

**PROCEEDINGS OF THE
ORIENTATION SESSION
FOR
FOCAL POINTS ON ICZM**

Working Paper
WP024

October 2003

**Program Development Office
for
Integrated Coastal Zone Management Plan
(PDO-ICZMP)**

**PROCEEDINGS OF THE
ORIENTATION SESSION
FOR
FOCAL POINTS ON ICZM**

Working Paper
WP024

Saimon Centre, Road 22, House 4/A, 5th floor
Gulshan 1, Dhaka 1212
Tel & Fax: 8826614; Tel: 9892787; Email: pdo@iczmpbd.org
Web: www.iczmpbangladesh.org

Dhaka, October 2003

TABLE OF CONTENTS

TABLE OF CONTENTS.....	I
1. INTRODUCTION.....	1
2. INAUGURAL SESSION.....	1
3. FIRST WORKING SESSION.....	1
4. SECOND WORKING SESSION	3
ANNEX A: LIST OF FOCAL POINTS	7
ANNEX B: LIST OF PARTICIPANTS	11
ANNEX C: ORIENTATION SESSION FOR FOCAL POINTS OF ICZMP PROJECT	13
ANNEX D: PRESENTATION BY FOCAL POINTS.....	31
ANNEX E: FURTHER STEPS.....	103

1. INTRODUCTION

The Integrated Coastal Zone Management Plan (ICZMP) is a multi-sectoral, multi-agency initiative in which the MoWR is the lead Ministry and WARPO is the lead agency. Intensive interaction, networking and partnership building are important tasks to facilitate the ICZM process.

Focal Points are operational contact points in relation to ICZM activities. They are the experts having appropriate position in their parent departments/organizations and having an overview of objectives, authorities, role, duties and responsibilities of their own departments/organizations”.

A proposal for Focal Points was discussed and endorsed in the 4th inter-Ministerial TC meeting held on October 24, 2002 and subsequently incorporated in the revised TAPP. It has been proposed that each of the 34 departments/organizations, of which 20 are already represented in the TC, would nominate an expert as Focal Point for the PDO-ICZMP. The MoWR requested departments/organizations to send nominations vide a letter dated June 03, 2003. Accordingly nominations were received from most of the organizations. (List of Focal Points, Annex A).

In this backdrop, it was decided to organize an orientation session for the Focal Points with an objective to familiarize ICZM concept and process.

2. INAUGURAL SESSION

The orientation session for Focal Points was held at BRAC Center, Dhaka, on 15 September. WARPO organized the orientation program. Mr. Md. Sayef Uddin, Secretary, Ministry of Water Resources attended the inaugural session as the Chief Guest, while His Excellency J. IJzermans, Ambassador of the Netherlands in Bangladesh attended as the Special Guest. Mr. H.S.M. Faruque, Director General, WARPO, chaired the inaugural session. Mr. Dhali Abdul Qaium, Principal Scientific Officer, WARPO, delivered an address of welcome and briefly narrated the background of ICZMP at the outset.

3. FIRST WORKING SESSION

The inaugural session was followed by two working sessions. Mr. H.S.M. Farouque, Director General, WARPO moderated the first session. List of the 35 participants from Focal Points (Government departments/agencies, universities and research institutes), WARPO officials and PDO consultants is shown in Annex B. There were two presentations in this session, one by Mr. Rob Koudstaal, Technical Adviser, PDO-ICZMP, on “ICZM concept and methodology” and another by Dr. M. Rafiqul Islam, Team Leader, PDO-ICZMP, on “ICZM and role of focal points” (Annex C). These two presentations were followed by an open discussion by the Focal Points. Discussions are summarized below.

Mr. Shahidul Azam, Bangladesh Rural Development Board (BRDB)

- Coastal zone lacks easy and fast transport facilities.

Mr. Saeedur Rahman, Bangladesh Water Development Board (BWDB)

- The ICZM process has so far been developed in isolation. A proper institutional setting is required.
- A firm political commitment is needed for its continuity.
- Focal Points may face administrative problems to liaison with field level staff.

Lt. Col. Mahmudunnabi, Survey of Bangladesh (SoB)

- The threat of “Sea Level Rise” should be considered along with three other criterion of the delineation of the coastal zone.
- Focal Points need some authority to perform their duties and responsibilities.

Ms. Zakia Yasmin Zoardar, Department of Women Affairs (DWA)

- Ministry of Women and Children Affairs/Department of Women Affairs should be included in the Steering Committee/Technical Committee.

Mr. Ziaul Haque Howlader, Bangladesh Parjatan Corporation (BPC)

- We need to know the criteria for the priority investment program (PIP).

Mr. Sultan Ahmed, Centre for Environmental GIS (CEGIS)

- The name of the project is the Integrated Coastal Zone Management Plan. But the ‘plan’ is absent in the list of ‘outputs’ of the PDO.
- Rules/regulations for managing the coastal zone should be mentioned. It is necessary to enact rules.
- The present ICZMP structure is for the project period. It is necessary to decide institutional setting for the post-project period. A Coastal Division within WARPO could be a possibility

Dr. Md. Giasuddin Khan, Department of Fisheries (DoF)

- It is necessary to ensure optimum utilization of coastal resources.
- There should be coordination of activities.
- Participation at the community level is important.
- Local level communities should participate in the policy process.

Mr. Md. Osman Ghani, Forest Department (FD)

- Many initiatives have so far been taken for the coastal areas. But the poverty has not reduced substantially.
- Each Department has its own issues and priorities.
- It has been stated that no new authority will be created for the coastal zone. Is it a pre-condition for the ICZMP process?

Ms. Nasreen Mohol, Institute of Water Modelling (IWM)

- Three physical processes (criteria) for delineation of the coastal zone have been considered. Has there been any analysis?

Mr. Md. Abdul Matin Mondol, Bangladesh Inland Water Transport Authority (BIWTA)

- It is necessary to know baseline data for coastal zone delineation.

Mr. Md. Nurul Islam, Local Government Engineering Department (LGED)

- There should be some criteria for selecting 5 GoB experts.

The moderator and the presenters responded to comments and questions. Responses on authority of Focal Points, ICZM process and PIP are summarized below.

- Liaison with field level officials in respective Departments is important. Focal Points are to use their own institutional structure. As they are designated Focal Points by the chief of respective Departments, it is more convenient for them to liaison with their departmental staff.
- There is intention and willingness. A process has started to stimulate the ICZM concept. It is a slow and long process. Now it is time for broadening the audience. The establishment of Focal Points is a positive step towards this.
- The criteria for PIP are being developed. This will be done together with GoB Departments.

4. SECOND WORKING SESSION

Dr. M. Rafiqul Islam, Team Leader, PDO-ICZMP moderated the second working session. Brief presentations were made by each Focal Point on respective activities in the coastal zone (those who submitted written inputs have been attached in Annex D). The session was rounded up by a synthesis presented by the moderator (Annex E) with special reference to immediate tasks of the Focal points. These are:

- ◇ Review and update of the first version of the PDO document “Coastal Zone Profile” by November 2003; and
- ◇ Organizing orientation session on ICZM in respective departments/organizations by January 2004.

Mr. Dhali Abdul Qaium, PSO, WARPO concluded the orientation session with a vote of thanks.



ANNEX A: LIST OF FOCAL POINTS

The MoWR, vide letter dated June, 2003, has requested 34 different agencies to nominate focal points, Till August 23, 2003, the following organizations have nominated Focal Points.

