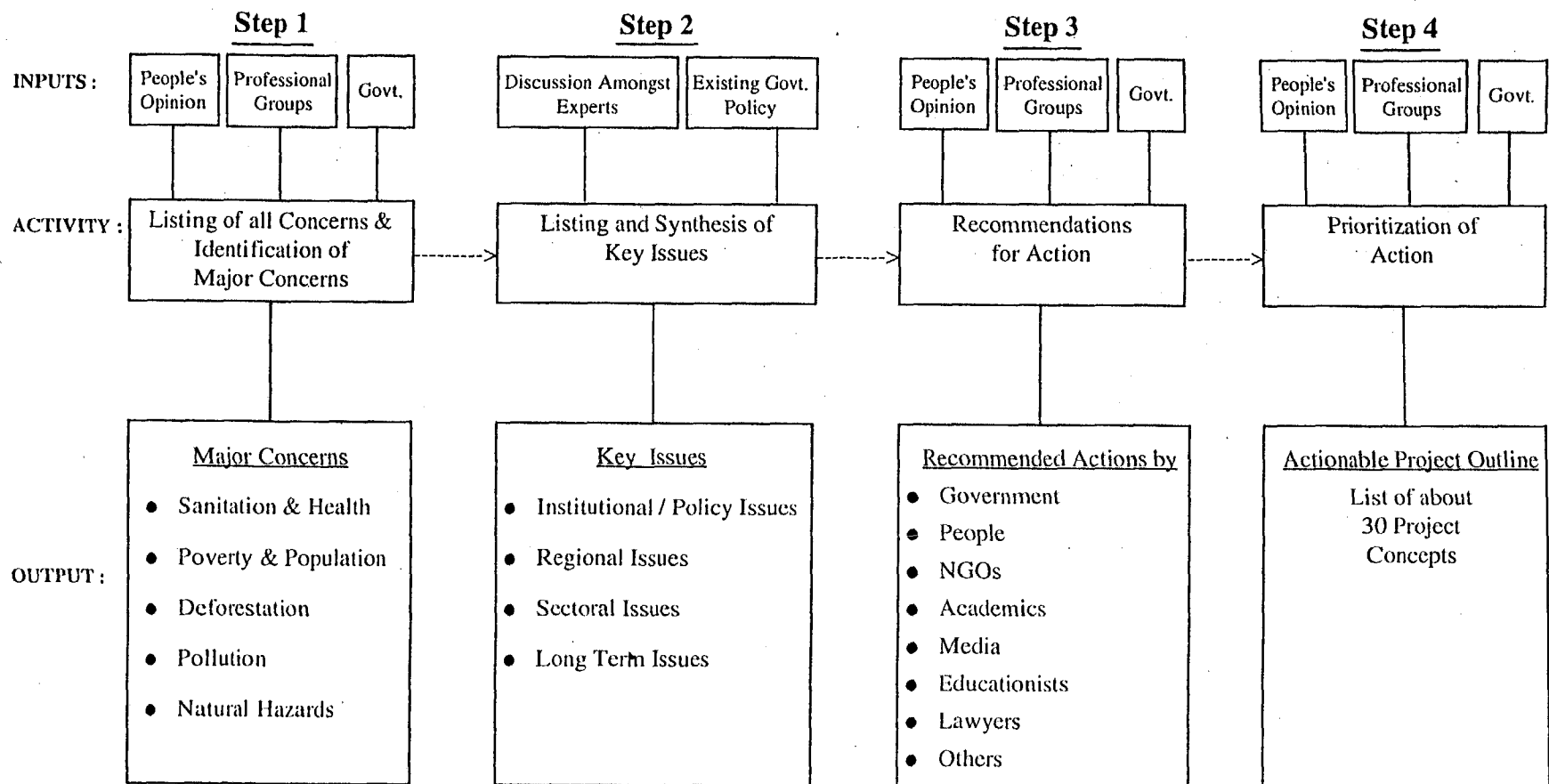
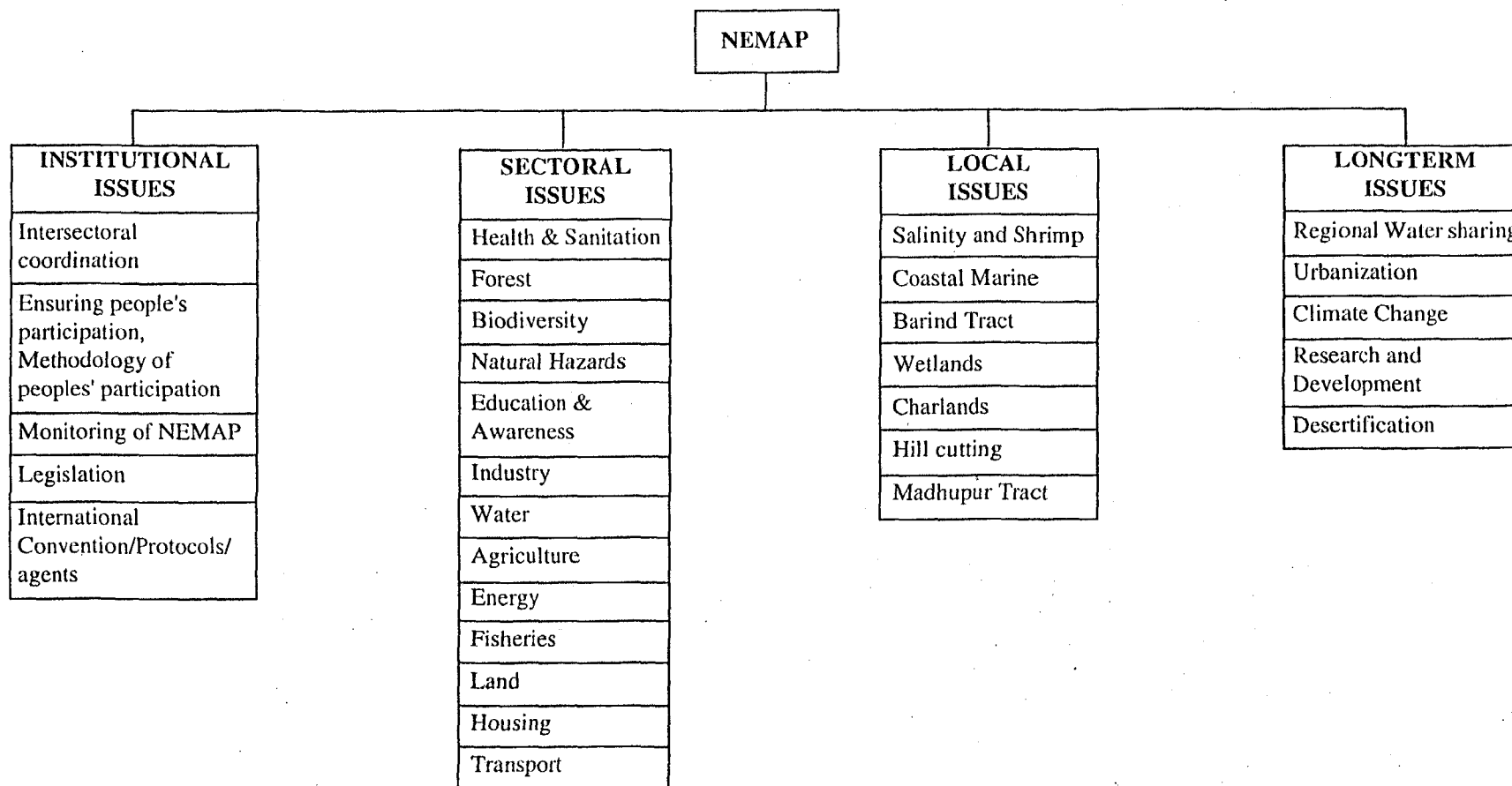


FIGURE 1.8 : SCHEMATIC REPRESENTATION OF MAIN ISSUES OF NEMAP



2. METHODOLOGY

2.1 Parties Involved

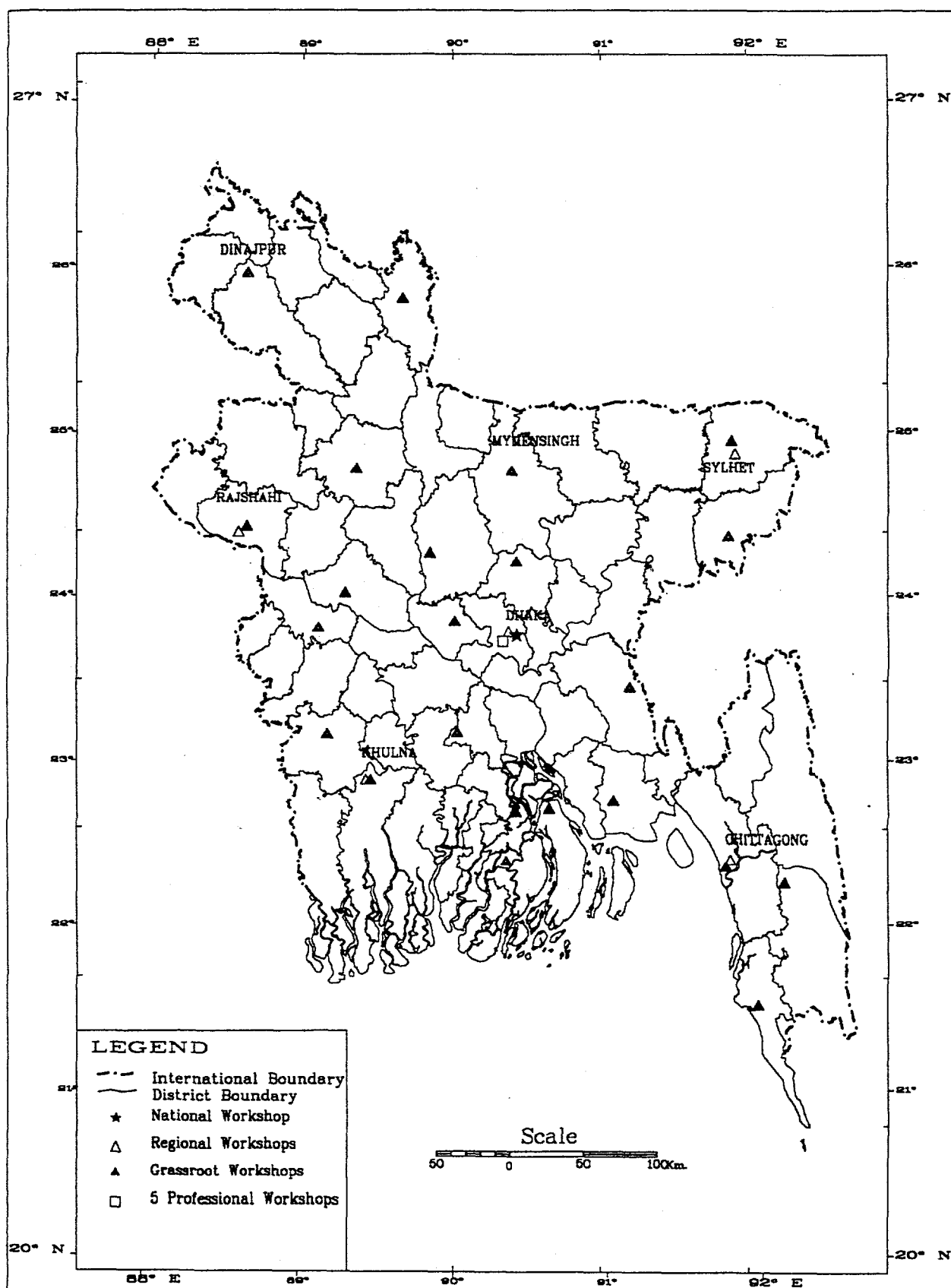
The NEMAP has been developed on behalf of the Government of Bangladesh (GoB) by the Ministry of Environment and Forest (MoEF) with Technical Assistance funding from UNDP. A National Project Director has been working with a secretariat within MoEF with the initial assistance of local and expatriate consultants for the first and second NEMAP preparations. In the third and final phase of the NEMAP process following the decision by GoB to initiate a consultative phase, the input from the non-government sector was sought. Thus a National NEMAP committee was established to oversee the consultative phase. This committee consisted of members from relevant government agencies and non-governmental groups including the Coalition of Environmental NGOs (CEN), Association for Development Agencies of Bangladesh (ADAB), Bangladesh Centre for Advanced Studies (BCAS), Forum of Environmental Journalists (FEJB) and others. The role of the different groups are shown in Figure 2.2. The Committee reviewed and approved the overall approach as well as the different components of the consultative process as described below. The UNDP provided financial assistance of approximately 60% of the total budget with GoB contributing 20% and the NGOs contributing 20%.

2.2 Process

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

(a) Grass-root Workshops

It was decided to hold 23 grass-root level workshop covering all the main agro-ecological zones of the country (Map 2.2.1). The responsibility for organising all was given to CEN/ADAB who in turn took the assistance of individual NGOs for organising each workshop. A group of 25 experienced facilitators were contributed by the different NGOs who were given training for two days on how to conduct the workshops. The first three workshops were held consecutively with all the facilitators present to allow the methodology to be refined and made uniform. Thereafter the workshops were held simultaneously in different parts of the country with a group of 6-8 trained facilitators attending each workshop (and an additional 6-8 rapporteurs contributed by the local organising NGO).



GIS CENTRE
BANGLADESH CENTRE FOR ADVANCED STUDIES

LOCATIONS OF GRASSROOTS, REGIONAL, PROFESSIONAL
AND NATIONAL WORKSHOPS

NATIONAL ENVIRONMENTAL MANAGEMENT ACTION PLAN (NEMAP)

GRASSROOT WORKSHOPS ON NEMAP

Sl. No.	Workshop Date	Place	Local Organizers
01	23-24 Feb	Comilla	ADAB
02	20-21 March	Mymensingh	ADAB/CARITAS
03	28-29 March	Chittagong	ADAB/CARITAS
04	30-31 March	Bhola	ADAB/Bondhujan
05	30-31 March	Bogra	ADAB/Nijera Kori
06	02-03 April	Faridpur(Rajoir)	ADAB/GUP
07	03-04 April	Kushtia	ADAB/SETU
08	06-07 April	Banderban	ADAB/CARITAS
09	09-10 April	Cox's Bazar	ADAB/CCDB
10	15-16 April	Manikganj	ADAB/PROSHIKA
11	16-17 April	Tangail	ADAB/Nijera Kori
12	18-19 April	Kurigram	ADAB/RDRS
13	20-21 April	Rajshahi	ADAB/CARITAS
14	23-24 April	Srimongol	ADAB/HEED-BD.
15	28-29 April	Khulna	ADAB/Nijera Kori
16	28-29 April	Noakhali	ADAB/Nijera Kori
17	03-04 May	Dinajpur	ADAB/CDA
18	05-06 May	Jessore	ADAB/RRC
19	08-09 May	Pabna	ADAB
20	11-12 May	Barisal	ADAB/BDS
21	14-15 May	Patuakhali	ADAB/CODEC/FPAB
22	14-15 May	Sylhet	ADAB/FIVDB
23	17-18 May	Gazipur	ADAB/PROSHIKA

The format of the workshops were carefully designed to allow a maximum input from all the participants who were chosen to ensure a balance of women, farmers, fishermen, officials, educationists, NGO workers, businessmen, elected representatives and others. Each workshop with 60 to 80 participants was held over two days to enable interaction and allow everyone to give input. The workshop started with a plenary session explaining the objectives and format of the workshop and then the participants were broken into 6 to 8 groups which were carefully selected to maintain homogeneity within each group (e.g. illiterate and literate people were not kept in the same group as previous experience has shown that the illiterate are often too shy to speak in front of literate people). Each group had a trained facilitator to ensure that everyone had an opportunity to speak while a rapporteur kept a record of the discussions.

Each group was asked to identify the most important environmental problems they faced. They were then asked to prioritize the ten most important problems with the causes of the problems. They were then asked to identify possible actions to address the problems at three levels, namely (i) by themselves, (ii) by the local government and (iii) by the central government. Each group then presented their findings to the plenary session where other groups were able to give their input and opinions. Differences which could not be resolved in plenary sessions were noted without trying to resolve the conflict or difference of opinion.

In addition to the group and plenary reports done by the NGO rapporteurs and facilitators, a group of experienced journalists were engaged to attend the workshops (one journalist per workshop) and prepare an overall report of the main issues discussed. Video recordings were also made of plenary and group discussions in a number of workshops.

(b) Regional Workshops

Following the grass-root level workshops a series of six regional workshops were held over a day each in Khulna, Sylhet, Comilla, Chittagong, Bogra and Mymensingh. Each regional workshop had over 100 participants. Some were from the grass-roots while many were from the divisional headquarters and represented local elected representatives, government officials, academics, NGOs and businessmen as well as farmers, fishermen and women.

The regional workshops focused on issues of the region and brought together different groups on each issue.

(c) National Workshop

On 29 June, 1994, the Prime Minister Begum Khaleda Zia inaugurated the National Workshop where she reiterated the determination of the government to carry out people oriented planning and directed the NEMAP organizers to again take the draft document back to the people through follow-up regional workshops. The national workshop also heard about the process of public consultation on NEMAP from the Minister for Environment and Forest, Mr. Akbar Hossain, the Secretary, Ministry of Environment, Mr. Abdullah Haroon Pasha, the Chairman of the Coalition of Environmental NGOs, Dr. Qazi Faruque Ahmed and UNDP Resident Representative, Ms. Eimi Watanabe.

(d) Professional Workshops

A series of professional workshops were held in Dhaka by different organisations. These involved separate workshops for lawyers organised by the BJMAS, academics and researchers organised by BCAS & women and NGOs organised by ADAB and journalists organised by FEJB. Each workshop was attended by 50 to 70 participants who were informed about the NEMAP process and were asked to give their opinions and inputs. These were recorded and reported back to the synthesis group.

(e) Government Consultations

The opinion and priorities of each relevant government ministry and agency was solicited by the MoEF and was reported back.

(f) Media Campaign

A well organised media campaign was organised including TV with a special "Abhimot" programme on NEMAP in June as well as another special programme again in July. Also a specially made TV advertisement on environment with a message on NEMAP was produced and was on air regularly for several months. Similar messages were also broadcast over the radio.

The print media was involved in the entire NEMAP process through FEJB as well as through the journalist/rapporteur. Every grass-root and regional workshop had local journalists who reported the proceedings in local papers.

(g) Questionnaires

A leaflet bearing a questionnaire was printed and 100,000 copies distributed all over the country through government and NGO channels. It was also printed in leading Bangla and English dailies which reached another 500,000 people.

Several thousand questionnaires were filled in and sent in for analysis at BCAS using a specially designed computer programme. The results were used by the synthesis group to prepare the NEMAP report.

(h) Video

A special video of the entire public consultation process including grass-root workshops, professional workshops, regional workshops and national workshop together with footage of real environmental problems from all over the country was made by the video unit of Proshika. The entire consultative process is documented in the form of a documentary in 30 to 40 video cassettes for broadcasting and showing in future.

Success and limitations of the consultative process

The NEMAP consultative process is the first time where such an effort of public consultation has been undertaken prior to any major planning initiative. It is innovative in three ways :

- o For going to the people to get their opinions prior to developing the plan.
- o For the cooperation between government and NGOs for developing a truly national plan.
- o For the use of national resource persons in all stages of developing the plan without any expatriate consultants.

Although great pains were taken, within the very real financial and time constraints, to enable the widest possible consultations both geographically and sectorally, it must be admitted that only a limited number of people could actually be consulted through the workshops. An estimated 3000 people participated in all the workshops combined. However, they were well distributed in terms of gender, profession and geographical coverage.

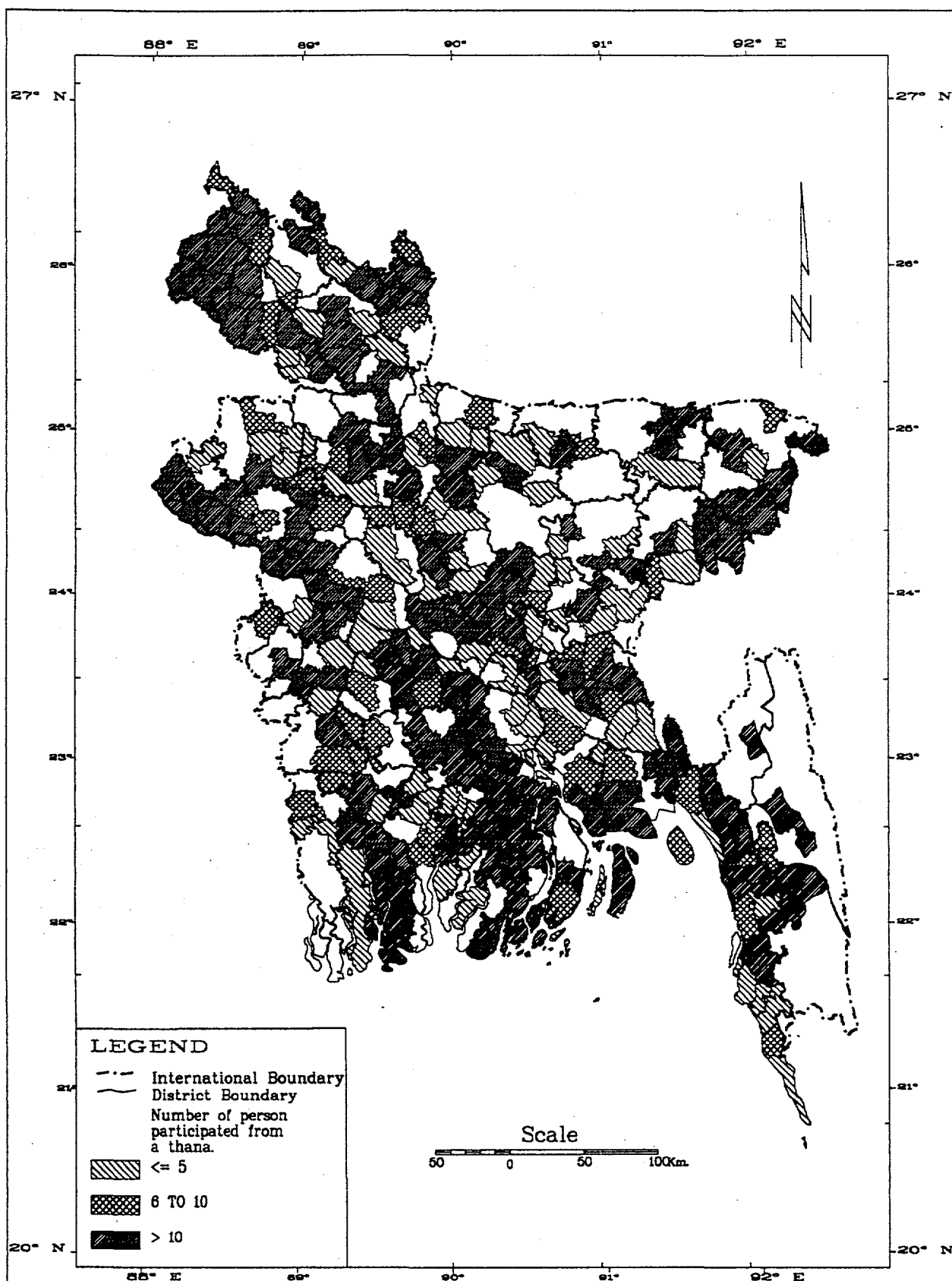
Another 5000 participated by sending in their opinions through the questionnaires/leaflets which was a very encouraging response considering that they had to fill in and send the completed questionnaire at their own cost.

The public awareness raising part of the process has undoubtedly reached a much wider audience probably in the order of millions through the TV programmes, the TV advertisements, radio programmes and advertisements, newspaper advertisement and thousands of column-inches of stories in national as well as local vernacular newspapers. This part of the process has been very successful in raising awareness about environmental issues in general and NEMAP in particular.

2.3 Geographical Coverage

Different activities were planned targeting maximum participation in terms of spatial coverage and coverage of people at different levels in the NEMAP consultative processes. The analysis shows that the participation in NEMAP process was satisfactory under given constraints. From the total of 493 thanas in Bangladesh, participants from 297 thanas participated in the NEMAP consultation process which means that the process has covered about 60% thanas of Bangladesh. 18% had less than 5 participants, while about 40% did not have any participants in the NEMAP process. Map-2.3.1 shows the spatial distribution of participation in the NEMAP process.

