

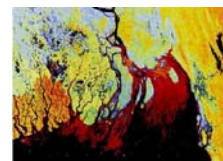
Government of the People's Republic of Bangladesh
Ministry of Water Resources
Water Resources Planning Organization (WARPO)

Identification of Knowledge Gap
for
Coastal Zone Management

Working Paper
WP041

Dhaka
July 2005

Program Development Office
Sponsored by the Government of the Netherlands and the United Kingdom
Executed by ARCADIS Euroconsult, the Netherlands



PDO-ICZMP

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

**Identification of Knowledge Gap
for
Coastal Zone Management**

Working Paper

WP041

Prepared by

Abu M Kamal Uddin

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, July 2005

STUDY TEAM

Md. Sayed Iftekhar

Atiqur Rahman

Rounakul Islam

A.M. Kamal Uddin

with contributions from

Dr. Md. Liakath Ali

M. Rafiqul Islam

with review and contributions from

Dr. Saiful Islam, Sundarban Biodiversity Conservation Project

Mr. Mohammad Qamar Munir, Marine Park Establishment & Ecotourism Development Project at St. Martin's Islands

Mr. Valdemar Holmgren, Coastal & Wetland Biodiversity Management Project

Dr. Rezaur Rahman

Mr. Ahmedul Hasan

Jalal Uddin Md. Abdul Hye

Md. Abdul Baten

Mr. Saiful Alam

TABLE OF CONTENTS

TABLE OF CONTENTS.....	I
LIST OF TABLES	II
LIST OF FIGURES.....	II
ACRONYM.....	III
1 INTRODUCTION.....	1
1.1 Background and context.....	1
1.2 Objectives and scope.....	1
1.3 Approach and Methods	2
1.3.1 Approach.....	2
1.3.2 Methods.....	2
1.4 User and partners of the knowledge base.....	3
2 EXISTING KNOWLEDGE: STATE OF ART FOR ICZM	5
2.1 Coastal zone profile.....	5
2.1.1 PDO documents	5
2.1.2 Information Books on districts.....	5
2.2 Integrated Coastal Resource Data Base.....	5
2.3 Knowledge Portals	6
2.4 Existing Knowledge Management Initiatives	6
2.4.1 Bangladesh Bureau of Statistics (BBS).....	6
2.4.2 National Water Resources Database (NWRD).....	6
2.4.3 Sustainable Development Networking Program.....	7
2.4.4 Environment curricula at the primary and secondary levels.....	7
2.4.5 Bangladesh NGOs Network for Radio and Communication (BNNRC).....	7
2.4.6 The Mass-line Media Centre (MMC).....	7
2.4.7 Bangladesh Rice Knowledge Bank	8
2.4.8 Resource Center of Coastal Development Partnership (CDP).....	8
2.5 Present status: e-governance	8
3 PRESENT STATUS: KNOWLEDGE REQUIREMENT	13
3.1 ICZM knowledge domains.....	13
3.2 Needs assessment tool: Indicator framework	13
3.3 Inventory of needed knowledge	14
4 KNOWLEDGE GAPS	15
4.1 Clustering knowledge gaps	15
4.1.1 Knowledge gaps resulting from inaccessibility.....	15
4.1.2 Incapability to interpret and assimilate	16
4.1.3 Knowledge gaps- non-existence of knowledge.....	16
4.2 Knowledge gaps for ICZM: State of Art.....	16
5 PROCESS TO REDUCE KNOWLEDGE GAP	19
5.1 Research / Creation	19
5.2 Acquisition/Access.....	20
5.3 Assimilation	20
5.4 Training and awareness building.....	20
5.5 Interaction.....	20
5.6 Knowledge management tools	21

6 KNOWLEDGE GAP FILLING	23
6.1 Program Coordination Unit.....	23
6.2 Study commissioned	24
REFERENCES	25
APPENDIX 1: POTENTIAL PARTNERS OF ICZM KNOWLEDGE BASE	27
APPENDIX 2: TABLE OF CONTENTS - WHERE LAND MEETS THE SEA: A PROFILE OF THE COASTAL ZONE OF BANGLADESH	33
APPENDIX 3: DATA LAYERS IN THE PROPOSED INTEGRATED COASTAL RESOURCE DATABASE (ICRD)	35
APPENDIX 4: OUTPUT-WISE LIST OF PUBLICATIONS	45
APPENDIX 5: KNOWLEDGE GAP ASSESSMENT	49

LIST OF TABLES

Table 1: Knowledge Required for Management Input Indicators (MIIs)	49
Table 2: Knowledge Required for Resource Base Indicators (RBIs).....	52
Table 3: Knowledge Requirement for Decision Support Indicators (DSIs)	58

LIST OF FIGURES

Figure 1: Schematic distribution of the potential knowledge providers and users of ICZM knowledge Base	4
--	---

ACRONYMS

ADM	Administrations & Institutions
B Post Office	Bangladesh Post Office
BADC	Bangladesh Agricultural Development Corporation
BANBEIS	Bangladesh Bureau of Educational Information and Statistics
BARC	Bangladesh Agricultural Research Council
BARI	Bangladesh Agricultural Research Institute
BBS	Bangladesh Bureau of Statistics
BDR	Bangladesh Rifles
BEPZA	Bangladesh Export Processing Zone Authority
BIDS	Bangladesh Institute of Development Studies
BIWTA	Bangladesh Inland Transport Authority
BMD	Bangladesh Meteorological Department
BOGMC	Bangladesh Oil, Gas and Minerals Corporation
BR	Bangladesh Railway
BRDB	Bangladesh Rural Development Board
BRRRI	Bangladesh Rice Research Institute
BRTC	Bangladesh Road Transport Commission
BSCIC	Bangladesh Small and Cottage Industries Corporation
BTTB	Bangladesh Telephone and Telegraph Board
BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
CAB	Consumers Association of Bangladesh
CBO	Community Based Organization
CDS	Coastal Development Strategy
CDSP	Char Development and Settlement Project
CEGIS	Center for Environment and Geographic Information Services
CERP	Coastal Embankment Rehabilitation Program
CZM	Coastal Zone Management
DAE	Department of Agricultural Extension
DC Office	District Commissioner Office
DLS	Directorate of Livestock Services
DMB	Disaster Management Bureau
DoE	Department of Environment
DoF	Department of Fisheries
DoFood	Directorate of Food
DoNFE	Directorate of Non Formal Education
DoPE	Directorate of Primary Education
DoRR	Directorate of Relief and Rehabilitation
DoSHE	Directorate of Secondary and Higher Education
DoSS	Department of Social Services
DoTE	Directorate of Technical Education
DPHE	Directorate of Public Health Engineering
DSI	Decision Support Indicator
DWA	Directorate of Women's Affairs

ECO	Economics and Finance
EGIS	Environmental and Geographic Information Services
ERD	Economic Relations Division
FAO	Food and Agriculture Organization
FD	Forest Department
FUN	Funds and Interventions
GO	Government Organization
GoB	Government of Bangladesh
GSB	Geological Survey of Bangladesh
HP&FW	Health, Population & Family Welfare
HUM	Human beings and Social conditions
ICRD	Integrated Coastal Resources Database
ICZM-KB	Integrated Coastal Zone Management – Knowledge Base
ICZMP	Integrated coastal Zone Management Plan
IDA	International Development Association
IMED	Implementation, Monitoring and Evaluation Division
INF	Infrastructure and Services
IPCC	Inter-governmental Panel on Climate Change
IPRSP	Interim Poverty Reduction Strategy Paper
IUCN	International Union of Conservation of Nature
IWM	Institute of Water Modeling
IWFM-BUET	Institute of Water and Flood Management–Bangladesh University of Engineering & Technology
KG	Knowledge Gap
KMA	Knowledge Management Approach
KU	Khulna University
LGED	Local Government Engineering Department
MF-Institutions	Micro Finance Institutions
MII	Management Input Indicator
MoA	Ministry of Agriculture
MoDM&R	Ministry of Disaster Management & Relief
MoE&F	Ministry of Environment and Forest
MoH&FW	Ministry of Health and Family Welfare
MoI	Ministry of Information
MoL	Ministry of Land
MoRA	Ministry of Religious Affairs
MoTextile	Ministry of Textile
MoW&CA	Ministry of Women and Children Affairs
NBR	National Board of Revenue
NGO	Non Government Organization
NIPORT	National Institute of Population Research and Training
NRE	Natural Resources and Environment
NSC	National Sports Council
NWRD	National Water Resources Database
O&M	Operation and Maintenance
PDB	Power Development Board
PDO	Program Development Office
PDO-ICZMP	Program Development Office – Integrated Coastal Zone Management Plan Project
PRSP	Poverty Reduction Strategy Paper

R&HD	Roads and Highways Department
RBI	Resource Base Indicator
REB	Rural Electrification Board
RRI	River Research Institute
SLF	Sustainable Livelihood Framework
SoB	Survey of Bangladesh
SPARRSO	Space Research and Remote Sensing Organization
SRDI	Soil Resources Development Institute
SUFUR	Support for University Fisheries Education and Research
SWMC	Surface Water Modeling Center
TAPP	Technical Assistance Project Proforma
ToR	Terms of Reference
UGC	University Grants Commission
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
WARPO	Water Resources Planning Organization
WASA	Water Supply and Sewerage Authority
WFP	World Food Program
WP	Working Paper

