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MINISTRY OF WATER RESOURCES

BANGLADESH WATER DEVELOPMENT BOARD

MEGHNA ESTUARY STUDY

TECHNICAL NOTE MES-011

ASSESSMENT OF MARINE SURVEY CAPABILITIES

JUNE 1997

DHV CONSULTANTS BV

in association with

KAMPSAX INTERNATIONAL
DANISH HYDRAULIC INSTITUTE
RESOURCE ANALYSIS

DEVELOPMENT DESIGN CONSULTANTS
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Technical Note on:

ASSESSMENT OF MARINE SURVEY CAPABILITIES

Dhaka, June 1997

Project Name : Meghna Estuary Study (MES)

Location : Lower Meghna Estuary

Key Words : BWDB, SSD, institutional development, marine surveys, Anwesha, training, data applications, data users, national water management.

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Meghna Estuary Study

Summary

Meghna Estuary Study(MES) institutional development report has two parts - First part is the main text and second part is appendices. Additional information regarding some aspects of the text are provided in Appendices.

Location: Meghna Estuary Study area is defined as the south eastern coast of Bangladesh comprising an area of about 11000 Km2 between Tantulia river in the west and the coast of Chittagong mainland to the east and the lower Meghna river from Chandpur to the Bay of Bangal.

Objective: The general objectives of MES are to address the problems of flood, coastal erosion and to exploit the potentials for the reclamation and development of new lands along coastal fringes. However, the specific objectives of this report is to find the activities and reponsibilies of different organizations related to MES and to examine the capabilities of these organizations for sustaining MES works even after completion of the project.

Background of Past Planning Activities: Land reclamation activities started in 1977 jointly by the Netherlands and Bangladesh Govts. The expatriate team members were attached to LRP/BWDB. The coordination and execution of the project activities were the responsibility of BWDB.

Flood Action Plan(FAP): Floods of 1987 and 1988 resulted the initiation of comprehensive flood action plan in 1990. Six regional study covered most of the country's flood prone areas. BWDB is the executing agency and erstwhile FPCO was the coordinating and supervising agency (FPCO merged with WARPO in 1996) but these MES areas remained outside the FAP study. So, MES now is carrying out the study for planning and development of the area.

Planning Background in the Water Sector: BWDB prepared the first master plan in 1964 in this sector although the Master Planning Organization (MPO) was established in 1983. MPO produced phase I and phase II plans with it institutionalization of planning process and water management. MPO was renamed as WARPO in 1992. WARPO has to upgrade and expand the national water plan with an intersectoral focus and interdisciplinary approach.

Institutional Setting: FPCO merged with WARPO in 1996. WARPO is the main organization for macro planning. BWDB is the organization responsible for project planning. Other organizations like LGED, BIWTA, Departments of Fisheries, Forest, Agriculture, Environment etc. are organizations responsible for micro planning(local level planning), implementation and O&M.

Findings: The immediate task of MES institutional development is addressed in this report. The capacity and capability of the survey and study division/ BWDB Chittagong is evaluated. Also the capabilities and performances of such other organizations in this field are assessed. Discussions as to the effective performances are presented and a few options to take future course of actions are given at the end.

1. INTRODUCTION:

MES project aims at increasing the physical safety and to promote sustainable development in the coastal area and the island. This can be achieved through planning the development of the area by means of surveys, master planning, development planning to meet urgent problems, understanding the natural processes and implementation of priority projects and institution building of the organization(s) involved in planning and the development of the estuary. Thus the sustainable establishment of the planning process in the water sector is dependent upon reliable data and other facts and information on hydrology, morphology, hydrodynamics, climatology, environmental factors and socio-economic conditions etc. of the estuary. The data collection, planning and development process of the estuary had started under LRP, PAF, and are continuing under LAED.

1.1 Land Accretion and Estuary Development Background

The Land Reclamation Project(LRP) started in December, 1977 jointly by Netherlands and Bangladesh Governments. The Netherlands team members were attached to LRP/BWDB as advisors. Co-ordination and execution of the project activities was the responsibility of BWDB. The objectives of the LRP are: (i)to address the problems of flood, coastal erosion and (ii)to exploit the potentials for the reclamation and development of new lands along coastal fringes.

To fulfill these objectives, a need was envisaged to set up an organization within the Bangladesh Water Development Board (BWDB) to carry out surveys and studies for developing a long term policy for land accretion activities in the South-Eastern coastal area of Bangladesh. The organization - Survey and Study Division of BWDB was established in 1978 at Chittagong. Equipment procurment, laboratory for analyzing water and sediment samples and training of personnel were started.

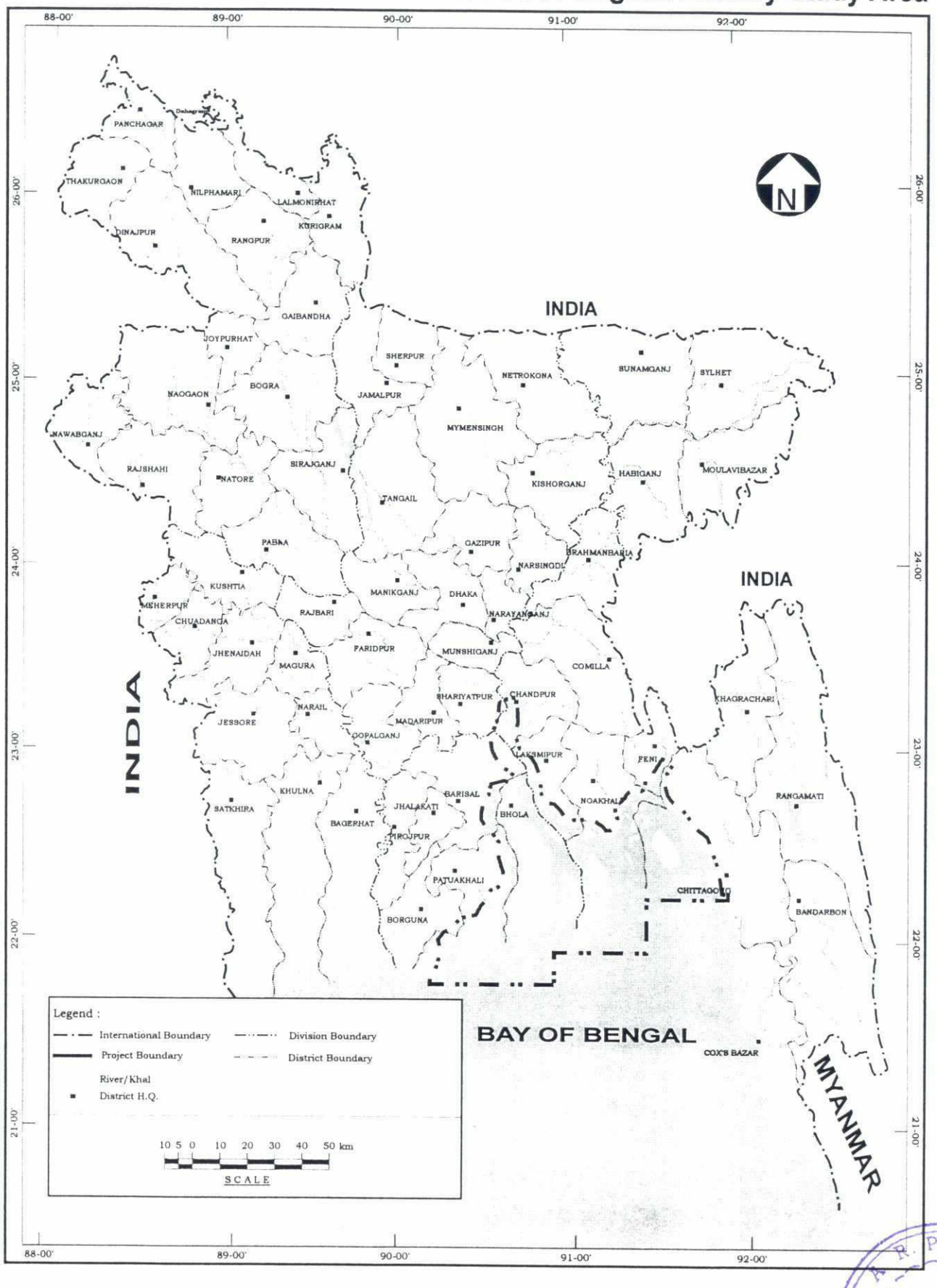
The project area is located in the eastern delta of Bangladesh comprising the area (appx. 11,000 Km^2) between Tentulia river and the coast of the Chittagong mainland and from the lower Meghna river (Chandpur) to the Bay of Bengal(project location map).

During the initial years the project was operated on a modest scale. The BWDB made available the river survey launch, ML Ganges, in order to enable an early start of the survey activities. In May 1980 the new survey vessel M.V Anwesha for LRP survey work was received in Bangladesh. Considerable progress was made with respect to the collection of data on hydraulics, hydrodynamics, sedimentology and bathymetry of the estuary.

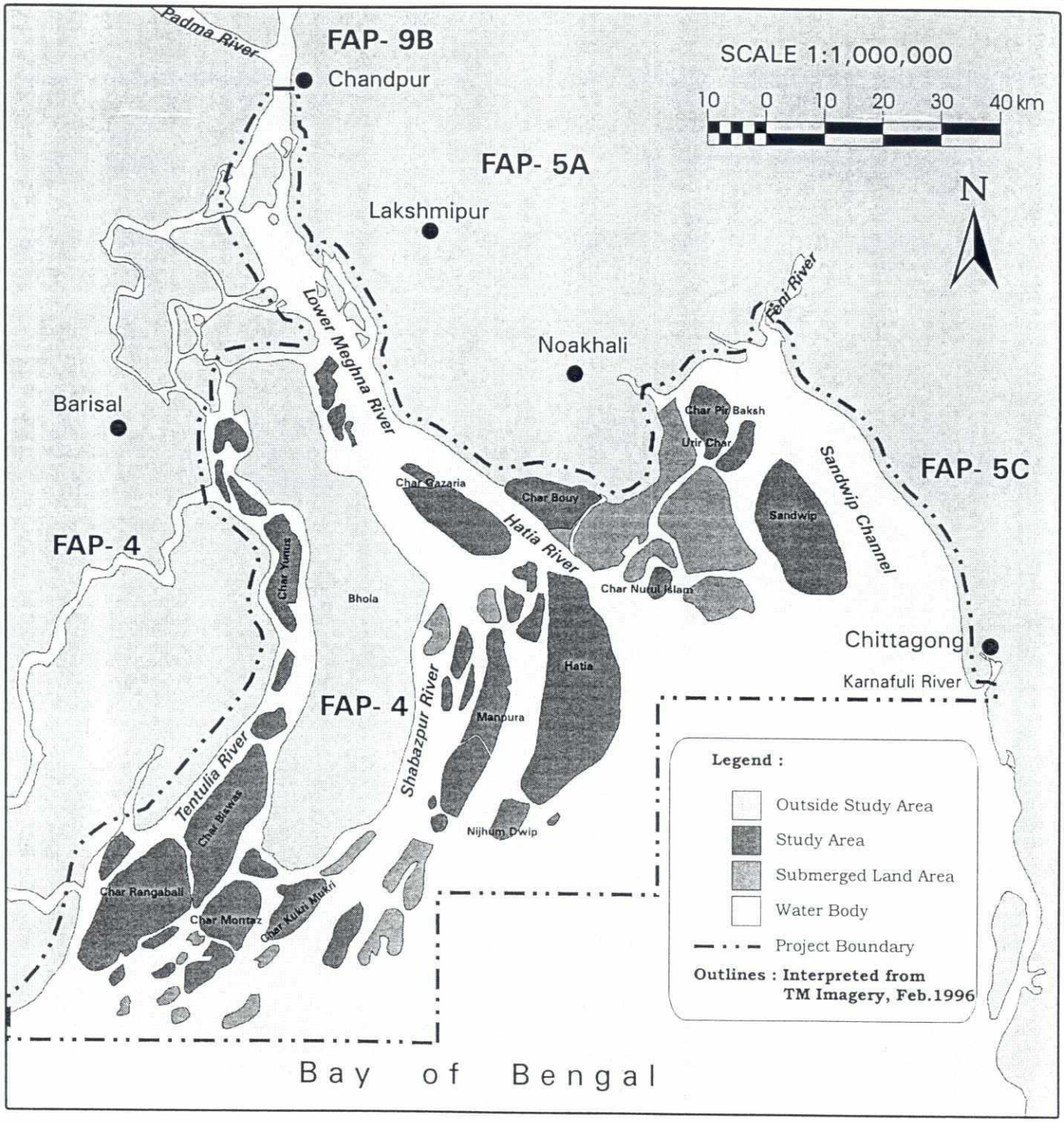
The objectives remained unchanged although, from time to time, the project was extended from one period to another for several times. The data collection and hydrographic survey continued. Repeated soundings and coastline surveys were executed to monitor erosion and natural accretion in specific areas in the estuary and a start was made with the long term planning of land reclamation works. The development of the two dimensional mathematical model on water movement in the south-eastern estuary was completed (1983-84).

During the period (1977 to 1985) of LRP, attention was focussed on the collection of hydrographic, hydrodynamic and other data in order to study the general hydraulic and morphological conditions in the south-eastern delta. These survey works lead to conclusions regarding reclamation - activities-exploring ways and means for settlement of landless people which will be of great value for possible future reclamation schemes.
During 1986 - 1990, LRP's main activities were limited to studies as pre-feasibility, feasibility, polder development, improvement of drainage and land accretion and settlement issues. During that period occasional bathymetric surveys were continued in order to monitor the morphological development in Sandwip, Urir Char area. LRP ceased to exist from 1992 but the Land Accretion and Estuary Development (LAED) came into being. The Survey and Study Division is now functioning under LAED, BWDB.

Location of Meghna Estuary Study Area



Map of the Project Area



1.2 Flood Action Plan and MES

Bangladesh experienced disastrous floods in 1987 and 1988 and initiated comprehensive Flood Action Plan (FAP). It comprises water development studies - supporting studies and pilot projects to improve project design and implementation and a number of non-structural measures to increase protection of people and infrastructure.

The Flood Plan Coordination Organization (FPCO) was established in(1990) as an arm of the Ministry of Irrigation, Water Development and Flood Control (MOIWDFC) to supervise and co-ordinate FAP activities.

Six (6) regional studies cover most of the country's flood prone areas. The only areas not covered are the Meghna Estuary and the Chittagong coastal areas to the south and east of FAB-4 and FAP-5. The cyclone of 29&30 April, 1991 demonstrated the need for similar type of FAP study in the Meghna Estuary area. The MES affords the opportunity to cover the regional aspect of flood controls and cyclone protection development while at the same time continuing with the hydrological and morphological study of the estuary.

At the start of the FAP, the main emphasis was given to technical consideration with implementation by the Bangladesh Water Development Board (BWDB) of MOIWDFC later renamed as Ministry of Water Resources (MWR). As the project progressed, the initial emphasis shifted from the reclamation of new land to the consolidation of existing young land. Pilot polders taken up for demonstrating methods of improved agricultural development became the focus for settling landless people. Land Reclamation Project developed two distinct sets of activities: i) those related to the development of the polder, notably to the settlement of landless people and ii) those related to the study of the processes of erosion and accretion. Both components continued under the same project head. By the end of the Project in 1991, it was divided into two separate activities. These were:

(i) Char Development and Settlement Project (CDSP);
(ii) Meghna Estuary Study (MES).

CDSP which would be land based and would be implemented by Ministry of Water Resources with participation from the Ministry of Lands, Ministry of Local Government Rural Development and Cooperatives, and others. The MES which would be largely concerned with the hydrological and morphological aspects, would continue with BWDB as the executing agency, but under the umbrella of FAP, supervised by the then FPCO. The Government of the Netherlands has expressed interest in providing assistance to GoB in the execution of both projects, with the Government of Denmark also showing joint interest in MES. MES is thus an extension of LRP but a component of FAP and started operation since November, 1995.

1.3 Objectives and Scope of MES Institutional Development

The main objective of institutional development in MES is to identify and develop conditions conducive to sustaining the project activities. These activities are aimed at:

- increasing the operational knowledge of the hydro/ morphological processes of the River Meghna
- increasing the institutional capacity to retain and up-date that knowledge
- developing appropriate approaches for repaid and low cost land reclamation.

MES comprises two main components. Through surveys and studies, an understanding will be developed of the forces that control and condition the ever changing pattern of land and see areas because of natural changes and changes induced by human interventions. From this a phased long term plan for the area will be prepared; this component referred to as the *"master plan"*. Consequently attention must be given to a continuation of surveys, studies and monitoring beyond MES.

The preparation of a comprehensive plan for flood protection and the improvement of the internal water management of the coastal islands are included in the MES study area. This component referred to as the "development plan".

The link between the two components lies in the consideration that, while the first will identify the potentials for the reclamation of new land, the second will produce models for the development and settlement of new land. Both components are expected to lead to the identification and subsequent implementation of priority projects.

It is clear from the above that the main thrust of the project is establishing and nurturing a planning process together with data collection and processing in support of that process in the counterpart organizations in a sustainable manner. Institutional development in MES focus on re-activating the data collection and processing activities and establishing/strengthening the macro-planning capability in the counterpart organizations. As such institutional development would be oriented toward identifying suitable / appropriate arrangement for effectively continuing these activities in an effective and efficient manner on long term basis after MES assignment is over.

While longterm beneficiaries are the population in the coastal area, more concrete beneficiaries of MES institutional development are:

- BWDB(SSD) or some other organization(s) to be entrusted with data collection and processing;
- BWDB as the organization responsible for development project planning (short term);
- WARPO, as the organization responsible for macro planning of water resources development and flood protection (medium to long term).

The relevant institutions and organizations were contacted in the water sector and information was collected on job situations. Also knowledgeable persons in the sector were also contacted to find development needs on institutional aspects. MES is primarily concerned with estuary in the southern coast and confines its activities related to planning and development process and try to find institutional linkages that help and support water sector planning process.

The institutional development component will pursue its objectives in relation to the complete land and water development process within the existing institutional and policy framework. In pursuing this goal, MES must take due account of institutional changes that have taken place or that is imminent in the GoB organizations in the water sector.

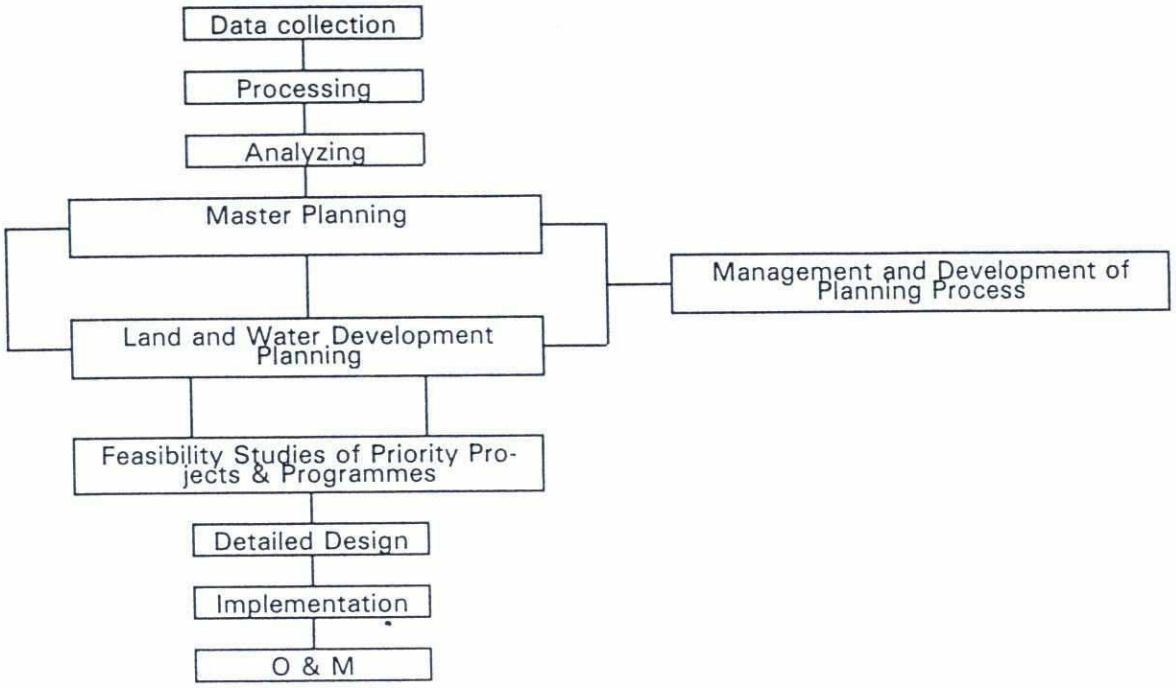
2. PLANNING AND DEVELOPMENT PROCESS FRAMEWORK

MES is principally a planning project whose main emphasis is to establish the macro planning process in the GoB institutional framework with re-activating and supporting data collection and processing activities. Besides,MES will be involved in micro planning only to the point of feasibility studies for priority projects and programmes. However, MES may identify institutional needs for implementation of the projects and programmes within the overall objective of shifting the burden of specially O&M from central GoB organizations to the local level. In this regard MES and CDSP closely co-ordinate the institutional requirements and developments. Thus the principal activities of MES will concentrate on measuring, studying and macro planning in the water sector. The project intends to develop appropriate approaches for rapid and low cost land reclamation i.e. the focus is more on the process than on specific outputs. Since MES is a study project, the institutional development component will pursue its objectives in relation to the complete land and water planning and development process within the existing institutional and policy framework.

2.1 Planning and Development Process

There are three main participants in water resources development and management-government, non-government entities and private sector. The appropriate role of the government is to control

overall exploitation and management of the resources and to undertake investment programmes. Non government entities should develop and manage resources for local interested groups' benefit. The chart below indicates the planning and development process.



The implementations of water resources management policies (through data collection, planning, master plan, development plans, priority projects etc.) in Bangladesh have many implications for public institutions dealing with water resources. Institutional structures at the national level are necessary for formulation and implementation of policies while local level institutional support, co-ordination and co-operation will help and assist the planning and development process.

2.2 Water Planning Background and Institutional Development

BWDB prepared a master plan (1964) comprising large-scale projects for flood control, drainage and irrigation many of which were implemented between 1960s and 1980s. World Bank's Land and Water sector study (1972) advocated for development of small scale minor irrigation projects which were implemented between 1970s and 1980s. By early 1980s need was felt for a long term water resource development plan and MPO was established (1983) under Ministry of Irrigation Water Development and Flood Control. MPO produced phase I (1986) and phase II (1991) plans and proposed to institutionalize the process of water planning and long term water management.

