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Social Studies

**OPERATION AND MAINTENANCE OF SMALL SCALE FLOOD CONTROL
PROJECTS: CASE OF BANGLADESH WATER DEVELOPMENT BOARD**

A Research Paper presented by

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Table of Content

Chapter I:

1. Introduction	1
1.1. Statement of the Problem	2
1.2. Justification	5
1.3. Objective of the Study	6
1.4. Organization of the Paper	6
1.5. Data Sources and Limitations of the Paper	7

Chapter II:

2. Flood Control and Drainage for Agriculture: An Arena for Varying Interest and Multiple Conflicts	8
2.1. Flood in Bangladesh	8
2.2. Investment trends in water projects worldwide and necessity of rethinking O&M at national level	10
2.3. Background: The Organization of BWDB	12
2.4. Existing Planning Process of BWDB and Operation and Maintenance	15
2.5. A Framework for Analysis	19

Chapter III:

3. Operation and Maintenance of Flood Control Projects in BWDB	26
3.1. Operation and Maintenance within BWDB - Changing Trends, Definitions and Practices	26
3.2. O&M at Project Level; Who is Responsible?	30
3.3. The Ecological Setting	33
3.4. Parties Involved in O&M of FCDI Projects: Experience from Cases	35

Chapter IV:

4. Conflicts: Tasks, Rules and Roles in Phases	41
4.1. Identification	41
4.1.1. Rules for identification of new projects	42
4.1.2. Roles played by the agencies and professionals concerned	43
4.1.3. Potential conflicts	43
4.2. Project Planning and Design	44
4.2.1. Rules for project planning and design	44
4.2.2. Roles played by the parties concerned	45
4.2.3. Potential conflicts	48
4.3. Project Implementation	48
4.3.1. Rules that guide project implementation	49
4.3.2. Roles played by different agencies, parties, and professionals concerned	49
4.3.3. Potential conflicts	50
4.4. System Operation and Maintenance	51
4.4.1. Rules for O&M	52
4.4.2. Roles played by different departments, profe- ssionals and significant beneficiary groups	53
4.4.3. Potential conflicts	57
4.5. Resource Mobilisation	57
4.5.1. Rules for resource mobilisation	58
4.5.2. Roles played by different actors involved in resource mobilisation	59

4.5.3.	Potential conflicts	60
4.6.	Conflict Management	61
4.6.1.	Rules and roles for conflict management	62
Chapter V:		
5.	Better Operation and Maintenance	65
5.1.	Participation of Beneficiaries for Good O&M; How? What Ways?	65
5.2.	Legal Issues	70
5.3.	Cost Recovery: Possibility and Limitations of Local Resource Mobilization	70
5.4.	Local Level Planning/Decision Making: Limitation and Scope	74
5.5.	What About the Idea of Abandoning the Central BWDB?	76
Chapter VI:		
6.	Conclusion and Recommendation	78

Tables

Table 1:	Actual expenditure of resources for BWDB O&M in two years	18
Table 2:	Irrigation system activities, by institutional and organizational elements	22
Table 3:	FCD/I system activities, by institutional and organizational elements	40
Table 4:	Typology of people's participation	69

Annexure

Annexure 1:	Graph: Flood in Bangladesh (1954-1988)
Annexure 2:	Organogram of BWDB O&M staff
Annexure 3:	Summary of structures and operating status of projects
Annexure 4:	Use and condition of embankment and overall assessment of constraints or problems for O&M
Annexure 5:	Map showing location of EIP projects
Annexure 6:	List of FAP projects up to 1995

GLOSSARY

ADB	Asian Development Bank
BRAC	Bangladesh Rural Advancement Committee
BRDB	Bangladesh Rural Development Board
BRE	Brahmaputra Right Embankment
BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
CDSP	Char Development and Settlement Project
CE	Chief Engineer
CEP	Coastal Embankment Project
DGIS	Directorate General of International Cooperation
DTW	Deep Tube Well
EIP	Early Implementation Projects
EMG	Embankment Maintenance Group
EPWAPDA	East Pakistan Water & Power Development Authority
FAP	Flood Action Plan
FCD	Flood Control and Drainage
FCDI	Flood Control Drainage and Irrigation
FfW	Food for Work
FFYP	Fourth Five Year Plan
FPCO	Flood Plan Coordination Organisation
HYV	High yielding variety
IBRD	International Bank for Reconstruction and Development (World Bank)
IDA	International Development Agency (World Bank)
IECO	International Engineering Consulting Organisation
IRD	Integrated Rural Development
khal	Natural channel/minor river/tidal creek
khalasi	'Cleaner' (actually guard) of regulator/sluice
LCS	Labour Contracting Society
LGED	Local Government Engineering Department
LLP	Low Lift Pump
MDIP	Meghna-Dhonagoda Irrigation Project
MIWDFC	Ministry of Irrigation, Water Development and Flood Control
MPO	Master Plan Organisation
NGO	Non-government Organization
NHCL	Northwest Hydraulic Consultants Limited
NTAP	Netherlands Technical Assistance programme
O&M	Operation and Maintenance (Organisation & Management)
O&MCC	Operation and Maintenance Cost Cell
OECD	Organisation for Economic Cooperation and Development
OECF	Overseas Economic Cooperation Fund
Parishad	Elected Council (e.g. of Upazila and Union)
RESP	Rural Employment Sector Project
ROM	Rehabilitation Operation & Maintenance
RRA	Rapid Rural Appraisal
SAP	Structural Adjustment Policy
SDE	Sub-divisional Engineer
SE	Superintending Engineer
SO	Section Officer
SRP	System Rehabilitation Project
SSSFCDIP	Second Small Scale Flood Control Drainage and Irrigation Project
SUWaR	Sustainable Use of Water Resources
Thana	Administrative unit above Union & below Zila (460 thanas in Bangladesh)
Union	Administrative level below Thana
UP	Union Parishad

Upazila	Thana was named as Upazila during 1980s	
UNO	Upazila Nirbahi Officer	
USAID	United States Agency for International Development	
WAPDA	Water & Power Development Authority (precursor of BWDB)	1981
WFP	World Food Programme	1971
WUA	Water Users Association	84
WUC	Water Users Committee	14
WUG	Water Users Group	1971
XEN	Executive Engineer	84

Chapter I

1.0. Introduction

Flood in Bangladesh has different meaning to different people. For the farmers and villagers, in general, normal flood is a way of life. Many occupational groups earn their livelihood from the normal flooding. As far as environment is concerned, it facilitates bio-diversity and to a great extent supports poor people to have access in common property resources (CPR).

To control abnormal flood and to manage water for agricultural purposes, certain interventions are made which have many social, economic and environmental consequences. Control measures are taken, mostly, through State interventions by way of construction of embankments, dykes, sluice gates etc.. In most cases such interventions overlook or neglect the initiatives taken by the people, who face the problem head on, in a spontaneous manner. Identification, planning, implementation of such interventions are organized by authorized agencies in the government who, most often, on matters decide things from a very 'top down' approach. Such that the intended beneficiaries get very little or no attention at all. In such situation, question arises as to what extent these really help the beneficiaries; and if not at all, how it can be ensured.

System Operation and Maintenance (O&M), which has a greater meaning of Organization and Management is considered to keep the system operational and as the means of achieving better performance. Problems of O&M lie in the whole process of flood control practices and the agencies responsible for its implementation. Organizational aspects of these agencies and different stages of interventions followed by them further aggregate the problems. The search for solutions to O&M problems needs looking into the whole process of interventions. Organizational aspects need to be directed towards better institutionalization, both within and outside, related agencies working in the same area and those who have potential to be incorporated.

The whole discussion about beneficiary participation in the infrastructure developed for them, carries within it many other related problems to the surface which suggest further attention to the whole process of intervention cycle and performance. Beneficiaries tend to view the interventions from the outside and done by the external agents and as such they assume the role of

reluctant actors in carrying out responsibilities, in contributing in decision making and in resource mobilization. It also includes external dimensions in the form of assistance and geo-climatic aspects. There are different sides to it: one is material condition in which such participation is desired; and second, is the question of homogeneity among the expected beneficiaries. Overall environment is not conducive for spontaneous beneficiary participation, and even if the interventions bring some benefits it will have different degrees of impact on different categories of beneficiaries. Third aspect to it is the interface between the professionals involved in the entire activity and the beneficiaries as a whole. This happens because from a 'normal' professionalism point of view, things are perceived differently from the perspective of the 'new' professionalism point of view.

Historical analysis of the problem is insufficient as far as its many dimensions are concerned. Conflict analysis at the micro-level analysis proves useful. From both tools the problems emerging are many and there is very little scope to indicate any alternative suggestions to resolve them easily. In this respect the study appears more of an exploratory problem analysis which raises questions on issues rather than formulating recommendations. But its suggestion for further investigations is expected to help come up with some clearer suggestions in future.

1.1. Statement of the Problem

The general state of Operation and Maintenance of Flood Control Projects is well summarized in the following statement:

- Government (BWDB) build systems according to its own design and planning procedures;
- beneficiaries regard thus as government structures;
- government has limited capacity to tackle all the problems related to Operation and Maintenance;
- farmers are disappointed but do not regard it as their duty and responsibility to contribute to improve O&M;
- O&M, therefore fully depends on government's efforts, and at considerable costs (SRP, 1993)

In trying to understand the problem one encounters the following problems

Technical Interpretation: From the beginning, problems of flood control have been considered as technical problems and recommended solutions are also only seen in technical terms; as engineering solutions for agricultural production. 'Normal' professionalism¹ (c.f. Chambers, 1983, 1988, 1993) is led by the engineers and economists. They deal mainly with technical feasibility of the projects but could not think about problems that are coming up now after the end of around thirty years of continuous construction activities.

Coverage: BWDB constructed 6,130 km. of embankment and 4,521 of hydraulic structures and 985 river closures all over the country (Bari and Shahjahan in Ahmad, 1989:259-260) in the period between 1959 to 1988. However, most embankments and also 50 percent of the water control structures are not in proper physical condition. BWDB covers the whole of Bangladesh having 15537 (in 1990) staff of which 933 were engineers and 254 were other professionals (World Bank, 1993:60). They are supported by inadequate fund and clear responsibility and accountability for O&M activities. The lack of reliable services from flood control projects over time means that farmers and other beneficiaries are not willing to risk changing their current practices.

Organization: There is a clear lack of distribution of responsibilities between the Development Section and O&M Section of BWDB and less importance is given to O&M in the course of day-to-day activities and in the allocation of funds. Lack of proper organization within the BWDB, and lack of proper coordination with other organizations such as working in the field of water development make the problems of organization more complicated.

Institutionalization: Disorganization is causing problems for proper institutionalization. All the activities currently under implementation, to build a more effective Operation and Maintenance function are still at the experimental stage. To direct these activities in this field, under the

¹ 'Normal Professionalism' means the thinking, values, methods and behaviour dominant in professions, disciplines and departments - preoccupations with infrastructure, budgets, schedules, and quantification; the way professionals and organizations think and operate biases the process against poor people; these reflects 'first' characteristics which includes large scale, capital-intensive, inorganic, market linked, mechanical, developed in 'core' ('first'), high technology etc. (Chambers, 1993:76-77)

guidance of 'new' professionalism² (c.f. Chambers 1983, 1988, 1993) and to link it up with other concerned and active complementary institutions is crucial. Lack of proper and stable local level institutions is a major problem for the potential development from below.

Resource: Resource use and resource mobilization through institutionalized processes together with the appropriate organization is unclear and unpredictable. There is no mechanism for local resource mobilization; resource flow from the central government but their volume is scanty (EIP 1990; Ahmed 1991). The shortage of funds results in insufficient staff being assigned to Operation and Maintenance activities and inadequate facilities and logistic support for the staff who are assigned. As it is likely to continue and may become more acute in the future, alternative O&M management model are required.

Participation: As mentioned above, all the facilities built to protect against flood is interpreted by the people as government property, of no benefit, and thus of no concern to them, hence, they don't care to maintain the investments properly. This sense of negation grew out of the experience people have from the early days of intervention in the field of flood control: they were never consulted on what is going to be constructed "for them".

Externalities: Flood control regime of Bangladesh is substantially influenced by external elements, both physical and non-physical. Numerous inflows of rivers are sourced from India, and therefore India is intervening to control them in many ways. This creates many problems "down stream". These problems are manifold, and also touch upon the needs and extent of O&M. Donor dependency in terms of funds and in the form of consultancy keeps away the possibility to rely upon local resources including human resource and knowledge of the local people, and thereby, posing as an obstacle for attaining sustainable development.

These problems cannot be solved, if they are dealt in isolation with one another. Rather, to understand the internal dynamics between the problems and

² "Key elements in these are reversals of the 'normal' - to put people before things, to decentralize, to enable and empower the poorer and weaker, to value and work on what matters to them, and to learn from clients rather than always to teach them" (Chambers, 1993:83)

potential conflicts between them, would necessitate the build-up of a comprehensive knowledge system. So far, they have been dealt with either as a problem of technology, or as a problem of administrative inefficiency. To look at the issue from the view-point of professional or occupational conflicts of interests, which have significant impacts in creating the problem complex, is absent. Narrow problem definitions therefore, negatively contributing to achieving overall system improvements for the intended beneficiaries.

This study intends to address these inconsistencies critically. Different parties involved in the whole flood control arena have multiple conflicts of interests in between and among the groups and also within the groups as actors and as beneficiaries. These professional groups include Engineers, Agronomists, Economists, Administrators, Donors (Van de Laar, 1994:17), NGO Workers and together with them different categories of Farmers, Fishermen, Boatmen etc..

1.2. Justification

Flood control is the key component for the development of Bangladesh agriculture. The construction of embankments and control structures have been proven not to be sufficient to achieve the goal. Further investigation of operation and maintenance of these interventions are being considered increasingly crucial.

This paper intends to look at some of the above problems in a more systematic way in the context of small scale flood control projects - particularly EIP, a programme dealing with small-scale water development projects, set up in 1975 within BWDB.

Bangladesh Water Development Board is the agency responsible for all interventions. It would be very interesting to study its overall activities in the field concerned. Within the BWDB, Early Implementation Projects³ (EIP) is involved in planning, monitoring and experimenting with elements of Operation and Maintenance in small scale flood control projects.

³ a Dutch aided small scale flood control programme started in 1975

For BWDB, EIP and for myself, as a staff member of EIP, it would be beneficial to have insight into the general problem of inadequate O&M and therefore to help in understanding the potential of improving future agricultural development of Bangladesh and thereby people's welfare.

1.3. Objective of the Study

This paper critically reviews and analyzes the planning process for flood control projects followed by the EIP, within the broad policy framework of BWDB. It emphasizes the underlying conflicts in different stages of project planning, implementation, which inhibit proper Operation and Maintenance when the projects are completed. The study would attempt to address the following questions:

- a) What are the features of the flood control situation in BWDB projects (esp. EIP type projects) that create conflicts;
- b) What are the strengths and weaknesses of the existing organizational structures in resolving the problems in flood control;
- c) What are the bottlenecks for the development of more effective O&M by contributing towards improved conflict management in flood control projects.

1.4. Organization of the Paper

This paper is structured as follows. Chapter one provides the introduction to the study by setting out the rationale, delineating the parameters of the study. Chapter two provides the background to present demand of Operation and Maintenance practices and current organization and planning process in BWDB and describes a framework for analysis. Chapter two specifically tries to create a background to understand all three research questions. Chapter three illustrates changing trends in definitions and practices of Operation and Maintenance; it also provides a picture of O&M practices at project level. Chapter four critically analyzes the conflicts that exists in different stages of project cycle from the perspective of the different tasks, roles, using case materials specifically from EIP. Chapter three and four both respond first two research questions by explaining real situation in the field, setting out a background for chapter five to respond question three. Which investigates the possibilities for planning improved Operation and Maintenance, by assessing the potential analyzed in the previous chapters.

Chapter six contain the conclusion and recommendation.

1.5. Data Sources and Limitations of the Paper

Systematic and qualitative assessment of the planning process within BWDB is undertaken because EIP, like some other EIP type programmes, within BWDB is in nearly all aspects bound by general BWDB procedures. When these programmes have opportunities to deviate from general BWDB practice, in view of its specific missions and concerns, are indicated. Case studies of EIP together with FAP 13 on Operation and Maintenance study documents are the key sources in this regard. Analytical section dealt with the problems experienced as contained in many documents of EIP, FAP 13 study report⁴ in the field of small scale flood control projects⁵. Case materials relating to O&M are used to understand micro-level conflicts and potentiality of conflict management. Together with the secondary data, personal experience of the researcher in the relevant field helped analysing the problem. Very little academic discussions can be noticed on the types of problems dealt here and limits the use of authenticated document for the research.

⁴ FAP 13 study was conducted by Hunting Technical Services Limited in association with some other consulting companies under the supervision of Flood Plan Coordination Organization of the Ministry of Irrigation, Water Development and Flood Control

⁵ very few irrigation and big FCD projects are included in FAP 13 study

Chapter II

2. Flood Control and Drainage for Agriculture: An Arena for Varying Interest and Multiple Conflicts

2.1. Flood in Bangladesh

There is difference between the normal beneficial floods of the rainy season, which are termed *barsha*, and harmful floods of abnormal depth and timing, which are termed *bonna*. 'The *barsha* which occurs more frequently than *bonna*, is not considered [by Bangladeshi villagers] to be a hazard at all, but rather a necessity for survival' (Paul, 1984). The flood plains of the *Brahmaputra*, *Ganges*, *Meghna* and some 250 smaller perennial rivers account for 80 per cent of the area of Bangladesh. Ninety per cent of the water discharge originates outside the country in India, Tibet, Nepal and Bhutan (Alexander in Boyce, 1991:2). Within Bangladesh, 83 per cent of the floodplain area is normally flooded in the summer monsoon season (Brammer in Boyce, 1991:2-3)⁶.

Bangladesh is a flood affected area; the types, severity and extent varies. Major factors are locational, climatic, nature of the river system, geomorphic, oceanic and human. Bangladesh is uniquely situated at the confluence of the three major river system in the world, which together drain vast watershed areas. High monsoon flow coupled with snowmelt run-off over the Himalayas through major river system, localized intensive rainfall during the monsoon season and sometimes the storm-surge due to cyclones results to floods. An overwhelming volume of water has to flow into the sea through one main channel (the lower *Meghna*). It is predominantly a deltaic flood-plains with flat topography having silted, unstable and hydraulically inefficient stream systems. High ocean tide and surges are common; rise of sea-level (localized) during monsoon contribute to flooding. Human interventions for the alteration of the ground surface of the watershed areas through varieties of landuse practice and flood control measures in the upper reaches of the river systems also causes flood. Hossain et al (1986 in Ahmad, 1989:29-30), considering the above factors, concludes that on the balance, the overall flood scenario will continue and only limited local flood relief is within the

⁶ Flood and flood control in our discussion will be concentrated primarily for agriculture and for normal flood (*bonna*) which are usually planned and implemented with the assumption of one in twenty years for full flood protection and one in ten years for submersible embankment in haor areas.

means of even most optimistic resource availabilities in a forceable future⁷.

Flood control for agriculture is crucial for Bangladesh. Flood control is needed for water control which include drainage and irrigation. It means, provision of the right amount of water at the right time. There is high degree of complementarity between water control and other inputs used in agriculture (Boyce, 1986). Small scale flood control interventions in Bangladesh necessarily include drainage but not often irrigation.

In order to face flood and to protect agriculture protection/control measures are being taken through constructing embankments, dykes etc.. Complementary to these embankment and dykes, water control structures like sluices/irrigation inlets are constructed. Strategy was to start construction of embankments along all big rivers, especially the three⁸.

The dominant approach to flood control in Bangladesh was on, the construction of large embankments on the basis of some technical studies. Under the geographical location of the big projects, smaller projects⁹ have been considered for gradual development. From the beginning studies mainly focused on technical aspects, and the intention was to make projects feasible in terms of agricultural growth only. During the 1960s and 1970s, these projects could show their success in the form of growing paddy production. The relative success of green revolution in the country was partially because of these projects (Hossain, 1988). However, according to donor and government agencies, Bangladesh Water Development Board (BWDB), water management infrastructure has only marginally contributed to agriculture growth, in comparison, for example, with the expansion of ground water irrigation facilities is less capital intensive (Duyne, 1994:4).