Sl.	Organizations	Name & Designation
1.	Ministry of Water Resources*	Attn. Mr. Talat Mahmud Khan, Sr. Assistant Secretary Bangladesh Secretariat, Dhaka
2.	Planning Commission*	
3.	Bangladesh Parjatan Corporation*	Mr. Shahabullah Director (Planning) Bangladesh Parjatan Corporation 233 Airport Road, Tejgaon, Dhaka-1215. Tel.: 8118658, 8117855-9 Fax: 8117235, 8126501 E-mail: bpcho@bangla.net Web: www.bangladeshtourism.org
4.	Bangladesh Water Development Board*	Mr. Md. Saeedur Rahman Chief Engineer/Project Director, Coastal Embankment Rehabilitation Project, Bangladesh Water Development Board, 54, Elite House, Motijheel C/A, Dhaka Telefax: 9565420 E-mail: cerp@dotbd.com
5.	Department of Public Health Engineering*	Mr. Md. Abdul Bari Project Director Coastal Area Rural Water Supply & Sanitation Project (GoB- Danida) Department of Public Health Engineering, Kakrail, Dhaka Tel.: 9334153
6.	Local Government Engineering Department*	Mr. Md. Nurul Islam Superintending Engineer (IWRM) Local Government Engineering Department (LGED) Agargaon, Shere Bangla Nagar, Dhaka 1207 Tel.: 9127411 E-mail: nislam@lged.org
7.	Department of Livestock Services*	Mr. Md. Khaza Nazim Uddin, Livestock Economist, Department of Livestock Services Krishi Khamar Sarak, Farm Gate, Dhaka Tel.: 9118312
8.	Department of Fisheries*	Dr. Md. Giasuddin Khan Chief Fisheries Extension Officer Department of Fisheries Matshya Bhaban, Kakrail, Dhaka Tel.: 9561592 E-mail: estuary@dhaka.net
9.	Directorate of Land Records & Surveys*	
10.	Department of Environment*	Mr. Md. Abdus Sobhan Director,

Sl.	Organizations	Name & Designation
		Administration, Development and Planning Department of Environment Paribesh Bhaban, Plot-E16, Agargaon, Shere Bangla Nagar, Dhaka
11.	Water Resources Planning Organisation*	Mr. Dhali Abdul Qaium PSO In-charge Engineering, Water Resources Planning Organisation, House 103, Road 1, Banani, Dhaka Tel.: 8814554, 8814556 E-mail: warpo@citechco.net Web: www.warpo.org
12.	Disaster Management Bureau*	
13.	Department of Agricultural Extension*	Mr. Kazi Mozammel Haque Deputy Director, Water Management & Agri. Engineering Wing, Department of Agricultural Extension Khamarbari, Dhaka Tel.: 9124778
14.	Department of Forests*	Mr. Md. Osman Ghani, Deputy Chief Conservator of Forests Social Forestry Wing, Ban Bhaban, Mahakhali, Dhaka Tel.: 9884963 (Off); 8923077 (Res) E-mail: osmang53@bttb.net.bd
15.	Bangladesh Shipping Corporation*	Captain ASM Fateh Lohani, Executive Director (Technical), Bangladesh Shipping Corporation, BSC Bhavan, Saltgola Road, Chittagong 4100 Tel.: 031-710484 Fax: 031-710506 E-mail: bc-ctg@spnetctg.com
16.	Bangladesh Agricultural Research Council*	Dr. Shaikh Gulam Hussain, Chief Scientific Officer (Forest), Bangladesh Agricultural Research Council, New Airport Road, Farmgate, Dhaka 1215 Tel.: 9132414
17.	Bangladesh University of Engineering & Technology*	Prof Dr. Md. Hossain Ali, Civil Engineering Department, Bangladesh University of Engineering & Technology, Dhaka 1000 Tel.: 9665650-80 Fax: 8613046 / 8613026 E-mail: estb@regtr.buet.edu
18.	Dhaka University*	
19.	Bangladesh Agricultural University*	
20.	Bangladesh Navy*	
21.	Bangladesh Inland Water Transport Authority	Mr. Md. Abdul Matin Mondol, Director, Hydrography Department, Bangladesh Inland Water Transport Authority, BIWTA Bhaban, 141-143 Motijheel C/A, Dhaka

Sl.	Organizations	Name & Designation
		Tel.: 9553552 (Direct) PABX: 9556151-55 / 9555042 Ext. 1224 E-mail: biwta@btbb.net.bd
22.	Bangladesh Meteorological Department (BMD)	Mr. Samarendra Karmaker, Deputy Director, Cyclone Warning Centre, Bangladesh Meteorological Department (BMD), Agargaon, Dhaka 1207 Tel.: 9114388 (Direct); 9135742 (Duty forecasting) Fax: 818230 E-mail: bmdswc@bdonline.com
23.	Bangladesh Rural Development Board (BRDB)	Mr. Shahidul Azam, Project Director, Rural Livelihood Project, Bangladesh Rural Development Board (BRDB), Palli Bhaban, 5 Kaoran Bazar, Dhaka Tel.: 8117915
24.	Department of Women & Children Affairs	Mrs. Zakia Yasmin Zoarder, Deputy Director (Planning & Evaluation), Department of Women Affairs, 37/3, Eskaton Garden Road, Dhaka Tel.: 9347594 E-mail: yasmin018@hotmail.com
25.	Bangladesh Bureau of Statistics (BBS)	Md. Nowsher Alam Project Director Bangladesh Bureau of Statistics (BBS) Agargaon, Shere Bangla Nagar, Dhaka Tel: 913 7338
26.	SPARSSO	Dr. Abdus Shahid, PSO, SPARSSO, Agargaon, Shere Bangla Nagar, Dhaka Tel.: 9121541, 9141625 Fax: 8113080 E-mail: sparrso@bangla.net; shahid@sparrso.org
27.	Institute of Water Modelling (IWM)	Mr. Jahirul Haque Khan, Senior Specialist, Coast, Port & Estuary Management Division, IWM, House 476, Road 32, New DOHS, Mohakhali, Dhaka Tel.: 8822105, 8824590-1 Fax: 8827901 E-mail: iwm@iwmbd.org Web: www.iwmbd.org
28.	Centre for Environmental and Geographic Information Services (CEGIS)	Mr. Sultan Ahmed, Program Manager, Liaison, CEGIS, Banani, Dhaka Tel.: 8821570-2, 8817648-52

Sl.	Organizations	Name & Designation
29.	Survey of Bangladesh	Lt. Colonel Mahmudunnabi Director, Defense Survey Survey of Bangladesh No. 2 Party, Tejgaon, Dhaka Tel.: 9127716 Fax: 9117463 E-mail: jenikabeb@hotmail.com
30.	Coast Guard	Lt. Commander M.R. Rahman (Ex), BN Assistant Director (Operations) Head Office, Bangladesh Coast Guard Road 09, House 511 DOHS, Baridhara, Dhaka -1206 Tel.: 9884958, 9881910 Fax: 9883424
31.	Chittagong University	Prof Dr. Nuruddin Mahmud, Institute of Marine Science, Chittagong University, Chittagong Tel.: 726311-14, 716552 E-mail: nuruddin@alnetbd.com
32.	Khulna University	Prof. Dr. Khairul Azam, Dean, Bio Science School, Khulna University, Khulna Tel.: 720663, 721791 Fax: 041-731244 E-mail: ku@bdonline.com
33.	Chittagong Port Authority	Dr. Safayat Hossain Khan, Chief Engineer, Chittagong Port Authority, Bandar Bhaban, Chittagong - 4100 Tel.: 031-712516; PABX: 812200-34, Ext. 2212 E-mail: cecpa@globalctg.net ; nadeem@globalctg.net
34.	Mongla Port Authority	Mrs. Salma Akhter, Deputy Chief Engineer (Civil), Mongla Port Authority, Mongla, Bagerhat Tel.: 0468-75244, 75355; (M) 0171-344181 Fax: 041-762331 E-mail: mpa@bttb.net.bd
35.	River Research Institute (RRI)	Md. Nazrul Islam Siddique Chief Scientific Officer (A.C.) Hydraulic Structure and Irrigation Division Hydraulic Research Directorate River Research Institute (RRI), Faridpur Tel.: Off.: 63524 (Off); 63580-268 (Res) PABX: 63580/63488-251 Fax : 63065 E-mail: rri@bttb.net.bd