MPO was renamed as the Water Resources Planning Organization (WARPO) in 1992 under MWR. It's objectives are to upgrade and expand the national water plan with an inter-sectoral focus and an inter-disciplinary approach.

The GoB approved the Bangladesh Water and Flood management strategy (1995) which establishes WARPO as the apex national water planning organization. As a part of institutional development process FPCO was also merged with WARPO in January 1996 and WARPO took the responsibility of completing the ongoing work initiated under the FPCO. WARPO is to be headed by a Director General supported by five technical Directorates. These are directorates of planning, socio-economics, environment, land resources, hydrology and engineering; and will draw upon the services of existing institutions. Policy guidance and strategic direction will be provided by the National Water Council chaired by the Prime Minister and an inter-ministerial steering committee will periodically review WARPO's goals, objectives and annual work plan. Thus the initial tasks of the new WARPO are (i)to upgrade and expand the national water plan with an intersectoral focus and inter-disciplinary approach, (ii)to maintain and expand the data bases

developed by the former WARPO and FPCO and other agencies (BWDB, SWMC, GIS, SSD, RRI, etc.), (iii)to further develop the analytical capacities to evaluate water sector planning and evaluate projects to provide feedback into the planning process, (iv)to become information dissemination center and thus to create an effective organization capable of accounting for inter-sectoral and cross-sectoral impacts and priorities.

Bangladesh Water and Flood Management Strategy (Sept. 1995 by MWR) recommended water resource development programmes which involve formulation of a strategic national water management plan (beyond 2000) as shown below.

- Institutional strengthening of water sector organizations involving reorganization and strengthening of planning organizations (FPCO, WARPO)
- Enhancing the capacity of the main agencies responsible for designing, constructing, operating and maintaining projects (BWDB, LGED, WASA, DPHE, BIWTA, MOF etc.) facilitating intersectoral coordination and cooperation. Emphasis would be given to training and human resource development, upgrading of interdisciplinary planning and technical skills in key areas and institutional reforms.
- Implementation of priority projects.

3. INSTITUTIONAL SETTING

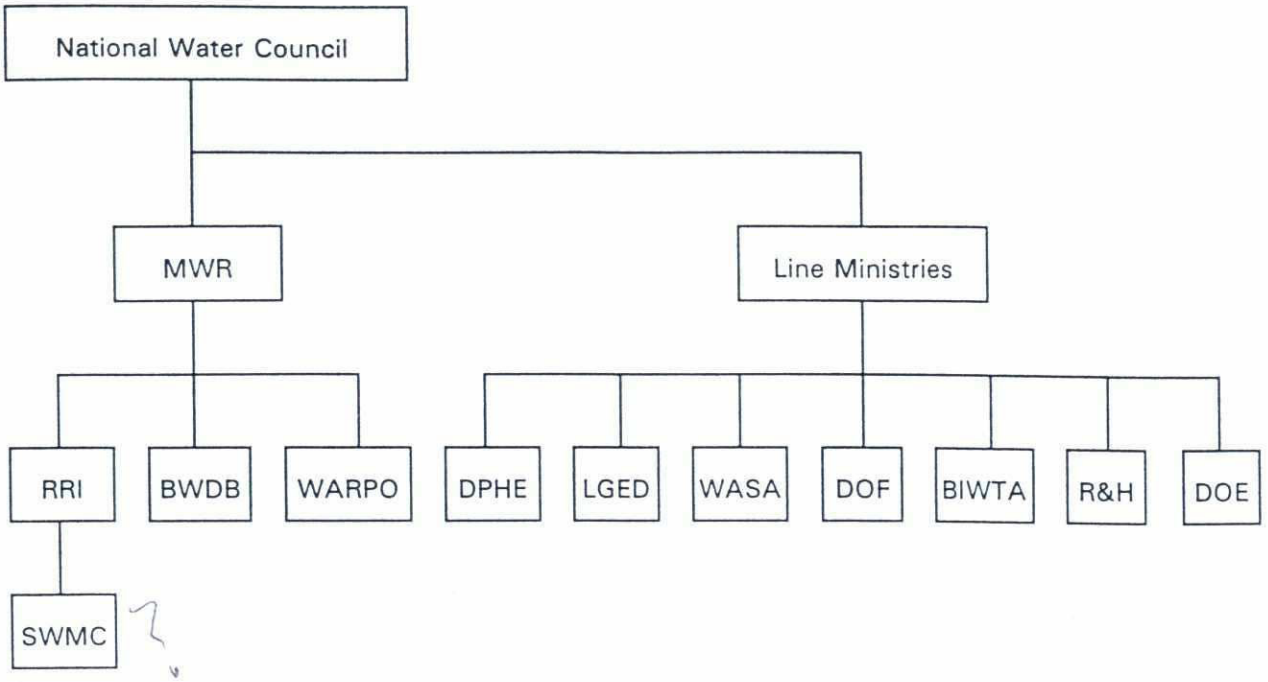
3.1 GoB Water and Flood Management Strategy

The FAP Conference of December 1995 discussed *inter alia* institutional development in the water sector. It established that the GoB has formulated a Water and Flood Management Strategy which constitutes a basic policy document of GoB in water sector calling for:

- addressing the long-term needs of sector management;
- undertaking integrated land and water use planning;
- achieving inter-sectoral balance;
- managing cross-border flows;
- basin-wise water resources development (Surface Water and Groundwater);
- balance between physical infrastructural and non-physical infrastructural approaches;
- setting environmental priorities;
- developing appropriate institutions.

3.2 Existing institutional Scenario

Flood Plan Co-ordination Organization (FPCO) has merged with the Water Resources Planning Organization (WARPO). WARPO is identified as the main organization for macro planning. BWDB as the organization responsible for project planning implementation and maintenance. BWDB, LGED, Departments of Agriculture, Fisheries, Forestry, Roads and Highways, Environment, BIWTA etc. are organizations in water related sectors which are responsible for micro-planning (Local Level Planning), implementation and O&M. This has resulted in some streamlining of the institutional framework in the water sector. The chart below indicate institutional scene and likely in action.



Nevertheless, there are still many different organizations operating in this sector. Bangladesh has the National Water Council (since Sept. 1989) with representations from all water related ministries for policy formulation at the highest level of government. Ministry of Water Resources has primary concern on flood control and water resources development (previously this ministry was known as the Ministry of Irrigation, Water Development and Flood Control (MOIWDFC). It has also the Water Resource Planning Organization (WARPO) for overall planning of water resources and ensuring its optimum utilization by various users. WARPO is also supposed to consolidate data on water resources collected by various agencies. The organization, however, has not operated as per new mandate for various constraints resulting very little has been accomplished in sectoral planning and co-ordination. Hopefully reorganization will start in WARPO next year. Individual line ministries have their own planning departments which operate in more or less complete isolation of one another. On the top of these Bangladesh planning commission is there to look after all sectoral allocation of investment fund for all ministries and coordinate macro planning process of the country.

Major investments in the water sector are made by the ministry of water resources through Bangladesh Water Development Board (BWDB) (about 20,000 employees) and by the ministry of local government and rural development through its Local Government Engineering Department (LGED) (about 900 employees). Besides, other water related ministries have their own development programmes which include cyclone and water related activities concerned mainly with rehabilitation and strengthening of existing infrastructure and construction of cyclone protection facilities. There is very little co-ordination of activities between all these agencies.

River Research Institute (RRI) with a few hundred employees has responsibilities for hydraulic model studies, soil mechanics, material and water quality testing. The Surface Water Modelling Centre (SWMC) is responsible for developing, applying and maintaining one dimensional river models to support planning and design activities in MWR. Previously the SWMC was under WARPO but in august 1992 it was transferred to the RRI as a separate administrative unit. There is a proposal under consideration for making the SWMC an independent trust.

The Flood Plan Coordination Organization (FPCO) which had been established as a temporary arm of the MWR with responsibilities to supervise and co-ordinate the Flood Action Plan (FAP) activities. As per government decision - FPCO merged with WARPO in January 1996. FPCO / WARPO was/is to co-ordinate FAP and MES activities whereas BWDB (LAED) retain responsibility of MES's execution.

The most important agencies operating in the sector outside MWR include.

1. LGED - Under Ministry of local Government with responsibility for small scale rural infrastructure department;

2. BIWTA - Under Ministry of Shipping, Bangladesh Inland Water Transport Authority - responsibility is inland transport and navigation;

3. MOA - Ministry of Agriculture - responsibility for ground water development.

4. DPHE - Under Ministry of Health, Department of Public Health and Engineering with responsibility for domestic water supply (tubwells).

5. DOF - Under Ministry of Fisheries, Department of Fisheries - responsible for fisheries development through stocking in with culture and capture fisheries.

6. DOFE - Ministry of Environment and Forest - responsible for development of forest in the new charland for agriculture and environmental development.

From the above setting it is clear that a number of organizations outside water ministry are involved for the assessment of impact on the project activities as they relate to different aspects of master planning and development planning. These organizations are LGRD, LGED, BIWTA, MOA, DOF, DPHE, DOE. etc. belonging to other line ministries. Involvement of many institutions creates some complexity of co-ordination in the planning, development and implementation and O&M process. This complex situation has relevance to MES institutional development output. In view of this, following actions required to address the institutional gaps as observed by the FAP conference of December 1995 are:

-to provide specific mandates for execution, monitoring and data collection organizations for implementation of the National Water Plan in collaboration with other agencies;

-provide specific levels of interaction between major water-related agencies for planning and co-ordination of water programmes and schemes.

A number of options and recommendations for institutional restructuring were presented to the said conference (Dec. 1995). These are:

-support to the National Water Council (NWC) through strengthening of WARPO;

-focussing government organizations or the legitimate role of the public sector institutions in the water sector i.e. the creation of infrastructure;

-non-govt. organizations would interact with the system at various levels of planning, schemes development and implementation, operation and maintenance.

WARPO and BWDB will work complementary to each other while RRI, SWMC and Hydrology directorates of the BWDB along with GIS will together form a non-profit corporation under companies act (status suggestion). But there was no mention of SSD/BWDB, Chittagong as an organization for collecting water resources data for Estuary areas of southern Bangladesh coast. May be all that was discussed in the said conference are on national perspective without depicting special areas for special approach and treatment. Some more information collected with respect to these above organizations are placed at **Appendix - A**.

4. INSTITUTIONAL TASK FOR MES

4.1 Assessment of Institutions

To get the MES activities underway, the immediate need for project is to re-activate the data collection and processing activities and to formulate arrangements to sustain data collection and processing upon expiry of the project.

Regarding the continuation of these activities, it is important to point out that the TOR requires a report on institutional arrangements for a purposeful continuation of a programme of studies for the Meghna Estuary, strengthening of the BWDB, Surveys and Study Division in Chittagong containing an assessment of the available capabilities in the country with respect to hydrographic surveying of coastal waters of Bangladesh and put forward proposals for optimum institutional arrangements for the continuation of a required routine programme of surveys and study after the expiry of MES.

This report is required with proposals for optimum and purposeful institutional arrangements to continue routine surveys and study after MES, (including required facilities, equipments, staffing, initial investment required and annual recurring costs). However, in the specified TOR it is also mentioned that BWDB should have its own institute to independently undertake studies, collect data and up-date the gathered information before the end of the project. In view of the TOR requirement the immediate concern of MES is to re-activate the data collection and processing activities in support of planning. The operational responsibility for data collection lies with the Surveys and Study Division (SSD) in Chittagong. MES is now control data processing and analysis. Data are sent to Surface Water Modelling Center (SWMC) which develops an overall model for the MES plan area and also local models to study specific interventions including alternatives in more detail. In assessing the sustainability of these activities due account will be taken of the need for appropriate manpower, operational budget, flexibility of operations and the links between the data collection and processing / analysis and studies to improve the overall and integrated water resources planning process.

In accordance with the TOR for institutional improvement - the SSD's position will be investigated first. However suitable alternatives also will be investigated as well. Institutional assessments will be made of the relevant organizations to determine their relative strength and weakness in terms of meeting the needs in respect of budget flexibility and management in the overall planning and development process. MES Inception Report (April '96) is yet to be finalized and approved, discussion and revision activities are in progress on Inception Report. The TOR of MES is also under revision. Under this circumstances the present assessment will be considered as interim reporting waiting for final assessment at the end of the project.

4.2 Assessment of Survey and Study Division (SSD) /BWDB, Chittagong

4.2.1 Background:

The Land Reclamation Project started in 1977 (December) to address the problems of flood and coastal erosion and to exploit the potentials for the reclamation and development of lands along coastal fringes. To fulfill the objectives there was a need to set up an organization within the BWDB to carry out surveys and study in order to develop a long term policy for land accretion activities in the South-Eastern Coastal area of Bangladesh. The organization - the Surveys and Study Division of BWDB was established in 1978 at Chittagong under LRP. The project (LRP) is headed by a Superintending Engineer and under Superintending Engineer's jurisdiction, the following divisions exit, each headed by an Executive Engineer.

1) Planning and Co-ordination Division
2) Project Preparation and Monitoring Division
3) Surveys and Study Division
4) Land Reclamation Division

The project had/has Netherlands advisory/ consultants team participated/ participates in the project activities and to transfer knowledge and technology to Bangladeshi counterparts.

The expiry of the LRP resulted the establishment of present Land Accretion and Estuary Development organization (LAED) within the BWDB headed by a Director (Superintending Engineer-a BWDB's designation). This Directorate is under the planning wing of BWDB. LAED Director reports to Chief Engineer (Planning), see LAED, BWDB organization chart **Appendix - A.**

4.2.2 Scope & Functions of SSD

The aim is to address the problems of floods and coastal erosion and to exploit the potential for the reclamation and development of new lands along the coastal fringes from the mouth of the lower Meghna in the west to the mouth of the Karnafuli River in the South east.

Function of Survey and Study Division, Chittagong: The functions are to carry out the hydrographic, hydrologic, hygrometric and topographic surveys such as:

1) Bathymetry
2) Velocity measurement
3) Discharge measurement
4) Coast line survey
5) Salinity measurement
6) Grain size distribution
7) Water level data collection
8) Topographic survey
9) Water and bed sample collection and Laboratory analysis
10) Processing of types of field data
11) Meteorological data.

SSD was engaged in the collection of bathymetric and hydrographic data in the south-eastern delta of Bangladesh. Within LRP, these data have been used in various pre-feasibility and feasibility studies for specific land reclamation projects(Sandwip cross-dam, Hatia-Nijhumdwip cross-dam projects) erosion protection projects (North Bhola, North Hatia and South Sudharam drainage study). Also data have been made available to other agencies inside and outside BWDB. At times special surveys have been carried out in order to measure the data that were required for other projects.

Laboratory Functions and Equipments

The main function of the Laboratory is to analyse the water and sediment samples which are collected by survey vessel M.V. Anwesha from the different stations of coastal area and off shore islands. The density, temperature, sediment concentration of water samples, sand & silt in samples, grain size distribution of sand and silt, percentages of sand and silt etc. are determined in Laboratory.

List of equipments of the Laboratory, SSD, Chittagong

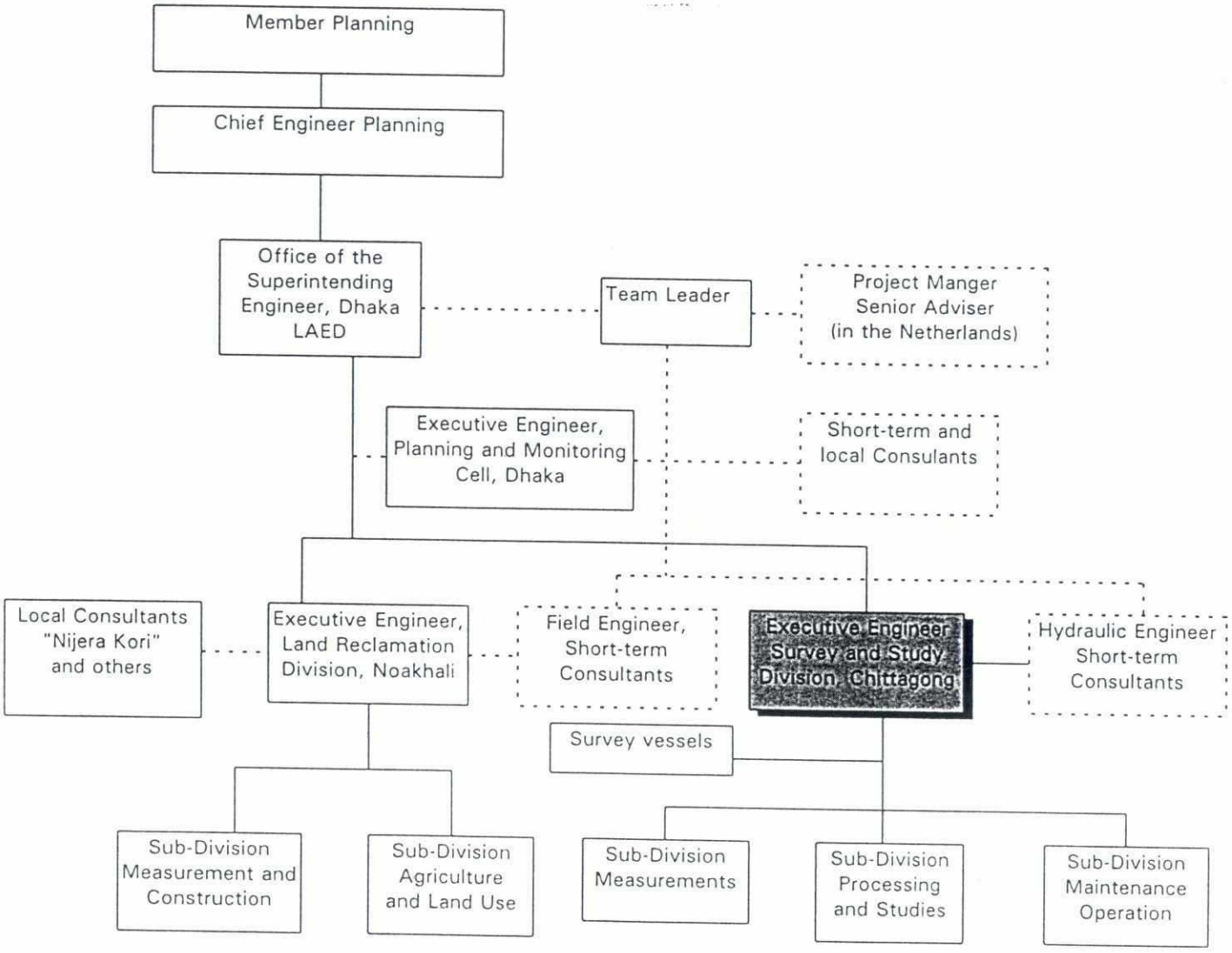
SL. No.	Description	Item No.
01.	Electric balance	01
02.	Vacuum pump	02
03.	Electric sieve shaker	01
04.	Electric Oven	01
05.	Electric Vibration Machine	01

06.	Salinometer	02
07.	Ysi (Salinometer with probe)	01
08.	Stop watch	02
09.	Force Pump	01
10.	Sieves in different size (set)	21
11.	Sieve pan	02
12.	Hydrometer / Photometer (VITATRON)	01
13.	Steel Almirah	02
14.	Water sample carrier (wooden)	07
15.	M.S. Frame Case	20 nos. Lab. and 4 nos. Awhesha

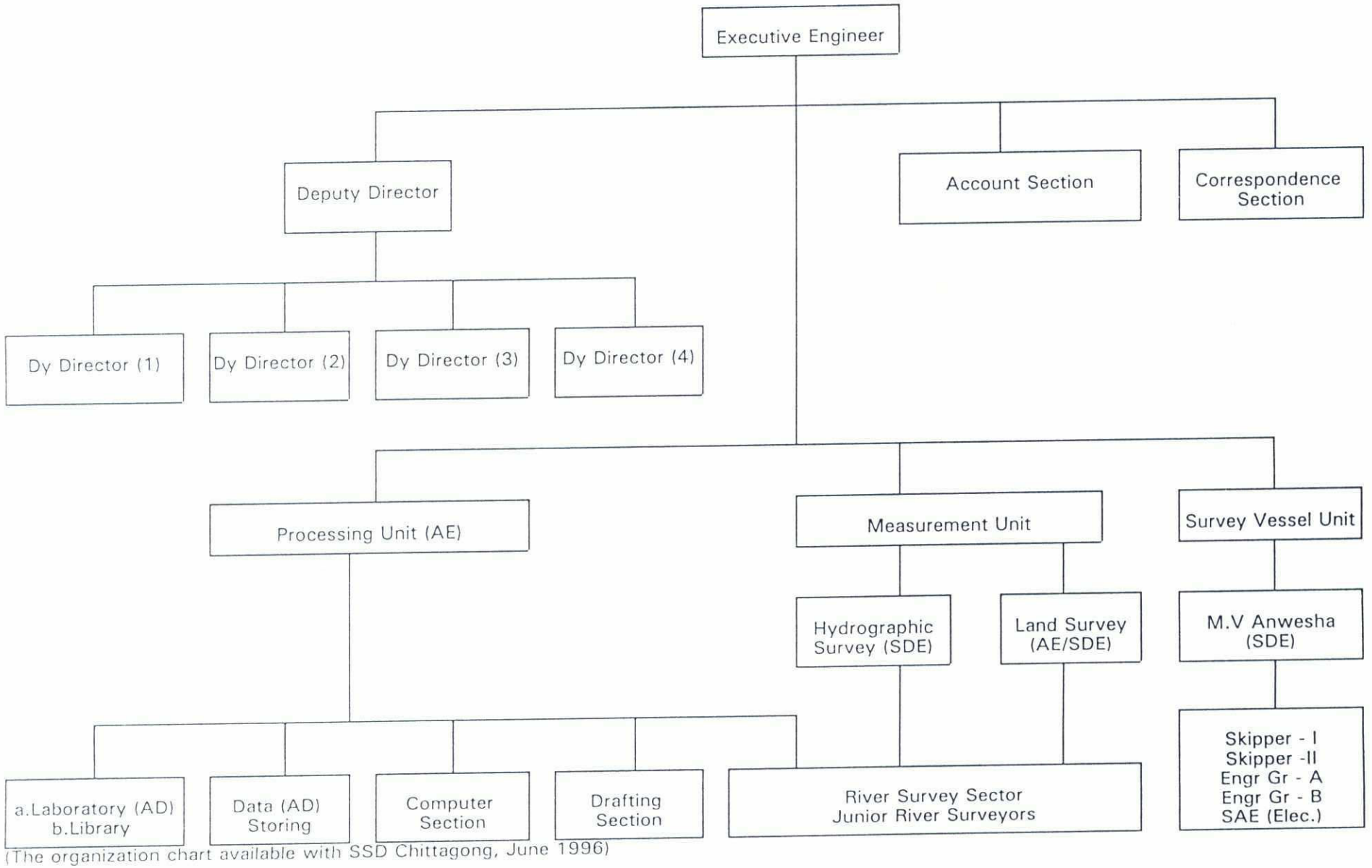
4.2.3 Organization

The Survey and Study Division (SSD), Chittagong is headed by an Executive Engineer - rank and status at per with BWDB Executive Engineer - Cadre, Engineer (Civil), working under LAED and reporting to Director LAED. There are three main units in the SSD - 1) Processing Unit 2) Measurement Unit 3) Survey Vessel Unit. Each unit headed by a Sub-Division Engineer (organization chart, june 1996).