Two consecutive big floods in 1987 and 1988 posed big questions to the existing operation and maintenance practice of the large construction projects. It appeared from the post-flood evaluation (BWDB, 1987) that most

⁷ a graph of area affected by floods starting from 1954 to 1988 is presented at annexure 1.

⁸ the Padma, the Brahmaputra and the Meghna

⁹ in EIP the small scale FCD project size ranges from 500 ha to 3000 ha.; mostly a few of such projects are looked after by one BWDB division which is usually located in each administrative districts

of such projects have failed to protect their area because of lack of proper operation and maintenance. In fact, government and donors started to recognize this, and are since looking for alternative ways to resolve the problem (World Bank, 1993). Another approach, of lesser importance, focused on small projects. It started in 1975 with the programme of Early Implementation Projects (EIP), but somewhat confusingly, the programme is called a project as well, largely because it started out of direct donor grant partially out of the mainstream control of BWDB system¹⁰. EIP was started in 1975 to plan and finance small scale flood control projects. But only in 1989 at the end of the evaluation of its third phase, did the evaluation report stated that 'operation and maintenance of projects should receive much more attention and become a main activity within EIP' (EIP 1989). Development of operation and maintenance (O&M) management models for BWDB Flood Control, Drainage (FCD) projects is one activity to be taken up as part of the Systems Rehabilitation Project (SRP), which is already on operation from late 1980s. Thus, both large-scale and small-scale projects face problems of O&M after the construction of infrastructure works is completed.

2.2. Investment Trends in Water Projects Worldwide and Necessity of Rethinking O&M at National Level

After the 1980s on a worldwide scale the area under irrigation is decreasing so as with the rate of growth in production of principal foods. The rate of growth in global grain production during 1950-84 was 2.9 which comes down to only 0.7 percent during 1984-92. 'The slowing down in the rate of expansion of irrigated areas reflects the reality that the scope for easy and cheap forms of new irrigation development seems to be coming to an end' (Van de Laar, 1994:5). The main causes behind this are land degradation, conservation and non-farm uses, salinization etc.. In the case of Asia, annual growth rates of area, production and yield for rice during 1973/75 to 1981/83 were 0.24%, 3.09% and 2.86% and in 1981/83 to 1988/90 the area remain almost the same (0.25) but for production it went down to 2.16% and for yield it was 1.91%. During the same period, wheat had experienced even more reduction. Area comes

¹⁰ in terms of sub-project identification, study and planning EIP has greater independence although it works together with a planning unit of BWDB; instead of central monitoring EIP has its own regular monitoring activities for which the general impression is that it can ensure better quality work in sub-projects; one of the reasons is that the expatriate consultants works are considered as donors representatives, when they pursue and recommend the implementation activity, it expedite and to a greater extent quality ensures; some other EIP-type programmes in the name of project financed by some other donors, were the follower of this approach; they are: SSSFCDI, SSDFC etc.

down from 1.58% to 0.29%, production from 5.99% to 2.96% and yield from 4.41 to 2.69% subsequently (Rosegrant et al in Van de Laar, 1994:7). According to Van de Laar, countries like Bangladesh and India still have a chance for a sustained growth, which could be attained through normal technological improvements and not through irrigation development. In the case of BWDB, for the period up to 1989/90, it had a gradual increase in irrigation area and from 1990/91 onwards it started going down (World Bank, 1993:189).

Effect of the decreasing growth negatively affects on the investment trend in the sector during the 1990s. From many sources it is clear that the reductions in irrigation investment have been dramatic. Aggregate lending and assistance for irrigation by the four¹¹ major agencies by the mid-1980s was less than 50 percent of the 1977/79 level (Van de Laar, 1994:11-13). Within this global scenario Bangladesh is likely to experience the same in the near future. Up to now the investment through project aid is at increasing trend (GoB, 1993:27-28). Although it is not clearly mentioned whether from 1990, most of the fund is invested for the very big Flood Action Plan (FAP) studies or not¹². For Bangladesh, land degradation caused by complex processes of river erosion, siltation of river bed, salinization, reduction of fish population and disruption of navigation routes because of the irrigation and drainage problem is more clear. Moreover, the whole sector neither from the donor community nor from the national government, seemed to be aware about these Systems maintenance that developed for irrigation or flood control purposes. Resource flow was only concentrated in the construction, very little and sometimes no resources were allocated and spent for Maintenance. Operation of the System was always controlled and taken care of by the government officially, which in most cases, failed to satisfy the farmers. In a situation where farmers do not get benefit from the facilities, their inspiration, to take the initiative to take care of the facilities constructed 'for them', slackens.

It is natural that when principal investment in the sector will be reduced, there is a subsequent reduction of funds for Operation and Maintenance will

¹¹ WB, ADB, USAID and OECF of Japan

¹² FAP up to now is at study phase; so in terms of real water sector investment it will have very different picture

also be reduced; it is more likely, when the realization about the necessity of such fund allocation is at primary stage. But at least to keep the system going the allocation of resources should always be a cumulative figure because the burden for maintenance for every year of construction accumulate.

Under such situation it is necessary to think about some alternative solution to address the problem, because in a poor country like Bangladesh, the continuation of such systems is hardly affordable. On the one hand, it is not possible financially with only government providing the needed allocation of resources¹³. On the other hand the present reality is - these projects are hardly producing any benefit to improve the welfare of the beneficiaries, and as a result of which beneficiary participation in the form of mobilizing resources and active participation in Systems Operation and Maintenance is absent. Although there is no concrete evidence to conclude, whether or not benefit yields, and to what extent, there is a general feeling that the distribution of benefits has resulted to widening of the gap between the rich and the poor, i.e., it made the rich more rich and the poorer more poor (EIP, 1992; Asaduzzaman, 1994).

2.3. Background: The Origin and Main Approaches of BWDB

In response to the devastating flood of 1954 and 1955, a flood control organization was set in late 1955 to look into the flood problem and suggest remedial measures. This flood control organization was created under a separate Chief Engineer in the Irrigation Department of the then Provincial Government. In the next year, the government obtained the services of a UN Technical Assistance Mission (Krug Mission) for the study of general flood problems affecting the country. This Mission pointed out the need for major hydrological investigations, and recommended setting up a Water and Power Development Authority for taking up implementation of specific water and power development projects arising from overall studies (Ahmad, 1989:30). EP WAPDA (East Pakistan Water and Power Development Authority) was created in 1959 by abolishing the Irrigation Department of the Provincial Government in pursuance

¹³ it was the finding of the EIP O&M Mission 1990 that only for EIP projects (about 90) annual cost requirement is Dfl 1 million excluding major rehabilitation cost (EIP, 1992:52)

of the recommendation of the Krug Mission¹⁴. Flood Control Organization also ceased to exist from then (ibid:31).

Thirty years before the Krug Mission Professor Mahalanobis had analyzed available records on flooding patterns and indicated probable long trends in flooding, and the possible effectiveness of flood protection measures. The central theme of his findings was that "it is therefore necessary to advise and educate the inhabitants to adopt their life to the changing conditions; to build their houses on raised grounds, and to take other precautionary measures [like flood warnings]"(Mahalanobis, 1927:6-7 cited in Adnan et al, 1992:35). In sharp contrast to this the main recommendation of Krug Mission include (i) feasibility study of flood control dykes on the banks of major river including and or flushing sluices and drainage regulators, and, if found feasible, implementation of these on priority basis; (ii) to take up and implement smaller flood control, drainage and irrigation projects; (iii) to take up a feasibility study of construction of a barrage on the *Teesta*¹⁵ for irrigation and flood control; (iv) to raise the level of homesteads in the flood control areas to rehabilitate them on flood dykes; (v) to identify areas where flood control can not be effectively done and industries, vital installation, etc., should not be constructed in such areas; (vi) co-operation should be established with India and other countries for development of comprehensive flood forecasting in the common rivers (Ahmad, 1989:31). The dominant theme of WAPDA's subsequent activities became the execution of major construction works arising at containing river flows.

Immediately after the setting of EP WAPDA in 1959, it commissioned an American consulting company IECO¹⁶ as its general consultant and they continued to base themselves on the recommendation made by the Krug Mission, which is very much a voice of 'Modernization' (Nicholson in Russel et al eds., 1981:17),

"The destructive floods of recent years call for control measures to protect the growing population ... Forty five million people who live to day under the imminent threat of disease and starvation, would advance to a new and vastly better way of life ... Gone would be the ever-present fears of flood on the one hand, and famine on the other. Secure in their lives and property, the people would be able to plan, to build, and to make progress (Krug et al, 1957:Foreword in Adnan et al,

¹⁴ Irrigation department was only involved to provide the irrigation facilities for agriculture while the realization about the flood control as an important element for a comprehensive support to agriculture outweighs the necessity of such an organization any more.

¹⁵ a big river flowing from India at the northwest of Bangladesh

¹⁶ International Engineering Company Inc.

1992:36).

This modernization approach also is echoed in the following comments made in the Master Plan for the construction of about 58 FCD/I projects consisting of thousands of miles of embankments, nearly hundred polders, and innumerable sluices and other water control structures, covering large parts of the country, recommended by the IECO in 1964 for implementation in the next twenty years:

"Completion of those Master Plan Projects which include embankments will confine flood flows to the river channels and thus permit intensified cropping"

"Food and cash crop production requirements will increase enormously between the present time and 1985. With virtually all arable lands under cultivation, the attainment of higher agricultural production levels necessitates an expansion of double and triple cropped area by irrigation, and the protection of cultivated lands by flood control and drainage schemes" (EP WAPDA, 1964:CIV-1 in Adnan et al, 1992:36).

Later in the paper, the discussion will further focus on these presumptions, their failures to achieve them, and their contributions to make the related problems more complex.

In the early sixties consulting engineer General Hardin¹⁷, similar to Mahalanobis, noted the complexity of the river system and recognized the 'normal flooding' as a way of life which people have learned to live with and profit by flood and flooding (Adnan et al, 1992:38). Moreover, Professor Thijsse of the Netherlands specifically mentioned the complexity which could emerge elsewhere in Bangladesh because of the early confinement of the world's biggest rivers which flow across the country. He warned about the future adverse effects. In his words,

"The study in question is one of the most difficult task for a hydraulic engineer to face. I doubt if anyone in [Bangladesh] East Pakistan is equal to it. It will even be difficult to find an expert anywhere who has a thorough knowledge of the theory and, at the same time, practical experience in handling very big rivers. He should nearly have a prophetic vision" (in Adnan et al, 1992:38).

In the very early stages of the formal start of implementing flood control measures, one usually refers back to the recommendation of Krug Mission. However this does not conform fully with what the mission actually recommended. Krug had suggested a careful prior investigation of the problems before any decisions were to be made. But the Krug mission regarded people as passive actors who were to be told what was to be done (Krug et al, 1957:28-30 cited in Adnan et al, 1992:35).

¹⁷ in 1963 General Hardin a former chairman of the Mississippi River Commission in USA made a report on flood in the delta

Creation of BWDB after the independence of Bangladesh followed the legacy of EP WAPDA. In 1972 IBRD reviewed the Master Plan prepared by IECO in 1964. It noted the inadequacy of data to embark on massive investment projects along big rivers, that the implementation plan exceeded EP WAPDA's capability and resources, and that the Plan did not consider changes in river regimes due to probable works in India (Ahmad, 1989:33). During mid 1970s BWDB introduced the small scale FCD/I projects and the creation of Master Plan Organization (MPO) and the formulation of National Water Plan under its auspices, which reflected a shift in thinking from an approach focusing only on flood control towards the integrated management of ground and surface water, without compromising with the continued construction of the embankments and structures following the Master Plan prepared in the previous period (Adnan et al, 1992:39).

Starting of Early Implementation Projects (EIP) within the BWDB in 1975 for the implementation of small scale flood control projects is significant in this period which later has been followed by some other donor funded programmes in the name of projects. Complexity and comparatively long implementation period induced failure of the big projects rationalized to take such a programme. Main concern in the beginning was on 'concentrating on small and relatively simple projects that could be implemented and completed within a short time' (EIP, 1989:7).

2.4. The Current Organization and Planning Process of BWDB

Organization of BWDB O&M:

The Bangladesh Water Development Board (BWDB) is a semi-autonomous public agency under the administrative control of the Ministry of Irrigation, Water Development and Flood Control (MIWDFC). It was established in 1972 when the East Pakistan Water and Power Development Authority (EPWAPDA) was split into two agencies¹⁸. BWDB is managed by an appointed Chairman and five Board Members, and is responsible for planning, design, implementation, Operation and Maintenance of FCD/I projects (FAP-13, 1992:2-2).

¹⁸ i) Bangladesh Water Development Board (BWDB) and ii) Bangladesh Power Development Board (BPDB)

BWDB established an O&M organizational structure during the 1980s¹⁹. Field offices of BWDB became responsible formally for O&M through the renaming of Divisions as O&M Divisions²⁰. In practice this amounts to general field activities, including smaller new projects, are placed under O&M. Experience in the FAP 13 study indicated that the new name amounted to more of a name change than a change in philosophy or emphasis in actual work. It can be noted that some anomalies exist, such as projects not declared as complete and not under an O&M Division but which have been effectively completed and operating for a numbers of years (FAP 13, 1992:2-2). It sufficiently indicates the disorganization within BWDB.

BWDB's management system for O&M on FCD/FCDI projects has a hierarchy of BWDB officers and engineers, who in theory supervise the work of paid employees (*khalasies*) who are assigned to the structures²¹. At the top of the hierarchy are the Zonal Chief Engineers, followed by the Superintending Engineers responsible for 'Circles' and below these is the O&M Division under an Executive Engineer. Executive Engineer (XEN) is the key position in charge of a BWDB division. Below the XEN are Sub-Divisional Engineers (SDE) who have more day to day responsibility for supervising O&M, and Section Officer (SO) with some technical background who are responsible on a day-to-day basis for small projects, or for parts of a larger one. The bottom tiers are Work Assistants, who are responsible for direct supervision of *khalasies*, who guard and operate the sluices (FAP 13, 1992:2-4).

The O&M boundaries are more administrative than determined by system management. For example the boundaries may overlap spatially between O&M Divisions and construction divisions or between different projects. O&M Divisions are responsible for rehabilitation and repairs to projects, and in theory supervise any operating activities. In practice they are also involved in overseeing and some design of new projects, and in modifications to existing FCD/I systems (such as additional structures) (FAP 13, 1992:2-4). Such situation, on the one hand, does not match with the demand for

¹⁹ an organogram is attached at annexure 2.

²⁰ which are basic unit with O&M responsibilities

²¹ at present most of the structures has no such khalasi but at the past it was a precondition to appoint khalasies for each structure and also for the embankment to a specified lengths.

hydrological requirement, and on the other hand, create anomalies in the distribution of responsibilities.

BWDB O&M Resource Mobilization:

BWDB resource mobilization has a very complex system. Resources are mobilized in different form through different ways following different guidelines which sometimes makes the problem of understanding the actual situation. Sometimes it is very difficult to understand the types of activities and their nature - about how far they can be termed as components of O&M, for which the resources are allocated. FAP 13 final report (1992:2-10) did not fully agree with the general impression that BWDB has major resource constraints on improving O&M in BWDB. Rather, it mentioned a variety of sources for O&M. These different sources involve a complex set of procedures which do not promote efficient or rational allocation of scarce resources to maintenance. After reviewing O&M Cost Cell report 1991, FAP 13 report summarized the findings. It indicated the following sources of budget allocations for the BWDB O&M:

- Revenue budget
- FfW Programme (from WFP)
- Development Budget; and
- Cash Foreign Exchange Budget

Revenue budget is mainly used for establishment costs. A small percentage goes to the operation and repair of completed projects. BWDB takes up FfW schemes mainly for the construction and rehabilitation of embankments and for the excavation/re-excavation of drainage and irrigation channels of completed projects. There are limitations in the use of wheat: the spatial allocation of BWDB's share of WFP wheat is determined to a considerable extent by WFP's target of providing support to thanans²² according to their population and distress level. There are several problems with FfW for maintenance. Earthwork is done in the winter when work and food are available. The late monsoon lean season is unsuitable for new earthworks but routine and emergency maintenance in FCD/I projects could be carried out in this period. Quality is compromised because payment is on a piece-rate basis.

²² the lowest administrative unit

Development budget is routinely used to finance the O&M activities of completed portion of the ongoing projects, and also donor funded repair and rehabilitation works, even though the Development Budget is traditionally used to construct new projects that are completely or partially financed by foreign aid. Little progress in improving the accuracy of O&M costing at the feasibility stage seems to have been made since figures given by IECO in 1960. A fixed percentage of construction costs are taken to represent O&M costs: 2 percent of earthwork investment and 1 percent of structure investment (FAP 13, 1992:2-12). O&M study conducted by the O&M Cost Cell (1991) indicates that the fund allocated for the O&M is sufficient which reflected in the comparative increase in allocation of O&M fund during 1989/90 than 1984/85. Table below gives the picture of actual expenditure of resources in two different years indicated before.

Table 1: Actual expenditure of resources for BWDB O&M in two years

Source	1984/85	%	1989/90	%
	Tk. mill		Tk.mill	
Rev. budget	294	49	529	34
FfW Prog	284	47	499	31
Dev. Budget	22	3	545	35
CFE Budget ¹	2	0	4	0

¹ Cash Foreign Exchange
Extracted from : FAP 13, 1992:2-12

It was not always a problem of lack of fund. But the situation becomes complicated since current budgets include foreign debt servicing and some rehabilitation works. In 1983-84 about 21 per cent of BWDB expenditure was on O&M. The expenditure allocation is not made for water management, routine maintenance or system operation. Apart from being diverted to establishment costs, O&M expenditures have also become dominated by periodic repairs rather than preventive maintenance which might help to reduce embankment failures. Actual situation in the field is different; the revenue budget allocation is usually inadequate even to meet the establishment costs of the O&M Divisions and sometimes the actual funds available at the end of the financial year are much less than the actual allocation. Because of this and to maintain the O&M staff of the completed projects, their remaining salaries are charged against development projects and in most cases the O&M staff are practically put to work in development projects. Thus the regular O&M requirements of completed projects are neglected (FAP 13, 1992:2-13).

Wheat allocated on a regular basis under FfW for maintenance of BWDB projects is inadequate compared to its total requirement that only emergency repairs are possible. It would appear that the allocations in a given year are insufficient to restore all completed projects to their original standard, and this simply institutes a rotational cycle of deferred maintenance. As a result, partial repair of embankments gives only partial benefits of the projects. The minor problems of the current year in the unrepaired part of the embankment become a major problem and a threat to the existence of the project in the subsequent years. Occasionally there are misunderstandings and conflicts between the BWDB and Thana staff involved regarding quality control of earthworks and distribution of wheat. BWDB staff generally responsible for the quality control of the BWDB's FfW schemes, but the distribution of wheat is done by the local UNO²³ and UP²⁴ members of the project area, according to the measurement of work executed, prepared by the BWDB staff (FAP 13, 1992:2-13).

2.5. A Framework for Analysis

Development takes place in an arena of conflict between competing interest (development agencies, national governments, local population and different production system). Conflicts of perceptions of development between development agents and national governments are influenced by internal determinants within which the donor and recipient countries operate. At the national level development projects have often not been conducive to the interest of the local populations but they also involve priorities, the pursuance of which may bring to open conflicts between production systems, or to conflict with the local value systems on which it encroached (Salih, 1993:5-6). Such conflicts and their nature have relation with the water sector projects.

Water sector development projects under the broad heading of rural development involve planned development following the improvement approach. Through the process of modernization and 'demonstration effect' stresses the importance

²³ Chief Govt. Officer in a Thana

²⁴ Union Parishad, the lowest tier of Local Government; its geographical area includes about 10-15 villages having three Wards (unit); Parishad is synonym to Council which constitutes of 9 elected members from three Wards and a nominated female member.

of the diffusion of the modern technology, skill and resources to the 'traditional' sector, which for various reasons has lacked the motivation and opportunities to develop economically (Long, 1977:183). Long concludes the discussion on the sociological problems of planned change with the following comments:

"Analysis of the social consequence of the rural development policies entails consideration of many dimensions: the relation between the particular policy and other government measures affecting the rural population; the pattern of political control and economic differentiation in the areas of implementation; the organization and style of leadership characterizing the promotion agencies and government departments involved; the struggles occurring within the government bureaucracy for control of particular programmes and scarce resources; and the expectations and interests of the local population itself" (Long, 1977:184)

According to Long the further crucial aspects relates to how different local groups interpret the general objectives and feasibility of government sponsored schemes, and how far the policy itself favours the interest of the particular social sectors at the expense of others. These are complex issues which necessitate focusing upon various structural, ideological, and organizational factors (Long, 1977:184).

