DYNAMICS OF PUBLIC POLICY FORMULATION: A STUDY OF ENVIRONMENTAL POLICY OF BANGLADESH

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Declaration

The thesis titled 'DYNAMICS OF PUBLIC POLICY FORMULATION: A STUDY OF ENVIRONMENTAL POLICY OF BANGLADESH' is submitted in partial fulfillment of the requirement for M.Phil degree in Public Administration. The research work has been carried out under my supervision. To the best of my knowledge no part of the work has been submitted for another degree or qualification in any other Institute.

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Abstract

Public policy is a complex process where several endogenous and exogenous factors simultaneously interact and shape the ultimate content, locus and focus. Public policies regulate conflicting views of the society to optimize social and political goals. Public policies in Bangladesh are generally the outcome of many factors. Many internal as well as external actors. factors remain here active in shaping policies and the policy making process. They can be categorized in to two groups as: a) internal actors which include parliament, political executive and permanent executives: b) external actors which include the donor/ development partners, foreign investors, regional and international; economic and political forum etc.

This study is devoted to an examination of the dynamics of public policy making in Bangladesh, with particular reference to the formulation and implementation of environmental policy. Environmental policy assumes a great significance in the country because of extreme pressure of a huge population on a limited resource base, has strained the country's carrying capacity, in terms of both the source and sink functions of environment. So, Bangladesh faces the most difficult task of balancing between development efforts and sustaining scarce resource base.

A review of Bangladesh's experience in environmental sector has been carried out in the study and it is revealed that, environmental policy making in Bangladesh is a new domain without much of past experience. There are two steps in the formulation of an environmental policy: the choice of an overall goal and the selection of a means to achieve the goal. Selection of a proper means is not always possible due to fund limit or scarce resources.

Often the programs and policy on environment focus on peripheral aspects instead of addressing the main problem. As a result, tackling environmental degradation has become difficult.

The study has detected the inconsistencies among the various sectoral policies on environment.

The study identified the environmental issues / problems of the country and the causes behind these problems. The major environmental issues of the country are land degradation, air pollution, water pollution and scarcity, natural disasters and loss of biodiversity. Some cases manmade causes and some cases natural causes are responsible for these issues.

The study also attempted to identify the extent of influence of actors in the environmental sector. The major actors in the environmental sector projects and policies in Bangladesh are various donor agencies like CIDA, UNDP, UNEP, WB, ADB, and NORAD. The DOE was created with the support of CIDA. Donors are providing financial and institutional support on various environmental projects and programs and they also induce their ideas on these programs. Besides, some of the NGOs have emerged with environmental protection as their main goal in Bangladesh like BELA, BAPA, BCAS, FEJB.

The study has come out with a number of recommendations like reformulating the existing environmental policy, incorporating environmental issues in various sectoral policies, raising awareness in environment etc. and these will help tackling environmental problems in the country.

Contents

Abbreviations

ADB: Asian development Bank

BAEC: Bangladesh Atomic Energy Commission

BAPA: Bangladesh Poribesh Andolon

BARC: Bangladesh Agricultural Research Centre

BBS: Bangladesh Bureau of Statistics

BCAS: Bangladesh Center for Advanced Studies

BELA: Bangladesh Environmental Lawyers Association

CIDA: Canadian International Development Agency

CUS: Centre for urban Studies

DOE: Department of Environment

EIA: Environmental Impact Assessment

ENSO: El-Nino-Southern Oscillation

EQS: Environmental Quality Standards

FEJB: Forum of Environmental Journalists

GOB: Government of Bangladesh

HYV: High Yielding Varieties

IUCN: International Union for Conservation of Nature

JICA: Japan International Cooperation Agency

km/hr: Kilometer/ Hour

Mha: Million Hector

MOEF: Ministry of Environment and Forest

MP: Muriate of Potash

NAM: Non-Align Movement

NCA: Net Cultivable Area

NEMAP: National Environmental Management Action plan

NGO: Non-Governmental Organization

NORAD: Norwegian Agency for International development

ODA: Overseas Development Assistance

RF: Reserved forests

SAARC: South Asian

SEMP: Sustainable Environmental management Plan

SOE: State of Environment

TSP: Triple Super Phosphate

UNDP: United Nations' Development Program

UNICEF: United Nations' International Children Fund

USF: Unclassified state forests

WASA: Water Supply and Sewerage Authority

WB: World Bank

WCMC: World Conservation Monitoring Centre

CHAPTER I

Introduction

1.1 Background of the study

Public policy is an important mechanism for moving a social system from the past to the future. It helps to shape the future. In the civilized societies, public policy is considered instrumental in protecting and furthering the interest of the common man and improving the quality of life at all levels of society.

A public policy may cover a major portion of its activities, which are consistent with the development policy. Socio-economic development, equality, or liberty or self- reliance or similar broad principles of guidance for action may be adopted as developmental policy or national goal. A public policy may be narrow covering a specific activity such as education. It may be applied to all people in a country or it may be limited to a section of its people.

The scope and size of public sector has grown enormously in the developing countries in the context of poverty alleviation, industrialization and urbanization. At present the functions of practically all governments, especially of the developing countries, have significantly increased. The growth of public functions has paralleled the growth of public policies in these countries.

Given the importance of public policy in a nation's life, this study is intended to examine the prevailing process of public policy formulation in Bangladesh, assess the shortcomings in the policy making process, and recommend ways and means whereby the policy making task can be improved. Public

policy is, however, a very broad concept, its scope extending to cover a wide range of issues of public interest, such as education and public health, human resource development, population control, environmental protection, promotion of trade and commerce, stability in money, credit and financial markets, development of the productive sectors of the economy such as agriculture, industry and services, and so on. In respect to all these areas, separate public policies are formulated and implemented, keeping in view the specific national objectives in each of these areas. In this study, only one specific aspect of public policy, i.e., "Environmental policy", has been chosen for analysis. The rationale for limiting the scope of the study to environmental policy alone is discussed in the following section.

1.2 Rationale of the study

The term 'sustainable development' was brought into common use by the World Commission on Environment and Development known as the Bruntland commission of 1987. The Bruntland commission's definition of sustainable development is 'meeting the needs of the present generation without compromising the needs of future. But at present, environmental degradation has become an almost inevitable consequence of our development activities. Bangladesh is one of the least developed countries of the world and the poor population is the main victim of environmental pollution.

There was a time when Bangladesh's per capita income was low, but her air was pure, and the water was uncontaminated. Over the past years, the country has been trying to achieve economic growth and narrow its income-gap and technology-gap with the developed countries. Unfortunately in the process the environment has been let to suffer, and as a result now a new, painful environment gap has emerged. Most of the indicators of environmental quality in Bangladesh are now far worse than in the

developed countries. Though this neglect of environment has not led to a narrowing of the income-gap.

Serious environmental degradation has taken place in Bangladesh in recent years. There are many dimensions of this degradation. Urban air pollution, ground water contamination (by arsenic, etc), surface water pollution, encroachment of rivers and other water bodies, improper disposal of industrial, medical and household waste, deforestation, loss of open space, loss of biodiversity, noise pollution, etc. are a few examples. In, any cases the extent of degradation has reached crisis proportions.

This degradation of Bangladesh's environment has taken place at a time when the developed countries are improving their environment in many respects.

There are several factors that make Bangladesh particularly vulnerable to environmental degradation. The fragile ecology, delicate flora and fauna, wetness of land, high density of population, reliance on foreign capital for industrialization, poverty of masses are some of them. For this reason, necessary and effective policies keeping pace with time must be made in this regard. It is undeniable that with the advent of technological development and advancement of human knowledge, the environment is bound to be affected. But we must make an effort to make a balance between the two, so that the human health hazards due to technological civilization may not adversely affect us.

The environmental protection effort in its post-industrial sense is of recent origin in Bangladesh. The beginnings can be traced back to the 1980s. Several developments took place in that period. As for example, a separate Ministry for Environment and Forests was created which replaced the small –Environment and Pollution Control Cell of Ministry of Local government,

Rural Development and Cooperatives. Besides, many non-governmental organizations (NGO) and some research and consulting organizations emerged with study of environmental issues as the main focus. These developments took place in the backdrop of serious environment al degradation. However, there were donor-induced elements in these developments.

As a result of these international and domestic processes, environmental protection emerged as a noticeable issue in the eighties. An important step in this regard was the adoption of the National Environment Policy and National Environment Action Plan (1992) National Environment Management Action Plan (NEMAP) (1995) by the ministry of Environment with participation by some NGOs and other organizations. The NEMAP led to the UNDP funded $26 million Sustainable Environment Management Project (SEMP) with 21 different components implemented by different Sub Implementation Agencies (SIA). In addition, the World Bank and the Asian Development Bank came forward with several environment – related projects.

But the environment in Bangladesh continues to deteriorate, because the above policies, projects and activities are not proving adequate for meeting the environmental challenge that the country faces, often the projects are ill conceived and instead of addressing the main problem, they focus on peripheral aspects. Even when they are well conceived, they are not properly implemented.

So to stop the process of environmental degradation in Bangladesh and to repair the damage that has already been done, an effective environmental policy is required.

1.3 Review of the Literature

Environment has become a major concern, both at the global level as well as at the national level in the developed and developing countries of the world, particularly, within the last few years. This is exhibited in the increasing concern about aspects like the Greenhouse Effect with the consequent increase in sea level, which may inundate large parts of the low lying deltaic regions of the world including Bangladesh. (Rahman et. al., 1994). Environment of Bangladesh is distinctively in severe condition. So, environmental policy enjoys greater importance for Bangladesh. Some of the works on the subject are reviewed here.

Mizan R. Rahman in his paper (2000) observes the inconsistencies of various aspects of national environmental policies. He notes that NEP has 6 broad objectives, containing 3 to 7 policy statements for each of the 15 sectors, totaling 69 sweeping statements with no prioritization. According to Khan, there exists contradiction among various sector policies, As for example, Fisheries Policy provided for export of turtles and other species, contradicting the NEP. On the other hand, NEP discourages the use of chemical fertilizers, but the agro policy focuses on intensive method using agrochemicals. He also focuses on the lack of intensive capability of MOEF. Quamrul Islam Chowdhury in his article "National Environmental Legislation" gave a general framework of the environment related legislation in Bangladesh. He observes that there are about 200 sectoral laws dealing with environmental issues, like land use, air and water pollution, noise, toxic chemicals, solid waste, forest conservation, wildlife protection, environmental health and sanitation etc. Some of these laws are inherited from the British colonial period. He also categorized these laws in the following way: a) Protection of environmental health, b) Control of environmental pollution c) Conservation of natural and cuitural resources. He also described the features of some of the laws. Such as-

- The Environmental Conservation Act, 1995
- Bangladesh Wild Life Preservation Act, 1973
- The protection and Conservation of Fish Act, 1950
- The Brick Burning (Control) Act, 1989
- The brick Burning (Control) (Amendment) Act, 1992

Rahman et. al. (1994) in their edited book 'Environment and development in Bangladesh' observe that degradation of the environment is undermining not only development in Bangladesh but also threatening the very natural resource base on which population of Bangladesh stake their survival. It has both short and long term consequences on the quality of life as measured in terms of nutrition and health status, longevity, housing, water supply, sanitation, education and employment prospects. Also damaging are certain human interventions borne out of man's use of technology, which can further disrupt the fragile ecological balance and aggravate landlessness, the urban drift and the climate of poverty. The only mode of practical development is sustainable development i.e. integrating environment and development issues.

Farooque and Hasan (1996) in their edited book summarized the laws related to environment in Bangladesh. They categorized the laws under 16 sectors, which are pollution and conservation, health, food and consumer protection, occupational rights and safety, public safety and dangerous cargo, land use and administration, agriculture and agro-chemicals, water resources, fisheries, forestry, wildlife and domestic animals, energy and mineral resources, local government laws, rural and urban planning and protection, transportation and safety, cultural and natural heritage vulnerable group etc. The authors also summarized some of the provisions of the constitution of Peoples' Republic of Bangladesh, which have bearing on environment and they included the English version of the National Environmental Policy (NEP).

Philip Gain's (1998) edited book on 'Bangladesh Environment, Facing the 21st Century' focuses on various aspects of environmental issues and problems in Bangladesh. The author tried to abstain from giving selected opinions or recommendations on the remedies to environmental concerns and problems. The author also wanted to contribute to more intensive discussions and actions on environmental issues of national and community interest. According to the author, energy, industrialization and industrial pollution, air pollution and disasters are a cluster of issues which elaborate the environmental issues and concerns that Bangladesh and its people encounter in their daily life. Despite its size, the industrial sector originates enormous environmental problems. Inferior technology, threat of industrial waste, banned or condemned chemicals and pesticides, indiscriminate discharge of wastes into water sources have posed serious problems. Disasters, apart from the natural ones, are sometimes linked with ill-planned industrialization and development interventions. A disaster can also be linked with health hazards and concerns as has been in the case of arsenic contamination. A section on environmental laws furnishes the legal implications of all the issues discussed. it also displays that there is a legal remedy if a case of pollution or violation of environmental ethics is brought to the court.

Miah and Alam (2002) in their paper "Deforestation and Greenhouse Gas Emission Caused by the Brickfields: Bangladesh Perspective" focused on the potentialities of brick fields in Bangladesh of deforesting and emitting greenhouse gases due to the consumption of fuel-wood and fossil fuel. The result was analyzed based on the observation of 12 brickfields in Hathazari Upazila, Chittagong, Bangladesh. The methodological approach followed the procedures outlined by the Intergovernmental Panel on Climate Change for conducting inventory of deforestation and greenhouse gas emission. It was estimated that due to the consumption of wood fuel in the brickfields of Bangladesh, the total amount of deforested wood would be 4248600 m^3

encompassing 1465020 m^3 round wood and 2783580 m^3 branches annually. By considering all wood fuel and fossil fuel, it was estimated that, the total emissions from all the brickfields of Bangladesh would be 4057110 tonnes of CO_2, 17700 tons of CH_4, 154920 tons of CO, 123 tons of N_2O, 4410 tons of NO_x and 2880 tons of NO per annum while the total carbon released in the atmosphere would be 1106490 tons annually. Their observation is quite revealing.

Alam et. al. (2002) in their paper "Level of Arsenic in Water, Soil and Food Samples in an Arsenic Affected Area" focused on the amount of arsenic found in water, soil and food samples of an arsenic affected area measured by different methods. Most of the people in Bangladesh are using ground water as a source of safe drinking water. At a time people have been habituated of using ground water through tube well as safe drinking water, arsenic has been found in the ground water in various regions. The water of some areas contains arsenic beyond the guideline value for drinking purpose. The acceptable limit of arsenic for arsenic for drinking water according to Bangladesh standard is 0.05 mg/L. Alam et. al. analyzed different water samples both treated and untreated and some food samples from various arsenic affected locations by different four methods and compared the results.

Nasima Akter (2002) in her paper 'Scenario of Hospital Waste in Bangladesh', attempt to explore the current hospital waste management, to recognize the health effect of the existing practice, to identify the weaknesses, and to provide suggestions for improvement of the situation in Bangladesh. At present, Bangladesh has no rigorous laws or regulation, which are enforced in hospital waste management. The waste is generally dumped together in a public place such as the hospital surroundings, the roadside or city corporation dustbin. As a result many kinds of diseases are spreading. Often the hospital staffs suffer from diseases due to weak

hospital waste management. The study indicates that, there is a need to improve the handling and disposal methods of hospital waste in almost all the available medical facilities. Based on the analysis the writer made several suggestions and recommendations to aid ion the development of a waste management system.

Mahbuba Nasrin and Khondokar Mokaddem Hossain (2002) in their paper 'Environment and Sustainable Development: Bangladesh Perspective', focused on some of the issues and problems related to environment and sustainable development in Bangladesh. The paper identifies the major problems related to socio-economic, cultural, political and environmental issues from the point of both sustainability and unsustainability. The paper also examines the impacts of Green revolution on agriculture, forest depletion on the ecology, environment and livelihood in Bangladesh. The paper further examines how the application technology has modified the condition of local production and physical environment.