Out of the total participants 70% were male and 30% were female participants.



GIS CENTRE
BANGLADESH CENTRE FOR ADVANCED STUDIES

SPATIAL DISTRIBUTION OF LEVEL OF PARTICIPATION
IN THE NEMAP PROCESS

NATIONAL ENVIRONMENT MANAGEMENT ACTION PLAN (NEMAP)

2.4 Analysis, Synthesis and Preparation of Reports

The proactive participatory consultative process of NEMAP was started in order to reflect views and concerns of people in various levels in the NEMAP process.

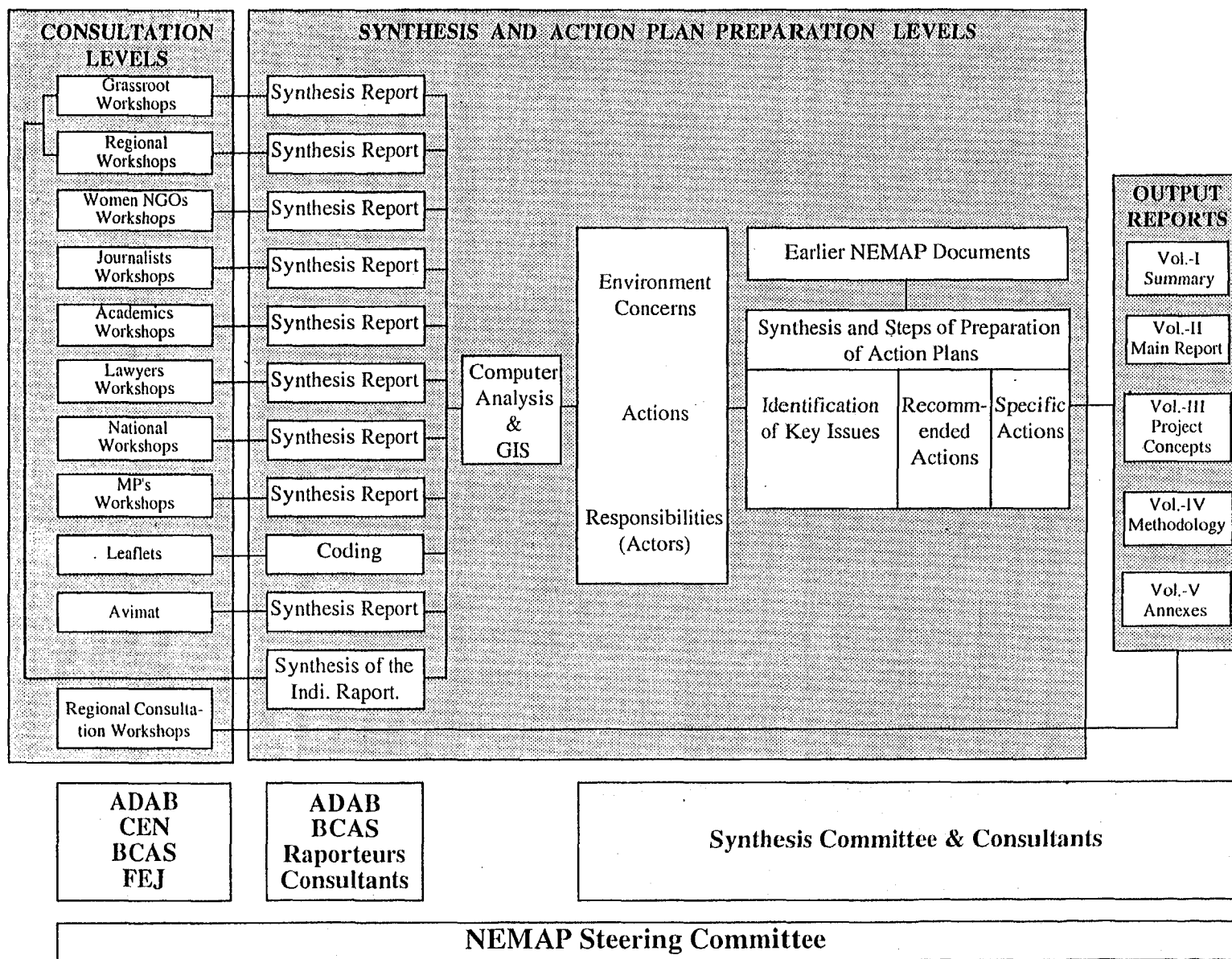
A synthesis sub-Committee was formed with the representation of MoEF, UNDP, NEMAP consultants, Coalition of Environmental NGOs (CEN) under ADAB, BCAS and the Forum of Environmental Journalists to steer activities of public consultation process and finalize the NEMAP documents. CEN under ADAB, was responsible for holding the grass root, regional and some professional workshops and their documentation. Holding workshops for the academics, was the responsibility of BCAS. National workshop was organised by MoEF. Four consultants were engaged for synthesising the information collected from different workshops and preparing the NEMAP. The activities of analyzing, synthesizing and preparation of reports were supervised and coordinated by the NEMAP synthesis committee with the representatives of the above mentioned agencies. A schematic presentation of the synthesis processes involved in preparation of NEMAP is given in Figure 2.2.

The present initiative took into account the previous two documents prepared earlier by NEMAP. 23 grass-root workshops were held around the country to seek opinion from people at the grass-roots on environmental concerns in their areas, about ways and means to mitigate them. A group of 24 facilitators were contributed by different NGOs who were given training and then attended all the grass-root workshops to ensure uniform facilitation. Each group's synthesised output was reported separately and was presented to the planner for further discussion to get a feed back.

A group of experienced journalists were organized to act as rapporteurs for each workshop who prepared independent synthesis reports. All information collected from the above workshops was synthesized and structured so that the consultants could use the information for the preparation of NEMAP. The 23 grass-root workshops were followed by five regional workshops, a national and several professional workshops for NGOs, academics, lawyers, journalists and others. Besides, the workshops a series of mass awareness raising activities were also undertaken including few special TV programmes such as "Avimat". The idea behind such awareness raising activities was, among others, to facilitate the participation of people in a questionnaire survey in respect of NEMAP. Synthesis reports of these workshops and activities were prepared by ADAB, BCAS, FEJ in such a way that the consultants could use these in the preparation of NEMAP.

100,000 leaflets/questionnaires were printed and distributed all over the country through government, non-government and media channels. The questionnaires were received at the MoEF and sent to BCAS for analysis. Information collected through all the above modes were structured and coded for computer assisted analysis. Necessary computer programme for synthesis and analysis were developed at BCAS. Advance technique such as Geographic Information System

Figure 2.2



(GIS) were also used to derive spatial information on environmental concerns, their solutions etc. After the preparation of the draft report, a summary version was prepared and was discussed in five regional workshops for feed back. The final reports were prepared incorporating the inputs from those workshops.

2.5 The Synthesis Process

The process of synthesis of all the inputs was a most difficult one and bound to do less than total justice to the richness of the process. Nevertheless in order to have a product that is actionable and useful a process of selection and prioritization is necessary. In carrying out the synthesis process therefore the following criteria were applied.

- o **The major concerns expressed by the people should be incorporated and addressed :** This was done by identifying the different concerns and issues raised by people in the different workshops as well as the questionnaires and analyzing the results.
- o **The major regional or ecosystem specific environmental problems should be addressed :** This was derived from people's concerns expressed in the earlier workshops as well as the consultative workshops. It also drew on the work done in the first NEMAP document. The people's opinions were analyzed using a Geographical Information System to see the geographical distribution of concerns.
- o **The major Sectoral Concerns were dealt with :** The main reason for this is the fact that the government ministries and agencies are divided along Sectoral lines and in order for any of them to be involved the issues need to be sectoral. This was done to ensure the participation of all the relevant government agencies. While doing this second NEMAP document which was largely sectoral based was taken into consideration.
- o **Institutional and Policy issues were addressed :** This was done based on existing government institutions and policies with the concerns expressed by the people.
- o **Proposed Actions would allow people's participation :** This was done by identifying the different actors in civil society including people, journalists, researchers, lawyers, professionals, youth etc. and suggesting roles for each of them where appropriate.
- o **Ensure that proposed Actions are practical :** This was achieved through a process of vigorous discussion and debate amongst the synthesis group and through the consultative workshops, which gave valuable feedback.

- o **Ensure that long term problems are not neglected** : This was done by recognizing the long term problems and suggesting early planning and vision exercises to deal with them.
- o **Ensure that the process of people's participation in NEMAP was adequately described** : This was done by having a separate volume describing the people's participation and also by preparing a specially commissioned video on people's participation in NEMAP.
- o **Ensure that the actions recommended were adequately prioritized** : This was done on the basis of people's concerns and priorities together with those of the government.

2.6 The Document

The NEMAP Document consists of four volumes namely (Fig : 1.2):

- o **Volume I** : A summary to be published and distributed nationally (in Bangla) and internationally (in English).
- o **Volume II** : The main document describing the concerns expressed by the people, the major issues and actions needed by different actors. It also considers existing government policies and prioritizes certain actions for immediate follow up.
- o **Volume III** : The actions prioritized in volume II are elaborated some what in the form of project concepts with an identification of possible lead institutions including government as well as non-government.
- o **Volume IV** : A description of the process of public participation with emphasis on the methodology used and examples of people's concerns as expressed by them.
- o **Volume V** : The technical Annex Volume giving a description of the data analysis, computer programmes, Geographical Information Systems used etc.

2.7 Preparation of the Action Plan

The Action Plan itself has been prepared in the following four steps (see diagram):

- Step 1: Identification of Major Concerns** : This was based upon the people's opinions expressed through the workshops as well as the questionnaires and

phone-in programmes. The seven major concerns identified by them in order of priority were :

- * Sanitation and health (lack of latrines and safe drinking water)
- * Socio-environmental (population, poverty, illiteracy)
- * Deforestation (tree cutting, lack of afforestation, loss of mangroves)
- * Pollution (air pollution, water pollution, industrial effluent)
- * Natural hazards (floods, drought, cyclone)
- * Water related (scarcity of surface & ground water, water stagnation, salinity)
- * Agro-chemicals (fertilizers, pesticides)
- * Others (erosion, biodiversity, fisheries, energy)

Step 2: **Listing and Synthesis of Major Issues :** This involved the main process of synthesis of a wide range of issues and concerns expressed from many diverse sources into the following groups of issues :

- * Institutional and Policy related issues (including inter-sectoral issues)
- * Regional Issues (including coastal zone, Farakka etc.)
- * Sectoral Issues (fourteen different sectors)
- * Long term issues (including urbanization and climate change)

Step 3: **Recommendations for Action :** These are based upon the recommendations made by the people themselves as well as professional groups and the government. The Actions thus identified are not confined to the government alone but are also directed to other parts of civil society namely :

- * Government (MoEF, DoE and other Ministries & agencies)

- * People
- * NGOs
- * Academics & researchers
- * Elected officials (including Members of Parliament)
- * Media
- * Educationist
- * Lawyers
- * Industrialists .
- * Other professionals

The list of recommended actions were prioritized for immediate action while others were left open for different groups to take up as they see fit and develop their own activities according to their own priorities.

Step 4: Prioritization of Actions : This was achieved based upon the opinions expressed by the people as well as professionals and government agencies. It also takes into account existing government priorities and policies in the field of environment as well as other sectors. Based upon these inputs a number of actions are identified for priority actions. These particular actions are then further elaborated into short Project concepts which can be taken-up for further action by the relevant agency or group. The list of actions thus prioritized is weighted in favour of government agencies as they will be the main actors, nevertheless actions for other parts of society are also prioritized and follow-up action for ensuring people's participation and monitoring is incorporated.

Finally, although it is admitted that the Action Plan is far from perfect and necessarily has probably neglected some issues and areas which certain groups may feel deserve higher priority, nevertheless it has attempted to be as responsive as possible to the concerns expressed by the different groups. It is also envisaged that the NEMAP will not be a one-off exercise but will be a living process in which the people will continue to be involved and monitor the activities to ensure that their concerns are genuinely being addressed.

3. INSTITUTIONAL ISSUES

3.1 Existing Institutions

The Government of Bangladesh recognizes the importance of environmental protection and sound management practice as the basis for long-term sustainable development in the country. In 1989, the decision was taken to create a single oversight Ministry - the Ministry of Environment and Forest - and within it a new Department of Environment along with the Forest Department. The Ministry is now a permanent member of the Executive Committee of the National Economic Council, which is the major decision-making body for economic policy issues and also approves all public investment projects. As the designated environment ministry, the Ministry of Environment and Forest has a key role in planning, reviewing and monitoring environmental initiatives and ensuring that environmental concerns are properly integrated into the national development process.

The ministry also bears responsibility for working with other ministries to ensure that environmental concerns are given due recognition in their development programmes. The ministry has an active part to play in policy advice and environmental action planning, in coordinating and overseeing the implementation of action plans, and in reviewing and monitoring the impact of development initiatives on the environment across all sectors. The ministry has recently been strengthened in a limited scale through the creation of some posts including some in planning.

The Ministry of Environment and Forest oversees the activities and interact with the following technical agencies :

Department of Environment (DOE);

Forest Department (FD);

Forest Industries Development Corporation (BFIDC);

Bangladesh Forest Research Institute (FRI) and the Institute of Forestry (Chittagong University);

Forestry Division of the Bangladesh Agricultural Research Council, and the National Herbarium.

The Department of Environment, as the technical arm of the Ministry, is responsible for environmental planning, management, monitoring and enforcement. The Department's responsibilities include: assessment and monitoring of tasks such as on-site surveillance of environmental improvement components of development projects; promoting environmental awareness through public information programmes; and controlling and monitoring industrial pollution. Recently the mandate of the Department has been expanded to include a stronger role in environmental impact assessment, and in formulating guidelines for line agencies involved in activities affecting air quality, soil and water conservation, afforestation, wildlife, critical habitats, fisheries and other natural resources issues. It is anticipated that the Department will set

environmental priorities, and formulate action plans to deal with high priority issues such as maintenance of water quality, control of deforestation and improved regulation of industrial wastes.

The Forest Department is primarily involved in the management and development of forestry resources in Bangladesh. The recently approved IDA-funded Forestry Resources Management Project includes the establishment of an Environmental Management Division within the Forest Department to help strengthen the environmental management of the Forestry Department's programmes.

The Planning Commission of the Ministry of Planning is responsible for the preparation of National Five-Year Plans. It allocates funds to individual Ministries responsible for implementing specific projects under these Plans and has the authority to supervise and coordinate cross-sectoral and inter-ministerial activities affecting the use of natural resources and the environment. At present, responsibility for environmental issues rests with the Planning Commission's Division for Agriculture, Water and Rural Institutions.

Although policy and programming frameworks (currently being finalized) provide a basis for addressing fundamental issues of environmental management and protection in Bangladesh, institutional capacity for implementing the various action measures identified for fulfilling the primary functions of environmental planning, monitoring and enforcement remains extremely weak. It is widely acknowledged that neither the fledgling Ministry of Environment and Forest nor its Department of Environment have yet developed the institutional capacity to substantially tackle problems of environmental management and protection.

The Institutional Issues under NEMAP have been considered in the following manner:

- o Intersectoral Issues
- o Local Environment Issues
- o Role of non-government Institutions
- o Implementation, monitoring and follow up of NEMAP
- o Strengthening of MoEF and DoE

Each of these are considered separately below:

3.2 Intersectoral Issues

(a) Introduction

Environmental issues are by definition intersectoral or cross-sectoral and require appropriate institutional mechanisms to deal with such issues. The Ministry of Environment and Forests being only one Ministry among many would find it difficult to resolve such inter-sectoral issues involving other line Ministries, some of which are much larger than MOEF. Thus there is clearly a need to develop institutional mechanisms to resolve such inter-ministerial issues at a higher level than the MOEF.

(b) People's perceptions

During the various consultation workshops people expressed their concerns about lack of coordination or institutional mechanisms both at national level as well as at local level. A number of recommendations were made for improved coordination and mechanisms for resolution of inter-sectional issues at both levels. At the national, inter-ministerial level a number of government agencies identified the need for such an institutional mechanism to resolve inter-ministerial issues relating to environment.

(c) Existing Policy

There exists already a National Environmental Council chaired by the Prime Minister with representation from all the Ministries as well as prominent persons from outside the government. This also has an Executive Committee chaired by the Minister for Environment and representation of different Ministries. At the Divisional level there also exists a Divisional Environment Committee chaired by the Commissioner with representation from all other government departments and even banks.

(d) Key Issues

The main problem in materializing the existing policy has been its lack of functionalization. The National Environment Council has met only once after the Earth Summit and launched a nationwide tree planting campaign. The campaign itself proved to be quite successful and showed the utility of activating such an inter-ministerial and national body chaired by the Prime Minister to launch a nationwide campaign. However, since then it has not been activated or used. Similarly the Executive Committee as well as the Divisional Environment Committees have also been dormant and many members of these committees are not even aware of their existence.

(e) Recommendation/Action

The main recommendation is, therefore, rather than proposing new Institutional mechanisms, to activate the existing institutional mechanisms, namely the National Environment Council, its Executive Committee and the Divisional Environment Committees. The responsibility for implementing this proposal will be with the Ministry of Environment and Forest and the issue to be used for activating the committees may be the implementation of NEMAP.

3.3 Local Environmental Issues

(a) Introduction

At the local level it was a frequently heard complaint from the people that there were no institutions responsible for environmental issues nor any mechanisms for dealing with inter-sectoral issues across different sectors. This is particularly important when conflicts or problems over natural resource use arise, such as water, land, forest, fisheries etc. The local government officials and people's representatives also feel the need for some local level institutional mechanisms.

(b) People's perception

People were particularly concerned about the lack of any local focal point for environmental problems and also the lack of any coordination between the existing sectoral institutions. People were also concerned that there be proposed mechanisms under NEMAP where by they could be next involved in the implementation of NEMAP at the local level.

(c) Existing Policy

As has been mentioned above there exists an Environmental Committee at Divisional level chaired by the Commissioner with representation from different government agencies at Division level. However, the Committees for the most part are non-functional. No such committees exist at lower administrative levels.

(d) Key Issues

The key issue here is how to activate the Divisional Environment Committees and develop mechanisms lower down the administrative stratum at District, Thana and even lower levels to coordinate and resolve inter-sectoral environmental issues. In particular such committees should ensure participation from people beyond government functionaries only.

(e) Recommendation/Action

It is therefore recommended that Local Environmental Committees (LEC) be set up at Thana level chaired by the Thana Nirbahi Officer with representatives from all government agencies at Thana level as well as non-government and people's representatives. These Thana Committees would discuss environmental issues involving inter sectoral coordination. It is further recommended that under NEMAP a number of locations be selected for implementation of this mechanism on a trial basis to refine the modus operandi before implementing on nationwide scale. The basis for choosing locations should be the grass root workshops where people identified local environmental problems. This would have the added benefit of involving local people who were consulted for the NEMAP planning phase, into the implementation phase as well. The initiative for this proposal should be taken by the MOEF under a pilot project (under NEMAP implementation and follow up).

3.4 Role of Other Non-government Institutions

(a) Introduction

As has been mentioned already environmental problems and issues cannot be addressed by government alone but require the inclusion of civil society as a whole including all other organized sectors. Such efforts need to be encouraged, supported and coordinated by the government.

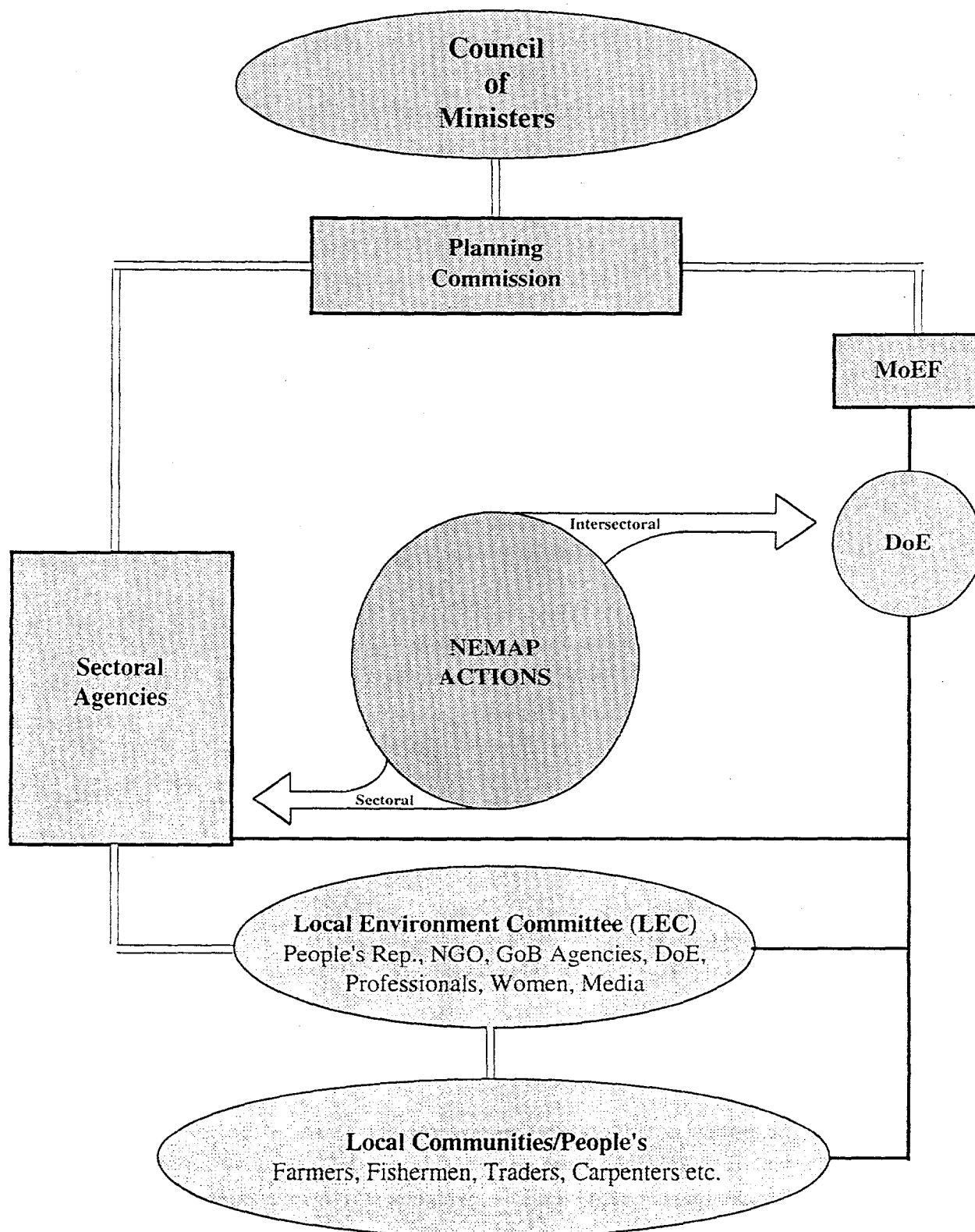
(b) People's perceptions

People from all walks of life and profession expressed a strong desire to participate in environmental activities in general and the implementation of NEMAP in particular. They expressed a need for having widespread participation in such activities to ensure their effectiveness. They also expressed a need for awareness raising and dissemination of the activities to give information to people about the implementation of NEMAP. It was strongly felt that environmental issues and problems are particularly amenable to getting largescale participation, from all sectors of society.

(c) Existing Policy

There is no specific policy on involving non-government sector in policy implementation. However the present democratic government has a general policy of involving people's participation in all its development activities. The involvement of people from all walks of life and this was also the basis for the preparation of NEMAP and thus it is implied that these sectors also need to be involved in its implementation.

Figure 3.1 : Proposed Institutional Arrangement for the Implementation of NEMAP



(d) Key Issues

The key issue is how to involve all sectors of civil society including people, NGOs, youth, academics, private sector, lawyers, doctors, engineers, other professionals, media, farmers, fishermen etc, in environmental activities in general and NEMAP implementation in particular. A related issue is to strengthen the capacities of the different sectors of civil society e.g., NGOs, private sector, academics, media, etc to actively participate in environment and NEMAP related activities.