ORGANOGRAM
BWDB/LAED/SSD



ORGANOGRAM SSD, BWDB, CHITTAGONG



(The organization chart available with SSD Chittagong, June 1996)

4.2.4 Manpower in SSD

Total sanctioned manpower strength according to TAPP is 90 against which 42 is in position on June 1996 as shown in the following tables.

Executive Engineer's Office - SSD (staff + support personnel)

Sl. No.	Designation	Sanction	In Position
1.	Ex. Engr.	1	1
2.	Dy Director	4	4
3.	Asst / Sub Engr.	2	2
4.	Divisional Accountant	1	abolished
5.	Draftsman gr. I	1	1
6.	Sub-Asst Engr.	1	vacant
7.	Hand Clerk	1	1
8.	SAA	2	1
9.	Steno typist	1	vacant
10.	Clerk cum typist	4	4
11.	Accounts Asst.	2	1
12.	Driver	3	2
13.	Store Keeper	1	1
14.	B. Printer machine operator	1	vacant
15.	Record Supplest	1	vacant
16.	Guard	3	vacant
17.	MLSS / Peon	4	1
18.	Sweeper	1	1
19.	Orderly (Peon)	1	1
20.	Office Choukider	1	vacant
21.	Gardener	1	vacant
	Sub-Total	37	21

Survey Vessel (staff + support personnel) - SSD

Sl. No.	Designation	Sanction	In Position
1.	Skipper gr. I	1	Vacant
2.	Engineer gr. A	1	Vacant
3.	Engineer gr. B	1	1
4.	Skipper gr. II	1	Vacant
5.	Sub-Asst. Engr.	1	Vacant
6.	Sailor	6	4
7.	Greaser	2	1
8.	Daughter vessel driver	2	Vacant
9.	Cook - B	1	1
10.	Lasker	2	1

11.	Jetty guard	3	Vacant
12.	Assistant cook	1	1
	Sub-Total	**59(22)**	**9**
Measurement Unit (staff + support personnel) - SSD			
1.	Sub-Divisional Engr.	1	1
2.	Junior River Surveyor	8	4
3.	Clark - cum typist	1	vacant
4.	Gauge Reader	4	1
5.	Survey Khalasi	4	3
6.	MLSS / Peon	1	-
7.	Guard	1	vacant
8.	**Sub-Total**	**79(20)**	**9**
Processing Unit (staff + support personnel) - SSD			
1.	Sub-Divisional Engr.	1	1
2.	Asst. Director	1	Vacant
3.	Tracer	1	Vacant
4.	Draftsman gr. II	1	Vacant
5.	Clark-cum typist	1	Vacant
6.	MLSS / Peon	1	Vacant
7.	Sweeper	1	Vacant
	Sub-Total	**86(7)**	**1**

Laboratory (staff + support personnel) - SSD

Sl. No.	Designation	Sanction	In Position
1.	Asst. Director	1	Vacant
2.	Lab-Technician	1	1
3.	Soil Technician	1	1
4.	MLSS / Peon	1	Vacant
	Sub-Total	4	4
	Grand Total	90	42

The above position of manpower strength shows that out of total 90 positions (professional + supported staff) 42 personnel are in position. Statement of particulars of SSD personnel is provided at **Appendix - B.**

4.2.5 Professional Personnel in SSD

At present (17-11-96) there are 4 Engineers and 2 Deputy Directors working in SSD, Chittagong. Amongst those Four Engineers - one is an Executive Engineer heading SSD, Chittagong, other 3 Engineers are Sub-divisional Engineers. All of the four Engineers are Diploma Engineers - and promotees and served at BWDB at various capacities at various BWDB agencies and started their career as Sub-Asstt. Engineer in Water development Board. Most of their experiences relate with constructions, embankment construction, repair and maintenance, estimate checking etc at various divisions / circles / zonal offices of BWDB. Major times of their service lives have been spent other than the Survey and Study Divisions type of work - i.e. hydrological, morphological

and hydrographical Survey and Study. Key professional staff are shown in the statement are below under Key Professional.

In addition, there are two Deputy Directors in SSD (previously there were 4 Deputy-Directors), both have B.Sc degrees as their educational qualifications and started their BWDB job as Asst. Technical officers and promoted as Deputy Directors. Of them one has BWDB working experience in Hydrology with the processing division, hydraulic research laboratory and the Ganges study while the other has experience of serving Hydrology department, BWDB. From the following statement it reveals that one of the Deputy Directors will retire in early 1997 while the other will retire in December 1996.

Of the three junior River Surveyors two have B.Sc degrees and one has diploma Engineering. All of them joined SSD early 1980s and have been working in the same post till to-date. They have on the job training experience in the MV Anwesha and all have 3 months training on Hydrography in Delft hydraulics in Netherlands. One degree Engineer transferred from SSD to another BWDB agency on 01-10-96 who had some experiences of hydrological survey through M.V Anwesha and 7 month training in Kaptai Engineering Academy. He served in SSD Ctg. during the periods 15-09-88 to 06-09-94 and 01-01-95 to 01-10-96.

Between June 19, 1996 to November 17, 1996 there were a few transfer of professionals from SSD, Ctg. while there were also few professionals joined in SSD Ctg. Significant observation is that the basic qualifications for these professionals who will head the three SSD - sections / units should have BSc Engineering (Civil) degree with minimum skill required --"**Operation and maintenance of survey equipments, additional skill required-- work planning, information management and report writing, efficient in hydrographic data collection and processing. Educational requirement of junior River Surveyors' is --Diploma in civil Engineering; minimum experience required knowledge of operation of survey equipments & hydrographic data collection.** It is observed that in time of transfer from SSD or transfer to SSD these requirements were not considered which may be one reason for SSD's lack of efficient operation as a Survey and Study Division for Land accretion and Estuary Development (job-description prepared by SRP is placed at **Appendix - C**).

Recently MES organized a short training programme during mid-August, 1996 in which one Sub-divisional Engineer participated as a trainee from SSD but he was transferred from SSD, Chittagong on 01-10-96. Another Sub-divisional Engineer who has obtained post graduate Diploma from Delft - Netherlands was transferred to Bhola - BIP/BWDB. Recently one B.Sc. Engineer joined SSD on 05/10/96 but transferred elsewhere on 16/11/96 after working 40 days in SSD. This kind of transfer of experienced personnel should not be encouraged for smooth operation of SSD for two reasons - (i)SSD's job is a specialized job in the field of hydrography and morphology - (ii)this organization is more or less a research oriented organization and in such research always there are elements of survey and study. Those who will work in such an organization must have basic qualifications in related disciplines plus experiences gain on the job and improved skill for survey and study through training. The SSD (during LRP's time) proved to be capable to carry out surveys on its own to process the collected data and present the survey data. The graduate Engineers of SSD mastered the use of computers for data processing and storage. Due to transfer of those graduate Engineers and induction of Diploma Engineers in the present SSD - that capability is also drained out. As a result only about 80 to 85% of the data collected earlier and stored in the SSD could have been possible to retrieve by MES consultants recently with great difficulty. The computers and other facilities either have became obsolete or damaged for not being utilized for many years.

There may be genuine reasons which may be external or internal for such transfers and joining but this is for sure that the organization suffers for such action and cannot strive for sustenance for long. Here it seems a clear sign of lack of manpower planning, little consideration for job descriptions in the organization and these actions work as contrary to organizational development and professional career development. Thus technology transfer or skill acquired could not make result rather it is misused or misplaced and was not allowed to contribute.

Statement of Present Manpower Position (30-11-96) in Survey and Study Division/ BWDB, Chittagong (Officers Cadre)

Name with Designation	Date of Birth	Educational Qualification	Joining date at SSD	Experiences	Training	Remarks
Md. Sultan Ahmad Executive Engineer	29/8/1941	Diploma-in Civil Engineering	12/8/1994	Start in BWDB on 22/1/-1964 worked as section officer, Sub-Divisional Engineer upto 11/8/94. Executive Engineer (SSD/BWDB) 12/8/1994 till date	None	-
Satyendra Nath Choudhury Deputy Director	01/04/1940	B.Sc	30/12/1989	Hydrology Directorate as Technical Officer from 1963 to 29/12/1984. From 30/12/84 to date SSD, Chittagong	Training in Hydrology, Bhagyakul Training Institute, Dhaka.	Start LPR from 31/3/1997 (for retirement)
Md. Mafizur Rahman Deputy Director	28/12/39	B.Sc	31/7/78	Worked in BWDB Hydrology Directorate	Departmental Training Kapti Academy and Bhagyakul Hydrological Training Institute, Dhaka	Start LPR from 26/12/96 (for retirement)
AKM Kamaluddin Sub-Divisional Engineer	26/9/1944	Diploma in Civil Engineering	14/11/91	Sub/Asstt Engineer/Section officer form 7/1/67 to 22/8/1978. Asst Engineer; from 23/10/78 to 21/8/80 Sub-Divisional Engineer; 22/8/80 to 13/11/91. BWDB, SSD from 14/11/91 Sub-Div. Engineer, to date	Training in Engineering Academy, Kaptai	-
Ali Akbar Sub-Divisional Engineer	31/12/1945	Diploma in Civil Engineering	18/8/96	BWDB from 28/4/67 to date as Sub-Asst. Engineer, Asst. Engineer, Sub-Divisional Engineer in different departments and circles	None	-
Md. Abdus Samad Sub-Divisional Engineer	24/11/1944	Diploma in Civil Engineering	15/5/95	In BWDB Service from 19/9/64, sub-Asst Engineer/Section officer, Asst. Engineer from 18/8/80 to 3/4/85; Sub-Div Engineer 4/4/85-14/5/85 BWDB. From 15/5/95 to date-SSD	None	-
K.M.Mustafa Kamal Jr. River Surveyor	12/6/1957	B.Sc	1985	From 1981 to 1985 trainee Hydrography in BWDB, 1985 to date SSD, Ctg.	6 month training. Tech. Training Centre Ctg. 2.5 month training Delft, Netherlands	-
Md. Masiuzamman Jr. River Surveyor	20/5/60	B.Sc	1981	From 1981 - till date, SSD	Electronic Tech. Tr. Centre Ctg., 3 months at Delft, Netherlands	-
Paresh Ch. Das Jr. River Surveyor	3/1/1960	Diploma in Civil Engineer	3/6/1985	From 3/6/1985 to date	Basic Electronic-6 months 2.5 month in Delft, Netherlands	-
Md. Abdul Aziz Engineer Grade 8 (Anwesha)	3/1/1963	Diploma in Marine technology (Narayanonj)	10/7/1985	From 10/7/85 in Vessel Anwesha	None	-

4.2.6 Computer Facility in SSD

Computer facilities in the SSD are mostly of older versions and obsolete for the MES works. List of machineries and accessories of SSD computer room are shown below.

List of Machineries and Allied Accessories of the Computer Room of Survey and Study Division, BWDB, Chittagong

Personal Computers and Allied Machineries:

1.	IBM Computer with monitor and key board	1 no.
2.	Copam Computer with monitor and key board	1 no.
3.	Compaq Computer with key board	1 no.
4.	Grid Case Computer with a 5.25 drive (monitor partially damaged)	1 no.
5.	Hewlett Packard Computer with monitor and key board and a 3.5 drive	1 no.
6.	UPS (TM 500)	1 no.
7.	Electronic Voltage Stabilizer	2 nos.
8.	Voltage Stabilizer (Auto Stack) (original one lost and replaced by a equivalent one)	1 no.
9.	Printers:	
	a) Epson LX-86	1 no.
	b) Epson FX-80+	1 no.
	c) Hewlett Packard HP	1 no.
	d) Super 5 EP-1201 A	1 no.
10.	Plotters:	
	a) Hewlett Packard HP (7470A)	1 no.
	b) Hewlett Packard HP (7575A)	1 no.
11.	Mouse	

Manuals (in computer library)

1.	DOS IBM	1 no.
2.	Microsoft Fortran Compiler	1 no.
3.	Getting Started Framework II	1 no.
4.	Using Framework II	1 no.
5.	Advanced Topics Framework	1 no.
6.	Learning Framework II	1 no.
7.	Guide to operations for IBM PC AT	1 no.
8.	Copam Operation Manual	1 no.
9.	HP 110 portable computer owners document	1 no.
10.	Series 110/Compiled basic	1 no.
11.	GW TM Basic	1 no.
12.	Personal Computer software library series 100	4 no.
13.	Operating Instruc. of impact dot matrix printer	1 no.
14.	Programmable calculator Casio FX-702P	1 no.
15.	Interfacing and programable manual	1 no.
16.	Interconnection guide	1 no.
17.	Portable computer HX-20 basic reference manual	2 nos.

18.	Operators manual	1 no.
19.	Word Star (photocopy)	1 no.
20.	Hewlett - packard (think jet printer)	1 no.
21.	GW basic statement, command, functions and variables	3 nos.
22.	MS-DOS user's guide	1 no.
23.	MS-DOS Reference (for grid case)	1 no.

Accessories:

1.	Diskette (three and half inches), used	21 boxes
2.	Diskette (three and half inches), blank	2 boxes
3.	Diskette Bank (3.5)	4 nos.
4.	Diskette (five and quarter inches) used	14 boxes
5.	Ribbon cartridge (Eposn LX-86), new	1 no.
6.	Ribbon cartridge (FX-80), New.	2 nos.
7.	Plotter Pens (new)	1 pkt.
8.	Paper for printer (one fourth used)	1 box
9.	Multi - plug	4 nos.
10.	Electrical Filter	1 nos
11.	3-points switch board	2 nos.

4.2.7 ANWESHA and Tender Boats

The marine survey activities under LRP had been carried out by the 'Anwesha' which was the main survey vessel of LRP stationed in Chittagong. Today, the vessel is operated by BWDB/SSD, it will also be used for the MES survey activities.

From May 1980 to 1991, 'Anwesha' had been in operation for some 50 percent of the time, the remaining time being spent on bunkering, scheduled and unscheduled repair and maintenance, water downtime holidays, and unrelated activities. The vessel was docked once per year for routine inspection and maintenance, and also, on several occasions, for major repairs due to accidental damage to the hull or to the propulsion system. Typical reasons for such damage was hitting the seabed, and getting the propeller entangled with fishing nets (to which the vessel is reportedly sensitive, 'LRP, Final Report', p.32-34).

In 1990, an appraisal mission made the following observations on working conditions in the project area(Westdijk and Mol, draft, undated):

- travelling distances are enormous;
- accessibility is often difficult and sometimes impossible;
- local currents are sometimes dangerous according to Dutch standards; and
- unpredictable and dangerous tidal bores occur in the area
  on one occasion a tidal bore caused the loss of one tender boat.

In addition to the LRP field programme, which ended in 1991, the vessel has been used for minor surveys for FAP1 (1990-91) and FAP24(1992).

After MES has started operation, three cruises have already been made in MES area and the 4th cruise will be started by mid December 1996. Before starting the 4th cruise, water level gauges to be installed in selected locations with in the project area. And Bathymetric survey will be started in mid December 1996.

The survey vessel MV Anwesha was docked (between 12/09/96 to 06/12/96) in the high Speed Dockyard at Fatullah for cutting and clearing fishing net which was stucked and twisted around the propeller during the last cruise. The engine cannot take full load on running condition. The running speed of Tenders are also less than required. The problems and defects would be

examined jointly by an expert from Royal Netherlands Embassy, Caterpillar Engine Expert from GET-CO and representative of the High Speed Dockyard (November 1996); this has been done.

4.2.8 Budget (Financial Account)

Total Budget and Expenditure of SSD during 1994-95 and 1995-96

Sl. no		1994-95		1995-96	
		Budget	Expenditure	Budget	Expenditure
	Revised Budget	**7471700.00**	**6633211.04**	**7471700.00**	**3921392.64**
	Details of Budget				
1)	Pay and allowance	3264700.00	3353881.65	3264700.00	3043147.51
2)	Employees welfare	867000.00	330365.92	867000.00	323422.09
3)	Office Expenditure	97000.00	79544.50	97000.00	67558.82
4)	Travel	200000.00	188817.44	200000.00	165073.40
5)	Electricity charges	75000.00	116171.28	75000.00	24984.59
6)	Tax - etc.	60000.00	59059.00	60000.00	1514.00
7)	Post, Telephone, Telegraph etc.	150000.00	130432.17	150000.00	98127.43
8)	Transport i) Petrol - mobil ii) Insurance iii) Road permit iv) Fitness Bank charge	 125000.00 2500000.00 2000.00 2000.00	 148292.96 - - 329.00	 125000.00 2500000.00 2000.00 2000.00	 76420.75 - - -
9)	Repair maintenance	110000.00	2200379.57	110000.00	84333.30
10)	Training	-	-	-	-
11)	Others (Overtime, tiffin, transport, Newspaper etc.	14000.00	25945.25	14000.00	36810.75
12)	Misc	5000.00	-	5000.00	-

This above expenditure incurred on account of pay, TA, Pension, Benevolent fund, Income Tax etc. (which includes LAED Head Qtr. staff). It is however noticed that recently the Skipper (Anwesha), Engineer (Anwesha), Laboratory Engineer (SSD) are on MES account under technical assistance. All expenses on Anwesha will also be borne by MES' TA fund.

4.2.9 Assessment and Measures for Strengthening of SSD Activities

Two types of professional personnel should manned the SSD, Chittagong to efficiently perform the jobs and functions. The types of professionals are those who plan, supervise and direct the activities. They are to be assisted by technical personnel like computer experts, junior River Surveyors, draftsmen, Laboratory technicians. Each of these types of personnel has specific job to conduct and perform. Therefore they need specific educational qualifications and schooling, training to improve and up-grade their skill with the changing need of the organization.

Job Description

In this count, SSD does have such job descriptions in practice as shown in their job assignments but there is no job descriptions for reference as approved; or historically how these job descriptions changed/change with time and how these serve the need of the organization. However, copies of job descriptions prepared (draft) by SRP / BWDB for SSD Chittagong, were collected which may be seen at **Appendix - C**. It seems that job descriptions are prepared on the basis of current level of officer's qualifications without regard to the job required in SSD. From LRP time, there were / are two main functions of SSD (i) survey and (ii) study of hydrodynamic and morphological behavior of the Meghna Estuary area. It is gathered that there were 3 Asst. Engineers at the beginning of the operation of SSD, Chittagong. These Engineers' job allocation were like the following:

1) One Asst Engineer for Survey
2) One Asst Engineer for Study
3) One Asst Engineer for operation and maintenance(One Executive Engineer was heading the SSD, Chittagong as the Local Chief Executive).

In course of time, there were revisions of designations such as Deputy Directors, Sub-divisional Engineer etc. Also a number of such posts were increased/ decreased for variuos reasons. In those days, there were not too many graduate Engineers available for water sector jobs in BWDB. As a result, BWDB recruited science graduates (B.Sc degree holders) as Asst Technical Officers and over the years this group became unsuitable for technical jobs above their existing positions in BWDB's hierarchy which required minimum of Engineering graduates. To overcome the stagnancy - these science graduates were promoted as Deputy Directors and posted in different BWDB's Directorates. These posts are shown as **absorbed posts**.

There were a number of positions filled in by officers called **"absorbed"** but it could not be ascertained against what post(s) they are absorbed (these officers were transferred by BWDB). This is done so because SSD Chittagong does not have proper job description - indicating purpose of the position, duties and responsibilities, educational requirements, minimum experience required etc. for each position. In case there is definite authorized job descriptions for SSD, these cases/ posting could be made possible following requirements set for each position. As a result instead of manpower planning and organizational development man power absorption became the main attention of BWDB.

The study part of SSD/Chittagong was adressed with due attention or importance from the very beginning though there were a few cases of training in coastal engineering and hydrodynamics in Europe. Many of those trained personnel were transferred for one or other reason by BWDB. After the survey data are collected, these need to be processed, analyzed and interpreted for preparation of projects. This capacity/capability is not present in the existing SSD.

The present SSD has some capacity / capability to conduct surveys but it is not evenly balanced by study part. The study part is already done or performed by expatriate / outside consultants. There was / is no endeavor to develop counterpart staff in SSD even during 17-18 years of its life. There were some trainings provided to some of the SSD - staff members in Europe but most of them are not there now. SSD/BWDB could not retain them for reasons of career opportunity elsewhere in BWDB and outside BWDB or promotion within BWDB as per stipulated BWDB service rules. But such career opportunities do not exist in SSD Chittagong or there is no incentive / arrangement to retain professional personnel.

Very little attention is given to SSD, Chittagong for its functioning effectively since it remained inactive prior to commencement of MES. In this case, one can ask himself "Why then SSD". One can answer that the coastal area study is a specialized job in itself and SSD was born out of that consideration. But it was remained underutilized and not manned properly. There is no degree Engineer in SSD, Chittagong (Nov, 1996) with specialization on hydrodynamics and morphology and expertise in studies, etc.

4.2.10 SSD's Services to Others

Following works were performed by SSD Ctg. for others in different periods.

Sl. No	Names of jobs	Years
1.	Kafco Jetty Survey	1993
2.	Survey of Bhola district town protection project	1992
3.	River Survey Project (FAP-24) of Bangladesh	1992
4.	Meghna River bank protection study (short term study)	1991
5.	Bramaputra River Survey Training Study	1990
6.	60 mw power station at Sikalbaha bank protection	1990
7.	Meghna Dhonagoda Meghna river bank protection survey	1986

It seems that SSD can provide services to other water related projects. This type of work may help to augment income of SSD through service-charges.