The Bangladesh State of Environment Report 2001 focuses on the environmental issues and concerns of Bangladesh. The main environmental issues of the country identified by the State of Environment are land degradation, air pollution, water pollution, bio diversity, natural disasters, agricultural resource base, urbanization, health and sanitation, energy etc. the report also suggest recommendations to tackle these properly.

Emdadul Haque edited book "Poribesh Ain Shankalan" attempts to compile the environmental and pollution control laws implemented and enforced by the Department of Environment. To enhance its practical value as a working reference, legal texts have been annotated with references to relevant government implementing policies, directives and administrative and procedural orders. According to the author, the book will serve as a reference guide to law enforcers and legal practitioners- police, inspectors,

public prosecutors, defense counsel, magistrates and judges- in the processing of environmental civil and criminal cases.

So we see, existing literature of Bangladesh mostly focuses on the various aspects of environment and causes and remedies of environmental degradation and a very few works have been conducted on environmental policy making.

1.4 Objectives of the study

The general objective of the study is to review the process of public policy formulation in Bangladesh, particularly environmental policy. The specific objectives of the study are:

a) identify the key environmental issues of the country
b) Make an overview of the environmental legislations and policies in Bangladesh
c) Asses the process of the formulation of the environmental policy
d) Draw some policy high lights

1.5 Methodology and scope of the study

Research on the study is based essentially on the secondary sources of data and information obtained principally by examining government policy documents and other relevant works and reports as have been available. In particular, various manuals and the fifth Five Year Plan document, planning guidelines and other survey reports, and relevant documents and publications of the Ministry of Environment and Forests have been examined to review the policies, the policy making process, and the procedures that exist in practice. Some officials, including Director, Technical, of DoE have been consulted.

The report is organized as follows. While the Introductory Chapter discusses the background, rationale, objective, and scope of the study and has also presented a general review of the literature on the subject, Chapter II is devoted to an examination of the conceptual framework of public policy making. Chapter III overviews the environmental issues and problems of Bangladesh. Chapter IV reviews the historical evolution of Environmental Policy in Bangladesh, and Chapter V highlights the dynamics of environmental policymaking and makes some recommendations for policy. Concluding observations and a summary of recommendations are presented in the VI -th and final chapter.

As is usual for research works of this type, the present study has its limitations. A major difficulty encountered during the course of the study has been that of restricted access to official documents and sometimes obstacles in getting the desired information in time. Yet, the findings of the study will hopefully enlighten the interested reader and may also be useful and instructive to policy makers.

CHAPTER II

Conceptual Framework

Generally Speaking, the term 'policy' means the behavior of some actor or a set of actors like an official, a governmental agency, or a legislature, which act in such areas as consumer protection, public transportation. Public policy can also be viewed as whatever governments choose to do or not to do. Such definitions may be adequate for the layman but, for the discussion of the systematic concept of public policy, a more precise definition is needed.

The literature in the field abounds with definitions of public policy. According to Robert Eyestone Public policy "broadly defined," is "the relationship of a governmental unit to its environment." Such a definition is so broad as to leave most readers uncertain of its meaning; it could encompass almost anything. Thomas Dye state that "public policy is whatever governments choose to do or not to do." This definition does not adequately recognize that what governments decide to do and what they actually do may diverge.

Political scientist Harold Lasswell and philosopher Abraham Kaplan define policy as "a projected program of goals, values, and practices."

Professor Richard Rose suggests that policy be considered "a long series of more-or-less related activities" and their consequences for those concerned, rather than a discrete decision. Although somewhat ambiguous, his definition does embody the useful notion that policy is a course or pattern of activity and simply a decision to do something. Political scientist Carl J. Friedrich defines policy as "a proposed course of action of a person, group, or government within a given environment providing obstacles and opportunities which the policy was proposed to utilize and overcome in an effort to reach a goal or realize an objective or a purpose".

The notion of policy as a course of action, Friedrich adds the requirement that policy is directed toward accomplishing some purpose or goal. Although the purpose or goal of governmental actions may not always be easy to discern, the idea that policy involves purposive behavior seems a necessary part of its definition. Policy, however, should designate what is actually done rather than what is merely proposed in the way of action on some matter.

Another approach to defining public policy is to break down the general notion into various component parts. Political scientist Charles O. Jones makes a distinction among proposals (specified means for achieving goals); programs (authorized means for achieving goals); decisions (specific actions taken to implement programs); and effects (the measurable impacts of programs) [Jones, 1977]. Here we have the problem of assuming that decisions, programs goals and effects are linked. It is seen that in many areas like welfare and energy, decisions of government have little to do with announced "programs" and neither are connected with national "goals".

Political scientist Heinz Eulau and Kenneth Prewitt gave a definition of public policy: " Policy is defined as a 'standing decision' characterized by behavioural consistency and repetitiveness on the part of both those who make it and those who abide by it" [Eulau and Prewitt, 1973].

James E. Anderson regards policy as "A relatively stable, purposive course of action followed by actor or set of actors in dealing with a problem or matter of concern". This definition focuses on what is actually done rather than what is only proposed or intended, and it differentiates a policy from a decision, which is essentially a choice among competing alternatives.

Governmental institutions and officials develop public policies. David Easton designates the authorities in a political system as the "elders, paramount chiefs, executives, legislatures, judges, administrators, councilors,

monarchs, and the like, [who] engage in the daily affairs of a political system" [Easton. 1965]. Moreover, these people are "recognized by most members of the system as having responsibility for these matters," and take actions which are accepted as binding most of the members so long as they act within the limits of their roles [Easton, 1965]. In short, public policies are those produced by government officials and agencies.

It would be helpful to consider some of the implications of the concept of public policy. First, the definition links policy to purposive or goal-oriented action rather than to random behavior or chance occurrences. Public policies in modern political systems do not, by and large, just happen. They are instead designed to accomplish specified goals or produce definite results, though these are not always achieved.

Second, policies consist of courses or pattern of action undertaken by governmental officials rather than their separate, discrete decisions. A policy includes not only the decision to adopt a law or make a rule on some issue but also the subsequent decisions to enforce or implement the law or rule.

Third, public policies emerge in response to policy demands, or when there are claims for action or inaction on some public issue made by other actors-private citizens, group representatives, or legislators and other public officials – upon government officials and agencies. Public officials make decisions that give content and direction to public policy. These decisions may enact statutes, issue executive orders or edicts, promulgate administrative rules, or make judicial interpretations of laws.

Policy statements are formal expressions or articulations of public policy. Among these are legislative statutes, executive orders and decrees, administrative rules and regulations, and court opinions, as well as statements and speeches by public officials indicating the government's

intentions and goals and what will be done top realize them. Policy statements are sometimes ambiguous. Different level, or branches, or units of government may issue conflicting policy statements, such as in controls on environment pollution or liability for consumer products.

Fourth, policy involves what governments actually do, not just what they intend to do or what they say they are going to do. In other words, the concept of policy refers to policy output. The concept can be best understood by such policy outputs as taxes collected, miles of highway built, welfare benefits paid, removal of restraints on trade, traffic fines collected, and foreign-aid projects undertaken. These policy objectives can be achieved with little difficulties. However, it is often found that policy outputs differ somewhat or even significantly from what policy statements indicate they should be. Policy outputs should be distinguished from policy outcomes, which focus on a policy's societal consequences.

Fifth, a public policy may be either positive or negative. Some form of overt governmental action may deal with a problem on which action is demanded (positive), or governmental officials may decide to do nothing on some matter on which government involvement was sought (negative). In other words, governments can follow a policy of laissez-faire, or hands off, either generally or on some aspects of economic activity.

Finally, public policy is based on law, universal principles, standards and conventions and is authoritative. It is compulsory to all. There is no one above the implication of public policy. For that matter public policy could be treated as the utilitarian law of the land. This monopoly of legitimate coercion distinguishes government from private organization.

There are a number of general typologies that political scientists and others have developed for categorizing policies. Some of these are as follows:

1. **Substantive:** Substantive policies indicate what government is going to do, such as constructing highways, paying welfare benefits or prohibiting the retail sale of liquor. Substantive policies directly distribute advantage and disadvantages, benefits and costs to people.

2 **Procedural:** Procedural policies, in contrast, indicate how something is going to be done or who is going to take action. So defined, procedural policies include laws providing for the creation of administrative agencies, determining the matters over which they have jurisdiction, specifying the processes and techniques that they can use in carrying out their programs, and providing for presidential, judicial, and other controls over their operations.

Anderson distinguishes between four types of public polices by their effect on society and the relationships among those involved in policy formation.

1. **Distributive:** Distributive policies may provide benefits to particular segments of the population- individuals, groups, corporations and communities. These usually involve using public funds to assist particular groups, communities, or industries.

2. **Regulatory:** Regulatory policies impose restrictions or limitations on the behavior of individuals and groups. That is, they reduce the freedom or discretion to act of those who are regulated, whether bankers, utility companies or saloon-keepers. In this sense they clearly differ from distributive policies, which increase the freedom or discretion of the persons or groups affected. When we think of regulatory policies we usually focus on business regulatory policies, such as those pertaining to control of pollution or regulation of transportation industries. Among others, these sort of policies were the focus of the movement for deregulation. The most

extensive variety of regulatory policies, however, is that which deals with criminal behavior against persons and property.

3. **Self-reguiatory:** Self-regulatory polices are similar to regulatory policies in that they involve restricting or controlling some matter or group. Unlike regulatory policies, however, self-regulatory polices are usually sought and supported by the regulated group as a means of protecting or promoting the interests of its members.

4. **Redistributive:** Redistributive policies involve deliberate efforts by the government to shift the allocation of wealth, income, property, or rights among broad classes or groups of the population, such as have and have-nots, proletariat and bourgeoisie. Redistribute policies are not only difficult to obtain but also hard to retain.

Public policies may also be described as either material or symbolic, depending upon the kind of benefits they allocate.

Material policies either provide tangible resources or substantive power to their beneficiaries, or impose real disadvantages on those who are adversely affected. Legislation requiring employers to pay a prescribed minimum wage, appropriating money for a public-housing program, or providing income-support payments to farmers is material in content and effect.

Symbolic policies, in contrast, have little real material impact on people. They do not deliver what they appear to deliver; they allocate no tangible advantages or disadvantages. Rather, they appeal to people's cherished values, such as peace, patriotism, and social justice.

Some theoretical approaches of public policy are as follows:

Institutionalism: Public policy is authoritatively determined, implemented, and enforced by governmental institutions. The relationship between public policy and governmental institutions is very close, a policy does not become a public policy until it is adopted, implemented, and enforced by some governmental institution. Governmental institutions give pubic policy three distinctive characteristics. First of all, government lends legitimacy to policies. Governmental policies are generally regarded as legal obligations, which command the loyalty of citizens. People may regard the policies of other groups and associations in society-corporations, churches, professional organizations, civic associations, etc.-as important and even binding. But only government policies involve legal obligations. Second, government policies involve universality. Only government policies extend to all people in a society; the polices of other groups or organizations only reach a part of the society. Finally, government monopolizes coercion in society- only government can legitimately imprison violators of its policies.

The institutional approach did not devote much attention to the linkages between the structure of governmental institutions and the content of public policy. Instead, institutional studies usually described specific governmental institutions- their structures, organization, duties, and functional characteristics on policy outputs. Public polices were sometimes described, but seldom analyzed. The linkage between structure and policy remained largely unexamined.

Process: Policy process can be viewed as a series of political activities- problem identification, formulation, legitimation, implementation, and evaluation.

Table 2.1: The policy process- A Framework for Analysis

Functional Activities	Categorized in Government	And as Systems	With Output
Perception Definition Aggregation Organization Representation	Problems of Government	Problem Identification	Problem to Demand
Formulation Legitimation Appropriation	Action in Government	Program Development	Proposal of Budgeted Program
Organization Interpretation Application	Government to Problem	Program Evaluation	Varies (Justification, recommendation, etc)
Resolution/ Termination	Problem resolution or Change	Program Termination	Solution or change

Source: Thomas R. Dye: 1981

It allows studying how decisions are, and perhaps even how they should be made. But it does not comment on the substance of public policy-who gets what and why.

Group Theory: According to this theory, public policy is the product of the interest group struggle. Individuals with common interests band together formally or informally to press their demands upon government. According to political scientist David Truman, an interest group is "a shared-attitude group that makes certain claims upon other groups in the society"; such a group becomes political "if and when it makes a claim through or upon any of the institutions of government." The task of the political system is to manage group conflict by (1) establishing rules of game in the group struggle, (2) arranging compromises and balancing interests, (3) enacting compromises in the form of public policy, and (4) enforcing these compromises.

According to group theorists, public policy at any given time is the equilibrium reached in the group struggle. This equilibrium is determined by the relative influence of interest groups. Changes in the relative influence of any interest groups can be expected to result in changes in public policy; policy will move in the direction desired by the groups gaining in influence and away from the desires of groups losing influence.

The influence of group is determined by their numbers, wealth, organizational strength, leadership, access to decision-makers, and internal cohesion.

Group theory purports to describe all meaningful political activity in terms of the group struggle. Policy makers are viewed as constantly responding to group pressures- bargaining, negotiating, and compromising among competing demands of influential groups.

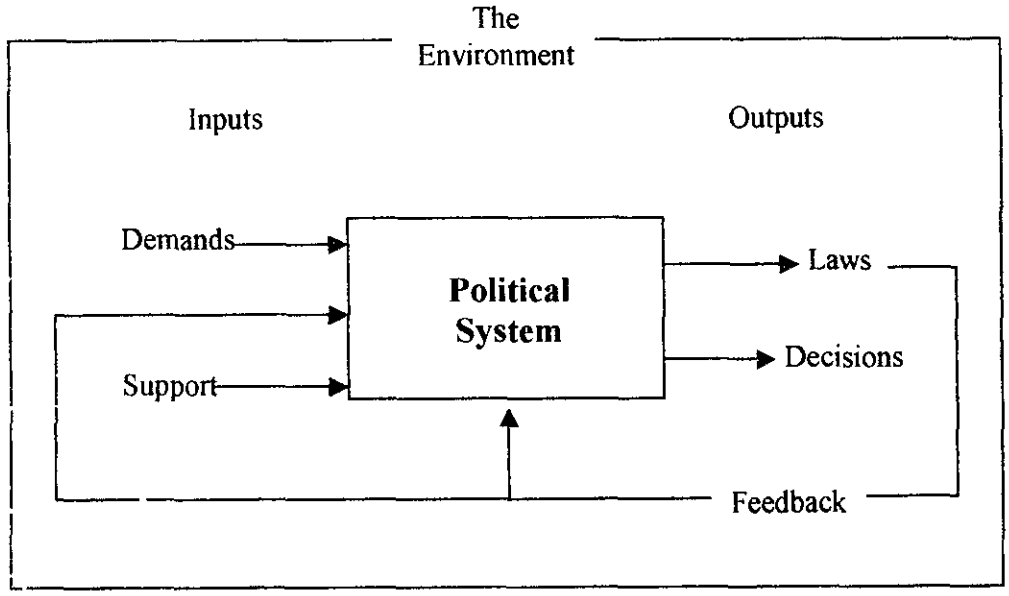
Group theory seems to overstate the importance of groups and understate the independent and creative role that public officials can play in the policy process. Another shortcoming of it is that in actuality many people (e.g., the poor and disadvantaged) and interests (such diffuse interests as natural beauty and social justice) are either not represented or only poorly represented in the group struggle.

Finally, from a methodological perspective, it is misleading to try to explain policymaking solely in terms of interests and group struggle. This bias leads to neglect of many other factors, such as ideas and institutions, which abound and which independently affect the development of policy.

Political Systems Theory: Public policy can be made as a response of the political system to demands arising from its environment. The environment consists of all phenomena- the social system, the economic system, the

biological setting- which are outside the boundaries of the political system. Outputs of the political system include laws, rules, judicial decisions, and the like. Policy outputs may produce new demands, which lead to further outputs, and moves on as a continuous flow of public policy (Figure 2.1).

