



BANGLADESH PUBLIC ADMINISTRATION TRAINING CENTRE
SAVAR, DHAKA

78th Senior Staff Course

25th September – 8th November, 2016



Policy Evaluation Report

On

National Water Policy, 1999 :

4.7 Water and Agriculture

Module 2: Policy Analysis and National Policy Review

Module Director : Dr. Rizwan Khair

Prepared and Submitted by:

Md. Fazlur Rahman Bhuiyan

Roll No-06, 78th SSC

Table of Contents

CONTENTS	PAGE
COVER PAGE.....	i
TABLE OF CONTENTS.	ii
ACKNOWLEDGEMENT.....	iii
ABBREVIATIONS AND ACRONYMS.....	iv
EXECUTIVE SUMMARY.....	v
CHAPTER 1 : INTRODUCTION	
1.1 Background and Context.....	01
1.2 Assessment of the policy.....	02
1.3 Planned timeline.....	02
1.4 Resources.....	02
1.5 Coherence.....	03
1.6 Purpose of the report.....	03
1.7 Scope of the study and report.....	03
CHAPTER 2 : EVALUATION METHODOLOGY	
2.1 Questionnaire preparation.....	04
2.2 Literature Review.....	04
2.3 Approach of Analysis.....	05
2.4 Limitations of the Report.....	05
CHAPTER 3 : REVIEW OF THE WATER POLICY	
3.1 Water resources in Bangladesh.....	06
3.2 Water Resource Management in Bangladesh.....	07
3.3 National Water Policy, 1999.....	07
3.4 Objectives of the Water Policy.....	08
3.5 Water and Agriculture.....	09
CHAPTER 4 : FINDINGS FROM INTERVIEW AND DISCUSSION	
4.1 Analysis of findings from Interview and discussion with Ministry and Organizations.....	10
4.1.1 Interview with Deputy Secretary (Dev-5), MoWR.....	10
4.1.2 Interview with information officer, WARPO.....	10
4.1.3 Discussions with Deputy Secretary (Budget), MoA.....	11

CONTENTS	PAGE
4.2 Interview and discussions with the field level officers and farmers.	11
4.2.1 Basic relevant information of the district.	11
4.2.2 Interview and discussions with Deputy Director, Agriculture Extension; <i>Kishoreganj</i>	12
4.2.3 Interview and discussion with Executive and Superintendent Engineers, BADC.	14
4.2.4 Interview discussion with Executive Engineer, DPHE; <i>Kishoreganj</i>	15
4.2.5 Interview and discussion with farmers and user of water.	16
CHAPTER 5 : ANALYSIS OF FINDINGS	
5.1 Enabling Environment.	18
5.2 Private Sector Participation.	20
5.3 Development of minor irrigation.	20
5.4 Groundwater for agriculture	21
5.5 Relevance.	21
5.6 Partnership and Cooperation.	22
5.7 Impacts.	22
5.8 Sustainability.	22
CHAPTER 6 : CONCLUSIONS.	
6.1 Conclusions	23
6.2 Recommendations.	24
6.3 Lessons Learned.	26
Reference.	27
Annex-1 : Questionnaire used for Ministry/Organization.	28
Annex-2 : Questionnaire used for Field Level Officers.	30
Annex-3 : Questionnaire used for Farmers/ users.	32
Annex-4 : National Water Policy, 1999	33
Table-1 : Number of pumps and equipment used for a coverage of cultivable land	13
Table-2 : Coverage under irrigation with ground water	14
Table-3 : Showing aquifer level in meter at different Upzillas in <i>Kishoreganj</i> district	16
Charts and Maps-1 : District map of <i>Kishoreganj</i>	11

Acknowledgement

Joint Secretaries are the key positions in the government mostly involved in policy formulation and implementation, providing services to the people. Peoples' expectation and demands are changing with their enhanced education and economy. Service providers need to be more responsive to the needs of people with intense competitive knowledge and technology. 78th Senior Staff Course is designed to fulfill that expectation. The policy evaluation paper is an outcome of the course aiming to prepare officers for the changed needs. At the outset I would like to thank Mr. A L M Abdur Rahman ndc, Respected Rector, BPATC and CMT for inclusion of National Water Policy, 1999 for evaluation.

This is a great opportunity to express my sincere thanks and gratitude to Dr. Muhammad Abu Yusuf, Director BPATC and the Mentor for Group-Teesta; for his continuous support, and talented guidance in reviewing the policy and preparing this report. I would like to extend my thanks to Dr. Rizwan Khair, Director BPATC and Module Director, Module 2 for his kind teaching on policy formulation and evaluation.

I wish to convey my thanks and respect to Mr. Md. Jaydul Hoque Molla, respected MDS and Course Director for encouraging and inspiring me to review the said policy and to prepare the report and for extending all facilities to make my stay at BPATC comfortable.

I would like to take this privilege to thank and express my gratitude to course coordinators-Mr. Md. Shohel Imam Khan, Director (ET); Mr. K M Abdul kader, Deputy Director (RC) and Mr. Razib Miah, Evaluation Officer, for their continuous and relented support to fully achieve the objectives of the course.

I am sincerely grateful to all respondents to the questionnaire who also enriched my knowledge by giving their valuable time to discuss on issues related to the policy. I respectfully acknowledge the contribution of Ms. Hosnara Akhter, Deputy secretary (Dev-5), MoWR; Mr. Md. Rabiul Islam, Deputy secretary (Budget), MoA; Ms. Nazmun Nahar Chowdhury, Information Officer and WARPO- for their great support with information and providing documents. I must acknowledge the support from my colleagues participating the course.

I am really happy to to extend my heartfelt thanks and love to Mr. Azimuddin Chowdhury, DC for making a 'home' for the team Teesta at Kishoreganj with entertainment and protocol. He took all the inconvenience for accommodating field attachment of the team. I would also like to thank Executive Engineer, BADC; Executive Engineer, DPHE; Executive Engineer, BWDB; Deputy Director, DAE; DFO, DoF; DPEO, DPE; all are stationed at Kishoreganj- for their good office and for sharing their experiences on NWP. There are many others who contributed to the review process, but I could not mention their names due to limited space.

Finally, taking this space I would like to salute poor farmers from Kishoreganj who has sacrifices their time for providing information in writing and oral. I learned many things from them.

Md. Fazlur Rahman Bhuiyan
Director Program (Joint Secretary); DPE.
Roll-06, 78th SSC; BPATC

Md. Fazlur Rahman Bhuiyan, Roll-06, 78th SSC; BPATC

ABBREVIATIONS AND ACRONYMS

ADB	:	Asian Development Bank
BADC	:	Bangladesh Agricultural Development Corporation
BBS	:	Bangladesh Bureau of Statistics
BPATC	:	Bangladesh Public Administration Training Center
BWDB	:	Bangladesh Water Development Board
DPHE	:	Department of Public Health Engineering
DAE	:	Directorate of Agriculture Extension
DFO	:	District Fisheries Officer
DOF	:	Department of Fisheries
DPEO	:	District Primary Education Officer
DTW	:	Deep Tube Well
FGD	:	Focus Group Discussion
GIS	:	Geographic Information Systems
LGED	:	Local Government Engineering Department
LLP	:	Low Lift Pump
MDG	:	Millennium Development Goal
MOA	:	Ministry of Agriculture
MOEF	:	Ministry of Environment and Forest
MOI	:	Ministry of Industries
MOWR	:	Ministry of Water Resources
NWRC	:	National Water Resources Council
NWRP	:	National Water Resources Plan
NGO	:	Non-Government Organization
NWMP	:	National Water Management Plan
PRSP	:	Poverty Reduction Strategic Plan
SDG	:	Sustainable Development Goal
SSC	:	Senior Staff Course
STW	:	Shallow Tube Well
WARPO	:	Water Resources Planning Organization

Executive Summary

Bangladesh is a deltaic floodplain where three major rivers the *Padma*, the *Meghna* and the *Jamuna* are flowing along with hundreds of other rivers across the country. They are the main source of water including local rainfall. During monsoon rainfall adds to the excessive flow of rivers cause severe flood and in winter minimum rainfall adds to withdrawals of water in the upstream push Bangladesh in a water crisis. Moreover industrial and other pollution impeding conservation of environment, become a serious concern for Bangladesh. The most critical of these are expanding water needs for a growing economy and population, providing total water quality management including salinity check, deterioration of surface and groundwater quality, and maintenance of the eco system. Considering the angered water situation the MoWR formulated and endorsed the National Water Policy, 1999.

The water policy of the government aims to bring order and discipline in the exploration, management and use of water. The objectives are to recognize and address overall basin wide planning, water supply and sanitation, fisheries, navigation, agriculture, industry and environment. This is a comprehensive and sound policy that demonstrates government's strong commitment regarding exploration and efficient management of water resources.

This policy evaluation report is an attempt to briefly highlight effects of the policy on targeted water resources problems in agriculture and on different group of people. Report also aimed at examining financial and technical feasibility and stakeholder's view in respect to Agriculture. Moreover, one of the purposes of this report is to reflect status of achievements including poverty alleviation, food security, public health and the environment.

Evaluation identified some improvements under the policy in relation to agriculture in the areas of public private partnership where NGOs and entrepreneurs are involved in construction of irrigation systems and motivating farmers for just use of water. The policy elevated opportunities for minor irrigation through low lift pumps, wise use of ground water for irrigation, especially in research area, that is in *Kishoreganj*. Policy evaluation report also transpired remarkable growing women employment and participation in agriculture.

However, this paper tried to explore the weak areas that require special attention by both public and private sector. The policy was endorsed in 1999, by this time water related socio economic conditions has been changed, global warming and climate change effects are seen prominent in Bangladesh, developing framework for partnership appears to be important, irrigation taxes and tolls becoming unbearable by the farmers deserve the revision of the policy. Severely lacking coordination at central and field level is one of the impediments to policy implementation. Poor financing pulling policy-shaping back by the inadequately staffed organizations.

The report ended with an aspiration that all identified impediments will be removed to ensure increased agricultural productivity for feeding added population and achieving the vision 2021 in relation to agriculture.

CHAPTER : 1

INTRODUCTION

CHAPTER : 1

INTRODUCTION

1.1 Background and Context :

Life for a day without water is impossible and un-imaginable. Bangladesh, from pre-historic period, has been enjoying abundance of water. Major sources of water are the Padma, the Meghna and the Jamuna along with hundreds of other rivers flowing across the country and regular rainfall. Among all, 57 rivers are crossing transnational borders from which water has been diverted or withdrawn. During the last decade of twenty first century Bangladesh started suffering from inadequate water flow in the rivers in dry season and over flooding during monsoon. This situation has been aggravating followed by climate change effect in the region. Insufficient and irregular rainfall has been contributing more threats to the water resources. Since then, Bangladesh has been thinking over the optimization in the use of quality water for life and crops and to ensure environmental conservation. In that purview, National Water Council, headed by honorable Prime Minister, met on 18th March, 1997 and gave directives to MoWR to formulate National Water policy. The meeting urged that water, the natural resource, is limited and every person or organization must use it judiciously. Basic thought came in a report named, 'Bangladesh Water and Flood Management Strategy (BWFMS)' under 'Flood Plan Coordination Organization (FPCO)', published in 1995. With the directives from the Honorable Prime Minister MoWR formulate and endorsed the National Water Policy in 1999.

The Water Resources Planning Organization (WARPO) was entrusted, as per this policy, with the responsibility for planning water resources development and they developed National Water Management Plan (NWMP) addressing the overall resource management issues in the whole of Bangladesh. The purpose of the NWMP is to operationalize directives given in the National Water Policy within a framework plan to guide integrated and comprehensive use of water and in providing water services. This is an important document for implementing the policy.

This paper represents a review and brief analysis of the National Water Policy 1999 and its effect on water management in agriculture. This review and evaluation is done as an individual assignment, a part of 78th Senior staff Course organized by BPATC.

1.2 Assessment of the policy :

The National Water Policy, 1999 is a very comprehensive policy covering all most all areas and issues related to water resources planning and management. National Water Policy is enriched with specific strategies of country's water resources management in relation to sixteen issues including '4.7 Water and Agriculture'. The main aim of this policy is to take all necessary means and measures in a view to manage water resources of the country in a comprehensive, integrated and equitable manner. Most of the objectives of the policy are achieved, and some are progressing. But during the review of the policy and some other relevant documents published by government and by private organization, found some salient features are missing in the policy; like climate change effect, effective coordination mechanism at national and at field level, private participation and monitoring over them, access to irrigation by poor farmers and pricing for using water. There should be strict principles on using ground water.