(e) Recommendation/Action

The proposed action is for each sector of civil society to become aware of the different activities under NEMAP and to undertake different elements of the Action Plan as they choose. They can do so either on a voluntary basis or by raising their own resources for the purpose. The role of the government will be to encourage the different sectors in their activities and to act as a clearing house for information sharing and dissemination.

3.5 Implementation, Monitoring and Follow-up of NEMAP

(a) Introduction

There is a clear need to have institutional mechanisms to implement, monitor and follow-up the NEMAP process through the coming years. This is particularly true as NEMAP is to be a living process which will be re-visited time and time again to review and make course corrections.

(b) People's perceptions

One of the strongest sentiments expressed by people during the NEMAP consultation phase was the lack of follow up and more particularly not keeping people informed of such follow up actions. They were, therefore, extremely keen that adequate follow-up measures be built in to the plan.

(c) Existing Policy

Although there is no existing policy with respect to NEMAP implementation it is expected that once NEMAP is adopted it will be accepted as policy. However, the existing Environment Policy may also be seen as a framework for the implementation of NEMAP.

(d) Key Issues

The key issues are how to manage effective implementation, monitoring and follow up of NEMAP both within as well as outside the government. It is also important to keep the element of government - non-government cooperation and people's participation as practiced in the consultative phase in the implementation phase as well.

(e) Recommendation/Action

It is proposed that the NEMAP secretariat in the MOEF continue its activities to coordinate the implementation phase of NEMAP. It is also proposed that the existing steering committee continue with representatives of all the Ministry focal points as well as non-government representatives to oversee the implementation phase of NEMAP. The specific, immediate steps to be taken by the NEMAP Secretariat and Steering Committee will be the following.

- o Activate the National Environment Council headed by the Prime Minister to consider and adopt the NEMAP
- o Activate the Executive Committee of the NEC to adopt and implement NEMAP
- o Ensure the widest possible dissemination and distribution of NEMAP nationwide
- o Start the implementation phase by carrying out a more detailed costing exercise for the different components of the Plan
- o Start pilot projects for implementation of the Local Environment Committees (LECs) in selected eco-specific locations
- o Support efforts by other Ministries, non-government organizations, media, elected representative, academics, youth groups and others to implement various parts of the Plan
- o Develop an information clearing house for NEMAP related activities with a dissemination component.

3.6 Strengthening of MoEF and DoE

(a) Introduction

The Ministry of Environment and Forest (MoEF) has been given a wide mandate and responsibilities under the Environment Policy and environmental legislation which will increase

Table 3.1 Institutional Issues

Key Issues	Recommended Action	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 examine and adopt NEMAP
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 including women and youths 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, Ministry of Sports and Youth, Ministry of Women and Children Affairs and others.	Take up specific actions under NEMAP for implementation through different group activities including women and youth.
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

* Priority

considerably with the implementation of NEMAP. Both the MoEF and its implementing agency, the Department of Environment (DoE) lack adequate manpower, expertise and other resources to fulfil their mandates 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 enforce regulations by the DoE and MoEF. It was therefore generally felt that strengthening the capacity of both MoEF and DoE should be 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 needs 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 effectively assess and monitor projects for their environmental impact; and
- * it suffers from a shortage of basic facilities, equipment and logistic support.

The Department of Environment faces similar weaknesses as identified below :

- * 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 for planning, monitoring, publicity, and for framing and enforcing legislation ;
- * lack of an 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 a 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 fulfil 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 in order to identify specific actions needed to strengthen their capabilities and capacity to carry out their mandates and responsibilities.

4. SECTORAL ISSUES AND ACTIONS

4.1 NATURAL HAZARDS

4.1.1 Introduction

Vulnerability to natural disasters like cyclones, floods, droughts, tornadoes and desertification are the major environmental concerns in Bangladesh. The task of sustaining the very limited resource base aggravated by population growth, over exploitation of these resources with consequent environmental degradation has further been complicated by natural calamities damaging resource base further including flora and fauna.

Damaging tropical cyclones in coastal areas uproot trees, telephone, telegraph and electricity lines, bridges, culverts and houses and kill people and household animals leaving serious adverse effect on economy and environment.

Damaging floods like that of 1988 brings in untold suffering to millions of people, death, disease and hunger, damage standing crops, destroy physical and economic infrastructure, fish and shrimp ponds and hatcheries etc.

People in a country that is blessed by enough rain are not always well fed. Droughts take a large bite from Bangladesh agricultural economy, causing instability and insecurity.

Disasters which cannot be prevented can be managed with adequate planning and adaptation. Government policy is thus to help avoid disaster or take adequate preparation to face and eventually overcome inevitable disasters.

4.1.2 People's Concerns

Large number of participants from a wide geographical coverage expressed different environmental concerns associated with natural hazards. Natural hazard as an environmental concern were reported from 152 thanas by 1752 participants of which 67.35% were male and 32.65% were female participants. They considered natural hazards as their main environmental concern. The major natural hazard as mentioned by them were cyclones, tidal surge, flash flood, river bank erosions, droughts etc. As an environmental concern of the general mass, natural hazards deserves to be addressed adequately.

4.1.3 Existing Policies

The main sector having influence on their concerns is the water resources sector extending and crosscutting other line agencies like Ministry of Relief and Rehabilitation and Disaster Preparedness Bureau etc.

Policies towards these serious concerns have been manifested in the development of a comprehensive flood management plan under "Flood Action Plan". The plan proposes control of damaging floods and mitigating their effects. At the same time beneficial effects of flood water was ensured. Safety of human lives having the highest priority, a master plan was developed selecting cyclone shelters. A massive construction programme of these shelters are continuing. Under Barind development programme massive afforestation work is under way to alleviate areas from the process of desertification and drought.

Flood Action Plan was guided by eleven principles which over the years have changed substantially based on intimate knowledge gained during the study. The Guiding principles may be noted as follows.

Two of the eleven guiding principles deal with flood preparedness, flood forecasting, early warning and disaster management. The studies under taken so far have gained a lot of insight and have come up with proposals to deal effectively with the situation, and the Government of Bangladesh is expected to adopt the following policies to deal with these serious environmental concerns.

With considerable potential for improving the national economy, flood forecasting and warning is to provide improved information to aid national preparedness for floods. Under this programme the government is expected to achieve :

- Comprehensive flood operation centre in BWDB
- Improvement of facilities for hydrological and meteorological monitoring including automatic telemetry, upgrading micro wave link to provide multi channel data transfer facilities for radar imagery and catchment rainfall estimate.
- Improvement of lead time and accuracy for real time forecast on main and secondary data.
- Development of real time forecasts at the regional level and provision of local depth-area flood forecast.
- Mike 11 flood forecast model or other advanced models when they are available to fairly accurate forecast with at least 72 hour lead time.

- Micro Computer based Local Area Network (LAN) using UNIX system to process data, operate model and generate forecast output.
- Improvement of facilities for receiving data from India (Teleprinter, facsimile and land line link)
- A micro-computer system for receiving and analyzing weather information from NOAA and other polar orbiting satellites.
- Improvement of lead time and accuracy for real time forecasts on main and secondary rivers.

Considering the importance of protecting peoples life and property, a viable programme of flood preparedness cannot be over emphasized. The disaster preparedness programme of the government of Bangladesh envisages to increase the capacities of households and local communities in highly disaster prone areas to cope with cyclones, flood and other potentially disastrous situations, through development of the following institutional arrangements:

- Achieving a functioning Disaster management Bureau integrating civil and military capabilities,
- Disaster management training,
- National policy statement and relevant legislation,
- Improved assessment procedures, guidelines and criteria,
- Guidelines as possible assistance needs,
- Guideline for resource allocation,
- Improved cyclone warning message content and dissemination,
- Local level flood prediction and warning dissemination system,

Cyclone protection project under FAP with the government of Bangladesh's approval hopes to achieve :

- to protect polders against saline water inundation,
- to provide protection against loss of life and damages caused by cyclonic storm surges,

- to critically review the midterm design programme of coastal embankment work.

4.1.4 Key Issues

The key issues in this sector are :

- Inadequate scientific knowledge on natural hazards and disasters.
- Timely and correct hazard forecasting. Inadequate hazard management preparedness.
- Lack of hazard proofing measures.
- Lack of knowledge on peoples' perception and their coping mechanism with natural hazard.
- Poor and uncoordinated post hazard intervention and management.

4.1.5 Actions Required

The key issues in the sector as reflected in the people's perception and existing policy are:

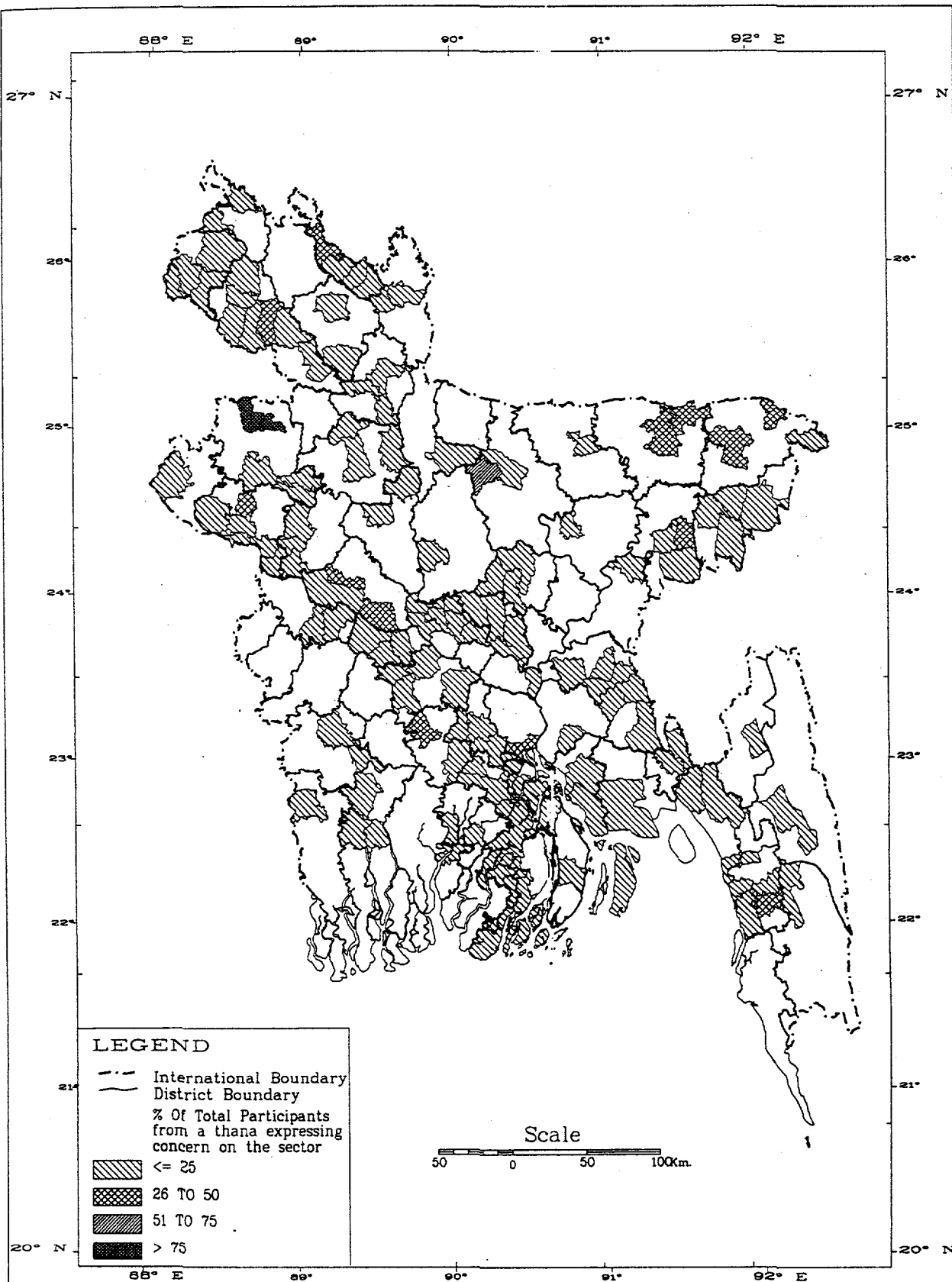
- (a) institutional weakness to address issues like: hazard forecasting, preparedness, post hazard intervention and management activities and hazard proofing;
- (b) unplanned development structures leading to susceptibility to natural hazards;
- (c) degradation of environment such as; silting of river, deforestation etc. leading to susceptibility to natural hazards;
- (d) lack of scientific knowledge and knowledge of people's perception on natural hazards.

Although the major concerns related to natural hazard have been reflected in the existing policies, institutional arrangement to implement the policy is still lacking. People perceive cyclones, tidal surges, flash floods, river bank erosion and drought as the main natural hazards that cause environmental degradation. The existing government policies do not focus on all these hazards (major policy focus is on floods and cyclones). People have suggested preparedness for hazards, post hazard rehabilitation, removal of unplanned flood control structures, afforestation, re-excavation of rivers, taking hazard proofing measures, environmental awareness etc. as the solutions to the major hazard related problems.

Table 4.1.6 : Natural Hazards/Disaster

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	MoW, BWDB, Met. Office, SPARRSO	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) *
Lack of scientific knowledge on natural hazards as well as lack of knowledge of people's perception	Scientific study on hazards	Project	SPARRSO, Research Organizations, People Community Organizations/ NGOs, LGED	Research programmes
	Study on people's perception on hazard	Project	SPARRSO, Research Organizations, Community Organizations/NGOs, LGED	Research and study programme
	Hazard mapping	Project	SPARRSO, Research Organizations, LGED, Community Organizations/ NGOs	Survey and mapping
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	MoR&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 Go agency's capabilities	Project	Disaster Management Bureau, ADAB	Creation of computerized database on hazards/disaster management by using GIS as a tool

* Priority



GIS CENTRE
 BANGLADESH CENTRE FOR ADVANCED STUDIES

SPATIAL DISTRIBUTION OF PEOPLE'S CONCERNS
 REGARDING NATURAL HAZARDS

NATIONAL ENVIRONMENT MANAGEMENT ACTION PLAN (NEMAP)

4.2 INDUSTRY (pollution/siting)

4.2.1. Introduction

With the dwindling share in GDP of agriculture sector and increasing contribution of industrial sector coupled with increasing incentives by the Government in the sector without advance planning shall lead to waste and depletion of already scarce natural resources, increased level of air, water and soil pollution and accumulation of hazardous wastes.

Industries both in public and private sector based on renewable agricultural resources and non-renewable depleting resources shall increasingly produce biodegradable and heavy metal toxic wastes and it has thus become imperative to take precautionary steps before serious environmental problems engulf and natural carrying capacity is exceeded in this densely populated country.

Most of the environmental problems are associated with low level of environmental awareness in industries, inappropriate location and choice of technology as well as absence of appropriate legislation and compliance.

4.2.2 People's Concerns

Grass root level workshops, professional and other interest group workshops, questionnaire survey etc. trying to capture people's perception adequately demonstrated that people at different levels are quite aware of the problems and associated manifestation of the problems though such assertions are not conveyed in technical/sophisticated jargon but in simple down to earth expressions.

Consensus perception of problems emanated from this sector and conveyed by the people may be summarized as follows:

- Black smoke from factories, Vehicles and brick making kilns.
- Sound pollution from factories and vehicles
- Effluent from factories render the waters in *Khal/Beel* unfit for the use of the community.
- Effluent from factories are responsible for the mass killing of fish and other aquatic lives.
- Solid waste disposal from factories.
- Fertility of soils around factories are dwindling.
- Siting of factories without planning.

- Poor working conditions in the working places.
- *Building industries in the residential areas.*

4.2.3 Existing Policies

The Ministry of Industries (MoI) most recent industrial policy was formulated in 1990 and raises the following issues :

- dis-investment and privatisation
- industrial financing through large scale institutional credit aimed at encouraging private entrepreneurship
- raising efficiency in the public sector
- promotion of importing substitution industries and trade liberalisation
- export promotion (especially the enhancement of non-traditional exports)
- Creation of export processing zones to attract foreign investment
- encouraging the dispersal of industries from established industrial cluster zones to other parts of the country.

Subsequent to this policy, in 1992 there has been a process of investment liberalisation and increased access of the private sector to previously closed investment areas such as telecommunications, air transport and energy.

Environmental Policy

The Government's environmental policy contains the following specific statements with respect to the industrial sector.

- Adopt corrective measures in phases in industries that cause pollution.
- Conduct Environmental Impact Assessments (EIAs) for all new public and private industries.
- Banning the establishment of any industry that produces goods that cause environmental pollution, closure of such existing industries in phases and discouragement of the use of

such goods through the development and/or introduction of environmentally sound substitutes.

- Assist the development of environmentally sound and appropriate technology, encourage relevant research and extension activities, balance such initiatives with the best use of labour and provision of fair wages.
- Ensure sustainable use of raw materials in industries and prevent their wastage.

The Department of Environment has proposed new legislation to combat industrial pollution which is likely to include the following :

- Require that all new industries obtain DoE and Ministry of Industry's clearance on siting.
- Introduce a new pollutant permitting system.
- Stipulate emissions and effluent standards for industries.
- Provide more stringent penalties for polluters.
- Require Environment Impact Assessments of all new industrial developments.

4.2.4 Key Issues

The contribution of the industrial sector to the economy of Bangladesh has been minimal over the last few decades. However the recent trend of industrialisation has lead to an increase in traditional industrial activities such as textiles and tanneries and the establishment of new industries such as electronic components manufacture. The trend towards industrialisation is necessary for the economic development of Bangladesh. It also presents the main vehicle for increasing employment opportunities for the growing urban populations, especially since the agricultural sector, which dominates the economy, offers limited potential for an increase in sectoral employment.

Existing industries create a number of environmental problems throughout the country, though these are mainly concentrated in Dhaka, Chittagong and Khulna areas. Much attention has been paid to characterising these problems and the results are documented in several reports. In outline, the environmental issues of the industrial sector include the following.

- Pollution arising from various industrial processes and plants throughout the country causing varying degrees of degradation of the receiving environment(air, land and water).
- There is a general absence of pollution abatement in terms of waste minimisation and treatment.
- Low level of environmental awareness amongst industrialists and entrepreneurs.
- Lack of technology appropriate to efficient use of resources and waste minimisation leading to unnecessary pollution loading in the environment.

- Economic constraints on pollution abatement and waste minimisation such as the cost of new technology, the competitiveness of labour, and intensive production methods as compared to more modern methods.
- Concentration of industry and hence pollution in specific areas which exacerbate localised environmental degradation and exceed the carrying capacity of the receiving environment.
- Unplanned industrial development has resulted in several industries being located within or close to residential areas which adversely affects human health and the quality of the human environment.
- Inadequate regulatory control (guideline) of industrial pollution arising from lack of appropriate legislation (an Environmental Protection Act is currently in force), and inadequate resources amongst regulatory bodies, compromising their effectiveness.
- Establishments of industries at the cost of good agricultural lands and in the residential areas.
- Lack of incentives to industrialists to incorporate pollution treatment plant in their industries.

The industrial sector has significant impacts on human health, agriculture, fisheries, water supply and the quality of the urban environment, mainly as a result of pollution (chemical and to a lesser extent thermal). Some inter-sectoral conflicts also arise out of unplanned development which often leads to the establishment of industries in urban areas and upon prime agricultural land.

4.2.5 Actions Required

People's concerns in this sector pertain to pollution arising out of emission, effluent, siting of industrial establishments in residential areas and good farm lands, poor working environment, absence of adequate laws, regulations and guidelines, lack of pollution abatement technology.

Sectoral plan has put emphasis on the development of industries which has the potential to increase industrial pollution in the country. The environmental policy and the proposed environmental legislation although providing for addressing industrial pollution issues, their implementation and enforcement would be uncertain without the pollution abatement regulation, guidelines and Environment Quality Standards. The requirements in this regard are also reflected in the following solutions to industrial pollution suggested by people: controlling unplanned setting of industries, better waste management measures, setting standards for environmental quality, regulation to control pollution and providing better working environment, give incentive to private sector to adopt pollution free technology.

The actions planned for this sector would therefore, put emphasis on the formulation of proper guidelines, setting quality standards, ensure better working environment, prepare action plan for heavily polluting industries in existence, motivate private sector to adopt pollution abatement technology.

Table 4.2.6 : Industry

Key Issues	Recommended Action	Type of Action	Actors/Agencies	Specific Action
Pollution from 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, DDE	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	DoE, MoI, BoI	Preparation of industrial guidelines *
				Institutional strengthening of DoE & MoI for the application of guidelines
Lack of landuse/zoning control on the location of industries	Application of zoning/landuse guideline	Policy/Project	DoE, MoI, BoI, MoL	Proper Application of the zoning and landuse guideline
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
Pollution from tanneries	Effluent treatment plants		MoI, DoE, Tannery industrial Units	Erection of treatment plants in the tannery units *
				Central treatment plants
				Physical test study
	Relocation of tannery industries	Project	DoE, MoI	Feasibility Study
Occupational health	Preparation of guidelines and setting standards for working environment	Policy/Project	DoE, MoI, MoHEP	Preparation of guideline and its implementation

* Priority

4.3 WATER RESOURCES

4.3.1 Introduction

Water is one of the two principal natural resources of Bangladesh which needs to be exploited most optimally and with great caution to achieve a bare minimum sustainability to feed the growing population.

Water resources development traditionally connotes the idea of flood control, drainage and irrigation to boost agricultural production. In recent years the national controls have been questioned considering the discernible adverse impacts on the most productive sector of flood plain fisheries. The imperatives of growing more cereal food grain having great political price, none the less continues to linger and as such shall continue to dominate the planning in this sector.

4.3.2 People's Concerns

Grass root level workshops , professional and other interest group workshops, questionnaires survey, trying to capture people's perception adequately demonstrated that people at the grass root level are quite aware of the problems. But the problems were viewed by the people in their own way, depending on their experience at one geographical location. Consequently there were differences about perception.

From 136 thanas 1032 participants have mentioned different environmental concerns related to water sectors. Among these 64.24% were male and 35.76% were female participants. 28.58% participants among the above mentioned participants mentioned that FCD/I created environmental problems. Map 4.3 show spatial distribution of people's concern in the water sector and concerns about FCD/I created environmental problems respectively.

Perception of the problems as expressed by the people may be summarized as follows: (some of the problems having cross sectoral extent have been placed under the most appropriate sector).

- Floods, with consequent loss of crops, damage to trees and housing, death and destruction of household animals and birds, scarcity of potable water, outbreak of diseases.
- River bank erosion initiated by flood renders people homeless, siltation of river having debilitating effect on river transport and marketing of agricultural produce.
- Construction of embankment and sluice gates without adequate planning having effect on drainage and fisheries.
- Decrease of water in khals and beels with consequent decrease in fish population.
- Changing trend in precipitation.

- Excessive and inappropriate use of fertilizer and pesticides manifesting them in surface and ground water.
- Water pollution is leading to skin diseases.
- Fertilizer and pesticides changing soil chemistry and formation.
- Availability of water is decreasing.
- Embankments prevent deposition of silt on land.
- Water related insects are increasing in number.
- Ground water level gone down having effect of availability of drinking water.
- Iron in water is manifesting itself more prominently.
- People are not consulted before the FCD/Is are planned.

4.3.3 Existing Policies

The Fourth Five Year Plan (FFYP) outlines a number of policies within the water sector which include the following :

- Bringing shallow and medium flooded land under controlled flooding to permit environmentally desirable integrated agriculture and aquaculture development.
- Facilitating the safe harvesting of winter crops through the construction of submersible embankments.
- Improved drainage, especially at the thana level.
- Undertaking comprehensive analysis of FCD/I projects including social costs and externalities and improving the quality and implementation speed of schemes.
- Rehabilitating existing projects in the light of past experience.
- Implementing big projects through a modular approach.
- Maximizing local participation of all project stages from formulation to implementation and operation to maintenance.

The main strategy in this sector continues to be an increase in irrigated area to allow greater crop production.

Environmental Policy

The Government's environmental policy contains the following specific statements of water resources.