Figure 2.1: A model of the political system



Source: Anderson, 1964.

Elite Theory: Public policy may be viewed as the preferences and values of a governing elite. Though we often assert that public policy reflects the demands of "the people". Elite theory suggests that "the people" are apathetic and ill informed about public policy, and elites actually shape mass opinion on policy questions more than masses shape elite opinion. Thus, public policy really turns out to be the preferences of elites. Public officials and administrators merely carry out the policies decided upon by the elite. Policies flow "downward" from elites to masses; they do not arise from mass demands.

Elitism does not mean that public policy will be against mass welfare, but only that the responsibility for mass welfare rests upon the shoulders of elites, not masses.

Second, elitism views the masses as largely passive, apathetic, and ill-informed; mass sentiments are more often manipulated by elites, rather than elite values being influenced by the sentiments of masses; and for the most, part, communication between elites and masses flows downward.

Rationalism: A rational policy is one that is correctly designed to maximize 'net value achievement'. By 'net value achievement' we mean that all relevant values of a society are known, and that any sacrifice in one or more values that is required by a policy is more than compensated for by the attainment of other values. This definition of rationality is interchangeable with the concept of efficiency. We can say that a policy is rational when it is most efficient- that is, if the ratio between the values it achieves and the values it sacrifices is positive and higher than any other policy alternative.

To select a rational policy, policy makers must (1) know all the society's value preferences and their relative weights; (2) know all the policy alternatives available; (3) know all the consequences of each policy alternative; (4) calculate the ratio of achieved to sacrificed societal values for each policy alternative; (5) select the most efficient policy alternative. Thus rationality assumes that the value preferences of society as a whole can be known and weighted. It is not enough to know and weight the values of some groups and others. There must be a complete understanding of societal values. Rational policy making also requires information about alternative policies, the predictive capacity to foresee accurately the consequences of alternate policies, and the intelligence to calculate correctly the ratio of costs to benefits. Finally, rational policy making requires a decision-making system that facilitates rationality in policy formulation.

Incrementalism: Constraints of time, intelligence, and cost prevent policy makers from identifying the full range of policy alternatives and their consequences. Constraints of politics prevent the establishment of clear-cut societal goals and the accurate calculation of cost-benefit ratios. The incremental model recognizes the impractical nature of "rational-comprehensive" policymaking and describes a more conservative process of decision-making.

Second, policy makers accept the legitimacy of previous policies because of the uncertainty about the consequences of completely new or different policies. Incrementalism is politically expedient. Agreement comes easier in policy making when the items in dispute are only increases or decreases in budgets, or modifications to existing programs. Thus incrementalism is important in reducing conflict, maintaining stability, and preserving the political system itself.

Finally, in the absence of any agreed-upon societal goals or values, it is easier for the government of a pluralist society to continue existing programs rather than to engage in overall policy planning toward specific societal goals.

The Official Policy Makers: Those who have legal authority to engage in the formation of public policy may be called official policy markers. These include legislatures, executives, administrators and judges. Everyone performs the task of making policy, which is at least somewhat different from the others.

Unofficial Participants: Many other participants take part in the policy-making process along with the official policy-makers. They may be categorized as interest groups, political parties, research organizations, communications media, and individual citizens. They are called unofficial

participants. Though they are important or dominant in various situations, they lack the quality to have legal authority to make binding policy decisions. They seek to influence but they themselves do not decide.

The Policy Making Process: The policy process involves the following stages of activity:

***Policy Problems*:** A policy problem can be defined as a condition or situation that produces needs or dissatisfaction among people and for which relief or redress through governmental action is sought. To be converted into a problem a condition must also be seen as an appropriate topic for governmental action and, further, as something for which there is a possible governmental remedy or solution. Public problems are those, which affect a substantial number of people and have broad effects, including consequences for persons not directly involved. Problems that have limited effect can normally be viewed as private. It should be stressed that whether a condition or situation is regarded as a problem depends not only on its objective dimensions, but also, quite importantly, upon how it is perceived by people or, put differently, how it is socially constructed.

***The Policy Agenda*:** Among many demands made upon government, only a small number receive serious consideration by public policy-makers. In other words, each problem must compete for official attention because legislators and executives have limited time and resources. Decisions to consider some problems mean that others will not be taken up, at least for the time being. The demands that policy-makers choose to or feel compelled to act on at a given time constitute the policy agenda.

To achieve agenda status, a public problem must be converted into an issue, or a matter requiring governmental attention. Professors Roger W. Cobb and Charles D. Elder specify two basic types of agendas such as the systemic

agenda and the institutional, or governmental, agenda. The systemic agenda as they define it "consists of all issues that are commonly perceived by members of the political community as meriting public attention and as involving matters within the legitimate jurisdiction of existing governmental authority." A systemic agenda will exist for every national, states, and local political system. The systemic agenda is essentially a discussion agenda. Most of the items on it will be general or abstract rather than specific or detailed.

As policy decisions can be made at a variety of points there are also several institutional agendas. An institutional agenda is basically an action agenda and thus will be more specific and concrete in content than a systemic agenda. Institutional agenda items can range from mandatory to discretionary.

The Agenda-Setting Process: In the policy formulation many, problems and issues compete for the attention of public officials, who also have their own preferred ideas to push. Only a portion of these problems will succeed in securing agenda status, however, because officials lack the time, resources, interest, information, or will to consider many of them, Agenda building is thus a competitive process, and a number of factors can determine whether an issue gets on an agenda, including how the problem at issue is defined.

The Formulation of Policy Proposal: Policy formulation is one that involves the development of accepted/proposed courses of action (often called alternatives, proposals or options) for dealing with public problems. Various competing proposals for dealing with a problem are presented.

There are several organizations that are involved in developing policy proposals. Among them are Government Agencies, Legislators, and Interest Groups.

Policy Adoption: The policy-adoption stage is not selection from among a number of full-blown policy alternatives but rather action on a preferred policy alternative for which the proponents of action think they can win approval, even though it does not provide all they might like. As the formulation process moves toward the decision stage, some provisions are rejected, others accepted, and still others modified.

Policy implementation: When the adoption phase of the policy process is completed and a bill enacted into law, then it can be called public policy. The next step of the policy process is to put the policy into effect that may be termed as the implementation phase. The implementation process involves many players, organizations procedures and techniques that carry policy into effect in an attempt to attain their goals. Policy implementation is neither a routine nor a highly predictable process.

Administrative Policy Making: Administrative decisions and other functions sometimes influence in determining the main theme of public policies. There are several ways by which the administrative agencies can help shape or make practices and program operation.

Techniques of Control: All public policies, whether promotional, regulatory, prohibitive, or re-distributive, include an element of control. The control techniques are important components of public policies by which they are to be implemented. The techniques of control are designed to engage people to de things, refrain people from doing things, or carry on doing things that they otherwise would not do.

Policy Evaluation: When the policy process is viewed as a sequential pattern of activities, its final stage is policy evaluation. More of an art than a science, policy evaluation encompasses the estimation, assessment, or appraisal of a policy, including its content, implementation, goal attainment, and other effects. Evaluation may also try to identify factors that contribute to the success or failure of a policy. Policy evaluation is as old as policy itself. Legislators, administrators, judges, pressure-group officials, media commentators, and citizens have always made judgments about the worth or effects of particular policies, programs, and projects.

Policy Termination: The termination of policy can occur if there is dissatisfaction with its costs and results, development and proliferation of political opposition after the evaluation and appraisal of policy. But policy termination is difficult for a number of reasons. So policy change is more likely than termination.

CHAPTER III

Major Environmental Issues of Bangladesh

Bangladesh is one of the poorest of the developing countries with a low resource base, a very low land-man ratio, threatened by both natural hazards and anthropogenic mismanagement and over-exploitation. The vast majority of the population is amongst the poorest in the world and lives almost exclusively on the natural resource base. But this resource base is under serious threat. Despite a rising awareness about the needs for protecting the environment, environmental degradation already cut a swathe through Bangladesh quite fast during the last three decades (1970-2000). The country's ecology has been damaged, the forests have depleted, the wetlands destroyed, different species of flora and fauna vanished, wildlife almost disappeared, bio-diversity degraded and the air quality deteriorated. And even if drastic measures are taken to halt the deteriorating trend, it is difficult to visualize an optimistic scenario for the country over the next 30 years. As a matter of fact, for the years ahead, the country is braced for a series of serious environmental problems like climate change, sea level rise, depleting groundwater table, the persisting menace of arsenic contamination of ground water, deteriorating of water and air quality, alarming level of soil degradation, etc. So we see Bangladesh is confronted with a host of environmental issues and problems. The major environmental issues of Bangladesh are discussed below.

Land degradation

Land resources have been defined as all soil resources other than minerals. In Bangladesh, soil resources mainly include yield crops, forests and pastures (Siddiqi, 1994: 10). Total area of Bangladesh is about 114.4 million

na of which 13.46 million ha are land surface and 0.94 million are rivers and inland water bodies (IUCNNR report, 1991: 8). Bangladesh has a very large population, about 110 million, and the current land/ person ratio is very unfavorable, and there is little or no scope of expanding the land resource base. In 1997, the per capita land availability was 0.11 hectors, declining from 0.16 hectors in 1981 (BBS, 1997). But this available land is degrading day by day.

Degradation of land refers to loss of its potential production capacity as a result of degradation of soil quality and also loss of effective use. The amount of organic matters in the soil is one of the best indicators representing soil quality. The level of the organic matter in the soil of Bangladesh is very low. About 45 per cent of the net cultivable area (NCA) of the country has less than one per cent organic matter content, which is very low. Only about 17 per cent of NCA has more than 3.5 per cent organic matter, which can be said high quality (source: *BARC, 1999*).

Based on the agricultural suitability, different levels of degraded land have been categorized as light, moderate and strong. When original biotic functions are more or less largely intact and production loss is about 5-10 per cent, the degradation is termed light; for the moderate class the productivity loss is about 20- 25 per cent, but it is still suitable for use in local farming systems; major improvement is required to restore productivity of the strongly degraded class, as the original biological functions are partially destroyed. Various types of land degradation are presented in the Table 3.1.

Table: 3.1: Types and extent of land degradation

Type of land degradation	Area under different degrees of degradation (Mha)			Total area (Mha)
	Light	Moderate	Strong	
Water erosion	0.1	0.3	1.3	1.7
River bank erosion	-	1.7	-	1.7
Soil fertility decline	3.8	4.2	-	8.0
Phosphorus deficient (for HYV rice)	5.3	3.2	-	8.5
Phosphorus deficient (for upland crops)	3.1	2.5	-	5.6
Potassium deficient (for HYV rice)	4.0	3.4	-	7.4
Potassium deficient (for upland crops)	2.1	5.4	-	7.5
Sulfur deficient (for HYV rice)	4.4	3.3	-	7.7
Sulfur deficient (for upland crops)	4.1	4.6	-	8.7
Soil organic matter depletion	1.94	1.56	4.05	7.55
Water logging	0.69	0.008	-	0.7
Salinization	0.29	0.43	0.12	0.84
Pan formation	-	2.82	-	2.82
Acidification	-	0.06.	-	0.06
Active flood plain	-	-	-	1.53
Deforestation	-	0.3	-	0.3
Barind	-	-	-	0.773

Source: Bangladesh State of the Environment, 2001

The two most important land degradation processes in Bangladesh are a) human interference, b) waterborne action

Human activities:

The State of the Environment report had identified the following human activities responsible for land degradation:

- *Improper cultivation in hill slopes, terrace land and piedmont plains:* Due to shifting cultivation on the hills (Jhum) every year at the same place, clearing the natural vegetation for cultivation of pineapple,

ginger and turmeric along the slopes of hills, rubber plantation soil erosion and loss of nutrients has increased.

- *Faulty irrigation:* Continuous irrigation causes the land inundated in most of the seasons and continued oxygen deprivation in the sub soils.
- *Unplanned rural infrastructure:* A significant portion of agricultural land is destroying for the construction of roadways every year. Besides, these infrastructures are causing water logging in the agriculture lands.
- *Urbanization:* the present process of urbanization in Bangladesh invariably reduces the amount of agricultural land.
- *Improper use of pesticides:* Pesticides applied to the fields destroys useful topsoil microbes, which eventually reduce the biological nutrient replenishment of the soil.
- *Brickfields and biomass use:* Most of the brick kilns are situated on good agricultural land and the fields are becoming unproductive. Moreover, over 50 per cent of the energy used for firing bricks comes from biomass.
- *Unplanned industrial development:* Industries are often encroaches on the fertile lands. Moreover, their effluents deteriorate the quality of soil.
- *Mining of sand and gravels from agricultural land:* Sand and pebbles are extracted from 2-3 feet under the topsoil of fertile lands and thus topsoil destroys.

Waterborne actions:

The following waterborne actions are responsible for land degradation:

- *Riverbank erosion and sedimentation:* The active flood plains of the Ganges, the Brahmaputra, the Jamuna, the Tista, and the Meghna rivers are most susceptible to riverbank erosion. The unique, natural

geographic setting, the behavior of an alluvial channel, together with characteristics of the tropical monsoon climate, are mainly responsible for the river bank erosion and sedimentation.

- *Deposition of sandy over-wash on agricultural land:* Deposition of sandy materials on agricultural land is frequent in low lands of greater Sylhet, Mymensingh and Chittagong Hill Tracts. This is the net result of hill cutting and deforestation.
- *Salinity:* Land with saline soil occurs in the Meghna estuary flood plains and in the southern part of Ganges tidal flood plain. Salinity in the coastal areas developed due to continuous tidal flooding and salt removal by leaching or washing by rain or inadequate freshwater flashing.

Land degradation is not only a matter of physical loss of land or quality; it has tremendous social, psychological, environmental and economical implications. As for example, riverbed erosion claims lands and homesteads and the poor migrate to urban areas for new shelter. An assessment was made by the Bangladesh Agricultural Research Council in terms of production loss of crops and additional agricultural input necessary to maintain soil nutrients. It was found that the total economic cost of land degradation exceeds to 2 billion US dollars per year, as presented in the following table (Table 3.2).

Table 3.2: The total economic cost of land degradation

Nature of land degradation	Physical quantity of loss output	Amount (MT/yr)	Cost (Million US $/yr)
Water erosion	Cereal production loss	1.06	140.72
	Nutrient loss	1.44	544.18
Fertility decline	Fertility decline	4.27	566.84
	Additional agricultural inputs	1.22	461.04
Salinity	Production loss	4.42	586.75
Acidification	Production loss	0.09	11.95

Source: BARC, 1999

Restoration to full productivity of land is possible through modifications of management system. Less use of pesticides, insecticides and chemical fertilizers, proper cultivation in hill slopes, planned urbanization and construction of rural infrastructures, social forestation etc. can reduce the land degradation significantly.

Air pollution

Air is a life sustaining precious natural resource. Fresh air is one of the most indispensable gifts of nature without which humankind will not survive. But, currently air pollution has become one of the varieties of manmade environmental disasters taking place all over the world. Air pollution has recently been receiving priority among environmental issues.

Causes of air pollution:

Emissions from vehicles: The total number of vehicles in the cities of Bangladesh increased enormously, which led to a serious deterioration of air quality. Besides, the automobiles in roads are often very old, overloaded and poorly maintained. They emit smoke far exceeding the prescribed limit. As an example, diesel vehicles emit black smoke, which is a primarily unburned fine carbon particle.

Unplanned industrial development: Industries in Bangladesh are situated mainly in major urban areas, for which, air pollution is concentrated in the big cities. Textile and dyeing, tanneries, pulp and paper, cement, metal, fertilizer and chemical factories in particular emit SPM (suspended particulate matter), sulfur dioxides, nitrogen oxides, carbon monoxide and ammonia, all of which deteriorate air quality.

Brick Kilns: Brickfields are operated almost all over the country during the dry season. These Brick making kilns mainly use coal and wood as their source of energy due to the non-availability of natural gas in most part of Bangladesh. The air pollution from these kilns is not only for the type of source of fuel they use, but also due to the thermal inefficiencies of the conventional kilns. This causes emissions like SO_x, CO, particulate matters, and volatile organic compounds that deteriorate air quality.