* Also represented in the Inter-Ministerial Technical Committee

ANNEX B: LIST OF PARTICIPANTS

Sl.	Name	Designation	Organisation	Tel. & E-mail
1.	Mr. Md. Sayef Uddin	Secretary	MoWR	
2.	Mr. Ehsan Shamim, ndc	Additional Secretary	MoWR	
3.	Mr. M.M Abdul Mannan	Deputy Secretary	MoWR	
4.	Mr. H.S.M Faruque	Director General	WARPO	9880879; warpo@citechco.net
5.	Mr. Dhali Abdul Qaium	Principal Scientific Officer (PSO)	WARPO	warpo@citechco.net
6.	Mr. Ziaul Haque Howlader	Executive Officer (Planning)	Bangladesh Parjatan Corporation	xs4allzhh@yahoo.com
7.	Mr. Md. Saeedur Rahman	Chief Engineer/Project Director	CERP, BWDB	9565420; cerp@dotbd.com
8.	Mr. Md. Abdul Bari	Project Director	GoB-Danida Water Supply & Sanitation Components	9334153
9.	Mr. Md. Nurul Islam	Superintending Engineer (IWRM)	LGED	9127411; nislam@lged.org
10.	Dr. Md. Giasuddin Khan	Chief Fisheries Extension Officer	Department of Fisheries	9561592; estuary@dhaka.net
11.	Mr. Kazi Mozammel Haque	Deputy Director	DAE	9124778
12.	Mr. Md. Osman Ghani	Deputy Chief Conservator of Forest	DoF	9884963; osmang53@bttb.net.bd
13.	Md. Nowsher Alam	Project Director	BBS	9137338
14.	Dr. Shaikh Gulam Hussain	Chief Scientific Officer (Forest)	BARC	9132414
15.	Mr. Md. Abdul Matin Mondol	Director, Hydrography	BIWTA	biwta@bttb.net.bd
16.	Mr. Samarendra Karmaker	Deputy Director, Cyclone Warning Centre	BMD	bmdswc@bdonline.com
17.	Mr. Shahidul Azam	Project Director	BRDB	
18.	Mrs. Zakia Yasmin Zoarder	Deputy Director, Planning & Evaluation	DWA	yasmin018@hotmail.com
19.	Dr. Abdus Shahid	Principal Scientific Officer (PSO)	SPARSSO	shahid@sparrso.org; sparrso@bangla.net
20.	Ms. Nasreen Mohal	Senior Specialist, Coast, Port & Estuary Management Division	IWM	0172-197279
21.	Mr. Sultan Ahmed	Program Manager (Liaison)	CEGIS	suahmed@cegisbd.com; subul2002@yahoo.com
22.	Lt. Colonel Mahmudunnabi	Director, Defense Survey	Survey of Bangladesh (SOB)	jenikabeb@hotmail.com
23.	Lt. Commander M.R. Rahman (Ex), BN	Assistant Director (Operations)		
24.	Prof. Dr. Nuruddin Mahmud	Professor, Institute of Marine Science,	Chittagong University	nuruddin@abnetbd.com
25.	Dr. Safayat Hossain Khan	Chief Engineer	Chittagong Port Authority	cecpa@globalctg.net; nadeem@globalctg.net
26.	Mrs. Salma Akhter	Deputy Chief Engineer (C.),	Mongla Port Authority	

Sl.	Name	Designation	Organisation	Tel. & E-mail
27.	Mr. Jahirul Islam	Lt. Commander BN	Coast Guard HQ	9881910
28.	Mr. Nazrul Islam Siddique	Chief Scientific Officer (A.C)	River Research Institute (RRI)	63524; rri@bttb.net.bd;
29.	Md. Noorul Islam Mia	Livestock Statistical Officer	Department of Livestock Services	9110115
30.	Dr. Rafiqul Islam	Team Leader	PDO-ICZMP	rafiq@iczmpbd.org
31.	Mr. Rob Koudstaal	Technical Adviser	PDO-ICZMP	rob@iczmpbd.org
32.	Mr. Mohiuddin Ahmed	Senior National Expert	PDO-ICZMP	mohiuddin@iczmpbd.org
33.	Mr. Md. Syed Iftekhar	Research Officer	PDO-ICZMP	iftekhar@iczmpbd.org
34.	Mr. Atiqur Rahman	Research Officer	PDO-ICZMP	atiq@iczmpbd.org
35.	Ms. Afsana Yasmeen	Research Officer	PDO-ICZMP	afsana@iczmpbd.org

ANNEX C: ORIENTATION SESSION FOR FOCAL POINTS OF ICZMP PROJECT

ANNEX D: PRESENTATION BY FOCAL POINTS

Activities of National Agricultural Research System

Sk. Ghulam Hussain, PhD

Chief Scientific Officer, Forest Division, Bangladesh Agricultural Research Council, New Airport Road, Dhaka 1215.

Email: sghussain@barcbgd.org

National Agricultural Research System

The National Agricultural Research System (NARS) is composed of Bangladesh Agricultural Research Council (BARC) and ten national agricultural research institutes (ARIs). Bangladesh Agricultural Research Council has responsibility of strengthening the national agricultural research capability through research planning, coordination, integration and resource allocation as the apex body of the NARS. The Ministry of Agriculture controls six out of ten research institutes and the remaining four by other ministries. The Organogram of NARS is presented in Figure 1.

Bangladesh Agricultural Research Institute (BARI), which is the largest of all the ARIs conducts research to ensure sustainable and increased production of non-rice cereals, oilseeds, pulses, fruits, vegetables, tubers, spices and condiments, and flowers, through scientific management of land, water, fertilizers, pests and diseases. Development of crop varieties resistant to biotic and abiotic stresses; improve farming systems to optimize production; develop tools and machinery to improve labour productivity; train research and extension personnel in improved crop production technologies.

Bangladesh Rice Research Institute (BRRI) conducts research on all aspects of rice in order to develop modern varieties of rice with high yield potential for different ecosystems, develop component technologies for improving productivity of rice-based cropping systems, transfer rice production technologies through training, workshop, seminar, and publication. Research on development of varieties and production technologies is conducted at the BRRI headquarters at Joydebpur and at nine regional stations

Bangladesh Jute Research Institute (BJRI) conducts agricultural, technological research on jute and allied fibres. The objectives are to develop short duration high yielding varieties of jute, kenaf and mesta; develop agronomic and crop protection technologies and processes and equipment for manufacturing new jute products and organize the production, testing and supply of improved pedigree jute seeds and multiplication, procurement and their distribution to various organizations and selected growers.

Bangladesh Sugarcane Research Institute (BSRI) conducts research to develop high yielding, high sugar, and disease and pest resistant sugarcane varieties. Its functions are to develop and maintain a germplasm bank through collection of sugarcane varieties; prepare production programmes of sugar, gur and syrup producing carbohydrate enriched crops/plants; conduct research on sugarcane based farming and to identify its economic advantages; and take measures for utilization of technologies regarding sugar, gur and syrup producing crops/plants.

Soil Resource Development Institute (SRDI) has the mandate for inventorying soil and land resources and investigating soil-related problems for agricultural research and development. The functions of SRDI include reconnaissance soil survey of the whole country on the basis of aerial photo interpretation and field and laboratory investigation of soils; detailed and semi-detailed soil surveys of development project areas and research farms for various beneficiary agencies; soil surveys for locating areas of problem soils; soil moisture characterization of soil tracts of the country; and preparation of various maps and reports based on the surveys.

Bangladesh Fisheries Research Institute (BFRI) conducts research to enhance the growth of fisheries production through optimal utilization of inland, brackish and marine waterbodies and to develop scientific policies relating to development of technology and management of fish culture and fish capture. The Institute has four research stations namely, the Freshwater Station at Mymensingh, Riverine Station at Chandpur, Brackish water Station at Paikgacha, Khulna and Marine and Fisheries Technology Station at Cox's Bazar.

Bangladesh Livestock Research Institute (BLRI) conducts research to a) solve basic problems affecting livestock and poultry production both at the national and farm level, b) develop techniques and knowledge pertinent to livestock and poultry production, c) strengthen research-extension-NGO linkage and expedite quick dissemination of the locally developed and introduced techniques to the end users, and d) assist Government and all concerned in policy decisions related to livestock and poultry research and development. The institute has two sub-stations, one at Naikhanghari, Bandarban and other at Baghabari, Sirajganj.

Bangladesh Forest Research Institute (BFRI) conducts research to develop management practices to increase productivity of national forests and village groves and to convert wastelands and marginal lands to forestry and agroforestry uses; develop technologies for rational utilization of forest products; generate technologies to conserve or restore environment balances through increases stocking densities of both rural and urban forests; transfer technology through extension services and other agencies to end-users.

BFRI has 22 research stations and sub-stations under five field divisions covering different forest types that spread over eight dendro-ecological regions. All divisions of the Institute except the divisional offices of Plantation Trial Unit and Mangrove Stations are located at headquarters. The two exceptions are at Barisal and Khulna.