Water development interventions obviously generate diversified conflicts in the phases of planning, implementation, operation and maintenance of the projects. Conflicts of interests are unavoidable - for the rearrangement of the natural resources, actors who are responsible for the change, occupational groups who are negatively affected for the intervention, and/or beneficiaries who are stratified heterogeneously.

There are many different ways to view or to approach the water sector problems. Among others Chambers (1988) identified different actors in an irrigation project who have varying priorities and preoccupations in perceiving the system performance. Landless labourer, farmer, irrigation engineer, agricultural engineer, agronomist, agricultural economist, general economist, political economist have their own perception about the possible first criterion of good system performance. Depending on the extent the various parties involved have the leeway to interact with each other and to accommodate each others interests, the importance of the emergence of conflict and conflict resolution is taken cared of.

Widstrand (1980) lists a hierarchy of conflicts e.g. conflicts over international rivers, ecological conflicts, administrative conflicts, conflicts between governments and farmers, conflicts between farmers, conflict

between donor agencies and govt./local groups surrounding water and water development policies through irrigation in hierarchical setting. In case of small scale flood control in Bangladesh the conflicts are more concentrated in (1) ecological conflicts especially for fishery and navigation for the professional fishermen and boatmen (2) administrative conflicts - inter/intra agency, central/local (3) government farmer conflicts (4) intra farmer conflicts (5) government NGO conflict and (6) donor agency, government and local group conflicts are common. These problems get more serious when other sets of practical problems get in especially e.g. engineering, insufficient flushing and drainage, water logging, land not getting water etc. - similar reference is made in Ali (1981, cited in Van de Laar, 1994:15). Interpretation of all related problems in the flood control and drainage projects from the social science point of view is imperative, as it is viewed by many writers in case of irrigation projects (Rydzewski, 1987; Chambers, 1988; Coward and Levine, 1986 cited in Van de Laar, 1994).

'Who is responsible?' may be the first element of a analytical framework for water management situation. For a further understanding of the problem, Ecological Perspective of the flood control projects in Bangladesh is necessary, it provides geographic and physical setting including its hydrological opportunities and constraints in which water availability and user conflicts have to be solved (Van de Laar, 1994). Analysis of functions, rules and roles proposed by Coward (1980 & 1991) is another useful framework for analysing irrigation situations. It can also be useful for flood control (project) situations. The framework looks at different conflicts that come into play in each of five basic tasks which can be translated for the flood control systems as well. Later three tasks: system maintenance, resource mobilization and conflict management can immediately be accepted for this kind of system. In this scheme Coward put more emphasis on rules for conflict management. Conflict management generally interpreted as provision for resolution of conflicts when they emerge.

Table 2: Irrigation system activities, by institutional and organizational elements

Task	Institutional and Organizational Element		
	Key rules	Important roles	Significant social groups
Water acquisition	Rules for acquiring extra water supplies for the system	Roles for planning and implementing water acquisition activities	Groups that seek additional water supply
Water allocation	Rules for allocating water between subunits of system, farms, and so on	Roles for establishing and implementing water allocation policies	Groups that influence water allocation policies and implement water distribution
System Maintenance	Rules for what repairs need to be done	Roles for identifying maintenance jobs and supervising repairs	Groups that provide routine or emergency repairs to system
Resource mobilisation	Rules for mobilizing labour, material, money, or other resources needed to perform system tasks and for responding to shortfalls in resources	Roles for implementing and monitoring the resource mobilisation process	Groups that collect specific resources
Conflict management	Rules for avoiding or resolving disputes between systems, zones of a system, or individuals	Roles for mediating disputes, making judgements, and enforcing sanctions	Groups that participate in settling disputes and in enforcing sanctions

Source: Coward (1991, in Cernea, 1991);

As conflicts in water resources development management are ubiquitous, one area of special interest is to study the mechanisms, which exist for conflict resolution and/or arbitration. The most widely used conflict resolution process involves the use of a third party mediator. Theoretically, it is expected that the mediator would be neutral. Challenging this role of

neutrality, some professionals introduce the notion of 'empowerment' (the giving of power to the powerless), as a basis for social change. Only a thorough grounding in conflict theory with its concomitant emphasis upon the role of power and powerlessness can show the mediator that without introducing empowerment into the process one is simply supporting the status quo (Scimecca in Sandole et al eds., 1987:30-31). It ultimately indicate to the lesson that anything neutral introduced into an unequal system, in the end, supports the group in power.

Efforts towards conflict resolution need to be integrated with the local people's knowledge and experiences which are inherent in their traditional activities. It can be argued that while States have a role to play as agents of change, an approach is needed which should be based on a thorough knowledge of people's actions, and incorporation of their perceptions and wishes. If this wealth of information is related to the objectives of State intervention, conflicts will be minimized, if not avoided. Experience is increasingly showing that approaches that are based upon unjustified assumptions about local people's needs are having unexpected and unpleasant results (Mgale in Salih et al eds., 1993:249-250). Here according to Mgale the crucial part is to be able to provide analyses to demonstrate the integral role of local knowledge, showing potentials and limitations as well as the developmental role of state intervention with the apprehension that not all state sponsored actions need to be negative by definition, there are a good many positive ones as well.

It has been exhaustively documented, that top-down planning approaches to development have largely failed and likely to do so in future. Failure of development projects and plans result despite considerable investments. In this respect, importance of local knowledge is important but difficult to establish. It is hard to accept that a trained scholar is not an omniscient expert who masters his field; similarly for a government officer to go and confess to his 'subjects' that although he has been appointed to a task as an expert, actually he should be a student and learn from the people whom he is supposed to advise and help. Also a fear can easily be apprehended among the experts and administrators that once it is experienced by the people that their knowledge is needed and that this knowledge also has more than a curiosity value, the existing structures might start to shake - since all

know that knowledge creates power around itself. "Terms that characterize local knowledge are e.g. 'accumulated wisdom', 'tested knowledge', 'local applicability', 'cultural boundedness' etc." (Hurskainen in Salih et al eds., 1993:32). There is no reason to doubt that people who have been living in a certain type of environment for several generations are the best experts to tell what kinds of adaptations will work and what will not. They have had ample time to experiment different kinds of methods. Joint effort of the 'educated' and local people probably would produce a new kind of knowledge hitherto nonexistent. It would bring the traditional knowledge to a forum where it could be viewed in the context of wider knowledge base, and thus become integrated into it (Hurskainen in Salih et al eds., 1993:33).

Rural development infrastructure e.g. flood control dam, a public good, can not be denied to local residents whether or not they have contributed money or labour to the project. Once the dam is built, no one in the protected area can be excluded from the protection it provides. When the dam is being constructed the prospective beneficiaries will further have reason to avoid helping out. Mobilizing the local resources from free riders for O&M may in fact prove extremely difficult (Russel in Russel et al eds., 1981:1-14). To consolidate the efficient exploitation of the Public Good and to avoid or mitigate the problems of free riders for greater articulation social organization is necessary (Freeman and Lowdermilk in Russel et al eds., 1981:153-173). It is not enough to argue that "everyone benefits" from public goods. Rather it is important to know how the demand of the voiceless and powerless might be made effective in the planning and implementation process. In other words how the system can be made more participatory (Nicholson in Russel et al eds., 1981:25; Rahman cited in Oaklay & Marsden, 1990:19). Participation is considered to be an active process, meaning that the person or group in question takes initiatives and asserts his/her or its autonomy to do so.

Continuous praxis of 'learning process (through projects)' would give the opportunity to establish intended beneficial projects, as well as, scope to have good operation and maintenance for them in course of time. This approach should start from the project identification stage because "perhaps one of the great lessons in rural development is that 'identification', in its hurried and obscure normal professional form, is much of the problem, and patient and

continuous learning and evaluation in the field are much of the solution" (Chambers, 1988b:14). The idea of learning-process approach originates in the village, its first step is awareness and action about the problem, its design is evolving and people involved, its supporting organization is built bottom-up having lateral spread, its main resources are local people and their assets, where staff training and development takes place in field based learning through action, implementation is gradual, local, and at peoples pace; its management focus is sustained improvement and performance, content of action is diverse; its communication is lateral which is based on mutual learning and sharing experience; leadership is personal and sustained, evaluation is internal and continuous; it suggest to embrace error, its effects is empowering and the whole proposition is associated with new professionalism (Chambers, 1993:12 with the help of Korten).

Chapter III

3. Operation and Maintenance of Flood Control Projects in BWDB

3.1. Operation and Maintenance within BWDB - Changing Trends, Definitions and Practices

At present, increased public awareness about poor O&M in the water sector in Bangladesh is due to the floods in 1987 and 1988; it focused public attention on the magnitude and urgency of the issues involved. The very first report by the BWDB on the 1987 flood mentioned the lack of proper O&M as the failure of the flood control projects. Flood Action Plan (FAP 13) took it as a major component in its studies. It continue to be the major point of concern by the donors especially for the World Bank and the Dutch government (WB, 1993; DGIS, 1994). Government's recognition of the importance of this problem is found in the Fourth Five Year Plan (1990-95). In the Chapter on Flood Control and Water Resources it is noted that - ineffective planning and slow implementation of schemes and consequent inability of the schemes to provide the stipulated modification of the land/water environment according to planned schedules which together cause inefficient O&M. It recommended to

"create appropriate institutional framework for operation and maintenance of schemes on a self-sustaining basis and assign local bodies at Union/Upazila levels the responsibility of maintenance/management of small schemes within their jurisdiction and correct institutional/management deficiencies at the field level" (FFYP, 1990-95:V.B-1,3).

Widstrand (1980:68) has observed the problem from another dimension, which is a major point of concern for Bangladesh situation. He pointed out the main problem of Operation and Maintenance:

"different emphasis on the provision of capital for the recurrent costs. ... the donors produce capital costs and leave the operation and financing costs to the receiving country ... with an increasing capital investment and an increasing number of installations, receiving countries do not have the funds nor the manpower to look after the installations".

Under structural adjustment policy officially imposed or mediated through the World Bank, it has been suggested that the needs of BWDB should be re-prioritized by focusing O&M on flood control projects rather than on construction of new works (World Bank, 1993:61-62).

Widstrand (1980:63) stressed the importance of administration while stating Operation from the point of view of irrigation projects. He interpreted Maintenance as the routine care of installations (embankment, structures etc.). According to him, Operation involves dealing with systems, personnel,

farmers, planners; while maintenance can be done without any contact with farmers and end-users. Van de Laar observed O&M similarly. According to him in early 1970s it denoted Operation and Maintenance, after the design and construction phases in irrigation development, this later on was replaced by the broader concept of Organization and Management (Van de Laar, 1994:24). O&M might collectively be termed the management of completed projects or 'systems'. FAP 13 final report (1992) defined O&M in the following manner, which reflects the narrow definition followed by the BWDB in most cases:

Operation:

Operation is the planning of and execution of water management at the system and sub-system levels. The most common components are the closing and opening of structures which affect water levels in the project, and the monitoring of this operation and the subsequent adjustment of targets and actions to meet the needs of land users.

Maintenance:

Maintenance is defined as actions taken to keep the physical components of a system in a state in which it can operate as desired.

In extension to its given basic definition, FAP 13 adds that operation reacts to changing environmental circumstances in order to achieve targets set to serve the interests of land users within the system. What farmers do in managing their land and water is also operation, but only when this interferes with other land users does it require regulation or interference by the public sector or the larger FCD/I system.

There are several aspects to maintenance: routine or preventive maintenance is normally carried out continually to preserve infrastructure in its intended state; sometime it may be periodic as in the re-excavation of *khals* which are not accessible to this type of maintenance all the time. Repairs may be undertaken in response to emergencies, which may be anticipated but can not be predicted with certainty, or may be carried out occasionally when components are so worn as to be beyond routine maintenance.

Investments in the water sector in Bangladesh are primarily donor-driven and donor dependent. The necessity of subsequent operation and maintenance was not in their aid priority agenda. They were concerned with the construction alone. Only in the late 1980s did they discover these. In case of EIP, is in evidence as Missions started talking about ROM²⁵ projects only in the mid 1980s and

²⁵ Rehabilitation, Operation and Maintenance projects; which was developed out of the frustrating performance of the completed EIP projects. ROM projects were planned to experiment O&M in the completed projects through target group participation. NGOs were planned to be included in the activities for the

other such projects i.e. SSSFCDI in 1991 and FAP 13 study in 1992. Operation and maintenance in its present definition was first clear in the EIP O&M Mission Report 1990 which was a final report proceeded by some other specific case studies of projects on engineering and socio-economic components. Pattern of change of definition of the concept of O&M within BWDB itself can help us to understand its gradual development in a historical perspective.

The experience of EIP with the ROM (cf EIP, 1986) concept, shows that in practice, the agencies in the water sector are not ready to respond to this new concept, which basically developed in a project setting without any proper institutional organization or policy backing within BWDB. At that time the environment in the related field was not receptive to the idea which was primarily planned to be collaborated by the NGOs and their target groups. While even today the main collaboration that BWDB expects to have for the organization of groups are not the NGOs. Rather they prefer BRDB²⁶ which has hardly any well organized groups in the village (cf. Wood, 1994:428-474).

Change of interpretations and practices follow an inconsistent process of paradigm shift more on the discussion and idea level rather than in the real world; initially, emphasis was given to the engineering solution to the problem. Later in the transitional period (existing environment) social components are getting importance together with engineering aspects. In theory it is believed that the future O&M will be guided by strong social component.

The first type of O&M modality is reflected in the East Bengal Embankment and Drainage Act of 1952. It says about the opening and shutting of sluices:

" Sluices constructed in any public embankment shall be opened or shut only by or with the general or special permission of the Engineer or of the officer in the immediate charge of the embankment, under such orders, either general or special, as he may receive from the Engineer" (Govt. of EP, 1967:10).

Next generation O&M is being organized at present in a traditional way putting the existing local UP Chairman/Member as the President of the committee with

organization of groups to be able to participate in the routine maintenance of embankment. In return the group members would have get the right to cultivate and exploit the khas land, embankment slopes, borrow-pits. This concept includes many elements which are beyond the jurisdiction of BWDB e.g. distribution of khas (government) land, leasing of embankment and borrow-pits among the target group members (in EIP main target groups include farmers up to small farmers, boatmen and fishermen who are negatively affected because of the implementation of the projects) etc.

²⁶ Bangladesh Rural Development Board the government implementation organization of Comilla Model

some influential landowners from the area. The Section Officer of local BWDB, who is in charge of the project, becomes the ex-officio member secretary of the committee. There is a standing order from the BWDB to organize such committees for sluice gate with more than one vent. This type of committee approach has undergone change through various recommendations made in different reports (EIP, 1990; EIP, 1992a) for modification. These reports recommended for the revision of these committees, suggested to incorporate fishermen, boatmen, female representatives together with some of the concerned officers from the thana (the then Upazila) e.g. Agriculture Officer, Fishery Officer, BRDB Officer etc.. Incorporation of the different categories of farmers from different land levels are also of these types²⁷ (EIP, 1992a).

Later generation of O&M include two different types. One is to build up user group organizations leading to a users council and another one is project committee concept (SRP, SSSFCDI, FAP 13,). User group concept would tend to exclude non-user groups. Those who have chances to be affected indirectly (e.g. landless, women) and also the users like boatmen, fishermen would have chances to be dominated by the farmers because they are comparatively few in number and weak, which might create another set of tensions within the community. It has also chances to be the follower of the 'top-down' approach because it is being developed to be guided and controlled by the local BWDB. Here intention behind the suspicion is to extend the concept of user group beyond its limit which will be such that it will reach out to the 'non users' and give them access to the scarce resource.

Together with the analysis of PUBLIC GOOD approach the recent realization of flood response from the academics may well be a subject of debate; the realization substantially elaborated (in Haque & Zaman, 1993:93-107; Islam, 1990:31; Boyce, 1991:1-23; Paul & Edmund, 1994:82-97) in line with the debate in between two paradigm: i) structural solution to the problem of flood control; and ii) 'living with flood' or adjustment with the flood. The first approach will have to continue the experiment and develop O&M system, while the later has very little O&M requirement in the traditional sense. Multidimensional discussions have the opinion that both from the peoples and

²⁷ representation from different land levels and different categories are important both from power and demand point of view

sustainability²⁸ point of view, the first approach has a limited scope to respond to the problem, so as to search for proper O&M. The concepts similar to the second and in response to the first are 'Controlled Flooding'²⁹, 'Green River'³⁰, indicate the validity of the line of thinking. While the following discussion on the initiatives taken by the BWDB are largely in line with the first approach.

3.2. O&M at project level; Who is Responsible?

Previous discussion largely reflected the responsibility at sector level and tried to understand the change and trend in O&M in BWDB. In this section the effort concentrates on understanding the responsibilities at project level³¹.

The importance of water to the societies which developed along the Euphrates, the Tigris and the Nile led Wittfogel to propound a theory of water control as a foundation for early civilizations. His main argument was that waterworks for agricultural purposes were so extensive and so important that a well organized cooperation was needed for their construction, administration and maintenance. This in turn led to a need for their centralized decisions from which a certain type of political centralization and hierarchy developed, what Wittfogel called "oriental despotism" (Wittfogel 1957 in Widstrands, 1980:3). If not totally true for the past period, at present it is true for the case of Bangladesh in the present situation. Centralized and government driven activity in the field of flood control gradually engulfing the scattered local community level initiatives. Projects in the modern sense are initiated, planned, implemented and operated by the government. But where there is place still left by the government, are being controlled and protected by the community according to their own definition of projects mostly based on their

²⁸ i.e. sustainable development point of view which denotes the theme "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987:43).

²⁹ the reverse of flood control, rather suggest to entertain the flood on a controlled basis so that both cropping pattern and human can cope with it.

³⁰ instead of confining the river by constructing embankment by the immediate side of the river it provides river to flow taking wider space having marginal interior dykes. It rather suggest to allow the river its own course.

³¹ project here similar to programme which basically adhered to some general elements: i) funded by a specific donor(s) ii) guided by some principles iii) have some special criteria and mode of operendi iv) not necessarily follow the mainstream BWDB rules, rather want to influence the existing for change

own hydrological unit. It is not an administrative unit, rather a hydrological unit formed occasionally on purpose either for contribution or for exploitation.

In theory, BWDB is accountable for the performance of its projects. But insufficient funding combined with inadequate linkages between BWDB and project beneficiaries result in BWDB staff being accountable primarily to their own organization rather than to the beneficiaries. The result is that the staff are more concerned in securing their future within the organization than to deliver a reliable service to outsiders (EIP 1990).

Here there is a big gap between irrigation projects, and flood control/drainage projects. All big irrigation projects are government initiated, some are government controlled and some are jointly controlled by the government and the community. Current practice, initiated by SAP, is to privatize the distribution and control of all the irrigation implements (machineries e.g. LLP, DTW etc.). These were under the control of the organizations like BWDB and BADC³² before. At present small scale irrigation projects are implemented and initiated privately in most cases. These were group managed before they were organized under the active collaboration of BRDB³³. Only FCD projects are totally controlled by the government (through BWDB).