1 INTRODUCTION

1.1 Background and context

- **Knowledge** is a condition obtained by a person or a body enabling to realize and understand the patterns and their implications. It involves the mental processes of comprehensions, understanding and learning. Knowledge is a dynamic continuously developing phenomenon and build up through practicing, acquisition, refinement, distribution and deployment and leveraged. So in the ICZM context, condition obtained by the institutions, organizations, communities, professionals and other bodies and individuals involved in ICZM policy, planning, development strategy, implementation and monitoring of the ICZM process are referred.
- **Knowledge gap** in the given context refers to the requirement of knowledge including data; information; indigenous, scientific and empirical knowledge which are necessary for the ICZM process that serves the purpose of the goal of the initiative and are not available at various levels of planning. In the context of CZM integration is required across geographic, timescale, sectors, disciplines, political and institutional, and policy, management, education and research that refers to accumulate and build on knowledge accordingly.
- ICZM Policy Note (1999) recognizes and identifies knowledge gaps and suggests acquiring knowledge and filling gaps through new activities for the development of the ICZM program (PDO-ICZMP, 2002a). ICZMP Inception Report (PDO-ICZMP, 2001) listed ongoing need for physical knowledge, survey needs, special studies and special activities and thematic meetings to harness and fulfill knowledge gaps. Following the note and in addition various PDO initiatives also recognizes, identifies and pinpointed knowledge gaps, e.g. Regional Workshops (2001), The ICZM dialogue (Sep 2002), PDSCL Survey (PDO-ICZMP, 2002c), CLA (PDO-ICZMP, 2003d)
- This initiative deals with activity 6.3 (knowledge gaps) of the project contributing to output 6, Integrated Knowledge Base (IKB)
- This report is structured introducing knowledge gaps, objectives and scope, approach and methods and possible users in chapter 1, Contextual existing knowledge in chapter 2, knowledge requirement in chapter 3, analysis and synopsis of Knowledge gaps in chapter 4, process of reducing knowledge gaps in chapter 5 and ways and means to gap filling in chapter 6.

1.2 Objectives and scope

The main objectives of this paper are as follows –

- ◆ Inventory of knowledge related to ICZM
- ◆ Identify partners/users for the knowledge base
- ◆ Establish knowledge needs for ICZM in Bangladesh
- ◆ Identify knowledge gaps (KG) in the context of ICZM process
- ◆ Means and ways to fill knowledge gaps

1.3 Approach and Methods

1.3.1 Approach

- The ICZM Indicator Framework (encompassing Management Input Indicators, Resource Base Indicators, and Decision Support Indicators) and set of indicators characterizing the coastal zone, district level vulnerabilities, livelihood or well being indicators; and a set of aggregated key indices for coastal development functions as the driving structure for determining knowledge need for ICZM and developing the knowledge base, including the Integrated Coastal Resources Database and possible web-based knowledge portals (PDO-ICZMP, 2004).
- Users / partners' needs based and identification of needs through interactions with the partners / users
- Assimilation of available data / information / knowledge; needs assessment considering ICZM that support harmonization and co-ordination, support a participatory decision making process, encourage good governance in the coastal zone and improve livelihood.
- Knowledge gaps refers to lack of awareness, what is needed, who needs what, gap due to non existence of knowledge, gap in interpretation, gap in assimilation, gap due to non accessibility and gap in dissemination mechanism.

1.3.2 Methods

- Review the data / information /knowledge needed to feed the indicators (needs assessment) that characterizes the coastal zone encompassing the management regime. Translation of the sets of ICZM indicators in terms of knowledge needs in to
 - structured data sets
 - analysis and interpretation
 - qualitative information
- Identification of potential partners / users of the ICZM knowledge base to be built on the indicator framework
- Review of the existing literature (including PDO documents, BBS survey and census reports, coastal zone project reports and national and international organization's report) on the coastal conditions and assimilate existing knowledge. A summarization of the knowledge available presented in the Coastal Zone Profile.
- Review of existing reports on coastal zone and ICZM in Bangladesh to extract calls for research, survey, studies and analysis.
- Analysis of assimilated knowledge and knowledge need determine knowledge gaps within the context and given time frame.
- Relevant reports, publications, working documents, inception reports, study findings and terms of references of following projects/organizations/institutions/initiatives have been screened:
 - Policy Note on Integrated Coastal Zone Management: Concept and Issues (22 September 1999)
 - Concept Note & Development Process on Integrated Coastal Zone Management: Joint Donor Identification Mission (IDA/NEDA/WFP), March, 1999
 - PDO-ICZMP Project Inception Report, ToR, ICRD (ToR), Regional PDO Workshops, studies/surveys

- FAO-SIFAR-CEGIS (CEGIS, 2004)
- Dialogue on water and climate (IPCC, 2002)
- Coastal Embankment Rehabilitation Project (2nd CERP) (CERP, 2000)
- World fish center (www.worldfishcenter.org)
- Fisheries sector review and future development study, June 2003 (DoF, 2003)

1.4 User and partners of the knowledge base

The knowledge is only relevant in association with user who determines knowledge need and knowledge gaps in their own perspective. Knowledge needs in this instance mean some users need it.

Likewise, knowledge management requires co-operation with other actors in Bangladesh' coastal zone, including i) the generation and supply of data and information, ii) the integration of coastal data / knowledge available to them which are generated through their own activities and design process, and iii) cooperation and networking among different knowledge-related activities (e.g. interaction among different forums, research units of agencies, PCU-Knowledge base.

It should be noted that actors (users as well as partners) would only actively engage in the knowledge management process if they expect clear benefits of doing so. Therefore, effective co-operation calls for a sound communication, assimilation and dissemination strategy.

Potential users

- National level: Policy makers, planners, GoB agencies, donor agencies, NGOs and professionals
- PDO-ICZMP to develop a Coastal Zone Policy and Coastal Development Strategy
- Project level: Government agencies, project managers (including GO and NGO) and professionals
- Local level: Community Based Organisations (CBOs), e.g. Water User Associations, Fishermen Group
- International organizations (like, FAO, UNDP, etc.)

Potential partners

ICZM sets out to integrate its knowledge base with that of other institutions (Figure 1). It will draw data and knowledge on the coastal zone from them and supply them with data, and knowledge that will support their activities. The potential partners could be identified as follows:

- National: GO institutions that gather and analyse data (e.g. BBS), the developers of the PRSP, donor agencies, national NGOs that gather local data related to livelihoods of coastal area households.
- Local/ project level: NGOs and donor agencies operating in the field
- Private sector as a potential partner, especially via encouraging improved communications infrastructure in the coastal zone.

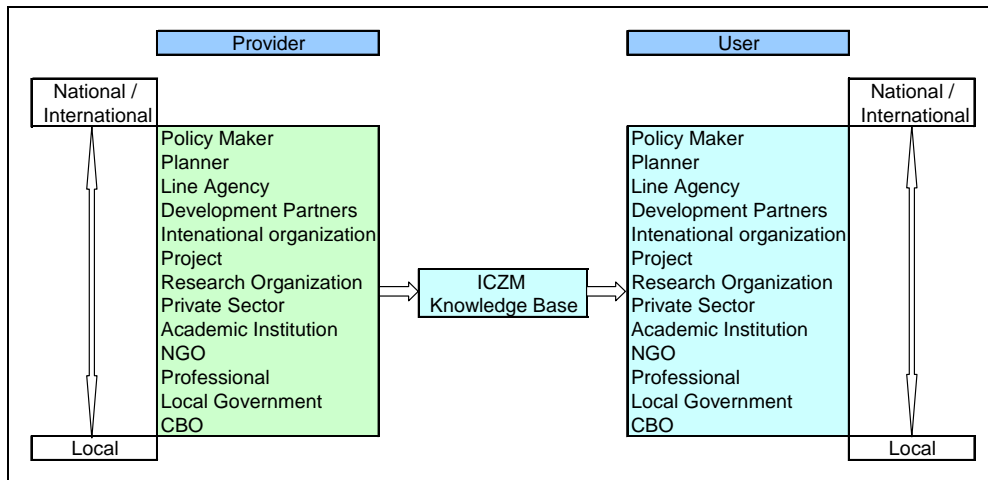


Figure 1: Schematic distribution of the potential knowledge providers and users of ICZM knowledge Base

A detail listing of the potential partners in the knowledge management with their role has been presented in **Appendix 1**.

2 EXISTING KNOWLEDGE: STATE OF ART FOR ICZM

Knowledge in the context as defined includes data, information, experience, indigenous and expert's knowledge. A number of stakeholders gather, generate, archive and use coastal knowledge. Attempt has been made to stream line archiving and develop an approach to handle knowledge necessary for ICZM and communicate knowledge to achieve ICZM objectives. This section briefly mentions the effort to listing inventory of knowledge and put light on the knowledge arena for ICZM.