1.3 Planned timeline :

The National Water Policy, 1999 has no timeline to be implemented, but National Water Management Plan, 2001 formulated basically to implement the policy, has timeline to implement some activities. There is a provision to periodically review and update with current situation and challenges. Water resources are the important inputs to industries, agriculture, fisheries and navigation-all contributing to economic growth which ultimately can contribute in achieving vision 2021. Water resources management need to be prioritized and there should be a time frame and activities to be identified as short term, medium term and long term even to reach the UN Sustainable Development Goals (SDGs) or Copenhagen Declaration on climate change.

1.4 Resources :

The National Water Policy, 1999 includes more than 118 policies and strategies, implementation and monitoring of those requires a huge organizational structure both in government and in private sector. WARPO is the apex planning and research body in the country , given responsibility for the implementation. But the organization is suffering from insufficient manpower and finance. As indicated in the policy, responsibility of implementation mostly lies with other ministry, division and subordinate offices at national and field level. Resource mobilization for policy implementation is urgent either from the treasury or from developments partners.

1.5 Coherence :

There were some guiding documents on water resources that influenced government to formulate the National water Policy. Poverty Reduction Strategic Plan (PRSP) and the Five Year Plan-two important document were considered as driving tool for striving country's economic growth. There are other documents, has relevance with water management.

1.6 Purpose of the Report :

The policy evaluation report is an attempt to briefly highlight effects of the policy on targeted water resources problems and on different group of people. Report also aimed at examining financial and technical feasibility and stakeholder's view in respect to Agriculture. Moreover, one of the purposes of this report is to reflect status of achievements against the targeted objectives of the policy, including poverty alleviation, food security, public health and safety, decent standard of living for the people and protection of the natural environment through managing water resources of the country in a comprehensive, integrated and equitable manner.

The main objective of this policy evaluation is to evaluate the National Water Policy, 1999 with particular reference to agriculture and:

- To identify strength and advantages of the water policy specially in the agriculture sector;
- To find and examine the challenges for the efficient and effective implementation of the plans under policy;
- To recommend for solving problems on the basis of findings and analysis of the water policy.

1.7 Scope of the study and report :

The National Water Policy, 1999 itself created a great scope to review and evaluate as it seems lacking organizational strength and structure, climate change issues and lapsed time also brought some issues like SDGs and 7th Five Year Plan. Earth summit or Copenhagen declaration and raising global concern on water and agriculture might be the scope for reviewing the policy. Bangladesh government also endorsed some other but relevant policies and rules, like National Agricultural Policy, National Fisheries Policy and of course, the Water Act, 2013 and the draft rules under that. So wide scope is there to review the National Water Policy. But it is a long process to collect primary and secondary data and information, requires study relevant documents which is not possible within two days. Review and evaluation will be limited to small area of primary and secondary data.

CHAPTER : 2

Evaluation Methodology

CHAPTER : 2

Evaluation Methodology

Evaluation methodology refers to the process of collecting information and data from different sources which is very important for conducting any research or evaluation. Results and acceptability of the report, to some extent, depends on statistically recognized methodology used in research. Contribution from the respected Mentor at different stages of evaluation including selecting methodology; benefited research output. The researcher of this policy evaluation report, in consultation with respected mentor, followed underlying methods for conducting the assigned evaluation-

2.1 Questionnaire Preparation :

Before going to the evaluation, the writer decided to interview the key stakeholders of the policy and prepared three sets of questionnaire. Planned interviewees were the representatives from MoWR, MoA, WARPO, at the policy level. Second categories are the implementers at the field level, planned interviewees were the representatives from the DAE, DPHE, BADC, BWDB, DoF. The third questionnaire was in Bangla and it was used to interview farmers, the ultimate users. All the questionnaire were pre structured with a view to taking stock of the status of implementation, their views about the policy, benefits and challenges of implementation. Questionnaire prepared for this evaluation are a mixed type with 'close ended and open ended'.

2.2 Literature Review :

Since there was a little scope for collecting and reviewing primary data, priority was given to secondary data and information, and that was possible through reviewing related documents and reports, rules and regulations from government and from local and international agencies. The library of BPATC, Library of WARPO, notes and handouts distributed in session/classes were used for reviewing literature. BPATC's wi-fi based internet were used intensively. The major Literature reviewed were mainly on water policy in relation to agriculture.

2.3 Approach of Analysis :

Approach used for the evaluation were- intense study of policy documents, relevant literature review, informal discussions and formal interview with key stakeholders. Interviews with key stakeholders included, were Deputy secretary (Dev-5), MoWR; Deputy secretary (Budget), MoA; Information Officer, WARPO at the central level. Five office heads of field level implementing offices were also interviewed. That was a great opportunity to interview nine farmers who are the main user of water.

The close ended questions were made to know the knowledge and level of awareness of interviewees on the policy, their involvement in the implementation. The open ended questions were made to know the challenges of policy implementation and their comments to overcome those challenges.

2.4.1 Limitations of the Report :

Extensive quality study or evaluation requires time and resources, which were not available for the current study. Only two days field attachment is not enough to carry out the related literature and collection of primary data. The National water Policy is a vast one with sixteen areas of consideration. So it is necessary to recognize the limitations of the current study, mostly which are-

- Time was too short to reach each of the stakeholders having the responsibility to implement the policy. Only one day was available for collecting data from Dhaka (Ministry and related Department/organization) and two days for field level data;
- The offices attended were not much aware but shown interest in a limited way except a very few;
- The farmers are not willing to talk to officials, some on request responded;
- Formal survey could not be carried out due lack of time;
- Due to time constraint less number of published literatures (for secondary data) consulted.

The writer somehow managed to overcome the limitations. So the study suffered a little about the accuracy, validity and reliability of data.

CHAPTER 3

Brief Review of the Water Policy

CHAPTER : 3

Brief Review of the Water Policy

3.1 Water resources in Bangladesh :

Bangladesh is a deltaic floodplain, three major rivers running through Bangladesh are -, the Padma, the Jamuna and the Meghna with a catchment area of 14.7 million hectares are the main source of water. These rivers remain overflowed with water from upper stream during the summer and monsoon and people suffer from flood and abundance of water. The other source of water is local rainfall, falling mainly between July and October that adds to excessive flow of rivers in that time. This results a huge excess of surface water during the summer months. But in winter basically there is no rainfall and the river flow is minimum, causes water shortage in Bangladesh during between January and March. The situation remains aggravated as there are water diversions and withdrawals in the upstream by countries located there. Consequently, the minimum water requirement to meet total demands for irrigation are less than what is available from surface and groundwater in Bangladesh, especially in the southwest and north-central regions of the country.

In a sector assessment document Asian Development Bank (ADB) highlighted that because of the topography and substantial seasonal variations of river flows, the country has encountered challenges of -

- severe flooding that inundates up to two-thirds of the country in monsoon;
- changes in river courses due to erosion and sedimentation;
- cyclones and tidal surges in coastal areas;
- intrusion of salinity;
- limited water during the dry season; and
- widespread arsenic contamination of groundwater.

Water management is further complicated by diverse interests among different water users including for agriculture, fisheries, navigation, industries, and domestic water supply. Water is also essential for the country's vulnerable natural ecosystems.

3.2 Water Resource Management in Bangladesh :

Devastating floods in 1954, 1955 and 1956 influenced to form a United Nations Mission popularly known as the Krug Mission to investigate the possibilities for water resources development in the then East Pakistan. On mission's recommendations, the East Pakistan Water and Power Development Authority (EPWAPDA) was created in 1959 for planning, design, operation and management of all water development schemes. A 20-year Water Master Plan was prepared in 1964 by EPWAPDA with USAID assistance. The main focus of the master plan was massive flood control and drainage followed by irrigation for achieving national self-sufficiency through increasing agricultural production.

In 1983 the National Water Resources Council (NWRC) was established as an inter-ministerial body and the Master Plan Organization was created and entrusted with the task to draft the first National Water Plan (NWP) and it drafted the National Water Plan in 1986, which was updated in 1991. The severe floods of 1987 and 1988 attracted widespread support from the international community for the Flood Action Plan, resulting in five regional plans and supporting studies. One important outcome of this process was a baseline assessment of water resources of the country. The water balance model (for both surface water and groundwater) was made in an effort to determine the extent of surface and groundwater reserves.

The NWP made the proposals to institutionalize the process of water planning and long-term water resource management in the country. As per its recommendation Water Resources Planning Organization (WARPO) was established in 1992 to carry out the water planning and management exercises.

3.3 National Water Policy, 1999:

From the above mentioned water systems in Bangladesh and the evolution of its management reflects the sufferings from and crisis of water. People and the government has been struggling to overcome the problems under the command of National Water Council, headed by the Honorable Prime Minister. One of the meeting of National Water Council held on March 18, 1997 realized that the water resources are not infinite and it requires sound

policies and plans for the exploration, development and use to meet the requirements of all users. From that meeting Honorable Prime Minister gave directives to formulate National Water Policy on a priority basis. Finally the policy endorsed by the government in 1999.

The approach to water resources management in Bangladesh has been based on structural interventions in flood control, drainage and irrigation (FCDI), culminated in National Water Policy and National Water Management Plan.

3.4 Objectives of the Water Policy :

The water policy of the government aims to provide direction to all agencies working with the water sector, and institutions that relate to the water sector in one form or another, for achievement of specified objectives. These objectives are broadly:

- a. To address issues related to the harnessing and development of all forms of surface water and ground water and management of these resources in an efficient and equitable manner;
- b. To ensure the availability of water to all elements of the society including the poor and the under privileged, and to take into account the particular needs of women and children;
- c. To accelerate the development of sustainable public and private water delivery systems with appropriate legal and financial measures and incentives, including delineation of water rights and water pricing;
- d. To bring institutional changes that will help decentralize the management of water resources and enhance the role of women in water management;
- e. To develop a legal and regulatory environment that will help the process of decentralization, sound environmental management, and improve the investment climate for the private sector in water development and management;
- f. To develop a state of knowledge and capability that will enable the country to design future water resources management plans by itself with economic efficiency, gender equity, social justice and environmental awareness to facilitate achievement of the water management objectives through broad public participation.

3.5 Water and Agriculture :

The main aim of this report is to evaluate the national water policy in relation to water and agriculture, that the report highlights the importance of water management for agriculture in Bangladesh. So the relevant paragraph of the National Water Policy regarding agriculture is given below:

“4.7 Support of private development of groundwater irrigation for promoting agricultural growth will continue, alongside surface water development where feasible. But there will be a renewed focus towards increasing efficiency of water use in irrigation through various measures including drainage-water recycling, rotational irrigation, adoption of water conserving crop technology where feasible, and conjunctive use of groundwater and surface water.

Water allocations in irrigation systems have to be done with equity and social justice. At the same time, serious consideration should be given to non-point pollution of water systems by fertilizer and pesticides that are either leached to the groundwater or washed off the fields to rivers and lakes. For this purpose, the policy of the Government is to:

- a. Encourage and promote continued development of minor irrigation, where feasible, without affecting drinking water supplies;
- b. Encourage future groundwater development for irrigation by both the public and the private sectors, subject to regulations that may be prescribed by Government from time to time;
- c. Improve efficiency of resource utilization through conjunctive use of all forms of surface water and groundwater for irrigation and urban water supply;
- d. Strengthen crop diversification programs for efficient water utilization;
- e. Strengthen the regulatory system for agricultural chemicals that pollute ground and surface water, and develop control mechanism for reducing non-point pollution from agro-chemicals; and
- f. Strengthen appropriate monitoring organizations for tracking groundwater recharge, surface and groundwater use, and changes in surface and groundwater quality.”

CHAPTER 4

**Findings from interview and discussion with
stakeholders at central and Field level**

CHAPTER : 4

Findings from interview and discussion with stakeholders at central and Field level

Visits are essential parts of a study or a research which require gathering information from primary and secondary sources. With a view to fulfill that requirement, visits were designed to key ministry, divisions and departments. Field level concerned offices and farmers were also visited.

4.1 Analysis of findings from Interview and discussion with Ministry and organizations :

4.1.1 Interview with Deputy Secretary (Dev-5), MoWR :

Deputy Secretary (Dev-5), MoWR responded to the questionnaire in written that government took several steps for the implementation of NWP, some of them are The Bangladesh Water ACT, 2013; formulating rules under the act is being drafted. MoWR assured that all the challenges of climate changes are identified and remedies were detailed in the rules. Future planning is only to implement the water resources management plan. The ministry referred to WARPO, the main implementing agency of water policy. There was no comment on a single meeting of National Water Resources Council within the last seventeen years, where Honorable Prime Minister is chairing the council.