Cooking: About 2.5 billion people, almost all in developing countries, suffer from high levels of indoor air pollution, which is due to burning wood, animal dung, crop residues, and coal for cooking and heating. Most of the victims of indoor pollution are women and girls, who have primary responsibility for cooking and tending the house.

Effects of air pollution:

Air pollutant is not only a health hazard but also reduces food production. Children are the worst victims of air pollution. If this situation continues, we will have children with low IQ. The major disease in Bangladesh is not diarrhea, but the acute respiratory infections caused mainly by the polluted air. Table 3.3 shows the pollutants and their sources and impacts.

Table 3.3: Pollutants, sources, and the impacts of air pollution

Pollutants	***Sources***	***Impacts***
1. Suspended particulate matter (SPM)	Motor vehicles Wood burning Industrial activities	Respiratory infections Throat irritation Aggravated asthma
2. Sulfur oxides	Diesel using vehicles Factory emissions	Affect respiratory tract and permanent lung damage, Bronchitis, Emphysema, Asthma, Plant growth reduction, Beans and tomatoes with bleached colorless spots

Pollutants	Sources	Impacts
3. Nitrogen oxides	Vehicle motors Power stations	Respiratory diseases, Chest congestion, Eye irritation, Headache, Suppressed growth of beans and tomatoes, Increase abscission and reduce yield in citrus plants, Spots and mild necrosis on cotton and bean plants, Acute leaf failure
4. Lead	Windblown dust Vehicles Coal and wood burning Metal production Phosphate fertilizer	Affected central nervous system, Renal damage, Hypertension, Children are 3 times more at risk then adults, Effects on plants
5. Carbon Monoxide	Petrol vehicles (2 and 3 wheelers)	Reduces the ability of blood to carry oxygen Exacerbates heart disorders
6. Aromatic Hydrocarbons	Unburned fuel from diesel engines	Drowsiness, Eye irritation
7. Benzene	Unleaded petrol emitted from catalytic converters	Carcinogen, Affected central nervous system
8. Ozone	Reaction between VOCs and NO_x in presence of sunlight	Reduced lung function, Asthma, Eye irritation, Nasal congestion, Lowered resistance to infection

Source: Philip Gain, 1998

Air pollution kills 15000 Bangladeshis each year, according a World Bank report released. The report says that Bangladesh could save between $200 million and $800 million per year—about 0.7% to 3.0 % of its gross national product – if air pollution in the country was reduced.

The salient problems in the cities of Bangladesh are not like those in other developed countries. The developed countries are able to mange these problems, but in Bangladesh cost is a major criteria. There is also a general lack of expertise to evaluate the problems, or prepare cost effective solutions, and therefore, the air quality is not yet managed efficiently.

The following measures can reduce the level of air pollution:

- All unfit vehicles should be screeched out
- National energy efficiency and emission standards should be promoted and efficient less polluting mass transit systems should be developed.

Water pollution

Water is the most vital and finite resource on the earth without which no living organism can grow. Water is termed with life. The environment, economic growth and development of Bangladesh are all highly influenced by water- its regional and seasonal availability and the quality of surface and groundwater.

Bangladesh is a country richly endowed with water resources. The water ecosystem comprises the tributaries and distributaries of the three major river systems: the Ganges-Padma, the Brahmaputra - Jamuna, and the Meghna and numerous perennial and seasonal wetlands like haors, baors and beels. All the three-river systems originate outside the country. The combined total catchment area of these major river systems is about 1.74 million sq kms, of which only 7 percent lies within Bangladesh. Another important feature to be considered for water resource planning is that 57 rivers of varying sizes enter the country from outside the national frontiers. The total length of the river courses is 24000 kms and covers about seven per cent of the country's territory (State of Environment Report 1999).

The contribution of annual rainfall to the annual surface runoff is about 25 per cent, with significant seasonal variation.

The largest use of water is made for irrigation. Besides agriculture, some other uses are for domestic and municipal water supply, industry, fishery, forestry and navigation.

Water pollution is the most serious problem because the long-term effects of water contamination by organic and inorganic substances are incalculable. Once surface water bodies like rivers, lakes, and ponds were the source of water for all household use. But now -a -days, they are severely polluted. City solid wastes, sewer water, chemical fertilizers, pesticides are polluting the water. Surface water of Bangladesh is highly characterized by the suspended matters, which contain the pathogenic or diseases producing bacteria.

At a time people have been habituated of using ground water through tube well as safe drinking water, arsenic has been found in the ground water in various regions. The acceptable limit of arsenic for drinking water according to Bangladesh standard is 0.05 ppm. The Bangladesh Atomic Energy Commission found the level of arsenic to be between 1.5 and 2 ppm in tube well water of some areas. Arsenic can cause skin cancer, kidney and liver failure, respiratory problems, and in extreme cases- death.

Causes of water pollution:

The major causes of water pollution are discussed below:

Industrial effluents: Most of the industries are located in densely populated urban centers along the banks of the major rivers. Most of these do not have any treatment plant and few have non-functional treatment facilities, which are not affecting in removing pollutants. As a result all the polluting effluents produced by the industries are discharged in water. Though Bangladesh is

not yet an industrialized country, the contribution of industrial effluent towards the pollution of water environment is quite significant.

The major polluting industries in Bangladesh are tanneries, paper mills, fertilizer factories, textile dying, sugar mills, distilleries, pesticides and chemical plants etc. The pollution potential of industrial wastes arises from high concentration of organic loads, presence of toxic substances, acids, alkalis, oils, odor producing and floating substances.

Agrochemical: The main suspected sources of agricultural runoff pollution are from the use of fertilizers and agrochemicals, including herbicides and pesticides. Urea, Triple Super Phosphate (TSP), Muriate of Potash (MP) and Gypsum are the main chemical fertilizers used in Bangladesh. The total amount of fertilizers used annually is about 2 million tons.

Fecal pollution: Bangladesh has the highest rural densities in the world and there is lack of sanitation facilities in the rural areas. Therefore, faeces from hanging latrines pollute the water bodies like rivers, canals, ponds etc.

Low flow in the dry season: A certain level of stream flows is required to maintain equilibrium between fresh water and saline water mixing zones. Due to reduction of water flow in the dry season, saline water intrusion into the river system, especially in the coastal areas increases.

Oil and Lube spillage: Oil and lube spillage from ships and other mechanized vessels are polluting the water of Bay of Bengal and other rivers.

Causes of scarcity:

The major causes of scarcity of water are discussed below:

Upstream withdrawal and diversion of flow: Bangladesh is a lower riparian country and the upper riparian countries have adopted various development schemes in the upstream regions of these rivers. As a result, a significant amount of dry season stream flow is withdrawn and diverted upstream both inside the country and outside by neighboring countries, for irrigation and navigation.

Dry season rainfall: In Bangladesh, dry season is considered from November to May, when rainfall is scanty and iritic. Over this seven-month period, only 22 per sent of rainfall occurs and evapotranspiration is four times higher than the rainfall (WARPO, 1996).

Dry season irrigation: Agriculture, particularly for irrigating HYV crops consumes the highest amount of water among the consumptive uses. Ground water is an alternative source of water in dry season. However, ground water aquifer is almost recharged annually through rainfall and flooding and replenishes every year. Due to excess withdrawal of ground water, water contamination such as arsenic pollution is on the rise.

Gradual siltation in riverbed and flood plain: Because of heavy rainfall during monsoon in the upper hill areas, flash floods are caused in the lower plains. With the runoff the water carries sandy sediments that spread over the floodplain. This shrinks the water holding capacity of the low-lying areas.

Floods: Due to excessive rainfall and surface runoff Bangladesh is vulnerable to flooding, which causes other water related problems. One of the major concerns during floods is access to drinking water and its purity. The higher total and fecal coliform levels in the surface water during floods *leads to a high incidence of diarrhoeal diseases.*

Proper use of pesticides and chemical fertilizers, using sanitary latrines, proper treatment of industrial effluents before releasing it to water bodies will reduce the water pollution. Destroying forests and hills, construction of unplanned rural infrastructures, unplanned urbanization, dependency on ground water, misuse of water should be stopped to reduce the water scarcity.

Bio Diversity

Literal meaning of biodiversity is the diversity of all life forms on earth including the various races and species of all microbes, plants and animals, their genetic differences, i.e. the gene pool of each species. Biological Diversity means the variability among living organisms from all sources including inter alias, terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; it includes diversity within species, between species, and of ecosystems (Article II, CBD, 1992).

In spite of threatened fauna and flora, there is a great potential in Bangladesh for biodiversity based sustainable development. The country has a rich fauna (both land and aquatic) and flora and it contributes to the international biodiversity pool, particularly with its rich genetic pool of rice varieties and with one of the world's few viable tiger populations. The rural population relies heavily on the economic benefits gained from the productivity and variety of the natural base (Ambrose and Ali, 1995:11). It is mentionable here that there are nearly 10,000 species of plants, animals and microbial organisms, a good percentage of which is found in superabundance.

Diversity is mainly observed at three levels: at the species level, at the ecosystem level and in animals. In 1992, World Conservation Monitoring Centre (WCMC) adopted a working figure of 12.5 million species in the world

(Khan, 1998:116). The world's biomass and large-scale ecosystems are actually aggregates of natural continuum of local ecosystems, habitats and communities whose boundaries may be difficult to define (Groombridge, 1992). Animal biodiversity has got several important values such as direct economic benefits; education; and research values; cultural and aesthetic values (khan, 1998:118).

Aquatic resources and water bodies of Bangladesh are known to be the habitat of 266 species of indigenous fish, 13 exotic fish, 56 prawns, about 26 freshwater molluses and 150 birds. The marine water bodies (200 nautical miles along the coast) are also remarkable for being habitat of 442 species of fish. There are 36 species of marine shrimps. About 336 species of molluses, covering 151 genera have been identified from the Bay of Bengal. In addition, several species of curves, 31 species of turtles and tortoises, of which 24 live in fresh water and found in Bangladesh (Sarker and Sarker, 1988 and Ali 1997). Ahmed and All (1996) published a species list of 168 seaweeds, 3 sponges, 15 crabs, 3 lobsters, 10 frogs, 3 crocodiles, 24 snakes, 3 otters, 1 porcupine, 9 dolphins, and 3 species of whale found in Bangladesh (Table 3.4).

There are numerous invertebrates in the country. Various authors have recorded about 70 species of bees, and many species of wasps (Alam, 1967).

The IUCN Bangladesh Red Data Book (2000) describes 266 species of inland fishes, 442 marine fishes, 22 amphibians, 109 inland reptiles, 17 marine reptiles, 388 resident birds, 240 migratory birds, 110 inland mammals, as well as 3 species of marine mammals in Bangladesh.

Table 3.4: Flora and fauna in Bangladesh

Category	Total Number of species
Flora	
Angiosperms	5000
Gymnosperms	5
Algae/ seaweeds	168
Fauna	
Sponges	3
Corals	66
(Marine and freshwater) Molluses	(336+26) 362
Insects	2493
Mites	19
Shrimp/ prawns	56
(Marine and freshwater) Crabs	(11+4) 15
Lobsters	3
Echinoderms	4
(Marine and freshwater) Fish	(442+266) 708
Amphibians	22
(Marine and inland) Reptiles	(17+109) 126
Birds	628
(Marine and inland) Mammals	(3+110) 113

Source: Khan, 1991; Ahmed and Ali, 1996; Alam, 1967; IUCN, 2000

Both flora and fauna are threatened by the loss of habitat. High population growth, increasing demand for timber and fuel-wood, and encroachment of other purposes and Jhum (shifting) cultivation in the hilly districts are responsible for deforestation in Bangladesh. Besides, unplanned urbanization and industrialization are leading the waste and pollution problems that affect natural ecosystem.

It is clear from the writings of O'Malley (1908 a, 1908 b), Pocock (1939, 1941), Mountfort (1969), Prater (1971), Hussain (1964), Hendrichs (1975),

Green (1978), Khan (1982a, 1985) that many wild-life species have been exterminated in Bangladesh and many more are threatened with extinction. According to Red List of IUCN there are 54 species of inland fishes, 8 amphibians, 58 reptiles, 41 resident birds, and 40 mammals, which are threatened through out the country. Among the marine and migratory animals, 4 fishes, 5 reptiles, 6 birds and 3 mammals are threatened. Besides 64 species of vertebrates have been recorded as critically endangered, 86 as endangered and 51 as vulnerable species.

Table 3.5: List of extinct wildlife in Bangladesh

Animals	***Common name***	***Scientific name***
Reptiles	Marsh Crocodile	*Crocodylus palustris*
Birds	Pink- headed Duck	*Rhodonessa caryophyllacea*
Birds	Common Peafowl	*Pavo cristatus*
Mammals	One- horned Rhinoceros	*Rhinocerus uncornis*
Mammals	Asiatic two- horned Rhinoceros	*Didermoceros sumavensis*
Mammals	Java Rhinoceros	*Rhinocerus sondaisus*
Mammals	Wolf	*Canis lupus*
Mammals	Swamp Deer	*Cervus duvauceli*
Mammals	Hog Deer	*Axis porcinus*
Mammals	Gaur	*Bos gaurus*
Mammals	Banteng	*Bos banteng*
Mammals	Wild Buffalo	*Bubalus busalis*
Mammals	Blue Bull (Nilgai)	*Bosephalus tragocamelus*

Source: IUCN, 2000

Forests:

Forest resources have a great contribution to the economic and ecological stability. Most of the forests of Bangladesh are located in the Greater districts of Chittagong, Chittagong Hill Tracts, Sylhet, Khulna, Dhaka,

Mymensingh and Tangail. The moist deciduous forests are found in Dhaka, Mymensingh, Rangpur, Dinajpur and Rajshahi districts. In the coastal areas, plantations have been established on the newly accreted char land.

There are officially three main types of forests under forest Department, which are:

a) The hill forest
b) The plain- land forest
c) Tidal mangrove forest.

The hill forest: The total area of hill forest is 670 000 hectors, which is 4.54 percent of total land area of the country. The hill forests have been broadly classified as tropical evergreen forest and tropical semi evergreen forest. Under hill forests the following types of forests are found:

- Reserved forests (RF)
- Unclassified state forests (USF)

The reserved forests are those managed by the Forest Department who collect revenue from them. Rest of the hill forest comes under the unclassified state forests.

Most of the hill forests in Bangladesh are characterized as mixed evergreen forests. In such forests the tropical evergreen plant communities are mixed with tropical deciduous trees in association with divers herbs, shrubs and bamboo jungles. Forests in greater Chittagong Hill Tracts, Chittagong and in Sylhet and Mymensingh fall under this category.

Hill forests in eastern districts of Chittagong, Cox's Bazar, Sylhet and Chittagong Hill Tracts are tropical evergreen or semi- evergreen forest. The most important commercial timber species of Chittagong Hill Tracts are Jarul, Gamari, Garjan, Chaplaish, Toon, Koroi, Civit, Champa, and Chandul.

Sal forest: The traditional Sal forest used to extend over Madhupur Tract, as well as the district of Dhaka, Mymensingh, Rangpur, Dinajpur, and Rajshahi. Now Madhupur Sal forest is the largest Sal forest patch in the country. In the Sal forest 70-75 per cent of the trees are Sal and the soil looks yellowish-red in color. The other commercially valuable trees in the Sal forest are Koroi, Chambal, Bahera and Banja.

Mangrove forest: Bangladesh has one of the largest mangrove ecosystems in the world and this ecosystem provides the country with a series of services. The mangrove forest is very rich in biodiversity, which supports 334 species of plants, 77 insects of different orders, 7 crabs, 1 lobster, 23 shrimps/ prawns, 400 fish, 8 amphibians, 35 reptiles, 270 birds and 42 species of mammals. Out of 26 species of mangroves, the two dominant ones are the Sundari and Gewa. Among the trees Gewa and Goran are been used in news print mills for paper production and fuel wood. The Sundari and Keora are used as timber woods. Leaves of Gol pata are used for thatching. At present there is no commercial timber felling due to a moratorium imposed by the Government of Bangladesh, with the exception of Gewa and Goran. 13 and 23 species of orchids and medicinal plants respectively found in the Sundarbans. It is also the largest honey-producing habitat in the country with the giant bees. The best tree for producing honey in the Sundarbans is Khulshi.