2.1 Coastal zone profile

The book, 'Where Land Meet the Sea: A Profile of the Coastal Zone of Bangladesh' prepared by PDO-ICZMP, is expected to become a reference document for information on the natural, human, socio-economic, infrastructure and institutional situation and processes in the coastal zone. It includes 'baseline' information and relevant knowledge on different aspects of the coastal zone. Extensive efforts were made in collecting and compiling basic data, information and experiences from different sources and analyzing, processing and assimilating them to become a set of baseline information. Purpose of the profile is to bring existing data, information, experience and knowledge on coastal matters together, and to summarize the "state of the art". The profile is expected to be useful for policy makers, planners, coastal managers, other government agencies, researchers, educators and communities, through:

- providing an objective reference document on the state of resources of the coastal zone;
- describing coastal livelihoods and economic activities;
- identifying main trends and changes over time in the main characteristics of the coastal resources system; and
- summarizing institutional arrangements for the coastal area, and related topics

Table of contents of the profile is presented in Appendix 2.

2.1.1 PDO documents

Several working papers, technical papers, notes, proceedings has been so far published by PDO on several issues summarize and present the current understanding on different coastal issues. A list of publication has been given in **Annex - 4**.

2.1.2 Information Books on districts

Information Books provide district level data and information. These books have been developed to aware and make the direct stakeholders instrumental to contribute in the participatory planning of respective districts. These books include data and information on livelihoods, livelihood options, local resources, vulnerabilities, development issues, development opportunities, future scenarios and role of the local resource users and communities in the resource management of the respective district. It also intends to bring readers into realization of the need for integrated and collective resource management and generate interest of the multiple stakeholders to be a part of the planning and implementation process for sustainable resource management. Information books will be published for all the 19 coastal districts.

2.2 Integrated Coastal Resource Data Base

An inventory of the available data has been made and structured for integrated costal resources database; ICRD (Appendix 3). Data collection by different agencies functional in the coastal zone is

a routine endeavor. There are also surveys, census and periodic data collection practices. The ICRD shall be the core of the Integrated Knowledge base (detailed later under tools) that archives, analyzes and disseminates data and information.

2.3 Knowledge Portals

Knowledge portals are organized websites/CDs that facilitate structured access to the available information and knowledge of specific subjects, such as livelihoods in the coastal zone. Knowledge in this context includes up to date overviews and databases, publications, literature overviews, catalogues of libraries, information about experts and agencies, etc. Objective of knowledge portal is to compile and disseminate knowledge and information to policy makers, stakeholders and the public at large.

A pilot and demonstration knowledge portal on estuary development (KPED) has been made (PDO-ICZMP, 2003c). The purpose of this KPED was to assess the suitability of this tool for further development and application.

The structure of knowledge portals preferably follows a conceptual model or logical sequence of cause – effect relations. The KPED concentrates mainly on the physical processes of the Meghna Estuary. The logical sequence of the processes of estuary development starts from *forces and inputs* (geology, climate, hydrological cycle, tide, fresh water input, sediment input, natural calamities, human interventions), goes through *resulting processes* (e.g., salinity processes, wind-storm-waves and sea-level changes), and combines these processes to the *patterns of water circulations and sediment and salinity distribution*. All of these determine the physical environment of the estuary (flooding and drainage, soil resources, fresh water resources, erosion and accretion and channel development). The KPED provides the relationships between different physical factors and their impacts on the different key issues influencing the lives and livelihoods of the people living in the estuary.

2.4 Existing Knowledge Management Initiatives

2.4.1 Bangladesh Bureau of Statistics (BBS)

Bangladesh Bureau of Statistics under the Ministry of Planning is the national organization to collect, create and maintain data. It is the central organization of maintaining and storing data. It carries out regular census like, population census, agriculture census, etc. Different surveys, like, poverty monitoring survey, sample registration systems, household expenditure survey, labor force survey, child nutrition survey, health, demographic survey and social statistics, small area and community level statistics, food for works and vulnerable group feeding, etc. It publishes Monthly Statistical Bulletin, Statistical Yearbook, Statistical Pocketbook, Yearbook of Agricultural Statistics, Foreign Trade Statistics regularly along with many other census and survey reports. The reports are available from the publication department of the organization at reasonable price. BBS also maintains a website containing some data and information on Bangladesh. The address of the website is www.bbsgov.org.

2.4.2 National Water Resources Database (NWRD)

Water Resources Planning Organization (WARPO) has the mandate to create, maintain and update a National Water Resources Database and information management system according to the National Water Policy. The primary activity of the National Water Resource Database (NWRD) is to meet the demand of water resource planners for a consolidated and reliable data bank. The data in NWRD has

been collected from different sources in many different formats (digital and paper) and also the maps produced in different scales and projections. NWRD possesses more than 300 data layers in 10 groups. These are: *Base data, Surface water, Ground water, Soil and agriculture, Fisheries, Forest, Socio-economic, Meteorological, Environment and Images.*

2.4.3 Sustainable Development Networking Program

The Bangladesh Institute of Development Studies (BIDS) is implementing the Sustainable Development Network Project (SDNP). The objective of the project is to create an appropriate tool - the SDN - for achieving and facilitating exchange of information/knowledge among development partners, academia, policy makers and the civil society, both national and international, in order to design and implement unique plans for sustainable development in Bangladesh. SDNP has developed a Web-Portal at www.sdnbd.org. It is far more than a Website, and the back end of the portal is supported by a sophisticated database containing several gigabytes of data.

2.4.4 Environment curricula at the primary and secondary levels

Environmental Curriculum at the Primary and Secondary level Project was initiated back in 1998 under the Ministry of Environment and Forest of GoB. This project is the component 5.5.2 of Sustainable Environment Management Programme (SEMP) and being implemented by the Department of Environment. National Curriculum and Textbook Board (NCTB) is the co-agency. Both DoE and NCTB have been working together with exchange of ideas, experiences and expertise. The project will continue up to the year 2005.

2.4.5 Bangladesh NGOs Network for Radio and Communication (BNNRC)

Bangladesh NGOs Network for Radio and Communication (BNNRC) is a changed name of Bangladesh Coastal NGO Network for Radio and Communication (BCNNRC). BCNNRC has established during April 2000 and registered as trust in the Ministry of Law, Justice and Parliamentary Affairs with the auspicious of 9 coastal non-government organizations (NGO) with lead initiatives from COAST (Coastal Association for Social Transformation Trust). This name change has been formalized on 5 April, 2003 considering the fact of all members urged to have national converge. Those 9 organizations are COAST of Bhola and Coxsbazar, Dwip Unnayan Sangstha (DUS) of Hatiya, Young Powers Social Action (YPSA) of Chittagong, Sangkalpa Trust of Barguna, Pirojpur Gono Unnayan Samity (PGUS) from Pirojpur, BRIDGE) from Khulna, Integrated Social Development Effort (ISDE) of Chokoria, SPEED Trust of Barisal, and Community Development Center (CODEC) of Chittagong and Patuakhali. All most all the chief executives of those organizations are the founder members and still most of them are continuing.

2.4.6 The Mass-line Media Centre (MMC)

Mass-line Media Centre (MMC) is a media related NGO, which upholds the philosophy that the access of the grassroots level people to the media expedites the process of participation. MMC was emerged back in 1995 by the initiative of a group of renowned and respectable citizens as a reflection of their thoughts on social welfare and development arena and envisaged to follow a decentralized communication policy for the promotion of human rights and democracy. Till then MMC is working with the vision that freedom of opinion, expression and free flow of information in the media is ensured.

However, the mission of MMC is to strengthen local media through skill development and training of the media professionals, networking among the development workers, social leaders, human rights activists, and civil society members who play a vital role to change the existing centralized media for an alternative and people oriented system.

MMC has its coverage over nine coastal districts of Chittagong and Barisal Divisions. The head office is in Dhaka, while the two media centres and one media sub-centre are established in Noakhali, Patuakhali and Barisal.

2.4.7 Bangladesh Rice Knowledge Bank

The rice-growing environments in Bangladesh are very diverse, varying from drought-prone high lands in the northwest through the flood-prone central region to the coastal saline zone in the south. Bangladesh has been divided on the basis of land, soil, hydrology and climate in to thirty major agro-ecological zones (AEZ). Researches for development of new rice varieties and production technologies for the diverse ecosystems are conducted. To disseminate the information related to rice research and rice cultivation, Bangladesh Rice Research Institute (BRRI) maintains a web site: Bangladesh Rice Knowledge Bank (BRKB). BRKB is a treasure of rice knowledge. This is a dynamic source of knowledge that will be updated regularly to keep consistency with the latest innovations and users' feedback. BRKB contains rice knowledge to address the regional as well as national issues associated with rice production and training. It started with rice but extends promise to be expanded to non-rice technologies in future. The extension service providers are the immediate beneficiaries of the BRKB. However, ultimately farmers will be benefited from it. The address of the web site is www.brkb.org.

2.4.8 Resource Center of Coastal Development Partnership (CDP)

The Coastal Development Partnership (CDP) was originally conceived as a coordinating secretariat for a network of NGOs to relieve the sufferings of the people of the waterlogged areas under the Coastal Embankment Project (CEP). Declared objectives of CDP are:

- ◇ to collect and disseminate necessary information on environment, local resources and social issues to NGOs, NGO networks, alliances, etc;
- ◇ to organize alliances and networks with local grassroots NGOs to develop an appropriate development perspective for the southwest coastal region of Bangladesh;
- and
- ◇ to organize issue-based citizens' forums.

CDP is maintaining a resource center, which performs various types of activities and provides specific information to information-seekers.