4.1.2 Interview with information officer, WARPO:

The apex body in Bangladesh for the planning and management of water resources is the WARPO. With the directives from the MoWR, they formulated the National Water Policy, 1999; National Water Management Plan 2001, endorsed in 2004. WARPO initiated the enactment of Bangladesh Water Act 2013. WARPO also act as the secretariat for the National Water Resources Council headed by the Prime Minister. In response to a question regarding update of the National Water Policy, she said that the Policy is comprehensive covering all the issues related to the water resource. In response to a supplementary question information officer explained that the policy is a well thought document. Climate change issues can effectively be managed within the framework of the policy. What are the steps to be taken

against water pollution with industrial discharges, leaching and draining of chemicals used in agricultural land under this policy ? In this respect he pointed out the weaknesses of the WARPO regarding the staffing, heading the organization, budget and authority. It is a planning organization, has the capability of planning but not the implementation. There are more than thirty five agencies involved in implementation, lacking severely the coordination. One of the main strategy of the policy is to review it periodically, but it did not happened during the last seventeen years.

4.1.3 Discussions with Deputy Secretary (Budget), MoA:

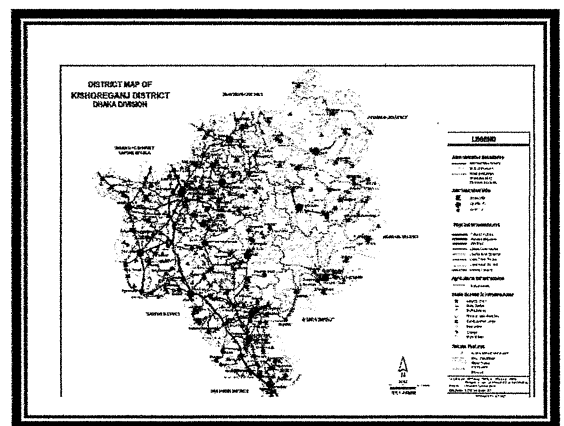
Deputy Secretary participated in discussion and explained they are much aware about the water policy. MoA endorsed the National Agricultural Policy, 2003 taking in mind the existence of water policy. He also expressed his satisfaction that the agriculture policy to some extent ensured the conservation of surface water for irrigation and discouraged the use of ground water for irrigation.

4.2 Interview and discussions with the field level officers and farmers :

The BPATC designed field attachment to Kishoregonj district as it has a diversified sources of water resources and it's use in irrigation and fishery. There are *Haors, Baors, Beels* and rivers covering a large area of the district make it different from other districts. This district is not only famous for crop production but also proud for the eminent personalities coming from this soil

4.2.1 Basic relevant information of the district:

Kishoregonj district is located at the north-eastern part of Bangladesh surrounded by Netrokona and Mymensing districts in the north, B. Baria and Narsingdi in the south, Sunamganj and Habigamj in the east and Gazipur in the west.



Total area	: 2731.21 sqkm
Population	: 29,50,926
Number of Upzillā	: 13
Number of farm families	: 4,56,203
Total land area	: 2,73,121 hector
Total Cultivable Land	: 2,15,688 hector
Major crops	: Boro Paddy, Wheat, Maize, Vegetables and winter crops
Total food production	: 9,19,534 MTs with a surplus of 2,07,419 MTs

Basic information and data relating to water and agriculture is important to review and for evaluation of NWP, 1999. Purposefully the writer of this report visited Kishoregonj district headquarters and rural area under SadarUpzilla of the district to collect information and data by interviewing district level concerned officials and the beneficiaries of NWP, specifically farmers. Two separate pre-developed questionnaire- one to interview concerned officials and another to interview farmers, were used to explore the implementation status, challenges of implementation, benefits and their awareness and thoughts on NWP. Moreover discussions with officers and farmers considered to be the best source of information, that were used. In addition to that, other opportunities were- to review official records, monthly, quarterly, yearly reports and statements of concerned offices.

4.2.2 Interview and discussions with Deputy Director, Agriculture Extension; Kishoregonj :

The present deputy director has been working here for one and half year but experienced in doing the same tasks before joining here. Department of Agriculture Extension is one of the stakeholder of NWP being user of irrigation water for the farmers. But his office is not much aware of NWP but aware about irrigation and water. Replying to the questionnaire in written, he explained his sincere concern over the excessive use of ground water since the water table is lowering day by day. He suggested to emphasize using surface water in the NWP as Kishoreganj has its abundance throughout the year. During discussion deputy director provided some information regarding the coverage of irrigation in the district, that are furnished in the following table-

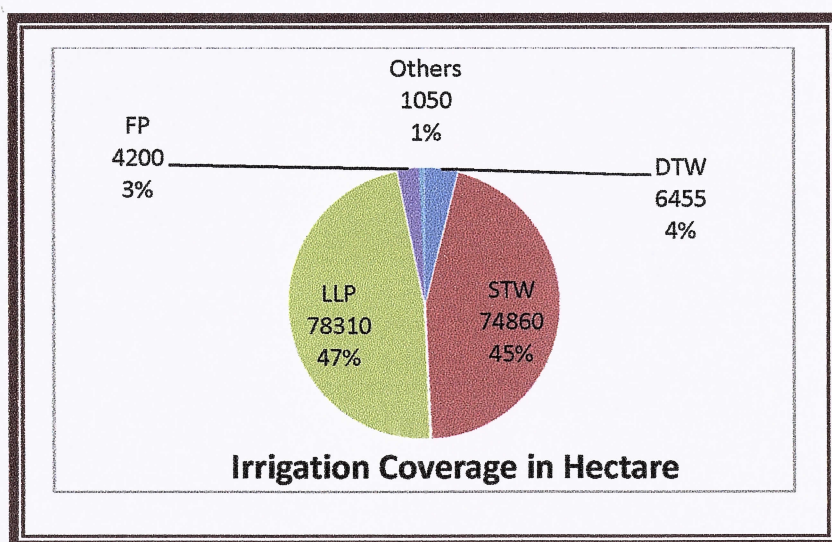
Sl. No.	Types of equipment used	No of equipment	Coverage in Hector
1.	Deep Tube Well (DTW)	410	6,455
2.	Shallow Tube Well (STW)	23,480	74,860
3.	Low Lift Pumps (LLPs)	4,948	78,310
4.	Floating Pumps (FPs)	24	4,200
5.	Others	4,638	1050
	Total	33,500	1,65,075

Table : 1- Number of pumps and equipment used for a coverage of cultivable land.

From the analysis of the above table-1, it is seen that the total coverage under irrigation in winter is 1,65,075 hectares out of total cultivable land of 2,15,688 hectors; ie 76.5%. Most of the land is taken under irrigation other than the rivers, marshy and water logged land. Deep Tube Well (DTW) and Shallow Tube Well (STW) are used to extract ground water, totaling areas covered is 81,315 hectares which is 49% of total irrigated land. Surface water used to irrigate 83,560 hectares which is 51% of total irrigated land. Use of ground water in abundance will deter the

quality of water with increased quantity of minerals including arsenic and salinity. In near future drinking water scarcity may create the new crisis in the society which is already exists in some northern Bangladesh. Over the

discussion it is understood that still there is not much minerals like arsenic, iron and saline are detected in ground and surface water but apprehension is following. In a reply to a question on training farmers for their capacity building and awareness raising in using optimum water



for irrigation and reducing the use of ground water, he explained that they were providing training but expected results are not getting. In a reply to another question he said, there is a lack of using scientific and water saving technology, like laying perforated irrigation pipelines or installation of sprinkler irrigation. From the above discussions it is evident that raising awareness, promoting newer advanced technology can improve the imbalance water use situation in the country. Replying to further question the Deputy Director added that DAE initiated floating vegetables cultivation where water stagnancy exists. There are some initiatives for the adaptation to climate change. Rain is not regular in season, increases irrigation dependency that might affect *Boro* yield and food security. Immediate attention to comprehensive water management plan can save the next generation.

4.2.3 Interview and discussion with Executive and Superintendent Engineers, BADC :

Executive Engineer, BADC do not have idea on NWP, 1999 but found concerned and sincere relating to water and irrigation and its effect on crop production as well as to climate change. Replying to the questionnaire in written he said, BADC is re-excavating canals, rivers and ponds for using them as reservoirs of water during winter. It also helps quick and rapid discharge of flood water during monsoon. He experienced that farmers are not much aware in optimizing the use of irrigation water, in most cases the existing irrigation systems cause a loss of 40% of irrigation water by leaching and draining loss. He assured the construction of modern water distribution structures by BADC. The superintendent Engineer proposed to form a regulatory body at national and district level to ensure the implementation of NWP. Over the discussion fact came out that there were some mismatch among the government agencies for authorities. BADC, LGED, BWDB, DAE, Municipalities need to be coordinated by some authority to avoid duplication of works, wastage of time and money at the implementation stage. Executive Engineer did not forget to mention their vision to ensure 'Effective irrigation management' and mission is to improve irrigation system using surface water and BADC has been working for achieving vision and mission. During discussion he cited the following statement on irrigation coverage in 2015-16 in Kishoreganj-

Sl. No.	Equipment	Number	Coverage in Hectors
1.	Deep Tube Well	410	7,210
2.	Shallow Tube Well	23,480	85,616
	Total from ground water	23,890	92,826
3.	Surface water by other means		78,017
	Total irrigated land		1,70,843

Table :2-Coverage under irrigation with ground water.

Statistics from BADC also shows 54% irrigation water coming from ground water which is not a favorable situation for conserving water and environment. Reason for reflecting same statistics show the discrepancy in statistics from different organization. DAE showed the total coverage under irrigation by ground water is 1,65,075, where BADC mark it as 1,70,843 hectares. There is a difference also in total cultivable land where DAE said 2,15,688 hectors, BADC said 2,04,977 hectares. This basically showed the lack of proper coordination among the organization doing the same tasks.

4.2.4 Interview discussion with Executive Engineer, DPHE; Kishoreganj :

The executive engineer has been working here for only six months, but experienced the position in other districts. He showed his excellence in water management and climate change effect on water. He identified the problem of planning and formulating policies at ministry or at headquarter level, does not work at the field or even at the district level. Planning should be based on field level experiences. The executive engineer suggested in writing that effective implementation of NWP requires a very strong bridging between district and national level. He expressed his deep concern over appearing and increasing concentration of arsenic and iron in the ground water at *Nikli* and *Bhairab Upazillas*. Based on a study, he said in urban areas water table is lowering down by 2 to 3 meter a year and in adjacent areas the figure is 1 to 1.5 meter per year. Excessive use of ground water will deter the quality of ground water and reduce the availability in the coming days. A surface water treatment plant is being implemented at *Bhairab upzilla* to ensure drinking water to the municipal people. The executive engineer provided a study report on time series ground water levels at different Upzillas-

Sl No	Upazila	2016	2015	2014	2013	2012
1	Ashtogram	6.85	6.58	6.30	6.05	5.80
2	Bazitpur	6.22	5.94	5.66	5.38	5.08
3	Bhoirob	6.71	6.40	6.10	5.81	5.55
4	Hossenpur	21.00	20.42	19.80	19.20	18.78
5	Itna	7.85	7.58	7.29	7.02	6.71
6	Karimganj	8.75	8.50	8.25	7.94	7.65
7	Katiadi	7.52	7.20	6.91	6.68	6.41
8	Kishoregonj Sadar	10.92	6.10	1.25	5.44	9.66
9	Kuliacahr	6.65	6.40	6.07	7.82	5.51
10	Mithamoin	6.66	6.40	6.07	5.76	5.45
11	Nikli	9.25	8.98	8.66	8.33	8.01
12	Pakundia	16.10	15.80	15.52	15.22	14.89
13	Tarail	10.52	10.15	9.78	9.42	9.02

Table : 3Showing aquifer level in meter at different Upzillas in Kishoreganj district

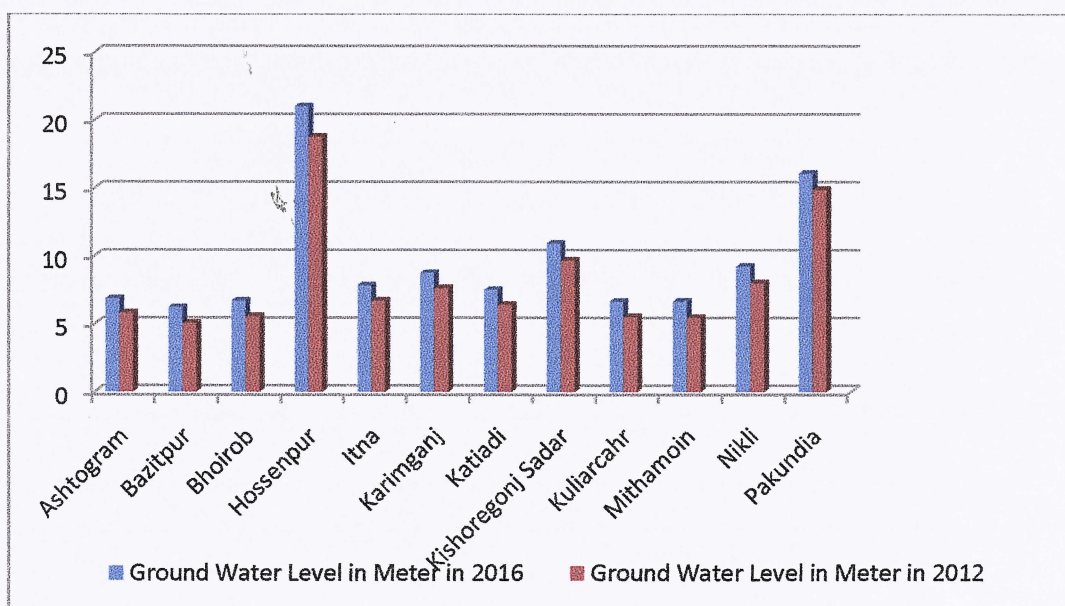


Chart : 1 Showing the lowering ground water table during 2012 and 2016

The above table and chart shows that the differences between water level height between 2012 and 2016 has significantly increased which means the water table has been going down rapidly. So justified use of ground water is required for conservation of water.