Another mangrove forest totally about 21020.45 acres of land at Chakoria Mangroves in Cox's Bazar has been destroyed mainly due to uncontrolled logging, agricultural expansion and shrimp culture. There it is pretty difficult to see remnants of mangrove vegetation other than few dead stumps here and there. Along with the forest all other flora and fauna are destroyed from the areas where fish is not also excluded.

Wetland biodiversity:

The northeast region of Bangladesh has a distinct type of wetland known as Haor basin which, comprises an area of about 2450 000 hectors or 17.5 per cent of the area of Bangladesh. The haors are depressions located between two or more rivers and function as small internal drainage basins. Within the lowest points of haor, there are one or more beels, which are lake like deep depressions retaining water permanently or for a greater part of the year.

Biological features in the haors are unique and fascinating. A total of 284 species of waterfowl were recorded in the haor basin (FAP 6, 1993). In spite of massive habitat losses, the northeast region is still an important place for migrated waterfowl. Various other wild lives, e.g. otters, cormorants, jacanas, coots, egrets, herons, etc. also find this a safe place for feeding, nesting, and breeding. The haor basin acts as a fish sanctuary for several indigenous fish species, and Phycologists have identified about 150 species in Bangladesh.

The swamp forests of the Haor Basin have communities of Hijal *(Barringtonia acutangula)*, Karaja or Karach *(Pongamia pinnata)*, Barun *(Crataeva nurvala)*, and Gota gamar *(trewia nudiflora)*, but these are very degraded due to overexploitation.

The Haor systems support major subsistence and commercial fishing, rice growing, grazing grounds for livestock, and also serve as a source of fuel, food and fertilizers for the local populations.

Coastal biodiversity:

Bangladesh has the world's largest bitch (710 km) along the Bay of Bengal, filled with a rich and unique coastal biodiversity. It has a great natural ecosystem in terms of scientific interest, and because of its outstanding

aesthetic value It also provides multiple renewable resources of direct economic benefits to the nation.

The marine resources in the Bay of Bengal waters are yet to be explored fully in terms of biodiversity. About 442 species of finfish, 336 molluses including 7 edible oysters, and 3 species of lobster have been recorder in the Bay of Bengal and there are 17 reptiles and 3 species of mammals.

The southern most offshore island, St. Martin's, is a small and beautiful coral island located in the Bay of Bengal. The west coast of the island is an important nesting beach for marine turtles in the Bay of Bengal.

Natural Disasters

Bangladesh is a disaster-prone country. The geographical setting of Bangladesh makes the country vulnerable to natural disasters. The mountains and hills bordering almost three-fourths of the country, along with the funnel shaped Bay of Bengal in the south, have made the country a meeting place of life-giving monsoon rains, but also makes it subjected to the catastrophic ravages of natural disasters. Its physiography and river morphology also contribute to recurring disasters. Abnormal rainfall and earthquakes in the adjacent Himalayan range add to the disaster situation. Effects of El-Nino-Southern Oscillation (ENSO) and the apprehended climatic change have a great impact on the overall future disaster scenarios (Bangladesh State of the Environment report, 2001:93).

Floods:

As Bangladesh is a land of many rivers and heavy monsoon rains, she is subjected to inundation by overflow from the riverbanks due to drainage congestion, rainfall runoff, and storm-tidal surges. Some 30 to 35 per cent of

the total land surface is flooded every year during the wet monsoon (Hossain et. al., 1987 and Milliman et. al., 1989. These normal floods are considered a blessing for Bangladesh providing vital moisture and fertility to the soil through the alluvial silt deposition. Only abnormal floods with high magnitude events inundating large areas and causing widespread damage to crops and properties are considered disastrous.

A statistical review was given by (Miah 1988) showing the flood-affected areas from 1954-1987. The extent of flooding areas were identified as (1954) 25.64 per cent area of the country, (1955) 35.21 per cent, (1963) 29.97 per cent, 1968 26 per cent, (1969) 36.61, per cent (1970) 29.61, per cent (1971) 25.33 per cent, (1974) 36.61per cent, 39.92 per cent (1987), 65 per cent (1988, 1998).

The causes of floods in Bangladesh may be attributed to the following factors:

- General low topography of the country with major river drainage through Bangladesh (Ganges- Brahmaputra- Meghna) including congested river network system
- Rainfall in up country and in country
- Snow melt in the Himalayas and glacial displacement
- River siltation, landslides
- Synchronization of major river-peaks and influences of one river on the other
- Human interference
    - Deforestation and denudation in the catchment area
    - Construction of unplanned roads, bridges, housing etc.
    - Flood embankments
    - Storage reservoirs
    - Diversion structures
    - Drainage congestion
    - Overgrazing

- Tidal and wind effects on slowing down the river outflow (back water effect)
- Effect of sea level rise
- Possible rise in sea bed and land subsidence
- Tectonic anomalies (earthquakes, change in river flow/ morphology, rise in water shades/ catchment area)
- Possible Green house effect and depletion of Ozone layer
- Experiments on melting of glaciers in the Himalayas (artificial) (Source: A. Atiq Rahman).

Excessive rainfall in the GBM catchment area, and synchronization of peak flow of the Ganges and the Brahmaputra-Jamuna rivers are the causes oof the devastating floods of the recent past. . Major investment on flood protection in the country began after the devastating flood of 1988.

Cyclones arid Storm surges:

The term cyclone is derived from the Greek word Kyklos that means coil of snakes. Satellite imagery showing the cyclonic formation depicts the 'coil of snakes' like- pattern.

Every year, there are some eighty tropical cyclones occurring around the globe, out of which about 4, (5per cent) form in the Bay of Bengal (Crane, 1988).

The Bay of Bengal is the breeding place of catastrophic cyclones. It is presumed that the inter-tropical convergence zone, which is situated near the equator, and where winds from the two hemispheres meet, plays a vital part in the formation of the tropical cyclones in this area.

The Bay of Bengal cyclones mostly originate at latitudes greater than 5 N (near the Andamans). It is presumed that the Inter-tropical Convergence Zone which is situated near the equator, and where winds from the two hemispheres meet, plays a vital part in the formation of the tropical cyclones in this area.

Cyclones in the Bay of Bengal usually move northwest in the beginning, and then gradually re-curve to move northeastwards, but this pattern is not uniformly followed. The cyclones usually decay after crossing land, causing colossal losses to life and damages to property in the coastal region. An average of 1-3 severe to moderate cyclonic storms hit Bangladesh each year, with associated storm surges as much as 13 meters higher than normal in extreme cases, which can reach as far as 200 km inland. Some of the major cyclones affecting Bangladesh area are shown in the following table along with their dates, maximum wind speed and heights of storm surge.

Table 3.6: Major cyclones that hit Bangladesh coast

Date	Maximum wind speed (km/hr)	Storm surge height (Meter)
30 Cctober, 1960	211	4.6-6.1
30 May, 1961	160	6.1-8.8
28 May, 1953	203	4.2-5.2
11 May, 1965	160	6.1-7.6
15 December, 1965	211	4.6-6.1
1 November, 1966	146	4.6-9.1
23 October, 1970	163	3.0-4.9
12 November, 1970	224	6.1-9.1
25 May, 1985	154	3.0-4.9
29 November, 1988	160	3.0-4.0
29 April, 1991	225	6.0-7.5
2 May, 1994	210	2.0-3.0

Date	Maximum wind speed (km/hr)	Storm surge height (Meter)
25 November, 1995	140	2.0-3.0
19 May, 1997	220	3.1-4.2

Source: Chowdhury 1987,1991 and Bangladesh Meteorogical Department 1988, BBS, 1998

Droughts:

Drought is an abnormal natural condition where there is lack of sufficient water to meet the normal needs of agriculture, livestock, industry, or for human use. While generally associated with semi-arid or desert climates, drought can also occur in areas that normally enjoy adequate rainfall, and moisture levels (ADB, 1991).

Drought conditions due to deficiency in rainfall affect different parts of Bangladesh mostly during the pre-monsoon and post monsoon periods. One study shown that from 1949 to 1979,drought condition had never affected the entire country and total population in any drought year. The drought of 1979 was one of the severest in recent times. The percentage of drought-affected area was 31.63 per cent in 1951, 46.54 per cent in 1957,37.47 per cent in 1958, 22.39 per cent in 1961, 18.42 per cent in 1966, 42.48 per cent in 1972 and 42.04 per cent in 1979 (Chowdhury and Hussain1981) During 1981 and 1982,drought affected the production of the monsoon crop. The northwestern part of the country is mainly affected by drought in various years.

Damage to crops due to drought for a few selected years is presented in the following table (Table 3.7).

Table 3.7: Damage to crops due to drought for a few seleoted years

Year	Damage
1978	0.7 million tons of *Aman* rice due to rain deficit in August and September
1979	0.6 million tons of *Aus* rice,0.3 million tons of *Aman* rice, and 0.4 million tons of *Boro* rice crops
1981	0.12 million tons of *Aus* and 1.3 million tons of *Aman* rice
1982	0.4 million tons of *Aman* rice due to rain deficit in October

Source: Hamid, 1991

Nor'westers and Tornadoes:

The two transitional periods between southwest and northeast monsoons over the Indian sub-continent are characterized by local severe storms. The transitional periods are known as pre-monsoon (March-May) and post-monsoon (October-November). In the pre-monsoon period, most of the abnormal rainfall or drought conditions and local severe seasonal storms popularly known as nor'westers (Kalbaishakhi) occur over different parts of Bangladesh. Tornadoes are generally associated with severe nor'westers. The tornado forms within the nor'wester and moves along the direction of the squall of the mother storm.

The frequency of nor'westers usually a reaches a maximum in April, whereas there are few in May, and minimum in March. Nor'westers and tornadcs are more frequent in the afternoon.

Wind-speeds in nor'westers usually do not exceed 113-130 km/hr (70-80 miles/hr), though often their speeds exceed 162 km/hr (100 miles/hr). When

the winds become whirling with funnel shaped cloud, having speeds at several hundred kilometers, then they are termed tornadoes. Tornadoes are suddenly formed and are extremely localized in nature and of brief duration. So it is very difficult to forecast their occurrence with the present techniques available. The following table (Table 3.8) shows some of the devastating Nor'westers and Tornadoes that hit Bangladesh:

Table 3.8: Some of the devastating Nor'westers and Tornadoes

Date	***Place***
14 April, 1969	Demra (Dhaka)
17 April, 1973	Manikganj (Dhaka)
10 April, 1974	Faridpur
11 April, 1974	Bogra
9 May, 1976	Narayanganj
1 April, 1977	Faridpur
26 April, 1989	Saturia (Manikganj)

Source: Karmaker 1989 and local newspapers

Earthquake:

Bangladesh is a part of Bengal basin, which is one of the most seismically active zones of the world. Lying as it does in the confluence of the India, Burma, and Eurasia plate, the land is extremely prone to earthquake disasters and in the past has experienced some of the worst earthquakes in the history. The earlier recorded earthquake affecting Bangladesh were in 1664 (epicenter in Dhaka) and in 1762 (epicenter in Chittagong). During the last 150 years six major earthquakes have hit Bangladesh (Gain, 1998):

Table 3.9: Major earthquakes that hit Bangladesh

Earthquake	***Date***	***Damaged Places In Bangladesh***	***Magnitude In Richter scale***
Cachar	10 January, 1869	Eastern part of Sylhet	7.5
Bengal	14 July, 1885	Srimangal, Bogra, Sherpur, Jamalpur, Mymensingh	7.0
Srimangal	8 July, 1918	Srimangal	-
Dhubri	-	Eastern parts of Rangpur	7.1
Bihar	15 January, 1934	Did not affect much the present Bangladesh	8.3
Assam	15 August, 1950	Did not affect much the present Bangladesh	8.5

Source: Gain, 1998

Bangladesh has been divided into three seismic zones:

- Zone III (the most active zone): The north and north-eastern parts including Sylhet, Mymensingh and Rangpur.
- Zone II (moderate zone): Dinajpur, Bogra, Rajshahi, Pabna, Tangail, Dhaka, Faridpur, Comilla, Noakhali, Chittagong, Chittagong Hilltracts.
- Zone I (minor zone): The south western part of Bangladesh including Jessore, Khulna, Barisal and Patuakhali

River Bank Erosion:

Riverbank erosion a serious problem in Bangladesh. It is a process largely controlled by river dynamics. The disruption in the life of many local communities is almost a continuous process, due to riverbank erosion and changing course of rivers. During floods, riverbank erosion becomes very acute, and leads to loss of valuable land (Bangladesh State of the *Environment Report, 2001:102).*

Natural disasters cannot be prevented, but the damage can be mitigated with adequate planning and adaptation. The impacts of these disasters vary with their type and magnitude. They also critically depend on institutional strength and response by the different agencies that usually take measures to mitigate and eventually overcome the losses (Bangladesh State of the Environment Report, 2001: 94)

Agricultural resource base

Agriculture is the major land use activity in Bangladesh. It accounts for 63.5% of the land use and employs 80% of the work force. Its main ecological relationship with other natural resources is through its reliance on water for irrigation. Floods and drainage problems are identified as limiting factors to higher agricultural productivity during the monsoon and during the winter when all other factors are conductive to growth, water is a constraint.

The two most important cereal crops are rice and wheat. Rice, the staple food in Bangladesh, covers 80% of the total cropped land. The country was self sufficient in rice for the first time in 1992.

The vast majority of the population depends on agriculture and natural resources for their food and income. As a result, agricultural resources in Bangladesh are under severe pressure and environmental strain. Due to mechanization of agriculture and emphasis on high yielding varieties to grow more food many traditional verities of rice and other crops has been lost. Besides, the practice of mono cropping has caused serious deterioration of soil characteristics and declined productivity.

Urbanization

The rapid pace of urbanization and rather haphazard or uncontrolled pattern of urban growth and expansion in Bangladesh are manifest in the various sectors of urban environment, such as in housing, transportation, water and sanitation, garbage disposal, drainage and flooding, health and nutrition education, community services, air and the visual or aesthetic environment.

Land and housing: the scarcity of available land and its high price, poverty and low affordability of people have caused the development of extremely high-density settlements in cities. The housing condition is quite unimpressive in city areas. From a study in 1981, about 64.18 percent of houses were simply thatched houses of very temporary materials. These are served with highly inadequate space, water, sanitation, and sewerage facilities.

Drainage and Flooding: Due to rapid urbanization and unplanned or unregulated urban development, many of the large urban centers in Bangladesh now suffer from problems of poor drainage and consequent stagnation of rain and floodwater.

Sewerage and sanitation: The sewerage and sanitation systems in the urban areas of Bangladesh are far short of modern standards and even where the modern system has been established, it is at best, inadequate in coverage. The human waste disposal system is a mixture of several modes, including the traditional mode of bucket latrines. Even in the Dhaka city, only about 35 % of households have access to the sewerage (CUS, 1989).

Water: The existing facilities of supplying water for drinking and other domestic purposes to urban areas in Bangladesh are too inadequate for the rapidly expanding population and also due to the fact that means of water

supply like tube well do not function properly (CUS 1989c). Moreover, the low quality of water in cities causes the high incidence of water borne diseases. The population in the numerous slums and squatters of the large cities are particularly susceptible to such diseases.

Health and sanitation

Only 36.9 per cent of total population has acceptable sanitation facilities in Bangladesh. The present sanitation condition in Bangladesh is quite unsatisfactory, especially in rural areas. According to a UNICEF survey conducted in 1989, less than 5 % of the rural population use sanitary latrines. The people are little aware of the role of excreta in disease transmission and they use the same water body for domestic purposes, cleaning, washing clothes and defecation practices. Surface water is abundantly available through major part of the year, but coliform count of most surface water sources is beyond the acceptable standard for any domestic use.