It is learnt that SSD received service charges against those jobs. But the amount so far received under this type of work could not been ascertained. SSD faced certain problems of procedure to handle this kind of job. Though there were some advance money received from the client by SSD to perform the work, SSD had to spend more at times than the advance amount to complete the job in time. But there were difficulties since SSD does not have any fund reserved to meet such emergency to complete the job. Executive Engineer of SSD has authority to spend Tk. 20,000-.00 monthly for establishment and miscellaneous expenses. Any time the head of SSD needs urgently more to spend - he faces difficulties to get it approved through Regional Accounting Center (BWDB). The RAC is the drawing and disbursing agent for SSD. This necessary expenditure is to be made through processing the order of approval from higher authorities of BWDB through RAC. The approval of BWDB through RAC although appears to be simple, in fact, it is not so easy rather very difficult and problematic. Without intense persuasion, it is not at all possible to get clearance in time. Policy should be adopted, and procedure is to be made easy and smooth. The whole process or alternatively this fee, so charged, will remain with SSD's own separate account, and the SSD's executive will handle it with information to RAC. For selling SSD's services to other clients and prospective clients, SSD can develop leaf-lets, brochures etc. introducing SSD, and the services it can render to others. BWDB's water related projects of above nature may engage SSD on assignments and job works (This may further be explored).

After MES has started functioning, 3 cruises have already been made in MES area and the 4th cruise will be started by mid December 1996. Before starting the 4th cruise water level pressure gauges are to be installed in selected locations with the project area and Bathymetric survey will be started afterwards.

The survey vessel MV Anwesha docked in the High Speed Dockyard at Fatullah near Narayangonj for cutting and clearing fishing nets which were entangled around the propeller during the last cruise. The engine cannot take full load now on running condition. The running speed of Tenders are also less than required. The problems and defects would be examined jointly by an expert from Royal Netherlands Embassy, caterpillar Engine Expert from GET CO, Dhaka and representative of the High Speed Dockyard (November 1996). After repair the Anwesha will be commissioned for the next cruise for the winter survey.

The Skipper of Anwesha and a marine engineer for MES (recently appointed) will prepare jointly inventory of equipments, tools, spare parts and also unserviceable spares and tools and other materials on board Anwesha to be later sold by auction with due approval from management.

Beside this, the Marine Engineer (MES) and store keeper of the Survey and Study Division, BWDB Chittagong will jointly prepare an inventory of all stores and re-arrange the storing facilities at Chittagong SSD at MES cost.

Meanwhile, laboratory Engineer, MES (recently appointed) will thoroughly examine and investigate the way of developing the laboratory of SSD for testing and processing of sample and also provide training to SSD laboratory personnel to improve technical and processing skill. Refurbishing the SSD laboratory and installation of new equipment/ machineries will be done by the laboratory Engineer (MES) in consultation with the SSD - Executive Engineer.

Extension of jetty will be done and for that matter, the formalities in term of calling quotations, finalization of the deal, etc. are under process and the work will be supervised jointly by SSD representative and MES Engineers. Reporting of the pontoon work will be finalized through Fisheries Development Corporation (FDC) Chittagong and the work will be supervised jointly by MES Engineer and SSD, Chittagong. Both jetty extension and pontoon repair will be made from TA fund. Repairing equipment and machinery, installation of pump, repair of roof of stair room etc. will be made. work is in progress and the expenditure will be met from MES TA fund.

New survey equipments purchased for the project have been installed on the Anwesha.The list of new equipment is shown at **Appendix - D.**

Survey and Studies

The broad objective and scope of the Survey and Study of the estuary area are aimed at production of regional plans to be incorporated in Macro level plan leading to phased implementation which include a major survey / study of the dynamic environment. These activities will extend beyond MES period and develop into a long term study and research programme. The specific objectives of MES are planning the development of the project area giving due attention to:

- surveys, carrying out systematic surveys to build up a reliable data base for assessing estuarine behaviour;
- practical solutions for effective continuation of surveys and studies aimed at sustained and coordinated actions to up-date and progressively implement the long term plan; and
- reinforce the capacity of the concerned institutions for survey, investigation, planning, designing and implementing MES, and its projects and long term plans.

As per TOR the institutional task for MES is to make an assessment of the available capabilities in the country with respect to hydrographic survey of coastal waters of Bangladesh and put forward proposals for optimum institutional arrangements for the continuation of a required routine programme of surveys and studies after the expiry of MES. Thus the other institutional task for MES is to make an assessment of other agencies than SSD/Chittagong.

In this respect, institutional component collected information and it reveals that there are about 15 data collecting agencies in Bangladesh which have been collecting water resource related data (see next page). Out of which seven are GoB agencies and others are autonomous organizations. The names of the organizations, types of data collected by all these organizations are given in the following page. To assess their relative position as data collecting agencies in the water sector specially of data collection from estuary area, a two page proforma was developed and issued to them for providing information (proforma shown at **Appendix - E**). Telephone contacts were made as a follow-up, and visits were made also to a few organizations but response is insignificant for compilation or analysis. From these contact and discussions, it appears that little systematic data collection efforts are provided by them. No separate sections in these organizations exist to handle such activities. It seems that they are doing this kind of data collection as and when required.

FAP listed about 62 users of water resources data (list in **Appendix - F**), who would be current and future potential users. Each and every other agency are the current rival or potential rival in the competitive sellers' and buyers' market. For SSD - this would be a challenge to compete with others in the market. Under the circumstances, SSD must assess the users' market and the

competitors. In the event, SSD becomes capable of supplying water resources data at cheaper prices, and of reliable and good quality - there is a possibility that SSD may survive and sustain with their activities.

SSD/BWDB has a sea going vessel with sophisticated tools, instruments and equipments to undertake surveys. No other data collecting agencies has such a vessel to sail in the coastal areas of Bangladesh. Even at emergencies like cyclones and post cyclone relief operations, the vessel Anwesha rendered great services. This could meaningfully be used by all data collecting organizations (government and non-government) on payment basis.

There are instances where it is found that SSD Chittagong worked for others in different periods beside it's routine activities (section 4.2.10). However, it seems SSD cannot operate enough independently and flexibly to become a self sustaining organization with the existing system.

Constraints on SSD

- Finance and accounting system (RAC/BWDB) makes flexible operation difficult.
- Contracting SSD by outsiders is difficult as everything has to go through the Chairman BWDB.
- Government pay scales and benefits do not sufficiently motivate staff.

4.2.11 Sustainability of SSD

This discussion intents to look into the activities of Survey and Study Division, BWDB, Chittagong in perspective: Upto this moment - what has been achieved by SSD during the period from its establishment in 1978 under LRP with respect to the project objectives?

This is not intended to evaluate the SSD for prescriptions at this moment by MES - but to find the strength and weakness of the present SSD since it gained valuable experiences during past 16 years of its activities for future use and reference with the intention to contribute to the planning and development of land and water resources aimed at benefitting landless poor in the estuary area.

The objective is to set up and to develop an organization within the BWDB which will carry out surveys and studies for the development of a long term plan on land reclamation and estuary control in the South-Eastern delta of Bangladesh and to improve the long term planning capability within this organization.

Under a Superintending Engineer (LAED) Head Quarter in Dhaka, Survey and Study Division was set up at Chittagong - headed by an Executive Engineer (1978).

BWDB was responsible for planning, development and implementation of projects till MPO had been established (1983) to take care of planning in the water sector. The authority of the organization was vested to BWDB's fields of activities to guide coastal development in the south-eastern delta focussing on land and water use development. BWDB was the executing agency - and supervising agency. After LRP when FAP started, FPCO came into being as an arm of the MoWR to supervise and co-ordinate FAP studies. For sometime, since 1991 there were not much survey activities. MES has been functioning since November 1995 and supposed to re-activate SSD, Chittagong; and former FPCO was co-ordinating and supervising agency of MES and BWDB (LAED) has been executing agency of MES. FPCO merged with WAROP in January 1996. Co-ordinating and supervising responsibility logically rest on WARPO unless otherwise decided.

The first part of the objective to develop and set-up an organization to carry out surveys has been done. The Survey and Study Division of LAED (previously LRP) proved to be capable of carrying out surveys on its own, and to process and present data. SSD was engaged first to collect bathymetric data in the south-eastern delta of Bangladesh. Within LRP, these data had been used in various pre-feasibility and feasibility studies for specific land reclamation projects (Sandwip crossdam, Hatia-Nijhumdwip cross-dam), erosion protection projects (North Bhola, North Hatia) and South Sudharam drainage study. Also data had been made available to other

Type and Source of Water Resource Related Data and Collecting Agencies

Sl	Type of Data	Name of Organization													
		BARC	BWDB	BADC	BIWTA	BMD	DPHE	WASA	SOB	SPARRSO	DOE	SRDI	MPO	RRI	Port Auth.
1.	Precipitation	X	X	-	-	X	-	-	-	-	-	-	X	-	-
2.	Streamflow		X	-	-	-	-	-	-	-	-	-	X	-	-
3.	River WL		X	-	X	-	-	-	-	-	-	-	X	-	-
4.	GW Table		X	X	-	-	X	X	-	-	-	-	X	-	-
5.	Aquifer Test		X	X	-	-	X	-	-	-	-	-	-	-	-
6.	Drilling Test		X	X	-	-	X	X	-	-	-	-	-	-	-
7.	Sediment Load		X	-	-	-	-	-	-	-	-	-	X	X	X
8.	Salinity level		X	-	-	-	-	-	-	-	X	X	-	-	-
9.	River X section		X	-	X	-	-	-	-	-	-	-	-	-	X
10.	Water use		X	X	-	-	X	X	-	X	-	-	X	-	-
11.	Land elevation		X	-	-	-	-	-	X	-	-	-	-	-	-
12.	SW quality		X	X	-	-	X	X	-	-	X	-	-	-	-
13.	GW quality		X	X	-	-	X	X	-	-	X	-	-	-	-
14.	Evaporation	X	X	-	-	X	-	-	-	-	-	-	-	-	-
15.	Climatic data	X	X	-	-	X	-	-	-	-	-	-	-	-	-
16.	Satellite photo & water related			-	-	-	-	-	-	X	-	-	-	-	-
17.	Maps (cont./topo)		X	-	-	-	-	-	X	-	-	X	-	-	-
18.	Soil data	X	X	X	-	-	-	-	-	-	-	X	-	-	-
19.	Cloud picture			-	-	-	-	-	-	X	-	-	-	-	-
20.	Morph. change		X	-	X	-	-	-	-	-	-	-	-	-	-
21.	Flooded area		X	-	-	-	-	-	-	X	-	-	-	-	-
	Total	04	19	07	03	03	06	05	02	04	03	03	06	01	02

Flood Action Plan listed about 62 users of water resources data. Their names are placed at (appendix - C). The TOR suggest collection of information to assess their position in the country for continuation of survey and study activities as a continuing process for planning and development purposes.

agencies inside and outside BWDB. At times special surveys have been carried out which were required for other projects. The graduate Engineers mastered the use of computers for data processing and storage. However, throughout the project, the manpower position was a weak point in terms of Engineers and Surveyors. Many times, in the course of its life, essential local technical staff were hired out of Technical Assistance fund by the Consultants and is also true for MES as BWDB could not appoint them on in its payroll on permanent basis. In this respect it may be mentioned that eight SSD officers received training within the country and abroad (Delft Institute) . The list of the officers are given below:

1.	RC Das	Executive Engineer	SSD
2.	Md. Mostafa Kamal	Sub-Divisional Engineer	SSD
3.	D.K Barua	Asstt Engineer	SSD
4.	Md. Amanullah	Asstt Engineer	SSD
5.	TK Bepari	Sub-Asstt Engineer	SSD
6.	Masiuzzaman	Jr. River Surveyor	SSD
7.	Khan M. Mostafa Kamal	Jr. River surveyor	SSD
8.	P.C Das	Jr. River surveyor	SSD

Except the three Jr. River Surveyors (5,6,7), others are not working in SSD. These Jr. Surveyors have been working in SSD without any prospect for career development within SSD or BWDB in terms of salary development, promotion or any other regular incentive even after working for more than a decade in SSD.

There are other eight Engineers from BWDB who had received higher training at Delft Hydraulic Institute, Netherlands on LRP fellowship but none remained in SSD (details shown at **Appendix-G**). This has thus been proved that SSD/BWDB never attempted to tackle this professional attrition.

The second part of the objective, referring to set-up and development of an organization to carry out studies, appears to be much more difficult to realise for the exiting SSD. The studies do not have physical outputs but give a sense of direction for planning, development and implementation of project.
Those Engineers, with foreign training, do not have any scope now to work at SSD and are encouraged to work at other organizations giving better incentives. The processes that govern the hydraulic and morphological phenomena in the estuary are complex. Clearly defined theories and methodologies for studies on land reclamation and estuary development in the Bangladesh circumstances are not available. These should be developed through research and studies. It is proved to be difficult to get and to keep qualified staff with proper background, interest and capability to form an effective study team in the SSD. This problem could partly be solved by directly hiring experienced local staff from free market by MES. Some of the Engineers have been trained in the use of mathematical (simulation) models but they do not belong to BWDB any more. So, the study component of the project depends heavily on outside consultancy input and financial assistance. Unless serious restructuring of SSD is considered in view of its present location, manpower, resource capability, service orientation for planning and development process, the objective of MES cannot be achieved.
Surveys and Studies, as indicated in the objective, are inputs for the development of a long term plan on land reclamation and estuary development in the south-eastern delta of Bangladesh. Now water sector planning responsibility is placed on WARPO, development implementation of projects on BWDB and priority projects on host of other Ministerial departments and local level organizations. LEAD/BWDB (MES) may develop general approach to the long term planing but the actual development of such a plan is beyond the scope of the project(MES). All regional plans should be made within the framework of WARPO's national plan, so the logical location of SSD is the question of the hour.

5. INVENTORY OF MES RELATED TRAINING NEEDS

5.1 Training

The sustainable establishment of the MES planning process depends on successful transfer of knowledge and skills to non-project personnel. In this connection MES will need to involve a number of non-project staff in its various disciplines. Particularly important in this regard are GOB counterpart staff. A number of these are expected to come from WARPO, BWDB (LEAD, SSD-Chittagong etc.) and possibly others as well.

Bangladesh water and Flood management strategy (Sept. 1995) by GoB, Ministry of Water Resources recommended development programme for Institutional strengthening of water sector organizations involving re-organization and strengthening of planning organizations (FPCO, WARPO) to enhance the capacity of the main agencies responsible for design implemention, operation and maintenance of projects(BWDB, LAED, BIWTA, MOA/BADC, MOF, MOFE, LGED etc. and private sector). The aim is to facilitate inter-ministerial and inter-sectoral co-ordination and co-operation. Emphasis would be given to training and human resource development, up-grading inter-disciplinary planning and technical skill as institutional reforms.

A training need inventory form was prepared by MES, Institutional Specialist, for preliminary identifications of staff training and development needs for MES. This inventory form was distributed to the consultants(all disciplines) in MES to form at least an idea by the anticipated volume and nature of training need. As per given TOR, SSD personnel were provided training (on-the job) during the 3 recent cruises on board Anwesha by expatriate Hydrologist and Chief Hydrographer of MES. As a part of training of BWDB personnel, one of the officers deputed to MES has participated to a refreshers course at Manila for higher studies for two weeks. In near future, there will be three types of training programmes. These are (i) long term (probably 1 year for 2 persons), (ii) medium term (6-8 persons) and (3) short term (3-4 persons) at Post Graduate level in Institutes home or abroad to be recruited from appropriate organizations. Meanwhile WARPO will be reorganized, hopefully, by the end of 1997 and will depute some of its staff to work with MES for on-the job training as associates to MES experts.

There is a need for commitment on the part of organizations that the trainee(incumbent) will have to remain in the services of SSD and other related organizations for a reasonable and appropriate period (2 to 5 years) during which staff development activities will be very rigorous so that no vacuum can occur due to staff attrition. Anybody receiving higher training abroad on his/her return in case he/she wants to leave the job, he/she shall have to pay back all expenses incurred on his/her training account including penalty to discourage migration.

A training programme was organized by MES (17-18 and 19 August 1996) for professional personnel of Survey and Studies Division Chittagong, Surface Water Modelling Centre (SWMC) Dhaka and Skipper MV Anwesha MES, Dhaka for further skill development and orientation to the new equipments and tools installed in the MV Anwesha(list of participants and resource persons are given in the following sections).

List of Participants for Training Programme(Surveys Anwesha, 17-18 and 19 August, 1996)

Sl.	Name	Designation/Organization
01.	Md. Sultan Ahmed	Executive Engineer, SSD,BWDB, Chittagong
02.	Md. Nurul Amin	SDE, SSD, BWDB Chittagong
03.	Md. Abdus Samad	SDE, SSD, BWDB Chittagong
04.	A.K.M Kamal Uddin	SDE, SSD, BWDB Chittagong
05.	Khan Md. Mostafa Kamal	Jr. RS, SSD, BWDB Chittagong
06.	Md. Masiuzzaman	Jr. RS, SSD, BWDB Chittagong

07.	Paresh Chandra Das	Jr. RS, SSD, BWDB Chittagong
08.	Nasreen Mohal	Modeller, SWMC, Dhaka
09.	Mahbabur Rahman	Equipment Manager, SWMC, Dhaka
10.	Bishawjit Kumer Kundu	Jr. Professional, SWMC, Dhaka
11.	Md. Sajidur Rahman Sardar	SDE, SWMC, Dhaka
12.	Md. Fakrul Abedin	SDE, SWMC, Dhaka
13.	Md. Younus	Skipper, MV. Anwesha, MES, Dhaka

Resource Persons: Mr. J.Oosterman, Team Leader MES, gave introductory lecture of the training programme followed by other resource persons from MES. Lectures were delivered by Dr. Mobarak Hossain (Hydraulic Engineer), Mr. Saifuddin Ahmed (Morphologist), Mr. M.H. Choudhury (Hydrographer), Mr. P.Mikkelsen (Instrument Specialist), Mr. M. Jonsson (Software Engineer) and Mr. Younus (Captain, M.V. Anwesha). The subjects discussed in the course of lectures are hydrographic data collection for mathematical modelling, bathymetric Surveys in the Meghna Estuary, and survey spreads "Anwesha" and Tender Boat. Positioning system DGPS-RTK-OTF; morphological data collection and mathematical modelling, measurment of flow transects by ADCP, hydrosoftware used for data acquisition, radar, gyroscope, auto pilot were considered. These lectures were arranged in the MES conference room and on board "Anwesha". There were provisions for general discussions and answering questions,and of presentation of slides / video. During last 5 years(1991-1995),there was no training programme or training of staff and now there is a budget of US$ 1,30,000 earmarked under this head for 1996/97, 97/98 and 98/99 as ADP for MES(FAP-5B). But there is no expenditure on that account as yet.

6. ASSESSMENT AND PROPOSALS FOR SSD STRENGTHENING

6.1 Assessment of SSD

As stated before, the immediate concern of MES is to re-activate the data collection and process activities in support of planning. The operational responsibility for data collection lies with Surveys and Studies Division (SSD) in Chittagong.

For the duration of the project, MES will essentially control the data collection process. MES will also control data processing and analysis. Data are sent to SWMC which develops an overall and local models to study overall and specific interventions for MES area. The MES institutional development component will assess the possibilities for sustaining these activities taking into account of the need for operational budgets, flexibility of operations, and the links between the data collection and processing to better manage the overall process.

In accordance with the TOR, the possibility of strengthening SSD will be investigated first. Then suitable alternatives will be investigated as well. Institutional assessments will be made for the relevant organizations to determine their relative strengths and weaknesses in terms of meeting the needs.

This will be done by conducting interviews in the organizations concerned using checklists to be developed. A major concern in this regard will be the fact that a number of data collection and processing related activities now have established in different organizations. MES proposals will take into account of the need for streamlining procedures, effectiveness of the activities, and efficiency of operations.

6.2 Proposal of Strengthening SSD

The first part of the objective to set-up and development of an organization to carry out surveys has been done completed(section 4.2.11). However, for the study part - a complete restructuring of the organization is necessary, that is, the present SSD should be divided into two major Sub-Divisions; (1) one should be called survey Sub-Division and (2) other should be called study and research Sub-Divisions.

This study and research Sub-Division should be manned by specialist, and should have at least post graduate degrees in the respective discipline with reasonable work experiences in the field. Head of the SSD should be study oriented person with required qualifications and experiences. A tentative manpower position with designation qualifications and job description is shown below:

Proposed Survey and Study Division

Designation	Qualification	Job Description
Director (Chief Executive)	Post graduate degree in Water Resource Engineering or Hydraulic Engineering Preferable PhD in the related field. Experience - Mathematical modelling, hydraulic surveys, studies, estuary planning.	Management - Administration Planning and Supervision of Survey and Study activities of SSD. Liason with other organization / institutions.
Hydraulic Engineer (Estuaries)	M.Sc/ PhD, reasonable experience as above.	Involve in study and research on behavior of the estuaries and process that take place. Use of mathematical model to assess the physical impact of natural process and human intervention in the estuarine area.
Hydraulic Engineer (Reclamation/ closure)	Post graduate degree in Hydraulic Engineering or Water Resources Engineering. Five years experience in the field.	Research/design of reclamation of land and closures, and possible effects of those.
Morphologist (coast/river)	Post graduate degree in Hydrology and coastal development Engineering.	Study morphological processes in estuary areas and rivers; co-ordinate effects of other studies on the major rivers and human interventions and their effects on morphological aspects on the study area and related river system.
Hydrographer	Post graduate degree in Water Resource Engineering specially in hydrography. Experience-Hydrographic and hydraulic surveys, survey programme preparation.	Hydrographic survey planning, development of survey vessel, equipment and staff. Implementation of hydrographic survey, processing and reporting.
Water Management and Drainage Engineering	Master degree in Hydraulic Engineering/ Irrigation and Drainage Engineering.	Planning and designing of drainage system, water management flood control appurtenant structures preparation of proposals for drainage and internal water management.
Civil Engineer (Embankment and flood protection structure)	As above, 5 years experience of planning and designing embankment.	Assessing options for layout for structures, embankments for development plans, preparation of checklist, for construction requirements with cost estimates (plus financial analysis).

Designation	Qualification	Job Description
Sr. Economic and Financial Analyst	Master degree minimum 5 years experience in economic and financial analysis and planning.	Economic and financial analysis and appraisal of land and water development plans, assist the preparation of development projects.
Modelling Specialist	Graduate in Hydraulic Engineering or Water Resources Engineering with 5 years experience in mathematical modelling.	Involved in mathematical modelling study with others and computational work.
Environmentalist	Master in Environmental Science or Environmental Engineering. Five years Experience in the field.	Assess potential environmental impacts of alternative options on development plans in water quality, soil, fishing, public health and habitats and propose measures for mitigation of adverse effect.