- Ensure environmentally sound utilization of all water resources.
- Ensure that actions taken to develop water resources and irrigation networks do not create any adverse impacts on the environment.
- Ensure that all steps taken for flood control, including construction of embankments, dredging of rivers, digging of canals etc., are environmentally sound at the local, regional and national levels.
- Mitigate adverse environmental impacts of completed flood control and water resources management projects.
- Keep the rivers, canals, ponds, lakes, haors, baors and all other water bodies and water resources free from pollution.
- Make the management of ground and surface water resources scientific, sustainable and environmentally sound.
- Conduct Environmental Impact Assessment before undertaking projects for water resources development and management, and integrate their recommendations into the project.

4.3.4 Key Issues

Due to the deltaic nature of Bangladesh, the management of water resources dominate environmental and developmental planning in many sectors. In the past there has been a tendency for planning to be sectoral in nature with a limited awareness of the impacts that FCD/I and other infrastructure projects have on other sectors.

As a result, environmental impacts have arisen in several sectors and geographical areas. They include impacts on fisheries, mangroves, wetland, agricultural land, settlements, water transport and the quantity and quality of water supplies. The major of the key issues of concern are as follows :

- Inadequate planning of FCD/I projects and failure to consider their wider impacts has led to environmental degradation in some areas due to, inter alia, drainage of wetland, flooding, waterlogging, siltation and salinisation.

- Insufficient consultation with local groups and project-affected persons has provided little incentive for community cooperation which is necessary for the long term viability of projects.
- Poor design of flood control projects often creates problems of localized flooding in neighbouring areas as the wider patterns of natural drainage have not been considered in the project design.
- Lack of institutional capacity within key implementing agencies such as the BWDB, for environmental planning and management has both created and exacerbated environmental problems in FCD/I project areas.
- Inadequate operation and maintenance of FCD/I projects has led to siltation of khals, land drainage problems and extensive damage to coastal and river defence.
- Inadequate action taken to prevent embankments being damaged by squatters and shrimp farmers.
- Management of land use within polders has been inadequate with the result that land use conflicts have arisen; principally amongst rice and shrimp farmers and in areas where polder land levels and cropping patterns vary.
- Decline of water table below the suction limit at peak dry season rendering tubewells non functional for several months in some areas.
- Insufficient information exists in many areas on seasonal variations in surface water flows and ground water availability to allow accurate determination of sustainable yields. Over abstraction of ground water resources in some areas has arisen due to inadequate planning or regulatory control. It has lead to seasonal abstraction difficulties and salinisation of ground water in some areas.
- Water management practices amongst many farmers are inefficient leading to wastage of water resources.
- Improved technology of water delivery systems has not been available to large sections of the farming community.
- Project feasibility studies have often failed to consider socio-economic costs and benefits and the economic costs of natural habitat degradation.
- Insufficient expertise for the assessment and management of compensation and resettlement issues exists within key line agencies such as the BWDB.

4.3.5 Actions Required

People's concerns in this sector relate mainly to flood damages, riverbank erosion, environmental degradation of water bodies, increased water pollution, ill design, planning and implementation of water development structures and lack of participation of people in them, unacceptable compensation package, non availability of irrigation water, drainage congestion, withdrawal of water from Ganges by India, etc.

The above issues are covered in the broad frame work of the sectoral plan and environmental policy. However, sectoral guidelines and institutional arrangement to implement the policy is still lacking. Further, methodology to plan, design and implement the water sector interventions through a people's consultative process has not been developed and there is not much existing experience in this regard.

People's suggested solutions on the above key issues are as follows: removal of ill planned water development structures, re-excavation of water bodies, providing adequate irrigation water, stop deforestation and encourage planting, providing adequate culverts, bridges for the flow of flood water, taking flood proofing measures in consultation with people regarding water development projects during planning, designing and implementation stages, provide adequate compensation to the project effected people, negotiate with India regarding Ganges water sharing. Suggested planning actions in this sector have broadly been formulated on the basis of the above solutions proposed by people.

Table 4.3.6 Water Resources

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Flooding and associated loss of life and property	Flood protection measure with people's participation	Project	MolWDFC	Flood protection projects with popular participation and proper environmental impact assessment *
	Flood Proofing	Project	Community Organizations/NGOs, People, LGED, MOR&R, Bureau of Disaster Management MolWDFC.	Pilot project in different flood regime
	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	MolWDFC, Universities, Research Organisations, People	Review of FAP 16 guideline for recommendation and 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	MolWDFC, People	Development of methodology with inputs on ADAB, CEN *
			ADAB, CEN, People	Lobbying and advocacy for GO & NGO collaboration
Poor designing & planning of FCD/I projects leading to over toping bridges	Design review of existing plan and on going FCD/I projects.	Project	MolWDFC	Design review of FCD/I projects taking environmental concerns under consideration
Draining of Wetlands, water logging, flooding, siltation, salinity & Depletion of Biodiversity	Mitigation, restoration wherever possible	Project	MolWDFC, People	Implementation of pilot projects
Flood protection measures impeding fish migration and natural recruitment	Re-designing the projects for creating infrastructure for facilitating fish migration to and from flood plains	Project	WDB, DoF	Pilot project in NW, Chalan beel area, Haor area, Meghna-Dhanagoda, CIP and coastal areas
	Research Development activities on the fish migration & natural recruitment in the FAP area		Universities, Research Organizations	Research/Projects and study programme
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)	Creation of research centre/institutions dealing with water sector data base backed up by GIS capabilities
	Institutionalization of SWMC, FAP 19, FAP 16, FAP 21 for the creation of national capability in water sector flood management modelling, flood forecasting and disaster management	Policy	MolWDFC	Development of appropriate project proposals for institutionalization of FAP 19, FAP 25, FAP 27 & SWMC in water sector organizations (WARPO, FRI etc.)
Unplanned abstraction of ground water leading to draw down of the water table, failure of shallow and deep tubewells	Preparation of guideline for planned abstraction of ground water	Policy/Project	MolWDFC, LGED (For small scale irrigation project)	Preparation of guideline and its implication
	Rehabilitate tubewells	Project	PPHE, LGED, NGOs	Low cost methods to rehabilitate tubewell
Over usage of surface water leading to drying up of wetland and causing navigation problems	Inventory on storage capacity	Project	MoFL	Comprehensive survey and mapping using remote sensing techniques
	Increasing storage capacity for holding flood water	Project	MoFL, LGED, Community Organizations/ NGOs, People	Excavation of rivers, canals etc.
Lack of consideration of impacts on the socio-economic condition of the affected people under FCD/I project	Incorporation to socio-economic impact study in the FCD/I projects	Policy/Advocacy/Project	Research Organization, Community Organizations/NGOs) Universities, Private sectors, People	Preparation of projects for base line studies for its monitoring and evaluation
Problems associated with acquisition of land under water development projects	Appropriate compensation package to the affected people	Policy/Advocacy	MolWDFC, Moland, People	Compensation Package or Resettlement Programmes in the Khaslands
Reduction of availability of water during the dry season in the Padma river due to the construction of Farakka barrage	Formulation of strategy at both national and international levels	Policy/Advocacy	MoEF, Mol, MolWDFC	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
Soil Conservation issues	Soil conservation measures in areas with high soil erosion such as Modhupur Tract, Hill slopes of Chittagong and Sylhet	Advocacy/Policy	DoF, 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

* Priority

4.4 ENERGY

4.4.1 Introduction

Availability of bio-mass fuel for domestic need has reached to a crisis proportion and shall exacerbate with uncontrolled population growth. Need of domestic fuel still account for the major share of energy use and must be satisfied. With the expansion of agriculture and the need to grow more food, energy input in the form of draught power shall increase. The limiting effect on already unsustainable, underfed cattle head is likely to be replaced with power. Continued withdrawal of bio mass from land already under intensive agriculture will have a declining trend in agriculture.

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 imported, mostly petroleum products. Sustainable use of natural gas in long time frame and proposed coal mining need to under go environmental audit and monitoring for their extraction, conveyance and use.

4.4.2 People's Concerns

Grass root level workshops, professional and other interest group workshops, questionnaires survey trying to capture people's perception, did not demonstrate that people at the grass root level are aware of the problem.

Depletion of energy resources (forest treated as different sector) was reported as a concern neither from significant number of participants nor from a wide geographical range.

Local concerns did not extend up to commercial energy and its ramifications except non and timely availability of fertilizers, cow food and fuel (particularly during flood).

Consensus perception of problems emanated from this sector and conveyed by the people may be summarized by follows :

- Indiscriminate felling of tress causing decline in tree coverage in the homesteads.
- Brick kilns use wood causing shortage of fuel wood for house hold use.
- Fuel is becoming dearer beyond the purchasing capacity of community.
- Depletion of forest coverage under government management.
- Reduction of cowdung as a fuel as a result of decline of bovine population and its alternate use as fertilizer.

4.4.3 Existing Policies

The main sectoral aim as stated within the FFYP is to provide an assured supply of energy to people and industry, partly facilitated by improved extension activities. Improving the quality of rural life and reducing environmental degradation are additional concerns.

Several strategies are proposed in the FFYP, the following are of particular relevance to sustainable development in the energy sector.

- Improved extension services for energy conservation technology.
- Diffusion of biogas technology to cattle herd owners.
- Increasing the availability of coal to brick field owners.
- Increasing the availability of low cost kerosene and LPG.
- Intensification of fuel wood plantations.
- Use of solar power in hospitals and other multi building premises and in remote areas.
- Establishment of alternative energy production systems such as micro hydro-power.
- Developing a decentralised energy development plan with the involvement of beneficiaries.

Environmental Policy

The Governments Environmental Policy makes the following specific statements on energy and fuel.

- Reduce and discourage the use of those fuels that pollute the environment and encourage the use of these fuels that are environmentally sound and less harmful.
- Reduce the use of fuel wood, agricultural residues, etc and increase the use of their substitutes.
- Adopt appropriate precautionary measures regarding the use of atomic energy which has adverse impacts on the environment and take preventative steps against all radiation and nuclear pollution.
- Invent, use and rapidly expand improved technology for saving energy and fuel.
- Conserve the country's existing and renewable sources of energy.
- Conduct EIAs before implementing projects for extraction of fuel and mineral resources.

4.4.4 Key Issues

Key environmental issues in the Energy sector are as follows :

- Deforestation to satisfy rural energy requirements has caused problems of flooding, soil erosion and siltation in many areas.
- The use of livestock manure for fuel in rural areas deprives the soil of natural fertiliser and leads to nutrient depletion and the loss of soil organic matter.
- There has been a general reluctance for alternative renewable rural energy sources to be developed (such as solar, wind and micro-hydropower) and the technological base in Bangladesh for developing such sources are inadequate.
- Energy conservation awareness is generally low throughout the country.
- Flat commercial rates for natural gas encourages wastage of the resource.

The heavy reliance upon biofuel in the rural areas has direct influence on soil physio-chemical characteristics and the availability of fodder and fruit trees. Development within the energy sector can directly influence the rates of environmental degradation, particularly if there is a shift towards the use of coal and peat, increased use of gas for domestic purposes and the development of appropriate alternative energy production technologies in rural areas. This will benefit several environmental concerns in the agriculture and forestry sectors.

4.4.5 Actions Required

People's concerns in the energy sector relate mainly to shortage of fuel wood due to depletion of homestead forests, government managed forests, increased use of wood in the brick kilns and non availability of cow dung as fuel due to decline of bovine population, lack of awareness on energy conservation.

Solutions to the energy crisis and actions suggested by people are : involving people in mass tree plantation, forest conservation and regeneration, increase bovine population, motivate people to use energy efficient chulas (stove) and making people aware about the causes of fuel shortage.

Both sectoral and environmental policies take into account the rapid depletion of fuel wood resources situation and put emphasis on the development of alternate sources of energies, energy conservation and tree planting to cope with the situation. However, the policies are not very much explicit on involving people for implementing programmes for sustainable development of energy through awareness raising. It is important that the solutions suggested by people are also taken on board while formulating actions in this sectors as the fuel wood crisis affects millions of people in Bangladesh on a day to day basis which is putting stress on the already depleted tree cover of the country.

Table : 4.4.6 : Energy

Key Issues	Recommended Action	Type of Action	Actors/Agencies	Specific Action
Heavy reliance on bio-fuels, fuel, wood, agri-residue, cowdung for fire	Development of awareness about the alternative use of agricultural residue and animal waste	Policy/Advocacy/Project	Community Organizations/NGOs, DoE, People	Media Campaign and demonstration etc. on alternate energy resources
	Development 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	Research Organizations, DoE, Community Organizations/NGOs,	Pilot projects
				Research and Development projects on efficient chulas

* Priority

4.5 FORESTRY

4.5.1 Introduction

Forests with their great natural ecological resources, serving humanity for thousands of years are decline on the wear in Bangladesh and has reached an all time low in recent years. Apart from timber the forest supply fuel wood, thatching materials, honey, fish and wax etc but the shrinking forest is gradually failing to supply the increasing demand.

Forests are also important to mankind for the various life forms that it supports including wild life and bio-diversity. Preservation of genetic resources is both a matter of insurance and investment that is necessary to sustain and improve the production in agriculture, forestry and fishery, to protect against harmful environmental changes, and to prevent extinction of species whose virtues are not yet known.

Signing of the June 1992 Rio Declaration, manifests the serious commitment on the part of the Government of Bangladesh, and actions taken in various projects, as such must conform to the long term sustainability policy.

4.5.2 People's Concerns

Grass root level workshops, professional and other interest group workshops, questionnaire survey trying to capture people's perception adequately demonstrated that people at the grass root level are quite aware of the problems.

Large number of participants, both male and female, from a wide geographical range, have reported environmental concerns related to forestry sector and most of these are on the rapid depletion of forest resources, both natural and village forests. 2369 participants from 272 thanas, expressed concerns related to forestry sector. Among them 72.77% were male and 27.23% were female participants. Map 4.5.1 show spatial distribution of participants who reported concerns in the forestry sector.

Importance of forestry, wild life and bio-diversity in the life of common people were adequately demonstrated through the long list of concerns expressed by the participants. People from different geographical areas having different setting like plain land, forested plain land, mangrove forest area, upland forested area, had different specific concerns but one concern was universal that trees and different life forms are disappearing with adverse effect on their lives.

Perceptions of problems emanated from this sector and conveyed by the people may be summarized as follows. Some of the perceptions are not necessarily scientifically correct but can be extended to understand the seriousness of the problem.

- Different species of plants bearing flowers and fruits are becoming rare and some of them completely extinct.

- Different species of animals are either rare or extinct.
- Different species of fish in the forest wetland are either rare or extinct.
- Different species of birds and insects are either rare or extinct having adverse effect of insect infestation in agricultural fields. (Important among them are those which used to be seen in homestead forest and agricultural land such as different snakes, frogs, earthworm, rabbit, jackals, vultures, eagle etc.)
- Merciless felling of trees and cutting earth from hillocks with concomitant clearing of forest having effect on flood, cyclone and drought.
- Felling of trees and clearing of forest deprives different animals and birds, insects, of their habitat, causing extinction of these species.
- Sanctuaries should be preserved.
- Unholy alliance between forest officials and timber merchants are to a great extent responsible for this forest clearing.
- Clearing of forest renders the unauthorized killing for personal benefit.
- Dwindling in number or extinction of different bees and wasps renders pollination either difficult or impossible.
- Change in natural balance due to change in optimal ratio among land, water and forest.
- Dwindling number or extinction of different medicinal plants.
- Depletion of homestead and village forest.
- Introduction of exotic species of trees.
- Fast depletion of village forest resources.
- Lack of awareness in respect of forest resources conservation, management, rules and regulations.
- Lack of people's participation in forest management and conservation activities.
- Ratification of bio-diversity Convention by the government.

4.5.3 Existing Policies

The main objectives of FFYP can be broadly described as follows :

- Rehabilitate and afforest the denuded and degraded forest land,

- Adopt conservation techniques,
- Increase employment of the landless poor, marginal farmers and women,
- Encourage social and community forestry,
- Attempt to meet the country's forest product requirement by integrating trees and agricultural and other traditional land-use,
- Protect wildlife resources and undertake measures to conserve bio-diversity in the country,
- Bring vacant land under tree cover,
- Improve supply of forest products to improve employment opportunities.

Environmental Policy

The Government's Environmental policy emphasises the need to address the key issues of loss of bio-diversity and degradation of natural habitats. It contains the following specific objectives:

- Conserve, develop and augment forests with a view to sustain the ecological balance and meet the socio-economic needs and prevailing realities.
- Include tree plantation programmes in all relevant development schemes.
- Stop shrinkage and depletion of forest land and forest resources.
- Develop and encourage use of substitutes of forest products.
- Conserve wildlife and bio-diversity, strengthen related research and help in dissemination and exchange of knowledge in these areas.
- Conserve and develop wetland and protect migratory birds.
- Calls for education to play a significant role in achieving the policy objectives.

4.5.4 Key Issues

Key environmental issues in Bangladesh associated with forests, wildlife and bio-diversity include the following :

- Encroachment of forest land for agriculture and human settlement.

- Uncontrolled depletion of forest resources and replacement by commercial forest causes not only the loss of forests, but leads to increased soil erosion, increased possibility of flash-flooding and diminishing bio-diversity.
- Management of wetland within forest is still poor and should be rehabilitated to develop an ecologically viable and socio-economically acceptable system of management for the preservation of such wetland and their resources.
- Salinity intrusion due to reduced fresh water flow in the Ganges system, due mainly to the withdrawal of large quantity of water in the upper riparian reaches, is affecting the vegetation of the Sunderban mangrove forest.
- Destruction of mangrove forests due to uncontrolled growth of shrimp farms.
- Inadequate resources and enforcement mechanisms for the protection of designated protected areas is leading to their inexorable degradation.
- Inadequate protective mechanisms to maintain unclassed State Forests is leading to their decline in area and bio-diversity due to exploitation and encroachment.
- Hunting, trapping and disturbances of migratory guest and aquatic birds are reducing their numbers, amongst which are some endangered species.

4.5.5 Actions Required

People's concerns in this sector relate to depletion of forest covers both in the government managed forests and village forests, depletion of wildlife and bio-diversity, illegal encroachment upon government forest lands, introduction of exotic species, enforcement of regulations, punishments for violation of forest and wildlife laws are not adequate etc.

Solutions suggested by people to address the situation are: adequate rules and regulations to protect and manage forests and wild life, undertake massive tree planting programme involving people, involving people in the forestry management and forest regeneration, provide training for nursery development and tree plantation.

Both sectoral and environmental policies have taken note of the degraded state of forest resources and it's fast rate of depletion. The suggested policy measures to address the situation reflect many of the problems, their solutions and actions required as suggested by the people. However, the policies are required to be more committed to people's participation in the forest resource management and afforestation programmes.

Table 4.5.6 (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, MoWDFC, 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, DoE, FD, Community Organizations/NGOs	Adopting and implementing adequate and appropriate National Forest Policy through people's participation and participatory enforcement through targeted groups *
				Afforestation and Reforestations of all types and classes of depleted and denuded state Forest Lands, Waste lands, Regenerations of State Forest lands through people's participations
				Strip plantations on State-owned public lands through people's participation
				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) as the basis for resource information management system
				Preserving the maximum amount of natural forest consistent with environmental, Social and economic conditions
	Awareness Development	Advocacy/Policy	MoEF, FD, Media, T.V., Radio, Newspaper, Video Film, Community Organizations/NGOs, People	Media Campaign, Extension, T.V. and Radio Programmes, Short Films, Art, Seminar and Symposium, Newspaper Articles, Essay Competitions at the Educational Institutions
Human Resource Development	Development of human resources in terms of members, skill types and levels and qualities	Policy/Project	MoEF, DoE, MoEstablishment, MoFinance, MoP, Cabinet Division, FD and, Community Organizations/ NGOs	Developing expertise and experience, efficiency, motivation and incentives, supporting role of women and ensuring appropriate training institutions and qualified trainers

* Priority

Table 4.5.6 (b) : Forestry and Biodiversity

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Encroachment on Forest Lands for agriculture and human settlement	Formulating new National Forest Policy backed by adequate and appropriate laws, rules and regulations for involving local communities in protecting and managing local forest and tree resources and giving them a reasonable share of all profits from forest products	Policy/Advocacy/Project	MoEF, MoLands, MoLaw, MoLGRDC, Cabinet Division, FD, People's Representatives, Journalists, Community Organizations/NGOs, People	Developing special programmes for areas with abnormal pressure of encroachments and Promoting group development and organizing local participation by the NGOs for undertaking locally managed forestry programmes including short-term income generating programmes
Degradation and depletion of forest wetlands and their resources	Preservation of wetlands and their resources	Advocacy/Project	MoLands, MoEF, MoLF, BFRI, Fisheries Research Institute, Universities, Research Organizations	Studying the causes and effects of destructions of wetlands and their resources through a study project and recommending measures for rehabilitating and conserving the wetlands and their resources Inventory of the wetlands and their resources *
Wildlife : Conservation of Wildlife	Giving priority to the protection of wildlife, birds, frogs, lizards and snakes	Policy/Advocacy/Project	MoEF, DoE, FD, 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, trapping, and export 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
				Strict and effective enforcement of enforceable laws, rules and regulations for the protection of wildlife, birds, frogs, lizards, and snake species
				Creation of more Game Sanctuaries and Reserves, Bird Sanctuaries, and preparation of Management Plans for managing the same with the participations of the community organizations and wildlife and Nature conservation Societies *
Degradation of Wildlife habitats	Preservation of wildlife habitats	Policy/Project/Advocacy	MoEF, DoE, FD, BFRI, Universities, Wildlife and Nature Conservation Societies, Conservation Organizations, People	Establishment of a network of protected areas, and more Wildlife Sanctuaries and Game Reserves
				Preparation of Management Plans for managing the protected areas with the participation of Wildlife and Nature Conservation Societies, and Conservation Organizations
Biodiversity : Conservation of Biodiversity	Biodiversity protection	Policy/Project/Advocacy	MoEF, DoE, MoLF, FD, BFRI, National Herbarium, Research Organizations, Universities, People's Representatives, Conservation Organizations, Wildlife and Nature Conservation Societies, Community Organizations/NGOs, People	Inventory of biota to assess the present status of biodiversity for evaluating the types and quantity presently available and monitor its changes overtime for biodiversity protection *
				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, DoE, 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

* Priority

4.6 LAND RESOURCES

4.6.1 Introduction

Land is the most important resource in Bangladesh. Land in Bangladesh is under intense use, threatening its carrying capacity. But, the same land base shall have to be exploited in future to satisfy needs of growing population. In spite of the intense use of land, there are areas sub-optimally or inappropriately used, such as, Government forested areas, coastal areas and deciduous hill forests.

Agriculture is the mainstay of the economy of Bangladesh and contributes about 40% to the GDP. This economic pattern will continue for quite some time to come. Therefore, population pressure on land is a crucial factor in the management of land resources in the country. In planning land use in the past, food crop production was given the top most priority sacrificing the interest of forest, cash crops, fish and cattle feed etc. It is to be understood that it will be increasingly difficult every year to produce enough food crops for the increasing population from the fixed area of land available for agriculture and alternative source of food is to be sought from sources other than land, i.e. seaweed and sea fauna etc.

As land area is fixed it necessarily becomes an increasingly limited commodity. Almost all sectors compete for the use of land and competition is intense due to low land man ratio. Issue like continual erosion of land by rivers, increasing landlessness and land fragmentation, unclear status and pattern of land ownership particularly with regard to 'new' land and low level of year round land utilization and the lack of land use planning needs solution for a sustainable growth.

4.6.2 People's Concerns

- Scarcity of land and increase in landlessness
- Unplanned construction of residential houses, shops, factories, markets and roads affecting agricultural land (loss of agricultural land).
- Use of prime agricultural land for brick making.
- Unplanned urbanization and setting of industries.
- Use of top soil for brick making rendering the land unfit for agriculture.
- Sale of land or soil to meet demand of dowry.
- Decreasing fertility of soil due to absence of organic manure.
- Top soil erosion and hardening of soil.
- Decrease in water retention capacity of soil.
- Loss of land for the creation of family graveyard.

- Continuous production of same crop on the same land (loss of fertility).
- Continuous production of tobacco for 2 to 5 year on the same land (loss of productivity)
- Land on the two sides of river are changing to sandy soil from clay or silt loam.
- Char areas used to produce ground nut and Boro but no more now.

Degradation of land, loss of soil fertility, land erosion, are the major environmental concerns of land sector expressed by the participants in the NEMAP process. 832 participants from 150 thanas expressed different environmental concerns in this sector. Map 4.6.4 shows the spatial distribution of people's environmental concerns in this sector.