Bangladesh Tea Research Institute (BTRI) conducts research to increase yields and quality of tea by developing improved production technologies and high yielding tea clones. The Institute has three sub-stations - one at Kaliti, Moulvibazar, one in Sylhet town and one at Fatikchheri, Chittagong.

Agricultural Research Facilities of NARS Institutes in the Coastal Region of Bangladesh are presented in Table 1 and Figure 2.

Major Coastal Region Related Activities of NARS

Most of the NARS institutes have programmes to address the special problems related to the coastal ecosystem.

1. Based on the research findings and expert consultation a monograph entitled "Salinity Problems and Crop Intensification in the Coastal Regions of Bangladesh" was published by BARC in 1990. Suggested the Potential cropping patterns for different land types and varied soil salinity levels (Table 2.)
2. The Bangladesh Agricultural Research Council has submitted **A Task Force Report on Agricultural Research and Development Plan for the Coastal Region of Bangladesh** to the Ministry of Agriculture in 1998.
3. Soil Resource Development Institute has completed semi-detailed survey of all the coastal Upazilas of Bangladesh and published Upazila Nirdeshika (Upazila Landuse Guide) for most of the Upazilas and the rest are in the process. These guides are useful in making local level planning.

4. Soil Resource Development Institute has prepared a Soil Salinity map in 1998.
5. The Bangladesh Agricultural Research Institute has programmes for Salinity management: Currently two projects are being implemented.

Project title: Development of integrated salinity management techniques for the coastal ecosystem of Bangladesh.

Expected Output: Salinity management strategies will be identified and the possibility of increasing cropping intensity will be increased. As a result farmers can increase their income and livelihoods to some extent.

Project title: Economic study on pulse based cropping patterns in south-western region of Bangladesh.

Expected Output: Suitable cropping pattern (s) will be identified. Therefore, more land will come under pulse cultivation and the quality of soil will be increased.

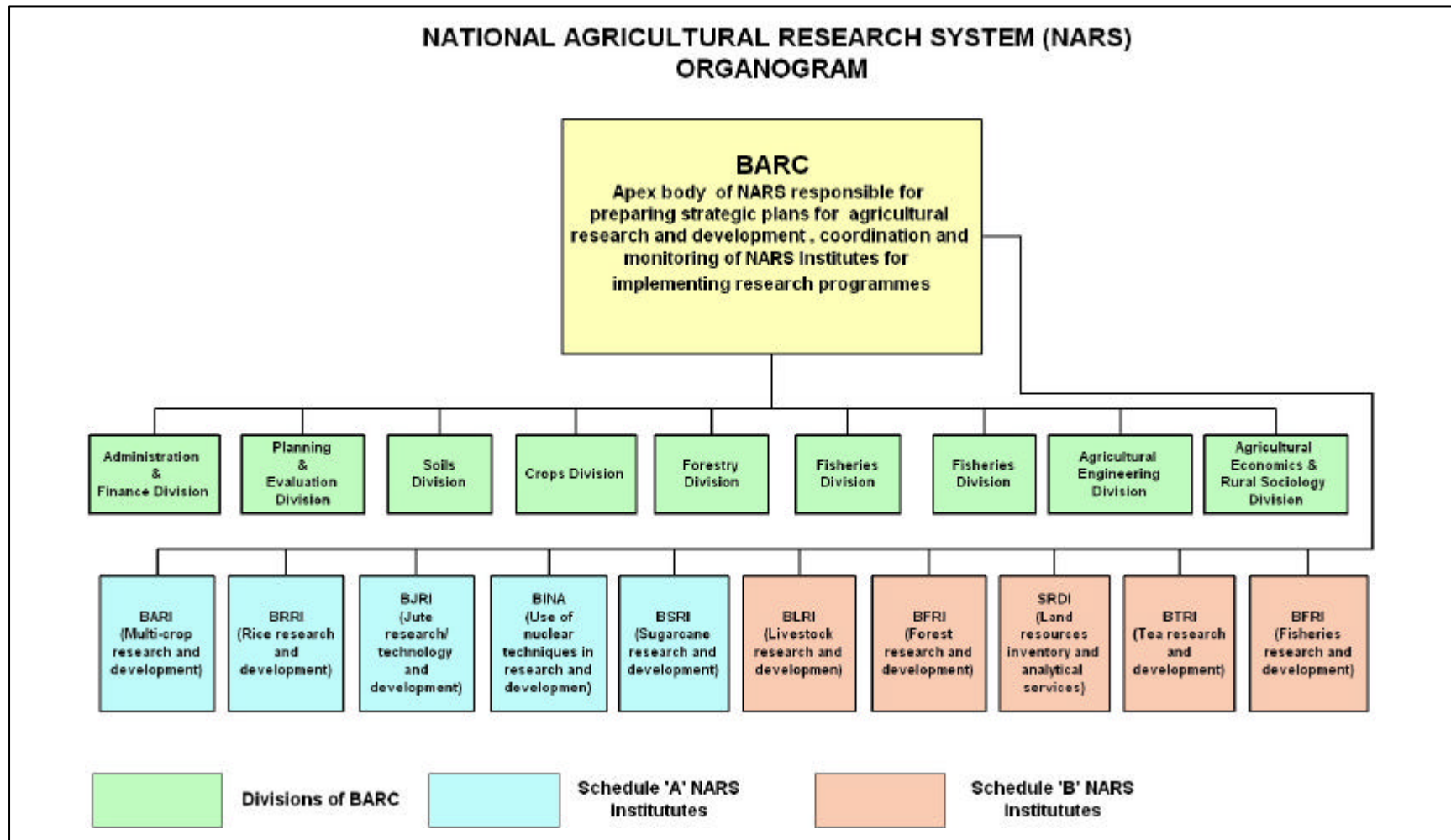


Figure 1. Simplified Organogram of NARS

Table 1. NARS Agricultural Research Facilities in the Coastal Region of Bangladesh

Institute Name	Station Type	District	Upazila
BARI	Regional Research Station	Chittagong	Hathazari
BARI	OFRD Research Station	Chittagong	Hathazari
BARI	Regional Research Station	Jessore	Jessore Sadar
BARI	Regional Research Station	Barisal	Barisal Sadar
BARI	OFRD Research Station	Khulna	Daulatpur
BARI	OFRD Research Station	Patuakhali	Patuakhali Sadar
BARI	OFRD Research Station	Noakhali	Noakhali Sadar
BARI	OFRD Research Station	Jessore	Jessore Sadar
BARI	Research Sub-Station	Chittagong	Chittagong Sadar
BARI	OFRD Research Station	Barisal	Barisal Sadar
BFRI	Research Station	Chittagong	Mirsharai
BFRI	Research Station	Chittagong	Sitakunda
BFRI	Sub-Station	Chittagong	Hathazari
BFRI	Research Station	Chittagong	Satkania
BFRI	Research Station	Cox's Bazar	Chokoria
BFRI	Research Station	Cox's Bazar	Ukhia
BFRI	Research Station	Khulna	Khulna Sadar
BFRI	Head Quarter	Chittagong	Chittagong City
BFRI	Sub-Station	Satkhira	Shyamnagar
BFRI	Research Station	Bagerhat	Sarankhola
BFRI	Sub-Station	Cox's Bazar	Cox's Bazar Sadar
BFRI	Sub-Station	Chittagong	Fatikhari
BFRI	Research Station	Chittagong	Rangunia
BFRI	Research Station	Chittagong	Fatikhari
BFRI	Research Station	Barisal	Barisal Sadar
BFRI	Sub-Station	Bhola	Char Fasson
BFRI	Sub-Station	Patuakhali	Galachipa
BFRI	Sub-Station	Noakhali	Noakhali Sadar
BINA	Research Sub-Station	Satkhira	Satkhira Sadar
BJRI	Research Sub-Station	Jessore	Monirampur
BJRI	Research Sub-Station	Patuakhali	Kalapara
BLRI	Sub-Station	Feni	Sonagazi
BRI	Regional Research Station	Feni	Sonagazi
BRI	Regional Research Station	Satkhira	Satkhira Sadar
BRI	Regional Research Station	Barisal	Barisal Sadar
BSRI	Sub-Station	Barisal	Barisal Sadar
BTRI	Research Sub-Station	Chittagong	Fatikhari
FRI	Marine Fisheries Technology Regional Station	Cox's Bazar	Cox's Bazar
FRI	Riverine Regional Station	Chandpur	Chandpur
FRI	Brackish Water Fish Regional Station	Khulna	Paikgacha
FRI	Research Sub-Station	Jessore	Jessore Sadar
SRDI	Sub-Station	Noakhali	Noakhali Sadar
SRDI	Sub-Station	Chittagong	Chittagong Sadar
SRDI	Sub-Station	Jessore	Jessore Sadar
SRDI	Sub-Station	Khulna	Khulna Sadar
SRDI	Sub-Station (Salinity Research Station)	Khulna	Batiaghata
SRDI	Regional Station	Khulna	Khulna Sadar
SRDI	Regional Laboratory	Khulna	Daulatpur
SRDI	Sub-Station	Barisal	Barisal Sadar
SRDI	Sub-Station	Patuakhali	Patuakhali Sadar