2.5 Present status: e-governance

Emerging electronic media and facilities fostered knowledge generation, archiving, communication and in fact knowledge management by large are boosted tremendously. Management of knowledge in future shall depend largely on the e-governance. Support to ICT Task force program of planning commission conducted a comprehensive Study of e-Government initiatives in Bangladesh supported by JICA. The data for the study was collected covering 303 government institutions throughout Bangladesh covering a total of 35,658 officers and 103,126 staff from July through September 2003. Following are the findings (Taifur, 2004) -

Hardware Infrastructure

- PC-Employee ratio at Ministry/ Division level is 0.22
- PC-Employee ratio at Department/ Corporation is 0.065
- PC-Employee ratio in Academic Institutions is 0.23

Connectivity Infrastructure

- 79% of Ministries/ Divisions are currently connected to the Internet

- 76% of Departments/ Corporations are currently connected to the Internet
- 75% of Academic Institutions are currently connected to the Internet
- Internet-connected PC-Employee ratio at Ministry/ Division level is 0.045
- Internet-connected PC-Employee ratio at Department/ Corporation level is 0.01
- Internet-connected PC-Employee ratio in Academic Institutions is 0.1
- At the Ministry/ Division level, 79% of offices connect to the Internet connect through dial-up only.
- At the Department/Corporation level, 77% of offices connect to the Internet connect through dial-up only.
- In academic institutions, 42% of offices connect to the Internet through dial-up only.
- At the Ministry/ Division level, about 11.6% of the offices have broadband and about 7% have radio-link connectivity.
- At the Department/ Corporation level, about 10% of the offices have broadband and about 4.2% have radio-link connectivity.
- At academic institutions, 8.3% of the offices have broadband, and about 12.5% have radio-link connectivity.
- 6 government offices have VSAT.
- At the Ministry/ Division level, about 40% have LAN.
- At the Department/ Corporation level, about 36.8% have LAN.
- In academic institutions covered in the survey, about 54% have LAN.

Use of ICT

- At the Ministry/ Division level, about 30.64% officers and about 32.64% staff use PCs.
- At the Department/Corporation level, about 20.6% officers and about 6.49% staff use PCs.
- In academic institutions, about 40% officers and about 7.4% staff use PCs.
- At the Ministry/ Division level, more than 88% of the offices that are connected to the Internet use it for purposes of official e-mail, about 80% for information search and more than 52% for downloading files.
- At the Department/Corporation level, about 50% use the Internet for official e-mail purposes, about 42% for searching information and about 32% for downloading files.
- In academic institutions, about 21% use the Internet for official e-mail purposes, about 25% for searching information and about 25% for downloading files.
- At the Ministry/Division level, a little more than 8% of the officers use e-mail directly and about 5% of the officers use e-mail through computer operators.
- At the Department/Corporation level, on an average, 6.5% officers use e-mail directly while about 5.75% officers use e-mail through the help of computer operators.
- In academic institutions, 42.4% of the officers use e-mail directly and about 38% of the officers use e-mail through computer operators.
- Percentage of offices with websites: Ministry -24%; Division -50%; Department -14%; Corporation -14%; Academic Institution -25%.
- Percentage of offices with customized software: Ministry -24%; Division -60%; Department -25%; Corporation -41 %; Academic Institution -50%.

IT Training

- At Ministry/Division level, percentage of officers trained in IT is 28% and percentage of staff trained is 29%.

- At Department/Corporation level, percentage of officers trained in IT is 23% and percentage of staff trained is 7%.
- In Academic Institutions, percentage of officers trained in IT is 6% and percentage of staff trained is 4%.
- About 28% of the Ministries/Divisions have in-house IT training facilities.
- About 27% of the Departments/Corporations have in-house IT training facilities.
- About 50% of Academic Institutions have in-house IT training facilities.

Maintenance of IT Systems

- About 56% of Ministries/Divisions have outsourced maintenance.
- About 51 % of Departments/Corporations have outsourced maintenance.
- About 46% of Academic Institutions have outsourced maintenance.
- About 16.3% of Ministries/ Divisions have no mechanism for IT Maintenance.
- About 15.7% of Departments/Corporations have no mechanism for IT Maintenance.
- About 15.2% of Academic Institutions have no mechanism for IT Maintenance.
- About 18.6% of Ministries/Divisions have maintenance being handled under projects.
- About 7.6% of Departments/ Corporations have maintenance being handled under projects.

IT Human Resource

- About 58% of the Ministries/ Divisions have no IT human resource.
- About 65% of Departments/ Corporations have no IT human resource.
- About 35% of Academic Institutions have no IT human resource.
- At Ministry/Division level, the number of IT trainers stand at 11% of IT Human Resource
- At Department/Corporation level, the number of IT trainers stand at 28% of IT Human Resource
- In Academic Institutions, the number of IT trainers stand at 37% of IT Human Resource

Positive Impact of Use of ICT in Government

The survey respondents have prioritized the impact of IT in the following order (the figures in bracket represent the percentage of offices which have put the following as an impact of IT):

- Increased Productivity (77%);
- Easier Access to Needed Information (71%);
- Preservation of Documents and Information (63%);
- Easier Sharing of Documents (60%);
- Improved External Communication (49.5%);
- Improved Internal Communication (45.5%).

Success Factors in the Implementation of e-Government

The survey respondents have prioritized the success factors for implementation of e- Government in the following order (the figures in bracket represent the percentage of offices which have put the following as a success factor):

- Initiative from Top-Level Officials (77%)
- Initiative from Mid-Level Officials (30%)
- Assistance from Donors (26%)
- Regular IT Training (16%)

- Initiative from Low-Level Officials (15%)

Issues to Overcome for Successful Implementation of e-Government

The survey respondents have prioritized the hindrances to successful implementation of e-Government in the following order (the figures in bracket represent the percentage of offices, which have put the following as a hindrance):

- Lack of Adequate Training (69%)
- Lack of Adequate Hardware (59%)
- Insufficient Maintenance (55%)
- Lack of Telecom Facilities (37%)
- Power Failure (35%)
- Lack of ICT Awareness (22%)
- Lack of Legal Infrastructure (22%)
- Lack of Bangla Interfacing (21%)
- Fear of Change (19%)
- Mindset Against Computers (18%)
- Lack of Acceptance of IT Systems (10%)

3 PRESENT STATUS: KNOWLEDGE REQUIREMENT

Knowledge requirement has been considered as substantial for each of the program element beginning with an elaboration of opportunities, problems and challenges and, particularly, in formulating a comprehensive policy document. Even more detailed understanding of conditions and processes of the coastal zone have been considered required in defining and prioritising a coastal development strategy (CDS). Additional to these implicit knowledge requirements, the Policy Note emphasized need for a system for ***collecting data and synthesizing information*** to support decision making of interventions that shall provide optimal and sustainable resource flow and depiction of trade-offs among various implementation alternatives (PDO-ICZMP, 2002a).

3.1 ICZM knowledge domains

Integrated Coastal Zone Management (ICZM) refers to management of the coastal zone in an integrated approach. Management activities concentrate and work for sustainable economic development, to keep ecosystems healthy and optimize sustainable turnover from the coastal system. Coordination of sectors functional in the coastal zone is essential to keep up integrity of the system and minimize conflicts and detrimental acts. As such knowledge is necessary on the state of the coastal resources including natural, physical, human, social, and financial conditions and trends there in (state of resource base, output and trends) and also on the input in to the system in terms of interventions both software (e.g. adoption of policy, strategy, legal aids and institutional mechanism) and hardware interventions (infrastructures) that bring changes in resource bases and output. The goal is however to enhance coastal livelihood i.e. outcome (regional economic growth, community well-being and sustainable environment). Thus knowledge arena for ICZM covers data, information and knowledge on the input in to the coastal system, output from the system and outcome at community level including trends. On the other hand knowledge on pressure, state and response of the resource base and their correlation to the input system and impacts on the human well-being are also necessary.

In the given context, a boundary has been set for defining knowledge and associated data that describes and characterizes the coastal zone with a detailed understanding of conditions, processes and relations (Appendix 5). Additionally Integrated Coastal Zone Management requires an understanding and appreciation of individual's [include person (local person and or expert) and agency] knowledge on the coastal zone in wider perspective. This is required also as implementation of ICZM process requires understanding of the patterns and their implications, which shall be built on the partner's experiences. In this context, data and knowledge of different spatial and temporal scales are available to different parties. On the other hand there is a great deal of gap between the knowledge requirement and existing knowledge. Indicator Framework (PDO-ICZMP, 2003a) for ICZM initially frames knowledge requirement for ICZM process. (Appendix 5)

3.2 Needs assessment tool: Indicator framework

Indicator framework functions as the driving structure for describing knowledge arena for ICZM and subsequently develop a knowledge base. Indicator framework introduce/describe the livelihood from a coastal perspective; identify problems and potential of the coastal zone; prioritise interventions; assess, monitor and evaluate interventions. Indicators for ICZM aim to measure conditions and trends of the coastal zone in terms of inputs, outputs and outcome of either autonomous developments or dedicated actions and interventions, such as those intended to be undertaken in the context of a coastal development strategy. The Indicator Framework considers *three sets of indicators*:

- *management input indicators (MIIs)*, which represent changes in the established institutional arrangements; formulated policies and plans; or direct interventions under implementation (e.g., characterized by public expenditures for the development of coastal infrastructure);
- *output or resource base indicators (RBIs)*, which characterize changes in the state of the local resource base consisting of natural, physical, human, social and financial resources; and
- *outcome or decision support indicators (DSIs)*, measuring the “value” of changes in the resource base (outputs) in terms of policy objectives, such as literacy rates and poverty reduction, in general representing objectives of the sustainable development.