4.2.5 Interview and discussion with farmers and user of water :

Whatever the sources or systems of irrigation, most benefiting peoples are the farmers, tried to interview some of them with printed questionnaire. Written questions were a little bit difficult to mostly illiterate farmers. Where the writer prioritized on face to face discussion but also tried to bring out the answers to the written questions. During visiting irrigation project at *Sadar Upzilla*, five farmers are interviewed and discussed on irrigation issues. They are all from *Sadar Upzilla*. On returning from the project another four farmers are found waiting for the boat on the bank of a river. They also interviewed and discussed on the same issue, who are from *Tarail and Itna Upzillas*. Replying to the question, whether they ever heard the name or existence of NWD, everybody answered negative. But all of them are aware of water, specially irrigation water. Only four are aware of deteriorating water quality with the use of chemical fertilizers and pesticides. Sixty percent of respondents admits the assistance from the government offices for irrigation during winter and the rest forty percent said they use personally managed or association based irrigation at local level. They identified silting up of rivers, canals, ponds as the major problem in conservation of water for using in dry season. They suggested to re-excavate those for retaining water for dry season and draining out of excessive water in rainy season.

Over the discussion all interviewed farmers said the cost of irrigation is increasing and going out of their capacity. BADC charges near about TK=1,500/- per acre, where private organizers charge for TK=2000/- to 3000/- per acre. They were also satisfied with services and tolls from government agencies rather than private organization. BADC and DAE officials were asked regarding the fees and tolls for irrigation, but none could accurately say. There is no set rules for irrigation fees and even there is no control over the private organizers.

CHAPTER : 5

Analysis and Findings

CHAPTER : 5

Analysis and Findings

There were many other guidelines and action plan used to monitor and manage the huge water resources which were not much effective in conservation and use of water resources. With that recognition Government endorsed The National Water Policy in 1999, the first strong political commitment, setting out a comprehensive sector goals adopting the principles of integrated water resource management (IWRM). The policy put emphasize on the peoples' participation including women in water management and highlights the importance of stakeholder's participation. It also recognizes the importance of the protection, restoration, and preservation of environment and its biodiversity including wetlands, mangrove and other national forests, endangered species, and the water quality. Water is considered as an economic and finite resource in the policy.

5.1 Enabling Water and Environment :

For enabling water and environment and making institutional changes to decentralize the management of water resources, a good number of policies which have direct impact on water management have been formulated by the government. These are as follows:

- National Policy for Safe Water Supply and Sanitation (1998)
- National Environment Policy (1992)
- National Fisheries Policy (1998)
- National Agriculture Policy (2013)
- National Policy for Arsenic Mitigation (2004)

It is identified in NWMP that there are 41 pieces of legislations in Bangladesh that in some way address the water rights, water quality and water management. The Legislations directly relevant to the Water Resources Management are -

- Groundwater Ordinance (1985)

- Water Resources Planning Act (1992)
- Bangladesh Environment Conservation Act (1995)
- WASA Act (1996)
- Environment Conservation Rules (1997)
- BWDB Act (2000)
- The Bangladesh Water Act 2013

Implementation and execution of the above listed policies, regulations, plans and laws are lies with relevant 35 organizations affiliated with 13 different ministries. But there are lots of drawbacks in the organizational structure, coordination and management. WARPO, responsible for macro level water resource planning, has very limited resources in terms manpower and finance. With the shortage of manpower it cannot cope with the wider mandate of water resource planning and oversee the implementation of water management programs and projects taken by other implementing agencies. It is also charged with collating data collected from various water sector agencies. More over the organization is also suffering from inadequate number of experts within the organizational structure and struggling to exert sectorial planning and coordination role to a great extent.

Bangladesh Water Development Board (BWDB) is responsible for implementing all major surface water development projects and other flood control and irrigation projects with command area above 1000 hectares and Local Government Engineering Department (LGED) under the Local Government Division is responsible for implementing flood control, drainage and irrigation projects with command area up to 1000 hectares. There are conflicts between LGED and BWDB at the district level. During discussion with Executive Engineer, BWDB, Kishoreganj the fact came out that the organizations are not following the authorities they have entrusted. LGED is implementing larger water related projects without having such experts in their department. He cited the example of re-excavating the Sunanda river crossing the town. The projects taken by the LGED are most likely political in nature planned and designed hurriedly in order to fulfill election pledges of the local political leaders. The offices are also suffering from shortage of manpower and finance.

5.2 Private Sector Participation :

The private sector is closely involved in water resources development and management by consulting, contracting, supplying irrigation and equipment. Private sector activities have expanded significantly over the last 25 years and they are particularly active in minor irrigation, rural water supply. But there is a lack of coordination between the public and private sector. During the field visits in Kishoreganj, interview and discussion with concerned officials and farmers reflected that private sector is charging double fees for irrigation water than public sector. There is none to see the sufferings of the poor farmers and they are compelled to pay rates. There is no strategic direction or ceiling of water tolls or not detailed the responsible authority placed in the policy.

5.3 Development of minor irrigation :

Water resources are in abundance during monsoon but difficult to utilize or store the huge water resources for agriculture and fisheries during scarce in winter due to financial and technical constraints. Though efforts have been made to develop some major irrigation, flood control and drainage projects, desired results have not been achieved. In order to meet the need for increased food production, minor irrigation has been widely used since 1960s. In Kishoreganj, Low Lift Pumps (LLP) and Shallow Tube Wells (STW) are commonly used covering 51 % of total irrigated land which contributes to the minor irrigation. Farmers and BADC officials expressed their desire to have more minor irrigation with LLPs and STWs, are less expensive. This irrigation type also helps ground water to be stable.

BADC used to rent DTW and LLP to the farmers. The government adopted the policy of privatization of business on minor irrigation equipment with installation of irrigation system. But the rental rates and fees were not seen authoritative, transparent and justified during the visit.

5.4 Groundwater for agriculture :

Policy number 4.7(a) and (b) in the national water policy emphasize conjunctive use of ground and surface water. But ground waters act as the strength for agriculture and irrigation in Bangladesh due to shortages and inconsistencies in the flow of surface water. Currently (2015) 35,322 deep tube wells, 15,23,322 shallow tube wells are in operation in Bangladesh to provide ground water for irrigation. About 79% of the total cultivated area is irrigated by groundwater (out of which 73% is used exclusively for boro), whereas the remaining area is irrigated by surface water.

Groundwater irrigation has serious consequences as energy costs are increasing, water levels are declining in the intensive irrigated areas of northern Bangladesh, and groundwater quality is deteriorating. The Arsenic contamination in groundwater is increasing and it is now an alarming stage. An estimated 70 million people have been chronically exposed to Arsenic via drinking water.

5.6 Relevance :

The National Water Policy is aimed at bringing discipline in water sector. Rivers are silting up, water table is going down, pollution becoming a great threat to the conservation, exploration and use of water is affected. The government felt the need for developing water sector in a planned way and endorsed the policy. From the previous discussion it is clearly observed that the policy is giving directions to all stakeholders to work together. In this policy private public partnership is encouraged, women empowerment is prioritized, peoples' rights in water is ensured and conservation of environment is importantly considered -which are the current needs of the nation. From the findings it is also seen that strategic water plans has been developed and implemented following the water policy. It gives a platform for playing important role by all concerned agencies, makes this policy highly relevant in water sector management.

5.7 Partnership and Cooperation :

Reviewing this policy it is assumed that NWP has given the opportunity to all partners to work together. The National Water Council, headed by the Honorable Prime Minister is a forum of inter-ministerial representatives, created scope for greater coordination in water management. The National Executive Committee is also playing the same role of planning actions for water sector and implementing them. Greater achievement with the policy, is the public private partnership at the ground level. Private irrigators are engaged to cover a larger percentage of total irrigated area, where government is less than expectation. Private entrepreneurs are producing irrigation equipment and other constructions, made irrigation easier to the farmers. NGOs are also supporting farmer associations for achieving their water rights and making them aware in relation to water policy. All the partnership and cooperation is seen through evaluation a success of NWP, 1999.

5.8 Impacts :

The policy intervention highlighted the NWP, 1999 in relation to agriculture is expected to create a conducive environment for the water sector to grow. Discipline in use of ground and surface water for irrigation has a great impact on environment and ecosystem. Evaluation says that it will increase the crop productivity and ensure food security for future. The way of implementation, with some exceptions, will reduce the poverty at rural area with women participation and cooperatives. Great impact will be in achieving the vision 2021 towards middle income nation and achieving SDGs in relation to agriculture.

5.9 Sustainability :

The major forces acting on water resources are the farmers including women, private partners and private entrepreneurs including NGOs, of course the government agencies, make this policy sustained. From the evaluation, as said earlier targeted benefits accrued from the policy would ensure better life of the people and will lead to ensure socially just, economically viable and environmentally sound development for the country. But it remains in questions whether the implementation will be smooth and effective.

Chapter : 6

Conclusion

Chapter : 6

Conclusion

6.1 Conclusion :

Legal instruments for enabling environment, institutional framework and management are crucial for development and management of water resources in Bangladesh. With the support from WARPO, the National Water Resources Council (NWRC), the apex decision-making body in Bangladesh provides an excellent institutional framework to ensure the decisions affecting water resources across the sectorial-lines. Endorsement of Water Policy is an important milestone for the water sector. The country has achieved a lot of advantages to manage water resources in line with the policy and subsequent plan. The existing policy, plan and guidelines provide a sound basis for the successful implementation of water and agriculture related projects in Bangladesh considering the principles of integrated water resource management i.e. equity, efficiency, environmental sustainability.

This review has shown that, ins-pite of constraintfinance and manpower, the agencies responsible for implementing policies and plans, made satisfactory progress towards water resources management in agriculture including minor irrigation and private sector participation. But from the findings it is evident that, successful policy implementation stigmatized with a lot of conflict arises in water resources planning and management at the field level due to- lack of awareness and motivation, lack of effective coordination and support and lack of manpower and finance.

The Policy encourages the conjunctive use of ground and surface water for irrigation has some consequencesin lowering the ground water table causes arsenic and iron concentration which affects human health and crops.Climate change issues are not well defined in the policy to secure environment. Effective coordination with MoA to reduce use of chemical fertilizers and pesticides polluting soil and water, to innovate climate resilient crop varieties; coordination with the Mol to protect river flow from industrial waste; coordination with the MoEF for

conservation of water environment and ecology are the major areas be considered. Much remains to do towards water resources management for next generation.