The delineation of responsibilities between Water Development Division and the O&M Division are not clear. It is not always the case that the O&M Division is in charge of regular O&M only. Rather depending upon the workload, they are also given the responsibility for new project construction. The nature of O&M is also an interesting point of discussion. In EIP projects, the O&M component included in the budget as O&M during construction, and three years O&M after the construction of the projects. Construction periods are usually four years. Further thought about the experiment and development of O&M within project framework is only initiated when the decision to withdraw from the project from donor financing is already taken. Operation of the structures are being taken cared of by the traditionally formed sluice committees formed formally

³² Bangladesh Agricultural Development Corporation

³³ Bangladesh Rural Development Board, the follower of Comilla Model

by the official order. Most of the elements accepted now-a-days as the basis for participatory and sustainable O&M for the future, all are on experiment, either already been tested (e.g. in SRP sub-projects) or waiting (e.g. in EIP focus projects) for the same - has to wait for the formal inclusion on a regular basis. It indicates the necessity of institutionalization within BWDB. Conflicts here emerge between BWDB central office and divisional offices, between BWDB and the donors, between the professionals, between the BWDB and civil and local administration, between the farmers, between farmers and other occupational groups, between the people living inside and outside of the embankment, between people who lost their land because of the acquisition and the rest, between people who have land in different land level, between people who have land close to the embankment or the structure point and the rest, between occupational groups who are threatened to lose their occupation and the potential beneficiaries etc.. At present, beneficiaries are slow to respond to the improvements offered by projects as the reliability of project services is uncertain. By the time farmers respond, project facilities have often deteriorated due to the lack of maintenance and project services are no longer available. The internal water management is often complex because of competing demands of different water users and technical constraints imposed by project design (EIP 1990:23).

In another EIP type project SSSFCDI³⁴ as part of the planning and design process, local project committees are formed for each structure or group of structures. Local project committees were recommended to comprising the Upazila³⁵ Chairman, Upazila staff, BWDB staff and representatives of project beneficiaries and other interested groups. The committees were formed during open meetings at which the planning and design of proposed structures were discussed by the project consultants, to the beneficiaries and other interested parties. The committees have become dormant during the construction phase but the intention is to train committee members in the operation and maintenance requirement of the structure and associated facilities when the structure is complete. During the formation, members of the project committees have agreed to be directly responsible for operation of project features and also for petty repairs and maintenance. The main responsibility expected from

³⁴ Second Small Scale Flood Control Drainage and Irrigation Projects

³⁵ which is called thana and there is no position called Chairman for that

the local project committee is to generate necessary public cooperation and participation in attending to the emergency situation (EIP 1990).

3.3. The Ecological Setting

The ecological perspective is very useful because it enables to locate geographically, where problems are, and who will be affected by poor or deficient O&M of BWDB to understand O&M situation in flood control projects. Problem discussion here is limited on the projects under EIP coverage (a map Bangladesh indicating the locations of EIP projects is at annexure 5). EIP has the advantage to have the specific experience of O&M in several unique complex situations. Different types of project indicate the need for some specific consideration regarding the needs of O&M basically because of their geographical location. The types are well indicated in the EIP report (1990) on Operation and Maintenance. They are:

i) Drainage projects: Drainage projects with no irrigation component have no operational requirement, as the drainage occurs without any further intervention or activity being required. If there is an irrigation component, the operational requirements can be complex especially in non tidal areas where the time to prevent further drainage and store water for irrigation has to be decided. Conflict can arise between highland farmers who want to store water for irrigation and low land farmers who want their land drained. It happens because usually there is no device in the *khal* in between two land level to help store water for the high land. The maintenance requirement of canals is unpredictable as the rate of siltation is variable and unknown.

ii) Projects giving Full Protection from River Floods: Operation of full flood protection schemes is complex as the need to protect a project area from flooding has to be balanced with demands for irrigation water from surface sources within the embankment and drainage of run-off from rain falling within the embankment area. Fishing and navigation interests may also influence project operation. If breaching occurs of a full flood protection embankment, farmers may be worse off than without an embankment and it need regular maintenance.

iii) Projects giving Protection from Tidal Flooding: The components of flood

protection of the coastal areas are similar to those areas subject to river flooding. The embankments tend to be smaller as they are usually located on the river bank which is relatively high ground. In addition, irrigation inlets are provided to allow controlled flooding of fields inside the embankment during high tides. As the tide recedes, the gates of the inlet structure are closed to prevent drainage of water.

iv) Projects giving Protection from Pre-monsoon flooding or *Haor*³⁶ Projects: The facilities constructed in these types of projects comprise of embankments and appurtenant structures. By preventing flooding in the pre-monsoon, farmers have sufficient time to harvest their paddy. It involves very high operation and maintenance cost. There are water management conflicts between agricultural users and fishermen. Farmers take the initiative in water management and construct cross dams to retain water for irrigation but fishermen want to drain water to catch fish.

The ecological perspective facilitates to understand the complexity and the performance of EIP projects. They therefore suffered in varying degrees from the lack of adequate operation and maintenance. Operational procedures have been developed on some projects but they tend to be uncoordinated and arbitrary. The procedures are not based on technical or social conditions and often serve the need of a small number of beneficiaries at the expense of the majority of potential beneficiaries. The physical facilities that have been constructed under EIP do not receive the continual maintenance required to keep the facilities performing as designed. Deferred maintenance may lead to major rehabilitation being required. The maintenance carried out on facilities tends to be deferred maintenance wherein the condition of the facility has deteriorated to such an extent that it is not performing the function for which it was designed and major works are required for rehabilitation. On some projects, maintenance requirements are increased by faults in project design. The facilities constructed by EIP are technically straightforward to design and construct but the complexities of their operation have not been fully appreciated. To balance equitably, the water requirements of different users (highland farmers, lowland farmers, fishermen, boatmen etc.) is a difficult

³⁶ Haor is a area where crop is grown only once a year; because of its saucer type depression every year these areas goes under water in the monsoon and submerge the land following flash flood coming from hill side

task that on many projects is far from straightforward (EIP 1990:21).

3.4. Parties Involved in O&M of FCDI Projects: Experience from Cases

FAP 12 (1992:3-5 to 3-11) conducted 17 case studies through RRA as a part of O&M assessment, selecting sub-projects from different regions and types. Interesting also to mention that the projects studied are financed by different donors e.g. IDA, ADB, NTAP and WFP. General findings are discussed citing specific cases when it is necessary. A brief summary of these case studies is also presented at annexure-3 and annexure-4.

Operation:

Operation mainly involves operation of water control structures, although cuts in embankments are also made for operational purposes by insiders. Most FCD projects are highly concerned with drainage, although structures may also be operated for water retention and in several projects there were some irrigation facilities. Virtually all projects had some operating problem, often because drainage facilities were inadequate or could never be sufficient when embankments keep out high river stages and heavy rainfall occurs over the internal catchment of the project.

In three projects (*Protappur*, *Nagor River* and *Silimpur-Karatia*), structures were present but they were virtually not operated. In the first case, water retention structures had fallen into disrepair but ground water irrigation was more important, hence the disrepair did not matter much. In the second case, a cut-breach (public cut) defeated its objectives, and in the third, because the structure were not wanted any way and the project is still open to flooding from a different river.

Sometime, the details of project design cause problems of operation. The most obvious case is the use of fall-boards³⁷ in water control structures - these were often stolen or removed by groups with different operating objectives (*Silimpur-Karatia*), or became easily damaged, or could not be removed when operation was needed. The latter is particularly true of the submersible

³⁷ pieces of wooden blocs which are put in the structure to protect unwanted water; it is put as and when necessary

embankment³⁸ project at Halir Haor where removal of fall boards to equalise water levels, after the Boro harvest but before overtopping, was hardly possible.

There are two components to the BWDB model of operation: paid *khalasies* and committees of local people to advise on operation if there is a *khalasi* or carry out operation otherwise. There are two levels of committees which are possible: project level and structure level in the projects studied. The former is only specified in *Meghna Dhonagoda* Irrigation Project and this is an exception among the 17 cases since it is a major FCDI project with a complex institutional framework laid out in its O&M manual. Nevertheless, it does not appear to have been implemented and a lack of consultation and coordination between BWDB and the Upazila was found during the field visits.

Although some form of structure committee(s) had been established in 12 of 15 projects with structures to operate, these were functioning to some extent in only seven of the projects. The precise task of these committees appear to be unclear at the field level. There were no attempts to establish these committees as representative and accountable groups for water management with any permanency or formal status in any of the projects studied. Organization of the committees are typically entrusted to lower level staff - Section Officers and Work Assistants. Even where these staff members are well intentioned and take this task seriously they have no training as community organisers and are inclined to assign responsibility to someone else, often a local influential person. In general there is a lack of institutional and technical support for the committees.

Operation of structures usually becomes dominated by local 'influential' people. It seems from the case study experience that some patronage from local elites is inevitable and probably desirable. It is necessary to ensure that they have common interests with the majority served by the structure. Sometime local elites (such as UP chairman) ensure reasonably fair and efficient operation of the structure (*Halir Haor*). In other cases they operate the structure to further their own interests or remove vital parts to prevent it

³⁸ it is a kind of dwarf embankment which allows flooding after a certain time; usually in the haor (large depression) areas such kind of embankment is constructed, where embankment is designed to protect dry season paddy (Boro) from early flood

being operated against their interest (*Chalan Beel Polder D*).

Operation often adversely impacts at least on one interest. There were frequently reported conflicts of interest in opening and closing regulators and sluices. In a majority of projects (9 out of 15), there were some conflicts between fishermen and farmers. In a few cases this was severe. Only in two projects (*Nagor River* and *Polder 17/2*) did fishing interests clearly have the upper hand (the latter is a special case among the projects studied since much of the project area is under shrimp cultivation). Conflicts over the appropriate level of drainage are also often found. Difference between farmers on high and low land were noted in seven projects. Conflicts between insiders and outsiders are also noticed.

Maintenance:

Maintenance concerns both earthworks (embankments, canals) and structures. The canals and structures are part of the water management problems discussed in the previous section. Operating problems are summarized in a table at annexure-3 and may be due to maintenance problems.

Table (annexure-4) shows widespread multiple use of project infrastructure, particularly use of embankments as roads and often for cultivation of trees and bushes, but also in a few important cases for housing. Embankments are often used as places of shelter during high floods, by both outsiders and insiders. Most embankments were in a generally poor state of maintenance and unregulated uses contribute to this, although they provide some benefits to users.

Breaches were associated with overtopping due to greater than design standard events, erosion, failure of weak points in embankments (for example cuts made for irrigation inlets - *Chalan Beel Polder D*, *Kahua Muhuri*), or more rarely with poor construction. Breaches have occurred in 11 out of 17 projects. Erosion has been notable in four of the projects (*Kurigram South*, *Meghna-Dhonagoda*, and the two reaches of BRE - all are along the main rivers), but affects ten projects to some extent. As a result resources are continually expended in protecting embankments from erosion, although the problem is ultimately one of inadequate set back distances compared with the intended life of the project (in MDIP two retirement was needed before the project was

completed).

Off site impacts, including higher water levels during floods, or more rarely impeded drainage for outsiders, were sufficient for people outside the projects to cut the embankments in four projects (creating a maintenance problem). In one case this was a result of disputes over cross-border flows and structures in India (*Sonamukhi-Bonmander*). These cuts indicate planning problems resulting in negative off-site impacts of problems in adjacent projects, and this is particularly a problem in the Atrai Basin projects - *Chalan Beel Polder D*, and *Nagor River*. In other projects, such as *Silimpur-Karatia*, outside interest mean that the sluices are left open (an 'operating problem'). In cases where the conflict of interest is clear, in others it may be that the project does not adversely affect flood levels outside. But people believe that this is the case.

More common (affecting eight projects) were cut of embankment made by the inhabitants of projects. These cuts were made to facilitate drainage in most cases, and in a few to introduce water for irrigation (*Kahua Muhuri*) or shrimp farming (*Polder 17/2*). These are operating problems, but again may be due to inadequate drainage capacity, additional water due to other cuts by outsiders (*Chalan Beel D*) or higher river levels than anticipated in planning due to confinement of rivers, rather than to simple operating difficulties.

In general there was very little evidence of maintenance work on regulators. Damaged gears were not uncommon, while *khal* re-excavation appears to be neglected or infrequent in most projects - there having been none since project completion in a number of cases (e.g. *Katakhali Khal*).

In the last three columns of Table (annexure-4), an attempt has been made to rate the relative contribution of planning, construction, and inadequacies in O&M (resources, management, institutional problems) to the overall O&M condition and performance of the projects. The two projects with no apparent O&M problems *Silimpur Karatia* is not operated or maintained as the structures, have to date, been more or less an irrelevance. The Table indicates that construction failures were relatively less important factors, although they are important in retirement of the BRE and are important contributors to the low performance of three projects. However, the various problems involved in

O&M are interlinked and it is difficult to generalise a single cause or even a key symptom of poor O&M.

The discussion here gives us the picture mostly at the project level then later followed by some case studies. These discussions indicate the conflict situation that exist in the flood control projects specially in the field of operation and maintenance. To have a wider and in-depth insight about the problem of operation and maintenance and to interpret the significance of ecological perspective, Coward's (1991, in Cernea, 1991) framework, which is basically used for the analysis of irrigation system, in a changed order, may be useful for small scale flood control project situations. The ecological perspective facilitates the discussion of a certain problem from different geographical setting. Keeping the institutional and organizational aspect in focus, the problems could be seen from its key rules, roles played by different parties involved in different stages of project identification, planning, design, system operation and maintenance, resource mobilisation, and conflict management. Problems that accumulated in the previous stages of the project cycle becomes more complex in the successive stage - this necessitates the need to include the project identification and project planning stages in the framework. The next chapter explains the framework elaborately and the following table indicates the same at a glance.

Table 3: FCD/I system activities, by institutional and organizational elements

Task	Institutional and Organizational Element		
	Key rules	Important roles	Significant social groups
Identification	Rules for identification of new projects	Roles played by the professionals/agencies concerned	Groups those are involved
Planning	Rules for project planning	Roles played by the parties involved	Groups those are involved
Design	Rules for design	Roles played by the parties	Groups those are involved
Implementation	Rules for project implementation	Roles played by the parties	Groups actively and indirectly involved
System O&M	Rules for O&M	Roles played by the different agencies	Groups those are involved in doing so
Resource Mobilization	Rules for mobilising resources locally and centrally	Roles played for resource mobilisation	Groups who are involved in doing so
Conflict Management	Rules for avoiding or resolving disputes within and outside the system	Roles for mediating disputes, judgement and enforcement	Groups that participate in settling disputes and enforcement

Source: Coward (1991, in Cernea, 1991); [changed for appropriate use in the following chapter]

Chapter IV

4. Conflicts: Tasks, Rules and Roles in Phases

The discussion in this chapter will focus on the experience of EIP as an organizational section, since it has been engaged in planning and implementing small scale flood control projects for a long time. The discussion will focus at the micro level for a detailed understanding of the problems and subsequent conflicts. Conflict analysis will highlight and focus the section on System Operation and Maintenance which of course have link with the preceding and succeeding sections.

4.1. Identification

Identification process of small scale flood control and drainage project within BWDB follows no clearly set rules. It has many dimensions depending upon the situation in which the birth of a project concept takes place. In most cases, the local BWDB division or sub-division first prepares a project from a geographical point of view locating the area in the map, looking at the potentiality of matching with the set criteria, motivated from its engineering and construction culture (World Bank, 1993:61). Other possible approaches could be to prepare projects upon the request from the local elites, UP chairman/members, MP (present or future), high officials (of BWDB or in the civil service), etc.. Conflict arise out of the lack of reflection of the local farmers needs in the proposal prepared by the engineers, where they used to grow their crops, for which the system is proposed. But the conflict does not appear in the forefront because the proposed plan is not even known to the farmers before, until they encounter the questions from some other group of 'rural development tourists' (Chambers, 1983) in the name of RRAs, or similar investigations. These 'tourists' work in a limited scope which is almost pre-determined by the engineering colleagues by providing some project area map. This map is supposed to indicate the infrastructures that are proposed to be constructed, which in a way tend to limit the observation on only infrastructure. The group used to confront a lot of modification proposals and change of the project concept but very little of them are accommodated finally. The well-off farmers are still in a better position, their interest is cared for and their views are taken into consideration but for the target

groups (EIP Target groups who are mentioned later), the voices hardly reach to the decision makers.

4.1.1. Rules for identification of new projects

The very first criteria for a sub-project in EIP is limited to technical considerations in phases I and II (1975-1985). In phase-I, it was directed toward 'concentrating on small and relatively simple projects that could be implemented and completed within a short time'. Which now end up along with a couple of elements in the course of its phases until it reaches the (final) phase IV. In its second phase the element of 'target groups' was included together with technical consideration which failed to influence the mainstream criteria of 'engineering flood control intervention to increase agricultural productivity'. In the Third Phase (1985-1990) the new socio-economic criteria formulated by EIP is as follows:

"Landownership should be more favourable than the average for the target group and no small group of landowners should have a firm control over the area"

"Negative effects on groups such as fishermen and boatmen should be minimised and/or any loss of income or resources compensated"

Along with the aforementioned conditions some other conditionalities were also mentioned in the Phase III document. They are: i) distribution of unutilized khas land among the landless ii) to organize target group members (EIP, 1992b:8).

Also at phase IV, in technical and engineering terms the EIP remained the same, even if it ventured into a larger variety of ecological and hydrological situations. On the one hand it emphasises the need for more explicit measures to increase the socio-economic scope of EIP. On the other hand it conveys a caution against deviating from the more limited objective of increasing agricultural productivity through engineering measures, indicating a vague distinction between 'beneficiaries' (which are likely to be better off farmers) and 'target groups' of disadvantaged people, including 'destitute women' (EIP, 1992:9). The criterion of size of the project or development cost per hectare also matters when it is found to be necessary.

4.1.2. Roles played by the agencies and professionals concerned

In the identification stage, the criteria are not even sometimes known to the field offices who are primarily involved in preparing the project. The field BWDB engineer(s) (XENs/SDEs³⁹) fall at the central point of the conflicts. The farmers and other occupational groups are at one side of the conflict, but they enter the picture only at a certain period. Some of them are never in a direct conflict because of the denial of their rights and existence e.g. the poor fishermen and boatmen. Conflict arises between the field office and the central office of the BWDB, because the immediate interest of the field office is very much motivated by their construction culture compared to that of the central office engineers. Involvement of other professionals in this stage is very minimum. Primary calculation about the post project benefits in terms of agriculture is mostly done by the engineers themselves. The economists are not at all involved at this stage. The social scientists come in the picture at a low profile as members of the consultant team together with the fellow consultant engineers. The role of the political elites, both at local and central level, is more important than other professionals and the potential 'beneficiaries'. Very often there are two factions, faction in power wants to have some activities in their constituency by which they can show their effectiveness in delivering their political promises. On the other hand, they can create an opportunity to earn for them, as well as for their clients directly and indirectly from the (project) activities.

4.1.3. Potential conflicts

Conflicts here are mostly ignored or denied because none of the parties are concerned about the conflicts. Everybody consider this at the very early stage when the fate of a project is not yet determined. The people who propose for the project try to sell it to every potential donor who might show interest. Project processing takes such a long time that nobody in the system can be ensured of his future involvement in the project, if it is implemented. The planning authority (e.g. EIP) in the central office receive many project proposals every year, initially they have very little scope to show interest about specific projects unless there is any special pressure from the locality

³⁹ Executive Engineer (XEN), in charge of a field Divisional Office; Sub-divisional Engineer (SDE), is in charge of field sub-division

or from top political or civil bureaucracy. As indicated before the real potential 'beneficiaries' have very little chance to know about what is going to happen with their fate. Even if they come to know it by any chance, they show least interest, because they possibly heard the same a long time before.

In order to avoid potential conflicts in the future, simple and comparatively less costly projects are selected. This easy approach could generate different kinds of conflicts in the next phase of the project cycle due to the non-consideration of other potential important elements of conflicts.

4.2. Project Planning and Design

Project planning and design is an arena of multiple interest and conflicts. The main conflicts take place among the professionals, between the professionals and the administrators, between the planners and the appraisal mission (in case of EIP), between the mission and the donor representative (the local embassy), between the farmers and the planners, between the farmers and other negatively affected occupational groups (e.g. fishermen, boatmen), between the local BWDB and the central planning office of BWDB, between the potential landowners who are going to lose their land for the alignment and the local BWDB, between the businessmen who lease the fishing bodies and the local BWDB/planners, between the petty businessmen who use their small boat for their business and the local BWDB/planners etc..

Conflicts here starts brewing on the surface gradually until it burst in the next phase, if the project is implemented. The conflicts between the farmers and other occupational groups with planners have very little scope to encounter each other. Scope is limited and it is only visible in the feasibility report in its socio-economic part, which is written by the consultant social scientists, mostly having a low voice in the planning team. Main conflicts remain limited among the professionals and exclude the real beneficiaries. The real beneficiaries step into the picture only in the implementation and O&M stages.