Indicators serve *policy-making level*, *strategy formulation level* and *action level*. Again the indicator framework is generic in the sense that only “dimensions” are identified for which specific indicators could be developed. It is ICZM-specific as in the process of identification and selection; these dimensions were verified on the basis of their relevance for ICZM. The processes and knowledge including descriptive information necessary for ICZM are also referred in the indicators frame, which shall be a priority to consider. The framework however also identifies sets of indicators (A combination of MII, RBI and DSI) to characterize the coastal zone (PDO-ICZMP, 2003a), district level vulnerabilities, livelihood or well being indicators; and a set of aggregated key indices (living in the coast; indicators) for coastal development.

Thus, Indicator Framework elaborates and guides to determine knowledge requirement (data, processes and knowledge) on physical, natural, and human system (includes livelihood and socio-economics). The institutional arena including policy, plan, strategy and legislations in one hand and the management interventions input on the other are also integral part of the mentioned knowledge system. ***As such the Indicator Framework has been considered as tools for determining knowledge requirement for ICZM.***

3.3 Inventory of needed knowledge

To describe and characterize the coastal zone and ICZM process various stakeholders require knowledge at different temporal and spatial resolutions. It is impossible and unnecessary to list the requirements of such huge knowledge by all the stakeholders. Attempts have been made to guide the knowledge requirements arena at dimension level of different categories and components of the ICZM indicators frame of management input indicators, Resource base indicators and decision support indicators (Appendix 5). It is mentioned that knowledge [domain knowledge (Intra/inter domain), local/indigenous knowledge and expert’s knowledge] are also inclusive in the knowledge system for ICZM and shall be collected, collected and archived in the Integrated Knowledge Base.

4 KNOWLEDGE GAPS

Knowledge gap refers to the knowledge necessary for the ICZM process and are not available at various levels of planning. In the context of CZM integrations is required across geographic locations, different timescale, various sectors, disciplines, political and institutional domains, policies, management aspects and education. Screening existing literature, reports and documents on availability of knowledge and gaps in compatibility of the ICZM process and in light of the Indicator Framework knowledge gaps has been compiled for ICZM. From the review of the existing knowledge it has been found that knowledge gap exists due to inaccessibility, inability to interpret and assimilation and non-existence (acquisition measures and research needed to fill gaps). However, knowledge gap is time and context specific and naturally shall evolve or surface as the user become aware of the need of knowledge for ICZM in a point in time.

During 2004 a review has been done on the requirement of data / information /knowledge to feed the indicators (needs assessment) that characterizes the coastal zone. Review of the existing literature on the coastal conditions and assimilation of the existing knowledge resulted in to a profile of the coastal zone, i.e. a 'state of art' of knowledge. Analysis of the assimilated knowledge and knowledge need determines the knowledge gap within the context and given time frame. Relevant reports, publications, working documents, inception reports, study findings and terms of references of projects/organizations/institutions/initiatives have been screened to extract the call for research, survey, studies and analysis which substantiated the knowledge gaps up to 2004 for ICZM in Bangladesh. Inter tidal phenomenon, empoldering effect on the coastal zone, erosion and accretion process and value of biodiversity are few examples of knowledge gaps. However, along with knowledge as such routine data collection and analysis and interpretation shall continue to fill knowledge gaps. Section 4.2 of this report includes compiled and analyzed knowledge gaps (2004) and means to reduce gaps have been indicated in the parenthesis. However, descriptions of means to reducing knowledge gaps are presented in chapter 5.

4.1 Clustering knowledge gaps

The knowledge is perspective, context, space and time specific in one hand and user dependent on the other hand. The trends in the state and processes and interactions in the coastal zone are of crucial importance for management purpose and as such knowledge has to be updated regularly. Analysis of the users perspectives reveals that knowledge gap results from inaccessibility to knowledge, inability to interpret and assimilate and non-existence of knowledge.

4.1.1 Knowledge gaps resulting from inaccessibility

Knowledge is neither valueless nor attribute free. Many organizations consider knowledge is too valuable to share with others. So they develop many restriction, rules and regulations to control the flow of information from their organizations. So even when relevant knowledge is available at different agency they are not accessible by other agencies. So the agencies suffer from knowledge gap.

In Bangladesh most of the data and information stored and utilized by government machinery are subject to restrictions in dissemination. For example, Government's investments and expenditure data in different sectors for different regions are available under different ministries. But due to different types of restriction and procedures most of the time these data are not available to other agencies.

Research organizations and academic institutions are sometimes seemed to be reluctant to share their knowledge with others. For example, during the data inventory for updating the NWRD many institutions have responded that they will share data filtering access to that information.

4.1.2 Incapability to interpret and assimilate

ICZM is a multi-dimensional and multi-scaling approach that demands comprehensive understanding of the partners of the ICZM process. Interpretation and analysis of the data and information to be enlightened to serve specific management functions. Individual organizations cannot assimilate their own departmental policies and directives in the field level. On the other hand the concept of integration, harmonization and cooperation in the development process including planning and implementation is quite new and understanding and capacity of line agencies are not adequate. At the same time mechanism to integrate ICZM partners is also lacking leading to non-assimilation of existing data / information in to usable knowledge in the given space and time. Management regime for optimal and sustainable development requires various inputs (Management Input Indicators (MII)) as referred in the indicator frame. Input brings change in resources bases ((Resource Base Indicator (RBI)) and provides output that in terms produces and serve better outcome (Decision Support indicators (DSI)) for the life and livelihood. It is very much necessary to clearly understand the interrelationship of management input, resource base output and outcome by the development decision makers. There are gaps in understanding and application of such knowledge.

4.1.3 Knowledge gaps- non-existence of knowledge

To generate new knowledge and information one of the most important processes is routine field data collection and dedicated analysis. But at present primary sources of data collection are very thin and set up under a very old system. For example, we do not have even a single data station for monitoring the cyclonic surge in the Bay and in land although this is considered to be the cause of worst disaster. Thus, the absence of infrastructure and system at the field level to collect routine data and information results in non-existence of knowledge.

Coastal zone management involves understanding of coastal conditions including natural, physical, human, socioeconomic and institutional arena as a whole as well as the system and processes that governs ever-dynamic Bangladesh coast. Knowledge requirement for ICZM vary on the changing perspective of the stakeholders over time and space and again on the scales (micro, meso and macro). Knowledge requirement thus evolve as the process and entire mechanism including human interaction, policy regime and input change. To serve the management requirements based on the perspective and aspiration of the stakeholders one need to generate knowledge, through research and survey. Analysis of the existing information should also create new knowledge, which will help in the reduction of the knowledge gaps.

4.2 Knowledge gaps for ICZM: State of Art

Screening existing literature, reports and documents on the availability of the knowledge in compatibility of the ICZM process and in light of the Indicator Framework knowledge gaps has been compiled for ICZM. The means to reduce the gaps have been indicated in the parenthesis and descriptions of means to reducing knowledge gaps are in next chapter.

- Linking mechanisms (protocols) for harmonization and coordination (creation, dissemination)
- Resource user's understanding of laws, regulations, standards, licenses (interpretation and dissemination)
- Legislation on ICZM issues (creation, interpretation and dissemination)
- Understanding of rules & international conventions related to marine fisheries (interpretation and dissemination)
- Participatory planning, decision-making, design and implementation and control (Accumulation, dissemination)

- Interpretation and implementation mechanism of various policy instruments (interpretation and dissemination)
- ICZM concept and tools including decision support systems and communication means (interpretation and dissemination)
- Impact of various inputs in to the system for ICZM (creation: monitoring)
- Detail land use including patterns and trends at sub district level (creation: monitoring)
- Criteria for land use planning and zoning (interpretation and dissemination)
- Digital Terrain Model with a 50 m resolution (creation and dissemination)
- Sustainable shrimp production system and conflict mitigation measures (Assimilation and dissemination)
- Volume, quality and abstraction of groundwater from shallow and deep aquifers (creation and dissemination)
- Sediment behavior and distribution in the deep sea and along the coast (creation and dissemination)
- Hydrology / hydraulics of the accreted area with tidal movement and velocities (creation and dissemination)
- Morphology and morphological processes (creation and dissemination)
- Predictive methods for future shaping of coastal zone (creation and dissemination)
- Analysis of land values gained and lost through erosion and accretion (Assimilation and dissemination)
- Bathymetry of the shallower parts of the Bay of Bengal (creation and dissemination)
- Salinity profile, Tidal behavior, Cyclone and Storm surge prediction (creation and dissemination)
- Erosion / accretion, topography, soil condition in the chars and inter-tidal areas (creation and dissemination)
- Biodiversity (Ecosystem level, species level and genetic level for both flora and fauna) (creation: monitoring)
- Potential of mangroves for the sustainable production of a range of products (creation and dissemination)
- Resource degradation process (Assimilation and dissemination)
- Air pollution in the coastal cities (creation and Dissemination)
- Physical impact of climate change (creation and Dissemination)
- Hydro-meteorological condition (creation and Dissemination)
- Assessment mechanism of fisheries, productivity, population dynamics of important species (creation and Dissemination)
- Spawning ground of the key fish species, Location of fishing grounds for demarsal stock (creation and Dissemination)
- Fisheries management (improved fishing technique, trawl, hilsha, pelagic potentials, fish health, artisanal gears, fisheries resource mapping, value adding, fish drying techniques) (creation and Dissemination)
- Impact of natural gas extraction (creation and Dissemination)
- Availability of sand and minerals creation, assimilation and dissemination)
- Guidelines and strategy for sustainable polder development (assimilation and dissemination)
- Soft methods for embankment and foreshore erosion control (assimilation and dissemination)
- Innovative and appropriate (friendly) water control structure (creation and dissemination)
- Status of cyclone shelter (Assimilation: state of art)
- Efficient honey collection method (creation and dissemination)
- Harnessing techniques of solar, wind and tidal energy (creation and dissemination)
- Low-cost economically beneficial techniques for making handicrafts (creation and dissemination)
- Turtle cultivation technology (creation and dissemination)
- Salt and water logging tolerant crops (creation and dissemination)
- Cropping techniques in saline environment (creation and dissemination)