4.6.3 Existing Policies

The Fourth Five Year Plan (FFYP) outlines a number of policies with regard to land resources and land use planning. These are aimed at improving land availability to the rural population and improving its productive use.

- Systematic and comprehensive analysis of optimal land use is to be undertaken.
- Enforcement of zoning laws to limit loss of agricultural land to urban development.
- Possible further reductions in land ownership ceilings.
- Enforcement of laws to enable share croppers to purchase land through the provision of long-term loans.
- Distribution of khas lands.
- Improving land use based on an assessment of its optimal cropping pattern.
- Promoting the use of marginal and homestead land for intensive cultivation.
- Formulation and execution of a land use policy to prevent wasteful resource use conflicts (such as shrimp and rice farming). The policy will take into account physical and environmental aspects of conflict areas.
- Leasing of inland open waters will be increased to a minimum of four years to promote higher production and resource conservation.
- Creation and maintenance of a permanent green belt along the coast and of participatory forestry along roadside etc.

Environmental Policy

The Government's Environment Policy makes four specific statements on land issues.

- Formulate a balanced and environmentally sound national land use policy and plan.

- Prevent land erosion, preserve and increase soil fertility and stress the need for protection of reclaimed land and for environmentally sound management of newly accreted land.
- Encourage the adoption of land use practices that are compatible with various ecosystems of the country.
- Reduce the impact of salinity and alkalinity on the land.

4.6.4 Key Issues

Availability of land is a major constraining factor in the development of Bangladesh. Virtually all available land is utilised for crop production, forestry, fisheries and for urban and infrastructure development. The distribution of land ownership is skewed towards the comparatively more wealthy. A long term continuing trend in this direction has been exacerbated in recent years by a series of natural disasters which has forced many small holders to sell their land. Policy changes have done little to reverse this process. The number of landless increases yearly with population increase, occurrence of natural disasters and changes in river courses.

Land fragmentation over several generations has also resulted in uneconomic farming which does not provide the subsistence needs of the families concerned. Much land has also been lost due to river erosion.

The key environmental issues include the following :

- Major land use conflicts arise from insufficient coordinated action amongst the 10 Ministries and 24 agencies concerned with land management. There is currently no formal interactive framework.
- The country lacks a comprehensive land use policy emphasising the most appropriate and productive use of land. This would contribute greatly to the resolution of land use conflicts.
- Despite general land shortage much derelict and unused land exists in urban areas.
- In several coastal polders land is being converted to shrimp farming and this has adversely affected agricultural production, caused loss of productive trees and has led to substantial depletion of mangrove forests.
- Traditional land use patterns are being changed with the introduction of HYV rice and irrigated agriculture.
- Agricultural land is being lost to the expansion of urban settlements, for sand and gravel mining, transport, brick field and industrial developments.
- Erosion of agricultural land exacerbates problems of land availability and rural poverty.

- Land fragmentation continues to render many families functionally landless.
- Short term leasing and share cropping precludes the right to land purchase over the long term.
- Land tenure and ownership patterns are unclear in many areas preventing long term investment in land productivity.
- Inadequate land use planning based upon an assessment of land capabilities constrains land productivity.
- Unregulated encroachment into forest lands leads to unsustainable agricultural exploitation of the land (short-term) due to uncertainty.

4.6.5 Actions Required

People's concerns in this sector relates to unplanned land use leading to gradual loss of agricultural land, loss of soil fertility, soil degradation, loss of soil productivity, landlessness, distribution of khas land, complicated land registration system etc.

People have suggested that in order to address the above concerns, policy in respect of land settlement, registration, distribution of khas land should be changed, land resource management practice should be changed from revenue orientation to development orientation, and land use planning should be introduced.

People's concerns have been reflected in the existing sectoral plan and environmental policy which outline the objectives of land resources development, and improve the land availability situation. However, some actions in respect of land policy reform are necessary incorporating the solutions suggested by people in the sectors to address the concerns raised.

Table 4.6.6 : Land Resources

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Unsustainable Landuse	Development of sustainable landuse management	Policy	Agricultural Research Organization, Universities, Community Organizations / NGOs	Action Research/Farm level research
	Study on indigenous sustainable landuse practices	Project	Research Organization, Community Organizations / NGOs, People	Study to increase efficiency of the production system and its application
Lack of interactive framework coordination amongst different agencies involved in Resource Management based on land	Creation of umbrella Organizations for the coordinations amongst the agencies concerned with land management and inter-sectoral conflict resolution	Policy	GoB, MoLand, Concerned Ministries	Policy formulation and creation of an appropriate interactive framework for intersectoral land management
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 recorded 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 address 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 corporation with agrarian and tenurial structure
				Programmes for giving khas lands for settlements to the poor and encouraging environmentally sound and sustainable landuse pattern
Management of charlands	Reviewing of survey and settlement of the charlands for environmentally sound landuse pattern leading to stabilization and reduction of river bank erosion	Policy/Project	MoLand, Research Organization	Review of char settlement law and recommendation
	Afforestation	Project	DoF, Community Organizations/ NGOs, People	Char afforestation programme with suitable agencies
	Integrated Development of Charland	Policy/Project	Community Organizations / NGOs, MoLand, People	Pilot study in the major chars of Padma, Meghna, Jamuna *
Soil Conservation issues	Soil conservation measures in areas with high soil erosion such as Modhupur Tract, Hill slopes of Chittagong and Sylhet	Project	DoF, 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 *

* Priority

4.7 FISHERIES AND LIVESTOCK

4.7.1 Introduction

Fisheries play a dominant role in nutrition, employment, foreign exchange earnings and other areas of Bangladesh's economy. Fishes provide over 80% of the nation's animal protein intake. The policy aims to increase fish production for domestic consumption by enhancing resource bases and improving technology.

Livestock remains a crucial sector in the agrarian and largely subsistence economy of Bangladesh as it not only provides the necessary draught power for various agricultural operations and transport, it is also one of the sources of animal protein and an important source of cash income.

This component of the National Environmental Management Action Plan outlines the policies of the Government of Bangladesh relevant to fisheries and livestock and identifies the key environmental problems of these sectors. Consideration is given to issues related to unplanned FCD/I, low dry season water levels, sustainable shrimp culture, over-fishing, lack of livestock feed and shortages of draught cattle, and an outline action plan is presented addressing these.

4.7.2 People's Concerns

Workshop at various levels were organised and questionnaire surveys were conducted to register people's perception in the NEMAP process. Through all these efforts people at various levels expressed their environment concerns in the fisheries and livestock sector. The participants at the national, divisional and nonprofessional workshops were quite articulate but those from the grass-root workshops and leaflets had rather spoken in their own terms as they perceived the environmental problems in the fisheries and livestock from their day to day experience. Environmental concerns expressed in the fisheries and livestock sector came from 688 participants in 64 thanas of which 413 were male and 275 were female. The major environmental concerns expressed by participants were :

- Pollution of ponds
- Fish diseases
- Bio-diversity
- Over fishing
- Poverty
- Landlessness
- Degradation of beels, khals, ponds and rivers
- Corruption, depletion of species
- Diseases of livestock
- Lack of adequate health care for livestock
- Damage and road construction
- Less flood
- Shortage of grazing land

4.7.3 Existing Policies

In general, the policy as reflected in the FFYP is one of increasing production and exports and creation of employment opportunities as the main focus of development activities in these sectors.

Environmental Policy

The Government's Environmental Policy outlines the following approach:

- Ensure appropriate environment for the conservation and development of fisheries and livestock.
- Prevent activities and diminish the natural habitats of fish and encourage rehabilitative measures.
- Ensure that activities aimed at developing fisheries and livestock do not create any adverse impact of the mangrove forests and other ecosystems.
- Evaluate existing water resources development, flood control and irrigation projects that have adverse impacts on fisheries and adopt alternate measures for pisciculture by improving environmental conditions.

4.7.4 Key Issues

- Ecological alternations due to environmentally unplanned Flood Control, Drainage and Irrigation (FCD/Is) projects can be considered as a major constraint to the viability of open water capture fisheries.
- Construction of coastal embankments, requiring the closure of tidal stream, channels, has reduced the productivity of fisheries. It has also damaged traditional "gher" fish culture and replaced it with modified brackish water aquaculture.
- Water abstraction from permanent water bodies, like beels and haors, during the dry season reduces the available habitat for fisheries.
- Inadequate regulation of shrimp culture in the coastal belt has contributed to increased soil salinity and damage to sensitive ecosystems like mangrove forests apart from the socio-economic impacts.
- The auction of freshwater bodies on a lease basis has lead to over-exploitation of fish resources to maximise short term profits.
- Over-fishing and harvesting of small fish-fries are contributing significantly to depletion of fish resources.
- Livestock development is constrained by lack of appropriate and readily available feed and fodder.

- Low productivity of the local breeds is a major constraint to sustainable livestock development.
- Veterinary services are insufficient and hence livestock health care inadequate.
- A chronic shortage of draught cattle exists in Bangladesh and improvement of their genetic breeding is essential. The deficiency is exacerbated by the inadequate genetic fitness of stock. The capacity to improve stock quality is also poor. Strengthening of research facilities for improved cattle breeding is a necessary.

4.7.5 Actions Required

Major concerns of the people in this sector relate to depletion of fish resources, degradation of fishing ground particularly floodplain and riverine fishing environment, overfishing, fish disease, bio-diversity, leasing fisheries to non fishing communities, exploitative marketing structure, lack of knowledge of credit facilities for fish culture, inadequate enforcement of fisheries laws, shortage of livestock feed, diseases of livestock and inadequate health care.

Solutions suggested by people for the improvement of fisheries and live stock resources are: regulating the construction of embankment, roads and polders, providing shelters for fish to breed, lease out fisheries to real fishermen, framing proper laws and their enforcement, increase production of livestock feed and provide loan for raising livestock, increasing health care and extension facilities in the rural areas, ensuring proper market for fisheries and livestock products

Although the environment policy has outlined the approaches to address the concerns expressed above broadly, the sectoral plan put major emphasis only on increasing production, exports and creation of employment opportunities, but not much on resource conservation, management, sustainability and environmental management. Therefore, the planning actions in this sector would address resource and environmental management, sustainability and equity issues.

Table 4.7.6 (a) : Fisheries

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
Loss of open water fishery habitats	Water needs and requirements for suitable hydrological conditions and hydraulics of water for fish, prawn and other aquatic animals in Bangladeshi waters must be recognized while designing and implementing water resources development projects. Allocation of requisite quantities of water with requisite hydrological conditions for fish and other aquatic animals and plants be made	Policy	MoEF, MoWDFC, MoFL	Ministry of Environment and Forests may initiate policy papers in consultation with other concerned Ministries 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 and comprehensive studies on the socio-economic conditions of professional and subsistent fisherman likely to be affected by the proposed projects	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 through construction of fish friendly structures in the existing embankments, crossdams, barrages across rivers etc. allowing fish, prawn and other aquatic animals to migrate back and forth from one component to the other and from downstream to upstream and vice versa across barrages and river closures	Project	MoWater Resources, MoFL	Case studies in selected completed water resources dev. projects (NEMAP methodology could be used) *
Lack of consideration of openwater fisheries in planning	Policies need to be put in place to mandate coordination between the government agencies and Ministries which, by their actions alter and modify aquatic and terrestrial environment	Policy	MoFL, MoI, MoAgriculture	Ministry of Fisheries and Livestock may initiate action to obtain a policy directive from the Council of Ministers to develop and implement obligatory coordination between the Ministry and Ministries of Water Resources/ Ministry of Industries/Ministry of Agriculture
Loss of openwater fish production	Mitigation of open water fishery losses needs to be ensured. Costs for mitigation of openwater fishery losses should be charged to the concerned water resources development projects causing the loss	Policy	MoFL, MoWater Resources	Fisheries production loss caused by different FCD, FCD/I and river closure projects should be quantitatively assessed and value thereof determined by the Ministry of Fisheries and Livestock through development and implementation a comprehensive projects for the purpose
	Monetary value of openwater capture fishery production loss and costs for fishery mitigation measures should be included in the cost and benefit analysis of water development projects	Policy	MoFL, MoWater Resources	
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 which needed tidal inundated areas along the coast nursery
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	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	

* Priority

Table 4.7.6 (b) : Fisheries

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
	Oil spillage to marine and inland water should be made punishable for offenders	Project	MoEF	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, MoLocal 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, MoI, MoLocal Government	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
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)	Revenue oriented management as practised now by the Ministry of Land and Deptt. of Forest in the Sunderban waters should be stopped forthwith. 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. Knowledge base of the living populations should be strengthened by the Fisheries scientists of the Department of Fisheries through the study of the dynamics of the aquatic populations and allowing their restricted harvest through measures like catch quota, size limits, protection during breeding season and other modern scientific management tools	Policy/Project/ Advocacy	MoFL, DoFisheries, FD	Ministry of Fisheries and Livestock should present a summary to the Council of Ministers seeking transfer of management of Fisheries from the Ministry of Land and Ministry of Forest for Sunderbans fisheries to the Ministry of Fisheries and Livestock 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 as also to obtain manpower, equipments and tools, transports, funds etc. to implement the plans for fisheries resource management
	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

4.8 AGRICULTURE

4.8.1 Introduction

This component of the National Environmental Management Action Plan outlines the policies of the Government of Bangladesh relevant to agriculture and identifies the key environmental problems of this sector. Consideration is given to issues related to sustainable agricultural resource use and production, use of agrochemicals and the safety of agricultural workers, and an outline action plan is presented addressing these.

4.8.2 People's Concerns

In all the grass-root, professional, national and regional, workshops concerns about environmental aspects of agriculture was highlighted with great emphasis as most of the participants, those particularly in the rural area, were somehow related with this sector. The participants in the professional workshop expressed their environmental concerns in this sector in articulated ways which in many cases reflected the sectoral concerns expressed in the earlier NEMAP documents. However, participants in the grass root level, mostly coming from rural areas, expressed their own day to day experience related to environmental problems in the agricultural sector. Concerns about environmental problem in the Agriculture sector come from 150 thanas where 1216 participants expressed their concerns about environmental problem in agriculture sector of which 759 were male and 457 were female. The major concerns in the agricultural sector expressed by the participants were as follows :

- Loss of bio-diversity;
- Loss of agricultural land for urbanisation and industry, houses, etc.;
- Shortage of irrigation water due to the drying of khals, beels etc.;
- Pest attack and diseases;
- Landlessness, Desertification, flash flood and flooding;
- Uncertainty of rain;
- Increased requirement of agro-chemicals;
- Loss of productivity due to use of agro-chemicals;
- Loss of rabi crop to introduce HYV.

Map 4.8 shows spatial distribution of people's environmental concerns in agricultural sector.

4.8.3 Existing Policies

The main aim of the Government is to increase the production of food grains with the goal of food self sufficiency. The increase in food production is being carried out through intensification of cropping patterns supported by increased ground water and surface water irrigation, intensive use

of agrochemicals, the introduction of improved crop varieties (HYVs), policy adjustments aimed at improving supplies of agricultural inputs and by improvements in the efficiency and outreach capabilities of the extension service.

Major constraints to agricultural productivity include frequent natural disasters, shortage of land, high population densities, unstable markets, lack of appropriate sustainable technology, inadequate investments (partly due to uncertain land tenure and tenancy arrangements) and insufficient extension support in terms of outreach capabilities and the appropriateness of extension messages.

Environmental Policy

The Government of Bangladesh has adopted an environmental policy which makes the following specific statements concerning agriculture.

- Ensure that all steps taken and technologies adopted for agricultural development and attainment of self-sufficiency in food are environmentally sound.
- Sustain the basis of all agricultural resources in the process of development and ensure their long term use in an environmentally sustainable manner.
- Regulate the use of those agrochemicals, artificial materials and inputs which diminish the natural fertility and organic properties of the soil and cause adverse impacts on man and animals. Ensure safety of agricultural workers who apply such inputs. Encourage the application of various natural fertilizers and insecticides.
- Facilitate environmentally sound development in the agriculture sector through appropriate changes in production management and production relations with a view to protecting the environment and encouraging sustainable use of resources.
- Increase the use of environment friendly natural fibres like jute and jute products.

4.8.4 Key Issues

The trends towards greater food grain production, principally through increased agricultural intensification and an increase in irrigated area has contributed to the development of a number of environmental problems which are apparent to varying degrees in different parts of the country. The major issues are as follows:

- Loss of crop bio-diversity due to introduction of HYV replacing local varieties.
- Abandonment of many indigenous crop varieties in favour of HYVs which will lead to irreversible loss of the country's genetic resources. This may have considerable consequences when global climatic changes become manifest in Bangladesh.

- Depletion of soil resources due to intensive cropping, principally reduction in soil nutrients and organic matter. This is manifest in some areas as crop micronutrient deficiencies and decreased yields.
- Loss of wetland habitats through abstraction, drainage and in-filling which results in depletion of aquatic fauna and flora and reduction in water availability to the rural poor.
- Loss of forest resources due to permanent agricultural encroachment and shifting subsistence farming in the Hill Tracts, which reduce aquifer recharge and lead to increase soil erosion.
- Desertification (in the Barind Tract for example) which has resulted from deforestation for agricultural development.
- Increased (and often inappropriate) use of agro-chemicals which raises the possibility of pollution of surface and ground waters, accidental poisoning and eutrophication of surface water bodies.
- Loss of agricultural products due to natural hazards, pest attack and disease.
- Share cropping / tenural problems.

4.8.5 Actions Required

The major concerns of the people in the agricultural sector are: loss of crop biodiversity and decrease in the production of rabi crops, increased requirement of agrochemicals in crop production and their increasing price, uncertainty of rain and inadequate irrigation water, land degradation, loss of crops due to natural hazards, pest attack and disease and land tenure problems, small plot and farm size.

People have suggested that the following measures would be helpful to address the concerns they have raised : Conserve biodiversity with both government and people's initiatives, put restriction on the use buying and selling of agrochemicals, preventive measures to protect crops from hazards and introduce crop insurance, diversification of crops, provide adequate irrigation water etc.

The sectoral plan aims to achieve self sufficiency in food through the increase of food grains production by adopting policies which enhances the use of agrochemicals, HYVs, cropping intensities, distribution of khas land to landless etc. Long term sustenance of productivity, conservation of biodiversity, restricted use of agrochemicals and other concerns in this sector are not reflected adequately in the sectoral plan. However, the environmental policy has made some statements in respect of these issues.

The planning actions in this sector would therefore put emphasis on the sustainability of crop production, environmental management, sustained supply of irrigation water, required agrochemicals and related other issues.

Table 4.8.6 Agriculture

Key Issues	Recommended Action	Type of Action	Actors/Agencies	Specific Action
Loss of genetic resources due to introduction of HYV	Preservation of Genetic Resources	Project	GoB, Agriculture Research Organization, BAU, National Herbarium	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
Reduction in the production of Rabi Crops	Crop Diversification with emphasis on traditional indigenous winter crops	Project/Advocacy	Agri. Research Organizations, BAU, Community Organizations/NGOs, People	Pilot studies in different agro-ecological zones
Expansion of urban centres, industrial areas and other sectors at the cost of valuable agricultural lands	Landuse zoning through landuse legislation	Policy/Advocacy	MoLand, MoAgri	Bringing the issue under landuse planning
Loss of agricultural land fertility due to overuse of agro-chemicals leading to increasing dependence on these chemicals	Appropriate regulation for the manufacture, transport and use of pesticide and agro-chemicals and its enforcement	Policy/Advocacy	GoB, MoEF, DoE	Formulation of legislation/rules and regulations, guidelines, in respect of pesticides, agro chemicals, manufacture, use and transport.
	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	Formulation of appropriate rules and regulations
			LGED, Community Organizations / NGOs	Development of sustainable minor irrigation scheme *
Loss of agricultural production due to natural hazard	Hazard Proofing and hazard management	Project	Disaster management Bureau, MoR&R	Enhancement of disaster management capability (Disaster preparedness, post disaster mitigation and management)
			Community Organizations/NGOs, People	Hazard proofing programmes
			Research organizations	Research on hazard proofing based on indigenous knowledge
Incidence of pest attack and diseases	Integrated pest management	Policy	GoB, Agriculture Research Organizations	Pilot Project, Research and Development Works
			Community Organization / 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
Loss of agricultural crop due to climatic uncertainty	Crop security	Policy	GoB, MoAgri, Private Sector (Insurance Corporation, Bank)	Crop security programmes at pilot scales in different areas prone to climatic uncertainties
	Hazard Profing	Project	Community Organizations / NGOs, People	Hazard proofing
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

* Priority

4.9 HOUSING AND URBANIZATION

4.9.1 Introduction

This component of the National Environmental Management Action Plan outlines the policies of the Government of Bangladesh relevant to housing and urban infrastructure and identifies the key environmental problems of the sector. Consideration is given to issues related to urban growth, housing, sanitation, and sewerage, and an outline action plan is presented addressing these.

4.9.2 People's Concerns

Participants from the grass-root, professional, regional, national workshops and leaflet survey expressed concerns about urban environment from a wide geographically distributed area. This appears unusual for a country like Bangladesh, where level of urbanization is very low. However, on analyzing responses it reveals that most of the environmental concerns are expressed from areas where the settlements are getting the characteristics of urban centres gradually, due to industrialisation, establishment of thana administrative centres, growth centres, trade centres etc. Participants from the urbanized areas, however, pointed out environmental problems arising out of inadequate urban facilities and institutional weakness to cope with the emerging environmental problems in the urban areas. The later groups of participants were mostly literate and urban dwellers. The environmental concerns expressed in the urban sector came from 617 participants in 125 thanas of which 444 male and 173 female.

Major environmental problems expressed were as follows :

- Loss of agricultural land due to urban expansion
- Lack of enforcement of zoning in the urban areas.
- Weak local government institutions who handle urban problems
- Lack of urban facilities such as garbage disposal, traffic jam, emission of smoke, inadequate and unplanned road
- Poor housing
- Lack of water supply
- Slums
- Flooding due to rain water and river flooding
- Migration of rural people to urban area at an increasing rate.
- Increased fire hazards
- Unrestricted growth of high rise buildings.

4.9.3 Existing Policies

In general, the policy as reflected in the FFYP is one of increasing investment in urban infrastructure. Much attention has been paid to water supply and sanitation improvements in Dhaka

and Chittagong in previous FYPs and the trend continues. Provision of basic services to the homeless urban poor is also an aim.

Environmental Policy

The Government's Environmental Policy outlines the following approach.

- Integrate environmental considerations into all housing and all urban planning activities and research.
- Gradually extend environmentally sound amenities to all the existing urban and rural housing areas in phases.
- Control those housing and urban development schemes that have adverse impact on the local and overall environment.
- Accord greater importance to the water bodies for their role in beautifying urban areas.

4.9.4 Key Issues

The key environmental issues associated with the housing and urban infrastructure sector are as follows:

- Weak local governments lacking capacity to address the urban problems.
- Unplanned and unregulated urban growth has overwhelmed public infrastructure provisions in many urban areas. Projected urban growth rates of 4-6% until the year 2010 indicate that urban squalor will remain for some time.
- Extremely high densities of people in urban areas (>200/acre) often in insanitary conditions causes high incidence of disease.
- Uncoordinated development of medical centres in urban areas and inadequate disposal of medical waste presents a high risk of disease transmission.
- Sewerage infrastructure is poorly developed even in Dhaka where it is estimated that only 18% of domestic sewage enters the sewerage system.
- There is an acute and increasing shortage of housing in urban areas. For example, it is estimated that by the year 2000 an extra 1.2 million houses will be required.
- Provision of housing for unmarried women engaged in professional work is inadequate.
- A regional imbalance in urban growth rates with the result that some urban centres are more stressed than others.
- No policy for deflecting or accommodating urban immigrants has been formulated.

4.9.5 Actions Required

Environmental issues in this sector emanate from the following major concerns expressed by people: expanding urban areas resulting from continuous migration from rural areas, poor condition of urban facilities, weak local government agencies lacking forward planning capability, no reflection of people's concerns in the activities of the agencies handling problems of the urban areas, slum problems, poor urban transport system, inadequate zoning law, building standards and poor enforcement of the existing regulations.