4.2.1. Rules for project planning and design

In recent years, the academics and the policy makers have arduously debated on the question as to whether solutions lie primarily in the prevention of

floods through structural measures or whether there should be much greater emphasis in the development and implementation of non-structural measures that mitigates the impact of the floods (Haque & Zaman, 1993:95).

Flood years in 1987 and 1988 can be considered as the turning point in the recent history of Bangladesh in the flood control and water development sector. Policies, planning criteria, design criteria, concepts of flood, idea of peoples participation - all these element got a shake from this time. EIP is in the middle of both traditional and the new, and is to encounter conflicts of both types. Before 1987 and 1988, the mainstream design and planning criteria concentrated to the structural, engineering and micro solution to the problem but later it is moving more and more towards the non-structural, regional, participatory approach of solution to the problem. In most cases it is guided by the former approach which is gradually being challenged by the later, apparently by the pressure from outside. It is partially because the Flood Action Plan (FAP) reports are not integrated in addition to other shortcomings; those reports are supposed to serve as a guide in the sector.

It is expected that starting from the project identification stage, the professionals working within EIP have to work as a multi-disciplinary team, so that the potential future conflicts on issues can be minimised. Communication with the local government offices at the thana level, NGOs in the locality, the UPs and the potential 'beneficiaries' are made so that future cooperation in project implementation and in O&M - cooperation can be ensured and conflicts can be avoided.

4.2.2. Roles played by the parties concerned

The shift in changing the concept of flood control and water development sector, and the subsequent conflict is well represented in the course of planning and appraisal of few EIP projects in the Nagor and Atrai River basin (*Bogra Polder 4, Gur-Nagor Minipolder, Naogaon Polder 2* etc.). Here conflicts arose between the planning office (DPS IV) and the (donor dominated) Appraisal Mission. In *Bogra polder 4*, the social scientists happen to be in agreement with the Mission members on social issues. They reflected the views of the people who were not at all willing to sacrifice their navigation and fishing

advantages; and for the target group the long stem monsoon paddy seemed to be more profitable than the other types which are possible to grow in post project environment. So, in general, people did not like the concept of typical structural solution to the problem as suggested by the technical team.

In most cases, the agriculturist within BWDB play a supportive role to the engineers. Although they officially have separate professional status but because of the overwhelming control of the engineering bureaucracy and their deputation is mostly under the engineers; their independent stand can hardly be observed. The role of the economists are more submissive.

Roles played by different researchers for the planning stage can not be conflict free. The parties involved in the field i.e. researchers, social groups and people who are the objects of such research, donors, users and the 'Gatekeepers'⁴⁰, are in conflicts of interests which are major obstacle for critical research⁴¹ (Adnan, 1992:1-4) as well as for useful project planning and design.

Working environment in EIP is somehow peculiar in the sense that its set up is very different from any other programmes within BWDB⁴². There are conflicts of interests among and within the groups. The two major groups involve in the conflicts are the BWDB members and the non BWDB members. Cooperation among the expatriates, the local consultants and the NGOs is common because of many reasons; one of the main reason is the financial dependency and the terms and conditions of the contract of each concerned. The advantage for them is that they are in a position to raise issues which are pertinent for the potential adversely affected groups. Potential victims can be the people who are going to lose their land for the construction of embankment, structures etc.; petty businessmen who often use their small boat

⁴⁰ in case of Bangladesh the bureaucratic and technocratic functionaries serve as the principal 'Gatekeepers'

⁴¹ Adnan defined critical research: the research which will facilitate to expand un-distorted knowledge, criteria of evaluation should be social cost and benefits rather than the private gains and losses of particular groups, coteries, conglomerates or individuals of importance and there should be no 'conflict of interest' situation obtaining in the case of funders, gatekeepers or research agencies involved (Adnan, 1992:2)

⁴² Here, there is primarily two groups: one is BWDB staff members consisting of engineers, economists, agronomist; and another group of local and expatriate consultants, consisting of engineer(s), socio-economists, and agronomist.

daily, the professional boatmen who are going to lose their occupation, the poor fishermen who used to have free access in the fishing bodies - for the construction of embankment or sluices. In rare cases, issues raised get importance and studied further and in most cases the conflicts are avoided. Even a simple modification proposal expressed by the people, of the original plan made by the engineers may appear to be impossible⁴³. Problems may also arise from the ecological ground which farmers used to refer during the planning period but very little is entertained in the conventional planning process. Because of the cordoning-off (polder) concept, embankment problems arises in the use of canal water, i.e. water can be polluted⁴⁴ (*Pathakhali-Konai*), in a non-EIP project, *Beel Dakatia*, water pollution due to water logging reached a dangerous level which generated so many other related conflicts (cf Adnan et al 1992); lands can be deprived of useful silt which is beneficial for paddy production (Brammer in Boyce, 1991). These problems are known to the farmers and they used to request for consideration of these problems during the planning time. But these requests are either ignored or treated as the version of the 'ignorant people who do not know where their benefit lies' (Chambers, 1983). None of the farmers want to lose his land even if it is good for him, and it is very logical in a country where the percentage of landless people are very high and land-man ratio is only 0.32 acres per person (Asaduzzaman, 1994a:6). Even if they agree to give land, they want to have the guarantee that they will get the compensation immediately. Which is simply impossible in the present situation for many reasons. One of the vital point is that the matter is dealt with by the land administration which is beyond the control of BWDB. Tremendous conflict arises in the implementation stage because of land related problems.

Another type of conflict arises among the cultures where the expatriates work as donors, as consultants or as researchers. Problems originate out of their misunderstanding about the culture of the society to whom they want to give their services to. Their imposing tendency in many respect makes things

⁴³ Case studies on the problem of navigation in Polder 41/7A and Singer Beel projects were done. Conflicts of interest between the farmers, the boatmen, the petty businessmen and differential interest between the land levels were noticed (cf. Salahuddin, 1990). Main reason why the problem was not entertained later in the final design is technical and from the financial ground.

⁴⁴ one study project called Sustainable Use of Water Resources (SUWaR) is dealing with these types of problem in flood control projects; this is a joint project of The Bangladesh University of Engineering and Technology (BUET) and The Royal Institute of Technology, The International Unit, Stockholm (cf SUWaR Project Document, BUET & RIT, 1991)

complicated. In many instances in EIP the donors postpone the decision about certain projects on grounds/precondition which appeared to be very difficult to be fulfilled easily (e.g. distribution of *khas* land in *Polder 65/A1* and *Naotana khal*, involvement of NGO(s) in *haor* projects etc.). These are some of the examples of insufficient awareness about the culture and society from the side of the expatriates.

4.2.3. Potential conflicts

The main conflicts here are limited among the parties who are going to provide funds for the project, people who are going to implement it, people who are going to monitor the project in the future and the people who were involved in the planning as consultants. People who will be responsible for O&M should have been in the forefront but since O&M is not institutionalized in modern sense yet, they are same people who are going to implement it. This is true in case of small scale projects. Because small scale projects are being implemented mostly by the O&M divisions. The real 'beneficiaries' i.e. the farmers as a party here are in silence. The people who are going to be negatively affected are also silent, very seldom they have a bit louder voice. Some of the conflicts kept silent in this stage can well be manifested in the next stages, especially in the O&M phase.

4.3. Project Implementation

Project implementation in its formal term is purely an area of the engineers. Where the Executive Engineers in the Divisional offices exercise the overall power. From EIP the BWDB engineers and the consultants play the role as monitor which is related with the disbursement of fund. After 1988, implementation of EIP funded projects are partially being done by the Landless Contracting Societies (LCS⁴⁵) in its earthwork (25 per cent) part; for which the NGOs are cooperating providing their landless groups, organizing them and facilitating their activities in every respect. So in EIP project implementation process LCS becomes a party involved in the conflicts.

⁴⁵ EIP introduced an order for the first time in BWDB that 25 per cent of the total earthwork in its projects to be allocated to the Landless Contracting Societies (LCS) who will be organized by the locally available NGOs. They are usually given the contract at least at the schedule of rates and do not need to participate in the normal bidding. The contract is given in the name of the leader of the LCS who is democratically elected by the other members but the profit of the contract is distributed equally according to their work point (cf. EIP, 1994).

4.3.1. Rules that guide project implementation

For the implementation of the project the physical work is contracted out to the private contractors usually in a formal bidding system. The local Executive Engineer (XEN) is the main contact person for them, who time to time give orders, disburse money upon the progress of work, make reminder for slow progress and report to the monitoring office (here it is EIP). For EIP projects the XENs are now to deal with NGOs, to allocate work for them according to the agreement, select site for their work, help them in the field because they are vulnerable, support and protect them in every stage of implementation. The problem which both executive engineer and the contractor are to confront with is the land for the construction, land for taking or compiling earth, to avoid the homesteads, public places e.g. schools, praying places, markets etc.. It is expected that land acquisition is done, and alignment for the embankment is fixed which is undisputed. It is important that the money is placed in the account of the XEN so that he can disburse it immediately upon valid claim of the contractors.

4.3.2. Roles played by different agencies, parties, and professionals concerned

In practice in this stage it is very difficult to satisfy or follow the rules for the implementors. All parties concerned used to play differently to twist the system according to their own advantage. Work never starts on time, money is never placed on time to XENs account. Land acquisition is never done by the administrators on time, tender is never floated on time, contractors do not start their work in time, people are not warned on time to evacuate the alignment, people are not paid the cost of shifting their homestead from the alignment, people are not paid properly if they lose their trees, the LCS groups are not given their section on time, people are not told if there is a cross dam going to be constructed on their *khal*, boatmen are not told to look for alternative jobs if their occupation is going to be threatened, the petty businessmen are not advised on how they can cope with the changed situation, etc.. The list can go on and on but the point is these multi-faced problems always arise as long as there is really no one who will take responsibility of solving the problems. The people from outside the area suddenly are faced by threats due to construction at the other side. They suddenly realize that their houses may just be submerged under water even if

it is just a regular flood, their drainage system may any time be blocked by the cross dam at the other side of the new embankment. Both for the insiders and outsiders it is not easy to accept such serious implications what they might have happened to here or were asked by the strangers⁴⁶ in the planning stage of the project in a very informal way.

Very often the 'beneficiaries' take the interventions as the decision of the government which they have to accept. Immediate reaction of the 'beneficiaries' is neutral. The people in the 'net'⁴⁷ look for the opportunity to earn something out of the intervention activities. There are instances that they play the role of the intermediaries when there is any dispute with the land or any other resources; sometimes they also provide manpower to work as sub-contractors to the contractors. The immediately adversely affected 'beneficiaries' sometimes resist but in most cases they are 'managed' by the intermediaries; in a few cases there are clashes which results to the postponement of physical works. In the existing top-down process everybody wants to earn something out of the opportunities; no one wants to contribute anything on a voluntary basis.

In case of LCS the conflict arises between the BWDB and the NGO, between NGO and the traditional contractors, between the LCS members and the contractors, between the land owners and the LCS members because of the land acquisition problem, between the BWDB field office and the central planning office. The creation and implementation of LCS system, indirectly reduced the total work under the normal bidding. This made contractors and the field BWDB officials unhappy. Moreover the support they get from the NGOs and the central office help enhance their working condition and ensure better work and wage, which normally the contractors can not provide to the normal labourers (cf. Sabri & Das, 1990).

4.3.3. Potential conflicts

Conflict here mainly shifted to the field. The 'beneficiaries' do not raise

⁴⁶ data collectors or the RRA team members

⁴⁷ vicious circle in which rural poor suffers and exploited, created out of the rural power structure (cf. BRAC, 1980)

conflicts in this stage unless they are severely affected. Usually they react, after the project implementation is completed and it (project) starts giving the 'benefit'. But the immediate victims of the project implementation, especially the people who lose their land, usually confront people in the field; mostly they are the contractors or their representatives. Those who are really responsible, namely: the officials in the administration, are too far away to be confronted. The indirect victims i.e. the poor fishermen and the poor boatmen rarely raise their voices, neither is the system of justice accessible to them. Until now the LCS and other concerned potential parties for conflict mentioned above are not confronting each other and it might continue to remain so, as long as the programme (EIP) is giving support to them, if not it be institutionalised within the BWDB normal system. Most problems that originates from this stage but are not raised on the surface, may be visualised in the O&M stage with its different dimensions and magnitude.

4.4. System Operation and Maintenance

A useful analytical framework putting some light on the important factors has been proposed by Gisselquist (1991 in Duyne, 1994), who argues convincingly that only one category of water management projects failed to perform as planned due to poor O&M. Gisselquist's "taxonomy of failed projects" helps to classify the BWDB projects in four different categories: projects with poor concepts, projects with poor design, projects with poor construction and projects with poor O&M.

What is argued here is, in its present state, there is no O&M existing in the BWDB projects. O&M has been used in its very narrow sense as evidenced by the above classification. Starting from the concept, the design and construction - all contribute to form the basis of poor O&M which by itself later becomes the victim and is blamed for the failure of the project.

O&M in its traditional form has little conflicts than its present form where O&M is likely to be interpreted as organization and management instead of operation and maintenance. In EIP projects it is still interpreted in its traditional meaning but since it is in a transitional stage, it is badly trying to switch over to the modern one. But in SRP and in the FAP it is

already on the agenda to adopt O&M in its 'modern' sense. From the perspective of both examples that are discussed below, there is an indication that the O&M of flood control projects are full of conflicts.

4.4.1. Rules for O&M

The objective of O&M within EIP is to develop and apply sustainable O&M models that will improve the reliability and long term performance of EIP projects and ensure an equitable distribution of benefits from the projects. Institutional arrangement will be developed. Beneficiaries and other interested groups will be involved in the operation and maintenance of the projects. Main activities that proposed to be taken up are i) routine maintenance, ii) deferred maintenance, iii) emergency maintenance, iv) major repair/new works, vi) institutional development, vii) water management models, viii) monitoring, ix) training, and x) research (EIP, 1990:32). The issue of institutional development involves mainly the strengthening of the traditional sluice committees and to think about the formation of project committees. Change of the traditional engineering response to O&M problem management is also an objective. Water management model is expected to deal with the issues and problems that involve the requirement of water at different land level and for different crops.

"Guidelines for People's Participation" in water development projects prepared jointly by BWDB, MIWDFC propose that to ensure better O&M, the system users will be organized following a one to three tiered structure, depending on the size and complexity of the system. At the tertiary level, it is the water users group (WUG) which will represent in the water users committee (WUC), which will further be represented in the water users association (WUA) (FPCO, 1993). If there is more than one WUA, an additional organization will be represented by the Federation of WUA (Duyne, 1994:5). This will have further relation with BWDB on administrative and technical matters.

The guidelines thus confirm the difficulty the BWDB has in understanding the socio-economic implications of their work, and they question as well the will and capacity of its staff to change the existing relations with their 'beneficiaries'. In fact, the conceptual framework of the Guidelines is based on the assumption that all farmers, independently of their socio-economic

status and amount of land cultivated in a specific project area, have common interests and equal opportunities to participate in the management of a system. In particular, the rigid hierarchical structure of water users organizations which hint that final decision-making will be made essentially through negotiation between highest level representatives of the common users and the water management bureaucracy, disregards completely the land tenure system and the related power structure.

A further assumption is that farmers would welcome the idea of getting organized to take over major responsibilities in O&M. It is suggested here that farmers' willingness to participate in O&M largely depends on the extent to which water management infrastructure is vital to the subsistence of the community.

4.4.2. Roles played by different departments, professionals and significant beneficiary groups

Embankment deprive the farmers of the beneficial effects of 'normal' seasonal floods (barsha), which is viewed as a beneficial phenomenon. Very often, this is not recognised by the normal professionalism. So whenever the system is built denying the popular belief, the believers among the farmers confront with the non-believers of this wisdom.

Land acquisition continue to be a source of conflict. In some projects, the problem with land acquisition is not solved even after so many years after the completion of the project (polder 43/2c). This creates problem when any initiative is taken for embankment maintenance or sustainable maintenance experiment⁴⁸. The people who still state their claim on embankment land, get involved in the conflict particularly against the parties involved in maintaining the land. The land acquisition problem may become even more complex. People having connections with the land office might take the chance to collect compensation money in the name of the real owner, who will of course proceed to claim what he is entitled to, for his land. Vested interest groups⁴⁹ can change the alignment in accordance with their own interest, even

⁴⁸ e.g. employment of EMGs (embankment maintenance groups) or experiment of biological protection of embankment in the project mentioned

⁴⁹ large/rich farmers, contractors, high officials within and outside BWDB, politicians

if it may go against the hydrological requirement.

Inter project conflicts became a very big problem in the water management project in the northern part of Bangladesh. The kind of problems which emerged involve design, planning, drainage, waterlogging, lack of drainage in the perennial river at the off-take of the canals; and these problems were well concretized in the case of three EIP projects: *Nagor Valley*, *Nagor River* and *Raktodoha Lohachura*. The problems of these three projects appear to be interlinked, and there is a basic flaw in their design because the interaction between projects has not been taken into account adequately during the design⁵⁰ stage (EIP, 1990:13).

Preventive embankments tend to provide a false sense of security and, ironically, may actually lead to an increase in flood damage. The findings in a recent study in southern Bangladesh by Stewart (1988 in Haque and Zaman, 1993:101) show that the average material damage was worse in areas inside the embankment compared to areas outside of it. Similar problems have been experienced by other projects, e.g., *Raktodoha-Lohachura* in the north of Bangladesh. When the people do not see any substantial benefit from the project for the purpose it was meant for, then they want to (mis)use the system according to their own individual benefit. It is a kind of denial of the principle goal of the project. There are instances that people cut the embankment in several places to get relief from the pressure of water to their homestead located outside of the embankment, even when their own crop land is threatened inside. People cut the embankment even for the reason of fishing (*Raktodoha-Lohachura*). Very often people from outside of a certain project want to destroy the embankment at the other side of the river, when it tends to create drainage problem for them. Sometimes it turns out to a violent conflict between the insiders and the outsiders (*Sonail Embankment*).

⁵⁰ "Three EIP projects, *Nagor Valley*, *Nagor River* and *Raktodoha Lohachura* are located in adjacent areas on the left bank of the *Atrai-Gur* rivers. The drainage sluices of *Raktodoha-Lohachura* are located on the high land beside the *Jamuna/Atrai* rivers. Sluice operation is controlled by highland farmers living in areas adjacent to the sluices. Their interest during the monsoon is to ensure adequate irrigation water for their transplanted *Aus* and *Aman* by letting flood water into the protected area through the sluices. Unfortunately, only a small percentage of the water flowing into the protected areas used for irrigation and the remainder flows into the adjacent *Nagor Valley* project. The southern area of *Nagor Valley* project around *Kharsuti Khal* is low-lying and considerable drainage congestion occurs inside the project because of high water levels in the *Atrai* river. Attempts to give *Nagor Valley* full flood protection have failed because of the accumulation of water inside the embankment. The problems of high water levels in *Nagor Valley* are compounded by the embankments of the *Nagor River* project on the opposite bank of the *Nagor River*. Farmers from the *Nagor Valley* project then cut the embankment of the *Nagor River* project to relieve drainage congestion in the area. Unfortunately this action nullifies the flood protection component of *Nagor River* project" (EIP, 1990:13).

If there is an irrigation component together with flood control and drainage, the operational requirements can be complex especially in non-tidal areas where the time to prevent further drainage and store water for irrigation has to be decided. Conflicts can arise between highland farmers who want to store water for irrigation and lowland farmers who want their land drained (*Singua River*) (EIP, 1990:11). In polder 6/8 extension, structures in the north are used by farmers to supply water for irrigation. Unfortunately, excess water drains southwards and results in drainage congestion and water logging of the southern land. The farmers constructed a cross dam to prevent water coming from the north from flooding their area but the northern farmers retaliated by demolishing the dam as water, likewise, accumulated on their land (EIP, 1990:17). Such problem with flashing and drainage problems are common, thus resulting to regular conflicts between north and south, and east and west.