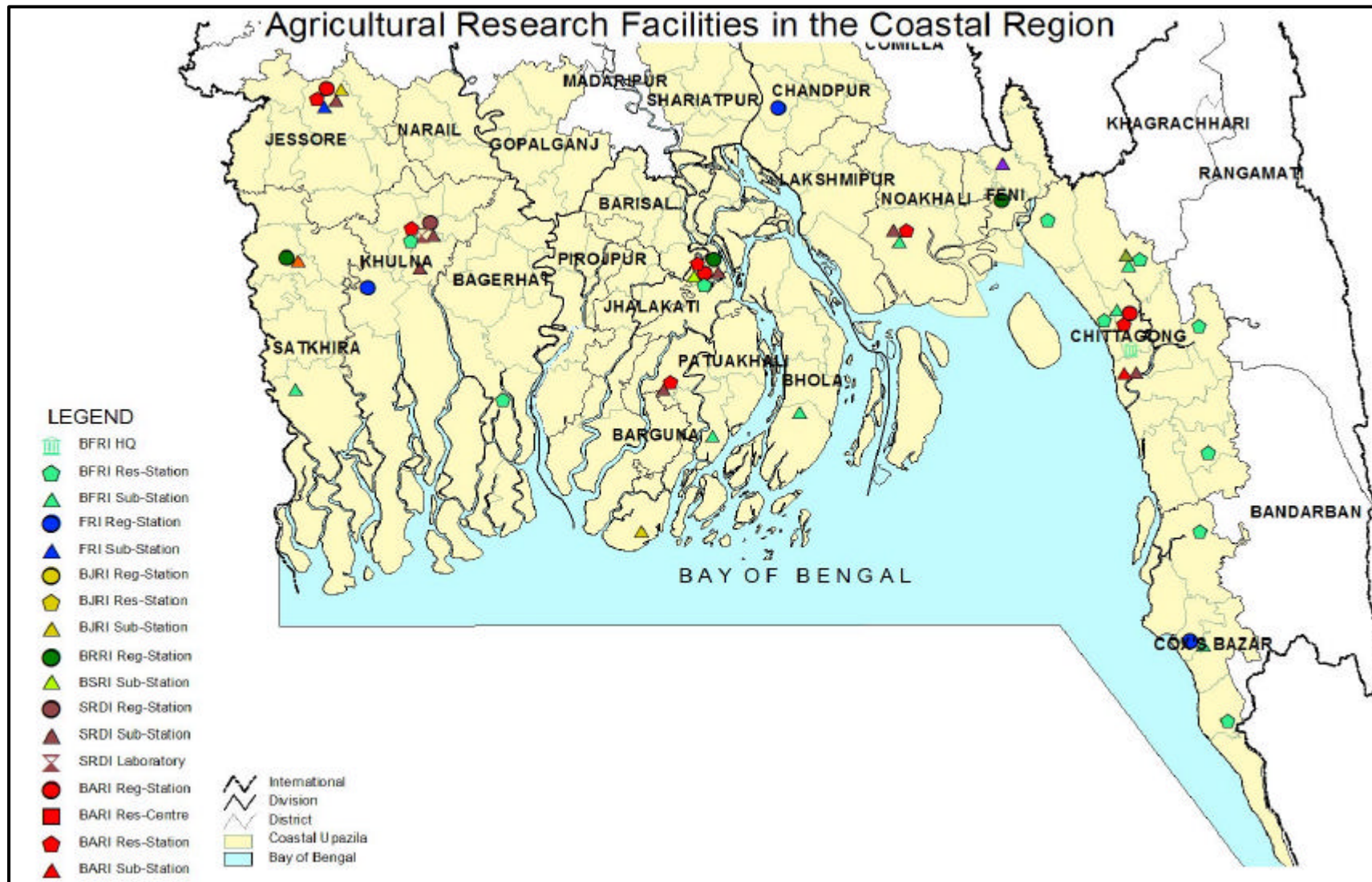


Figure 2. NARS Agricultural Research Facilities in the Coastal Region of Bangladesh

Table 2. Potential cropping patterns for different land types and varied soil salinity levels

Salinity	Highland			Medium Highland			Medium Lowland		
Category	Kharif-I	Kharif-II	Rabi	Kharif-I	Kharif-II	Rabi	Kharif-I	Kharif-II	Rabi
S ₁ (2-4 ds/m ⁻¹)	B. aus Chilli Groundnut	L.T.Aman HYV aman	Pulses Onion Watermelon Wheat Chilli Mustard Potato	B.Aus	L.T.Aman HYV aman	Pulses Mustard Chilli Vegetable Wheat Potato Cowpea Watermelon Sunflower	B. aus	B.Aman L.T.aman	HYV boro Mustard Pulses Wheat Potato Sweet Potato
S ₂ (4-8 ds/m ⁻¹)	B. aus Chilli B. aus Chilli Cucumber	L.T.aman	Soybean Groundnut Cowpea Spinach Chilli Mustard Potato	B.Aus	L.T.aman HYV aman	Mustard Sesbania Cowpea Soybean Chiili Grountnut Wheat HYV Boro Potato Sweet potato Sunflower	B. aus	B.aman L.T.aman	Soyean Mustard Wheat Spinach Potato Sweet Potato
S ₃ (8-16 ds/m ⁻¹)	Bermuda Grass Cucumber Cotton Sorghum		Wheat Barley Cucumber Cotton	Sesbania Sorghum	L.T.aman	Cabbage Barley Cotton Wheat Sorghum	Sesbania	L.T.aman	Barley Cotton Wheat
S ₄ (16- ds/m ⁻¹)	Cotton Bermuda Grass <i>Leplochia fusca</i>	Cotton Barley		Cotton	Cotton	Cotton	Cotton		Cotton