4.2 Recommendations :

Bangladesh has achieved a remarkable progress in water resources management but there are ample spaces to improve the quality of implementation. This evaluation study into the water policy gives valuable information in findings which may be considered as the tools for reviewing and effectively implementing the policy. On the basis of findings following recommendations are made for consideration by the concerned authority-

- 6.2.1 The National Water Policy was endorsed in 1999, since then the status of water systems, its availability, quality and water related socio economic conditions has been changed which needs the revision of the policy;
- 6.2.2 Environmental challenges has the new dimension, intrusion of salinity in the ground water as well as in the sub soil, reduces the crop yield and somewhere no yield, creates the need of incorporating issues of developing salinity resistant varieties, use of scientific water saving equipment for irrigation and crop diversification in the policy, along with the MoA;
- 6.2.3 Effective inter-ministerial coordination needs extension up to Upzilla level for smooth implementation. Collaboration between BADC, DAE, BWDB, LGED, DPHE, DoF and WARPO has to be increased because they are the major stakeholders which play vital role in the sector by using water (both surface and groundwater). At present the administrative departments are centrally organized, seldom respond to user needs and demands, emphasizing construction rather improving services, and have insufficient dialogue and coordination. There should be implementation and coordination committee even at the Upzilla level with concerned officials and stakeholders;
- 6.2.4 WARPO has to work as a center of excellence with the authority for awareness building and coordination. Under this circumstance, WARPO has to be strengthened by filling gaps of resources including manpower;

- 6.2.5 Special attention has to be given on physical infrastructure development in Bangladesh such as construction of the Padma Barrage, the Brahmaputra Barrage and the Meghna barrage;
- 6.2.6 BWDB and Department of Public Health Engineering along with Technical Universities of Bangladesh have to take collaborative research Plan for long-term research and management of groundwater. Proper research and study is needed to investigate climate change impact water and irrigation in Bangladesh;
- 6.2.7 Regulatory framework has to be established for implementing the National Water Policy. Cross cutting issue should be avoided;
- 6.2.8 Silted up water bodies to be re excavated or dredged accordingly to make them reservoir for winter irrigation. It will help to enhance surface irrigation keeping the ground water reserve for future use;
- 6.2.9 Resources mobilization should be quicker in cases of emergency, like river erosion and flood control.
- 6.2.10 Efficiency in groundwater use can be improved through the adoption of strategy for resource conservation, crop management practices - alternate wetting and drying (AWD), direct seeded rice, and bed planting. These will help in reducing groundwater demand for agriculture. Declining trend of ground water availability both in terms of quality and quantity suggest maximum use of surface water for winter irrigation;
- 6.2.11 Comprehensive development and application of Geographic Information System (GIS) is necessary for controlling or reducing the flood effect. River training and dredging works should be taken.
- 6.2.12 Fees and Tolls for irrigation water both in public and private sectors need regulation;
- 6.2.12 Further in depth study about the management of water resources used in agriculture is required to find out the best possible ways to manage and utilize scarce water resources in Bangladesh and all that need to be incorporated in the water policy.

6.3 Lessons learned :

A good policy may contribute services to people as well as to the nationaleconomy, if it is prepared in a view to that. The NWP, 1999 was formulated on that view and has been successfully implementing since 1999. It was a long way that the policy contributing to the nation by exploring all the areas of water except but a few, like climate change effect and institutional arrangements. In Bangladesh perspective, government organizations need, a push by strong directives within the legal frame, to work sincerely. So, if detailed directives can be included in the policy that might work on people in the systems. The important lesson is that a good policy may not work to achieve its goals without devoted initiatives.

References

- Alam, M. and Quevauviller, P. (2014). An Evaluation of Integrated Water Resources Management (IWRM) activities in Bangladesh. *Asia Pacific Journal of Energy and Environment*, Volume 1, No 1, pp 28-36
- Rahman, S. and Islam, (2014). 'Country Baseline Assessment WATER SECTOR INTEGRITY IN BANGLADESH'. Dhaka Bangladesh Water Integrity Network (BAWIN), Transparency International Bangladesh (TIB), pp12 - 13
- Khalequzzaman, M. and Islam, Z. (2013). Review of the Water Act 2013, bdnew24.com, (online], p1
- MoWR, (2013). Bangladesh Water Act, Ministry of Water Resources, Government of the People's Republic of Bangladesh.
- ADB, (2011). SECTOR ASSESSMENT (SUMMARY) *Country Partnership Strategy: Bangladesh, 2011-2015*. Manila: Asian Development Bank, p1
- Chadwick, M. and Datta, A. (2006). *Water Resource Management in Bangladesh A Policy Review Livelihood-Policy Relationships in South Asia*, Working Paper 1. London: DFID, pp2-10
- World Bank, (2005). *Bangladesh Country Water Resources Assistance Strategy* Bangladesh Development Series - paper no. 3, Dhaka. The World Bank, p9
- WARPO, (2001). *National Water Management Plan, Vol.1: Summery Report, Vol.2: Main Report*, Water Resources Planning Organization, Ministry of Water Resources, Government of the People's Republic of Bangladesh.
- MoWR, (1999). National Water Policy, Ministry of Water Resources, Government of the People's Republic of Bangladesh.

Bangladesh Public Administration Training Centre
Savar, Dhaka-1343
78th Senior Staff Course

Questionnaire to review
'National Water Policy, 1999 and Agriculture'

For officers under the Ministry of Water Resources, Ministry of Agriculture, WARPO
and concerned other Offices

Please Tick the appropriate one or/and describe where applicable

1. For how long you are working here ? Year. Month
2. Do you know detail about National Water Policy, 1999 ? Yes No
3. Is there any initiative from the Government to implement the Water Policy ? Yes No
- 3.1 If yes, what are those ? Is there any implementation committee at national and /or at field level ?
- 3.1.1
- 3.1.2
- 3.1.3
4. Are the effects of climate change considered in National Water policy ? Yes No
- 4.1 If No, what are the issues or areas of climate change, you think should have been covered in the Policy ?
- 4.1.1
- 4.1.2
- 4.1.3

5. Do you think the water policy formulated and accepted in 1999, Yes No
should be updated with current perspective ?

5.1 If yes, what are the issues you think to include or review-

5.1.1

5.1.2

5.1.3

5.2 If No, Why ?

5.2.1

5.2.2

6. Do you have any plan specially in your office to implement the Yes No
Water policy effectively ?

6.1 If Yes, please mention some the implementation plans

6.1.1

6.1.2

6.1.3

7. What are your suggestions to improve the water resource
management at the national level in Bangladesh-

7.1

7.2

7.3

Name of the Officer., Designation.

Office.

Signature with office seal

Many thanks for your contribution

Bangladesh Public Administration Training Centre
Savar, Dhaka-1343
78th Senior Staff Course

Questionnaire to review
'National Water Policy, 1999 and Agriculture'

For officers under the Department of Agriculture Extension, BADC, WARPO
and concerned other Offices

Please Tick the appropriate one or/and describe where applicable

1. For how long you are working in this office ? Year. Month
2. Do you have any idea about National Water Policy, 1999 ? Yes No
- 2.1 If Yes, what are the articles/paragraphs/issues are effective for conservation of water and it's use as irrigation in Agriculture?
2.1.1 Articles/paragraphs ; Please mention reason
2.1.2
2.1.3
3. Do you have any plan or project specially in your office to implement the Water policy effectively ? Yes No
- 3.1 If Yes, please mention some the plans or projects with period
3.1.1
3.1.2
- 3.2 If Yes, please mention objectives of the plans or projects with their percent of achievement
3.2.1
3.2.2
4. Do you think that the water policy has been implementing effectively and efficiently ? Yes No
- 4.1 If No, what are the reasons -
4.1.1
4.1.2

5. Water conservation and optimum use is important for agricultural development. But how is your office and the National Water Policy, 1999 is contributing to the fact ?
5.1
5.2
6. How is your office helping people in draining out stagnant and flood water in a pace from agricultural land-
6.1
6.2
7. Do you have any program in your Department to ensure water supply to irrigate farming lands in dry season ? Yes No
7.1 If Yes, please mention
8. What are the major problems in water management and conservation in this District ?
8.1
8.2
9. What are the initiatives or steps to be taken for better water management and conservation in this District ?
9.1
9.2
10. Are the farmers aware and sincere in using irrigation water ? Yes No
11. What are the areas of National Water policy, 1999 you think to be updated ?
11.1
11.2
12. What are your suggestions for efficient and effective water management at national and District level-
12.1
12.2

Name of the Officer....., Designation.....

Office.....

Signature with office seal

Many thanks for your contribution

বাংলাদেশ লোকপ্রশাসন প্রশিক্ষণ কেন্দ্র, সাভার; ঢাকা
৭৮তম সিনিয়র স্টাফ কোর্স, গ্রুপ-তিস্তা

“জাতীয় পানি নীতি, ১৯৯৯ ও কৃষিতে পানির ব্যবহার”
শীর্ষক পর্যালোচনার জন্য প্রশ্নমালা

সেবা গ্রহীতার জন্য
(প্রযোজ্য ক্ষেত্রে টিক চিহ্ন ও বর্ণনা করুন)

১. বাংলাদেশে জাতীয় পানি নীতি নামে একটি নীতি রয়েছে, আপনি শুনেছেন কি ? হ্যাঁ না
২. সেচ কাজে পানি ব্যবহারের প্রয়োজন হলে আপনি কি সরকারের কোন দপ্তরের সহযোগিতা পান ? হ্যাঁ না
৩. কৃষি সেচে পানির সমস্যা হলে আপনি কিভাবে তা সমাধান করেন ?
৩.১
৩.২
৩.৩
৪. শুষ্ক মৌসুমে কৃষি কাজে পানি সরবরাহের জন্য পানি উন্নয়ন বোর্ড/বিএডিসি/কৃষি বিভাগ থেকে কোন কর্মসূচি নেওয়া হয় কি ? উত্তর হ্যাঁ হলে তা কি ? হ্যাঁ না
৪.১
৪.২ না
৪.৩
৫. কৃষি জমিতে জলাবদ্ধতা বা বন্যার পানি নিষ্কাশনে বিএডিসি বা সরকারের অন্য কোন প্রতিষ্ঠান আপনাদেরকে কিভাবে সহায়তা করেছে ?
৫.১
৫.২
৫.৩
৬. কৃষি উন্নয়নে পানি সংরক্ষণ ও এর সুযম ব্যবহার গুরুত্বপূর্ণ বলে মনে করেন কি ? হ্যাঁ না
৭. আপনি জানেন কি, কৃষিতে সার ও কীটনাশক ব্যবহারের ফলে মাটির নীচের পানি দূষিত হয়ে পরবর্তীতে সেই পানি আপনার ফসলের ক্ষতি করতে পারে ? হ্যাঁ না

৮. ক্ষরা সহ্য করতে পারে বা কম সেচে ফলন হয় এমন কোন ফসলের জাত সম্পর্কে আপনার কোন ধারণা আছে কি ? হ্যাঁ না
- ৮.১ এ ধরনের জাত পেলে আপনি কি চাষাবাদে আগ্রহী ? হ্যাঁ না
৯. আপনি কি মনে করেন পানি একটি অন্যতম সম্পদ, এর যথাযথ ও পরিমিত ব্যবহার জরুরি ? হ্যাঁ না
১০. পানি সম্পদ ব্যবস্থাপনার মাধ্যমে দারিদ্র দূরিকরণ সম্ভব বলে মনে করেন কি ? হ্যাঁ না
সম্ভব হলে তা কিভাবে ?
১১. পানি সম্পদ ব্যবস্থাপনার প্রধান সমস্যাগুলো কি বলে মনে করেন
- ১১.১
- ১১.২
- ১১.৩ হ্যাঁ না
১২. সমস্যাগুলোর সমাধান বা আরও দক্ষতার সাথে পানি ব্যবস্থাপনার জন্য কি কি পদক্ষেপ গ্রহণ করা প্রয়োজন বলে আপনি মনে করেন
- ১২.১ হ্যাঁ না
- ১২.২
- ১২.৩
১৩. পানি সম্পদ ব্যবস্থাপনায় আপনার যদি আরও কোন পরামর্শ থাকে ?
- ১৩.১
- ১৩.২
- ১৩.৩

নাম....., পিতার নাম....., গ্রাম.....

উপজেলা.....; জেলা.....

স্বাক্ষর

FR Buiy
Ril : 122
Room: 410
Annexure : 4



National Water Policy

Ministry of Water Resources
Government of the People's Republic of Bangladesh



PRIME MINISTER
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF
BANGLADESH

FOREWARD

The declaration of the *National Water policy* is a bold step towards good governance in Bangladesh. In the absence of such a policy, much damage has already been done to the bio-diversity and environment of the country. Many adverse and counter-productive situations have been created due to lack of coordination in development programmes and use of water resources. For a water-dependent country like Bangladesh, this situation is highly detrimental to its overall development and this needs to be remedied urgently.

The National Water Policy seeks remedy to this chaotic situation by bringing order and discipline in the exploration, management and use of water resources in Bangladesh. It clearly and unequivocally declares the intention of the government that "all necessary means and measures will be taken to manage the water resources of the country in a comprehensive, integrated and equitable manner." It sets out the objectives of such a policy and provides the broad guidelines for achieving those objectives. The policy has successfully integrated internationally accepted water management principles, norms and standards, with the demanding social and economic needs of a developing country. The true strength of this policy, however, emanates from its decentralized and democratic nature that gives every user the opportunity to vote for the use and sharing of water in an efficient, equitable and environmentally sustainable manner.