The SSD (after proposed strengthening) will have to be up-graded. SSD is to be headed by a Director. SSD will consists of two major units/ Sub-Divisions; namely 1) Survey 2) Study and Research. Each unit will be headed by a Chief Technical Officer / Additional Director. The other key personnel in the staff will be as below:

Proposed Survey Sub-division and Study & Research Sub-division

Survey Sub-division		Study & Research Sub-division	
Chief/Additional	1	Chief/Additional Director	1
Hydrographer	1	Hydraulic Engineer (Est)	1
Engineer	2	Hydraulic Engineer (Rec)	1
Laboratory Chief	1	Morphologist	1
Estuary River Surveyors	5	Sr. Economist - Financial Analyst	1
Anwesha Skipper	1	Water Management and Drainage Engineer	1
Engineer	1	Civil Engineer	1
Skipper (Gr.-B)	1	Environmentalist	1
Sub-Asstt. Engineer	1	Modelling Specialist	1
	Sub-Total = 14		Sub-Total = 9
		Junior Hydrologist (Est)	1
		Junior Hydrologist (Rec)	1
		Economist	1
		Civil Engineer	1
		Jr. Sociologist	1
			Sub-Total = 5
	Total = 14		Total = 14

These key staff should be assisted by appropriate number of supporting staff. A committee may be formed to examine the reorganization proposed and the existing staff position in SSD. The supporting staff will be of two categories (1) technical such as draftsmen, cartographer, laboratory technicians, computer operators, (2) others assistants to administration, accounts, other miscellaneous jobs etc. The committee should be formed drawing officers form WARPO, BWDB, RRI and MWR.

The salary scales should be different from BWDB scale for the different cadres and categories. For example the salary and benefits may be at par with SWMC to make the organization viable.

6.3 Financial Position SSD

The existing annual financial obligation of SSD/BWDB may be seen very briefly as below:

	Description:	Taka in Lakh
1.	Personnel of GoB (Total pay + Travelling allowance pension, provident fund, income tax, house rent etc.)	77.00
2.	Equipments input	10.00
3.	Operation of Survey vessel Anwesha (including insurance and minor spares)	100.00
4.	O&M of vehicles, survey equipments, office appliances etc.	10.00
5.	Contingencies (price & others)	13.00
	Total	**210.00**

Thus about taka 210.00 lakh annual budgetary provision is required for the existing situation for SSD. The future upgrading of SSD as proposed at section 6.2 will require more budgetary commitments from GoB to make it sustenable.

6.4 Suggestions

1.To build up survey and study capacity and capability the organization (SSD) must be able to attract and retain highly qualified staff. An institution building should cover activities related to this. It should be made clear that institution building would not necessarily be achieved from the provision of equipment and technical training. SSD/BWDB should be prepared to enter into a dialogue regarding the conditions of services of staff employed in the SSD with respect to recruitment promotion, rotation or transfer system since current system seems counter productive to the building up of institutional capacity and capability.

2.Raising the capacity of an organization may not always need comprehensive training and institution building efforts, so long other factors are holding back the performance. A general element which applies to SSD/BWDB (to the whole BWDB organization) is related to employees incentives and general motivation. This should be taken into account when the assessment of the capacity and capability of SSD/BWDB is made.

3.This is true that salary scale is not compatible with the appropriate and suitable qualifications requirements. This could be solved through providing authority of action by SSD management under formal arrangement. The arrangement would be like this.SSD will in addition to its primary routine functions of survey and studies, sell their services to outsiders officially under a contract/agreement on job basis and charge fees. These service fees or charges should be on cost plus basis. Any amount on the top of actual cost will be distributed to SSD and to its all employees. Formula of distribution will be like; actual cost amount will go to SSD account, any amount left after meeting this actual cost will be distributed as
50% will go to all professionals of SSD
25% will go to all support staff of SSD
25% will to go SSD's account.

4.Survey unit SSD may remain in Chittagong but head office together with study and research unit should be in capital city Dhaka. It is reported once and again that RRI faced significant problem to attract and retain qualified staff. Even 50% of the professional

posts could not been filled. The main reason for this seems to be the physical location of RRI at Faridpur, which is far away from capital city Dhaka, becomes less attractive for qualified professional staff. To be in Dhaka is advantageous for inter-action, co-ordination and co-operation because all the water sector institutions/ organizations and other related institutions, planning commission, BBS, MOWR, BWDB, WARPO, hydrology and morphology Directorates of BWDB, BIWTA, LGED, SWMC, GIS, Bangladesh University Engineering and Technology (BUET), Dhaka University, Agriculture Ministry/ department, Environment Ministry and department etc are in Dhaka. This location is advantageous from professional point as well as institutional point of view.

In this kind of job Head of SSD (Director) not only be empowered for making contract/agreement but also should have authority to engage short-term specialist / consultant and others and the expenditure on this account of temporary assignment should be met from contract amount and not from SSD's normal budget. However, any earning on this account of fee will be within the jurisdiction of BWDB/s audit and inspection.

This action will provide better opportunities and incentives to all SSD personnel and they will likely to improve their skills through hardwork and will take promotional effort to enhance their professional activities.

6.5 Options and Actions

Option one: The FAP conference of December 1995 suggested amalgamation of Hydrology Directorate, BWDB, RRI and SWMC to form a private company. SSD may be allowed to join the venture.

Option two: Survey part of present SSD may remain as it is today but study part may join with SWMC.

Option three: SSD's present survey unit may be amalgamated with Hydrology Directorate of BWDB and study unit should join SWMC and RRI. Head office should be relocated to Dhaka to form a federated autonomous organization under MWR Planning Commission.

Option four: Hydrology, Morphology Directorates of BWDB, RRI, SWMC, GIS, SSD, all may together form an Institute of Water Resources Research and Development.

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Appendix - A

BANGALDESH WATER DEVELOPMENT BOARD (BWDB)

The Bangladesh Water Development Board (BWDB) is the lineal descendant of the Water Development Wing of the erstwhile East Pakistan Water and Power Development Authority (EPWAPDA), created in 1958. BWDB was created by Presidential Order No.59 in 1972 when water and power wings were separated.

The aforesaid legislation authorises the Board to prepare, for the approval of the Government, a comprehensive plan for the control of floods and the development of water resources in Bangladesh. The functions specified under the statute include :

a) Construction of dams, barrages, reservoirs and other original works: irrigation, embankment and drainage, bulk water supply to communities and recreational use of water resources;
b) flood control including water-shed management;
c) prevention of salinity, water congestion and reclamation of land;
d) except within the limits of sea-ports, maintenance, improvement and extension of channels for inland water transport, including dredging of channels, but excluding all such operations as may be assigned by the Government to any other agency;
e) regulation of channels to concentrate river flow for more efficient movement of water, silt and sand, excluding all such operations as, in the opinion of the Government, may be carried by any other agency.

BWDB is a body corporate consisting of a Chairman and five other Members appointed by the Government. The Board, in the discharge of its functions, is required, under the relevant law, to be guided by such directions as the Government may give from time to time. In addition to this, the law provides overriding authority to the Government in terms of

a) determination of the terms and conditions of services of the Chairman and the Members of the Board.

b) termination of their appointment without assigning any reason.

c) allocation of functions and delegation of authority to the Chairman and Members.

At the apex of the organisation is the Board of Directors consisting of the Chairman and five Members. The position is shown in the following page. The Chairman acts as the Chief Executive. Each Member has his own area of responsibility and a separate set of functions. The Chairman is assisted by five staff offices. BWDB has a large head office with 21 directors/divisions headed by officers of the rank of Chief Engineer/Director.

The field and project offices are headed by Chief Engineers (CEs). Initially, only four Zonal Chief Engineers were there. Four more Chief Engineers with project set-up have been added in recent years. Below the Chief Engineers in the field are the Superintending Engineers (SEs) as the head of Circle Office; in the next layer are the Executive Engineers (XENs) in charge of Divisions followed by subdivisions with Subdivisional Engineers (SDEs). At the bottom are the Sectional Officers (SOs). Among officials of class I category, (61.62%) are engineers, (11.33%) are other professionals including a small number of economists and (27%) belong to other jobs that include finance and account.

In 1979, BWDB had nearly 18,500 personnel of whom 2000 were professionals, 6500 technical and accounting staff and 10,000 non-technical. Five years later when Enam Committee completed its organizational review of BWDB, the total strength stood at 18032. A summary view of the manpower situation in the number of existing employees have been shown below. The reduction of existing employees against sanctioned post is mainly due to retirement, drawing back of RRI, WARPO and FPCO staff on deputation or liens. Regardless of this decrease BWDB now has a sanctioned personnel strength of 17684 against which the total number of the staff is 16341.

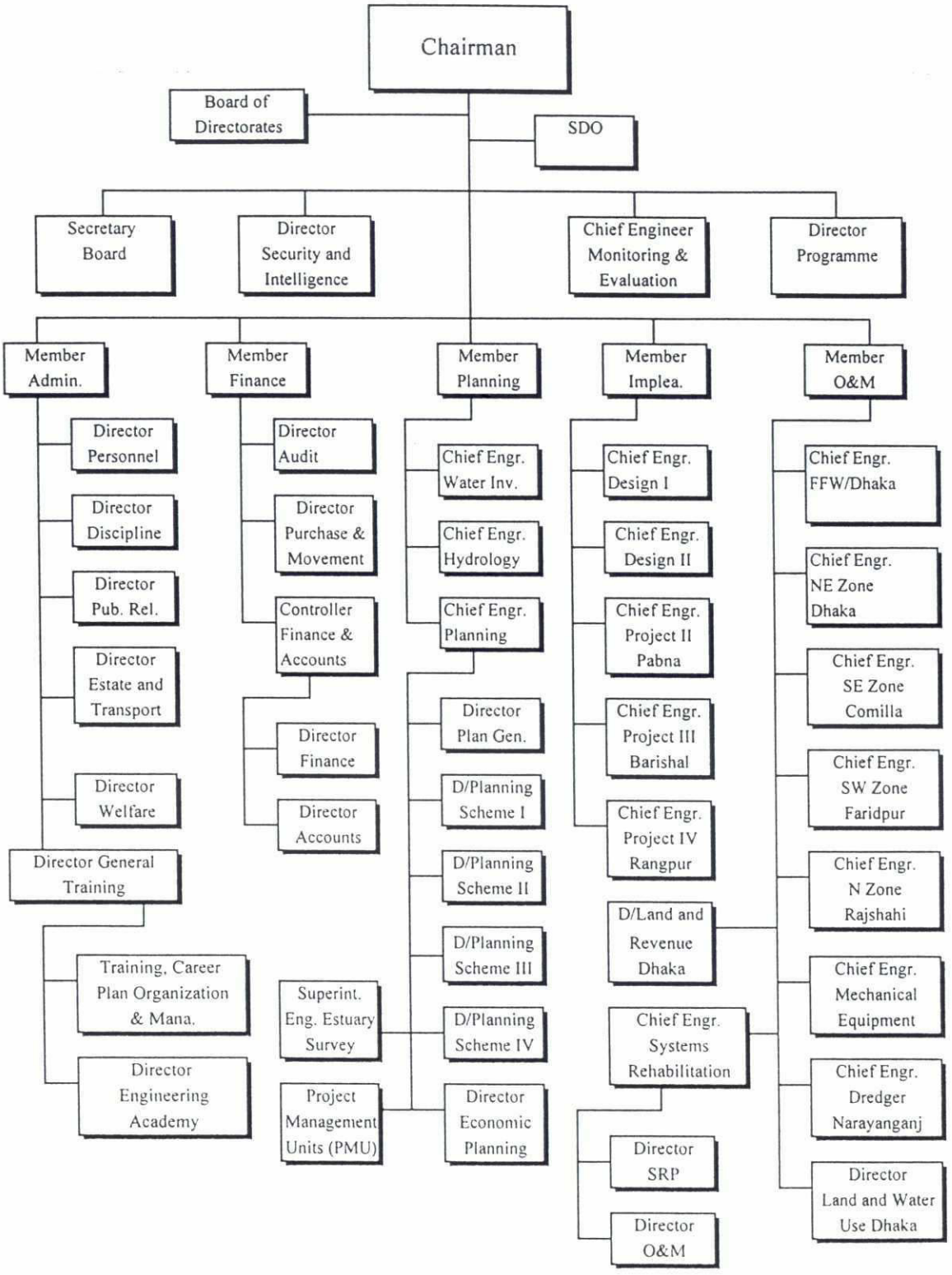
The break-up by category is shown below:

Class	Number
Class-I	1535(9.39)
Class-II	54(0.33)
Class-III	9372(57.35)
Class-IV	5380(32.92)
Total:	16341(100)

(Note: *Figure in the parentheses indicate % of total*)

BWDB has compiled a list of 500 completed water sector projects of various sizes and types; of these, 33 projects were completed before EPWAPDA was established. The total outlay is computed at Tk. 3650 crores. In physical terms BWDB itself has been able to construct 7.44 thousand Km of embankment, 4.54 thousand Km of drainage channel, 3.34 thousand Km of irrigation canals, 5995 number of structures, 49 pump houses, 390 sluices and 3659 bridges/culverts.

ORGANOGRAME
Bangladesh Water Development Board (BWDB)



WATER RESOURCES PLANNING ORGANIZATION (WARPO)

In March 1992, the Water Resource Planning Organization (WARPO) was established as an autonomous body under MIWDFC. Essentially, WARPO has derived and developed from the former Master Plan Organization (MPO), established in 1983 under Phase I of the Water Sector Master Plan Project (WSMPP) - funded by the UNDP. From April 1987, the activities of this project were merged with those of the Surface Water Simulation Modelling Programme (SWSMP) also funded by UNDP. This effort, which continued up to November 1987, were the initial steps taken to formally set up two institutions of MPO (subsequently WARPO) and the Surface Water Modelling Centre (SWMC)

WARPO has been functioning under its original mandate though FPCO merged with WARPO in January 1996. After the merger personnels of FPCO and WARPO were posted within the organizational frame of original WARPO. Chief Executive of WARPO is designated as Director General (D.G.). There is a Secretariat department which has been working under DG's direct supervision doing administration and accounts function of WARPO. There are two professional divisions called 1) Chief Planning and 2) Chief Technical support, each headed by one Chief Scientific Officer (CSO). Planning Division is sub-divided into 5 sections and Technical Support Division into 3 sections. The sections under planning are 1) Engineering 2) Water Resource 3) Economic 4) Agronomy 5) Environment, Forest and Fisheries and under Technical support. Sections are 1) Computer and information center 2) Monitoring and Evaluation 3) Special Studies Section. Each section is headed by a Principal Scientific Officer (PSO). Then follows in the staff line Senior Scientific Officer (SSO), Scientific Officer (SO) and others follow in various staff positions (shown in the organogram).
Regarding Re-organization after FPCO-WARPO merger, some of the FPCO personnels are absorbed in the original WARPO organisation in the vacant positions and some officers / staff were transferred to other organisations. Still there are a few surplus staff in WARPO. There is a provision of 90 personnel in WARPO as per organogram collected from Chief of Planning (WARPO) which is shown as:

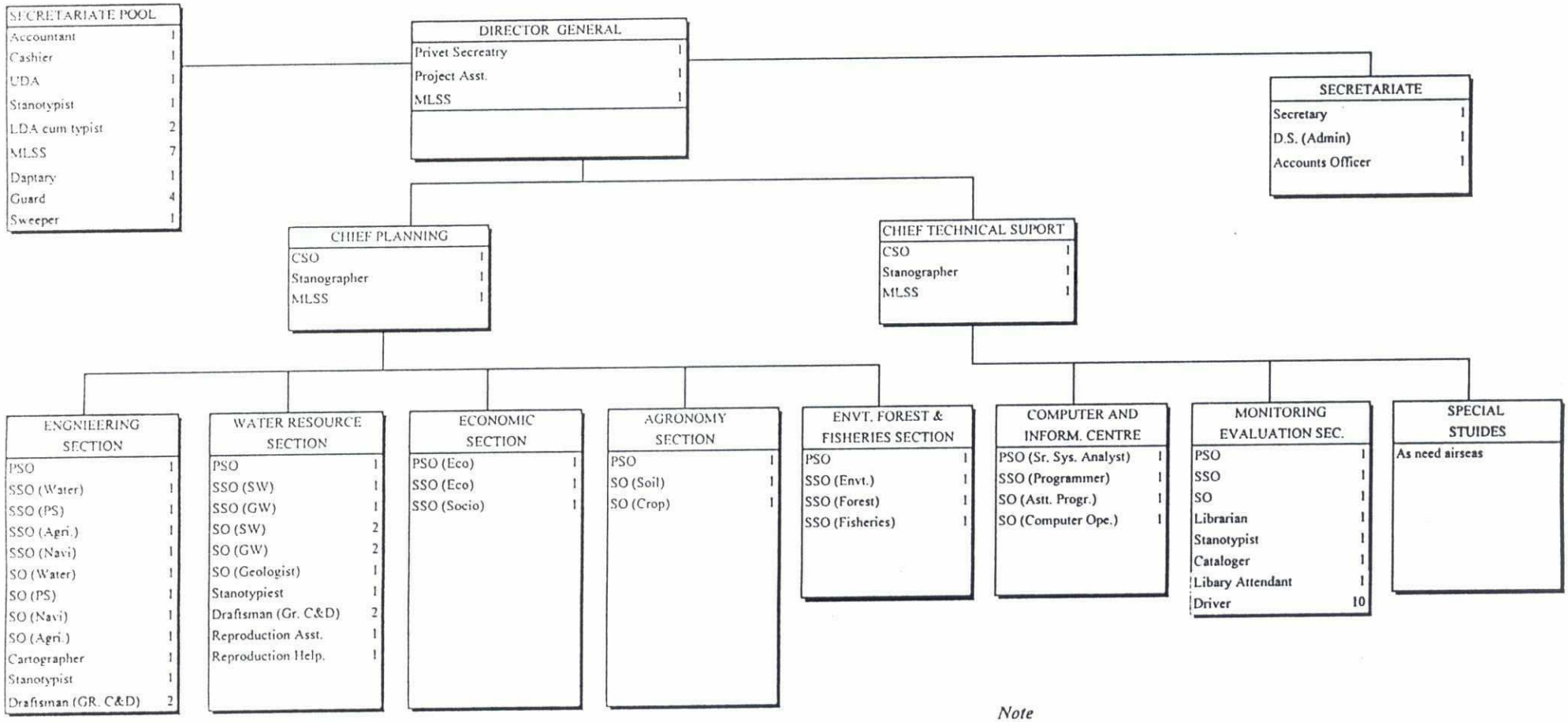
WARPO Manpower Provision
(Prior to Merger of FPCO)

DG-1	Steno Typist-4
CSO-2	Library Asst.-1
PSO-7	Reproduction Asst.-1
SSO-13	Reproduction Helper-1
SO-14	Driver-10
Cartographer-2	DG's Secretariate Staff-22
Draftsman-4	DG's Personal staff-5
Librarian-1	CSO's Personal Staff-6

Reorganisation of WARPO is actually planned to take place after completing formalities that is finalization of TAPP, completion of formalities for recruitment of consultants, formalities to finalise Technical and Financial proposals, IDA clearance, consultant mobilization etc. All these activities are expected to complete by end of May, 1997 and actual re-organization of WARPO may take place not before end of June as verbally reported by Chief Planning.
WARPO presently has no permanent building of its own to develop better working environment which would facilitate efficient functioning of WARPO through installation of office equipment and computer facilities to perform necessary data processing, analysis and storing the same for master planning purposes. There is a feeling of uncertainty among the WARPO staff members of their job security and incentives because WARPO is yet to be re-organized.

Appendix - A

ORGANOGRAM OF WARPO



Note

CSO	Chief Scientific Officer
PSO	Principal Scientific Officer
SSO	Senior Scientific Officer
SO	Scientific Officer
UDA	Upper Division Officer
MLSS	Lower Division Assistant

RIVER RESEARCH INSTITUTE (RRI)

The RRI was established in 1958 as the Hydraulic Research Laboratory to handle mainly engineering problems pertaining to hydraulics and soil mechanics. The RRI today plays a major role as a specialized unit for applied research in the fields of river, irrigation, estuary and coastal hydraulics, soil mechanics, concrete, building materials and water quality. In July 1990, RRI became the national River Research Institute, a semi-autonomous organization reporting directly to MWR. The institute has already provided assistance to several FAP Components. FAP 1 an FAP 9B have received assistance in hydraulic (physical) modelling; analyses have been carried out for FAP 1,2,3 9A, 9B and 21/22; sediment for FAP 1, 9B and 21/22, soil and concrete for FAP 8A and 20 and water analysis for FAP 17. The functions and responsibilities of RRI are:

a. to prepare designs by physical model(river training, erosion control, flood control, irrigation, drainage and research works) of river, estuary and coast;
b. to investigate river flow, flow distribution water security, surface and ground water use and environmental aspects mainly saline water intrusion and water quality to develop water resource by physical model;
c. to investigate the quality of elements to be used for river training, control of river erosion, flood control and irrigation and drainage of water and to justify and evaluate the quality of construction works;
d. to carry out training programmes on the aforesaid areas and to publish periodicals and articles on these activities;
e. to advise the Government Local administration or any other organizations on the above-mentioned activities;
f. to communicate and help local and foreign organizations which are engaged in the relevant types of activities to carry out joint activities; and
g. to take up any step necessary to implement the above activities.

Organizational Setup

RRI is headed by a Director General and comprises three directorates each managed by a Director: The Directorates are Geotechnical research; Hydraulic Research; and Technology Services. The additional setup comprises; 7 Chief Scientific Officers (CSO); 11 Principal Scientific Officers (PSO), 20 Senior Scientific Officer (SSO), and 58 Scientific Officers (SO). In total there are 100 professional staff and 321 support staff in the organization.

Institutional Assessment

One of the most significant problems of RRI appears to be the ability to attract and retain qualified staff. As of April 1992, only 43% of the established professional posts are filled. The main reason for this seems to be the physical location of RRI. The location at Faridpur appears to be less attractive for qualified professional staff. In addition, the organization has experienced a very high staff turnover. This situation apparently is complex in nature, but would have to be looked into with the objective to minimize if not eliminate the problem.