Embankments impede the movement of freshwater fish and cut off their spawning areas, hence, it threatens the occupation of more than a million fishermen and jeopardizes the already marginal supply of animal protein in the diet of the majority of the people (Zaman & Haque, 1993; Asaduzzaman, 1994b). This has an effect of destroying Common Property Resources (CPR). In a post project situation the CPR decreases and the access of the poor to the fishing bodies also decreases; and their interest confronts with the newly established lessee groups who are involved in safe Culture Fishery in the flood controlled ponds, canals and depressions (*beels*). It is always a case of conflict in almost all flood control projects that the fishing interest to drain/retain the water never match with the interest of the farmers. In the *haor* areas of Bangladesh it is a regular feature of conflicts where the big fish businessmen⁵¹ reside in areas outside of the project location, and therefore, do not care about what is happening with the farmers living in the project area.

Shrimp cultivation versus agriculture also poses some kind of conflict between the farmers and the shrimp cultivators. In most cases, the shrimp cultivators either are the large farmers from the project area or outsiders who are rich and with established connections with the administration. The small and the medium farmers receive little, if any, compensation for the loss of access to

⁵¹ One clear distinction between the fish businessmen and the poor fishermen is that the businessmen are rich and do not do the fishing as their occupation rather they only invest money sitting in the big towns and employ people to look after the leasing bodies; mostly have very strong link with the local and central administration.

their lands. Prior to the advent of shrimp culture the projects were beneficial to all groups of farmers, but thereafter, the benefits have been captured by a few farmers⁵². The time the shrimp cultivators want to take in saline water usually mismatch with the demand of sweet water for agriculture. Saline soil content in the gradually increases, and thus, results to a decline in crop yields. This makes the long term perspective for agriculture very uncertain. Nationally, export of shrimps earns much needed foreign currency. Income per unit of land is much higher from shrimp culture than from agriculture. The main problem is with the distribution of benefits (EIP, 1990:16), as well as, with environment (Khan, 1994:20-21).

Embankments and structures can cause severe disruption to navigation, and project facilities are often damaged by boatmen trying to pass through. Boats are important, if not the only means of transport especially in the southern regions of Bangladesh.

Sluice committees are formed as needed in functional project. The legal authority continue to reside with project management, these committees are given advisory roles in managing operations. It is presumed that these organizations would be able to represent the interests of all the beneficiaries of the structures concerned. These sluice committees often turn out to be dominated by specific coteries or kin groups of local influential groups, to the exclusion of less advantaged users. In other cases, such communities were found defunct or virtually non-existent (Adnan, 1992:42). Study in one EIP project found that "... the sluice committees have a strong elite bias, and often no clear distinction is made between sluice committee matters and general Union Parishad politics" (Johansson and Hultin, 1991:22). On the involvement of landless in O&M, the study found that this was a totally alien concept, and then even if landless and marginal farmers were nominally made members of a committee, in reality they still lacked any effective influence (ibid:23). Domination of committees by influential persons often led to conflicts between social groups⁵³. The factor dividing the conflict group

⁵² in one of the projects (Polder 35/3) it is reported only eight large families are controlling the whole area shrimp.

⁵³ for example it can be the ownership of handle (to operate the vents of the sluice) which became a key symbol of power in control over management. Possession of the handle reflected the current balance of forces in an on-going struggle between different interest groups. Its significance is highlighted by reports of theft or conflict over the handle.

sometimes could be locational advantage and disadvantage, rather than wealth and class (Adnan et al, 1992:42-43).

4.4.3. Potential conflicts

Conflicts here are diversified. The group of implementors, the professionals, the vested interest groups within the BWDB and in the administration, the businessmen who have interest on different resources available in the area; on the other hand there are the 'beneficiary' farmers, fishermen, the boatmen, the victims who lose their livelihood and land, the 'non-beneficiaries' who are the victims of diminishing protein deficiency and environmental hazards because of the project performance - are involved in multi-dimensional conflicts.

The 'beneficiaries' are divided depending on their livelihood pattern, occupation, categories, location of land they own/live, the connection they have to be able to exploit secondary sources of livelihood. Their conflict between highland-lowland, between drainage-flashing, between agriculture-fishing, between agriculture-navigation, between inside-outside, between project area and outside project area - none of them are created by them. In most cases they are the result of the conflicts between the wisdom of the 'beneficiaries' and the 'will' of development partners. The cost out of these conflicts are always borne by the 'beneficiaries', but the gains are always enjoyed by the development partners with different interest but with mutual cooperation among themselves.

4.5. Resource Mobilisation

The issue of resource mobilisation is raised here in a scenario where, accepting a huge inflow of foreign money in the sector is questioned since it is increasingly creating aid dependency of the country. On the other hand, the core element of discussion is that without local resource mobilisation through peoples participation, sustainable O&M of the projects is not possible. These types of questions are raised at the time when it is becoming more and more clear that technical and structural solutions to the problem are full of contradictions and are becoming unmanageable. It reflects resource constraints on the one hand, and knowledge constraints on the other. So the attention automatically is concentrated to local resource and local participation

(mobilisation). The discussion here is more on resource mobilisation for O&M rather than for construction of new projects.

4.5.1. Rules for resource mobilisation

BWDB does not have the financial or physical resources to operate and maintain completed projects efficiently, and the performance of many projects is below expectations. It is evident that BWDB was less interested in the O&M of existing structures than in the commissioning of new projects with much larger funds for FCD/I constructions. Correspondingly, donors were reported to be primarily interested in providing funds for new structures, while expecting funds from local resources (Adnan et al, 1992:42). In EIP it is realized that funds for O&M will not be available from central or local government and new sources of funding will have to be identified and activated (EIP, 1990:23).

In EIP after the tenure of normal project implementation of 3-5 years O&M fund is allocated for another three years for a newly completed project. O&M during construction is also included within the project budget. Usually the donors pay all the project expenditures except the cost for land acquisition and manpower provided by BWDB. There is no progress yet towards local resource mobilisation. Government allocation of funds for O&M from its revenue budget is very minimal. Very recently (after 1992) the allocation started to improve comparatively, but it is still far from adequately meeting the total requirement for an effective and efficient O&M.

Present BWDB policy concentrates on revenue collection efforts in irrigation projects and not on flood control and drainage projects, but this approach avoids the question of how to fund O&M on flood control and drainage schemes.

Resource mobilisation in the water sector is being exploited and hampered directly and indirectly by other agencies as well, who are involved in constructing infrastructural development projects. The agencies⁵⁴ who are constructing roads, bridges, culverts or very small scale water sector

⁵⁴ roads and highways department or the local government agencies e.g. thana or UP

interventions⁵⁵ work in a very uncoordinated manner. The initiatives, that are taken by the people enthusiastically to solve certain common problems, after or before (without) the implementation of a certain FCD/I project by the BWDB through mobilising their own manpower and financial contribution, have very little scope to maintain or sustain them within the existing institutional framework. Rather very often these initiatives are destroyed, once BWDB intervene.

4.5.2. Roles played by different actors involved in resource mobilisation

BWDB is now confronting a pressure for change mainly because of the new realization developed about the whole water sector development: its developmental role in its past and present, the strategy it took to combat the agricultural problem of the country, the damage it made to the environment; and at the same time subsequent problem it made to its organization by making it an engineer dominated and donor dependent are the main issues in that agenda. The donors under the leadership of World Bank intends to make the point to BWDB. Here the contradiction lies within the donor policy itself. As it earlier indicated, starting from its inception BWDB is being supported, guided and fully financed by the donors and their deputized consultants. When they (donors) themselves are a party to a mistake, they lay full responsibility for the whole thing to BWDB.

In BWDB the allocation and management of O&M resource flow is very unwieldy, because some of the sources, are provided from grants, and some from credit sources. Wheat allocation under FfW program is not well accounted, although a huge amount of money is spent every year for O&M purposes. The total resources allocated annually for maintenance is about US\$19 million, of which only about US\$ 1.5 million is for actual maintenance: the rest was spent on power and fuel, establishment costs, foreign debt service and arrears (World Bank, 1993:61).

This is especially true for projects like EIP, where almost full support is granted by donors from 1975. It continued to construct projects without

⁵⁵ as it is done by the local government engineering department projects e.g. RESP (Rural Employment Sector Project)

considering its sustainability or future O&M. Only in the middle of the 1980s did they start to raise the issue and wanted to introduce some local resource mobilisation at the project level through the NGOs in ROM projects; which was premature and quite different from the existing BWDB rules and resulted to a failure⁵⁶. BWDB local officials, the landowners, the landless groups and their NGO get involved in the conflict among themselves in response to an immature action taken by a donor driven project, which did not care about limitations of the administrative and institutional aspects.

Misappropriation of public funds in FCD/I works is a well known fact and it is widely alleged in the national press. It is evident that links exist between corruption and poor quality construction (Adnan, 1992:45). In EIP projects the work order of new projects are given by the XENs. Supervision of work is done by the XEN and his staff, EIP team consisting of BWDB and consultant engineers do the monitoring job. In many cases the contractor and the field office are warned for the poor quality of work; very often the monitoring report causes tension among the parties concerned because it indicates improper service delivery. It is generally believed that linking service charge collection with reliability of project services would make local politicians and government staff more accountable to the local people, and would help the development of local institutions. It is evident from the field experience that people sometimes offer their own effort and resources e.g. land⁵⁷, free of compensation if they see that the project is really helpful for them.

4.5.3. Potential conflicts

Conflicts in resource mobilisation is more likely to emerge within the system than with the groups. The conflicts are clearly manifested by the way the burden of foreign aid is easily accommodates in the form of grants, credit or in food aid. The system of resource mobilisation sometimes even fail to track

⁵⁶ in the ROM concept the plan was to organize and engage the landless groups to maintain the embankment and structures in exchange the groups will be given the using right of khas land, BWDB acquired borrow-pits and embankment slopes for fish cultivation and plantation; since it was very much new to BWDB and there are lot of problem with the land acquisition remains in the projects the idea could not be materialised

⁵⁷ in the north east of Bangladesh, submersible embankment for the haor projects usually land is not acquired; there are very little conflict with the people regarding the land

down its status on a periodic basis. Resource is indeed scarce in Bangladesh but this does not justify the way it is being (mis)used within the BWDB, and neither will it redound to improvement of the economy. Spending more for establishment rather than for actual work is case in point. When the system nullify the role of the people for whom the system is made, of the pattern of resource mobilisation would surely should have problems, especially in terms of contribution, monitoring or accountability .

Conflict is evident with the approach of the donors, what they took in the past with the present, to the whole approach to resource mobilisation. Within the government (BWDB) the conflict becomes more acute because the government usually encourage more construction under new projects when its scarce resource does not permit added cost for maintenance of new constructions. The conflict is more evident in its policies about the projects and their activities. Very often the project modalities are made in accordance with the donors policies which conflicts with the interest of the beneficiaries, essentially in terms of culture, society and institutions, as a consequence project fail.

4.6. Conflict Management

Little by way of any mechanism or institution exists for the purpose of conflict resolution, despite a lengthy four-decade modern history of flood control in the country. This is a challenge to social scientists and the local people to understand and analyze why it had been so, and to devise and develop such mechanisms for real life application in an atmosphere of trust and intimate collaboration (Asaduzzaman, 1994a:12). This is very likely if viewed from a holistic point of view. In Bangladesh the picture is not limited only in the field of flood control and water development projects. It is the same all over and all the infrastructure development activities have similar kind of system gap. This is very much related with the social structure of the country where the people are not educated and mostly poor; people in the villages still have to wait a long time before a formal system for conflict resolution is institutionalised in their areas. Traditional influence still recognize traditional leaders which are by and large controlled by the richer groups.

4.6.1. Rules and roles for conflict management

Resolution of conflicts between socio-economic or location-specific groups is crucial project needs (and social maintenance) which have opposed interests in terms of project outcomes e.g. people living inside and outside embankments, farmers and fishermen. Both rich and poor people can be involved on either side. Mechanism and institutions are developed through which those who gain and lose from projects can negotiate and reach a decision on what should be done - with, or without, project management being involved in the process. For such conflict resolution to be effective, the institutions and processes evolved must be accepted as having legitimate authority by all concerned. Absence or withdrawal of such recognition by one or more parties may well undermine the whole enterprise (Adnan et al, 1992:31).

Whatever rules being practised here are informal. Nobody exactly knows whom to approach to raise their complaints if need be. This problem clearly indicates what is happening within the administrative organization, as well. The command line of BWDB is different from the command line of normal bureaucratic administration. The XEN, as the chief of the Division, is not accountable to the district administration since the district commissioner is not the direct supervising officer of the XEN. There is some sort of a coordination committee, which holds meetings once a month in the districts, where the attendance of the XENs is not mandatory. So when a conflict arises, people are confused as to whom they should approach for judgement. Normally for major conflicts, the nearest court handle the case, and for a minor and very local conflict, complaint is made with the local *Shalish*⁵⁸ or with the UP. The main problem with all these are the credibility of the courts; because none of them have technical knowledge to give the verdict. Of course BWDB is approached either in the beginning to solve the problem locally or as expert if it is in a higher court, in case of bigger conflicts.

But the interesting point is nobody talk about the problem makers, if not it is a conflict between the contractor and the BWDB or a problem with the landowner who denied to give the possession of his land for construction of

⁵⁸ informal court in the village usually formed by the richer and(or) elder representatives of the gustees (kin group) - a mechanism of conflict resolution, sort of a compromise aiming at longer terms social interest (Rahman, 1991:86-104)

embankment or structure. If it is problem with the design, planning, drainage; or water logging because of the planning or design; or a problem with the breaching or a public cut caused by the ill design or planning or construction; or a problem created as effect of a project constructed elsewhere - nobody is there to blame. These conflicts are never in the agenda of the national parliament⁵⁹.

Sluice committee so far is the only entity in the area. But for most cases sluice committees are either not formed or have very little to do⁶⁰. It is interesting to mention here that there is no scope or forum to question the rules, mode of formation of sluice committee, its duties and responsibilities; or duties to be performed by the BWDB for the committee and about the overall performance of the sluice committee. There is a lack of clear legitimacy. Project committees, Water Users Groups and Water Users Committees are planned to be formed in the completed projects as part of the modern O&M activities which are expected to work as the forum for the resolution of conflicts.

The formation of multi-disciplinary study team for the planning of new projects and also for the development of O&M in the completed projects has become a popular initiatives being followed in many projects; and BWDB is under pressure to institutionalise it within the system. FAP is the major implementor of this approach; although the projects like EIP have started this long ago and developed it gradually. This might help reduce the conflict among the professionals, if they are employed with the same terms and conditions under the same umbrella, otherwise the professionals employed by the BWDB will have higher status. This might help achieve concrete progress if the BWDB is decentralised and multidisciplinary organization is formed at least at district level to ensure improved services at project level. Some donors have already shifted their policy along this line and supporting the projects which are integrated with other department or agencies working in the wider field of rural development (e.g. Dutch govt. policy cf. DGIS 1992). But for the beneficiaries, the praxis needs to travel far ahead because initially the effort will have marginal impact and distribution of benefit will be

⁵⁹ even the multi billion dollar FAP is not discussed in the parliament, which was introduced during the last military regime

⁶⁰ for detailed please see Johansson and Hultin, 1992 and also mentioned at para 4.4.2.

differential since they are not homogenous and their livelihood is unequally based.

Chapter V

5. Better Operation and Maintenance

5.1. Participation of Beneficiaries for Good O&M; How? What Ways?

Gains and Losses:

Chambers used a setting to understand the indirect gains and losses to the land poor in irrigation projects (1988:8-10). Considering the fact that most of the farmers are landpoor, it can be said that the losses in FCD projects are expected to be worse off compared to those involved in purely irrigation projects, as Chambers indicated. For successful irrigation projects, the labourers are ensured of their jobs, at least for a year. In a technically successful FCD project, it is likely that the marginal farmers bought out, landless tenants are displaced, people are displaced from the alignment sites and get inadequate or no compensation, agricultural workers and the women are affected because of the water-borne diseases, small farmers and sharecroppers are displaced by induced waterlogging and salinity (coastal projects) problems. Moreover the loss of livelihood for the boatmen and fishermen are remarkable, for whom there is no process of accommodation for alternative livelihood or compensation. It is likely that all these people who are going to face the losses would be very reluctant about project O&M matters.

Criteria of good performance:

The criteria of good system performance varies according to the type of profession a person is engaged (Chambers, 1988:30). For a landless it is the increase in labour demand and wages; for an irrigation/drainage/agriculture engineer, it is the efficient control and use of water; for an agronomist, it is the maximisation of the product in a maintained moisture regime; for an agricultural economist, it is high and stable farm production and incomes; for a general economist, it is high internal rate of return; for a political economist, it is equitable distribution of benefits, for a sociologist it is participation of the beneficiaries in the management; for the donors, it is to show the size of the area covered and amount of money they spend. There is a clear lack of accommodation of all these interests within one single streamlined strategy. On the other hand, it is not easy to accommodate all of them with equal importance. Some of them might need to take the lead over others within an organization which is conducive to each other.

Accountability:

Some donors hold the view that organizational reform entails the establishment of separate construction divisions, whose sole function would be to construct project infrastructure and to hand it over to O&M divisions upon completion. O&M division would not be involved in construction and could focus on realizing the potential benefits for which scarce resources were invested (World Bank, 1993:63). But the problem will not be solved because of the absence of accountability of BWDB to the beneficiaries in the system. Ideally, BWDB is accountable for the performance of its projects. But insufficient funding combined with inadequate linkages between BWDB and project beneficiaries result in BWDB staff being accountable primarily to their own organization rather than to beneficiaries (EIP, 1990:25; Ostrom et al, 1993). Corruption in the sector is well evident⁶¹, as it is common in other departments in many Third World countries. It can be generated out of the 'transfer trade' which can powerfully affect the motivation of the engineers. "... O&M and other posting is sold by politicians sometimes for many times a managers salary" (Chambers, 1988:181). These sort of problems indicate the limitations of the staff to be accountable to the beneficiaries. Recent initiative⁶², to involve some other ministries and departments together with the BWDB projects, recognize the fact that this (BWDB) agency alone is neither capable nor has it the mandate to tackle and see the problem from the holistic point of view of rural development. According to Chambers for a change in the (especially irrigation) sector there are four effective ways by which the system could be managed: separate O&M cadres, rights and information for farmers, accountability and incentives for managers, and enhanced professionalism (ibid:181).

What is the problem with participation?:

At present the beneficiaries are slow in responding to the improvements offered by the projects, and this is because the reliability of project services deteriorated due to the lack of maintenance, and project services are

⁶¹ some of them are mentioned by Adnan: a) selection of in appropriate design b) awarding of contracts through collusion between the functionaries concerned c) improper execution of construction d) overbilling and unwarranted payments e) misappropriation of resources for flood relief and rehabilitation etc. (Adnan, 1991:37).

⁶² Char Development and Settlement Project (CDSP), started in 1995 under the Dutch grants which includes, together with BWDB, ministry of land, education, health, rural development, women to combat the whole range of related problems

no longer available, or are captured by non-farmer interest groups⁶³. Today's emphasis on lack of users participation in O&M as a major cause for their weaknesses, may detract the attention from other problems. Gisselquist's (1991 in Duyne, 1994) categorization of projects clearly show that lack of users participation cannot be seen as the only cause of failure in water management projects, as is often suggested in Bangladesh. It should be obvious that handing over management responsibilities for existing projects to farmers organisations, may hardly improve the condition of ill conceived and constructed projects (Duyne, 1994:4). Keeping this in mind it can be said that the projects proved to be properly designed, planned and implemented, and that the beneficiaries are satisfied with their performance, the negatively affected groups are properly compensated or accommodated⁶⁴ - only in those projects peoples participation can be expected. At least the first condition to introduce the participation and idea of handing over the project can be thought about.

Donors are increasingly showing more concern about people's participation. 'Guidelines for People's Participation' in Water Management Projects (FPCO, 1993) is prepared with the effort of the high level officials of the BWDB, top representatives of the FPCO and MIWDFC. When approved it would be applied to all BWDB water management systems. The guidelines stress the need for participation at all stages of project cycle, and thus, clearly differentiate between participation in the stage of project identification, pre-feasibility studies, feasibility studies, detailed design, implementation, operation and maintenance and monitoring and evaluation. However given the fact that most future investments in the water sector are likely to aim at improving the performance of existing systems rather than in the construction of new ones, the section of the Guidelines that may have some direct repercussions on the present management style, is the one on participation in O&M (Duyne, 1994:5). So in most cases it would be difficult to reverse the system because of the mistakes committed during the previous stages.