The publication of this *Policy* is only the beginning of a long-process of water resources management in the country. Attaining the objectives of the policy would depend largely on quick follow-up action and concerted effort by all concerned agencies and the people in general. I call upon all concerned to implement this *Policy* in right earnest. I hope the National Water Council will oversee its implementation with diligence and determination.

Sheikh Hasina



ABDUR RAZZAQ

Minister
Ministry of Water Resources
Government of the People's Republic of Bangladesh
Dhaka

PREFACE

Life in riverine Bangladesh is based on water. Availability of water, in both quantitative and qualitative terms, is a basic human right and sound planning is necessary to ensure it. It is an unfortunate fact that we did not have any water policy in the past. All our activities used to be conducted on the basis of our experience and expediency. Now, we have finally come to realise that water is not an infinite bounty of nature. Rather it is a finite resource and it is imperative that we have sound policies and plans for its exploration, development and use to meet the requirements of all users. It was from this realisation that in a meeting of the National Water Council held under the chairmanship of the Hon'ble Prime Minister on March 18, 1997 she gave the directive to formulate the National Water Policy on a priority basis.

The Policy has been prepared by our officials and local experts without any assistance from foreign experts. All efforts have been made in the Policy to protect all interests by ensuring a neutral perspective. It also contains the objectives of the Policy and the actions to be taken to achieve those objectives. This Policy attaches special importance to the conjunctive use of ground and surface water. Policy indications regarding such issues as overall basinwide planning, water rights and allocation, public and private involvement, public investment, water supply and sanitation, fisheries, navigation, agriculture, industry and environment are also incorporated in the Policy. We are happy and proud to be able to publish this Policy for the first time during the tenure of the present government.

We have already taken up the formulation of the National Water Management Plan (NWMP). The NWMP will provide necessary advice on follow-up actions to be taken for implementing the policies enunciated in the National Water Policy. It is our expectation that all concerned government and non-government organisations and the people at large will all out efforts for the implementation of the Policy for exploration, development, use and management of water resources of the country.

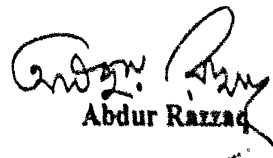

Abdur Razzaq

Table of Contents

1.	Introduction	1
2.	Declaration of National Water Policy	2
3	Objectives of National Water Policy	3
4.	National Water Policy	4
	4.1. River Basin Management	4
	4.2. Planning and Management of Water Resources	5
	4.3. Water Rights and Allocation	7
	4.4. Public and Private Involvement	8
	4.5. Public Water Investment	9
	4.6. Water Supply and Sanitation — <i>Shafiqul</i>	10
	4.7 Water and Agriculture <i>FRBny</i>	11
	4.8. Water and Industry	12
	4.9. Water and Fisheries and Wildlife — <i>Asad</i>	12
	4.10. Water and Navigation — <i>Ans Ahmed Ali</i>	13
	4.11 Water for Hydropower and Recreation	13
	4.12 Water for the Environment	13
	4.13 Water for Preservation of Haors, Baors, and Beels	15
	4.14 Economic and Financial Management	16
	4.15. Research and Information Management	17
	4.16. Stakeholder Participation	17
5.	Institutional Policy	19
6.	Legislative Framework	21

1. Introduction

Water is central to the way of life in Bangladesh and the single-most important resource for the well-being of its people. It sustains an extremely fragile natural environment and provides livelihood for millions of people. Unfortunately, it is not infinite and cannot be treated as a perpetual free gift of nature to be used in any manner chosen. The unitary nature of water makes its use in one form affect the use in another. Its availability for sustenance of life, in both quantitative and qualitative terms, is a basic human right and mandates its appropriate use without jeopardising the interest of any member of the society.

Availability of water, including rainwater, surface water, and groundwater, in usable forms calls for its sustainable development, a responsibility that has to be shared collectively and individually by members of the society. Private users of water are the principal agents for its development and management and private investments need to be actively promoted in the water sector, ensuring equal opportunity to all. However, development of water resources often requires large and lumpy capital investment and generates economies of scale, which justifies public sector involvement. Government's role also becomes important because of the necessity of protecting the needs of the society at large and addressing important environmental as well as social issues such as poverty alleviation and human resources development.

Water resources management in Bangladesh faces immense challenge for resolving many diverse problems and issues. The most critical of these are alternating flood and water scarcity during the wet and the dry seasons, ever-expanding water needs of a growing economy and population, and massive river sedimentation and bank erosion. There is a growing need for providing total water quality management (checking salinity, deterioration of surface water and groundwater quality, and water pollution), and maintenance of the eco-system. There is also an urgency to satisfy multi-sector water needs with limited resources, promote efficient and socially responsible water use, delineate public and private responsibilities, and decentralise state activities where appropriate. All of these have to be accomplished under severe constraints, such as the lack of control over rivers originating outside the country's borders, the difficulty of managing the deltaic plain, and the virtual absence of unsettled land for building water structures.

The water policy provided hereunder, lays down the broad principles of development of water resources and their rational utilisation under these constraints. It will help guide both public and private actions in the future for ensuring optimal development and management of water that benefits both individuals and the society at large.

2. Declaration of National Water Policy

As water is essential for human survival, socio-economic development of the country and preservation of its natural environment, it is the policy of the Government of Bangladesh that all necessary means and measures will be taken to manage the water resources of the country in a comprehensive, integrated and equitable manner. The policies enunciated herein are designed to ensure continued progress towards fulfilling the national goals of economic development, poverty alleviation, food security, public health and safety, decent standard of living for the people and protection of the natural environment.

The National Water Policy will be reviewed periodically and revised as necessary. It will guide management of the country's water resources by all the concerned ministries, agencies, departments, and local bodies that are assigned responsibilities for the development, maintenance, and delivery of water and water related services as well as the private users and developers of water resources.

3. Objectives of National Water Policy

The water policy of the government aims to provide direction to all agencies working with the water sector, and institutions that relate to the water sector in one form or another, for achievement of specified objectives. These objectives are broadly:

- a. To address issues related to the harnessing and development of all forms of surface water and ground water and management of these resources in an efficient and equitable manner
- b. To ensure the availability of water to all elements of the society including the poor and the underprivileged, and to take into account the particular needs of women and children
- c. To accelerate the development of sustainable public and private water delivery systems with appropriate legal and financial measures and incentives, including delineation of water rights and water pricing
- d. To bring institutional changes that will help decentralise the management of water resources and enhance the role of women in water management
- e. To develop a legal and regulatory environment that will help the process of decentralisation, sound environmental management, and improve the investment climate for the private sector in water development and management
- f. To develop a state of knowledge and capability that will enable the country to design future water resources management plans by itself with economic efficiency, gender equity, social justice and environmental awareness to facilitate achievement of the water management objectives through broad public participation

4. National Water Policy

The policies set forth herein are considered essential for addressing the objectives of improved water resources management and protection of the environment. Every public agency, every community, village and each individual has an important role to play in ensuring that the water and associated natural resources of Bangladesh are used judiciously so that the future generations can be assured of at least the same, if not better, availability and quality of those resources.

4.1 River Basin Management

Basin planning provides the most rational basis of development of water resources under the influence of one or more major rivers. International river basins, however, such as the Ganges basin, the Brahmaputra basin, and the Meghna basin present special problems. Due to its location as the lower-most riparian, Bangladesh has no control over the rivers entering through its borders. The adverse effects of this are the floods and water scarcity, which occur frequently. Although the 1996 Treaty on Sharing of the Ganges Waters with India has brought some relief to the drought-prone area of the southwest, the water shortage problem during the dry season is likely to aggravate in the Ganges and other basins with rising demands of the increasing population. It is, however, encouraging to note that the relevant provision of the treaty will provide the basis in the future for discussion on sharing of waters of the common rivers.

It may take considerable effort and time for Bangladesh to work out joint plans for different river basins with other co-riparian countries. As a long-term measure, therefore, it is the policy of the government to undertake essential steps for realising basin-wide planning for development of the resources of the rivers entering its borders.

The Government will endeavour to enter into agreements with co-riparian countries for sharing the waters of international rivers, data exchange, resource planning and long-term management of water resources under normal and emergency conditions of flood, drought and water pollution. While moving towards the attainment of basin-wide plans in the long run, it will also be necessary for Bangladesh to concentrate on the development of individual hydrological areas to meet short and intermediate term requirements.

The policy of the Government of Bangladesh, in the short and intermediate term, for fostering international cooperation in water management is, in italics letter, to:

- a. Work with co-riparian countries to establish a system for exchange of information and data on relevant aspects of hydrology, morphology, water pollution, ecology, changing watershed characteristics, cyclone, drought, flood warning, etc., and to help each other understand the current and emerging problems in the management of the shared water sources.
- b. Work with co-riparian countries for a joint assessment of all the international rivers flowing through their territories for better understanding of the overall basins' potentials.
- c. Work jointly with co-riparian countries to harness, develop, and share the water resources of the international rivers to mitigate floods and augment flows of water during the dry season.
- d. Make concerted efforts, in collaboration with co-riparian countries, for management of the catchment areas with the help of afforestation and erosion control for watershed preservation and reduction of land degradation.
- e. Work jointly with co-riparian countries for the prevention of chemical and biological pollution of the rivers flowing through these countries, by managing the discharge of industrial, agricultural and domestic pollutants generated by human action.
- f. Seek international and regional cooperation for education, training, and research in water management.

4.2 Planning and Management of Water Resources 21

The Government recognizes that the process of planning and managing water resources requires a comprehensive and integrated analysis of relevant hydrological, topographical, social, political, economic, environmental and institutional factors across all related water-using sectors.

The intricate nature of drainage systems within the country requires that activity for planning and management of the nation's river systems is undertaken within the context of hydrological regions. The principal river systems create natural boundaries for these regions. The hilly areas of the east form another hydrological region.

Henceforth, to address these issues the policy of the Government will be as follows:

- a. The Water Resources Planning Organisation (WARPO) will delineate the hydrological regions of the country, based on appropriate natural features, for planning the development of their water resources.
- b. WARPO will prepare, and periodically update, a National Water Management Plan (NWMP) addressing the overall resource management issues in each region and the whole of Bangladesh, and providing directions for the short, intermediate, and long runs. The plan will be executed by different agencies as determined by the Government from time to time.

- c. The NWMP and all other related plans will be prepared in comprehensive and integrated manner, with regard for the interests of all water-related sectors. The planning methodology will ensure co-operation across sectors and people's participation in the process.

Within the macro framework of the NWMP:

- d. Sector agencies of the Government and local bodies will prepare and implement sub-regional and local water-management plans in conformance with the NWMP and approved Government project appraisal guidelines. The Executive Committee of the National Water Resources Council (ECNWRC) will resolve any interagency conflict in this regard.
- e. The Bangladesh Water Development Board (BWDB) will implement all major surface water development projects and other FCDI projects with command area above 1000 hectares. The Local Government will implement FCDI projects having a command area of 1000 hectares or less after identification and appraisal through an interagency Project Appraisal Committee. Any interagency dispute will be resolved by means prescribed by the Government.
- f. The participation of all project affected persons, individually and collectively, will be ensured in the planning, design, implementation, and operation and maintenance (O&M) of publicly funded surface water resources development plans and projects. Local Governments (Parishads) will be the principal agencies for coordinating these efforts. Community level self-help groups (private) and Non-Government Organisations will also be relied on to assist in the participatory process.

The Government will further:

- g. Frame rules, procedures, and guidelines for combining water-use and land-use planning
- h. Frame, and periodically revise, the rules, procedures and guidelines on all aspects of water management
- i. Make social and environmental assessments mandatory in all plan development

Through its responsible agencies, the Government will:

- j. Undertake comprehensive development and management of the main rivers through a system of barrages and other structural and non-structural measures
- k. Develop water resources of the major rivers for multipurpose use, including irrigation, fisheries, navigation, forestry, and aquatic wildlife
- l. De-silt watercourses to maintain navigation channels and proper drainage
- m. Delineate water-stress areas based on land characteristics and water availability from all sources for managing dry season demand
- n. Take steps to protect the water quality and ensure efficiency of its use

- o. Develop early warning and flood-proofing systems to manage natural disasters like flood and drought
- p. Designate flood risk zones and take appropriate measures to provide desired levels of protection for life, property, vital infrastructure, agriculture and wetlands. In this regard the following principles will guide future action:
 - i. Regions of economic importance such as metropolitan areas, sea and air ports, and export processing zones will be fully protected against floods as a matter of first priority. Other critical areas such as district and upazila towns, important commercial centers, and places of historical importance will be gradually provided reasonable degree of protection against flood. In the remaining rural areas, with the exception of those already covered by existing flood control infrastructure, the people will be motivated to develop different flood proofing measures such as raising of platform for homesteads, market places, educational institutions, community centers, etc., and adjusting the cropping pattern to suit the flood regime.
 - ii. In future all national and regional highways, railway tracks, and public buildings and facilities will be constructed above the highest ever-recorded level of flood in the country. This principle will also apply in cases of reconstruction of existing structures of this nature.
 - iii. All plans for roads and railways embankment will adequately provide for unimpeded drainage.
- q. Undertake survey and investigation of the problem of riverbank erosion and develop and implement master plans for river training and erosion control works for preservation of scarce land and prevention of landlessness and pauperisation.
- r. Plan and implement schemes for reclamation of land from the sea and rivers.