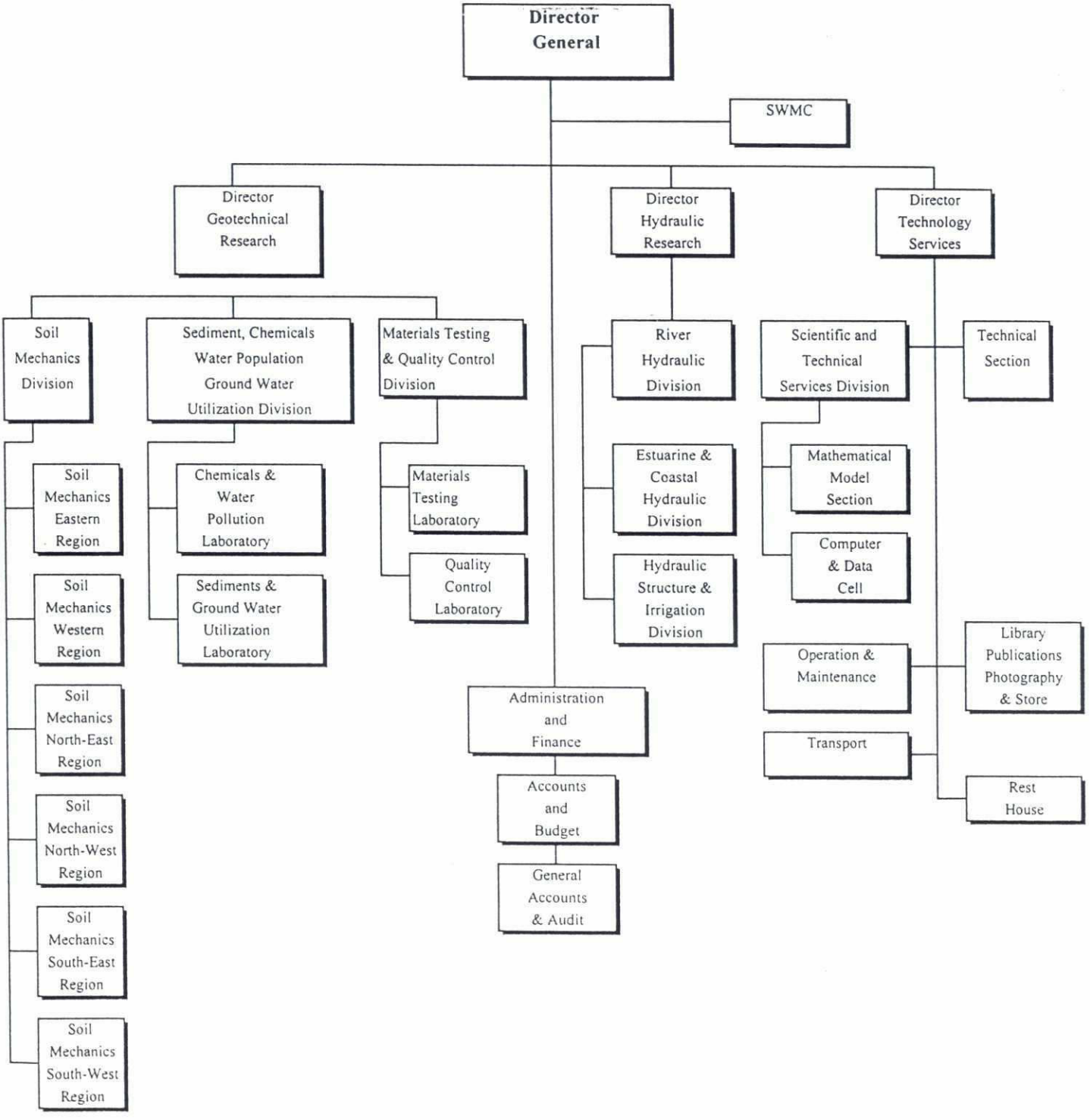
RRI will continue to play a significant role in the implementation of FAP and FAP generated projects. Physical modelling in connection with design of structures; testing of cement and other construction materials, quality of water, investigating sub-soil ect.are some the functions of RRI. The material testing capacity of RRI should be reviewed as the role of RRI in this capacity would be overwhelming with the increased direct supply of materials by local contractors.

Institutional Support to RRI of Specific Relevance

Since 1977 RRI has received considerable external as well as national support. RRI received assistance through the UNDP project "Preparatory Assistance Project" from 1977 to 1982. The UNDP project "River Research Institute" was a follow-up project implemented during the period 1983-1990. The joint UNDP/UNDTCD/GOB Evaluation Mission in 1990 called for addition external support to enable the increased potential of RRI in hydraulic and geotechnical engineering to be applied to FAP and other projects in the water-resources sector. The programme would also increase the range, quality and quantity of RRI's work. The programme is still to be embarked upon pending the availability of donor funds.

Appendix - A

Organogram
River Research Institute



SURFACE WATER MODELLING CENTRE (SWMC)

SWMC is a centre of activities in river hydraulics and mathematical modelling in Bangladesh. It was created in 1990 with financial assistance from DANIDA. The centre was established based on the technology transferred by the Danish hydraulic Institute during the Surface Water Simulation Modelling Programme initiated in 1986 and supported by the World Bank. SWMC now forms an independent unit under the Ministry of Water Resources administered through the River Research Institute. SWMC has its head quarters in Dhaka where a team of Bangladeshi engineers provide specialised consultancies to government and private institutions.The Danish Hydraulic Institute has provided the mathematical modelling technology and training of the SWMC staff. The core of the technology provided has been the transfer and application of the MIKE 11 modelling system for all major rivers in Bangladesh. From the onset in 1986, KHI has been associated with the Bangladesh University of Engineering and Technology (BUET).

The MIKE 11 modelling system describes the water levels and flow velocities in the rivers inside Bangladesh based on information about the hydraulic conditions at the boundaries and the physical shape of the rivers. Measurements of water levels and flows inside Bangladesh are used to calibrate and verify the river models.In addition to the basic river models other models of MIKE 11 are in use for describing hydrological processes, salinity intrusion from the Bay of Bengal, sediment transport, river morphology and water quality.SWMC obtains the necessary field data on water level rainfall evaporation discharge cross-section sediment etc. from the Bangladesh Water Development Board, supplemented by specialised field surveys. As a result the SWMC now have at its disposal a unique database containing hydrological, hydraulic and water quality data for the entire Bangladesh.

Main Functions

Updating the existing general regional and sub-regional Surface Water Models utilizing the latest available data. Extending the local capacity and capability in mathematical modelling(flow of water, sediment and other substances) of the rivers of Bangladesh. Introducing new development in 1-D modelling of softwares with specific attention to apply latest modelling tools (MIKE,SHE).

National and Regional Models

SWMC models have been used extensively in the FAP studies. SWMC has developed national and regional river models covering the entire country. The General Model includes the Ganges, Meghna and Brahmaputra rivers and all the larger regional rivers. Among others this model has been used in the Flood Hydrology Study component of FAP25. Further the General Model is used by Bangladesh Flood Forecasting and Warning Centre for generating flood level forecasts. The model has been carefully calibrated and verified against 1986-91 data. SWMC checks and updates the model each year using the latest available data.Regional models exists for 6 regions. They represent a considerable investment of human and technological resources, and provide the best possible background for specific project applications, both on a regional scale, or in detailed and local studies. Some of the examples of its applications are:

- Dhaka Aricha Highway Design
- Pabna Irrigation Project
- Sundarbans Hydraulic study
- Manu River Project
- Teesta Irrigation and Drainage Project
- Dhaleswari Mitigation Study.

Manpower

Professional (Civil, Hydraulic & Irrigation Engineers)	-	41
Technical	-	7
Administration	-	16
Others	-	31
Total		95

Functional Services

Data Acquisition and Sales: Rainfall and Evaporation,Water Levels and Discharges,Suspended and Bed Sediments, Salinity, Water Quality, Cross Section and Bathymetric Surveys.

Water Resource Management: Rainfall-Runoff Modelling, Reservoir and Barrage Operations, Irrigation and Drainage.

River Modelling: Flood Protection Control, Navigability of Inland Waters, River Bank Protection and Stability, Salinity Intrusion, Sediment Transport River Morphology, Water Quality.

GIS: Flood Depth Inundation Mapping, Depth-Duration Analyses, Salinity Intrusion,Impact Assessments.

Two-Dimensional Modelling: Tidal and Coastal Hydraulics, Storm Surges.

Equipment Rental: Current Meters, Echo Sounders, Levels and Theodolites, Automatic Water Level Recorders,Pressure Cells, Salinity and Temperature Cells, Sediment and Water Samplers,Turbidity and Salinity Meter, Self Recording Current Meters, Differential Global Positioning Systems (DGPS),Computers and Peripherals,

Tools and Equipments :Computer - 72, electrical/computer application - 84, Computer Software -63, Comunication Equipment -169, Laboratory equipment-32.

New Equipment: RTK-GPS

SWMC has recently procured a Real Time Kinematic (RTK) GPS and is the sole owner of this advanced equipment or possibly one of very few available in Bangladesh. Real time kinematic surveying is the newest dynamic GPS survey technique and delivers precise horizontal and vertical positions instantaneously. The equipment consists mainly of two system. The reference system has a dual frequency GPS receiver with radio and antenna and the rover system is also equipped with a GPS receiver with radio and antenna and also a backpack and a rangepole. The RTK-GPS will be used extensively in the Cyclone Shelter Project and the Meghna Estuary Study.

Budget

Year	Source of financing of the budget			
	Governemnt of Bangaldesh	Other sources (subsidy)	Income from outside contracts	Total budget
	Lakh Taka	Lakh Taka	Lakh Taka	Lakh Taka
1992	32.00	548.00	-	584.00
1993	42.00	713.00	-	755.00
1994	100.00	600.00	-	700.00
1995	90.00	540.00	-	630.00
1996	130.00	250.00	-	380.00

SWMC to be Independent Trust

The Surface Water Simulation Modelling (SWSM) Committee in its meeting held on 3rd March 1996 accepted the proposal for forming a 'Trust' for SWMC on the basis of the recommendation of the four member Sub-committee on institutionalization. The detail of the trust will be formulated through a legal advisor. The expected date for forming the trust is by end December 1996/early 1997. Donor support is requested for financial assistance for 'Institutional Strengthening' as well as technological upgrading in necessary fields.

BANGALDESH INLAND WATER TRANSPORT AUTHORITY

During the British period the river conservancy work was carried out by the private shipping companies like IGN-RSN. As such improvement and development of the Inland Water Transport (IWT) sector was dependent on the companies own infrastructures. There were no provision of government control and maintenance of water ways. The first dredger (Foyer) was acquired in 1907 and "Alexandria" dredger was purchased afterwards and thus dredging was introduced in the river conservancy work.

The inland waterway bill was passed by the Bengal Legislature in 1934 but it was never put into execution. To set up an authority for development, operation, maintenance and control of inland water transport and of certain inland navigable waterways, the then East Pakistan government on 31st October, 1958 promulgated an ordinance called the East Pakistan Inland Water Transport Authority (EPIWTA) ordinance, 1958 (EP ordinance No LXXV 1958). The Government by an order, constituted a two member Authority of EPIWTA (Nov 4, 1958) and it started functioning since November 18, 1958. Bangladesh Inland Water Transport Authority (BIWTA) is the successor by the erstwhile EPIWTA. The chartered functions of the Authority were/are conservency, pilotage, transport, port engineering, hydrography etc. Hydrographic section was first headed by Rear Admiral (Rtd.) SA, Schank of the U.S. coast and geodetic survey department. Lt. Cdr (Rtd) Sir R.K. Husband FRICS, OBE of British Royal Navy was appointed to organize the hydrographic survey services in 1964. Thus IWTA consisted of Traffic, Conservancy and Pilotage, Waterway & Ports Engineering, Accounts and Secretariate departments.

Rapid geomorphological changes in the hydraulic regime of Bangladesh waterways impede smooth navigation, and implementation of development projects along the water front became essential. Hydrographic survey and allied data collection on a continuous basis also became, therefore, a basic need not only for improvement of navigational channels but also for effective planning of development projects. As such hydrographic survey works became one of the essential chartered functions of IWTA. Hydrographic service started (1959) by EPIWTA, since then the works of hydrographic survey related data collection and publication of hydrographic charts of both inland and coastal water are being regularly carried out by BIWTA. Hydrographic surveys carried out in the field normally involves (1) position fixing (2) measuring of depth and (3) collection of water level data.

The most fundamental requirement of the field survey is to possess required number of appropriate survey vessels. BIWTA has 18 survey vessels equipped with survey gears, Decca Receivers, echo-sounders, communication sets etc. The scope of works of this department are:

1) Navigational survey
2) Dredging survey
3) Port and harbour survey
4) Route mapping
5) Wreck survey

The department carries out surveys and publishes charts in scale versions, i.e. from 1:100 to 1:75000. The following table gives the account of Hydrographic surveys carried out by BIWTA from 1981-82 to 1990-91.

Years	Navigation Survey		Dredging Survey (km)
	Inland Water (km)	Costal Water (km)	
1981-82	976	1657	37
82-83	2070	2335	64
83-84	1332	453	32
84-85	1395	1294	171
85-86	2137	790	201
86-87	2313	1372	120
87-88	2124	70	55
88-89	1480	-	140
89-90	1526	910	125
90-91	1325	450	155

Academic qualifications required for the entry into the service is the post graduate degree in physics or mathematics preferably with honours in the graduate level. After two years exhaustive professional training (theoretical as well as practical) the participants have to spend another additional period of two years with the survey parties for on-the-job exhaustive survey and computational works before they are accepted by the department as professionally qualified personnel. BIWTA undertakes the hydrographic services through 261 personnel of which 28 are highly trained.

Problems and Bottle necks

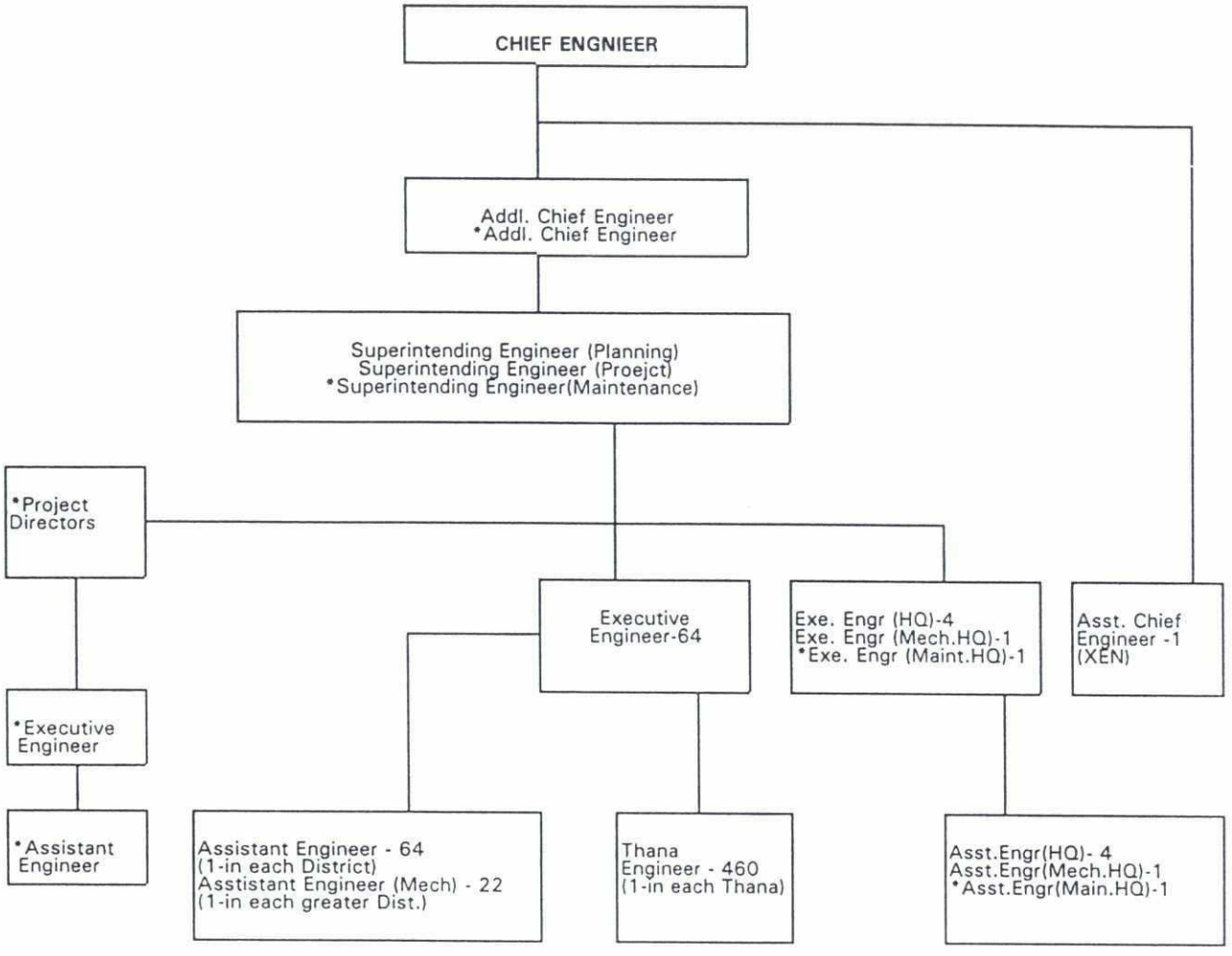
Inadequate allocation of fund is one the main constraints. The expenses by the Hydrography Department are borne from the Revenue Budget of BIWTA and allocation of 1990-91 fiscal year was Tk. 166.26 lac.

The shortage of trained man-power is another issue. The reasons for the shortage are limited scope for promotion, comparatively low pay-scale and lower opportunities and other poor given facilities those exist in the department. Many well trained and expert personnel leave the organization whenever better opportunities are received elsewhere.

LOCAL GOVERNMENT ENGINEERING DEPARTMENT

Local Government Engineering Department known as LGED started in 1970s as a small cell in the local Government Division. Government created the local government Engineering Bureau (LGEB) under the local government Division in october, 1984 under the revenue budget of the government. LGEB was upgraded as the local government Engineering Department by the government in August, 1992. LGED's Chief Executive is the Chief Engineer and he is supported by Additional Chief Engineer, Superintending Engineer, Executive Engineer, Asst. Engineers which may be seen from the organization structure of LGED (below).

ORGANIZATION STRUCTURES OF LGED



Total Posts (Revenue Budget)	
Chief Engineer	1
Addl. Chief Engineer	1
Superintending Engineer	4
Executive Engineer	64
Executive Engineer (Mech)	1
Asstt. Chief Engineer (XEN)	1
Asstt. Engr./Thana Engr.	528
Asstt. Engineer (Mech)	23
Sub-Asstt. Engineer	984
Estimator (SAE)	2
Draftsmen (SAE)	462
Lab. Technican	64
Mechnial Formen	1
Accountant	525
Stenographer	6
Head Assistant	1
UDA	68
Steno Typist	70
Surveyor	460
Work Assistant	1840
Account Assistant	461
Office Asstt/ LDA-cum-Typist	926
Store Keeper	460
Electrician	460
Other Support Staff	2131
TOTAL:	9548

LEGE Headquarter	
Chief Engineer	1
Addl. Chief Engineer	1
Superintending Engineer	4
Executive Engineer	4
Executive Engineer (Mech)	1
Asstt. Chief Engineer (XEN)	1
Asstt. Engr.	4
Asstt. Engineer (Mech)	1
Estimator (SAE)	2
Draftsmen (SAE)	2
Mechnial Formen	1
Accountant	1
Stenographer	6
Head Assistant	1
UDA	4
Steno Typist	1
LDA-cum-Typist	1
Account Asstt.	1
Driver	12
Duplicating Mach. Operator	1
Amonia Mach. Operator	1
MLSS	21
TOTAL	82

District Leavel	
Chief Engineer	1
Asstt. Engr.	1
Asstt. Engineer (Mech) (in 22 greater district)	1
SAE	1
UDA	1
Accountant	1
Steno Typist	1
Vehicle Driver	1
Truck Driver	1
Road Rollar Driver	1
MLSS	1
Each District:	12
TOTAO (All District)	726

Thana Level	
Thana Engineer	1
SAE (construction)	1
SAE (Maintenance)	1
Draftsman (SAE)	1
Store Keeper	1
Accountant	1
Surveyor	1
Work Assistant	4
Electrician	1
Office Assistant	1
LDA-cum-Typist	1
Accounts Assistant	1
Chowkidar	2
MLSS	2
Each Thana:	19
TOTAL(All Thanas):	8740

*The Post are under the Development Budget

Major Functions of LGED

LGED is a Government Department under the Local Government Division of the Ministry of Local Government, Rural Development & Cooperatives. The broad functions of LGED are given in thr Table below.

Prepared model for Thana plan book union plan book, and other physical planning/ mapping tools.	Provide technical assistance to Union Parishad.	Provide technical assistance for Thana level infrastructure development work.	Provide technical assistance to Zila Parishad.
Provide technical assistance to Municipalities.	Implement infrastructure development project (with donor financing) in various regions of the country.	Implement GCCR Programme with Food Aid provided by WFP, Australia, EEC, FRG & Canada.	Implement infrastructure development programmes of other Ministries.
Impart Training in Engineering, Management and Financial aspects.	Prepare Implementation guidelines/ Methodology for infrastructure development projects.	Prepare Design and other Technical Manuals Models, Specifications.	

Main Activities of LGED

Local Government Engineering Department carrys out activities of rural infrastructure development,maintenance of infrastructures, geographic information system and of technical development etc. A list of such activities presently undertaken by the LGED is shown below.

o **Infrastructures development**

Construction of feeder roads type-B
Construction of rural roads
Bridges and culverts on feeder roads
Development of growth centres and rural markets
Embankments, sluices and regulators
Re-excavations of khas and other ponds for pisciculture
Tree plantation on slopes of embankments and feeder roads
Construction of school building,office building,cyclone shelters & killas etc.
Drainage, solid waste management,slum improvement and sanitation etc.

o **Maintenance of Rural Infrastructure**

Routine maintenance of earth roads, Herring Bone Bond & paved roads
Repair and routine maintenance of structures

o **Geographic Information System**

Collection of all forms of georeferenced data
Production digitized Thana base maps
Ground truthing by Global Positioning System
Large number map production

o **Management Information System**

Preparation of Hydrological Data Base for Water Resouces Schemes and Structures

Preparation of standard set-up, tests and rates of tests
Preparation of analytical and standard reports on testing and quality control of materials
Identify new and innovative approach to construction activities
Dissemination of appropriate technology for construction work
preparation of alternate models for construction of cyclone shelters and killas
Preparation of plans of functional buildings under various RD projects
Policy/ strategy for maintenance of rural infrastructures
Implementation, Guidelines & Manuals for infrastructure development projects
Strategy for progress/effect/monitoring of RD projects including data on employment generation.