The poor health condition of Bangladesh is related to poor environmental condition. A high rate of mortality and morbidity exist in the country. The common diseases prevalent are mostly are due to unsanitary conditions, paucity of safe drinking water and malnutrition, initiated and complicated by poverty and illiteracy. Diarrhea is the predominant cause of death among children below 5 years of age. The infant mortality rate in Bangladesh is among the highest in the world. The Planning Commission estimate is 125 deaths per thousand live births.

Medical facilities in Bangladesh are extremely poor. Except for a few facilities offered by the government, the common people cannot afford medical treatment as required. In 1997 there were 37131 hospital beds, 78.39% of which were government hospitals, only 25587 registered

physicians and 13830 registered nurses. Bangladesh gets less nutrition than required. In Bangladesh a person requires 2039 calories per day; but capita daily calorie intake is 1868. However, the average calorie intake is better in rural areas than in the urban areas. In the rural areas per capita daily calorie intake is 1892 and in urban areas it is 1779. According to the WB survey, women and children are the worst deprived section in food and nutrition intake. (Gain, 1998:232)

Energy

Among the energy recourses, Bangladesh has a vast resource of natural gas, some hydroelectricity and coal, and large amount of fuel wood, crop residue, cow dung etc. 55% of the total energy consumed in Bangladesh is collected traditional organic fuels. Natural gas meets 24% of the country's total fuel need, while hydroelectricity provides 2 % of the needs. 19 % of fuel need for Bangladesh comes from imported coal and mineral oil (World Bank, 1995). A brief description of energy resources in Bangladesh is presented here:

Natural gas: Natural gas is given the most importance of all the commercial resources in Bangladesh. The total storage of natural gas in the country is estimated at 22.899 trillion cubic feet, of which 13.59 trillion cubic feet is feasible to extract.

Oil: A small deposit of oil has been discovered at Haripur (Sylhet) with an estimated reserve of 1.6 million tonnes. The test oil is producing at the rate of about 15000 tonnes of crud oil per year (300 barrels per day) in comparison with the total consumption of 1.7 million tonnes per year (Atiq, 94: 265).

Coal: In Bangladesh, coal deposits has been discovered in three locations; Jamalganj (Bogra), Barapukuria (Dinajpur), Khalaspir (Rangpur). At present about 2, 50, 000 tonnes of coal is imported per year mainly for brick burning. Recently extraction of coal from Barapukuria has been started.

Commercial energy: Commercial energy sources comprise of 4% hydro, 68 % natural gas, and 25 % imported oil, as only 300 barrels per day are being produced locally.

Biomass fuels: In Bangladesh, due to scarcity of fuel wood, high proportion (70 to 80 per cent) of biomass fuels is supplied by agricultural residues and animal dung. Moreover, at present all the three types of biomass fuels are consumed beyond sustainable limits causing adverse effect on the productive environment.

Biomass fuels play an important role in meeting total energy demand and it is going to continue in the foreseeable future. Unplanned use of biomass fuel is responsible for environmental degradation. Close interactions among agriculture, forestry, energy and industry sectors are necessary to achieve and maintain sustainable supply of biomass fuel.

Conclusion

A number of socio- economic, environmental and political issues threaten the sustainability of Bangladesh. Poverty, malnutrition, illiteracy, population explosions and natural disasters are the barriers for the development of Bangladesh and accordingly measures should be taken to overcome these problems. To have a sustainable Bangladesh, an understanding of the multi-sectoral and interrelated impact of environmental degradation, which create vulnerability at national, regional and local level needs to be addressed from short, medium and long-term strategies. Development initiatives should be

based on environmental impact assessment and strong measures should be taken to prevent deforestation, unplanned urbanization, industrialization, water management and energy extraction for sustainable development.

CHAPTER IV

Evolution of National Environmental Legislations of Bangladesh

Though the activism about environment is of recent origin, the people of the subcontinent since ancient time were conscious about the need for a harmony between man and nature. In fact South Asian civilization is a nature based one, where people lived in nature and by nature. Therefore enactment of environmental legislation in Bangladesh was initiated since the British rule. These rules were subsequently modified and new legislations were enacted during the Pakistan time and after emergence of Bangladesh. The environmental legislation were enacted sector wise, even under Penal codes and are therefore were handled through different sectoral agencies. In all the cases the main player in the implementation of legislation were the police, magistracy and judiciary.

Environmental legislation in Bangladesh cover the i) social issues like environmental health, occupational health and safety, wage, working hours etc, ii) natural resources conservation issues like pollution control, protection of ecological, aesthetic and cultural resources and iii) international obligations like global climate, wildlife conservation, conservation of ecology, etc.

The social issue related legislation include the Employment of Children Rules 1955; Factory Act 1965, 79; Bangladesh Pure Food Ordinance, 1959; Bengal Motor Vehicle Act, 1939, 1940 And 1983; Tea Plantation Labor Ordinance 1962 and Rules 1977; Water Hyacinth Act, 1936; Embankment and Drainage Act, 1952; East Bengal State Acquisition Act, 1950; Smoke Nuisance Act, 1905; Brick Burning Act, 1989 etc. and the like.

Important provisions of these legislations deal with child workers restriction and prohibitions, workers rights in respect of community health, occupational health and safety, wage, minimum working conditions, accident and compensation, recreation, public nuisance, common properties right, occupational hazards, etc. However, these legislations only cover the factory workers, tea plantation workers and shop and establishment workers of private and public sectors.

The legislations related to conservation of natural resources issues are Bangladesh Forest Act, 1927, 1989, 1994 and Brick Burning (control) (amendment) Act, 1992. The Forest Act 1927 basically prescribed and specified the punitive measures for the offenders. The amendment of the Forest Act, 1899 was in fact the cosmetic work over the Forest Act structure of 1927. Brick Burning Act prohibits use of fuel wood in brick burning kilns.

As per recommendation of Forestry master plan, the amendment 1994 of the Forest Act made provisions for conservation of ecosystem, wild life and biodiversity conservation, flexible arrangement for people's participation in forestry activities, and coordination and conflict resolution with other development agencies. Moreover, this Act brought the community forest under the coverage of section 31 of Forest Act, 1989 and deleted the time limit specified to deal with the forest settlement cases.

Enactment of Bangladesh Wildlife (preservation) (amendment) Act 1974 replaced the (i) Bengal Rhinoceros Preservation Act 1932. Wild Birds and Animal Protection Act, 1912 and Elephant Preservation Act, 1879. The provision of this act specified elaborately the wildlife species that enjoy various protective umbrellas and also specified the punitive measures. Provisions of the Wildlife preservation Act (amendment) 1974 require immediate revision and review under changed socio-economic condition since the enactment of this Act.

The policies of the government on matters concerning the environment have often been formulated in response to initiatives taken by non-government environmental activists.

The Government adopted National Environmental Policy in 1992. Its main objectives are:

- Maintenance of the ecological balance and overall progress and development of the country through protection and improvement of the environment;
- Protection of the country from 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 environment related international initiatives.

These aims are translated into more detailed objectives for different sectors, which are as follows:

1. **Agriculture:** Agricultural development and self-sufficiency in food is to be achieved through the conservation of agricultural resource base by appropriate use of development and management technology.

2. **Industries:** Adoption of appropriate pollution prevention measures in phases: banning of pollution causing industries; encouragement of research and development in environmentally sound industrial technology; arrangement for Environmental Impact Assessment (EIA) before establishment of any industry in public and private sectors.

3. **Health and hygiene:** Promotion of public health and hygiene; incorporation of environmental education in the health education curriculum; development of healthy environment in urban and rural areas and in the labor housing areas.

4. **Fuel / energy:** Discouraging the use of pollution causing fuels; taking precautionary measures against radioactive fuels; wood and agricultural waste and encouragement of the use of alternative sources; arrangement for EIA prior to mining undertakings for energy and minerals.

5. **Water development, Flood control and Irrigation:** Environmentally sound and sustainable development and management of water development, drainage and irrigation projects involving both surface and ground water; maintaining the inland waters free from pollution; arrangement for EIA prior to implementation of water development and management projects; removal of the adverse environmental effects of previous water resources management and flood control projects.

6. **Land:** Adoption and extension of environmentally and ecologically sound land use practices and conservation of soil fertility; prevention of land erosion and strengthening of the land reclamation program; prevention of land from salinity and alkalinity.

7. **Forest, wild life and biodiversity:** Forestry conservation and afforestation programs in order to maintain ecological balance; conservation of wild life and biodiversity; research program; exchange program of knowledge and experience; conservation and development of the national wetlands and the migratory bird sanctuaries.

8. **Fish and livestock:** Protection, conservation and development of fish habitat; development of fisheries without adversely affecting the mangrove and other ecosystems; ensuring appropriate environment for live stock development; re- evaluation of those FCD/I projects found to cause adverse effects on fisheries resources.

9. **Food:** Environmentally sound practice of food production processing, distribution and disposal of waste food, prevention of import of food injurious to public health and environment.

10. **Coastal and marine environment:** Conservation and development of coastal and marine ecosystem and fisheries resources; prevention of pollution from domestic and foreign activities; strengthening research program on coastal and marine environment; keeping the coastal and marine fish catch at the maximum sustainable level.

11. **Transportation and communication:** Control of resource degradation and pollution from ports, dockyards, and carriers and by the passengers; to ensure that the road, rail, air and inland navigation systems do not pollute or degrade the environment; arrange EIA prior to the implementation of any project related to transportation and communication.

12. **Housing and Urbanization:** Integration of environmental ideas and concepts into all planning and research regarding housing and urbanization; extension of environmentally sound physical facilities in phases into urban and rural housing areas; control over housing and urbanization that is creating both local and general adverse effect on environment; emphasizing on the role of water bodies in the beautification of urban areas.

13. **Population:** Conservation and development of environment through the participation of women and jobless and through human resource development; incorporation of the concept of protection and conservation of environment in population control policy and program.

14. **Education and Public Awareness:** Provision of mass education, both formal and non-formal, creating public awareness and ensuring voluntary participation of people in the conservation and long term sustainable use of resources and environment; inclusion of environmental education materials in the training of government and non government officers, employees, industrial and business workers.

15. **Science, Technology and Research:** The National Science and Technology Policy (1986) would incorporate:
    a. Provisions for supervision and control of environmental pollution;
    b. Environmental consideration in the priority sectors for research and development.

16. **Legislative framework:** The Environmental Policy also includes provisions for updating and amendment of existing laws, particularly in the light of international laws, conventions and protocols which Bangladesh should consider to approve; enactment of new laws in whatever sector necessary, as well as ensuring enforcement of such laws for the conservation of environment and resources and control of environmental degradation and pollution.

Besides, in the fifth-Five-year Plan (1997-2002), there is a commitment on the part of the government to address the environmental issues in chapter X on "Environment and Sustainable Development". Referring to Bangladesh's commitment to the international Conventions and Protocols related to

environment, the chapter gave policy guidelines, identified goals and objectives and showed implementation strategies including financial arrangements.

To oversee environmental policy's implementation, a broad based National Environment Council was formed headed by Prime Minister. In 1996 the Government formed the National Conservation Strategy (NCS) in which guidelines regarding resource use have been spelt out. The National Environment Management Action plan (NEMAP) was also prepared in 1996. Both the NCS and NEMAP were results of interactive process and outcomes of consultative exercises in which effort to involve the government agencies, the non-government community and other actors of civil society such as professionals (doctors, lawyers, journalists, academics, grass root activists, researchers), parliamentarians, the business community and the media representatives were made.

NEMAP is intended to build on the general principles set out in the National Environmental Policy by proposing concrete actions and interventions in a number of priority areas. The Government of Bangladesh through the Ministry of Environment and Forest following the commitments made under the Agenda 21 at UNCED in Rio de Janeiro in June 1992 initiated NEMAP. The exercise was carried out in phases with the support of UNDP.

- The first phase carried out in 1992 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.
- The second phase carried in 1993 by a national and 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.

The third phase carried in 1995 by local consultants, as well as NGO's, journalists, academics, lawyers and other professionals consists 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 duel function of raising people's awareness about environmental issues.

In addition to the Ministry of Environment and Forests, and its main agencies- DoE and FD, the other line ministries of the government also have a major role to play in implementing the NEMAP. Other line ministries include the Ministry of Industries, Ministry of Water Resources, Ministry of Agriculture, Ministry of Land, Ministry of Education, Ministry of Local Government and Rural Development, Ministry of Energy, Ministry of Health, Ministry of Fisheries and others.

On the other hand, the Environment Conservation Act was passed by the parliament in 1995 and the rules under this Act were approved in 1997. The Environmental Conservation Act, 1995 (ECA '95) is currently the main legislative framework document relating environmental protection in Bangladesh, which repealed the earlier environment pollution control ordinance of 1977 and has been promulgated in 1995.

The main objectives of ECA '95 are:

- Conservation and improvement, and
- Control and mitigating pollution of environment.

The main strategies of the Act can be summarized as:

- Declaration of ecologically critical areas, and restriction on the operation and process, which can be carried or cannot be initiated in the ecologically critical areas.

- Regulations in respect of vehicles emitting smoke harmful for the environment.
- Environmental clearance.
- Regulation of industries and other development activities- discharge permit.
- Promulgation of standards limit for discharging and emitting waste.
- Formulation and declaration of environmental guidelines.

Environmental Conservation Rules, 1997, are the first set of rules, promulgated under the Environment Conservation Act 1995. Among other things, these rules set:

i) The National Environmental Quality Standards for ambient air, various types of water, industrial effluent, emission, noise, vehicular exhaust, etc.,

ii) Requirement for and procedures to obtain environment clearance.

iii) Requirement for IEE/ EIA according to categories of industrial and other development interventions.

According to the rules, any project/ development interventions is to obtain site/ location country clearance based on the application along with necessary paper as per requirement against respective categories, including the initial environmental examination, IEE which will contain the scope of work of the proposed EIA and then to obtain Environmental Clearance (by submitting the application along with necessary papers and after Obtaining the approval on the EIA report, which is to be obtained in between). The DOE may take up to 60 days to issue the site clearance (from the date of receiving the application), 60 days to approve the EIA and 30 more days to issue the Environment Clearance.

For effective compliance of these rules and act, the Government set up Environment Courts in Dhaka and in the five other divisional headquarters of Bangladesh in 2002 following the Environmental Court Act.

Sustainable Environment Management Program (SEMP): The SEMP is a follow up implementation of NEMAP. With a grant of US$ 26 million, SEMP is the largest environmental program of UNDP across the world. It has 26 components being implemented by 21 sub Implementing agencies (Govt. 8, Professional bodies 2 and NGOs 11), spread over a period of five years (1998-2003). The SEMP has five broad components: a) Policy and institution b) Participatory eco system management, c) Community based environmental sanitation d) Advocacy and awareness and e) training and education. The SEMP is intended to benefit the grassroots level population, particularly women, in the eco specific intervention areas. It supports community capacities for sustainable management of environmental resources and strengthens the capacity of public sector to develop new frameworks for policy development in support of enhanced community participation and sustainable management of the country's environment and natural resources.

The SEMP puts especial emphasis on sustainable and participatory environmental management, focusing on the five main areas: 1) Strengthening the legislative and policy development capacity at all levels; 2) Promoting effective planning and designing, and evaluating and managing ecosystem resources by communities supported by the poor people's access to productive resources and technologies, and enhancing community participation in environmental planning and implementation with special emphasis on the recognition of women's inputs to sustainable resource management; 3) Developing and transferring appropriate models for environmental sanitation and waste management; 4) Strengthening the capacity of environmental awareness creation and advocacy by government

and civil society bodies; 5) Integrating environmental education at non-formal, primary and secondary school levels.