- Male and female population migration pattern over the year (creation and dissemination)
- Physical status of human health (Assimilation and dissemination)
- Quality of education received by the students (Creation: Monitoring and evaluation)
- People's awareness on environmental hygiene (Assimilation and dissemination)
- Accessibility of people to GoB departments and NGOs (creation: monitoring and dissemination)
- Extent of CBOs and informal organizations (creation and dissemination)
- Extent and effect of violence (creation and dissemination)
- Deposited funds in the private sector (creation and dissemination)
- Spatial and seasonal fluctuations of wages (creation and dissemination)
- Female agricultural wage rate (creation and dissemination)
- Information on the accessibility of the poor people in ICZM institutions (creation and dissemination)
- Remittances received in each years and their destination (creation and dissemination)
- Regional distribution of export earning (Assimilation and dissemination)
- Fluctuations in employment and disguised unemployment (Assimilation and dissemination)
- District level distribution of income and expenditure (Assimilation and dissemination)
- Monetization of rural and urban sectors (Assimilation and dissemination)
- Trends in common property resources (Assimilation and dissemination)
- Water resource use map (creation and dissemination)
- Access to utilities and local facilities (creation and dissemination)
- People's knowledge, awareness and empowerment (creation and dissemination)
- Cohesion and conflict resolution (creation and dissemination)
- Disaggregated information on income, expenditure, savings, investments and debts (creation and dissemination)
- Effect of floods from eastern hill catchments (creation and dissemination)
- Health security in rural-urban and rich-poor strata (Assimilation and dissemination)
- Food security in rural-urban and rich-poor strata (Assimilation and dissemination)
- Water security and access to sanitation in rural-urban and rich-poor strata (Assimilation and dissemination)
- Decision making process, women's access to and control over production means (Assimilation and dissemination)
- Applicability of education and training (creation and dissemination)
- Awareness of coastal women regarding sustainable development and their position (creation, dissemination)
- Security, Mobility and Participation of women in decision making (creation, dissemination)
- Quantifiable market values of environmental goods and services (creation, dissemination)
- Pollution hot spots (creation, dissemination)
- Forest health index map (creation, dissemination)
- Effect of industries (especially ship breaking) and port activities on coastal health
- Protection and conservation techniques of coral reefs (creation, dissemination)
- Conservation of indigenous varieties of rice and other crops (creation, dissemination)
- Comprehensive estimates of pollution load and their effect in the water-bodies
- Impact of land based pollution (creation, dissemination)
- Impact of coastal aquaculture (creation, dissemination)
- Research on toxicity levels in fish/shellfish (creation, dissemination)
- Suitable and appropriate knowledge to identify interventions regarding accretion and erosion (creation and Dissemination)
- Assessment techniques for calculating project benefits and impacts (creation: monitoring and evaluation)

5 PROCESS TO REDUCE KNOWLEDGE GAP

Knowledge gaps for a particular organization could be generated from either endogenous factors (incapability to interpret and assimilate, disrupted horizontal and vertical information flow, ignorance of the existence of data and information) or exogenous factors (like, non-existence of data or information, non-accessibility to the existing data / information) or from both. This context can also change with time as needs for data or information might change resulting in increase or decrease of knowledge gap. ICZM process demands a continuous endeavor to reduce knowledge gap. The generic processes of reducing knowledge gap have been described in the following paragraphs.

5.1 Research / Creation

There are gaps in knowledge on the process of the natural, physical and human systems have to be generated through research. Relevant agencies will undertake research programs and shall maintain cooperation and coordination with research and academic organizations. Moreover, there should be dedicated program for analyzing data for predetermined routine purposes. Following are few examples;

- ◇ Marine biodiversity
- ◇ Effect of safety net programs on the target population
- ◇ People's participation in the democratic process
- ◇ Possible impact of climate change on Bangladesh coast
- ◇ Status of islands and chars
- ◇ Forest health index map
- ◇ Water use map
- ◇ Fisheries resources map
- ◇ Land use and zoning

Moreover, the organizations will develop scientific methodologies, modeling tools, models, information management systems, etc. to create new knowledge and reduce gap. Following are few examples;

- ◇ Cyclone Shelter Information Management System
- ◇ Development of portal on inventory of completed and existing program in CZ, lessons learned, primary data, problems in implementing and O&M, etc.
- ◇ Digital Terrain Model; A 50-meter resolution DTM for the coastal zone
- ◇ Fisheries resource assessment tool
- ◇ Upgrading of hydrodynamic models to morphological and ecological models and link these to hydro informatics module for socio-economic and environmental analysis towards developing a holistic knowledge of the system

5.2 Acquisition/Access

There is lack of data and again there might be data available to some agencies but are not open accessible. Data shall be gathered in case of lack e.g. water level over space and time. On the other hand many information and data are considered as classified by the organizations and agencies that hold and own the data and restricted by different rules and regulations. Agencies other than the owner might need these data cannot access, due to non-conducive rules and regulations. These types of restrictions could be revised and updated to make them more conducive for use by other partners. Some examples of knowledge gaps due to strict control are follows;

- ◇ Government's expenditure and investment data segregated by administrative districts and or by sectors
- ◇ Findings of the research and survey commissioned under various relevant institute and or authority, e.g. UGC, FRI, BUET etc.

5.3 Assimilation

Even the existence of data / information at the agency level does not ensure availability and usability of the knowledge at that agency due to the lack of capacity to analyze, interpret, synthesize and assimilate. Inefficient (or absent) bottomward / downward organizational information flow can also hinder the development of knowledge. Examples are, like –

- ◇ Department of Fisheries has adopted the 'Code of Conduct for Sustainable Fisheries', which has to be widely disseminated among the local level officers and the stakeholders and implication of implementation of the code has yet to be identified and measure has to be taken.
- ◇ Bangladesh Government has signed many conventions and treaties but the consequences of the conventions in the activities and policy directives have yet to be assimilated.

5.4 Training and awareness building

Awareness raising through information dissemination campaign among the partner organizations shall generate need of the organization and through training relevant organizational capacity shall increase to a level to implement and adopt ICZM process. Examples are,

- ◇ Understanding of the data and knowledge requirement for ICZM shall lead individual agencies to adjust their respective data collection procedure to incorporate data demand for ICZM
- ◇ A standard multi-faceted information flow system could be established among the partners of ICZM, bringing them in similar level of understanding.

5.5 Interaction

Net working, cooperation and coordination of the partners and their understanding and appreciation of the partner's activity shall facilitate and provide a close interaction that shall reduce knowledge gap.

5.6 Knowledge management tools

PDO has endeavored to build a platform for the partners through which information / data will be exchanged among them. Particular two initiatives are –

ICRD

Data / information regarding the coastal zone will be stored in the Integrated Coastal Resources Database. This database will be open access and subject to regular updating and revision. ICRD will follow the standard NWRD linkage

Knowledge Portal

Knowledge portal store available knowledge, analyzed information and selected data on a particular issue or subject related to ICZM. The knowledge portal acts as a source of ready reference to the users. PDO has developed a knowledge portal on Meghna Estuary.

6 KNOWLEDGE GAP FILLING

6.1 Program Coordination Unit

Knowledge gap filling activities shall be coordinated and pursued through the Program Coordination Unit (PCU), which is a coordinating & facilitating unit for ICZM program in Bangladesh. It is a multi-ministerial and multi-agency setup with MoWR as the lead ministry and WARPO as the lead agency.

The PCU is perceived to be the central body for coordination, harmonization and operationalization of ICZM process and to serve as a service setup for relevant government and non-government agencies, NGOs, LGIs, private sectors active in the coastal zone.

Empowerment of the coastal community shall be pursued equipping them with appropriate knowledge. The coastal community in this context includes resource users at large, key professionals and policy makers. Knowledge management shall include an operational integrated knowledge base, knowledge generation studies specially on regional scale, Multi dimensional communication mechanism across the coastal community to create awareness at large, and dissemination of information shall be the focus of investment in this regard.

In this context, the following interventions are on-going or in pipeline in the coastal zone.