Measures suggested by people to the environmental issues arising out of the above concerns are: Strengthening local institution's capability for forward planning with consultation of people, create better urban facilities including housing facilities for the urban poor, middle class and working women, enacting appropriate legislations for urban land use, building standards, zoning and town planning, enforcing existing laws.

Although the environment policy states that all planning activities in this sector would be integrated with environmental concerns, the sectoral plan, however, has proposed interventions mainly in infrastructure development and providing water supply, sanitation and basic services.

- The planning actions in this sector would, therefore, also incorporate institutional strengthening, necessary policy and legislative changes to address long term issues in the sector and incorporate concerns of the people in the planning process.

Table 4.9.6 : 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
Absence of Urban landuse Guideline, Zoning law and their enforcement	Review of present landuse guidelines and zoning law	Policy	MoWorks, UDD	Formulation of appropriate guideline and legislation for zoning
	Institutional strengthening for the enforcement of laws and regulations relating to urban landuse zoning and town planning	Policy/Project	MoLocal Govt., MoWorks, RAJUK, KDA, CDA, Municipalities	Strengthening institutional capabilities of the involved agencies
Unplanned Slum and squatter settlements	Slum improvement in terms of housing, health and sanitation	Policy/Project	MoLocal Govt., Community Organizations / NGOs	Initiate planning programmes for improvement of the slum areas *
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
Fire hazards	Increase awareness	Policy/Project	Media, Civil Defence, Community Organizations / NGOs, People	Media campaign and awareness development programmes
	strict application of zoning regulation	Policy	Local Government Agencies	Formulation of zoning law and their strict application
	Increase coverage of fire fighting capabilities	Project	Civil Defense Department	Institutional capability development
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

* Priority

4.10 HEALTH, SANITATION AND POPULATION

4.10.1 Introduction

This component of the National Environmental Management Action Plan outlines the policies of the Government of Bangladesh relevant to health, sanitation and population control and identifies the key environmental problems of these sectors. Consideration is given to issues related to health awareness, water quality, infant mortality, low literacy, disposal of human and industrial wastes and high population densities, and an outline action plan is presented addressing these.

4.10.2 People's Concerns

In all the workshops and responses of the questionnaire survey it was found that health sanitation and faecal pollution problems related to health were emphasised by large number of participants and the geographical distribution of people's environmental problem in this sector exhibits or shows this as a environmental problem. 3008 participants from 240 thana reported various environmental concerns in the health sector.

Map 4.10 shows the spatial distribution of people's environmental concerns in the health sector. It is obvious from the figure and map that concerns about environment in the health sector is wide-spread all over Bangladesh and is very much of a people's concern which of course also reflects the sectoral policy.

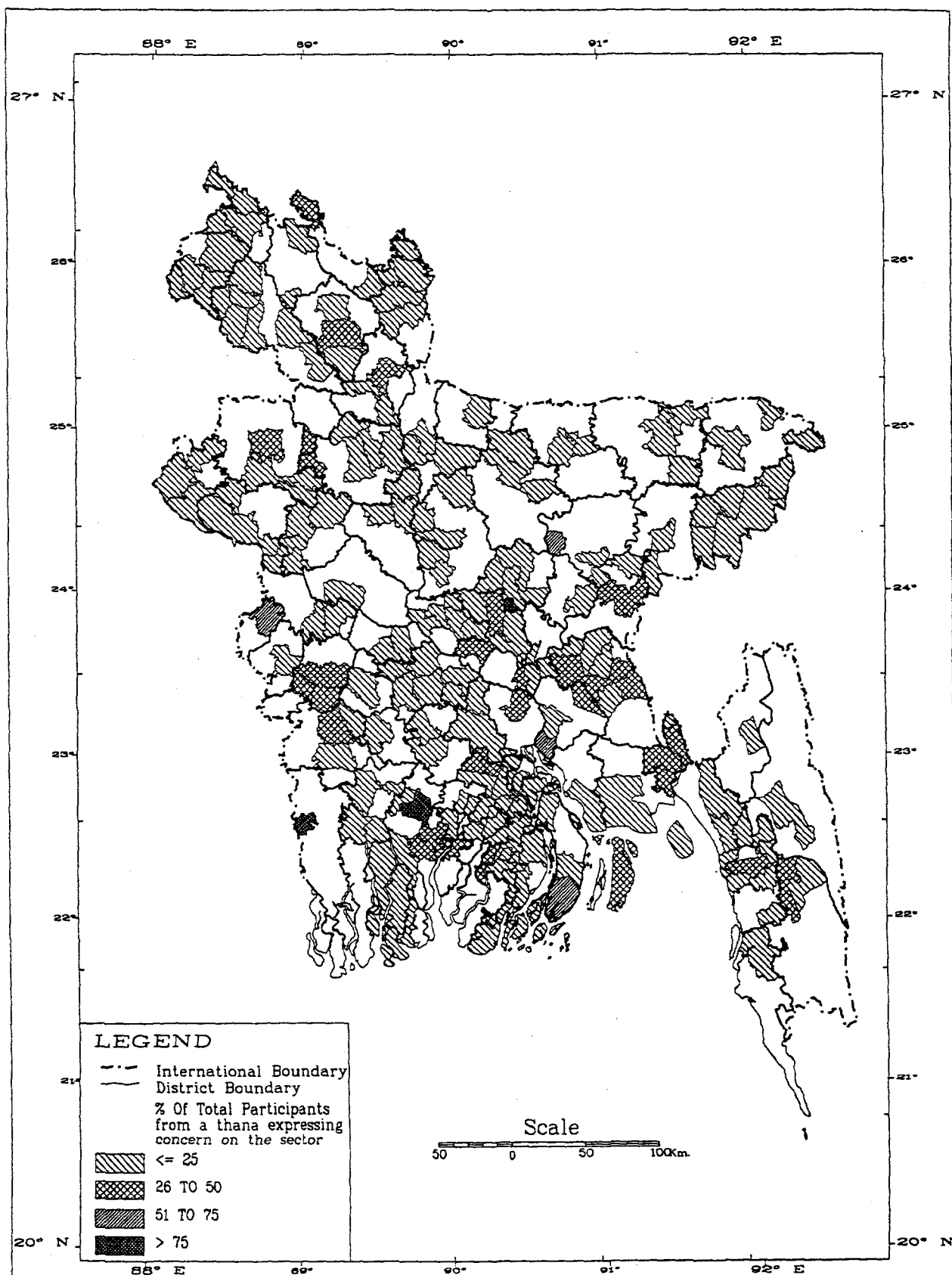
The major health related environmental concerns are as follows :

- Faecal pollution
- Malnutrition
- Lack of health, education and awareness
- Rapid population growth
- Lack of family planning
- Educational knowledge
- Poor child and mother care
- Lack of drinking water
- Lack of water for household purpose
- Smoke from brick field and inefficient chulas (stoves)

4.10.3 Existing Policies

Key Government policy statements relating to health and population are identified as follows:

- Increased access to safe drinking water and sanitation for rural and urban populations and measures against environmental pollution.



GIS CENTRE
 BANGLADESH CENTRE FOR ADVANCED STUDIES

SPATIAL DISTRIBUTION OF PEOPLE'S CONCERNS
 REGARDING HEALTH AND SANITATION

NATIONAL ENVIRONMENT MANAGEMENT ACTION PLAN (NEMAP)

- Increasing the status of women through improvements in their health, education and income generating activities.
- Undertaking efforts to delay marriage.
- Identification of under-privileged and vulnerable families and provision of food.
- Promotion and pursuance of population planning as an integral part of the total development process and the integration of population issues into all development programmes.
- Build up the national commitment to a one child family norm.

The strategy to achieve the latter would involve making the availability of family planning less complicated, making it more community orientated and introducing various options for interventions which could include economic disincentives directed towards small families.

The FFYP propose a merger of the Directorate of Health Services and the Directorate of Family Planning in order to provide comprehensive local health services under the Ministry of Health and Family Planning (MoHFP).

The coverage of the Government's rural sanitation programme, which makes available water sealed latrines, will be increased to cover 18% of the rural population in the FFYP. In towns, the availability of piped water will also be increased to 75%.

- Protein caloric intake is extremely low in rural areas and has declined since 1960. This contributes to high infant mortality rate and a low level of disease resistance amongst the population in general.
- Low literacy rates greatly impede the dissemination of information on environmental health.
- In most towns, the disposal of human and industrial waste is inadequate.
- In urban areas, the rate of population increase outstrips attempts to improve provisions for water supply and sanitation.
- High population densities in rural areas leads to encroachment and degradation of natural habitats, and over-exploitation of fisheries and other natural resources.
- Inadequacies in the institutional framework for population control (such as absence of birth/death registration and the non-integration of health and family planning services) means that it is difficult to monitor the success of population interventions.

4.10.4 Key Issues

The generally inadequate state of human health in Bangladesh is the result of inextricable linkages between over population, poor nutritional status, and inadequate potable water and sanitation provisions. The major issues in this sector relate to the following :

- Human health in Bangladesh is affected by a number of interlinking issues such as overcrowding, poor sewerage and sanitation provisions and the presence of polluted surface waters. Improved water supply and sanitation infrastructure will contribute greatly to a decline in many diseases.
- There is a low level of environmental health awareness amongst the rural and urban poor and homeless population.
- Despite 80% of rural households having access to tubewell water, many people continue to rely on contaminated surface waters and are therefore vulnerable to waterborne disease.

The key issues of this section are :

- Inadequate provision for safe drinking water
- Inadequate provision for latrine
- Using open places for defecation and urination
- Lack of Mother and Child Health Care facilities
- Quality of drug
- Malnutrition
- Unhealthy condition at work place
- Inadequate institutional framework for population control
- Lack of awareness in health, sanitation and nutrition
- Narcotics and drug abuse

4.10.5 Actions Required

People's concern in this sector relate to lack of awareness on environment, population control, health and sanitation etc., inadequate coverage of health care and family planning services, rapid population growth, drug abuse and low standard of medicine etc.

The suggested solutions by people are : supply of sanitary latrines, safe drinking water and family planning materials at low cost or free of cost, raising awareness on environment including population growth and family planning, health, sanitation, nutrition and faecal pollution. Necessary social mobilization will be required to make the above programmes effective.

The existing policy and sectoral plan have outlined the approaches to address the underlying issues and at present there are a number of major activities undertaken both by the government and NGO agencies within the policy frame work.

The planning actions in this sector would be to strengthen the institutional capability to improve the service delivery systems, raising awareness, imparting education and widening service delivery coverage, measures to enforce and implement the provisions of policy and laws for quality standards and abuse of drugs existing.

Table 4.10.6 : 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
Inadequate institutional framework for population control	Strengthening existing institution for service delivery system		MoH&FP, Community Organizations / NGOs	Bringing more population and areas under the existing programme of service delivery
			Resource Organizations	Monitoring and Evaluation of existing programmes
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
Narcotics and Drug Abuse	Strong surveillance to stop drug trafficking		GoB, Narcotics Departments	Strong surveillance to stop drug trafficking
	Awareness Development		GoB agencies, Community Organizations / NGOs	Awareness programme. Media campaign, Rally etc.

* Priority

4.11 EDUCATION AND AWARENESS

4.11.1 Introduction

Within Bangladesh the level of environmental awareness is generally low both in urban and rural areas. This does much to exacerbate the process of environmental degradation in the country. Many of the actions required under NEMAP attempt to improve the sustainability of human activities in specific sectors. This component of NEMAP has the more general aim of improving environmental awareness amongst the population and developing the study of environment at all levels of education. Below the policies of the Government of Bangladesh relevant to education and public awareness are outlined and key environmental issues identified, especially those related to environmental education curricula, participation of women in education, environmental extension awareness and research. An action plan is presented addressing these.

4.11.2 People's Concerns

Necessity for environmental education and awareness was highlighted by a large number of participants from a wide geographical coverage. 2626 participants from 234 thanas expressed the need for environmental education and awareness from population as well as different levels of people are involved in development activities. Map 4.11 shows the spatial distribution of participants expressed the need for environmental education and awareness.

The major opinion reflected in the workshop and questionnaire survey in respect of environmental education are as follows :

- Curriculum should be developed for School, College, University and Technical Institutes on environment.
- Media coverage is not adequate on environmental matters.
- Radio, T.V. should telecast more programmes on environment
- Imparting environmental education through non formal education by GO and NGO agencies.

4.11.3 Existing Policies

The Government's policies towards education includes the following:

- Optimum utilisation of existing educational facilities through proper planning. Meaningful efforts are to be mounted for combating drop-outs and to minimise its incidence.
- Expansion of non-formal primary education through strengthening of government mass literacy centres and mobilising the resources of the NGOs.
- Secondary schools, colleges and general universities will be required to develop and adhere to a minimum standards of available facilities and qualified teaching staff.

- Extension education and management training for teachers and education administrators would be organised.
- Effective utilisation of Vocational Training Institutes and the National Council for Skill Development and Training will be strengthened to promote effective inter actions between the training institutes on the one hand and the employers in the private and public sector on the other.
- Environmental education would be imparted to the teachers and students at all levels of education.
- Specific measures must be undertaken to ensure adequate participation of women at every level of education.

The strategy to achieve the above takes into account that the resources available for the education sector are inadequate compared to the commitments for compulsory primary education, enlargement of the base of female participation in secondary education and other important development activities.

The FFYP proposes multi-shift and co-education operations be initiated in all institutions to ensure the better utilisation of available facilities. It also encourages the participation of the private sector and community involvement to ensure optimum utilisation and operations of the educational institutions.

Environmental Policy

The Government's Environmental Policy contains the following specific statements on education and public awareness:

- Eradicate illiteracy with a view to integrate people more in the development of the country and take necessary steps to increase literacy.
- Create wide-spread mass awareness regarding protection of the environment and utilisation of all national resources in a sustainable and environmentally sound manner.
- Ensure inclusion and dissemination of environmental knowledge and information in the formal and non-formal systems of education and the media.
- Encourage spontaneous and active participation of people in all environmental activities.
- Incorporate environmental issues in all training programmes for public and private sector officials and employees including industrial and commercial workers.
- Encourage necessary research and evolve technology so as to ensure long term, sustainable and environmentally sound utilisation of all resources.

- Ensure that environmental issues get due consideration in all research activities by research and development institutions.

4.11.4 Key Issues

Adequate attention is yet to be given to environmental education, research and mass awareness. The key issues arising from this include:

- Environmental education syllabus needs to be upgraded to provide clear conceptions of the priority issues.
- Since only about 30% of the population are literate, major efforts have to be undertaken to provide basic education to the remaining population.
- Low literacy rates greatly impede the dissemination of information on environmental health, nutrition and mother and child care, essential areas for the overall development of the country.
- Low level of female literacy rates. Due to the socio-eco-cultural situation women constitute the most educationally deprived group.
- The coverage given to environmental issues in the press and other information media is sporadic and insufficient.
- Training programmes on environmental education are inadequate and need to be improved.
- There is no coordination of approaches to environmental awareness training by various Ministries and NGOs which compromises their effectiveness, out-reach and cost-efficiency.

4.11.5 Actions Required

People's concerns in this sector relate to illiteracy of the general mass, lack of provisions for environmental education in the curriculum at all levels, inadequate coverage of environmental aspect in the radio, T.V and media, inadequate institutional arrangement to impart environmental education to wider section of people, particularly women.

Environment policy has addressed the above issues adequately but the sectoral policy and plan do not reflect them explicitly.

The present planning process would, therefore, put emphasis on institutional strengthening for imparting environmental education, introduction of environment in the education curriculum at all levels and their development, training of teachers on environmental education, providing environmental education through non formal modes, increase media coverage on environment.

Table 4.11.6 : Education

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 emphasis on environmental education in teachers training programme	Incorporation of courses on environment at technical institutions	Policy	Technical Education Board	Improvement and revision of the curriculum and syllabus *
	Inclusion of environmental aspects in the curriculum and syllabus	Project	MoEducation	Review and upgrade 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 education 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.	Programmes on environment awareness at mass scale *
			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 *
Low literacy rate impedes imparting environmental education	Increase over all literacy rate	Policy	MoEducation, Community Organizations /NGOs, People	Mass literacy programmes, increasing coverage with monitoring & evaluation

* Priority

4.12 TRANSPORT AND COMMUNICATIONS

4.12.1 Introduction

In this component of NEMAP the policies and issues related to transport and communications are identified. Consideration is given to environmental issues related to road, rail and inland and coastal shipping networks in the country, and an outline action plan is presented addressing these.

4.12.2 People's Concerns

Environmental problems related to transport and communication were not expressed by a large number of participants compared to other sectors and responses. Participants who expressed environmental concerns in this sector did not represent very wide geographical coverage. Environmental concerns expressed by participants were from 30 thanas and the total number of participants expressing concerns were 94.

The major concern in this sector were as follows :

- Indiscriminate and unplanned rural road development causing increased floodability and drainage problem
- Inadequate culverts
- Emission of smoke
- Road accident
- Silting up of water
- Oil pollution due to mechanised boats and launches
- Payment of compensation and resettlement for the evicted people in road/railway development projects

4.12.3 Existing Policies

The main sectoral aim reflected in the FFYP is the improvement and expansion of the transportation network with particular emphasis on the Jamuna Bridge development. The main sectoral strategies are as follows.

- Choosing new projects on the basis of their economic viability.
- Developing a transport network which does not conflict with overall water management policies.
- Promoting increased participation of the private sector.

- Coordinating transport policies within national land use planning.
- Increasing the efficiency and use of existing facilities through tariff adjustments which take into account maintenance costs and transportation economics.

Environmental Policy

The Government's Environmental Policy makes the following specific statements on transport and communication.

- Ensure that road, rail, air and inland water transport systems do not pollute the environment or degrade the resources.
- Ensure that people and transport using roads, rail, air and inland waterways do not pollute the environment and take steps to protect the health of the workers that run them.
- Control those activities in inland ports and dockyards which cause pollution of water and the local environment.
- Reduce and discourage the use of those fuels that pollute the environment and encourage the use of those fuels that are environmentally sound and less harmful.

4.12.4 Key Issues

NEMAP identifies the following environmental issues in the transport and communications sector as important:

- Widespread unchecked water pollution arises from inland and coastal shipping. Facilities to receive and treat ship wastes are lacking.
- Air pollution in localised urban areas and along major roads due to incomplete combustion of fuel is a major cause for concern.
- Regulatory control and monitoring of waste disposal from ships and trains is insufficient.
- Poor vehicle maintenance and inadequate enforcement of legal requirements results in much unnecessary pollution and fuel wastage.
- Urban transport planning and management appears inadequate for the volume of traffic in many urban areas, resulting in traffic jams which waste both time and fuel.
- Inappropriate shallow borrow excavation (eg. along the Asian Highway) removes much more topsoil than conventional deep borrow pits, thus affecting agricultural production.
- Road and rail construction lead to permanent loss of agricultural land though offers possibilities for social forestry along route corridors, and for aquaculture in borrow pits.

- The socio-economic costs and benefits of bridge construction and the resultant replacement of ferries needs to be considered in project appraisal. Many livelihoods are diminished when ferry crossings become redundant.
- Inadequate attention to natural drainage patterns often leads to inadequate culvert provisions.
- Siltation of inland waterways and their closure due to FCD/I structures adversely affects private boat owners and forces a shift from river to road transport.
- Involvement of women in road construction and maintenance is limited, thus depriving many rural women-headed households of income generation.
- The level of road safety is extremely poor leading to loss of life and vehicles through accidents.
- Noise pollution from vehicles horns and air traffic is significant in many areas, affecting health and disrupting commerce and administration.
- Permanent loss of land to road and rail construction decreases agricultural production and affects the long term livelihoods of displaced farmers.

4.12.5 Actions Required

People's concerns in this sector relate to indiscriminate and unplanned rural road and infrastructure construction, resettlement issues related with transport infrastructure construction, silting up of water ways, accidents on roads and water ways, pollution due emission of smoke and discharge of oil by mechanized vehicles etc.

Preparation and implementation of guideline for rural roads, providing proper and quick compensation to the project affected people, pollution control, coordination among different agencies etc are the suggested solutions made by the people.

Although the sectoral policy aims to develop transport networks in coordination with the national water management and landuse policies, it is not explicit about incorporating environmental concerns or coordinating it with the environment policy, which has outlined the frame work to incorporate environmental concerns in the planning and development in the transport sector.

The planning interventions in this sector would incorporate guideline preparation for rural roads and infrastructure development, reviewing resettlement policy for delivering compensation packages, institutional arrangement to coordinate with other agencies which affect development in this sector, reenforcement of policy for the abatement of pollution from vehicular emission and discharge.

Table 4.12.6 : Transport and Communications

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 and undertaking EIAs*
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 sound transport network infrastructure*
	Reviewing the design of the existing networks in order to facilitate drainage fish passes	Project		
Air pollution	Application of existing law	Policy	DOE, BRTA, IWTB	Application of existing rules and regulations *
Road accident	Enforcement of existing laws	Policy	Law enforcing authority, BRTA	Law enforcement
Situation of major water ways	Dredging wherever possible	Policy/Project	IWTB	Dredging programmes
Oil Pollution due to mechanized boats and launches in the inland water way	Enforcement of existing law	Policy/Project	IWTB, 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	IWTB, Bangladesh Navy	Strengthening capability of the law enforcing agencies with training manpower and speedy coastal water transport
Inadequate urban transport system	Assess the requirement for adequate urban transport facility in major urban centres	Project	Roads and Highways, CDA, KDA, RAJUK	Transport survey and planning for major urban centres
Compensation and resettlement of the evicted people in transport development projects	Review of land acquisition for delivering rapid compensation packages with provision of rehabilitation of the evicted persons / households	Policy	MoLand, Agencies requiring land for transport development purpose	Enactment of appropriate land acquisition law for providing speedy and adequate compensation package to evicted person / household
				Development of operational directives for resettlement programmes
Loss of valuable agricultural land due to transport development	Land use planning	Policy	DoE, MoLand	Formulation of land use plan
Noise Pollution particularly in the urban areas	Enforcement of existing law	Policy	DoE, Law Enforcing Agencies	Enforcement of existing law
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

* Priority

5. LOCATION SPECIFIC (LOCAL) ISSUES AND ACTIONS

In the early NEMAP documents several regional issues were high lighted which required urgent interventions. In the NEMAP participatory process in addition to those issues several other regional issues were raised locally by the participants. 1655 participants from 150 thana raised concern about environmental degradation which are regionally well defined and represent part or whole of some ecological units. These regionally well defined areas exhibit environmental degradation resulting from intervention activities in a number of sectors. As such environmental problems can not be addressed by a single sectoral agency alone, but requires integrated environmental management interventions. Therefore, these issues were treated separately as regional issues.

NEMAP has identified them as **Local Issues** and has grouped them under the following heads :

- Charland issues
- Madhupur Tract issues
- Barind Tract issues
- Wetland issues
- Hill Cutting issues
- Salinity and Shrimp Cultivation issues
- Coastal and Marine Resources management issues

From these the most critical ones have been considered for the action plan with a pilot approach which are as follows:

5.1 CHARLAND ISSUES

There are chars on all the alluvial rivers - large and small. These chars are highly unstable but some of them are observed to remain stationary for a long time. These quasi-stable chars are inhabited by people and brought under agricultural activities. Some of the charlands of the major rivers of the country name by the Meghna, the Padma, the Jamuna and the Ganges are quite big and many of them have quasi-permanent settlements and people move back to the mainland during the flood period. The newly formed charlands have a fragile eco-system, the soil being devoid of organic matter and not fit for agricultural activities. Even then land hungry people move in, searching for a living.

These charlands are important habitat of birds and aquatic animals. There is a need to develop an understanding of the ecosystem of charlands, including their soil formation processes, and then develop recommendations for exploitation of the charlands within a sustainable limit.

The component of NEMAP proposes to select several chars under the following categories :

- newly formed and unstable;
- relatively unstable
- old and quasi-stable;
- inhabited and uninhabited; and
- small, medium and large.

Existing ecosystem will then be studied to recommend ways and means of exploiting the land resources to a sustainable limit. As may be appropriate the study may also recommend measures for land reclamation and land stabilisation. MoEF may implement this project.

The study will be carried out by a team comprising geographer, sedimentologist, fresh water ecologist, river engineer, sociologist and cartographer. The NEMAP Implementation Cell will be responsible for preparation of necessary project documents. It may be useful to appoint a group of specialists to prepare a state of art/status report, identify issues involved and prepare detailed TOR of subsequent actions.