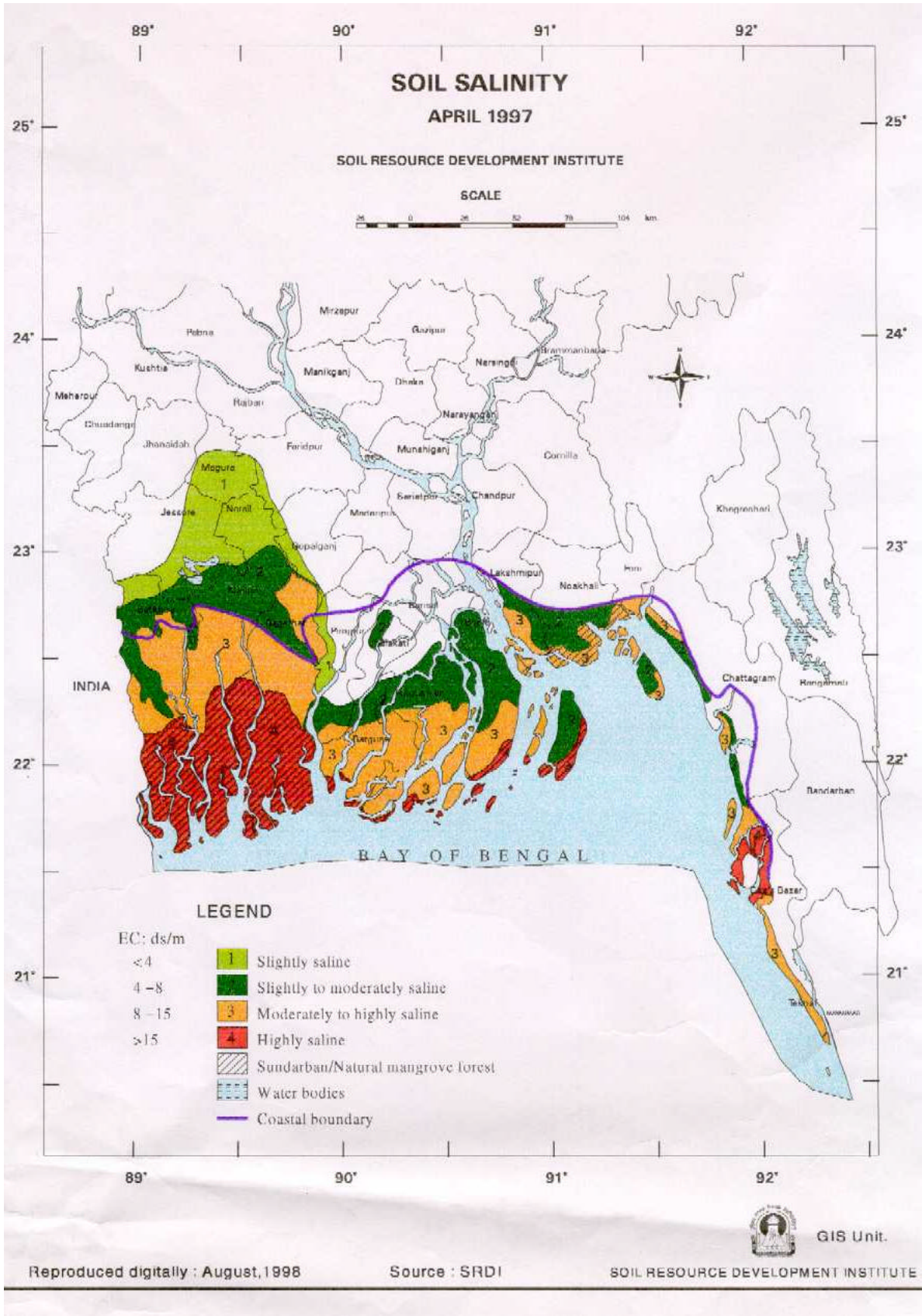


Figure 3. Soil Salinity Map

Glimpses on Bangladesh Rural Development Board (BRDB)

Bangladesh Rural Development Board (BRDB) is the largest public sector organization working in the vital and priority Sector of rural development vis-a-vis poverty alleviation. The activities of BRDB are spread over the whole rural areas of the country covering 458 Upazilas. At the take off and early stage of its functioning, BRDB had the thrust to augment agricultural productivity through organizing farmers into two-tier cooperatives (of Comilla model) and assisting them with training & credit facilities. The intervention of BRDB produced tangible result in introducing high-yielding varieties of crops including rice, use of fertilizer, increasing irrigated agriculture etc. & thereby brought about increased production of food.

However, from mid- 70 BRDB gradually expanded its focus on poverty alleviation with special emphasis on the ever increasing landlessness and disadvantaged rural women folk. The following specific objectives are pursued by BRDB:

- i. To contribute to the agricultural productivity through organizing farmers into cooperatives & providing them training & credit support
- ii. To undertake Project/program aiming to contribute to the Govt's effort to alleviate/reduce poverty
- iii. To organize rural women (especially poor ones) into cooperatives/Informal groups in under to develop their socio- economic conditions and empowering them towards sustainable development
- iv. To pilot and implement various development models and approaches in the field of poverty alleviation and rural development

Mentionably, BRDB has implemented a number of area development and poverty alleviation Projects throughout the country alongside its regular program of agriculture cooperatives. At present, it is implementing the following large-scale projects related to poverty alleviation and Women's empowerment:

- i. Rural Livelihood Project in 152 Upazilas
- ii. Rural Poverty alleviation Project in 123 Upazilas
- iii. Integrated women's Program in 150 Upazilas
- iv. Women's Self-employment Project in 349 Upazilas
- v. Rural Development -5 Project in 27 Upazilas

The progress of BRDB activities are presented below in a not-shell:

Adoption of Upazilas	:	458
Formation of UCCA	:	449
Formation of UBCCA	:	169
Formation of UBCCA (female)	:	<u>22</u>
Total:		1098

<u>Societies/groups(No)</u>	<u>No. of members</u>	
KSS -	60,651	21,95,911
MSS -	7,812	2,53,915
MBSS -	17,471	4,18,631
BSS -	8,441	2,46,291
Informal group (male) -	8,277	1,90,575
<u>(Informal group (female)-</u>	<u>14,011</u>	<u>3,16,845</u>
Total:	1,16,573	37,22,168

Capital formation : Tk. 22,134.37 Lakh

Loan disbursement : Tk. 2,47,187.14 Lakh

Training of beneficiaries (No):

i) Skill training	:	457,072
ii) Heath, Nutrition	:	3,03,077
iii) Family Planning	:	2,47,411
iv) Human Development	:	5,51,409

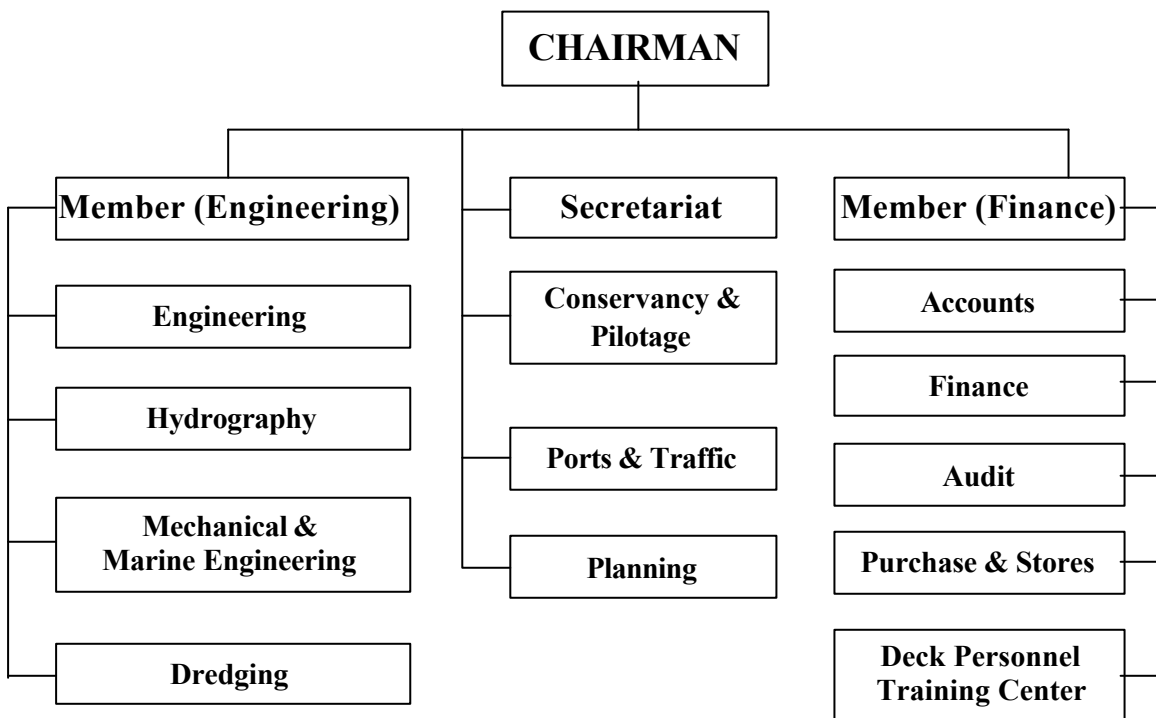
BRDB has been working in the vital sector of rural development and presently pursuing its focus on poverty alleviation in conformity with the Govt's policy and Country strategy. Its contribution towards employment generation, livelihood enhancement and women's empowerment is modest and it is hoped that BRDB will continue to make much headway in the pursuit of its mission to accelerate the tasks of poverty alleviation and rural upliftment.