All project under SEMP focus on strengthening capacity at three levels: a) Community (enabling the poor to have more access to environmental resources of Bangladesh), b) Local (developing the capacity to protect the interests of the poor) and c) National (establishing and enforcing enabling laws, policies and plans). Capacity building efforts are targeted at enhancing community level decision making on environmental resources: sub national level capacity building targets will enhance capacity for environmental advocacy and awareness: and finally, the national capacity building support will firmly establish the environmental agenda in the national development plans and policies.

Environmental problem is a global problem that calls for a global response. At the global level Bangladesh has signed and ratified nearly all the major International Protocols to protect Ozone layer, the Basic Convention on Trans boundary movement of hazardous wastes, the Convention on Biodiversity, the Ramsar Convention and the Framework Convention on Climate Change etc. In various international forums Bangladesh acted with other developing countries to persuade the developed countries, to pay for the damages they had cost. Bangladesh is particularly active in various conferences and meeting of the Kyoto protocol and the framework convention of climate change.

But the environmental laws can not play an effective role in combating environmental pollution in Bangladesh where poverty and illiteracy coupled with over population is aggravating the crisis day every day. The existing environmental laws are incomplete, ineffective and unenforceable, and very often, the implementation mechanism is not clear and the functions of implementing authority are also not well defined or, the implementing

authority is institutionally very weak. Besides, environmental laws can be criticized for their non-punitive approach, for only few have the punitive capacity which are also very marginal to influence. For these reason a comprehensive national environmental policy is required and we see donors' support in terms of adoption and implementation of major environmental policies in Bangladesh is dominant as for example we can mention NEMAP or UNDP sponsored SEMP.

CHAPTER V

Selected Actors in the Formulation of Environmental Policy

Policymaking is one of the most essential functions of any government throughout the world. It provides the framework within which all actions regarding the accomplishment of an objective are to be activated.

But a policy is not made in a vacuum. Rather it results from the interplay of many factors, actors and brains. "According to systems theory, demands for policy actions stem from problems and conflicts in the environment and are transmitted to the political system by groups, officials, and others. At the same time, the environment both limits and directs what policy makers can effectively do."(Anderson: Public Policymaking, Pp: 51).

Hence, we see public policy is a complex process, where several endogenous and exogenous factors simultaneously interact and shape the content, locus and focus. Public policies regulate conflicting views and interests of the society to optimize social and political goals.

Different types of people are engaged in the policymaking process in Bangladesh. They are the different ministries, the parliament, bureaucrats, political parties, pressure groups, business organizations, donor agencies, multinational enterprises etc. There is continuous interaction and feedback among these groups in the stage of policy formulation process. Through continuous discussions, the opinions and suggestions of these groups are placed before the policymaking bodies on the basis of which they arrive at some decision that finally takes the shape of a policy. These actors can be broadly categorized in the following way:

Internal actors

The official policy makers:

1. Parliament
2. The political executive: i) The Prime Minister ii) Cabinet iii) Ministers
3. The permanent executive: i) The Secretariat ii) Ministries iii) Divisions
4. The Courts
5. Policy Staff within Government
6. Advisory Boards

Unofficial Participants

1. Political Parties
2. Service Associations
3. Trade Unions
4. Professional Bodies
5. Clientele Groups
6. Mass Media

External Actors

1. Donor/ Funding Agencies
2. Foreign Investors
3. Regional and International Economic and Political Forums
4. International Pressure Groups
5. International Experts/ Consultants

Specifically, in respect of environmental policy and projects in Bangladesh, the Ministry of Environment and Forests, donor agencies and some NGOs contribute to the policy making process. Changes in the policies and acts are made whenever there arise a need for a new policy in a particular sector. However the policy makers alone are not responsible for being unable to make an effective environmental policy or making other sectoral policies environmentally friendly. Bangladesh has to depend greatly on foreign aid for her survival. The aid giving countries and donor agencies tend to influence the formulation of various policies at different times. And sometimes their interest does not tally with our interest. So, whenever we

discuss the international situation that set the scene for Bangladesh public policy making, the following three aspects need to be taken into consideration:

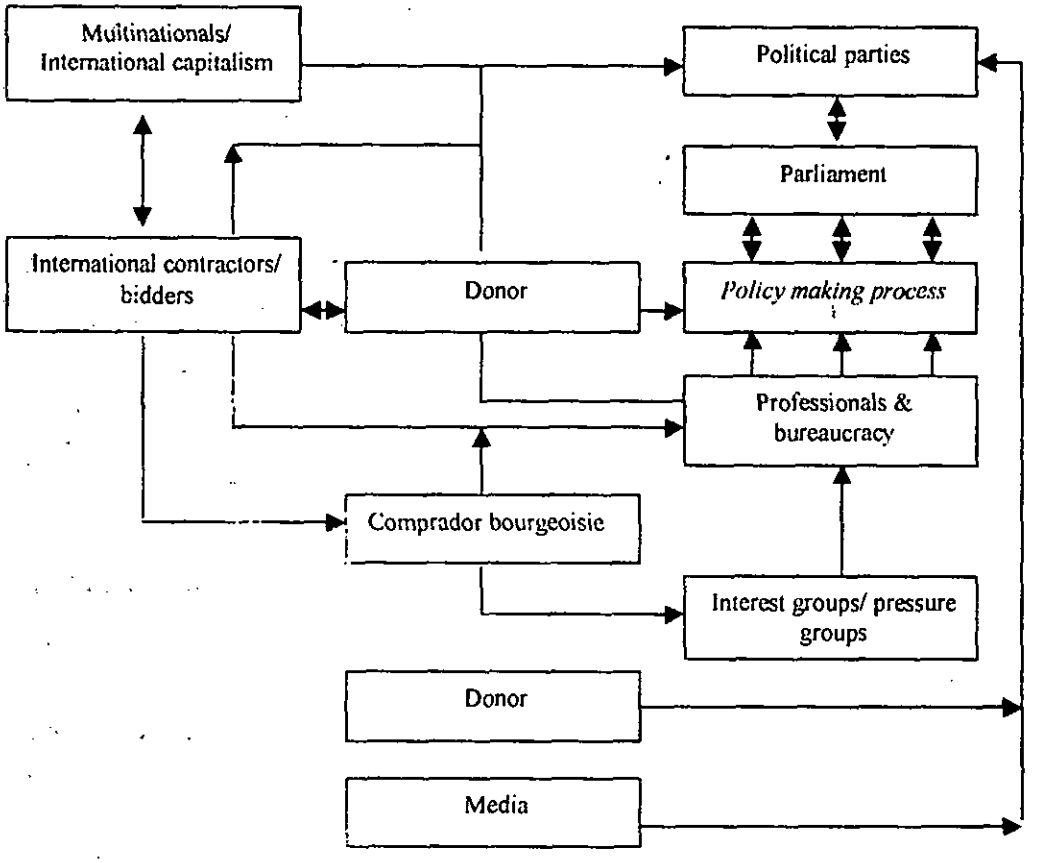
a. Bangladesh's links with the multilateral aid groupings such as World Bank, IMF, ADB, etc and aid giving countries.

b. Various multinational and International NGOs within the country.

c. Bangladesh's memberships in different regional forums such as SAARC, etc. and international organizations as UN, OIC, Commonwealth etc.

The following figure illustrates the dynamics of policymaking process in Bangladesh (Figure 5.1).

Figure 5.1: Dynamics of policymaking process in Bangladesh.



Source: Salahuddin Aminuzzaman. 'Dynamics of project management in Bangladesh- An institutional Analysis', Development Review Vol IX, No 2 1993.

The steps followed in the formulation of environmental policy are as follows:

Ministry of Environment (MOE) was created in 1989. At that time there was no specific rules/policy for the newly created ministry, though it was necessary. At that time National Conservation strategy project was going on under the supervision of Department of Environment (DOE). DOE was created in 1977 as Department of Environment and Pollution Control. The initial draft of an environmental policy was prepared by the personnel of that project. That draft was not fruitful but provided the baseline information only. The secretary of the ministry orally instructed the DOE officers and 3/4 officers of the ministry to prepare a basic draft following the information of that initial draft. A Deputy Secretary of the Ministry and Director (Technical) of DOE prepared the basic draft. That draft of environmental policy was sent to various ministries for opinion. On the basis of opinion from various ministries, DOE arranged a workshop in 1991 for discussion of the opinion on larger forum. That was a well-attended workshop. MOE updated the draft policy and it was placed before the cabinet for approval.

To look after the implementation of the environmental policy, National Environmental Committee was formed in 1993,headed by the Prime minister and consisted of around 70 members including Secretaries of various ministries (including Environment secretary), ministers, Members of the parliament, Representatives of NGOs. During two regimes, only two meetings of the National Environmental Committee were held.

This is the formal process of environmental policy formulation and implementation but the so-called development partners play very dominant role in the environment sector projects in Bangladesh. In fact, DOE was created by the advice of the donors. The principal Development Partners

are Canadian International Development Agency, United Nations Development Programme, Norwegian Agency for Development, World Bank and several others are also interested in this sector.

NORAD

NORAD funded the National Conservation Strategy project, which was an earlier attempt to incorporate environmental thinking into the national planning process, which predated NEMAP. Under the project, they collected information on some critical ecosystems with a view to develop management plans.

CIDA

The support from CIDA is mainly aimed at institutional strengthening of DOE, which is the main technical wing of the Ministry of Environment and Forests. The DOE had some very specific requirements regarding policy and regulations which stems from the environment act such as the framing of rules for Environmental Impact Assessment (EIA), Environmental Quality Standards (EQS), and the like. CIDA provided support to DOE addressing these needs. It is also funding the Bangladesh Environmental Management Project whose objectives are capacity building and raising awareness through education and training at national, local and community levels.

World Bank

World bank did not fund any direct environmental projects before but it supported environmental aspects of other projects-developing environmental guidelines for four sectors under the industries sector loan. The World Bank focused its attention on the different line ministries who will have a major role in protecting the environment including Agriculture, Industries, Energy, Fisheries etc and it assisted Ministry of Environment and Forests in carrying out an extensive consultation exercise, twelve

different line ministries to come up with ideas and projects on the implementation of NEMAP. The WB is the sub-implementing agency of one component of the SEMP

UNDP

UNDP is the main funding agency of SEMP. It supported the NEMAP planning process and to the implementation phase of NEMAP with the primary focus of its support in three areas, as-

a) Policy and institutional strengthening of Ministry of Environment and Forests

b) Training and awareness raising

c) Grass-root level pilot interventions in some key ecosystems under threat (such as wetlands, Barind hilly areas and char lands etc.) Main agency for funding of SEMP

Asian Development Bank

Asian Development Bank is one of the earliest donors to support environmental activities in Bangladesh, especially in institutional development of the DOE in the mid 80s. In recent years it has not been a major funding agency in environment directly though it has funded forestry sector projects and also studies on tannery waste management and toxic waste regulations.

Other donors

A number of other development partners are very active in supporting environmental activities. These include- Danida, ODA, JICA, GTZ etc. One of the areas, which seem to be common in several of the development partners programs is that of policy, institutional and regulatory framework. In fact, CIDA, UNDP and the World Bank programs all address these three issues in one way or another.

Selected NGOs:

Bangladesh Environmental Lawyers Association (BELA)

Bangladesh Environmental Lawyers Association was established in 1992 by a group of academics, researchers and practicing lawyers. BELA's mission is to ensure a sound and sustainable ecological order in the country using the legal mechanism.

For this BELA is engaged in research, promotion of environmental awareness, education, training, public interest litigation and advocacy etc. The most effective and remarkable success achieved by BELA in urban environmental issues is in the field of public interest litigation.

BELA's legal process and method of handling this type of issues are at least three, namely, legal notices, meditation and court cases. In a number of instances the service of legal notice upon the violator of law could create enough pressure and bring in necessary changes. The organization gets the information of violations from the suffered people or from newspapers.

BELA filed a number of writ petitions on urban environment issues like writ petition about unlawful filling up of Gulshan, Banani, Baridhara Lakes, about Burigonga river and so on. The court considered these prayers of petitions by issuing Rule Nisi, direction of show cause, or issuing of injunction, which ultimately influence the relevant authorities to take necessary attempt. As for example, in the case of Gulshan lake fill up, after BELA's appeal the project was subsequently cancelled by the Government. The organization runs its works with the help of foreign donations and mainly its activity is Dhaka based.

Bangladesh Center for Advanced Studies (BCAS)

This is the oldest NGO working in the field of environment in Bangladesh. Under its main program 'Natural Resources, Environment and Development' it has many projects in the fields of agricultural development, surface water systems, social forestry, fisheries, urban health and global climate change. The purpose of BCAS is to harness Bangladeshi and international expertise to develop suitable scientific methodologies for carrying out multidisciplinary research on resource management, environment and development issues. It holds seminars and workshops and publishes books and reports, newsletters on environmental issues and activities.

Forum of Environmental Journalists of Bangladesh (FEJB)

Forum of Environmental Journalists of Bangladesh is a pioneer professional watchdog for environmental conservation. It is a kind of think-tank and research organization. It was founded in 1983 by a group of journalists dedicated in protecting environment under the aegis of United Nations Economic and Social Commission. Its activities include holding seminars and workshops, training programs for journalists and arranging investigative field trips, publishing books, reports, news letters, documentary films and features within its mandate. FEJB is a member-oriented organization. The journalists working in daily newspapers and interested in environmental issues can be member. These members are trained up with environment related topics and are motivated to write on the issues like unplanned urban growth sewerage or drainage problem, environmental degradation etc. it also observed various international days which are related to environment. FEJB has five regular publications, which are quarterly or yearly.

Bangladesh Poribesh Andolon (BAPA)

BAPA was officially launched in July 2000 and since then it is working as platform of all pro-environmental activities in Bangladesh. BAPA's main objectives are promotion of public awareness and action for prevention of environmental degradation, mitigation of pollution and protection of safe environment in Bangladesh and influencing protection of global environment. It launches vigorous campaign including demonstrations, rallies and boat processions to protest against pollution and encroachment of the rivers and water bodies, use of unbalanced pesticides on vegetables and fruits.

One of their important achievements is about *Buriganga Bachao Andolon.* For this all types of programs particularly lobbying with the higher-level authorities was done. BAPA has the same type of program about the rivers Turag, Balu and Gulshan and Baridhara and Uttara lakes.

Another notable achievement of BAPA is about banning fish culture in lagoons of WASA at Pagla. BAPA agitated in front of WASA Bhaban and with other organizations and media also continued demanding of stopping such unhealthy process. At last WASA took step to kill the fishes. 95% of BAPA's activities are Dhaka based. But the organization is hoping to extend their activities to the whole of Bangladesh.

Waste concern

Waste concern was established in 1995. Its main purpose is to popularize compost fertilizer by processing solid waste. Waste concern is working with a pilot project for making compost in Dhaka city. Through this project they are trying to explore the economic benefit associated with recycling of the waste. Thus they are trying to manage the waste in a sustainable way.

Other NGOs

The environment related activities of other general purpose NGOs like BRAC, PROSHIKA, Grameen Bank include support for tree plantation on roadside, embankments and other public lands, technical support for aquaculture and poultry development, training and awareness creation on oral dehydration for diarrhoeal diseases and immunization, campaign for cleanliness etc. Most of these activities are rural based.

Environmental Performance of the country:

- Survey of vehicles
- Issuing environmental clearance to industries, ensuring formulation and implementation of plan for environmentally safe management of chemicals and hazards, wastes
- Producing a number of documentary films, information brochures, education materials, posters etc
- Publishing a large number of books, reports, training manuals and water quality data bank
- Imposing ban on import of wastes and reconditioned vehicles of more than five years old
- Compiling inventory of Green house gas making vulnerability assessment and identifying mitigation measures
- Ensuring integrated water resource management
- Adopting programs to combat air pollution in Dhaka city to restrict the number of two stroke engines
- Implementing ban on import of two-stroke engine three-wheeler and their chassis
- Preparing Environmental Impact Assessment guidelines for industries
- Implementing ban on the use of polythene bags throughout the country

Introduction of pollution Under Control Certificates to vehicles

(Source: Give Earth a Change, DOE, 2002)

The National Environment Policy (NEP): has 6 broad objectives, and contains 3 to 7 policy statements for each of the 15 sectors of the economy, a total of 69 sweeping statements. They are too broad in nature, with no prioritization and no indication either of the tools or the institutional capability needed for their implementation. Besides, Environmental Action Plan (EAP) also identifies the government's implementing agencies for each of the 120 actions it proposes. So, the NEP should be reformulated with prioritizing its objectives and action plan. It should also have time frames for achieving its targets and it should specifically mention what to achieve and how to achieve rather than vague statements.