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	MoL and	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	MoL and	Charland management plan with landuse component
Untimely and improper survey of settlement and registration of rights	Timely char survey operation	Policy	MoL and, 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	MoL and, DLR	Revision of char survey and settlement procedure
	Management of Settlement in charlands with the participation of the community	Policy/Project	MoL and, Community Organizations / NGOs, People	Charland settlement programme with the participation of Community Organizations *

* Priority

5.2 MADHUPUR TRACT ISSUES

The dissected area of Madhupur tract is highly degraded. The organic matter content, soil moisture retaining capacity and soil fertility is very low 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 plant and animal species for the last 100 years. In the grassroot and regional workshops participants of all over Madhupur raised concerns about the environmental degradation of Madhupur tract and the about poor environmental management of the Madhupur forest.

Mainly rainfed crops are grown during monsoon on relatively level areas because of severe moisture stress during the dry seasons. Homestead trees are fast depleting because of acute shortage of fuel wood and lack of initiative for replantation.

Sloping land surrounding the hillocks are highly eroded and some places are rugged because of high rate of surface run off during rainy seasons due to lack of soil conservation practices. Topsoil is being constantly eroded away. Due to the increase in erosion the beds of all the rivers within and around this Tract have been filling up with sediments and have become more prone to over bank flooding.

The Madhupur Tract serves as a water catchment for the river Turag, Banar, Bangshi and their tributaries. The area has many watershed units, a natural subdivision within the region which, besides being a separate entity, also tends to provide a regional across action of landscape, soil, flora, fauna and landuse.

To prevent environmental degradation as well as maintaining sustained agricultural 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 initially which will then be replicated through the area. A Project Formulation Framework for the pilot project has already been prepared by NEMAP. The proposed pilot project will carry out the following takes in order to find out, through action-research a replaceable module:

- reduction of gully erosion through checks and sheet-erosion through cover crops;
- increase tree cover both on forest and agriculture land;
- improvement of water harvesting and promotion of fish culture both in open and closed waters;
- increase in public awareness through training, education and dissemination of information.

It is proposed that the initial pilot level project will be implemented by MOEF in coordination with local NGOs and DOF.

Key Issues

- i) Rapid Deforestation of the Madhupur tract
- ii) Loss of wild life and plant biodiversity
- iii) Soil erosion
- iv) Encroachment into forest land
- v) Introduction of exotic species without environmental consideration
- vi) Lack of landuse control
- vii) Legal complexities in respect of forest lands.
- viii) Removal of bio-mass leading to adverse effect on soil fertility
- ix) Illegal felling of trees.

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	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	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

* Priority

5.3 BARIND TRACT ISSUES

Barind Tract is located in Nawabganj, Naogaon and Rajshahi districts. The west Barind is north-south oriented and is broadly dome shaped, sloping down to the east, west and south, with land gradient averaging 0.947 m. per km. The general soil type of Barind is mainly grey terrace. The region lies in the driest part of the country and in the dry season it is semi-arid in character. The mean annual rainfall is about 1300 to 1400 mm. and the variability is high. Predominantly transplanted Aman is grown during the summer season and for the rest of the year most of the land is arid and cropless. Ground water development in the area is being questioned as a viable mode of sustainable development of irrigated agriculture. Ground water has reportedly fallen because recharge has not matched extraction.

The tract is considered as an ecologically fragile zone with extremely low vegetative cover (Hamid 1987). There is practically no tree cover except some in the homestead. The combination of climate and soil characteristics makes it particularly susceptible to desiccation. In order to prevent further environmental degradation appropriate watershed management and participatory forestry practices should be adopted in this region. A pilot project should therefore be undertaken to increase the vegetation cover, reduce sheet and gully erosion, improve the organic content of cropland soil, and increase the surface area of water bodies by excavating ponds and creating small lakes along existing seasonal stream beds.

MOEF will be the implementing agency. The NEMAP Implementation Cell will prepare necessary project preparatory documents.

Barind tract experiences frequent drought and has started showing 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 alleged that increased groundwater abstraction has reduced groundwater availability for irrigation. Large number of environmental concerns were expressed by the participants of NEMAP popular consultation process.

Key Issues

Various environmental concerns in respect of Barind Tract, expressed by the participants of the grassroot and regional workshops, are grouped under the following environmental issues :

- (1) Large scale deforestation
- (2) Large scale groundwater abstraction resulting in increasing uncertainty in the availability of irrigation water.
- (3) Loss of wildlife
- (4) Degradation of a large number of ponds
- (5) Degradation of soil due to loss of fertility, particularly organic matter and nutrient minerals.
- (6) Removal of agricultural residue.

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, Barind Development Authority	Afforestation programme with people's participation *
Ground water abstraction	Ground water survey and environmentally sound ground water development programme	Policy/Project	Barind Development Authority, Local Govt. agencies, BWDB	Ground water survey
				Formation of environmentally sound ground water abstraction plan
Loss of Wildlife	Afforestation	Advocacy/Policy/Project	FD, Community Organizations / NGOs, People, Barind Development Authority	Awareness programme for wildlife conservation
	Wildlife conservation measures	Policy/Project	FD, Community Organizations / NGOs, People	Afforestation
Degradation of ponds	Re-excavation of ponds for pisciculture and irrigation	Project	Barind Development Authority, 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 Authority, Community Organizations / NGOs, People	Proper Soil conservation measures *
Signs of desertification	Conducting Research	Project	Research Organizations, Universities	Study programme on desertification *

* Priority

5.4 WETLAND ISSUES

Environmental degradation of wetland is a major environmental consideration in Bangladesh. During the NEMAP consultation process concerns were expressed about the reduction of wetlands in different parts of the country particularly those in the haor basis (Sylhet, Mymensingh), peat basins (Madaripur, Faridpur, Gopalganj, Khulna) and Chalan beel areas (Pabna, Natore, Sirajganj). There was a express need to bring these wetlands under proper environmental management. Under the NEMAP pilot scale management intervention in selected wetland has been envisaged.

The reduction of wetlands is one of the marked features of environment degradation in Bangladesh. This reduction has been partly due to natural causes, partly to human interference and partly to a combination of natural and human causes. The shrinkage of wetlands (particularly the perennial ones) has affected the breeding of beel fishes, thus reducing their catch, and also reduced other wetland products. Where wetlands have been completely dried up there has been an adverse effect on drinking water supply and there may be long-term effect on the viability of the ecosystem.

Key Issues

- i) Reduction of area of the major wetlands due to increased agricultural practise.
- ii) Loss of wetland biodiversity.
- iii) Unplanned infrastructure construction leading to increased flooding and drainage problem.
- iv) Mineralization of perennial water during the dry season from residual fertilizer leading to eutrofication, rendering the perennial water a reduced environment inhibiting growth of fish.
- v) Poisoning wetlands for some aqua culture project intervention in the open water environment (Haor area)
- vi) Absence of integrated management of the wetlands
- v) Reduction of wildlife.

Table 5.4 : Wetlands

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Reduction of Wetland area	Wetland management plan incorporating land use control	Policy/Project	Molard, Mol/WDFC	Preparation of Pilot scale management action plan for selected wetland *
Reduction of wildlife species	Implementation of wildlife conservation laws	Policy	FD	Strengthening law enforcement authorities
	Creation of sanctuaries	Policy/Project	FD	Declaration of sanctuaries under wetland management action plan
Loss of wetland biodiversity	Biodiversity conservation	Policy/Project	FD, DoF	Declaration of sanctuaries under wetland management action plan
Unplanned infrastructure development (particularly water development structure)	Preparation of guideline for infrastructure development in the major wetland ecosystem	Policy/Project	LGED, DoF, WDB	Preparation of guideline for wetland infrastructure development
Lack of integrated wetland management policy	Development of a comprehensive wetland management policy	Policy/Project	DoE, WDB	Integrated wetland management plan *

* Priority

5.5 HILL CUTTING ISSUES

Hill cutting as an environmental issue came up in Sylhet, Cox's Bazar, Chittagong, Mymensing and Dinajpur areas. The manifestation of environmental problems associated with hill cutting were different in all these places.

Key Environmental Issues :

- i) Hill cutting due to development works such as construction of roads, expansion of settlement areas causes siltation of small drainage streams resulting in drainage congestion and flooding.
- ii) Hill cutting causes increased soil erosion and instability of hill slopes
- iii) Hill cutting destroys scenic beauties
- iv) Hill cutting causes loss of wildlife and biodiversity
- v) Removal of forest cover for stone quarrying in the foothills of Mymensing district resulting in loss of forest cover, erosion and drainage problem.

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	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 works in afforestation programmes in hilly areas
Loss of wildlife and biodiversity	Management of slope through afforestation	Advocacy/Policy/Project	FD, Community Organizations / NGOs, Private Sector, People	Management of hill slopes through community Organization and Private individual *
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
	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 *
Absence of Awareness regarding hill slope management	Awareness campaign in respect of environmental impact of hill cutting	Advocacy/Policy	DoE, Community Organizations / NGOs	Media, T V, Radio campaign, Newspapers Training and awareness raising programme by community organization

* Priority

5.6 SALINITY AND SHRIMP CULTIVATION ISSUES

Introduction of shrimp cultivation and its rapid expansion has caused environmental degradation in the coastal areas, increase of salinity, social inequalities and tension in the coastal areas of Bangladesh. Concerns on these issues were raised by the grassroot and regional workshop participants, particularly from the southeastern and south western regions.

Key Issues

The following are the key environmental issues related to increase in salinity and shrimp cultivation:

- i) Conflict between shrimp farming and agriculture
- ii) Alleged loss of biodiversity due to shrimp fry collection
- iii) Adverse impact on fishery
- iv) Cuts in the embankment by shrimp growers as well as paddy farmers.
- v) Increase in soil salinity
- vi) Loss of agricultural productivity
- vii) Increase in social conflict and tension.

In the coastal areas of Bangladesh a large number of polders have been constructed, main objective of which was to prevent periodic inundation by spring tides and increase agricultural productivity of the area. While this increase in agricultural productivity has been achieved, the projects have not been free from controversy as it has focused only on control of water and neglected the management aspect. No importance was given to environmental aspects and thus it has become an example of the consequences, in terms of related development, that arise from ignoring environmental factors. Introduction of semi-intensive shrimp cultivation have caused further environmental degradation. Increase in salinity in the south west region have added to the dimensions of the problems.

The main problems of the coastal poldered areas are as follows :

- Problem of drainable congestions and heavy rate of siltation in channels both inside and outside the polders;
- deterioration of embankments to an alarmingly low level and they are not effective against high spring tides and storm surges;
- absence of irrigation water and appropriate water management practices;

- cuts in embankments by shrimp growers as well as paddy farmers;
- increase in salinity;
- conflict between shrimp farming and agriculture;
- decrease in pasture land;
- adverse impact on fisheries;
- adverse impact on navigation.

To overcome some of the aforesaid problems the government initiated the Delta Development Project of BWDP in 1975. Actual work started in 1981 and Polder - 22 in Khulna area was taken up for rehabilitation. Main objectives of this activity was confined to improvement of the embankments and internal drainage, provision of irrigation inlets and studies on agricultural practices. Useful experiences have been gathered and the work was extended to Polder-29. These two polders (No. 22 and No. 29) are located in semi-saline zone. Problems of polders in saline zone are more acute and shrimp cultivation is more extensive there.

This component of NEMAP proposes to develop environmentally viable polder management approach in one of the polders in saline zone on pilot level. While it is recognised that shrimp cultivation is desirable from economic consideration, the present production practice is not environmentally acceptable. The present practice of catching shrimp fries from the rivers is destroying all other fish varieties. Decrease in grazing land, a common property resource, available in post-aman-harvest period, due to conversion into shrimp farm, is a major management issue. Social conflict between shrimp growers, mostly outsiders, and local people living in shrimp growing zones should be worked out. Problem of channel siltation is very acute and flushing arrangement could solve the problem. Identification of tree species appropriate to the saline regime is also important.

First step in NEMAP will be the identification of a saline zone polder in cooperation with BWDB and preparation of a PEF. After proper identification of all relevant problems and issues through a rapid rural appraisal, a feasibility level master plan may be developed for the selected polder. This plan may then be implemented as a pilot level activity. In the long run, remedial measures can be applied in all polders.

BWDB will be the implementing agency and MOEF will be the coordinating agency with support of Department of Environment, Department of Forest, Department of Livestock and Department of Fisheries. NGOs working in the area should also participate.

Table 5.6 : Salinity and Shrimp Cultivation

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	Preparation of guideline and its implementation *
Conflict between Shrimp culture and agriculture	Zoning control on shrimp cultivating area	Policy	WDB, Moland, Private Sector	Preparation of guideline and its implementation *
	Awareness and Training	Advocacy/Policy	DoF, Fisheries, Community Organizations / NGOs, People	Programme on environmental awareness for shrimp seed collection *
Loss of biodiversity due to shrimp seed 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
Adverse socio-economic effect	Involvement of local people in the shrimp farming activity, timely and adequate payment of lease money	Advocacy	Private sector, DoFisheries WDB	Favorable lease deed under the supervision of DoFisheries, WDB
	Involving small farmers in the shrimp production	Advocacy	Community Organization, NGOs, People	Small scale shrimp pond projects involving the participation of the small land holders and holders

* Priority

5.7 COASTAL AND MARINE RESOURCE MANAGEMENT ISSUES

This section outlines the policies of the Government of Bangladesh relevant to the management of coastal and marine resources and identifies the key environmental problems in this area. Consideration is given to issues related to, inter alia, coastal pollution, unsustainable exploitation of coastal and marine resources, industrial coastal concentration, regulatory control, tourism development and mangrove protection, and an outline action plan is presented addressing these.

The main sectors which have influence on marine and coastal natural resources are fisheries, forestry, industry, transport and tourism, though other sectoral influences are apparent. The policies of these sectors, as reflected in the Fourth Five Year Plan do not specifically address environmental concerns of the coastal and marine environment. However, there is the recognition that sustainable use of resources is required and that control of both industrial and ship borne pollution is required. The focal Ministry for environmental management of coastal and marine resources is the MoEF, though the MoEF will work in conjunction with concerned sectoral Ministries.

The Government's Environmental Policy broadly addresses environmental issues of concern and contains the following specific comments with respect to coastal and marine resources.

- Ensure conservation and environmentally sound development of coastal and marine ecosystems and resources.
- Prevent all local and external activities that lead to pollution in the coastal and marine areas.
- Strengthen necessary research in order to preserve and develop coastal and marine environment and resources.
- Restrict coastal and marine fish within sustainable limits.

The key environmental issues pertaining to coastal and marine resource management which need to be addressed within NEMAP are as follows:

- Pollution of the marine and coastal environment arises due to disposal of untreated municipal and industrial waste (including oil and grease from ship breaking activities) and sewage.
- Concentration of industry in specific areas causes localised pollution from a variety of untreated wastes.

- The lack of regulatory control and facilities for the disposal of ship wastes leads to substantial localised pollution from bilge and trans-shipment of materials and resources such as oil.
- The volume of shipping in the Bay of Bengal and the lack of control over waste disposal and tanker flushing represents a high potential for pollution of mangrove forests such as the Sundarbans.
- The lack of emergency response systems and general preparedness for major release and accidents along the coastal are a cause for concern.
- Uncontrolled tourism development and exploitation of marine resources for the tourist trade threatens unique marine habitats within Bangladesh.
- High population densities along the coast and upon coastal islands lead to environmental degradation and loss of natural habitats, flora and fauna.
- Mining of reef materials, sand, gravel and coastal rock formations increases the rate of marine erosion in some areas.
- Deforestation of mangroves due to shrimp farming affects coastal defence, adversely affects marine fisheries production and leads to a loss of bio-diversity (especially animals) and of livelihood to over 5 million people who depend on mangroves.
- Lack of coastal management strategies and land use plans for specific coastal areas has led to unplanned development and widespread environmental degradation.
- Failure to implement wildlife and habitat protection measures in mangrove forests has led to continuous decline in bio-diversity.
- Absence of an environmentally sustainable tourism development strategy prevents development of the industry and an economic return for habitat protection measures.
- Evidence of top-dying of Sundari trees appears to be linked to reductions in the discharge of coastal rivers which is due to over-abstraction for irrigation purposes and diversion of the rivers upstream.
- Closure of coastal rivers due to flood control and drainage measures has affected migratory fish populations such as hilsa.

- Unclear responsibilities for the management of char lands leads to their premature colonisation preventing their stabilisation through vegetation and forest development, and natural soil development (which could support agriculture).

Many of the above environmental concerns can be addressed by appropriate sectoral Ministry responses. Some cross-sectoral responses are also required and these will be predominately pursued by the MoEF.

Adequate management of many of the above issues required institutional strengthening initiatives in sectoral agencies. These are outlined in the relevant sectoral action plan. For example, the abatement of industrial and urban pollution is addressed in the section on industry. Coastal afforestation, bio-diversity conservation, fisheries development, land use planning, pollution from shipping and agricultural development are considered in other sections.

There is also an urgent need to introduce expertise which addresses the inter-sectoral environmental management requirements of coastal and marine resource protection. In response to this it is proposed to form a Coastal and Marine Unit within the MoEF.

Table 5.7 : Coastal and Marine Resources Management

Key Issues	Recommended Actions	Type of Actions	Actors/Agencies	Specific Action
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	DoE and other government agencies, Private Sector, Mol	Landuse/zoning control through coastal zone management
Susceptibility to natural hazard	Better warning system, Hazard protection and proofing	Policy/Advocacy	Disaster management Plan, Community Organizations / NGOs, People	Community based hazard management programme
	Awareness development	Advocacy	Media, T.V , Radio, Community Organization (NGO), People	Hazard protection measures 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
Deforestation of mangrove vegetation	Afforestation	Project	FD, Community Organizations/ NGOs, People	Plantation programmes with peoples participation
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	MolWD FC, BWDB	Development of environmental guide lines
	Environmental impact studies on the already constructed water development projects & recommend actions for mitigative measures	Policy/Project	MolWDFC, 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	FD/DoE	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
Lack of coastal zone management strategy	Preparation of a comprehensive coastal zone management strategy	Policy	DoE, FD, Moland	Preparation of a coastal management plan *

* Priority

6. 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 about 0.5 C. The warming trend is consistent with that of the Northern Hemisphere as a whole.

In the future, Bangladesh may get warmer and wetter. From the IPCC (1990) "Business-as-Usual" emissions scenario, Bangladesh is projected to be 0.5 to 2.0°C warmer than today by the year 2030, although the uncertainties are very high.

Agencies dealing with natural resource management in Bangladesh face an extremely difficult task in taking and implementing decisions on the allocation and utilization of land and water resources for human activities. The institutional structure for efficient planning and implementation of decision often is incomplete or not operational. They are dealing with long range changes beyond the time horizon of their immediate concerns and interest such as climate change. The potential for long term development in Bangladesh depend to a high degree on such exogenous and uncertain issues which are expected to change the inundation and drought conditions in the country, affecting the potential for agriculture, while an increased intrusion of saline waters is likely to affect strongly the availability of water and soil for all kind of human activities.

But policy-action cannot afford to wait until all the uncertainties and gaps in knowledge are resolved. For Bangladesh, this sense of urgency is heightened since Bangladesh may be especially vulnerable to the consequences of climate change as it is located in a dynamic low lying delta with most of its land within a few meters of sea level.

After Bangladesh ratifies the Climate Convention, it will be formally obliged to meet these commitments which would require the following issues to be taken into account :

- Develop national inventories of the sources and sinks of greenhouse gases.
- Formulate programmes containing measures to mitigate climate change and to facilitate adaptation.
- Promote and cooperate in the development of practices and processes that control, reduce or prevent greenhouse gas emissions.
- Promote sustainable management, conservation and enhancement, as appropriate, of sinks and reservoirs of greenhouse gases.
- Prepare for adaptation to the impacts of climate change; develop integrated plans for coastal zone management, water resource and agriculture.
- Take climate change into account in social, economic and environmental policies and actions.

- Promote and cooperate through scientific, research, related to the climate system.
- Promote and cooperate in the exchange of relevant information related to the climate system and climate change and to the socio-economic consequences of response strategies.
- Communicate to the Conference of the Parties, information related to implementation.

Immediate priority should therefore be given to research that directly supports these commitments. The following research directions are suggested :

- to determine the magnitudes of the natural and anthropogenic sources, sinks and fluxes of greenhouse gases and ODS in Bangladesh.
- to develop integrated impact models for Bangladesh that link existing climate, environmental and socio-economic?

Bangladesh may propose projects for financing, through the Global Environment Facility (GEF), the international entity which operates as the financial mechanism of the Climate Change Convention on an interim basis.

Table 6.1 : Climate Change and Sea Level Rise

Key Issues	Recommended Actions	Type of Action	Actors/Agencies	Specific Action
Uncertainties arising from the impacts of sea level rise on different sectors	Scientific study on the impact of sea level rise	Project	DoE, Research Organizations, Universities	Vulnerability study due to sea level rise on the basis of IPCC scenarios studies, modelling *
Uncertainties arising due to the impact of draught and desertification on different sectors	Scientific study on the impact of drought and desertification	Project	DoE, Research Organizations, Universities	Modelling studies
Uncertainties due to potential adverse impacts of increased use of greenhouse gases (ODS)	Scientific studies	Project	DoE, Research Organization Universities	Prepare study projects

* Priority

6.2 Urbanization

Although a small proportion of the total population in Bangladesh live in cities, the growth of urban centres and their population has been significant over the past several decades. The level of urbanization in Bangladesh is however still rather low (about 20% in 1991), but the rate of urbanization is very high (over 70% annually, during the last four decades). There are 500 urban centre with a population of 13 million. However, of the total urban population about 455 is concentrated in five major cities. Dhaka accounts for over 25% of the total urban population.

The growth of population has been substantial over the past few decades. In 1951 population of Dhaka was 335,928 which increased to 6,100,000 in 1991 and in 2025 Dhaka will have a population of 12,500,000 and will rank as a "Mega City". By the year 2025 the physical expansion will cover most of the low lying areas and the present urban centre will merge together gradually. The process will produce a single ecological system. Under such condition the city service facilities will be heavily burdened or even non functional unless large investments are made in this sector.

Urbanization of Dhaka would trigger tremendous opportunities leading to further growth and development. The projected urban development of Dhaka resulting in increased influx of people, growth of infrastructural organization and investments will be accompanied by problems of large magnitude and dimensions, leading to expansion of environmental risks and hazards.

The other major cities are also likely to witness similar phenomena in respect of their urban expansion, growth and associated problems.

High level of uncertainties are associated with these projected changes which have to be dealt with properly in the formulation of perspective plan for the urban sector of Bangladesh, and vision exercises and researches are to be conducted on these changing urban scenarios to feed the planning process.

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	Study on urbanization process in Rajshahi, Chittagong, Khulna *
	Vision exercise on Dhaka as a Mega City	RAJUK, Universities, Resource Organizations	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 from upstream.

All major rivers flowing through Bangladesh have their origins outside her borders. Therefore any intervention in the upper riparian regions have a significant impact on Bangladesh. Bangladesh, through its complex network of river system, drains an area of about 1.76 million square kilometre of catchment areas of the Ganges, Brahmaputra and Meghna rivers, of which only 7 to 8% lies in Bangladesh. This physical characteristics severely limits the degree of control and management of the inflow water in the monsoon and in the dry season.

Water resource in Bangladesh to-day faces a critical situation. Bangladesh delta, one of the largest in the world, is undergoing rapid hydrological, morphological and ecological changes due to natural and anthropogenic reasons.

Although still a point of controversy, one of the causes of increased flooding in Bangladesh can be traced to Nepal and Assam, where majority of the rivers originate. Massive deforestation of the mountain-sides has significantly reduced the Himalaya's capacity to absorb the monsoon rains, and greatly increased the eroded soil that is carried by the flood waters.

Another major problem being faced by Bangladesh is due to the construction of the Farakka Barrage, located on the Ganges in India, a few kilometres upstream of the border with Bangladesh. It was completed in 1975 and, during the dry season, augments flows to the Bhagirathi - Hoogly system and supports irrigation in West Bengal. Its success in these functions is reported to have been limited.