Md. Abdul Matin Mondal
 Director Hydrography
 BIWTA

In brief functions of Bangladesh Inland Water Transport Authority (BIWTA) and Activities in the Coastal Area of Bangladesh.

1.0 The Bangladesh Inland Water Transport Authority (BIWTA) was established in 1958 under an ordinance “The East Pakistan Inland Water Transport Authority Ordinance, 1958 (E.P Ordinance No. LXXV of 1958)” and is responsible for the maintenance and development of the inland waterways of Bangladesh as well as performing regulatory functions associated thereto.

1.1 At present the Authority consists of one Chairman and two Members who directly control different departments. Each department is headed by a Director or its equivalent. The organogram of the Authority is given below :



2.0 As per Section 15 of the Ordinance entitled the erst which East Pakistan Inland Water Transport Authority Ordinance 1958 (E. P. Ordinance No. LXXV of 1958), with subsequent amendment vide Notification No. 920-Pub of November 19, 1977 (Ordinance No. LV of 1977), the Authority performs some statutory functions which can be classified under two broad heads viz (a) development and maintenance functions and (b) regulatory functions.

a) Some of the development and maintenance functions of the Authority are :

- Carry out river conservancy works including river training works for navigational purposes and for provision of aids to navigation including marks, buyos, lights and semaphore signals;
- Disseminate navigational and meteorological information including publishing river charts;
- Maintain Pilotage and hydrographic survey services;

- Draw up programmes of dredging requirements and priorities for efficient maintenance of existing navigable waterways and for resuscitation of dead or dying rivers, channels, or canals, including development of new channels and canals for navigation;
- Develop, maintain and operate inland river ports, landing/ferry ghats and terminal facilities in such ports or ghats;
- Conduct traffic surveys to establish passenger and cargo requirements on the main rivers, feeders and creek routes;
- Arrange programmes of technical training for Inland Water Transport personnel within and outside Bangladesh;
- Prepare plans or schemes for carrying out any of the above mentioned functions.

b) The regulatory functions of the Authority are :

- Fix maximum and minimum fares and freight rates for Inland Water Transport on behalf of the Govt. and
- Approve time tables for passenger launch services.
- Approve design of water crafts/Vessels.

3.0 The activities of BIWTA in the coastal area of Bangladesh includes hydrographic surveys being carried out by modern Differential Global Positioning System (DGPS), data collections, conservancy works and to provide landing facilities along the coast. The bottom topography of the coastal area of Bangladesh is very shallow and subject to constant topographical and hydraulic changes. As such navigation by the ocean going ships through these waters is hazardous and demands regular hydrographic surveys and studies of the area. BIWTA is carrying out hydrographic survey and related hydraulic investigation works of about 1,000 Sq. Km. of coastal waterways annually and publishes.

Hydrographic Charts to facilitate conservancy works and channel marking system for promoting maritime activities of the country. BIWTA has been maintaining an extensive network of 13 (thirteen) tide gauges at different strategic locations along the coastal area and offshore islands and collecting water level data for forecasting tides in Bangladesh and publishes Tide Tables for 17(seventeen) tide gauge stations using BIWTA's computer since 1987. BIWTA has been providing conservancy services throughout the coastal waterways of the country to ensure safe navigation by the mariners. BIWTA has also been providing landing facilities for millions of people traveling through the coastal waterways of the country.

4.0 BIWTA has updated the Mean Sea Level (MSL) value at Sadarghat, Chittagong and modified Chart Datum (CD) formulae "Indian Spring Low Water (ISLW)" developed by Professor G.H. Darwin, using the extended harmonic analysis by Admiralty method along the coastal waters and offshore Islands of Bangladesh.

BRIEF INFORMATION ABOUT WATERWAYS

- Length of inland waterways : 24,000 km.
- Length of navigable waterways :
 - Monsoon : 5968 km.
 - Dry season : 3865 km.
- Least Available Depth range : 3.90 m to 1.50 m.
- Launch landing points : 688
- Annual water discharge : 1400 billion cubic meter.
- Annual quantum of silt : 2.5 billion tons.
- No. of passenger carried : 87.80 million.
- Quantum of cargo carried : 0.58 million ton.

STATUS OF INLAND WATERWAYS :

The waterways of Bangladesh have been classified into four categories depending on Least Available Depth (LAD) ranging from 3.90 m to 1.50m.

Name of Route	Length of Route	Percentage of total Route
Class- I	683 km	11%
Class- II	1000 km	17%
Class -III	1885 km	32%
Class -IV	2400 km	40%
Total	5968 km	100%

STATUS OF INLAND PORTS :

- A) Major inland ports : 11
- B) Launch Stations : 303
- C) Landing points (no infrastructure) : 374

List of Buoy/Beacon

The name of night route	Buoy	Beacon
Chittagang- Chowkighata- Chandpur	20	11
Chandpur- Dhaka-Narayanganj	3	14
Chowkighata- Barisal- Mongla	4	47
Mongla- Khulna- Mohesharpasha	1	13
Chandpur- Barisal		23
Chandpur- Mawa		4
Narayanganj- Daudkandi		1
Narayanganj- Bhairab bazar		17
Mawa- Kawrakandhi		2
Aricha- Nagarbar- Bagabari		12
Aricha- Daulatdia		3
Sirajgonj- Bhuapur		5
Barisal- Bhola		6
Barisal- Patuakhali		5
Patuakhali- Khepupare	1	7
Barisal- Borguna		2
Chittagong- Cox sBazar	6	8
Total	53	108

DIFFERENTIAL GLOBAL POSITIONING SYSTEM (DGPS) OF BANGLADESH

System Description

The differential GPS beacon system of BIWTA consists of three reference stations at the previous DECCA CHAIN stations in Dohazari (Chittagong), Monirampur (Jessore) and Rupchandrapur (Mymensingh), which broadcast continuously (24 hours in a day) DGPS corrections via Beacon transmitter within a frequency range 283.5-325.0 kHz. The range of each Beacon station is 300 km guaranteeing the coverage of the whole territory of Bangladesh. The system delivers a positioning accuracy of (Latitude, Longitude, Altitude and timing) 1-5 meter for GPS users. The correction information is encoded in Radio Technical Commission for Maritime Services Special Committee (RTCM SC-104) data format.

A) DGPS Beacon station:(Mymensing/Chittagong/Jessore)

The Reference station and Integrity Monitor (RSIM) as part of the DGPS broadcasting station of known position consists at each of the three sites of the Beacon Reference Station, the Beacon Integrity Monitor and the Broadcast station Controller PC (BSC). Each station broadcasts continuous DGPS pseudo-range corrections (The propagation time = GPS receiver clock time – the time showed by C/A or Y code from the satellites) in addition to related user information. Each station has continuous real time monitoring of its own broadcast via the Beacon Integrity Monitor as the distance between each satellite and the receiver is given as the propagation time multiplying with light speed Beacon Reference station computes DGPS correction data (200 bits per second) transmitted by the beacon transmitter.

B) DGPS Control Station:

The control station is located in BIWTA Bhaban where the entire DGPS network will be monitored and controlled. The control station communicates with three Beacon stations via Radio Modem or Telephone Modem. The control station receives status and error reports from the broadcast station, sends to user specified data requests to these station and controls the configuration of the whole network. The control station has the ability to act on any out of tolerance alarm condition to send RTCM messages to the broadcast stations for broadcast to all mobile users.

C) Remote Monitoring Station & Universal Reference Station

The Remote Monitoring Station (RMS) is located in Narayanganj which is engaged the integrity monitoring and quality assurance checking of the RTCM correction broadcast from the Reference station and the ability to record raw GPS information is co-located single frequency 12 channel GPS Receiver. The integrity monitoring requirements have been identical to those for the Beacon Station. An integrity monitoring reports will be accessible to the control station via modem connection.

The Universal Reference Station is also located in Narayanganj, which is designed to run as an automated system, which obtains and stored GPS observable data for post processing purposes. The GPS data will be collected with a co-located dual frequency GPS receiver in order to provide a high degree of accuracy, will be made available to remote users through Bulletin Board service via data carrier for use in Post-Processing calculation.