⁶³ for example in the case of polder 34/3 and 35/3, the expected beneficiaries have been displaced by a special interest group (shrimp cultivators) and receive no benefits. If there had been a representative O&M committee, the take over of these projects may have been resisted more successfully by the farmers who can only watch their incomes and land deteriorate.

⁶⁴ e.g. the long-term effects on productivity and availability of fish within the project area are not known. The problems are basically being ignored in the design of most flood protection projects but fishing interests should be included in the operational strategy for any project and their water requirements should be accounted for during project design (EIP, 1990:11)

Adnan et al (1992) tried to look for a comprehensive idea about peoples participation, its interpretation by various actors at various level made a substance of it; which seems to be useful to understand the level of peoples participation in FCD/I project setting in Bangladesh within and outside EIP. The term 'people's participation' is broken down into three broad types: (a) information process, (b) project-related activities and (c) people's initiatives; each of them again sub-divided into more detailed forms, as it is summarized in table-4. Some of the useful factors which help assess the quality are significant. The information process is already in practice in most of the FCD projects. In project related activities instrumental involvement is implemented; functional involvement has limited use in EIP or in some of the irrigation projects; negotiation is not in practice yet; in the programme like SRP, the externally initiated organizations are active to organize people on experimental basis; conflict resolution process is not yet developed. People's initiative which is considered as the model O&M environment, is still far from being achieved. Critical features that are mentioned as criteria for assessing the quality of participatory processes are mostly nonexistent in any FCD/I project at present. Empowerment as a tool for greater participation has very little space to be injected within the society (problem of social structure).

Table 4

A TYPOLOGY OF PEOPLES PARTICIPATION

Different Ways in Which the Term People's Participation is Understood

# INFORMATION PROCESS	* Project related information flows
1. Unilateral Announcement	* Telling people about what is going to happen: project interventions
2. Listening	* Giving project information and listening to peoples views about the problem and possible solutions, etc.
3. Consultation	* Dialogue regarding project options, without people having a share in decision making
4. Data collection	* Gathering information for project purposes through: <ul style="list-style-type: none"> – Surveys, interviews, 'random walks', etc. – Quasi-anthropological participant observation method
# PROJECT-RELATED ACTIVITIES	* Activities initiated by project management and/or other external agencies
5. Instrumental Involvement	* One-shot involvement for project needs, e.g. giving employment, using various services
6. Functional Involvement	* Involvement aimed at ensuring sustainability of project activities: <ul style="list-style-type: none"> – Maintenance groups (eg. Labour Contracting Societies) – Sluice committees – Tax-paying for project O&M
7. Negotiation	* Bargaining about project options between people and project management and/or concerned authorities
8. Externally Initiated Organization	* Organizing people by external agents or activists for predetermined objectives related to the project
9. Conflict Resolution	* Resolving conflicts between groups of people and concerned agencies with differing interests – preferably through a decision making process which is accepted as legitimate by all concerned
# PEOPLES INITIATIVES	* Initiatives independent of project management or any other external agents
10. Self-Mobilization	* Collective response of a whole community (or a defined social group) to issues such as waterlogging and the adverse impact of FCD/I projects, with the initiative and leadership coming from inside the community (or group)
11. Empowerment	* Self-initiated mobilization of poor and disadvantaged groups aimed at having increased freedom of choice and bargaining power in relation to project management, as well as wealthier and more powerful groups controlling local communities

Criteria for Assessing the 'Quality' of Participatory Processes

# CRITICAL FEATURES	
1. Transparency	* Whether all stages of project activities are publicly visible, including decision-making processes?
2. Access to Information	* Whether there is adequate and timely access to project information for all?
3. Accountability	* Whether the agencies involved in project management and implementation are procedurally and periodically answerable to the people in the impact areas, as well as the citizens of the country in general
4. Meaningful Choice	* Whether people can participate in a voluntary manner without being compelled, constrained, or otherwise left with no other choice?
5. Comprehensiveness	* Whether people have been consulted from the very outset in defining the nature of the problem prior to any project being decided upon, as contrasted to consultation during subsequent stages of the project cycle?
6. No-Alienation	* Whether people have participated in away that they do not feel distanced and alienated from project management, the implementation process and the eventual outcomes (eg, FCD/I structures)?

5.2. Legal Issues

Very little has been revised after the first water act was passed in 1952 (modified in 1966) about legal issues. Some initiatives, that have been taken by the FAP and other concerned projects are still in draft forms. Draft act called 'Large and Medium Scale Irrigation Project (Public Participation) Regulations, 1992'⁶⁵ mainly addressed the issue of organization and regulation for User Groups. But there is no proposal for any change in the organizational structure of the BWDB or responsibilities of the BWDB officials. Although the draft bills contained some provisions which incorporate the local government officials but it failed to add any new element which can bring change in the BWDB from an engineering dominated organization to a multidisciplinary one. Even if there is a law, there are minimal possibilities for enforcement in favour of the common people. By contrast, there is much room for the powerful to manoeuvre with the rules for their benefit⁶⁶.

5.3. Cost Recovery: Possibilities and Limitations of Local Resource Mobilization

The issue does not only effect one sector, but it could also be viewed from a national scale. None of the public sector enterprises think about optimum cost recovery. If we look into the performance of local government institutions, even the very minimum tax fixed by the UP is not easy to collect because of many reasons, mostly political, none of the existing leaders want to be unpopular by pressing people for the tax. Dominant 'relief culture'⁶⁷, induce people not to pay for any public good.

⁶⁵ drafts are prepared by i) northwest hydraulic consultants (NHCL) ii) G.K. Irrigation Rehabilitation Projects and some others

⁶⁶ in the case of land acquisition, exploiting the fishing grounds it is evident

⁶⁷ people are used to get free medical facilities, free primary schooling, free water, free extension service etc. etc.; very often our leaders promise to give free land tax facility and announce general amnesty for credit taken by the farmers before an election. Low rate of giving any sort of payment for any public goods facility is again re-enforced by these sort of irresponsible declarations which became a part of culture. It is a way of making own fate at the cost of using public property by the politicians. Even the mosques and schools are being constructed by the relief fund provided by the NGOs, where peoples participation in the form of contribution of money is nil. This culture appears overwhelmingly disastrous

Foreign dependency vs local resource mobilisation:

It almost became an iron law of development assistance that the more money an assisting organization has to move, the more its energies are consumed by the imperative to ensure that the funds are obligated on schedule according to whatever procedures are agency mandates. This focus leaves little time to apply the money in ways that increase local capacities for sustainable, self-reliant development.

While it is widely recognized that development assistance often fails by the standard, the extent to which it all too often reduces capacities for sustained self-reliant development is less widely recognized. The following examples are illustrative (Korten, 1989:139-140).

"At a November 1988 OECD meeting on nongovernmental organizations (NGOs), one participant told of a study from Latin America that compared a region of a recipient country that had received a major injection of foreign project assistance with one that had not. The aid receiving area had built up the staffing of its public development agencies and prospered so long as the assistance funding flowed. However, once the foreign-funded project terminated, overstaffed bureaucracies sat idle waiting for someone to send more money. The other region, spurred by creative local leadership, had undertaken its own development initiative based on the mobilization of local resources. Having learned effective self-reliance it continued to progress without special outside funding".

"Studies in one Asian country compared local irrigation systems in contiguous communities. In each case one system had been assisted by government under a foreign aid project while the other had own resources. The facilities in the unassisted systems were more often functional, operating costs were lower, maintenance was better, and performance reliability was higher".

One reason, as indicated by the example above, is that external aid has a way of creating expectations within the community that development will come as a gift from an outside agent (both government and the donors), rather than through people's own efforts. People used to call the structures built by the BWDB as "wapda" (name of the previous organization), and they do not consider these structures as their property.

The conflict between mobilization of fund and building capacity becomes particularly critical at this point in history when the transformation of institutions must be the central agenda. The more the assistance money that is poured through existing agencies without a clear strategy of using the money to support a transformation of resource management systems, the more those agencies are likely to resist substantive reform. BWDB is a typical example of such typology.

Within an elusive point, international assistance have the potential to

produce human benefits, which may vary substantially with the specific situation, the consequences of increased assistance are quite likely to be negative-irrespective of whatever area of development it is used. Thereafter, the more money is transferred, the less the future capacity of the assisted countries and people to mobilize and manage their own resources (Korten, 1989:140-141). The amount of foreign assistance received by BWDB was already overwhelming by late 1980s, and yet, it even increased to greater amounts after the consecutive big floods in 1987 and 1988 as a consequence, the country started to be burdened by a great foreign debt. The 'big push' is under way with the introduction of FAP in 1990s. There is no sign that overall capacity of BWDB has been enhanced rather there are available negative instances.

Water as a public good:

If there is any initiative to recover the costs the 'public-good' nature of the water resource often makes this difficult. The essence of public good is that it is available to all, and no one can be denied access to it. Thus an individual has no incentive to invest in its development or maintenance, since it would be impossible to recover costs from users ('free-riders'). 'Tragedy of the Commons' highlights, no single agent has an incentive to refrain from exploiting it according to one's own way, since others would continue to do so; unless effective cooperation arises among users, there is likely to be over-exploitation and abuse of the resource (Magrath, 1989 in Winpenny, 1994:12). Traditionally FCD projects are preconceived as public welfare projects. For purely irrigation projects there has been a policy of pricing inputs in terms of infrastructure like embankments, drainage network and irrigation facilities, for which pricing has never been on a full cost basis. Rather for the purpose of cost recovery, the pricing only considered the operational cost of irrigation component of the projects. Even this partial costing could not be effectively enforced for recovery from the beneficiaries because a jumble of complex socio-economic reasons stands in the way of its implementation. Flood control and gravity drainage have always been treated as public goods. Benefits of FCD projects vary from one plot to another, depending on their location, topography and soil fertility. Assessment of prevention of crop damage due to FCD project development is a difficult task. It is very difficult to determine fair rates reflecting the benefits obtained by the farmers and their ability to pay. These reasons made the cost recovery

aspect in the FCD projects complicated (Ahmed, 1991:35-37).

Institutionalisation; present and future:

Sluice committee bias: most of the documents prepared for the donor-induced projects still concentrate on talking about committees (EIP, 1990; FAP Guideline 1990; WB, 1993). Some of them proposed to base on sluice committees and then form a federation of sluice committees, until finally forming into a project committee⁶⁸. Others are in favour of user group concept which starts from user groups to users committee and ultimately to form users' council or federation of users' councils. Integration of these committees with the local government institutions are also proposed, mainly with UP and the former Upazila⁶⁹ which presently has been abolished⁷⁰. There is an administrative set up called District Council⁷¹, having a very passive/formal role - which could be instrumental to coordinate the project under a certain district at the local level. Although this appears difficult, because in most cases the hydrological boundary of projects and the administrative boundary do not coincide.

Activities of the project committee expected to be funded from local resources (e.g. from charging project beneficiaries) are channelled through a local institution such as the Union Parishad (council). It is also thought that initially some funds could come from the centre until the revenue collection system is established locally, which remain as a very complicated issue. The project committee could be given technical support by the local BWDB at the Division who could be nominated as member secretary of the committee (EIP, 1990:26). This type of committee approach has already been tested and

⁶⁸ representativeness of these committees may be questioned. e.g. about the involvement of landless in the committee, one study found that this was a totally alien concept, and that even if landless or marginal farmers were nominally made members of a committee, in reality they still lacked any effective influence (Johansson and Hultin, 1991:23).

⁶⁹ Upazila concept was tested during late eighties with the existing thana (the lowest administrative unit); where there was provision to have elected chairman as the head of the council. Different government officials deputed in the upazila were under the direct control of the elected chairman. Chief executive officer of the upazila worked as the member-secretary of the chairman.

⁷⁰ experiment with the local government institutions is a very important drawback for Bangladesh which hinders to think about any institutionalization in the concerned area

⁷¹ there is vacuum of concrete form of decentralization in Bangladesh, for which the future and present role of district council is not clear. If it would be a council of elected UP chairman or even the recently abolished upazila chairman, it could be a good forum for the coordination of developmental activities in the district

limitations of the approach is already known. The role of UP, so far, have been very formal and supportive to the local BWDB, as desired, to fill up the proforma for the formation of sluice committees. Its role has never been trusted by the project beneficiaries as decision making body for the committees, neither at sluice nor at project level.

Handing over small scale projects to the local government was an idea without having any guarantee for the local resource base. Since not even 10 percent of the local government expenditure is provided from local sources (Task Force, 1991:245), it is totally unrealistic to hand over such big burden to them when the total environment is premature to collect tax from the local beneficiaries; or there is any hope for alternative sources/resources to provide fund and technical support for that.

5.4. Local Level Planning/Decision Making: Limitation and Scope

In the discussion of the whole water sector, the collection of data and the analysis of problems are best done centrally, while solutions are often best sought in a decentralised fashion, subject to the creation of the necessary legal, institutional and policy conditions. But much of the problem lies in the sector with mismatch between geography and hydrology which do not necessarily define the best scale planning and problem solving. Nor do they justify the use of 'integrated' or 'comprehensive' plans for water development, in which solutions are sought and implemented in a centralised manner. Such plans have been criticized for both practical and conceptual reasons (Winpenny, 1994:23).

Some of top-down control, regulation and allocation of entitlements, bottom-up decision-making, and trading of water rights are efficient. Such mixed institutions have, in fact, been used with success, both with and without government sanction (Roumasset et al in Winpenny, 1994:25).

Activities of the UP is more localised. Union chairman or parishad members are often members of sluice committees as they are influential landowners with land affected by sluice operation. Developing O&M institutions for EIP projects in cooperation with UP would seem to be more promising (EIP, 1990:26), but the problem lies with their linkage with both local

administration and BWDB in many ways. These leaders in modern times, mostly from landlord family and at the same time, more and more, they are coming closer to the local development activities as direct beneficiaries as contractors, PIC⁷² member/chairman or as local agent of the contractors (Rahman, 1991:92-93). The alliance they form involving in the development circle very often appears as anti-people.

With the current world-wide trend to turn the management of government resources over to the private sector, one option is to give responsibility for operation and maintenance to a group, such as a private group or a non-governmental organization. The group could be paid to operate and maintain a project. Payment to the group could be in the form of a permission allowing the group to exploit local resources such as *khas* land or fishing rights in *beels*. A more diversified version of this model would be to lease short sections of embankment to individuals in return for the individual maintaining the embankment. The lease could be given for a number of years so that the individual would have some incentive to maintain the embankment properly. Distribution of local political and economic power varies between projects and applying one formula for project management would result in many failures. Some form of project committee is required but the legality of establishing a comprehensive project committee is not clear. The recommended approach would be to strengthen existing sluice committees and establish project committees with their participation. Involvement of local institutions and elected representatives should be done cautiously. As with any institution building, this may take several years before a viable structure is established and will take a considerable effort to implement (EIP, 1990:27).

Institutional development:

Part of the institutional development is to identify and introduce ways for beneficiaries to contribute to O&M costs. A project can financially support O&M in the short term but can not be responsible for O&M in the long term. Central government do not have sufficient funds to pay O&M costs and ways to secure long term sources for funding O&M, still have to be explored. Blair has drawn attention to the fact that increased local resource mobilisation and public sector effectiveness are related. A decentralized revenue system

⁷² Project Implementation Committee; usually formed in the FfW projects for the infrastructure development projects

together with a decentralized spending system provides a clear link between public activities and their costs. This is expected to increase Government effectiveness with respect to both the mobilization and utilization of local resources (Blair, 1989 in Task Force Report, 1991:245). Problems lies with the management of the resources available in a project. BWDB is responsible for the system operation and maintenance but officially they are not the owner of it, since they do not acquire the land; it is the land department who own it officially, provided it is acquired properly. The water bodies inside the area, some of which are part of the system and part of them are Commons - both are under the control of the district administration. BWDB has no legal authority to utilize or to rent them out and earn additional resources.

5.5. What About the Idea of Abandoning the Central BWDB?

It could be gleaned from the discussion above and also from chapter IV, that the problem in the FCD projects appears very complicated and it is evident that the conflicts among the groups and among the organisations concerned or among organisations, institutions and groups are spread out through out the whole sector. In most cases, these conflicts emerge because of external interventions. This brings more and more disadvantages for the farmers, fishermen, boatmen and others who are dependent on same sources of livelihood. On the one hand, the present intervention pattern failed to bring distributive benefit for the different categories of people and helping few people at the cost of the majority; and on the other hand the process of development is making people more and more alienated from and irresponsible about their own problems.

People feel and want to solve their own problem and want to contribute to its solution, only when they realize that it will be beneficial for them and there is nobody to help them other than themselves. Any hope for external assistance (both national or international through government or NGO system) can destroy the immediate organized, enthusiastic, initiative of the people. Here constraints are more with the size of the problem both for ability to contribute and ability to be organized. Peoples' self-help endeavour has enormous potentiality which is very much evident in many initiatives taken by the people to solve their own local flood problem in many areas. In most cases when they do not see any chance to get help from outside, they even construct

cross dams on *khals*, make dykes to protect the flood by contributing money and labour according to their share.

Only, mere flood control initiatives are not sufficient. For a comprehensive result, it needs to involve some other supplementary activities including agriculture extension, fishery, cooperatives, education, land management and related inputs which is already realized and initiatives are being taken along that line (eg. CDSP). But any approach which will replicate the IRD⁷³ is ultimately expected to be captured by the few. Here the notion of decentralized development can be thought about which is an "ideological principle associated with the objective of self-reliance, democratic decision making, popular participation in government, and accountability of public officials to citizens" (Rondenelli et al, 1984 in Task Force Report, 1991:232).

For many reasons BWDB appears to be an "... unbalanced organisation, genetically geared to centralised decision-making for the construction of infrastructure. Divisions, subdivisions and 'circles' are imposed on the human and political geography of Bangladesh from an inherited - but carefully nurtured - top-down vision of delivering the goods' whether the subjects like it or not" (Bernstein 1994 in Dwyne, 1994:4). Within existing framework, the nature of the activities that are being on operation and/or under the process of implementation, to solve the problem of flood and subsequently its O&M encircling BWDB seemed to be impossible to get any substantive result.

⁷³ Integrated Rural Development approach

Chapter VI

6. Conclusion & Recommendations

The complexity of the problem is well recognized in the agenda of study projects under FAP, especially the area of studies it covered⁷⁴. In most cases these studies could not come up with any concrete solution which could be used as the basis for further consideration in any endeavour to undertake interventions for flood control. It is more clear, if we look at the trend of flooding over the last four decades (figure 1, annexure 1). It tends to suggest that with all efforts of flood control during the same period, the severity of flood is increasing nonetheless. FCDI projects in general mean that some people gain and some others lose from its direct and indirect effects on livelihood sources. Since the project planning process is always constrained by inadequate accommodation for compensatory measures and do not involve different interest/affected (positive/negative) groups in project planning process, conflicts over Operation and Maintenance frequently emerge. Organizational failure of BWDB to respond to the problem is clearly visible.

Even if projects are being constructed and geared toward solving the problem of flood, the problem is continuously becoming more and more complex through encounter with other relevant dimensions of it, such as navigation, fishery, common property resources, land acquisition, water pollution, confinement and some other problems. Significant evidence supports that some of the projects constructed do not at all need any further maintenance and many of them would perform better if the infrastructure constructed are eliminated. It means that going back to the pre-project situation and O&M does not matter at all. This situation can be considered as beyond the scope of normalisation⁷⁵. It could happen because in many areas the practical conditions on which projects were built are not existing any more. It is important that some provision exists which will allow areas to go back to its pre-project situation, in case there is possibility of better livelihood opportunity.