The water problem started when India started withdrawing water from Ganges, Teesta and many other river / streams, thereby depriving Bangladesh of water badly needed for irrigation in the dry season. The Ganges recorded lowest flow of 9.43% cusec on 6 April, 1993, against a flow of 60,000 to 65,000 cusec in pre-diversion period.

Early signs are that the flow changes have induced measurable impacts on the river systems of Bangladesh, specially the south-west region. It has become apparent that Farakka has : reduced dry season flows in the Ganges to record low levels; closed the Ganges - Kobadak Irrigation Scheme during the dry season; reduced minimum dry season flows in the Gorai to zero for long periods; created adverse impacts on in-stream and riparian habitats resulting from accelerated flow recession and low dry season water levels, and adversely affected environmental, commercial and agricultural interests associated with reduced dry season inputs of fresh water. It has similarly

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 water sheds including Farakka	Conduct studies on regional water shed	Project	MolWDFC, MoEF	Programme for data collection
	Collect information on the proposed upstream intervention	Project	MolWDFC, MoEF	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	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. *

* Priority

accelerated the possible permanent abandonment of the Gorai as a Ganges distributary here the morphological changes are allowed to continue without human intervention.

The Ganges Water Agreement was signed between Bangladesh and India for sharing water of the Ganges at Farakka on 5th November 1977 for period of five years (1977-82). The Agreement was significant in that, it recognised the Ganges as an international river. [The water to be shared at Farakka was for five months period from 1st January to 31st March every year. The agreement provide for 80% guarantee of available flow to Bangladesh in case of exceptional low flow of the Ganges at Farakka].

Under the India - Bangladesh Agreement of 1977, dry season abstraction was limited to 580 cubic meters (cumecs), with Bangladesh receiving the remainder and a guaranteed minimum of 80% of the average flow calculated from 1948 to 1973, even if the actual flow fell short in any year. Under such an arrangement, the impact of Farakka on dry season flows was limited. However, in 1988 the Agreement expired and it has not yet been renewed or replaced. As a result, dry season flows entering Bangladesh have decreased even more markedly since 1989.

An answer to the problem is the formulation of regional water management plans, which should be developed based upon hydrological, hydrogeological and agro-ecological characteristics. These plans should identify areas where exploitation of water should be constrained or prohibited and outline sustainable methods of exploitation.

Bangladesh's requirements for the sustainable management of transboundary water resources (eg Ganges River) and the preservation of national ecosystems should be identified and the cooperation of neighbouring countries sought through binding agreements. In addition to discussions with regional countries, alternate conceptions/projects should be evolved to reduce the impacts of upstream withdrawals.

6.4 Research and Development

With severe resource limitations in a densely populated country, education becomes the most important resource for conservation of material resources, their optimum use and environmental protection. Education is an important factor for population planning, public hygiene, health and other environmental fields. It is also a powerful instrument to mobilise community in the process of sustainable socio-economic development and to ensure a meaningful commitment and accountability for people's welfare.

A working committee should be established on a permanent basis to review the status of environmental education, evaluate options for improvements and coordinate inter-agency actions in environmental education. This committee will oversee the introduction of environmental education in Bangladesh.

Development of environment science as a specialised subject at secondary and tertiary level is needed. Institutes of higher education (including Universities) need to expand and / or create curricula / courses which address the environmental issues pertinent to Bangladesh. The objective is to introduce courses which will provide the range and level of professional environmental skills required for the sustainable development and environmental management of Bangladesh in the medium to long term.

The University Grants Committee must be given the mandate to give funds to finance environmental research. The selection of specific environmental research programmes and the consideration of environmental aspects in other research will be facilitated by a Research Evaluation Committee chaired by the MOEF.

The resource limitation in Bangladesh, both physical and financial, makes it imperative that maximum output is achieved from minimum resources without endangering the environment. In order to achieve this, an essential task before the scientific and research community of Bangladesh is to evolve new environment-friendly technology to help sustain national growth.

Furthermore, to maintain sustainable development in Bangladesh, introduction of bio-technology has become imperative and must be actively considered, specially for the agricultural sector.

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	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 now 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 commercially important fish, prawn and other aquatic animal populations under exploitation in the inland and marine waters of Bangladesh	Project	MoFL, DoFisheries	Formulation and implementation of projects for fish and prawn assessments in Bangladesh *
Aquatic environmental needs for different fish and prawn populations in the inland and marine waters are unknown	Hydrological chemical and biological environmental needs for different fishes and prawns ought to be ascertained to through field and laboratory research including the use of stimulation models	Project	MoFL, FRI, DoFisheries	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 *

* Priority

7. CONCLUSIONS

The challenge to sustainable development in Bangladesh hinges on three paradigms :

- o Achieving significant development for all the citizens as demonstrated by Human Development Indicators.
- o Integrating environmental dimension in all development activities and at all levels: plans, policy, programme, projects, community and ecosystem.
- o A governance structure where environmental concerns become central and the people, i.e. the stakeholders, become the ultimate custodian of the resource base and source of all decision making.

Though it may appear that simultaneous achievement of all the three above mentioned objectives is an impossible and improbable task, there is an inherent synergy amongst the three paradigms that could become the essential driving force for achieving sustainability in Bangladesh. The question is not only how to achieve sustainable development in Bangladesh, but more appropriately how to build in the concepts of sustainability of communities, ecosystems, projects and programmes. Thus achieving sustainability must become a central objective and the majority of country's population, who are poor, must be brought into the development-environment nexus and be central in decision making and become visible productive contributors.

The key actors are :

- o Government
- o Parliament
- o Government Agencies
- o Local Government
- o Private sector
- o NGOs
- o Media
- o Academic/Research Community
- o Organized and unorganized community organizations
- o Youth groups
- o Families
- o Individuals.

The list of Institutional, Sectoral, Location Specific and Long Term Actions that have been developed in the Action Plan include an identification of the institutions and organizations both government as well as non-government which may be most appropriate to carry out those Actions. To enable the different organizations to identify the most appropriate actions for them a separate list of actions for different government as well as non-government organizations are shown in Table 7 (a) and 7 (b).

Thus the Action Plan has a role for different sectors of civil society including both government and non-government. It is envisaged that there will be a continuation of the coordination and review role of the Ministry of Environment and Forest along with its other government and non-government partners in the follow up and implementation of the Action Plan. However, their role is only partly to coordinate all the actions being taken by different groups, but also to act as an information clearing house while encouraging all groups in civil society to take up elements of the Action Plan and implement them on their own initiative.

Prioritization

The different activities recommended in the Action Plan are meant to be implemented by different groups and organizations including the government and non-government sector and in some cases both together. Although the concerns and issues raised and indeed many of the proposed solutions and actions were derived from the people through various mechanisms including the workshops and questionnaires, the final list for prioritization has been done keeping the following in mind :

- * People's concerns and recommendations
- * Existing Government Policies
- * Current institutional set up
- * Practicability of the action
- * Identification of suitable institution/organization for implementing the action

Based upon these criteria a prioritized list of Actions have been developed as shown schematically in Figure 7.1. Each of these Proposed Actions are further elaborated into useable Project Concepts with an identification of the relevant agency or organization in Volume III of NEMAP. However, this does not mean that other sectoral, regional, long term or institutional actions shown in the Main Report (Vol II) cannot be taken up for action by the appropriate agency or organization. All of the Actions recommended are considered important, however, only some have been selected for prioritization according to the following criteria :

- * Where large numbers of people are likely to be affected
- * Where urgent action is needed
- * Where ecosystems may be lost or badly damaged if action is not taken immediately

- * Where appropriate institutional mechanisms are essential
- * Where people's participation needs to be assured
- * Where pilot projects are immediately feasible

Although the prioritized list has focused more on the role of the Government, and particularly the Ministry of Environment and Forests, Department of Environment and Department of Forest as these are the ones primarily responsible for environmental issues it also brings in the other government Ministries, Agencies and Research Organizations in as much as they relate to the environment. Last, but far from least it identifies Actions that can be taken up independently by other organizations like NGOs, Universities, Colleges, Schools, Research Institutions, Journalists, radio, television, elected representatives, including members of parliament, lawyers, industrialists and the people themselves. A strong emphasis is placed upon continuing the process of people's participation in the implementation and monitoring of NEMAP.

The Way Ahead

The NEMAP document being circulated represents a fusion of the concerns and priorities of people from all areas of the country and all walks of life including professionals and the different agencies of the Government of Bangladesh. It was developed in an open and highly consultative manner by the Ministry of Environment and Forests in cooperation with many other groups including NGOs, researchers, journalists, lawyers and the people themselves. It is envisaged that the implementation phase of the Action Plan will continue this cooperative and consultative process and that people who were consulted during the planning phase can also be involved in the implementation phase and monitoring of it. It is therefore expected that the NEMAP will become a process of implementation of environmental actions with people's participation and that the exercise of public consultation can be repeated a few years later. Only if the result of such a future consultation results in people seeing an improvement in conditions of their environment can the NEMAP be considered a success.

The following are the specific and immediate actions to be taken for implementation of NEMAP :

- o Activation of National Environment Council chaired by Prime Minister (and its Executive Committee chaired by the Minister for Environment and Forest) to discuss & adopt the NEMAP.
- o Continuation of NEMAP Secretariat in Ministry of Environment and Forests and Interministerial Steering Committee with non-government participants to :
 - o Ensure widespread dissemination and public awareness of NEMAP
 - o Detailed costing exercise of different elements of NEMAP
 - o Assist other sectoral agencies and non-government agencies in preparing their own environmental guidelines and activities
 - o Set up Local Environmental Committees on pilot scale in selected ecosystems
 - o Act as a central clearing house for NEMAP related activities including a strong dissemination component.

FIGURE 7.1 : SCHEMATIC REPRESENTATION OF MAIN ACTIONS OF NEMAP

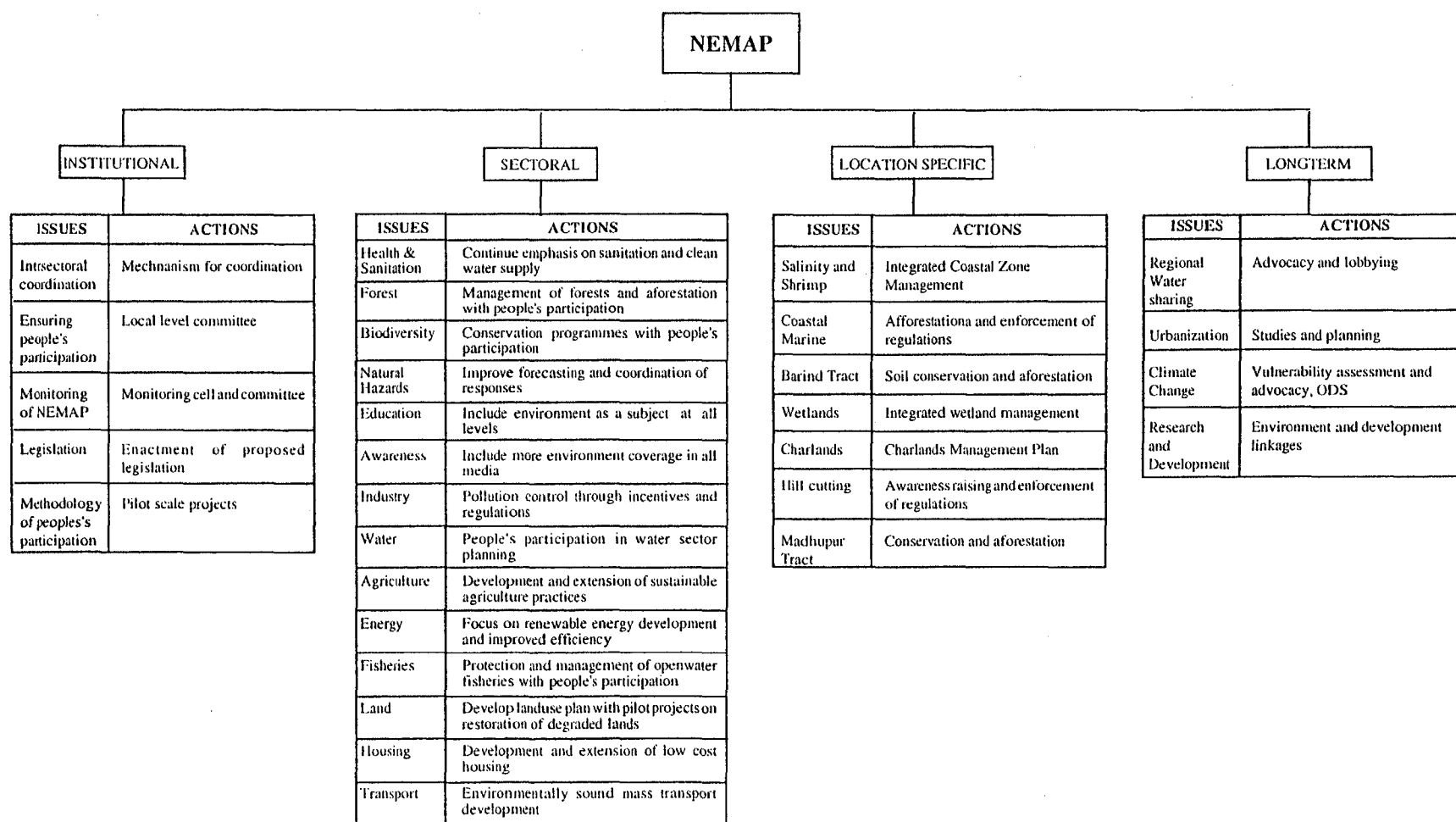


Table 7 (a) : Institutional Distribution of Action

Institutions	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 relevant international treaties (e.g. Climate Convention, Biodiversity Treaty, Montreal Protocol, CITES, etc)
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 library 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 (b): Institutional Distribution of Action

Institutions	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 Ensure institutional capability within NGO associations to give support to on 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 programmes and projects involve youth in awareness raising and other activities, e.g. tree planting, pisculture, 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 Discuss and pass existing environmental bill

8.1 Abbreviations

ADAB	:	Association of Development Agencies in Bangladesh
AEU	:	Agriculture and Environment Unit
BCAS	:	Bangladesh Centre for Advanced Studies
BELA	:	Bangladesh Environment Lawyers Association
BFIDC	:	Bangladesh Forest Industries Cooperation
BFRI	:	Bangladesh Forest Research Institute
BJMAS	:	Bangladesh Jatiya Mahila Ainjibi Samity
BRAC	:	Bangladesh Rural Advancement Committee
BWDB	:	Bangladesh Water Development Board
CCDB	:	Christian Commission for Development in Bangladesh
CDA	:	Community Development Association
CEN	:	Coalition of Environmental NGOs
CMRU	:	Coastal and Marine Research Unit
CODEC	:	Community Development Centre
DAE	:	Department of Agricultural Extension
DoE	:	Department of Environment
DoF	:	Department of Forestry
DPB	:	Disaster Preparedness Bureau
ECNEC	:	Executive Committee of the National Environment Council

EIA	:	Environmental Impact Assessment
ESCAP	:	Economic And Social Commission for Asia and Pacific
EQS	:	Environmental Quality Standard
FAO	:	Food and Agriculture Organization
FAP	:	Flood Action Plan
FCD/I	:	Flood Control Drainage and Irrigation
FD	:	Forest Department
FEJ	:	Forum of Environmental Journalists
FFYP	:	Fourth Five Year Plan
FIVDB	:	Friends in Village Development Bangladesh
FPCO	:	Flood Plan Coordination Office
FRI	:	Forest Research Institute
GDP	:	Gross Domestic Product
GEF	:	Global Environment Facility
GIS	:	Geographic Information System
GOB	:	Government of Bangladesh
GUP	:	Gana Unnayan Parishad
HYV	:	High Yielding Variety
IEU	:	Industry and Environmental Unit
IPCC	:	Inter-governmental Panel for Climatic Change

IUCN	:	International Union for Conservation of Nature
km	:	Kilometre
LAN	:	Local Area Network
LGED	:	Local Government Engineering Department
LPG	:	Liquidified Petroleum Gas
mgt	:	Management
MoAgri	:	Ministry of Agriculture
MoE	:	Ministry of Education
MOEEMR	:	Ministry of Electricity, Energy and Mineral Resources
MoEF	:	Ministry of Environment and Forest
MoEstb	:	Ministry of Establishment
MoF	:	Ministry of Finance
MoFL	:	Ministry of Fisheries and Livestock
MoHFP	:	Ministry of Health and Family Planning
MoI	:	Ministry of Industries
MoIWDFC	:	Ministry of Irrigation, Water Development and Flood Control
MoLANDS	:	Ministry of Lands
MoLaw	:	Ministry of Law
MoLGRD	:	Ministry of Local Government, Rural Development and Cooperatives
MoLocal Govt.	:	Ministry of Local Government

mm	:	Milimetre
MoP	:	Ministry of Planning
MoR&R	:	<i>Ministry of Relief and Relief and Rehabilitation</i>
MoTour	:	Ministry of Tourism
NEC	:	National Environment Council
NEMAP	:	National Environment Management Action Plan
NGO	:	Non Governmental Organization
NCS	:	National Conservation Strategy
NOAA	:	National Oceanic and Atmospheric Administration
PFF	:	Project Formulation Format
PVDO	:	Private Voluntary Development Organization
RDRS	:	Rangpur Dinajpur Rural Service
RRA	:	Rapid Rural Appraisaaal
SETU	:	Services for Education Training and Unity
UNCED	:	United Nations Conference on Environment and Development
UNCHS	:	United Nations Centre for Habitat and Settlement
UNDP	:	United Nations Development Programme
WDB	:	Water Development Board

8.2 NEMAP Review Committee

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15. Mr. Chinmoy Mutsuddi, President, FEJB, Member
16. Mr. Shaymol K. Shaha, ADAB, Member
17. Mr. Mustafa Kamal Majumder, Journalist, Member

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11. Mr. Rowshan Ali Chowdhury, Former Chief Conservator of Forest
12. Dr. Subinay Nandy, UNDP
13. Dr. Mohiuddin Farooque, BELA

8.4 Participants at NEMAP Synthesis Workshop

BRAC, CDM, RAJENDRAPUR

September 29, 1994

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17.	Dr. A. Atiq Rahman	Director	BCAS
18.	Ms. Sughra Arasta Kabir	Research Officer	BCAS
19.	Mr. Dwijen Mallik	Sr. Research Officer	BCAS
20.	Mr. Mazharul Alam	Jr. GIS Expert	BCAS

8.5 List of Facilitators and Rapporteurs

	Name	Address
1.	Nasima Akhter	ADAB
2.	Shamsuddin Md. Rafi	ADAB
3.	A.K.M. Shahjahan	ADAB
4.	Nurul Momen Bhijan	ADAB
5.	Mizanur Rahman	BRAC
6.	Md. Abdus Samad	BCAS
7.	A.K.M. Morshed	BCAS
8.	Md. Sk. Zakaria	BCAS
9.	Md. Abdur Rashid	Nijera Kori
10.	Khondoker Shamsul Alam	Nijera Kori
11.	Nurul Islam Siddique	Nijera Kori
12.	Hasina Akhter	Nijera Kori
13.	Shawkat Hayat Khan	Nijera Kori
14.	Rasheda Begum	Nijera Kori
15.	M.A. Hakim	PROSHIKA
16.	Md. Atiqullah	PROSHIKA
17.	Monitosh Howladar	PROSHIKA
18.	Umme Kulsum	PROSHIKA
19.	Mominur Rahman	PROSHIKA
20.	Tapan Chakrabarty	PROSHIKA
21.	Giasuddin	PROSHIKA
22.	Sunil Bhadra	PROSHIKA

23.	Anwar Hossain	PROSHIKA
24.	Md. Rezaul Karim	PROSHIKA
25.	Giasuddin Talukder	PROSHIKA
26.	Abul Kalam Azad	PROSHIKA
27.	Kamal Ahmed	NGO FORUM
28.	Kashinath Biswas	GUP
29.	Amena Khatun	GUP
30.	Anil Roy	GUP
31.	Tapan Mitra	BARRA
32.	Shamol Kanti Bose	BARRA
33.	Kazi Baby	UST
34.	Sirajuddahar Khan	ALRD
35.	Md. Fazlur Rahman	SETU
36.	Md. Mozammel Hoque	BANCHTE SHEKHA
37.	Sarwar-e-Kamal	CARITAS
38.	Md. Nazimuddin Khan	ARBAN
39.	Arun Kumar Saha	VORD
40.	Md. Humayun Kabir	PROSHIKA
41.	Afzalunnesa Chowdhury	CARITAS
42.	Shah Atowar Ali	POUSH
43.	Asaduzzaman	POUSH
44.	Mehedi Hasan	POUSH

MAIN FACILITATORS

	Name	Address
1.	Md. Kamaluddin	ARBAN
2.	A. Majid Mollick	CARITAS
3.	Shabbir Ahmed Chowdhury	BRAC
4.	Shaymol Kumar Saha	ADAB
5.	Dipok Kumar Ghosh	PROSHIKA
6.	Masuda Khatun Shefali	NARI UDDYOG KENDRA
7.	Alo D. Rozario	CARITAS

GENERALIZED SCHEMATIC SHOWING ORGANIZATION AND STRUCTURE OF GRASS-ROOT WORKSHOPS

Step	Time	Groups	Activities	Purpose
1	Early morning	All together (plenary)	<ul style="list-style-type: none"> o Brief presentation by organizers (MOEF/ADAB) on purpose of workshop o General discussion to identify environmental problems & concerns 	<ul style="list-style-type: none"> o To explain purpose and objectives of the workshop o To make a general list of environmental concerns/problems and to get general agreement on what should be considered "environmental" & what shouldn't
2	Late Morning	Small groups (Selected by profession & gender)	<ul style="list-style-type: none"> o Each individual allowed to select 10 most important environmental problems & concerns o Agree on 10 most important for the group as a whole 	<ul style="list-style-type: none"> o To allow each individual to give his/her own priorities o To get the group, through discussion (facilitated by NGO facilitator) to agree on a set of 10 problems
3	Early Afternoon	Small group	<ul style="list-style-type: none"> o To identify causes of each of the 10 listed problems 	<ul style="list-style-type: none"> o To think of causal linkages between the problems identified
4	Late Afternoon	Plenary	<ul style="list-style-type: none"> o One member from each group's (elected from within the group) presents their 10 problems with causes 	<ul style="list-style-type: none"> o To share each group's priorities with other groups & stimulate discussion
5	Evening	All together	<ul style="list-style-type: none"> o Have dinner together & discuss informally amongst participants, facilitators, rapporteurs, organizers etc. 	<ul style="list-style-type: none"> o To break the ice and make every individual feel comfortable and therefore more willing to share his/her thoughts
6	Morning	Small groups	<ul style="list-style-type: none"> o For each of the 10 problems identify possible actions to address the problem 	<ul style="list-style-type: none"> o To elicit solutions and actions from individuals and groups
7	Late Morning	Small groups	<ul style="list-style-type: none"> o Identify responsibility and actions at three levels : (i) by the individuals themselves, (ii) by the local government & local community & (iii) by the national government 	<ul style="list-style-type: none"> o To generate a sense of individual responsibility for action o To identify specific groups to take actions identified for each problem
8	Afternoon	All together	<ul style="list-style-type: none"> o Each group presents the group's identification of solutions and responsibilities o Discussion amongst all the groups on the solutions & responsibilities presented by each group 	<ul style="list-style-type: none"> o Sharing each group's thinking with the others o To allow general discussion & debate (some debates could be resolved amicably with the group modifying its conclusions but in most cases the groups stood by their opinions which were recorded as such)

- Notes :
1. Total number of participants in each workshop were between 60 and 80.
 2. Each workshop was held over two full days to allow every individual an opportunity to participate.
 3. Participants were from different backgrounds e.g. farmers, fishermen, businessmen, teachers, govt. officials, people's representatives, NGO women & target group members.
 4. Priority attempts were made to have at least 50% women participation.

5. Six trained facilitators from ADAB were provided to each workshop with another six to eight rapporteurs from the host NGO.
6. Each small group had one trained facilitator and one rapporteur to record discussions.
7. In many workshops video recordings were made of plenary and small group discussions.
8. In each workshop a senior professional journalist was present throughout to keep an independent record of the workshop.
9. Each group's discussions, problem list, solutions and responsibilities were recorded separately and submitted to the Synthesis Group for writing up.