In Bangladesh enforcement of the acts, laws, regulations and policy to tackle environmental degradation is weak due to lack of institutional capability. The Department of Environment is an inadequately staffed and insufficiently equipped agency of the government shouldering a very serious responsibility. According to CIDA experts –the Department of Environment in Bangladesh would need 115,000 functionaries, at various levels, to discharge its responsibilities in a proper manner. Responsibilities, that at present, rest on the shoulders of some 173 odd people (who include drivers and messengers) (Source: The daily Star, January 3, 2001).

The Department of Environment is supposed to provide Environmental Impact Assessment clearances to all government projects; to all new industries, to oversee the activities of the transport authorities regarding vehicular emissions and the like. The department of Environment has the legal instruments to carry out the responsibility, but with the extremely limited manpower and resources it is almost impossible for the department

to carry out the responsibility. Institutional capacity building in terms of manpower equipment and training is essential.

Table 5.1: Capacity building

Type of capacity building	Recipient and Resource requirement	Outcome
Improvement of analytical Laboratories, Monitoring Equipment, and Training	♦Department of Environment under Ministry of Environment and Forest ♦Resources are required for improving analytical laboratories and training	♦Improve analytical capabilities, which will enable DoE to produce good quality data ♦Better enforcement of Environmental Act and Regulations
Networking and Dissemination of information	♦Department of Environment will establish a network of professionals, including researchers from government and private sector ♦Resources are required for maintaining this network	Sharing of knowledge and experiences among professional groups ♦Assistance in formulating action research and policy advocacy
Waste reception and Treatment facilities at Ports	♦Ministry of Shipping and Port authority ♦Resources are required for installing reception and treatment facility	♦Reduce pollution load in the coastal and marine areas

Source: State of the Environment Report 2000

Policies are not implemented properly for inefficiency and corruption. The Environment court was established in the 18th February 2002. After the establishment of the court, only 7 cases were filed up to June 2003 (Source; The Prothom Alo, 5th June, 2003). Due to procedural complexities,

negligence of police and the corruption of some DOE officers, environmental pollution cases do not come up to the Environment Court. According to the act, before filing case in the environment court, one has to submit written complain to the Department of Environment. The DOE will conduct inquiry and file case if necessary. The complainants can go to the Environment Court only if the DOE does not take steps within 60 days of their submission of complains. The Environment Court can give 5-10 years imprisonment and can fine up to 10-lac taka. The law should be simplified. Provisions should be made for direct appeal to the court.

There is contradiction among various sectoral policies. As for example, the fisheries Policy provides for export of turtles and other species, contradicting NEP. Emphasis on Agriculture Policy 1999 mostly on rice, wheat and maize is not facilitative to conserving the crop diversity. While NEP discourages use of chemical fertilizers, the agro-policy's focus on intensive method using agro-chemicals will have a negative impact on environment. As environmental issues are crosscutting, there are overlapping jurisdictions and conflicting mandates among agencies. For example, about a dozen ministries and two- dozen agencies are concerned with land management. For this reason, environmental issues should be included in various sectoral policies in Bangladesh and the different sector policies should be made coherent regarding environment.

The policies sound more mission like with statements of pious objectives rather than real policy directions. The sectoral policy and guidelines prescribe dos and don'ts, rather than showing how to do or why not to do. The Forest Policy states the need for establishing a triangular partnership among the forest department, the people, and the NGOs, but there is no direction as to how the need will be forged. (Bangladesh state of Environment Report 1999, Pp: 218)

There is a gap between government and civil society organizations. Solution to environmental problems does not always require costly projects; sometimes, correct policies with proper implementation are needed. Social pressure can do a lot for the initiation of such projects. The poor are very hard on the environment. Neither regulation nor taxes can reach them. Only then will the government imposed charges or legal sanctions, have any chance of being effective, when there is moral persuasion and peer pressure from community leaders. Civil society members should become more active in generating social awareness and pressure. It is praiseworthy to note that various sections of Bangladesh's civil society are indeed becoming more active about environment. Many civic voluntary organizations are emerging with environmental protection as their goal. There are many ongoing movements focused on particular environmental goals, such as protection of Dhaka's greenery and lakes. Civil society could strongly influence the government in recent past as for example; the government changed venue of NAM convention center from Osmani Uddyan to Sher-e-Bangla Nagar.

The level of environmental awareness is very low both in urban and rural areas. Environmental policy addressed these issues but the sectoral policies and plan do not reflect them explicitly. For this:

-More focus on environment should be given in the curriculum of School, College, University and Technical Institutes.

-Radio, T.V. should telecast more programmes on environment.

-Environmental education should be imparted through non-formal education by GO and NGO.

The ultimate success of any policy or decision depends on the extent to which it turns into action programs and research efforts to bridge gaps. These action programs and research activities should be undertaken immediately to prevent further deterioration of the environmental resource

base and to assess the various impacts of degradation of land and water eco systems on human health. In addition, promoting a strong network among researchers and policy makers will enable quality research and sharing of knowledge and experiences towards better implementation of policies (State of the Environment 2001).

In the SAARC countries, a new era of environmental constitutionalism has developed. As for example, India, Sri Lanka and Nepal, have incorporated the right to environment as a fundamental right of their citizens in the constitutions. But there is no such provision in our constitution. So the right to environment can be included in the constitution as a fundamental right of citizen.

Bangladesh needs the support of international environment community. Many of Bangladesh's environmental problems are of regional or global origin. Without active support of environmentalists of other countries of the region and of the global community at large, Bangladesh will not be able to effectively solve these problems.

Chapter VI

Summary and Conclusions

This study has examined theoretically and empirically the dynamics of public policy making, especially the environmental policy making process in Bangladesh. Major conclusions and findings of the study were discerned in the previous chapters. These are pieced together in this concluding chapter without making monotonous repetitions.

The introductory chapter briefly discusses the importance of public policy making, in particular the significance of environmental policy formulation and its proper implementation in Bangladesh. Various documents, research reports and books relevant for the study were also revised in this chapter.

This study places strong emphasis on the quality, skill and foresight of the various policy-making agents that are directly involved in the process of formulation of environmental policy and its implementation.

Public policy making is one of the most important and also complex tasks of a modern government. A public policy must have a purpose. It should be goal oriented. it should also have a legal basis and its success will crucially depend upon the strong commitment of the people responsible for its formulation and implementation. The environmental condition of the country is degrading day by day and chapter three focuses on the major environmental issues of the country, such as, land degradation, air pollution, water pollution and scarcity, loss of bio diversity, natural disasters etc.

A chronological view of environmental legislations indicates that environmental legislations were adopted since the British rule and were modified under the administration of different governments. During the last

decade, successive governments have adopted a number of policies and laws. These include the National Environment Policy 1992, National Environment Action plan 1992, and Forest policy 1994, Forestry Master Plan 1993-2012, Environmental Court Act 2000 etc. Besides, the National Environmental Management Action Plan (NEMAP) was prepared with participation of grassroots people. There are follow-ups of NEMAP, such as the UNDP supported Sustainable Environment Management Program (SEMP), CIDA- supported Bangladesh Environment Management Project etc. But the state of environment today does not match this impressive array of policies, because the latter are not based on a sound process and workable instruments to realize the intended output/ impact.

It should be mentioned that though environmental policies and programs were subjected to frequent reviews but they could contribute little to conserve environment and tackle further deterioration of environment in Bangladesh. This study highlights some of weaknesses of the National Environment Policy and also makes some suggestions, such as:

The National Environment Policy (NEP) has 6 broad objectives, and contains 3 to 7 policy statements for each of the 15 sectors of the economy, a total of 69 sweeping statements. They are too broad in nature, with no prioritization and no indication either of the tools or the institutional capability needed for their implementation. Besides, Environmental Action Plan (EAP) also identifies the government's implementing agencies for each of the 120 actions it proposes. So, the NEP should be reformulated with prioritizing its objectives and action plan. It should also have time frames for achieving its targets and it should specifically mention what to achieve and how to achieve rather than vague statements.

- The NEP may include the Polluter pays principle, which requires that the potential and actual cost of pollution should be borne by the person or organization responsible for causing environmental pollution. Although the Environment Conservation Act 1995 is based on this principle, there is lack of broad- based standards about the potential and actual damage. So, these standards are required to be set.
- The NEP should give emphasis on the Principle of preventive action which requires action to be taken at an early stage and, if possible, before the damage is caused. It does not consider repairing damage after it has occurred. Access to environmental information, environmental information, environmental impact assessment (EIA) and pre- authorization procedures are some of the tools to apply this principle.
- The NEP may include the provision of decentralization in the housing and urbanization sector, which will act against concentration of resources in a few mega cities and help to achieve a better distribution of development all over the country. Some fully residential satellite towns may be developed surrounding the big cities with good communication and transportation system with those cities. It will reduce pressure on the big cities and inhabitants of the satellite towns will get better environment for living.
- The NEP should along with social forestation, give emphasis on creating canals beside the roads to reduce destroying hills, enhance beautification and increase the fish production.

In Bangladesh, policy formulation and implementation have been deficient for many reasons. The first is the weak policy formulation capacity. Policies often fail because these are not formulated on the basis of rigorous and sound analyses. The personnel engaged in formulating policy often lack of

technical skill and are unable to carry out the research required to bring out the potential impact of alternative directions.

The other problem is that of weak implementation and monitoring capacity. Commitments at the bureaucratic level may be weak when the donors put pressure to initiate a particular policy. Public servants might lack the technical capacity to carry out the policy themselves, either because of their limited competence or because the actual constrains were not identified at the time the policy was formulated.

Implementation of environment sector policies can be improved by better coordination among various ministries and implementing agencies, as we know environment is a cross sectoral issue. This aspect is lacking in the existing policy measures. Besides, there is a gap (lack of understanding) between civil society organizations and governmental agencies. The civil society agencies do not get enough scope to participate with government though they are interested. So, the whole process is often shrouded in secrecy. The participation of multiple pressure groups and professional bodies should be encouraged for an effective environmental policy. Besides, some other suggestions, which are discussed in details in chapter five, are briefly as follows: institutional strengthening of DoE, carrying out research on environment, including environmental issues in sectoral policies and taking steps for environmental awareness raising.

The donors are very active in the environmental sector and on many occasions they insist the GOB to undertake programs on this sector. They funded many environmental projects even before the creation of MOEF. As for example CIDA provided support on institutional strengthening of MOEF, UNDP supported the NEMAP planning process and to the implementation phase, UNDP is also funding SEMP, which is a follow up of NEMAP. WB is a sub-implementing agency of one component of SEMP.

The reform efforts, regarding various policies in Bangladesh, are not being effective because of bureaucratic complexities, incompetence, corruption, and delays in decision-making. It is often found that reform efforts under way are mostly on paper and very little of it is put into practice. All these inefficiencies should be removed and favorable atmosphere should be created for an efficient bureaucracy to flourish along with a reform of civil administration. However, we should keep in mind that, environmental problems in the country are the cumulative effects of actions that had been taking place for more than four decades. These problems will not disappear over night.

The study focused on the shortcomings of the formulation and implementation of environmental policy and at the same time proposed some suggestions for improvement of the country's environmental sector. It is expected that the findings of the study will build a new platform for the ministry of Environment and Forest and those in the policy making process. It may generate new knowledge about the nature of policy and suggest new areas for further reform and reformulation of environmental policies.

Bibliography

Ahmed F.M., Tanveer S. A. et al. *Bangladesh Environment 2000. Vol. One and Two.* Dhaka, Bangladesh Poribesh Andolon (BAPA), 2002.

Aminuzzaman, Salauddin. *Dynamics of Project Management in Bangladesh- An Institutional Analysis*, Development *Review Vol IX, No 2,* 1993.

Anderson, E. *Public Policy Making.* 3rd ed. New York: Holt, Rinehart and Winston. 1984.

Asthana D. K., Asthana M. *Environment: Problems and Solutions.* New Delhi: S. Chand and Company Ltd., 1998.

Bangladesh Centre for Advanced Studies, DoE. *Bangladesh State of Environment Report 2001.* Dhaka.

Bangladesh Centre for Advanced Studies. *Guide to the Environmental Conservation Act 1995 and Rules 1997.* Dhaka, 1999.

Bangladesh Forum of Disaster Preparedness. *Bangladesh Durjug Protibadon 2002.* Dhaka, 2003

Chowdhury Q I. *Bangladesh State of Bio- Diversity.* Dhaka, Forum of Environmental Journalists of Bangladesh (FEJB), 2001.

Chowdhury Q I. *Bangladesh State of Environment Report 2000.* Dhaka, Forum of Environmental Journalists of Bangladesh (FEJB), 2001.

Dye, Thomas R. *Understanding public Policy. 4th ed.* Englewood Cliffs, N.J.: Prentice Hall, 1981.

Dye, Thomas R., and Harmon Zeigler. *The Irony of Democracy*. Belmont, Calif.: Wadsworth, 1970.

Easton, David. *A Framework of Policy Analysis*. Englewood Cliffs, N.J.: Prentice Hall, 1965. *The Political System,* New York, Knoph, 1953.

Farooque M, Hasan Rizwana S. *Laws regulating environment in Bangladesh*. Dhaka: Bangladesh Environmental Lawyers Association (BELA), 1996.

Farooque M. *Environment and Law*. Paper presented at a seminar arranged by BELA, December 27-29, 1996, Dhaka, Bangladesh.

Gain P. *Bangladesh Environment Facing 21st Century*. Dhaka, Society for Environment and Human Development (SEHD), 1998.

Government of peoples Republic of Bangladesh, Ministry of Environment and Forests *National Environment Policy 1992 and Action Plan*. Dhaka, 1992.

Government of peoples Republic of Bangladesh, Ministry of Environment and Forests. *National Environment Management Action Plan*. Dhaka, 1995.

Haque E. M. *Poribesh Ain shonkolon*. Dhaka, Department of Environment and Bangladesh Environment Management Project, 2002.

IUCN *Red List Of Threatened Animals Of Bangladesh*. Dhaka, 2000.

Jones, Charles O. *An Introduction to the Study of Public Policy*. Boston: Duxbury, 1977.

Lasswell, Harold D., and Abraham Kaplan. *Power and Society*. New Heaven: Yale University Press, 1970.

Latham, Earl. "The Group of Basis of Politics." In Heinz Eulau, Samuel J. Eldersveld, and Morris Janowitz, eds., *Political Behavior*. New York, Free Press, 1965.

Lindblom, C.E. *The Policy Making Process*. Anglewood Cliffs, NJ: Prentice Hall, 1968.

Pandey G. N. *Environmental Management*. New Delhi: Vikas Publishing House Pvt Ltd., 1997.

Planning Commission, (GOB). *The Fifth Five-Year Plan 1997-2002*. Dhaka, 1998.

Rahman, Atiq A., Jansen Eirik G. et al. *Environment and Development in Bangladesh. Vol. One and Vol. Two*. Dhaka: University Press Limited, 1994.

Simon, Herbert A. *Administrative Behavior: A Study of decision Making Processes in Administrative Organizations*. 3rd ed. New York: Free press, 1976.

The Daily Prothom Alo, Dhaka, Bangladesh.

The Daily Star, Dhaka, Bangladesh.

Truman, David B. *The Governmental Process*. (New York: Knopf, 1951).

Zafarullah, Habib. *Understanding Bureaucracy: A Primer*. Dhaka, Academic Publishers, 1992.

Zafrullah, H., Taslim, M A. *Policy Issues in Bangladesh*. Dhaka, University Press Limited, 1995.