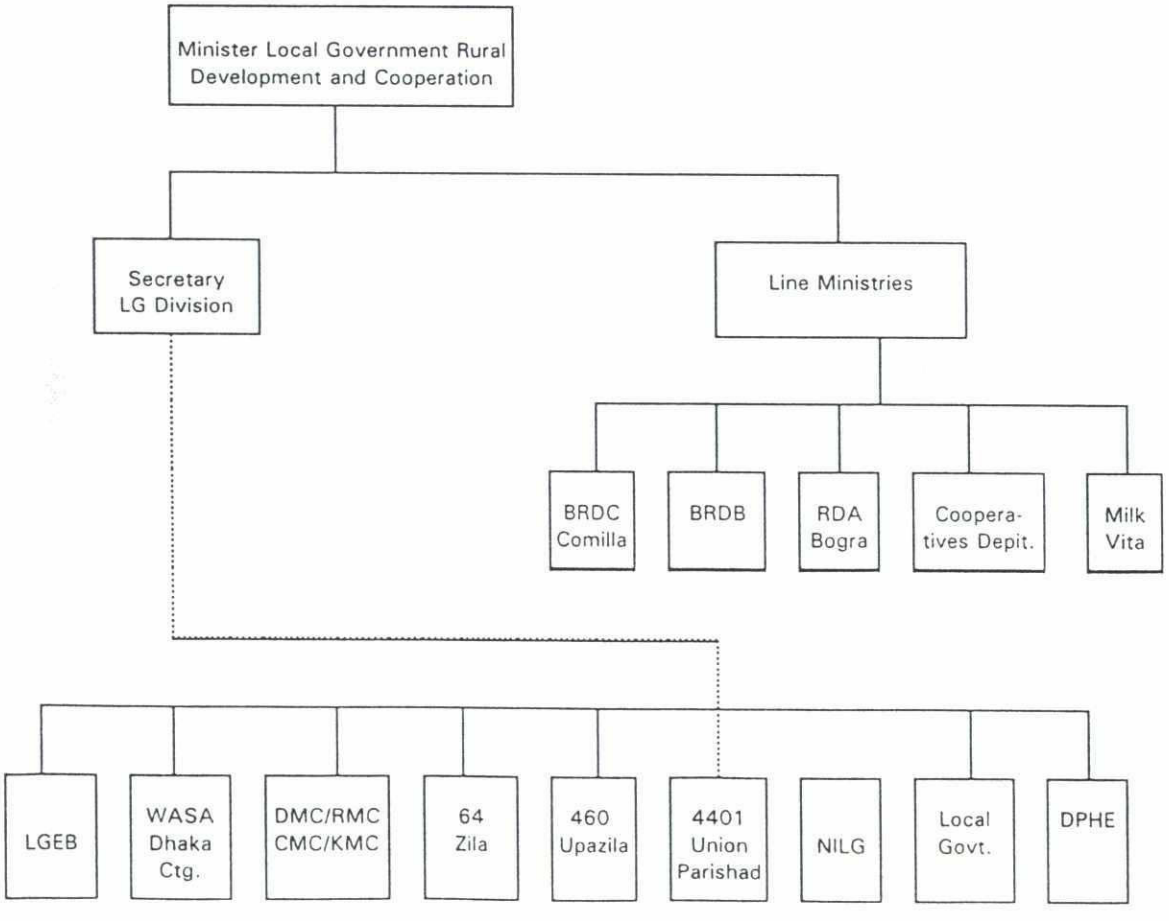
o **Training Programme**

Training for Foundation Course
Training of Trainers
Thana Engineers Orientation
Office Management
Water Resource Course(WR-I, WR-II)
Road Construction Training
Physical Planning Course.

The following chart shows the organizational structure of Ministry of Local Government, Rural Development and Cooperatives(MLGRDC) and Local Government Engineering Department is a part of the said Ministry.

ORANOGRAM

Ministry of Local Governament, Rural Development and Cooperatives (MLGRDC)



Appendix - B

Statement of Particulars SSD Personnel

Sl.no	Description of the Post.	No. of Post	Pay scale.	Name	Qualifications	Date of Birth	Experience	Training	Remarks
1	2	3	4	5	6	7	8	9	10
1	Executive Engineer	1	6300-8050/=	1. Mr. Md.Sultan Ahamed	Diploma Engg. (Civil)	29.08.1941	Serveying,Building constructions,Embankment constructions,Structures in CEP,Planning & Disign of as well as administration.		
2	Deputy Directors (Absorbed)	4	4800-7250/=	2.(a) Mr.Md.Mofizur Rahman	B.Sc.	28.12.1939	Worked in Hydrology Processing division,Ganges study, Hydraulic Reach Lab. ,Currently in SSD-MES.	Departmental Training at Kaptai Academy,Baggakul Hydrological Training Institute.	
				(b) Mr. Mridul Kanti Barua	B.Sc.	01.07.1939	Worked in Hydrology Processing division,Ganges study,Worked in various divisions/circles/ zonal offices of BWDB.Currently in SSD-MES.		
				(c) Mr. Md. S.N.Chowdhury	B.Sc.	01.04.1940	Served in Hydrology Deptt., BWDB and SSD,Ctg.	Instrument handling, data collection,processing of hydro-metro data	
				(d) Mr. Md. Mostafizur	B.Sc.	?	Data processing		Retired
3	Assistant Engineer/ Sub-Divisional Engineer	2	4800-7250/=	3.(a) Mr.A.K.M.Kamal Uddin	Diploma Engg. (Civil)	26.09.1944	Embankment construction, sluice gate construction,building construction as Sub-Assistant Engr.,tender processing,Estimate checking.	Completed 3 months training in the Engineering Academy. Kaptai.Training in CIDA aided and WFP aided projects	
				(b) Mr. Abdus Samad	Diploma Engg. (Civil)	24.11.1944	Embankment construction, sluice gate construction,building construction as Sub-Assistant Engr.,tender processing,Estimate cheking.	Training in CIDA aided and WFP aided projects	
4	Divisional Accountant	1	1725-3725/=	Abolised					Post. Abolised
5	Draftsman Gard-I	1	1725-3725/=	5. Mr. Hafizur Rahman Tarafder	Trade Comerse certificate in drafting				
6	Sub-Assistant Engineer.	1	2300-4480/=	6. Vacant					Posting is needed
7	Head Clerk	1	1375-2870/=	7. Mr. Nurul Anwar					
8	S.A.A.	2	1375-2870/=	8.(a) Mr. Jalal Uddin					
				(b) Vacant					
9	Steno typist	1	1375-2870/=	9. Vacant					Posting is needed
10	Clerk cum typist	4	1200-2335/=	10.(a) Mr.Shamsul Haq					
				(b) Miss. Khaleda Banu					
				(c) Mr. Wahidur Rahman					
				(d) Mr. Khokan Kanti Mojumder					
11	Accounts Assistant	2	1200-2335/=	11.(a) Mr. Tofazzal Hossain					
				(b) Vacant					
12	Driver	3	1200-2335/=	12.(a) Mr. Sirajul Islam					

Appendix - B

Sl.no	Description of the Post.	No. of Post	Pay scale.	Name	Qualifications	Date of Birth	Experience	Training	Remarks
1	2	3	4	5	6	7	8	9	10
				(b) Mr. Shamsul Alam					One no. Posting is needed
13	Store Keeper	1	1200-2335/=	13. Mr.Haron-or-Rashid					
14	Blue Printer/Machene Operator	1	1050-1915/=	14. Vacant					Posting is needed
15	Record supplier	1	1050-1915/=	15. Vacant					Posting is needed
16	Guard	3	900-1530/=	16. Vacant					2 nos Night guard are engaged on Daily basis
17	Miss/Peon	4	900-1530/=	17.(a) Mr. Abul Hasan					
				(b) Vacant					
				(c) Vacant					3 nos Posting is needed
				(d) Vacant					
18	Sweeper	1	900-1530/=	18. Montu Sarder					
19	Orderly peon	1	900-1530/=	19. Mr.Rafiqul Islam					
20	Office Chowkider	1	900-1530/=	20.Vacant					Posting is needed
21	Gardener	1	900-1530/=	21. Vacant					Posting is needed
	Survey Vassel								
1	Skipper	1	4800-7250/-	1.Vacant					Recruitment is needed
2	Engineer Grade - "A"	1	4800-7250/-	2.Vacant					Recruitment is needed
3	Engineer Grade - "B"	1	3200-5440/-	3.Mr. Md. Abdul Aziz					
4	Skipper Grade- II	1	2850-5155/-	4.Vacant					Recruitment is needed
5	Sub-Divisional Engineer	1	2300-4480/-	5.Vacant					Posting is needed
6	Sailor	6	1200-2335/-	6.(a)Md. Jamal Hossain					
				(b) Syed Zakir Hossain					
				(c) Kamrul Islam					
				(d) Abul Bashar					
				(e) Vacant					Posting is needed
				(f) Vacant					Posting is needed
7	Greaser	2	1200-2335/-	7.(a) Md. Nurul Hossain					
				(b) Vacant					Posting is needed
8	Daughter Vessal Driver	2	1200-2335/-	8. Vacant					Posting is needed
9	Cook (cook-B)	1	1050-1915/-	9. Md. Mujibur Rahman					
10	Lasker	2	975-1750/-	10. Md. Abdur Rashid					
11	Jetty guard	3	900-1530/-	11.Vacant					3 Nos Jetty Guard are working on daily basis
12	Assistant Cook (Cook-A)	1	900-1530/-	12. Mr. Chand Miah					
	Measurement Sub Division								
1	Sub-Divisional Engineer	1	4800-7250/-	1. Mr. Mostafa Kamal	B.Sc -Engineer (civil) Post Graduate Diploma		Assistant Engineer = June /85 to July / 90 Sub-divisional Engineer = July/90 to till date		Post graduate diploma taken from Delft Hydraulics Netherlands. 1989-90 (11 month)

Appendix - B

Sl.no	Description of the Post.	No. of Post	Pay scale.	Name	Qualifications	Date of Birth	Experience	Training	Remarks
1	2	3	4	5	6	7	8	9	10
2	Junior River Surveyor	8	2300-4480/-	2.(a) Mr.Khan Md. Mostafa Kamal	B.Sc.	12.06.1957	Working in the same post from 28.04.81 to till date	6 month training on basic Electronics in Chittagong Technical Training centre,Chittagong Hydrographic training under guidance of Dutch Hydrographer in M.V. Annesha. 3-month training on course of Hydrography in Delft hydaulics in Netherland.	Need 3 month training on course of Hydrography in Delft Hydraulics in Netherlands
				(b) Mr. Mofiuzzaman	B.Sc.	20.05.1960	Working in the same post from 28.04.81 to till date	6 month training on basic Electronics in Chittagong Technical Training centre,Chittagong Hydrographic training under guidence of Dutch Hydrographer in M.V. Annesha. 3-month training on course of Hydrography in Delft hydaulics in Netherland.	
				(c) Mr.P.C. Das	Diploma Engineer (Civil)	03.01.1960	Working in the same post from 28.04.81 to till date	6 month training on basic Electronics in Chittagong Technical Training centre,Chittagong Hydrographic training under guidence of Dutch Hydrographer in M.V. Annesha. 3-month training on course of Hydrography in Delft hydaulics in Netherland.	
				(d) Vacant (05 no.)					Posting is needed
3	Clerk cum typist	1	1200-2335/-	3. Vacant					Posting is needed
4	Gange Reader	4	975-1750/-	4. (a) Md.Foizul Kabir					
				(b) Vacant (03 No.)					Posting is needed
5	Survey khalasy	4	975-1750/-	5. (a) Md. Amin Ullah					
				(b) Mr. Abu Sayed					
				(c) Md. Abdul mannan Howlader					
				(d) Vacant					Posting is needed
6	MLSS/Peon	1	900-1530/-	6. Vacant					Posting is needed
7	Guard	1	900-1530/-	7. Vacant					Posting is needed
	Processing Sub-Division								
1	Sub-Divisional Engineer	1	4800-7250/-	1. Md. Nurul Amin	B.Sc. Engineer (civil)	15.03.1962	Assistant Engineer) = 15.09.88 to 28.10.92 Sub-Divisional Engineer)= 29.10.92 to till date	7 month Fundamental training on BWDB locally Re-orientation training in Kaptai Engg.Academy, Chittagong Hill Tracts for 2 week	For the interest of MES Project works,needs Post graduate diploma Course from Abroad
2	Assistant Director	1	2850-5155/-	2. Vacant					Posting is needed
3	Tracer	1	1200-2335/-	3. Vacant					Posting is needed
4	Draftsman guard--II	1	1375-2870/-	4. Vacant					Posting is needed
5	Clerk cum typist	1	1200-2335/-	5. Vacant					Posting is needed
6	MLSS/Peon	1	900-1530/-	6. Vacant					Posting is needed
7	Sweeper	1	900-1530/-	7. Vacant					Posting is needed
	Laboratory Section								
1	Assistant Director	1	2850-5155/-	1. Vacant					Posting is needed
2	Laboratory Technician / Soil Technician (Grade - C)	2	1550-3405/-	2. (a) Mr. Ali Ahamed Majumder	S.S.C (fail)	30.05.1948	Lab.Assistant =)09.11.70to Soil Technician =) 01.01.93		
				(b) Mr. Abdul Latif Khan	S.S.C (fail)	25.01.1941			
3	MLSS/Peon	1	900-1530/-	3. Vacant					Posting is needed

Appendix - C

BWDB JOB DESCRIPTION

JOB DESIGNATION: Dir. Land Accretion & Estuary Development Group: PLANNING

BWDB Designation:	SE (Engineering)	Job Description code : 04031
Cadre :	Engg.(Civil)	Initial Payscale :4
Member/Wing:	Planning	pay Scale Range: 7100-8700

Job Position:	Directorate of Land Accretion & Estuary Development.
Job Location:	Dhaka.
Reports to:	Chief Engineer, Planning.
Reports for:	Directorate of Land Accretion & Estuary Development.
No. of Subordinates:	26
BWDB Liaison:	Directorates of Planning, Programme, Accounts, Finance, Board's Sectt.
Non-BWDB Liaison:	MOWR, FPCO, Funding Agencies, Consultants, WARPO, BRDB.

Purpose of the job:
Conduct estuary survey for formulation of land accretion projects and also to monitor implementation of land accretion projects.

Duties and responsibilities :

01. Manage, supervise and administer the activities of the Directorate of Land Accretion & Estuary Development
02. Give guidance, supervise, train and appraise the officers and staff of his own office and his subordinate heads of office.
03. Supervise the preparation of TAPP, PCP and PP, TOR, PC-2
04. Conduct estuary survey including bathymetric, hydrological and topographic survey and testing of water and soil samples.
05. Conduct feasibility studies of land accretion and land reclamation projects.
06. Monitor consultant's work.
07. Act as BWDB counterparts to the expatriate consultants.
08. Review, revise and update feasibility study reports.
09. Prepare progress reports, ADP etc.
10. Arrange seminars/workshop.
11. Approve work estimates.
12. Carry out any other official tasks assigned by the higher authority from time to time.

Educational Requirements
B.Sc.Engg. (Civil) (Entry as AE).

Minimum Experience required:
12 Yrs in Civil Engineering (Class 1).

Minimum Skills Required (to enter the Job):
1. Project Planning.
2. Office Management.

Additional Skills Desired (to be acquired on the Job):
1. Policy preparation

BWDB JOB DESCRIPTION

JOB DESIGNATION:	Executive Engineer	GROUP: PLANNING
BWDB Designation:	XEN	Job Description code : 06115
Cadre :	Engg.(Civil)	Initial Payscale :6
Member/Wing:	Planning	pay Scale Range: 4800-7250
Job Position:	Directorate of Land Accretion & Estuary Development.	
Job Location:	Dhaka.	
Reports to:	Director, Land Accretion & Estuary Development.	
Reports for:	Himself and AE/SDE under him.	
No. of Subordinates:	-	
BWDB Liaison:	Different BWDB office.	
Non-BWDB Liaison:	Administrative Ministry, FPCO, WARPO, Funding Agencies,Consultants, local administration.	

Purpose of the job:
To assist Dir. Land Accretion & Estuary Development in the technical activities of the Directorate.

Duties and responsibilities :

01. Assist the SE/Director in the following activities :-
- Preparation of TAPP, PCP and pp.
- Estuary survey including bathymetric, hydrological and topographic surveys and testing of water and soil samples.
- Prepare/update feasibility studies of land accretion and reclamation project.
- Act as BWDB counterparts to the consultants.
- Prepare progress reports, ADP etc.
- Preparation of work estimates.
- Implementation monitoring of projects.
- Arranging seminars/workshops.
- Correspondence on Technical matters.

02. Carry out any other official task assigned by the higher authority from time to time.

Educational Requirements
B.Sc.Engg. (Civil) (Entry as AE).
And/or, Diploma in Civil Engineering (Entry as AE through promotion).

Minimum Experience required:
5 Yrs in Civil Engineering (Class 1).

Minimum Skills Required (to enter the Job):
1. Report writing.
2. Surveying.

Additional Skills Desired (to be acquired on the Job):
1. Estuarine survey.

Appendix - C

BWDB JOB DESCRIPTION

JOB DESIGNATION:	Executive Engineer	Group: PLANNING
BWDB Designation:	Executive Engineer	Job Description code : 06123
Cadre :	Engg.(Civil)	Initial Payscale :6
Member/Wing:	Planning	pay Scale Range: 4800-7250
Job Position:	Survey & Study Division.	
Job Location:	Chittagong.	
Reports to:	Director,Land Accretion & Estuary Development.	
Reports for:	Survey & Study Division.	
No. of Subordinates:	51	
BWDB Liaison:	CE Planning; CE, Zone; SE Design; SE Circle, SE/Director, Planning Director, Programme/ Finance/ Audit/ Accounts.	
Non-BWDB Liaison:	Govt., Semi Govt., Autonomous bodies/NGO Offices (consultant), Public representatives of the beneficiaries of the Project area.	

Purpose of the job:
Scheduled implementation of Study & Survey Programme and preparation of proposal for future programme in connection with land accretion & estuary development.

Duties and responsibilities :

01. Implement policy, goals and targets of BWDB, to look after overall administration of the Division.
02. Identify, investigate and submit proposal for new schemes and planning for Survey & Studies for land reclamation and estuary control in the Eastern Delta of Bangladesh.
03. Prepare ADP, work authorization and to initiate preparatory works for timely execution of ADP.
04. Submit/sanction estimate, prepare, float, receive, process and finalize tender to issue work order and to arrange prequalification of contractors, to process enlistment of contractors.
05. Write and submit ACR of the subordinate officers & staff.
06. Investigate public complains/representation, to report in the event of accident, loss damage, theft and misappropriation of Board's property, to submit survey report of unserviceable articles.
07. Attend different meetings as and when required.
08. Check, supervise, monitor and report the implementation of physical component of ADP.
09. Check bills of the contractors as per codal rules, process the bills for payment, submit reimbursement bills instantaneously, furnish audit reply, process salary bills of officers and staff.
10. Supervise the works of hydrographic data collection and processing of that data with the assistance of DO, SDE, AD, JRS, SAE.
11. Supervise the works of DD, SDE, AD, JRS, SAE and other officers and staff and to ensure that the duties and responsibilities of the officers and staff are properly carried out.
12. Carry out any other official task assigned by the higher authority from time to time.

Educational Requirements
B.Sc.Engg. (Civil) (Entry as AE) and/or Diploma in Civil Engineering (Entry as AE through promotion).

Minimum Experience required:
5 Years in Civil Engineering (Class 1).

Minimum Skills Required (to enter the Job):
1. Information management & report writing
2. Work Planning.

Additional Skills Desired (to be acquired on the Job):
1. Monitoring of policy implementation.
2. Motivating subordinates and delegating tasks.
3. Manage and control.

BWDB JOB DESCRIPTION

JOB DESIGNATION: Skipper / Master (Survey Vessel) Group: PLANNING

BWDB Designation:	Skipper/Skipper-II.	Job Description code : 06142
Cadre :	Engg.(Civil)	Initial Payscale :6/9
Member/Wing:	Planning	Pay Scale Range: 6:4800-7250,9:2850-5111
Job Position:	Survey & Study Division.	
Job Location:	Chittagong.	
Reports to:	XEN Survey & Study Division.	
Reports for:	Himself	
No. of Subordinates:	-	
BWDB Liaison:	BWDB Planning Offices.	
Non-BWDB Liaison:	As directed.	

Purpose of the job:
To provide technical assistance in connection with the operation and navigation of the survey vessel.

Duties and responsibilities :
01. Navigation of the survey vessel.
02. Maintenance of the Deck side of survey vessel.
03. Guide the sailors of the vessel.
04. Carry out any official task assigned by the superior authority from time to time.

Educational Requirements
1st Class/2nd Class Inland Master Certificate.

Minimum Experience required:
6 Years navigation of coaster/fishing trawlers for skipper.
2/5 Years navigation of coaster/fishing trawlers for skipper.

Minimum Skills Required (to enter the Job):
1. Knowledge of good navigation.

Additional Skills Desired (to be acquired on the Job):
1. Good command on operation,maintenance and navigation of the survey vessel.

Appendix - C

BWDB JOB DESCRIPTION

JOB DESIGNATION:	Engineer (A/B) (Survey Vessel)	Group: PLANNING
BWDB Designation:	Engineer Grade A/B.	Job Description code : 08001
Cadre :	Engg.(Civil)	Initial Payscale :6/8
Member/Wing:	Planning	Pay Scale Range: 6 = 4800-7250,8 = 3200-5440
Job Position:	Survey & Study Division.	
Job Location:	Chittagong.	
Reports to:	XEN Survey & Study Division.	
Reports for:	Engineer (A/B).	
No. of Subordinates:	-	
BWDB Liaison:	Dredger offices.	
Non-BWDB Liaison:	As directed.	

Purpose of the job:
To provide technical assistance in connection with the operation and maintenance of engine room, machineries & tender boats of the survey vessel.

Duties and responsibilities :

01. Operation and maintenance of engine room and tender boats of the survey vessel including maintenance of the machineries of the vessel.
02. Guide the greaser of the survey vessel.
04. Carry out any official task assigned by the superior authority from time to time.

Educational Requirements
1st Class/2nd Class Inland Master Certificate.

Minimum Experience required:
6 Years navigation of coasters
2/5 Years navigation of coasters.

Minimum Skills Required (to enter the Job):
1. Good command in the operation and maintenance of the survey vessel (Engine Side).

Additional Skills Desired (to be acquired on the Job):

1.Skill in repairing of minor defects of the engine of the survey vessel.

BWDB JOB DESCRIPTION

JOB DESIGNATION:	Sub-Divisional Engineer.	Group: PLANNING
BWDB Designation:	Sub-Divisional Engineer.	Job Description code:09001
Cadre :	Engg.(Civil)	Initial Payscale :7
Member/Wing:	Planning	Pay Scale Range: 4100-6500
Job Position:	Survey & Study Division.	
Job Location:	Chittagong.	
Reports to:	XEN Survey & Study Division.	
Reports for:	Himself,SAE & Engineer(A/B) .	
No. of Subordinates:	-	
BWDB Liaison:	Different BWDB offices.	
Non-BWDB Liaison:	Govt., Semi Govt. and NGO offices though XEN.	

Purpose of the job:
To assist XEN in the scheduled implementation of study and survey programme and proposal for future programme in connection with land accretion & estuary development.