4.3 Water Rights and Allocation X

The ownership of water does not vest in an individual but in the state. The Government reserves the right to allocate water to ensure equitable distribution, efficient development and use, and to address poverty. The Government can redirect its use during periods of droughts, floods, cyclones, and other natural and man-made disasters, such as contamination of groundwater aquifers that threaten public health and the ecological integrity. Allocation rules will be the formal mechanism for deciding who gets water, for what purpose(s), how much, at what time, for how long, and under what circumstances water use may be curtailed. Rules for water allocation will be developed for in-stream needs (ecological, water quality, salinity control, fisheries and navigation) during low-flow periods; for off-stream withdrawal (irrigation, municipal and industrial, power), and for groundwater recharge and abstraction. Allocation for non-consumptive use (e.g. navigation) would imply ensuring minimum levels in water bodies used for that purpose.

Henceforth, the policy of the Government to regulate the use of water, where required, will be exercised in the following manner:

- a. The Government will exercise its water allocation power in identified scarcity zones on the basis of specified priorities.
- b. In general, the priority for allocating water during critical periods in the water shortage zones will be in the following order: domestic and municipal uses, non-consumptive uses (e.g. navigation, fisheries and wild-life), sustenance of the river regime, and other consumptive and non-consumptive uses such as irrigation, industry, environment, salinity management, and recreation. The above order of priority could however be changed on specific socio-economic criteria of an area by local bodies through local consensus.
- c. For sustaining rechargeable shallow groundwater aquifers, the Government will regulate the extraction of water in the identified scarcity zones with full public knowledge.
- d. Specific drought monitoring and contingency plans will be prepared for each region experiencing recurrent seasonal shortages of water with due consideration to conjunctive use of rainwater, surface water and ground water and alternative ways of satisfying demand. The contingency plan will include action to limit the use of groundwater according to priorities. Appropriate provisions of law should be made to protect specific users' rights in these extreme cases.
- e. The Government may empower the local government or any local body it deems fit, to exercise its right to allocate water in scarcity zones during periods of severe drought, and it will monitor the water regime and enforcement of the regulations through specifically designed mechanisms.
- f. The Government may confer water rights on private and community bodies to provide secure, defensible and enforceable ownership/usufructuary rights to ground water and surface water for attracting private investment.
- g. In specifying surface water rights, the minimum requirement of stream-flow for maintaining the conveyance channel will be ensured.

4.4 Public and Private Involvement

Water resources management requires involvement of the public and private sectors, communities and individuals that benefit from the delivery of water-related services. The ultimate success and effectiveness of public water resources management projects depends on the people's acceptance and ownership of each project. It is important to delineate the roles and responsibilities of every one involved in water resources management. The principle that community resources should be managed by the community concerned, alongwith local government institutions unless a greater national interest prevails, should guide water resource

management. It is recognised that women have a particular stake in water management because they are the principal providers and carriers of water, main caretaker of the family's health, and participants in many stages of pre and post harvest activities. The policies of the Government regarding the respective roles of the public and private sectors are:

- a. Government's investments in water programme will be directed towards creation of public goods or for addressing specific problems of market failure and protecting particular community interests.
- b. Policies and programmes of any public agency involving water resources will be coordinated with the policies and programmes of all other public and private bodies to build synergy and avoid conflict.
- c. Public water institutions will, to the extent feasible, use private providers of specific water resources services in carrying out their mandates, giving preference to beneficiary groups and organisations.
- d. The management of public water schemes, barring municipal schemes, with command area up to 5000 ha will be gradually made over to local and community organisations and their O&M will be financed through local resources.
- e. Public water schemes, barring municipal schemes, with command area of over 5000 ha will be gradually placed under private management, through leasing, concession, or management contract under open competitive bidding procedures, or jointly managed by the project implementing agency alongwith local government and community organisations.
- f. Ownership of FCD and PCDI projects with command area of 1000 ha or less will gradually be transferred to the local governments, beginning with the ones that are being satisfactorily managed and operated by the beneficiary/ community organisations.
- g. Appropriate public and private institutions will provide information and training to the local community organisations for managing water resources efficiently.
- h. Enabling environment will be created for women to play a key role in local community organisations for management of water resources.
- i. Government, where appropriate, will restructure its present institutions and design all future institutions for efficient implementation of the above policies.

4.5 Public Water Investment

The Government considers that a consistent and uniformly applied analytical framework for project appraisal is essential to equitable, efficient and effective water resources management. A true multi-objective analysis of the water needs of an area, and the formulation of options for investment and management must consider the interrelations among different sources of water, different management schemes and the interaction between needs of different users and

purposes. Investments in infrastructure may displace people and disturb ecosystems and, as such, broader water resources planning assessments and specific project appraisals must consider these cross-sectoral implications.

The policy of the Government in this regard is to ensure that:

- a. Water resource projects, as far as possible, are developed as multipurpose projects with an integrated multi-disciplinary approach from planning to implementation to monitoring.
- b. Planning and feasibility studies of all projects will follow the Guidelines for Project Assessment (GPA), the Guidelines for People's Participation (GPP), the Guidelines for Environmental Impact Assessment (EIA), and all other instructions that may be issued from time to time by the Government.
- c. All relevant analytical procedures and evaluation methods, such as mathematical modelling, physical modelling, cost-benefit analysis, risk analysis and multi-criteria decision making are routinely used as part of water resources planning and project appraisal.
- d. Public water projects are designed with specific provision for future disinvestment, if and when feasible.
- e. Interests of low-income water users, and that of women, are adequately protected in water resource management.
- f. There is continuous updating and archiving of water resource data and basic information by relevant public sector agencies.

4.6 Water Supply and Sanitation

The rural areas of Bangladesh suffer from lack of quality drinking water. Surface water supplies are generally polluted and groundwater, which till now had been the best source of safe drinking water, is contaminated with arsenic in many parts of the country. Heavy withdrawals of groundwater for irrigation have also lowered the water table in many areas below the effective reach of hand tubewells. Seepage of agro chemicals into shallow aquifers may also pollute water for human and animal consumption. Salinity intrusions from seawater deep into the land in the southwest are rendering groundwater unfit for consumption. Cities and urban areas too are facing the problem of receding water table due to heavy groundwater extraction. These water supply and sanitation problems have obvious implications for public health. Diarrheal diseases, arising largely from drinking unsafe water, are a leading cause of death in the rural areas. Lack of proper sanitation and drainage facilities, inadequate water supply, and insufficient health and hygiene education are the primary causes of diseases in the urban areas. Lack of access to safe water supply in the rural areas is a special hardship for women who have to carry water over long distances, with significant impact on their health and productivity.

To address these problems, it is the policy of the Government to:

- a. Facilitate availability of safe and affordable drinking water supplies through various means, including rainwater harvesting and conservation.
- b. Preserve natural depressions and water bodies in major urban areas for recharge of underground aquifers and rainwater management.
- c. Mandate relevant public water and sewerage institutions to provide necessary drainage and sanitation, including treatment of domestic wastewater and sewage and replacement of open drains and construction of sewers, in the interest of public health.
- d. Empower, and hold responsible, municipalities and urban water and sewerage institutions to regulate the use of water for preventing wastage and pollution by human action.
- e. Mandate local governments to create awareness among the people in checking water pollution and wastage.

4.7 Water and Agriculture ↘

Support of private development of groundwater irrigation for promoting agricultural growth will continue, alongside surface water development where feasible. But there will be a renewed focus towards increasing efficiency of water use in irrigation through various measures including drainage-water recycling, rotational irrigation, adoption of water conserving crop technology where feasible, and conjunctive use of groundwater and surface water.

Water allocations in irrigation systems have to be done with equity and social justice. At the same time, serious consideration should be given to non-point pollution of water systems by fertilizer and pesticides that are either leached to the groundwater or washed off the fields to rivers and lakes. For this purpose, the policy of the Government is to:

- a. Encourage and promote continued development of minor irrigation, where feasible, without affecting drinking water supplies *+ without affecting ground water.*
- b. Encourage future groundwater development for irrigation by both the public and the private sectors, subject to regulations that may be prescribed by Government from time to time.
- c. Improve efficiency of resource utilisation through conjunctive use of all forms of surface water and groundwater for irrigation and urban water supply.
- d. Strengthen crop diversification programmes for efficient water utilisation. *MoA, DAE, DD, Agri*
- e. Strengthen the regulatory system for agricultural chemicals that pollute ground and surface water, and develop control mechanism for reducing non-point pollution from agro-chemicals.
- f. Strengthen appropriate monitoring organisations for tracking groundwater recharge, surface and groundwater use, and changes in surface and groundwater quality.

4.8 Water and Industry

Excessive water salinity in the southwest region is a major deterrent to industrial growth. Also, pollution of both surface and groundwater around various industrial centers of the country by untreated effluent discharge into water bodies is a critical water management issue. The policy of the Government in this regard is that:

- a. Zoning regulations will be established for location of new industries in consideration of fresh and safe water availability and effluent discharge possibilities.
- b. Effluent disposal will be monitored by relevant Government agencies to prevent water pollution.
- c. Standards of effluent disposal into common watercourses will be set by WARPO in consultation with DOE.
- d. Industrial polluters will be required under law to pay for the cleanup of water-body polluted by them.

4.9 Water and Fisheries and Wildlife

Fisheries and wildlife are integral aspects of economic development in Bangladesh and strongly linked to advancement of target groups, poverty alleviation, nutrition, and employment generation. Availability of water for fisheries is thus important from the point of view of sustenance as well as commercial ventures. It is, therefore, the policy of the Government that:

- a. Fisheries and wildlife will receive due emphasis in water resource planning in areas where their social impact is high.
- b. Measures will be taken to minimise disruption to the natural aquatic environment in streams and water channels.
- c. Drainage schemes, to the extent possible, will avoid state-owned swamps and marshes that have primary value for waterfowl or other wildlife.
- d. Water bodies like baors, haors, beels, roadside borrow pits, etc. will, as far as possible, be reserved for fish production and development. Perennial links of these water bodies with the rivers will also be properly maintained.
- e. Water development plans will not interrupt fish movement and will make adequate provisions in control structures for allowing fish migration and breeding.
- f. Brackish aquaculture will be confined to specific zones designated by the Government for this purpose.

4.10 Water and Navigation 7

Inland navigation is of substantial economic importance to Bangladesh because its numerous watercourses provide the cheapest means of transportation. Siltation, however, has disrupted river communications in many water channels. De-siltation of these channels is required not only to restore their navigational capability but also to assist surface drainage. The policies of the Government in this regard are:

- a. Water development projects should cause minimal disruption to navigation and, where necessary, adequate mitigation measures should be taken.
- b. Minimum stream-flows in designated rivers and streams will be maintained for navigation after diversion of water for drinking and municipal purposes.
- c. Dredging and other suitable measures would be undertaken, wherever needed, to maintain navigational capability of designated waterways.

4.11 Water for Hydropower and Recreation 7

Bangladesh has limited potential for hydropower due to its flat terrain and the absence of suitable reservoir area. However, it may be possible to build mini hydropower plants at small dam and barrage sites. A major environmental concern of hydropower development is the impediment to a river's natural flow imposed by structures built on it. A hydropower facility may be restrictive for fish movement also.

Use of water for recreational purposes is useful for developing tourism facilities. Introducing these facilities at the sites of reservoirs, lakes, dighis (big ponds), sea resorts, etc. would help the tourism industry of the country. The policy of the Government is therefore that:

- a. Mini-hydropower development schemes may be undertaken provided they are economically viable and environmentally safe.
- b. Recreational activities at or around water bodies will be allowed provided it is not damaging to the environment.