Application:

DGPS is being used very efficiently and economically for hundred of purpose like accurate Surveying, Dredging, Natural resource management, Offshore oil and gas exploration, fertilizer management in Agriculture, Fleet management by maritime port, GIS, Military services, Instrument landing system in Airport, Fisheries department, Forest department etc.

List of Development Project Under ADP in the year 2002-2003

Name of the Ministry/Division/Organization : Ministry of Shipping, BIWTA. (Figure in Core Taka)

Sl. No.	Name of the Project	ADP Allocation for the year 2002-03	Taka released upto Jan.'03	Expenditure upto Jan. '03, & % of allocation
		Total Taka (F.C)		Total Taka
1.	Long-term dredging programme for maintaining waterways navigable including procurement of 3 No. dredgers and 1 No. booster pump with other accessories.	1.68 (0.02)	0.79	0.6061 (37.88%) -
2.	Construction of ferry terminals and ferryghats including other allied facilities at Horinaghat and Alubazar for introducing ferry service between Chandpur and Shariatepur waterways.	2.00	1.00	0.3491 (17.45%) -
3.	Introduction of waterways around Dhaka City, 1 st phase: Development of Navigability and providing landing facilities from Sadarghat to Ashulia Bridge.	11.80	2.95	2.8491 (24.14%)
4.	Hydraulic and Morphological Study for the Selection of a Site for Ferryghats Alternative to Nagarbari/Notakhola.	0.29	-	-
5.	Feasibility study and detail design for Providing landing facilities at 3 (three) coastal Upa-zillas (Cox's Bazar Sadar, Sandwip & Monpura) for river crafts.	0.30	-	-
6.	Rehabilitation of launch ghat under Chandpur River port damaged due to River erosion.	2.22	-	0.0061 (0.27%)
7.	Procurement of 9 Dredgers with accessories for maintaining the navigability of inland waterways.	-	-	-
8.	Procurement of 2 nos. high powered salvage unit.	-	-	-
9.	Charting of Inland Waterways and coastal waters of Bangladesh.	-	-	-
	Total :	18.21 (0.02)	4.74	3.8104 (20.92%)

Cost of Computer, Accessories, Training & Installation (Price in Taka approximately)

Sl. No.	Description of Item	Qty.	Unit price (Taka)	Total price (Taka)
01.	64 bit Server, 64MB RAM, 2 GBHard Drive, CD ROM DRIVE, PCI BUS etc.	2	12,75,000	25,50,000
02.	a) Original 64 bit UNIX Operating System (Unlimited User)	1	2,00,000	2,00,000
	b) Original documentation	1	40,000	40,000
03.	UNIX Terminals	20	30,000	6,00,000
04.	Printers (Dot Matrix)	4	30,000	1,20,000
05.	UPS (2KVA)	4	40,000	1,60,000
06.	32 User UNIX repeater	2	2,00,000	4,00,000
07.	a) Intelligent HUB	1	3,70,000	3,70,000
	b) HUB Power Supply	1	90,000	90,000
	c) HUB Management Software	1	50,000	50,000
08.	Original 32 user UNIX database Software.	1	2,50,000	2,50,000
09.	Software development	LS	45,00,000	45,00,000
10.	80486DX2, 66MHZ, 8MB RAM 540 MB Hard disk, VGA color Monitor (For Bengali Program)	2	95,000	1,90,000
11.	Computer Training	LS	2,00,000	2,00,000
12.	a) Server Software media kit.	1	80,000	80,000
	b) Server Software documentation.	1	18,000	18,000
13.	Cabling (in computer Room)	LS	50,000	50,000
14.	Installation	LS	1,00,000	1,00,000
			Total Tk	99,68,000
			L.S. Tk.	100,00,000

(Taka One Hundred lac only)

Cost of Computer, Accessories, Training & Installation (Price in Taka approximately)

Sl. No.	Description of Item	Qty.	Unit price (Taka)	Total price (Taka)
01.	64 bit Server, 64 MB RAM, 2 GB Hard Drive, CD ROM DRIVE, PCI BUS etc.	1	12,75,000	25,50,000
02.	a) Original 64 bit UNIX Operating system (Unlimited User)	1	2,00,000	2,00,000
	b) Original documentation	1	40,000	40,000
03.	UNIX Terminals	5	30,000	6,00,000
04.	UPS (2 KVA)	1	40,000	40,000
05.	32 User UNIX repeater	1	2,00,000	2,00,000
06.	Original 32 user UNIX database Software.	1	2,50,000	2,50,000
07.	Software development	LS	10,00,000	10,00,000
08.	80486DX2, 66MHZ, 8MB RAM 540 MB Hard disk, VGA color Monitor (For Bengali Program)	1	1,00,000	1,00,000
09.	Computer Training	LS	2,00,000	2,00,000
10.	a) Server Software media kit.	1	80,000	80,000
	b) Server Software documentation.	1	18,000	18,000
11.	Cabling (in computer Room)	LS	10,000	10,000
12.	Installation	LS	10,000	10,000
			Total Tk	35,73,000
			L.S. Tk.	36,00,000

Taka Thirty six lac only)

Bangladesh Inland Water Transport Authority
Preliminary Course on DOS. Word Perfect.
Windows and dBase III plus.

(First batch)

Name of Course	Days & Date			Duration of course	Name of Officer/Trainer	Remarks
	SAT	MON	WED			
DOS (Three days)	-	2/40	4/10	For Staff: 15:00-17:00 and For Officer: 17:30-19:30	Md. Abdul Matin Mondal Sr. Dy. Director (Tide)	
Word Perfect (Ten days)	-	9/10	11/10		& Hasina Khandker Dy. Director (Tide)	
	7/1					
	14/10	16/10	18/10			
	21/10	23/10	25/10			
	28/10	30/10	-			
Windows (Seven days)	-	-	1/11			
	4/11	6/11	8/11			
	18/11	20/11	22/11			
dBase III plus (Sixteen days)	25/11	27/11	29/11			
	1/12	4/12	6/12			
	9/12	11/12	13/12			
	17/12	18/12	20/12			
	23/12	24/12	27/12			
	30/12					

Activities of SPARRSO on Bangladesh Coastal Zone

Dr. M.A. Shahid, Principal Scientific Officer, SPARRSO

Email: sparrso@banglanet; shahid@sparrso.org

Tel.: 9113956, 9141625

Bangladesh Space Research and Remote Sensing Organization (SPARRSO) is a multi sectoral research and development agency of the Government of the People's Republic of Bangladesh. It is an autonomous organization under Ministry of Defence and is engaged in the peaceful uses of space science and remote sensing technology and Geographical Information system (GIS) in the Country.

From the beginning, SPARRSO has been applying space and remote sensing technology and GIS on the coastal area of Bangladesh. Some of these activities are listed below:-

1. Daily monitoring of movement of cloud systems (cyclones) over the Bay of Bengal and Indian Ocean as well as Western Pacific.
2. Study on land accretion and erosion in the coastal Zone.
3. Study of mangrove forest cover type and coastal plantation assessment.
4. Monitoring of mangrove afforestation activities in Bangladesh coastal area.
5. Morphological study of the coastal area.
6. Study of coastal shrimp farming and agricultural area.
7. Mapping of salinity affected area.
8. Studies on the dynamics of tropical cyclones.
9. Numerical modelling of storm surges in the Bay of Bengal.
10. Study on coastal dynamics.
11. Study on denudation of mangrove forest due to shrimp fanning.
12. Coastal zone development and fishery environment analysis using remote sensing and GIS.
13. Remote sensing and geographical information system (GIS) for suitable shrimp farming site selection in Bangladesh.
14. Timber Volume Inventory in the Sundarbans using remote sensing
15. Study on Climate Change and Sea level rise and its impacts on Bangladesh Coast.
16. Numerical modelling of circulation in the Bay of Bengal.

NB. SPARRSO would be able to contribute greatly to the success of the ICZMP through experienced and highly skilled manpower, excellent instrumentation facilities, and well-founded data base, both conventional and remote sensing.

Small Holder Livestock Development Project, Khaza Nazim Uddin, Livestock Economist

Department of Women Affairs, Mrs. Zakia Yasmin Joarder, Deputy Director (P & E)

Mongla Port Authority, Mrs. Salma Akhter, Deputy Chief Engineer (Civil)

ANNEX E: FURTHER STEPS