Duties and responsibilities :

01. Assist the XEN in implementing the police, goals and targets of the Board.
02. Assist the XEN in supervising the works of JRS, SAE in the implementation of the physical component of ADP.
03. Guide and supervise the work of the JRS and SAE in discharging their duties and appraise the XEN any problem arising for immediate remedial measures.
04. Assist the XEN for preparation of estimates and PP under the guidance of the superior authority.
05. Investigate and report on public complaints/representation through XEN.
06. Guide and supervise the collection and processing of hydrographic data, execution of study programmes draw up various technical report in regard to land reclamation, accretion promotion and estuary development.
07. Supervision of the operation & maintenance of survey vessel, pontoon jetty, survey and laboratory equipment.
08. Preparation of bills of expenditures against temporary advance in connection with repair & maintenance of survey vessel, tender boat, survey equip. and hydrographic survey work etc.
09. Carry out any official task assigned by the superior authority from time to time.

Educational Requirements
B.Sc.Engg. (Civil) (Entry as AE).
And/or, Diploma in Civil Engineering (Entry as AE through promotion).

Minimum Experience required:
4 Years in Civil Engineering (Class 1)

Minimum Skills Required (to enter the Job):
1. Operation and Maintenance of survey equipments.

Additional Skills Desired (to be acquired on the Job):
1. Information management & report writing
2. Work Planning.

BWDB JOB DESCRIPTION

JOB DESIGNATION: Asstt. Director (Technical) Group: PLANNING

BWDB Designation:	Asstt. Director (Abs.)	Job Description code:09002
Cadre :	Administration	Initial Payscale :9
Member/Wing:	Planning	Pay Scale Range: 2850-5155

Job Position:	Survey & Study Division.
Job Location:	Chittagong.
Reports to:	XEN, Survey & Study Division.
Reports for:	Himself.

No. of Subordinates: -

BWDB Liaison:	Different BWDB offices.
Non-BWDB Liaison:	As directed.

Purpose of the job:
To assist XEN in the scheduled implementation of study and survey programme and preparation of proposal for future programme in connection with land accretion & estuary development.

Duties and responsibilities :
01. Assist to implement the police, goals and targets of the Board.
02. Hydrographic data collection.
03. Data processing and storing.
04. Laboratory analysis of samples.
05. Carry out any official task assigned by the superior authority from time to time.

Educational Requirements
B.Sc.Engg. (Civil) (Entry as ATO/AD through absorption).

Minimum Experience required:
3 Years experience in research works.

Minimum Skills Required (to enter the Job):
1. Operation of survey equipment.

Additional Skills Desired (to be acquired on the Job):
1. Efficient in hydrographic data collection & processing.

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BWDB JOB DESCRIPTION

JOB DESIGNATION: Junior River Surveyor Group: PLANNING

BWDB Designation:	Junior River Surveyor	Job Description code:10006
Cadre :	Non Cadre	Initial Payscale :10
Member/Wing:	Planning	Pay Scale Range: 2300-4800

Job Position:	Survey & Study Division.
Job Location:	Chittagong.
Reports to:	XEN, Survey & Study Division.
Reports for:	Junior River Surveyor.
No. of Subordinates:	-
BWDB Liaison:	Planning office.
Non-BWDB Liaison:	As directed.

Purpose of the job:
Provide technical assistance in collecting hydrographic data for caring out land accretion & estuary development activities.

Duties and responsibilities :
01. Hydrographic data collection.
02. Data processing.
03. Minor repair of survey instruments.
04. Carry out any official task assigned by the superior authority from time to time.

Educational Requirements
Diploma in Civil Engineering.

Minimum Experience required:
Knowledge of operation of survey equipment & Hydrographic data is required.

Minimum Skills Required (to enter the Job):
1. Operation of survey equipment.
2. Hydrographic data collection and processing.

Additional Skills Desired (to be acquired on the Job):
1. Report writing.

Appendix - C

BWDB JOB DESCRIPTION

JOB DESIGNATION:	SAE (Survey Vessel)	Group: PLANNING
BWDB Designation:	Sub-Asstt. Engineer	Job Description code:11016
Cadre :	Non Cadre	Initial Payscale :10
Member/Wing:	Planning	Pay Scale Range: 2300-4480
Job Position:	Survey & Study Division.	
Job Location:	Chittagong.	
Reports to:	XEN, Survey & Study Division.	
Reports for:	Himself.	
No. of Subordinates:	-	
BWDB Liaison:	Planning office.	
Non-BWDB Liaison:	As directed.	

Purpose of the job:
Assist SDE in the scheduled implementation of study and survey programme and preparation of proposal for future programme in connection with land accretion & estuary development.

Duties and responsibilities :
01. Assist hydrographic data collection.
02. Minor repair and maintenance of survey equipment and electrical works of the vessels.
03. Carry out any official task assigned by the superior authority from time to time.

Educational Requirements
Diploma Engineering in Power (Entry as SAE).

Minimum Experience required:
Knowledge of survey equipment & Hydrographic data collection is required.

Minimum Skills Required (to enter the Job):
1. Operation of the survey and electrical equipment.

Additional Skills Desired (to be acquired on the Job):
1. Hydrographic data collection.

BWDB JOB DESCRIPTION

JOB DESIGNATION: Laboratory/Soil Technician(Equipment) Group: PLANNING

BWDB Designation:	Laboratory/Soil Technician.	Job Description code:12001
Cadre :	Non Cadre	Initial Payscale :16
Member/Wing:	Planning	Pay Scale Range: 1200-2333

Job Position:	Survey & Study Division.
Job Location:	Chittagong.
Reports to:	XEN, Survey & Study Division.
Reports for:	Laboratory/Soil Technician.
No. of Subordinates:	-
BWDB Liaison:	Different BWDB office as directed.
Non-BWDB Liaison:	As directed.

Purpose of the job:
Provide technical assistance for laboratory analysis of soil & water samples.

Duties and responsibilities :
01. Assist the laboratory analysis of soil & water samples collected during the hydrographic survey.
02. Carry out any official task assigned by the superior authority from time to time.

Educational Requirements
SSC (Entry as laboratory asstt.)

Minimum Experience required:
2 Years experience as laboratory technician is required.

Minimum Skills Required (to enter the Job):
1. Laboratory analysis of different types of samples.

Additional Skills Desired (to be acquired on the Job):
1. Efficiency in analysis of different types of soil samples.

Appendix - C

BWDB JOB DESCRIPTION

JOB DESIGNATION: Sailor (Survey Vessel) Group: PLANNING

BWDB Designation:	Sailor.	Job Description code:14006
Cadre :	Non Cadre	Initial Payscale :14
Member/Wing:	Planning	Pay Scale Range: 1200-2335

Job Position:	Survey & Study Division.
Job Location:	Chittagong.
Reports to:	Skipper/Skipper II, survey vessel.
Reports for:	Sailor.
No. of Subordinates:	-
BWDB Liaison:	SDE & XEN, S&S Division.
Non-BWDB Liaison:	As directed.

Purpose of the job:
Provide technical assistance in connection with the navigation of the survey vessel.

Duties and responsibilities :
01. Assist in the navigation of the survey vessel.
02. Washing, cleaning and guarding of the vessel.
03. Carry out any official task assigned by the superior authority from time to time.

Educational Requirements
Class - VIII (Entry as Sailor).

Minimum Experience required:
3 Years experience as Lasker is required.

Minimum Skills Required (to enter the Job):
1. Knowledge of navigation of a vessel.

Additional Skills Desired (to be acquired on the Job):
1. Sound Knowledge in navigation of a vessel.

NEW EQUIPMENTS FOR ANWESHA

Sl. No.	Name of Equipments	No. of Eqp.
1	Hydro rack incl:	1
2	Hydro computer s/n 3	1
3	Radtel GXI	1
4	24-12 volt inverter	1
5	B.W screen	1
6	Printer	1
7	Keyboard	1
8	4 ea power cable for Radtel GXI	1
9	4 ea cable for Radtel GXI	1
10	2 ea cable for Radtel GXI	1
11	Trimble 7400 GPS Receiver	1A
12	Trimble 7400 GPS Receiver	1A
13	Trimble 7400 GPS Receiver	1A
14	Trimble 7400 GPS Receiver	-
15	Antenna cable for GPS Receiver	-
16	Antenna cable for GPS Receiver	-
17	Antenna cable for GPS Receiver	-
18	Antenna cable for GPS Receiver	-
19	GPS antenna for Trimble 7400	-
20	GPS antenna for Trimble 7400	-
21	GPS antenna for Trimble 7400	-
22	GPS antenna for Trimble 7400	-
23	1 ea power cable, 2 ea 1/0 cables, 1 ea remote dongle	-
24	1 ea power cable, 2 ea 1/0 cables, 1 ea remote dongle	-
25	1 ea power cable, 2 ea 1/0 cables, 1 ea remote dongle	-
26	1 ea power cable, 2 ea 1/0 cables, 1 ea remote dongle	-
27	3 ea Trimble 7400 MSi Operator Manual	-
28	Hydro software manuals (on-line)	-
29	Hydro software manuals (on-line)	-
30	Hydro rack	2
31	Hydro computer	2
32	Radtel GXI	2
33	B.W monitor	2
34	Printer	2
35	Keyboard	2
36	50 paper rolls for printer	2

	Name of Equipments	No. of Eqp.
37	RD ADCP	2
38	Hydro rack	3
39	Safecom computer	3
40	Computer	3
41	Radtel GXI	3
42	Colour monitor	3
43	WTW 323 Salinometer incl. probe	3
44	WTW 323 Salinometer incl. probe	3
45	ACQ rack	4
46	ADCP/ACQ computer	4
47	Switch box	4
48	Keyboard	4
49	1 ea Knudsen echosounder incl. power cable	5
50	6 ea Echosounder paper for knudsen echosounder	5
51	6 ea Echosounder paper for knudsen echosounder	5
52	6 ea Echosounder paper for knudsen echosounder	5
53	6 ea Echosounder paper for knudsen echosounder	5
54	1 ea DTS Monochrom monitor	5
55	1 ea Hewlett Packard 5L laser printer	5
56	2 ea Knudsen manuals	5
57	1 ea Backpack	5
58	1 ea Grundfos sediment pump	5
59	1 ea UHF antenna for Radtel GXI receiver	5
60	1 ea UHF antenna for Radtel GXI receiver	5
61	1 ea UHF antenna for Radtel GXI receiver	5
62	1 ea UHF antenna for Radtel GXI receiver	5
63	1 ea Antenna cable for Radtel GXI receiver	5
64	1 ea Antenna cable for Radtel GXI receiver	5
65	1 ea Antenna cable for Radtel GXI receiver	5
66	1 ea Antenna cable for Radtel GXI receiver	5
67	Atlas Deso 14 echosounder incl. transducer and cable	6
68	Atlas Deso 14 echosounder incl. transducer and cable	6
69	Rolls of echosounder paper for Deso 14	6
70	Sailor SP2048 VHF	6
71	Sailor SP2048 VHF	6
72	Sailor SP2048 VHF	6
73	Sailor SP2048 VHF	6
74	Sailor power supply for VHF	24

Sl. No.	Name of Equipments	No. of Eqp.
75	Regulator for Gundfoss pump	6
76	2 boxes of paper	6
77	Valeport SK 110 water sampler	7
78	OKi Microline 380 printer	24
79	Roland DXY A3 plotter	8
80	5 ea Data cartridges 1220 QIC80	64
81	Backpack 800 TD Tapestreamer	8
82	Exsiccator incl. 2 shelves + 8 bags of silicagel	9
83	Vacuum pump incl 5 vacuum hose	9
84	Millipore manifold incl, 3 filtering funnels	9
85	Sartorial balance, Misc. glass	9
86	Top for exsiccator	9
87	201 vacuum bottle	9
88	101 vacuum bottle	9
89	Soldering iron	11
90	2 ea Power supply PC, UHF power meter, Amp meter	11
91	3 ea Power supply 24V 12A	11
92	Cable termination Kit	11
93	12V to 24V converter 25A	11
94	Kodak printer, Oki colour ribbon, printer cable, 3 ea PC mouse	11
95	12V to 24V charger, 220V plugs, 2 ea 12V charger	11
96	2 ea 24V charger, 220V plugs	11
97	Mascot power supply	11
98	Tape streamer	11
99	RAACO rack incl. bolts and nuts	11
100	ABC switch	11
101	Plate RS 501-086	11
102	Hand drill incl battery and charger	11
103	Co-contact cleaner	11
104	Screen 99	11
105	4 ea Iron for ref. station	11
106	1 box of mixed cables	11
107	VHF antenna	48
108	Integrated bottle sampler	39
109	3 ea Tubes for 21 bottle	13
110	3 ea Nossel for tube	13
111	Pipe for ADCP	28
112	Umbilical (spare)-Subcon plugs	14

Sl. No.	Name of Equipments	No. of Eqp.
113	ADCP frame	14
114	Top plate for ADCP frame	14
115	Tube for ADCP frame	28
116	2 ea Rod (used)	14
117	Tripod	14
118	1 ea Autopilot	14
119	1 set of cables for autopilop	14
120	9 ea Antenna rod	15
121	1 ea ADCP-frame rod	15
122	Zitech multiscan monitor "168"	16
123	Zitech multiscan monitor "813"	16
124	Zitech computer	16
125	Compaq Contura PC	16
126	Keyboard	64
127	1 x 100m cable	32
128	2 x 50m cable	16
129	Refstation rack incl. Radtel GXI	17
130	Refstation rack	17
131	Tool box incl. tools	17
132	2 x 2 port card 2 x 4 port card 1 x CPU 1 x VGA 1 x Hercules 1 x Disk 850 Mb 1 x Floppy disk 4 x Mb RAM 3 x Mouse 1 x Mini keyboard Floppy box	17
133	Colour monitor	18
134	Retch sieving machine	18
135	WTW 325 salinometer WTW 325 sieves	18
136	Sieves	144
137	Winch incl. umbilical	19
138	Settling tube	40
139	Top for settling tube	40
140	Gyro	42
141	1 Rack spare parts	42

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PROFORMA INFORMATION FOR WATER SECTOR DEVELOPMENT

1. Name of the organization/establishment:

2. Address:

   Telephone:

3. Date of establishment:

4. Main Functional areas:

5. Budget

Year	Source of financing of the budget			
	Governemnt of Bangaldesh	Other sources (subsidy)	Income from outside contracts	Total budget
	Lakh Taka	Lakh Taka	Lakh Taka	Lakh Taka
1992				
1993				
1994				
1995				
1996				

6. Manpower

Categories/ Section	Education Level		Additional Training/ Experiences	Shortage/ Surplus
	Description	Number		
Administration				
Professional and Technical				
Others				
Total				

7. Jobs performed (volume of work i.e. turnover)/accomplished between 1992, 1996, (under what arrangement) self initiated or out side request.

Type of data collection	Source of data	Under water arrangement

8. Jobs at Hand

1)

2)

3)

4)

9. Who are User(s)/Customer(s) of the data/information with Name & Address, Telephone)

1)

2)

3)

4)

10. Current Facilities available for undertaking job assignments

1) Physical

2) Technical (Tools, equipment, Transport etc.)

3) Manpower

LIST OF DATA USERS

1. Asian Development Bank (ADB)
2. Bangladesh Inland Water Transport Corporation (BIWTC)
3. Bangladesh Inland Water Transport Authority (BIWTA)
4. Bangladesh University of Engineering and Technology (BUET)
5. Bangladesh Shipping Corporation (BSC)
6. Bangladesh Agriculture University (BAU)
7. Bangladesh Bureau of Statistics (BBS)
8. Bangladesh Power Development Board (BPDB)
9. Bangladesh Parjatan Corporation (BPC)
10. Bangladesh Fisheries Development Corporation (BFDC)
11. Bangladesh Agriculture Research Institute (BARI)
12. Bangladesh Association for the Advancement of Science (BAAS)
13. Bangladesh Water Development Board (BWDB)
14. Bangladesh Agriculture Development Corporation (BADC)
15. Bangladesh Chemical Industries Corporation (BCIC)
16. Bangladesh Institute of Development Studies (BIDS)
17. Bangladesh Rice Research Institute (BRRI)
18. Bangladesh Agriculture Research Council (BARC)
19. Bangladesh Meteorological Department (BMD)
20. Centre of Integrated Rural Development for Asian and the Pacific (CIRDAP)
21. Chittagong Municipal Corporation (CMC)
22. Chittagong Port Authority (CPA)
23. Chittagong WASA (CWASA)
24. Chittagong Dry Dock
25. Chittagong University (CU)
26. Civil Aviation Authority (CAA)
27. Department of Public Health Engineering (DPHE)
28. Department of Agriculture Extension (DAE)
29. Department of Environment (DOE)
30. Department of Forests (DOF)
31. Dhaka University (DU)
32. Dhaka WASA (DWASA)
33. Dhaka Municipal Corporation (DMC)
34. Directorate of Fisheries (DOF)
35. Directorate of Agriculture Marketing (DAM)
36. Flood Porgramme Co-ordination Organization (FPCO)
37. Flood & Agricultural Organization (FAO)
38. Geological Survey of Bangladesh (GSB)
39. Institute of Engineers Bangladesh (IEB)
40. Jamuna Multipurpose Bridge Authority (JMBA)
41. Jhangir Nagar University (JNU)
42. Joint River Commission (JRC)
43. Khulna Municipal Corporation (KMC)
44. Khulna Shipyard
45. Khulna (Mongla) Port Authority
46. Krishibid Institution
47. Local Govt. Engineering Bureau (LGEB)
48. Master Plan Organization (MPO)
49. Planning Commission (PC)
50. Public Works Department (PWD)
51. Railway Board (RB)
52. Rajshahi Municipal Corporation (RMC)
53. Rajshahi University (RU)
54. River Research Institute (RRI)
55. Roads & Highways Department (RHD)
56. Rural Electrification Board (REB)
57. Soil Resources Development Institute (SRDI)
58. Space Research and Remote Sensing Organization (SPARRSO)
59. Survey of Bangladesh (SOB)
60. UNICEP
61. United Nations Development Programme (UNDP)
62. World Bank Resident Mission (WBRM)

PROJECT FELLOWSHIPS AND TRAINING

The following project officers received training through the project's fellowships programme during LRP.

Mr. D.K. Barua,
Assistant Engineer, Survey and Study Division
Since 1985, local staff member
Attended the one year course in hydraulic engineering at the International Institute for Hydraulic and Environmental Engineering at Delft, 1981/1982. Worked since 1987 with assistance of the LRP intermittently in Bangladesh and the U.S.A on his Ph.D degree.

Mr. Harun-or-Rahsid,
Assistant Agricultural Officer, Pilot Polder Division
Attended the three months International Course on Land Drainage at Wageningen in 1982.

Mr. A.B.M Sjahjahan,
Agronomist, Land Reclamation Division
Attended the Cropping System Research Programme of the International Rice Research in the Phillipines from February till June 1985.

Mr. Md. Amanullah
Assistant Engineer, Survey and Study Division
Attended the one year course in hydraulic engineering at the International Institute for Hydraulic and Environmental Engineering at Delft, 1985/1986.

Mr. A.H.M Kausher,
Assistant Engineer, Office of the Superintending Engineer
Attended the one year course in hydraulic engineering at the International Institute for Hydraulic and Environmental Engineering at Delft, 1985/1986.

Mr. Md. Mahfuzur Rahman,
Assistant Engineer, Planning Cell
Attended the one year course in hydraulic engineering at the International Institute for Hydraulic and Environmental Engineering at Delft, 1987/1988. Thereafter continued his studies in the Netherlands for his M.Sc degree.

Mr. Muinur Rashid,
Sub-divisional Engineer, Planning Cell
Attended the one year course in hydraulic engineering at the International Institute for Hydraulic and Environmental Engineering at Delft, 1987/1988.

Mr. Md. Abul Quassem,
Executive Engineer, Planning Cell
Attended the seven months course on Rural Development Planning at the Institute of Social Studies at the Hague, 1987/1988.

Mr. Tapan Kumar Bepari
Sub-assistant Engineer, Survey and Study Division
Attended a six months course on Basic Electronics at the Vocational Training Institute in Chittagong, 1988. In 1889 he received further training for a period of three months at Delft Hydraulics in the Netherlands on operation, maintenance and small repairs of hydrographic survey equipments.

Mr. Md. Mosiuzaaman,
Junior River Surveyor, Survey and Study Division
Attended a six months course on Basic Electronics at the Vocational Training Institute in chittagong, 1988. In 1989 he received further training for a period of three months at Delft Hydraulics in the Netherlands on operation, maintenance and small repairs of hydrographic survey equipments.

Mr. R.C. Das,
Executive Engineer, Survey and Study Division
Attended the three months International Course on Land Drainage at Wageningen in 1988.

Mr. Md. Asaduzzaman,
Sub-Divisional Engineer, Planning Cell
Attended a fifteen months course on rural Development Planning at the Institute of Social Studies at the Hague, 1988/1989.

Mr. Khan Md. Mostafa Kamal,
Junior River Surveyor, Survey and study Division
Attended a six months course on Basic Electronics at the Vocational Training Institute in Chittagong, 1989. In 1991 he received further training for period of three months at Delft Hydraulics in the Netherlands on hydrographic surveying and on operation, maintenance and small repairs of hydrographic survey equipment.

Mr. P.C. Das,
Junior River Surveyor, Survey and Study Division
Attended a six months course on Basic Electronics at the Vocational Training Institute in Chittagong, 1989. In 1991 he received further training for period of three months at Delft Hydraulics in the Netherlands on hydrographic surveying and on operation, maintenance and small repairs of hydrographic survey equipment.

Mr. Ghulam Mohiuddin Ahmed,
Sub-Divisional Engineer, Planning Cell
Attended the one year course in hydraulic engineering at the International Institute for Hydraulic and Environmental Engineering at Delft, 1989/1991.

The following symposia, congresses, etc. were attended by project staff.

- National Symposium of River Basin Development, Dhaka, 1981
- Exhibition of the Bangladesh-Netherlands Cooperation Programme, Dhaka, 1982.
- National Symposium on the Bay of Bengal, Dhaka, 1982
- International Symposium on Polders of the World, Lelystad, the Netherlands, 1982
- The Asian Conference on Remote Sensing, Dhaka, 1982
- Coastal Engineering Conference Developing Countries, Bejing, 1987
- International Conference Coastal Engineering, Delft, the Netherlands, 1990.

Study Tours:

In 1988 LRP staff made a trip to Indonesia to visit the Rawa Sragi Project, a sister project of the LRP. In 1989 staff of the Indonesian project paid a return visit to the LRP. For June 1991, similar study tours are planned to Indonesia and Sri-Lanka for some LRP staff and representatives of the Ministry of Irrigation, Flood Control and Water Resources.