4.12 Water for the Environment 0

Protection and preservation of the natural environment is essential for sustainable development. Given that most of the country's environmental resources are linked to water resources, it is vital that the continued development and management of the nation's water resources should include the protection, restoration, and preservation of the environment and its bio-diversity including wetlands, mangrove and other national forests, endangered species, and the water quality. Accordingly, water resource management actions will take care to avoid or minimise environmental damages.

Water quantity and water quality issues are uniquely linked. Poor water quality affects the availability of fresh water for different uses. Contamination of surface water bodies and groundwater aquifers by agricultural pollutants, industrial discharge, domestic pollution, and non-point source urban runoff exacerbate water quality problems and endanger both natural ecosystem integrity and public health. Other environmental problems include: excessive soil erosion and sedimentation, waterlogging and salinisation of agricultural land, groundwater depletion, watershed degradation and deforestation, reduction of biodiversity, wetland loss, saltwater intrusion, and coastal zone habitat loss.

Henceforth, all agencies and departments entrusted with water resource management responsibilities (regulation, planning, construction, operation, and maintenance) will have to enhance environmental amenities and ensure that environmental resources are protected and restored in executing their tasks. Environmental needs and objectives will be treated equally with the resources management needs. It is, therefore, the policy of the government that all water management agencies and related natural resources departments will:

- a. Give full consideration to environmental protection, restoration and enhancement measures consistent with the National Environmental Management Action Plan (NEMAP) and the National Water Management Plan (NWMP).
- b. Adhere to a formal environmental impact assessment (EIA) process, as set out in EIA guidelines and manuals for water sector projects, in each water resources development project or rehabilitation programme of size and scope specified by the Government from time to time.
- c. Ensure adequate upland flow in water channels to preserve the coastal estuary eco-system threatened by intrusion of salinity from the sea.
- d. Protect against degradation and resuscitate natural water-bodies such as lakes, ponds, beels, khals, tanks, etc. affected by man-made interventions or other causes.
- e. Completely stop the filling of publicly-owned water bodies and depressions in urban areas for preservation of the natural aquifers and environment.
- f. Take necessary steps to remove all existing unauthorised encroachments on rivers and watercourses and to check further encroachments that cause obstructions to water flows and create environmental hazards.
- g. Stop unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.
- h. Encourage massive afforestation and tree coverage specifically in areas with declining water table.
- i. Enforce the "polluter pay" principle in the development of regulatory guidelines for all regulatory actions designed to protect public health and the environment.

- j. Provide education and information to the industrial and farming communities on self-administered pollution control mechanisms and their individual and collective responsibilities for maintaining clean water sources.

4.13 Water for Preservation of Haors, Baors, and Beels

Water bodies like haors, baors, and beels are precious assets of Bangladesh with unique regional characteristics. Apart from their scenic beauty, they have great economical and environmental value. Even during extremely dry seasons, when the smaller beels turn into quagmires, the haors and the baors retain considerable amount of water. These water bodies account for a large share of the natural capture fisheries and provide a habitat for a wide variety of aquatic vegetation and birds. They also provide sanctuary to migratory birds during winter. The haors and the beels usually connect to some adjoining river through khals.

In the past, many beels have been drained through engineering interventions and turned into cropland for immediate gains. The adverse effects of such interventions have been deleterious to the environment. They have destroyed the fish and aquatic vegetables that thrive in these wetlands and are important in the diet of the rural poor. They have also blocked the flow of wastes, discharged from the flood plains and domestic sources, which naturally move out of the beels through the khals into the river's drainage system. Only submersible dikes have provided tangible benefits in certain haor areas by enabling cultivation of high yielding variety boro rice.

The Government believes that in order to assist the natural processes of groundwater recharge, maintenance of aquatic life and ecological balance, disposal of wastes through the dynamic river system, and for turning the huge water bodies into recreational areas, their planned development is essential.

It is, therefore, the policy of the Government that:

- a. Natural water bodies such as beels, haors, and baors will be preserved for maintaining the aquatic environment and facilitating drainage.
- b. Only those water related projects will be taken up for execution that will not interfere with the aquatic characteristics of those water bodies.
- c. Haors that naturally dry up during the winter will be developed for dry season agriculture.
- d. Take up integrated projects in those water bodies for increasing fish production.
- e. Natural water bodies will be developed, where possible, for recreational use in support of tourism.

4.14 Economic and Financial Management 3

Changes are required in the system of prices and other economic incentives affecting water demand and supply in Bangladesh. Unless the users pay a price for water, there will be a tendency to misuse and deplete it under scarcity conditions. Desirable practices such as conjunctive use, water-saving agricultural and industrial technologies, water harvesting, water transfers, and water recycling, both within and between sectors, will emerge only when users perceive the scarcity value of water.

A system of cost recovery, pricing, and economic incentives/disincentives is necessary to balance the supply and demand of water. Cost recovery of services such as flood control, drainage, irrigation, and wastewater treatment has not been considered adequately. Failure to recover O&M cost leads to decline of service quality and deterioration of the system. This, in turn, makes the consumers less willing to pay for the deteriorating services. An important principle, for the long-term, in this regard is that public service agencies should be converted into financially autonomous entities, with effective authority to charge and collect fees. The participation of users in managing and maintaining water facilities and operations is an important element of financial accountability. It is, therefore, the policy of the Government that:

- a. Water will be considered an economic resource and priced to convey its scarcity value to all users and provide motivation for its conservation. For the foreseeable future, however, cost recovery for flood control and drainage (FCD) projects is not envisaged in this policy. In case of flood control, drainage, and irrigation (FCDI) projects water rates will be charged for O&M as per Government rules.
- b. Relevant public water supply agencies will be gradually given authority to charge for their services.
- c. Recovery of O&M cost will, as far as possible, be made through private collection means such as leasing and other financial options. Beneficiaries and other target groups will be given preference for such contracts.
- d. The pricing structure will match the goals and needs of the water provider and the population served. Water rates will be lower for basic consumption, increasing with commercial and industrial use. The rates for surface and groundwater will reflect, to the extent possible, their actual cost of delivery.
- e. Water charges realised from beneficiaries for O&M in a project would be retained locally for the provision of services within that project.
- f. Effective beneficiary participation and commitment to pay for O&M will be realised at the project identification and planning stages by respective public agencies.
- g. Appropriate financial incentives will be introduced for water re-use and conservation, responsible use of groundwater, and for preventing overexploitation and pollution.

4.15 Research and Information Management X

Informing policy makers of the choice of appropriate technology to meet policy goals and make them aware of their significance and impact is an essential requirement of a dynamic water management policy. It is important to reach a common understanding between specialists, planners, politicians and the general public about the changing environment and the optimal ways and means of achieving the national water management goals. As management decisions become increasingly complex and information-sensitive, the demand for supporting research and information management increases.

It is the policy of the Government in this regard to:

- a. Develop a central database and management information system (MIS) consolidating information from various data collection and research agencies on the existing hydrological systems, supply and use of national water resources, water quality, and the eco-system.
- b. Restructure and strengthen, where appropriate, water resource and agriculture research institutions to undertake systematic research and analysis of water and land management issues and problems arising both nationally and internationally.
- c. Investigate thoroughly important flood control and management issues, such as the efficacy of coastal polders, for guiding future policy on structural interventions.
- d. Investigate important sociological issues, such as the phenomenon of interference with water structures (e.g. public cuts), and the motives and conflicting interests behind them, to assist the process of building public support and acceptance of government water management programmes.
- e. Strengthen and promote the involvement of public and private research organizations and universities to:
 - i. Develop and disseminate appropriate technologies for conjunctive use of rainwater, ground water and surface water.
 - ii. Develop and promote water management techniques to prevent wastage and generate efficiency of water and energy use.
 - iii. Produce skilled professionals for water management.

4.16 Stakeholder Participation

Decisions regarding water resources management can affect nearly every sector of the economy and the public as a whole, and stakeholder participation should be established in a form that elicits direct input from people at all levels of engagement. Stakeholder involvement should be an integral part of water resources management, at all stages of the project cycle. Towards that objective there should be a complete reorientation of the institutions for increasing the role of stakeholders and the civil society in decision making and implementation of water projects. The Government has to be at the core of the effort to help build the local institutions and to impart a precise awareness of the issues and an unambiguous understanding of their role in water management. Similarly, Government must lead the effort to ensure greater participation of women in this endeavour.

In order to ensure that all stakeholders actively and fruitfully participate in water resources management decision making at all stages, it is the policy of the Government that:

- a. The "Guidelines for People's Participation (GPP) in Water Development Projects" be adhered to as part of project planning by all institutions and agencies involved in public sector management of water resources.
- b. Guidelines for formation of water user groups (WUG) and similar community organisations will be formulated.
- c. Generally 25 percent of the earthwork of any public water project will be offered to specific target groups or beneficiaries.
- d. All opportunities are explored and efforts undertaken to ensure that the landless and other disadvantaged group are directly involved in participatory management of local water resources.
- e. New projects proposed by a community or local institution will be considered for implementation on a priority basis only when the beneficiaries have mobilised a certain percentage of the total cost as their contribution to the project.

5. Institutional Policy

The governance and management of the national water resources require a great deal of coordination of existing institutions and in some cases reform and creation of new community-based institutions. Water resources management extends across many water using sectors as well as political jurisdictions and geographically and hydrologically diverse areas. Properly functioning institutions are essential for effective implementation and administration of the country's water and related environmental resource management policies and directives.

The Government will restructure and strengthen, where appropriate, the existing institutions to ensure that the agenda for reform and the action plan is implemented efficiently. Two important principles will govern institutional restructuring. Firstly, there should be separation of policy, planning, and regulatory functions from implementation and operational functions at each level of government. Secondly, each institution must be held accountable for financial and operational performance.

It is the policy of the Government that:

- a. The Government will formulate a framework for institutional reforms to guide all water sector related activities. It will periodically review the mandates of all water sector institutions and redefine their respective roles, as necessary, to ensure efficient and effective institutions commensurate with changing needs and priorities.
- b. The National Water Resources Council (NWRC) will coordinate all water resources management activities in the country, and particularly:
 - i. Formulate policy on different aspects of water resource management.
 - ii. Provide directions for optimal development and utilisation of the national water resources.
 - iii. Oversee the preparation and implementation of the National Water Management Plan.
 - iv. Provide directions on the development of efficient institutions for managing the water resources.
 - v. Provide policy directives for appropriate coordination among different water sector agencies.

- vi. Look after any other water resource management matter that may require its attention.
- c. The Executive Committee of the National Water Resources Council (ECNWRC) will have the following responsibilities:
 - i. It will provide directives on all matters relating to the planning, management, and coordination of water resources across all sectors, as may be required by the NWRC.
 - ii. It will guide water management institutions at the national, regional, and local levels in the formulation and implementation of policies and plans for improved water management and investment.
 - iii. It will apprise and advise the National Water Resources Council periodically on matters of water resource management.
 - iv. It will undertake any other function, as may be required from time to time, by the NWRC.
- d. WARPO will be the exclusive government institution for macro-level water resource planning. It will also serve as the Executive Secretariat of the ECNWRC with the following principal responsibilities:
 - i. Providing administrative, technical, and legal support to the ECNWRC.
 - ii. Advising the ECNWRC on policy, planning, and regulatory matters of water resources and related land and environmental management.
 - iii. Preparing and periodically updating the National Water Management Plan for approval of the NWRC.
 - iv. Setting up and updating the National Water Resources Database (NWRD) and Information Management System.
 - v. Acting as a "clearing house" for all water sector projects identified by different agencies and reporting to the ECNWRC on their conformity to the NWMP.
 - vi. Undertaking any special study, as may be required by the ECNWRC, for fulfilling the objectives and programmes envisaged in the National Water Policy and the Bangladesh Water and Flood Management Strategy.
 - vii. Performing any other function as may be assigned to it from time to time by the Government.
- e. The Government will lead the effort towards developing grassroot institutions, in conjunction with the civil society, for managing water resources at community levels.
- f. Public water projects will include a training component for transfer of knowledge and technology to the users that will be monitored by the executing agency at every stage of the project work.

6. Legislative Framework

Setting the appropriate legislative framework is fundamental to effective implementation of the water policy. The existing legislation related to any form of water management in Bangladesh requires supplementing in a number of key areas. This policy will be given effect through a National Water Code encoding specific provisions of the water policy to facilitate its implementation.

The policy of the Government in this regard is:

- a. To periodically review the provisions of the body of laws and regulations that have an impact on water resource management and to recommend changes and amendments in them for efficient coordination of the work of different water-related sub-sectors.
- b. To enact a National Water Code revising and consolidating the laws governing ownership, development, appropriation, utilisation, conservation, and protection of water resources.