⁷⁴ Annexure 6 is the list of FAP projects

⁷⁵ usually it is expected that the O&M stage is the stage when, with appropriate planning and the implementation of mitigation and monitoring procedures, negative social impacts can be minimized and benefits maximized. In this stage communities return to a stage of 'normalisation' (Burdge, 1995:40)

The demand and meaning of O&M is more and more shifting from *Operation and Maintenance* towards *Organization & Management*. BWDB with its normal professionalism has limitations to respond consistently with the demand, and reform accordingly when a clear lack of its organizational weakness is alarming. With its present organizational structure initiatives to incorporate other agencies and departments for a certain project has little chance to succeed if its role remain as the coordinator. Its role can be subordinate to an agency which has greater formal and professional mandate to see and solve the problem from a more holistic point of view of development. At the micro level it is more complicated for it (BWDB) to respond while different types of conflicts emerges on the surface in different stages of the project planning, implementation and O&M - because of its limited access to reach and to interact with the beneficiaries at that level.

Solution to the problem could be looked upon in the following manner in different scenarios. Continuous learning process approach through institutionalisation has to be followed. All the experiments to be done on a regular basis within a revenue set up; the projects within development set up can only try to implement the result of the experiments which are found to be suitable for Bangladesh's environment. This is to stop the distortions that are being done in a dependent environment. Financial dependency tends to destroy the appropriate line of thinking and provocations to take actions, ignoring the fact of relevance with other vital parameters, such as organization, sustainability, cultural and social reality, institutionalization etc..

Two scenarios can be thought about to come up with some realistic suggestion for O&M in flood control projects. First: Provided the FCD projects includes the irrigation on compulsory basis and that is how it creates an environment when it would ensure at-least two crops⁷⁶ in most part of Bangladesh. It could open up a possibility for the private sector to be involved in the sector fully. Since the policy of the present time is to privatise irrigation sector, the further thought in the field could be towards the system O&M through private sector development. The idea of peoples participation would imply here, on a limited scale, with the people using the system, in a project

⁷⁶ rabi (winter crop) and pre-monsoon paddy

area. Concept of user group participation is consistent to this. Severe negative effect of this approach will be on the target group people, since it is difficult to talk about compensation package for them within private sector in Bangladesh situation. This approach necessarily demands clear, legal aspects which will ensure the responsibility and accountability aspects for everyone to be involved in the whole business. Since there is no evidence to show that privatisation (either in the form of individual or group enterprise; or public limited company) in Bangladesh are coping well with the economy, it would be rational to abandon the idea. Even the idea of involving NGOs to take the full responsibility of a certain project for operation and maintenance is not rational. Reasons behind are i) the NGOs are not technically equipped ii) people are not used to see NGOs in the place of government; NGOs could not achieve that credibility yet iii) GO-NGO relation in this area is still premature for such collaboration.

Second: Organization of O&M together with the local government through democratic use of all the organizations available in the area. Lack of stabilization of the institutionalization of the local government in Bangladesh is the major problem of this concept. In the eighties, the whole effort of decentralization of the responsibility in this sector was based on Upazila system which is absent now. There is a very big vacuum in local government institutions now. Lack of consistent political institutionalization process is the main obstacle to this approach. This could be organized out of the existing conventional local government system together with the people's initiatives on issues which is enthusiastically created to solve a certain common problem; the groups are formed according to the extent of the problem; they contribute, they collaborate as long as the problem exists without having any written contract. This type of initiative could be seen only when it is believed by the people that there is no hope for any help from outside the community⁷⁷. And they should also be involved from the beginning of the problem not only at one stage of it i.e. only at the stage of O&M when the project is already constructed not by them. Potentiality of this approach should be judged looking back into the history or instances of such kind. Further detailed study on these types of people's initiatives is crucial. This search could go beyond the area of O&M in flood control project problem alone;

⁷⁷ this community could be within a Shamaj, village or group of both

it can take into account all types of self-help endeavour that are noticeable in the communities in different form.

The question of scale is a crucial factor for such considerations. It is realistic to believe that the micro initiatives taken at the community level might be expected to be well organized, but the problem which would demand the measures to be taken beyond their capacity should have to be tackled by relatively bigger organizations. It is difficult to recommend a specific set up within the existing organization where such comparatively bigger problems can be taken care of. Here the learning process approach would be useful to act according to the potentiality existing within the local government system or people's organization. And on the basis of complexity and necessity - centralization and decentralization of responsibilities can be distributed. For the bigger projects and for greater technical involvement more centralized initiatives will be required. But it should be mandatory, that in every level technical priority subordinates to social and rural development objective for the purpose of sustainable⁷⁸ development.

It is well evident that institutionalization through donor-driven-project approach has limitations. It is important and useful that all the experiments are done within the revenue budget framework, which may be controlled centrally but should be based on the real problem area. The donor intervention which can only follow or help establish the result of the experiments, if found effective, for wider coverage and extension. The role of the donors, as well as, the expatriate consultants will be supporting and to be guided by the local experts.

Success in mobilization and appropriate of resource use largely depends on the aspect of accountability. Mechanisms need to be developed where all decisions are taken democratically. Degree of achievement depends on the degree of need felt by the beneficiaries about the concerned problem. Further development of the approach can be built upon further investigations on the issues discussed above.

⁷⁸ here sustainability in the sense of self-reliance, environment and institutionalization

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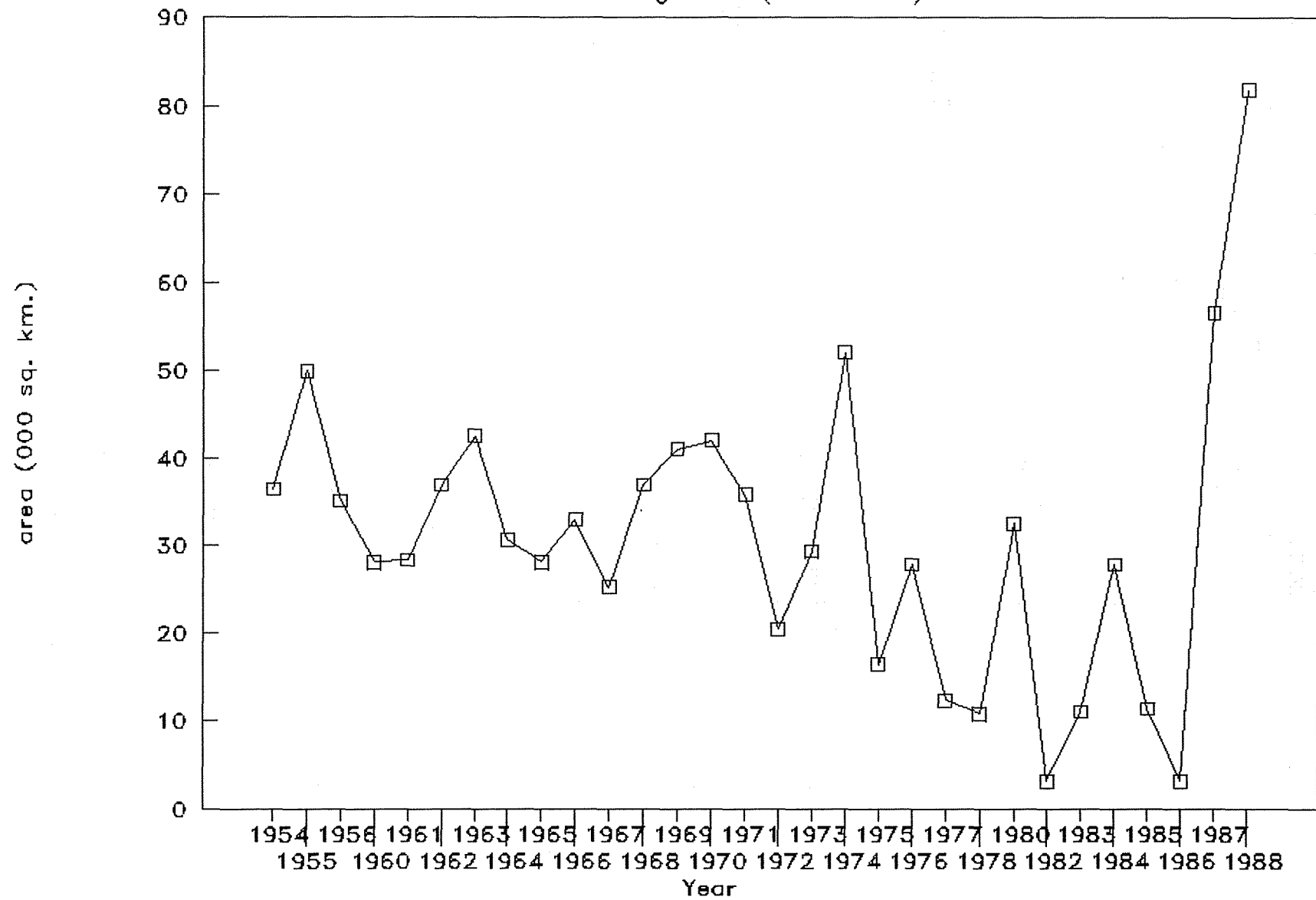
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ANNEXURE 1: GRAPH

Flood in Bangladesh (1954-1988)



BWDB O&M ORGANIZATION

Member	Chief Engineer	Superintending Engineer	Executive Engineer
Chairman	North Eastern Zone SE Designs & 3 EEs EE Office 1 DD Office 2	Moulvi Bazar	Habiganj Moulvi Bazar II
		Mymensing	Mymensing Tangail
		Sylhet	Sylhet Manu
		Dhaka	Dhaka I Dhaka II Dhaka III Rupganj
	South Eastern Zone SE designs+3 EEs EE Office 2 DD office 2	Chittagong	Kaptai Cox Bazar Chittagong I Chittagong II
		Comilla	Chandpur Mech. Chandpur Civil Laxmipur Noakhali Comilla
	Northern Zone SE Designs+2 EEs EE Office 2 DD Office 2	Bogra	Rajshahi Gaibandha Sirajganj Bogra
		Dinajpur	Dinajpur Mech. Dinajpur Civil Rangpur Panchagar
	South Western Zone SE Designs+2 EEs EE Office 2 DD Office 2	Khulna	Jessore Bagerhat Satkhira Khulna I Khulna II
		Kushtia	Bheramara Alamdanga Chuadanga Jhenida Shaikupa Kushtia
Chairman		Barisal	Barisal Patuakhali Barguna
	Mechanical EE Office 1 DD Office 2		
	Dredger EE Office 1 DD Office 2		
	Food for Work EE Office 1		
	Land & Revenue (Director) DD Office 2		
Chairman	Land & Water Use (Director) Soil & Agr. Survey Agronomy Extension Planning		
Chairman	O&M		
	Implementation		
	Planning		
	Finance		
Chairman	Administration		

Annexure 3

Summary of structures and operating status of projects

Project	structures	committees	functioning?	actually operated by?	drainage problems	conflict farmers vs fishermen	high vs low	private surface water mangament initiatives
Chalan Beel Polder D	yes	no	no	BWDB	yes ++	yes+	yes+	irrigation inlets
Kurigram South	yes	no	na	BWDB	yes+++	yes+	yes++	no
Meghna–Dhonagoda IP	yes	yes	some	BWDB	no	yes++	no	yes LLPs from gravity canals
Zilakar Haor	yes	some	one	BWDB	yes+	yes+	no	yes LLPs through pipe inlets
Kolabashukhali	yes	yes	no	BWDB	yes++	yes+	yes+	1 khal privately opened & closed for irrigation and drainage
Protappur IP	yes	yes	no longer	no one khalasies missing	no	no	no	LLPs as gravity irrigation not possible from river
Nagor River	yes	some	no	no one – only one khalasi	yes++	yes+++	no	no
Sonamukhi–Bonmander	yes	no	no	anyone influential	yes++	yes++	no	private and local government embankment built, also impact of projects in India
Sakunia Beel	yes	yes	slightly	committee	yes++	no	no	LLPs over embankment
Silimpur–Kratia	yes	no	no	not operated	no	no	yes+	no
Katakhali Khal Project	yes	yes	partly	at direction influential people	yes++	yes+	yes++	cuts and inlets for irrigation

Continued in the next page

Continued
Annexure 3
Summary of structures and operating status of projects

Project	structures	committees	functioning?	actually operated by?	drainage problems	conflict farmers vs fishermen	high vs low	private surface water mangament initiatives
Halir Haor	yes	yes	yes but	influential people manage	some	some	no	regular cuts and repairs for drainage needed
Konapara embankment	no(1)	na	na	na	some	no	inside vs outside	(1) effectively many privately controlled BWDB drainage outlets
Kahua Muhuri	yes(2)	informal	yes	local people	yes+	no	no	(2) later additions irrigation cuts
Polder 17/2	yes	yes	yes(3)	BWDB	no	yes+++	yes+	(3) shrimp farmers have installed many private structures and control sluice operation
BRE Kamarjani Reach	yes	no	na	BWDB	yes++	no	yes+	no
BRE Kazipur Reach	no(4)	na	na	na	no	no	no	(4) washed away, retired embankment breaches annually so open drainage

Note: Where drainage problems and conflicts occur these have been ranked: +moderate, ++important, +++severe
BWDB operation means by khalasies
na – not applicable

Source: FAP 12/13 RRAs

Extracted from: FAP 12 Final Report, 1992 page 3-6, 3-7

Annexure 4

Use and condition of embankment and overall assessment of constraints or problems for O&M

Project	Embankment used for			% in poor condition	breaches	erosion	cut by insiders	outsiders	key problem		O&M
	road	trees	houses						plan design	construction	
Chalan Beel Polder D	yes	yes	no	50%	yes	no	yes	yes	**	O	**
Kurigram South	yes	yes	yes	+50%	frequent	yes	yes	no	**	***	**
Meghna-Dhonagoda IP	yes	no	few	20%	yes	yes	no	no	***	***	**
Zilakar Haor	yes	no	no	70%	no	no	no	no	O	O	**
Kolabashukhali	yes	yes	no	50%	no	yes	no	no	*	O	*
Protappur IP	yes	yes	yes	most	no	no	no	no	*	O	**
Nagor River	yes	some	no	85%	yes	yes(4)	few	yes	***	*	***
Sonamukhi-Bonmander	na - drainage project with short private embankment						no	yes	***	O	**
Sakunia Beel	yes	yes	no	70%	yes	yes	no	no	O	**	**
Silimpur-Kratia	yes	yes	no	15%	yes	yes	no	no	***	O	O
Katakhali Khal Project	yes	no	no	50%	yes	no	yes	no	*	O	***
Halir Haor	yes(1)	no	no	33%	yes	no	yes	no	O	O	**
Konapara embankment	yes	yes	no	80%	yes	yes	yes	no	O	O	**
Kahua Muhuri	yes	yes	no	60%	yes	yes	no	yes	**	O	***
Polder 17/2	yes	no	no	5%	no	no	yes(2)	no	***	***	O
BRE Kamarjani Reach	yes	yes	yes	70%	yes	much	yes	no	** (3)	** (3)	**
BRE Kazipur Reach	yes	yes	yes	50%	yes	much	no	no	O	** (3)	***

Notes: * = moderate problem, ** = important problem, *** = severe problem

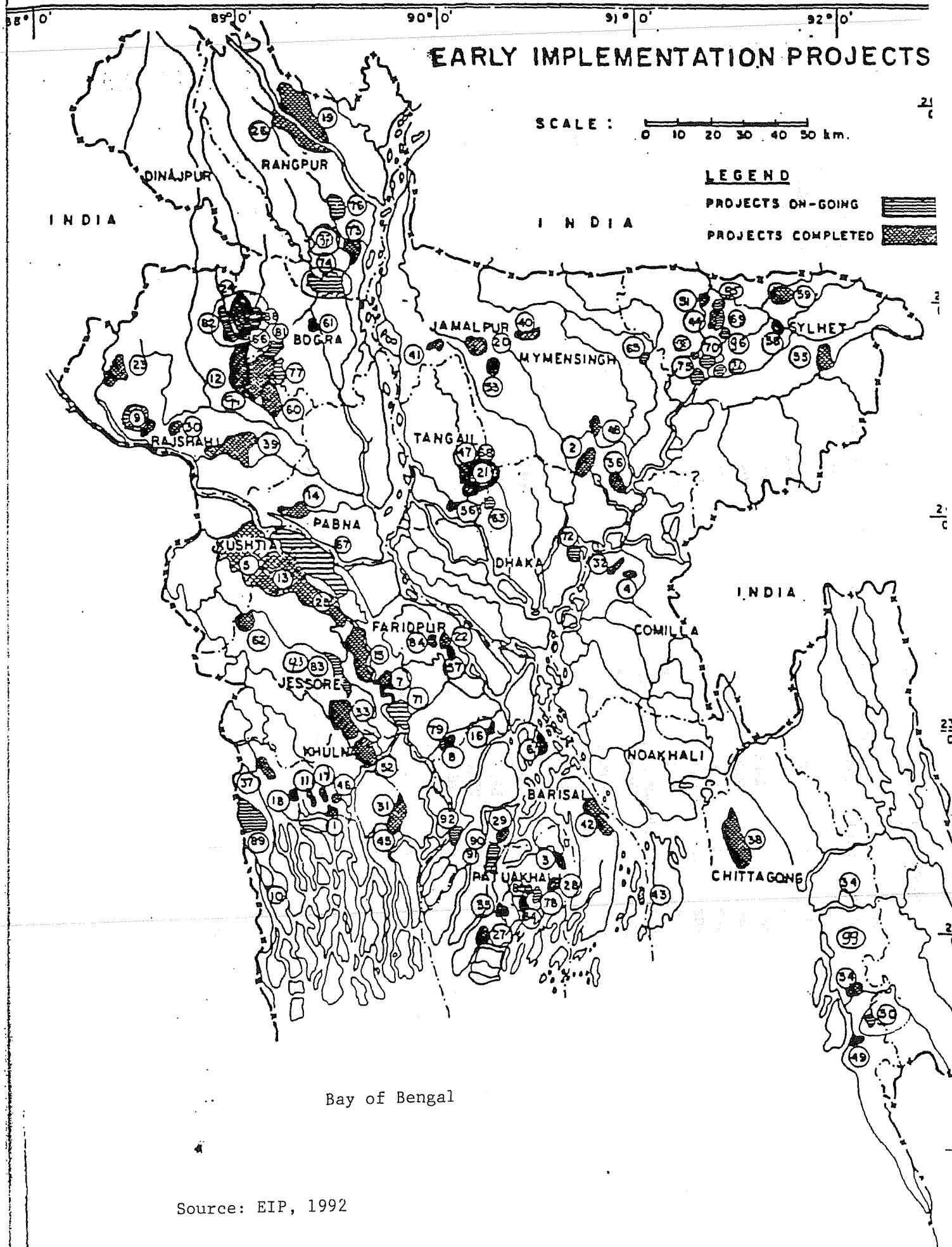
Note: Where drainage problems and conflicts occur these have been ranked: +moderate, ++important, +++severe

BWDB operation means by khalasies

na - not applicable

Source: FAP 12/13 RRAs

Extracted from: FAP 12 Final Report, 1992 page 3-9



Flood Action Plan (first phase)

PLAN COMPONENTS

1. Brahmaputra Right Bank Strengthening
2. Brahmaputra Right Bank
 - NW Regional Drainage Study
 - NW Diversion Drain
 - NW Interceptor Drain
3. Brahmaputra Left Bank
 - NC Regional Flood Control/Drainage Study
 - BL Embankment (N)
 - BL Compartment (N)
4. Ganges Right Bank
 - SW Regional Study
 - Gorai Intake & GR Embankment
 - SW & SC Drainage Improvement
5. Meghna Left Bank
 - SE Regional Study
 - Gumti & SE Drainage
6. North East Region
 - NE Regional Study
 - Rehabilitation Project
7. Cyclone Protection Project
8. Dhaka Town Protection
9. Other Towns Protection
10. Flood Forecasting & Early Warning
11. Flood Preparedness

SUPPORTING ACTIVITIES

12. FCD/I Agricultural Study
13. Operation & Maintenance Study
14. Socio-Economics Study 1:Active Floodplain
15. Socio-Economics Study 1:Land Acquisition
16. Environment Study
17. Fisheries Study and Pilot Project
18. Topographic Mapping
19. Geographic Information System
20. Compartmentalization Pilot Project
21. Bank Protection Pilot Project
22. River Training/AFPM Pilot Project
23. Flood Proofing Pilot Project
24. River Survey Program
25. Flood Modelling/Management
26. Institutional Development Programme

Source: World Bank, 1989, page 59