- ◇ Development of the Integrated Coastal Resources Database

In view of the above, concept notes on the following programs have been made:

- *Knowledge management and dissemination* is one of the vehicles for establishing coordination and harmonization mechanism for the ICZM process. Knowledge base shall bring and unite the users/ partners for ICZM and provide the basis for holistic decision-making process for the coastal zone's sustainable development. Emphasis will be given on social communication approaches.
- Maintenance and updating of 'Integrated Coastal Resources Database' ICRD as the core of the knowledge base
- Prepare guidelines for structuring project database- Linkage between national and project databases
- Prepare bi-annual 'State of the Coast' report
- Establishing 'Resource Center' where coastal zone management related books, reports, documents from Bangladesh and overseas countries will be maintained. This will become a reference center for all coastal managers. Support links with district information centers.
- Outreach and dissemination through website, mass media, news letter, library and awareness materials
- Communicating knowledge both horizontally and vertically through partnership development, workshops/scientific meetings and others
- Knowledge coordination including acquisition (receive from partners and knowledge generator), archiving and assimilation and transaction. Establish protocols for smooth transaction of data and knowledge
- Formation and functioning of knowledge user group and knowledge generator network for regular identification of knowledge gap and pursue knowledge generation
- Tools development for functional operationalization of the knowledge system including knowledge analyzing tools, knowledge portals etc.

- Supporting knowledge dissemination and social communication through radio and TV stations located in the coastal zone and specially promoting community radio networks

Regional/framework studies. Many projects are being implemented in the coastal zone in any given period. The scopes of implemented projects are always specific, detailed but limited. The importance of regional/framework studies has been spelled out and elaborated, for example, in a recent (June 2004) Joint Bangladesh Netherlands Formulation Mission for the Char Development & Settlement Project. These studies are usually beyond the scope of individual projects. Examples of regional/framework studies are:

- Vision for future char development & settlement
- Coastal land zoning
- Resource inventory of the EEZ and its management plan
- Coastal groundwater management plan
- Compendium on polder development and settlement
- Development of a base Coastal Zone hydrodynamic model

Capacity Building & Training. It is widely acknowledged that the spotlight should be on human development, which would trigger growth in all sectors. Training is regarded as a core component of human development. This takes in two broad strata of population, the people at large and the professionals in the implementing agencies. Training is essential to enhance productive capacity of the people in existing occupations, as well as to create capacity in non-traditional activities that would absorb the “surplus labor” from traditional natural resources-based livelihoods. Training in the form of occupational skill and management is likely to trigger innovations in the job market. On the other hand, the planners and the practitioners in intervening institutions, both public and private, need to refresh them to understand ICZM linkages in their respective domains. Support will be given to course development, educational material development in universities and other training institutions. Activities include identification of human development (capacity building) needs, training needs assessment, identification of centers for training for different group of stakeholders, ToTs, implementation of training at upazila, zila and national level, specific advanced training in regional countries

6.2 Study commissioned

Following studies have been commissioned to Center for Environmental geographic Information services (CEGIS) to fill gaps required to formulate a coastal development strategy (CDS)

- ◇ Impact of the climate change on the coast of Bangladesh shall be assessed based on the findings and recommendations of 3rd IPCC. The impact shall cover salinity intrusion, storm surge heights and frequencies, tidal inundations regime and others.
- ◇ Coastal chars and islands inventory shall be validated and adjusted.
- ◇ Participatory planning process shall be demonstrated in to two districts. District development plans are to be implemented in a participatory mechanism. The process shall be streamlined
- ◇ Future scenarios of the resources bases including the human capitals are a pre requisite for planning and strategy development and shall therefore be projected.

REFERENCES

- CEGIS, 2004.** Vulnerability analysis of major livelihood groups in the coastal zone of Bangladesh. Center for Environmental and Geographic Information Services. Dhaka, 2004.
- CERP, 2000.** Preparation Report for the Proposed Coastal Zone Management Programme; Volume 1; Main Report. Second Coastal Embankment Rehabilitation Project Preparation Consultants, Jakko Poyry Consulting Oy in association with DHV Consultants BV, Mott Macdonald Group, Devconsultants, Techno Planners, House of Consultants Ltd and Desh Upodesh Ltd.; Bangladesh Water Development Board, Ministry of Water Resources, Dhaka, Bangladesh, December, 2000.
- DoF, 2003.** The future for fisheries: Findings and recommendations from the fisheries sector review and future development study. Department of Fisheries, Ministry of Fisheries and Livestock, Dhaka, Bangladesh, June, 2003.
- IPCC, 2002.** Dialogue on water and climate, Proposal to the 19th Session of the IPCC, International Steering Committee of the Dialogue on Water & Climate, Technical Advisory Task Force of the Dialogue. International Consortium of the Dialogue on Water and Climate, Geneva www.waterandclimate.org , International Panel of Climate Change, 17-20 April 2002.
- PDO-ICZMP, 2001.** Integrated Coastal Zone Management Program, Inception Report. Program Development Office for Integrated Coastal Zone Management Plan Project. Water Resources Planning Organization; Ministry of Water Resources, Bangladesh. Dhaka January 2001.
- PDO-ICZMP, 2002a.** Previous Initiatives and Base Conceptual Documents. Program Development Office for Integrated Coastal Zone Management Plan Project; Working Paper WP001. Water Resources Planning Organization; Ministry of Water Resources, Bangladesh. Dhaka May 2002.
- PDO-ICZMP, 2002b.** Vulnerabilities, Opportunities & Emerging Issues as Transpired from Four Regional Workshops. Program Development Office for Integrated Coastal Zone Management Plan Project; Working Paper WP003. Water Resources Planning Organization; Ministry of Water Resources, Bangladesh. Dhaka August 2002.
- PDO-ICZMP, 2002c.** Perceptions of Direct Stakeholders on Coastal Livelihoods. Program Development Office for Integrated Coastal Zone Management Plan Project; Working Paper WP004. Water Resources Planning Organization; Ministry of Water Resources, Bangladesh. Dhaka September 2002.
- PDO-ICZMP, 2003a.** Framework for Indicators for ICZM. Program Development Office for Integrated Coastal Zone Management Plan Project; Working Paper WP016. Water Resources Planning Organization; Ministry of Water Resources, Bangladesh. Dhaka October 2003.
- PDO-ICZMP, 2003b.** Coastal Livelihoods: An Introductory Analysis. Program Development Office for Integrated Coastal Zone Management Plan Project; Working Paper WP011. Water Resources Planning Organization; Ministry of Water Resources, Bangladesh. Dhaka January 2003.
- PDO-ICZMP, 2003c.** *Knowledge Portal on Estuary Development (KPED)*. Program Development Office for Integrated Coastal Zone Management Plan Project; Working paper WP017. Water Resources Planning Organization; Ministry of Water Resources, Bangladesh. Dhaka, May 2003.

PDO-ICZMP, 2003d. Coastal Livelihoods: Conditions and Context. Program Development Office for Integrated Coastal Zone Management Plan Project; Working Paper WP015. Water Resources Planning Organization; Ministry of Water Resources, Bangladesh. Dhaka June 2003.

PDO-ICZMP, 2004. *Living in the Coast: measuring quality of life.* Program Development Office for Integrated Coastal Zone Management Plan Project; Living in the Coast Series 3. Water Resources Planning Organization; Ministry of Water Resources, Bangladesh. Dhaka, April 2005.

Taifur, S.A.S.M., 2004. Comprehensive Study of e-Government Initiatives in Bangladesh, Final Report, Planning Commission, Ministry of Planning, Government of Bangladesh, Dhaka, Bangladesh, 2004.

APPENDIX 1: POTENTIAL PARTNERS OF ICZM KNOWLEDGE BASE

Organization / Agency	Main Sector	Role in Knowledge Management
Government / Semi-Government		
Bangladesh Agriculture Development Corporation	Agriculture	– Interpretation – Assimilation
Bangladesh Agriculture Research Council	Agriculture	– Creation through research – Storage and archiving – Dissemination
Bangladesh Atomic Energy Commission	Minerals and energy	– Creation through research – Storage and archiving – Dissemination
Bangladesh Bank	Economics and Finance	– Interpretation – Dissemination
Bangladesh Bureau of Educational Information and Statistics	Education	– Storage and archiving – Dissemination
Bangladesh Bureau of Statistics	Information	– Storage and archiving – Dissemination
Bangladesh Export Processing Zone	Industries	– Interpretation – Assimilation
Bangladesh Inland Water Transport Authority	Water resources	– Interpretation – Assimilation – Creation through research
Bangladesh Inland Water Transport Corporation	Transport	– Interpretation – Assimilation
Bangladesh Institute of Development Studies	Development	– Creation through research – Storage and archiving – Dissemination
Bangladesh Meteorological Department	Meteorology	– Creation through research – Storage and archiving – Dissemination
Bangladesh Parjatan Corporation	Industries	– Interpretation – Assimilation – Creation through research
Bangladesh Petroleum Corporation	Minerals	– Interpretation – Assimilation
Bangladesh Rice Research Institute	Agriculture	– Creation through research – Storage and archiving – Dissemination
Bangladesh Jute Research Institute	Agriculture	– Creation through research – Storage and archiving – Dissemination
Agriculture Information Services	Agriculture	– Storage and archiving – Dissemination
Directorate of Food	Agriculture	– Interpretation – Assimilation
Bangladesh Railway	Transport	– Interpretation – Assimilation
Bangladesh Road Transport Authority	Transport	– Interpretation – Assimilation
Bangladesh Rural Development Board	Rural Development	– Creation through research – Storage and archiving – Dissemination – Interpretation and assimilation
Bangladesh Small and Cottage Industries	Industries	– Interpretation

Organization / Agency	Main Sector	Role in Knowledge Management
Corporation		– Assimilation
Bangladesh Telephone and Telegraph Board	Communication	– Interpretation – Assimilation
Bangladesh Textile Mills Corporation	Industries	– Interpretation – Assimilation
Bangladesh Water Development Board	Water resources	– Creation through research – Storage and archiving – Dissemination – Interpretation and assimilation
Barisal City Corporation	Local government	– Interpretation – Assimilation
Bangladesh Livestock Research Institute	Agriculture	– Creation through research – Storage and archiving – Dissemination
Rural Development Academy	Rural Development	– Creation through research – Storage and archiving – Dissemination
Bangladesh Academy for Rural Development	Rural Development	– Creation through research – Storage and archiving – Dissemination
Rural Development & Cooperative Division	Rural Development	– Interpretation – Assimilation
Cooperative Department	Rural Development	– Interpretation – Assimilation
Local Government Division	Rural Development	– Interpretation – Assimilation
Directorate of Relief and Rehabilitation	Relief and Rehabilitation	– Interpretation – Assimilation
Bangladesh Oil, Gas and Minerals Corporation	Oil, gas and minerals	– Interpretation – Assimilation – Creation through research
Civil Aviation Authority of Bangladesh	Transport	– Interpretation – Assimilation
Bangladesh Land Port Authority	Transport	– Interpretation – Assimilation
Department of Shipping	Transport	– Interpretation – Assimilation
Bangladesh Post Office	Communication	– Interpretation – Assimilation
Directorate of Technical Education	Education	– Interpretation – Assimilation
Directorate of Secondary and Higher Education	Education	– Interpretation – Assimilation
University Grants Commission	Education	– Interpretation – Assimilation
Ministry of Health & Family Welfare	Health	– Interpretation – Assimilation
Directorate of Women's Affairs	Social and Women Affairs	– Interpretation – Assimilation
Directorate of Youth Development	Social and Women Affairs	– Interpretation – Assimilation
Implementation, Monitoring & Evaluation Division	Economics & Finance	– Interpretation – Assimilation
Chittagong City Corporation	Local Government	– Interpretation

Organization / Agency	Main Sector	Role in Knowledge Management
		– Assimilation
Chittagong Development Authority		– Interpretation – Assimilation
Chittagong Water Supply and Sewerage Authority	Health	– Interpretation – Assimilation
Department of Environment	Environment	– Interpretation – Assimilation – Creation through research
Department of Fisheries	Agriculture	– Interpretation – Assimilation
Department of Land Record Survey	Land	– Creation through research – Storage and archiving – Dissemination – Interpretation and assimilation
Department of Livestock	Agriculture	– Interpretation – Assimilation
Department of Social Services	Social and Women Affairs	– Interpretation – Assimilation
Departmental of Agriculture Extension	Agriculture	– Interpretation – Assimilation
Directorate of Primary Education	Education	– Interpretation – Assimilation
Directorate of Public Health Engineering	Water	– Interpretation – Assimilation
Disaster Management Bureau	Disaster	– Creation through research – Storage and archiving – Dissemination – Interpretation and assimilation
Economic Relations Division, Finance Ministry	Economics & Finance	– Interpretation – Assimilation
Forest Department	Agriculture	– Creation through research – Storage and archiving – Dissemination – Interpretation and assimilation
Bangladesh Forest Research Institute	Agriculture	– Creation through research – Storage and archiving – Dissemination
Geological Survey of Bangladesh	Gas, Oil and Mineral resources	– Creation through research – Storage and archiving – Dissemination
Khulna City Corporation	Local government	– Interpretation – Assimilation
Khulna Development Authority		– Interpretation – Assimilation
Khulna University	Education	– Creation through research – Storage and archiving – Dissemination
Local Government Engineering Department	Rural Development	– Creation through research – Storage and archiving – Dissemination – Interpretation and assimilation
Mongla Port Authority		– Interpretation – Assimilation
National Board of Revenue	Economics & Finance	– Interpretation – Assimilation

Organization / Agency	Main Sector	Role in Knowledge Management
Planning Commission	Planning	– Interpretation – Assimilation
Police Department	Law and order	– Interpretation – Assimilation
Power Development Board	Energy	– Interpretation – Assimilation
River Research Institute	Water	– Creation through research – Storage and archiving – Dissemination
Roads & Highways Department	Transport	– Interpretation – Assimilation
Rural Electrification Board	Energy	– Interpretation – Assimilation
Soil Resources Development Institute	Soil	– Creation through research – Storage and archiving – Dissemination
Space Research and Remote Sensing Organization		– Creation through research – Storage and archiving – Dissemination
Survey of Bangladesh		– Creation through research – Storage and archiving – Dissemination
Project		
Greater Noakhali Aquaculture Extension Project	Agriculture	– Interpretation – Assimilation – Creation through research
Empowerment of Coastal Fishing Community for Livelihood Security Project	Agriculture	– Interpretation – Assimilation – Creation through research
Patuakhali – Barguna Aquaculture Extension Project	Agriculture	– Interpretation – Assimilation – Creation through research
Fourth Fisheries Project	Agriculture	– Interpretation – Assimilation – Creation through research
Smallholder Livestock Development Project in Five Southern Districts	Agriculture	– Interpretation – Assimilation – Creation through research
Sustainable Environment Management Program	Environment	– Interpretation – Assimilation – Creation through research
Coastal and Wetland Biodiversity Management at Cox's Bazar and Hakaluki haor	Environment	– Interpretation – Assimilation – Creation through research
Reducing Vulnerability to Climate Change Project	Environment	– Interpretation – Assimilation – Creation through research
Coastal Embankment Rehabilitation Project	Land	– Interpretation – Assimilation – Creation through research
Char Development and Settlement Project	Land	– Interpretation – Assimilation – Creation through research
Sundarban Biodiversity Conservation Project	Agriculture	– Interpretation – Assimilation

Organization / Agency	Main Sector	Role in Knowledge Management
		– Creation through research
NGO		
Action Aid	Development	– Creation through research – Storage and archiving – Dissemination – Interpretation – Assimilation
ASA	Development	– Creation through research – Storage and archiving – Dissemination – Interpretation – Assimilation
Association of Development Agencies in Bangladesh	Development	– Creation through research – Storage and archiving – Dissemination – Interpretation – Assimilation
Bela	Development	– Creation through research – Storage and archiving – Dissemination – Interpretation – Assimilation
BRAC	Development	– Creation through research – Storage and archiving – Dissemination – Interpretation – Assimilation
CARITAS	Development	– Creation through research – Storage and archiving – Dissemination – Interpretation – Assimilation
Oxfam	Development	– Creation through research – Storage and archiving – Dissemination – Interpretation – Assimilation
Proshika	Development	– Creation through research – Storage and archiving – Dissemination – Interpretation – Assimilation
Other		
Bangladesh Agriculture University	Education	– Creation through research – Storage and archiving – Dissemination
Center for Environmental and Geographic Information System	Environment	– Creation through research – Storage and archiving – Dissemination
United Nation International Children Emergency Fund	Development	– Creation through research – Storage and archiving – Dissemination – Interpretation – Assimilation
United Nations Development Program	Development	– Creation through research

Organization / Agency	Main Sector	Role in Knowledge Management
		<ul style="list-style-type: none"> - Storage and archiving - Dissemination - Interpretation - Assimilation
World Bank	Development	<ul style="list-style-type: none"> - Creation through research - Storage and archiving - Dissemination - Interpretation - Assimilation
Chittagong University	Education	<ul style="list-style-type: none"> - Creation through research - Storage and archiving - Dissemination
Grameen Phone Limited	Communication	<ul style="list-style-type: none"> - Interpretation - Assimilation
Institute of Water and Flood Management	Water	<ul style="list-style-type: none"> - Creation through research - Storage and archiving - Dissemination
Institute of Water Modeling	Water	<ul style="list-style-type: none"> - Creation through research - Storage and archiving - Dissemination
International Union of Conservation of Nature	Environment	<ul style="list-style-type: none"> - Creation through research - Storage and archiving - Dissemination
Coastal Fisher-folk Community Network	Development	<ul style="list-style-type: none"> - Creation through research - Storage and archiving - Dissemination
Department of International Development	Development	<ul style="list-style-type: none"> - Creation through research - Storage and archiving - Dissemination - Interpretation - Assimilation
Co-operative American Relief Everywhere	Development	<ul style="list-style-type: none"> - Creation through research - Storage and archiving - Dissemination - Interpretation - Assimilation

APPENDIX 2: TABLE OF CONTENTS - WHERE LAND MEETS THE SEA: A PROFILE OF THE COASTAL ZONE OF BANGLADESH

<i>PART 1: INTRODUCTION</i>
Background, Delineation of the coastal zone, Traditional coastal development, The process of change, Definition and implementation of integrated coastal zone management, Limitations, Intention and structure of the Profile
<i>PART 2: NATURAL CONDITIONS</i>
GEOGRAPHY; Geographical setting and characteristics, Genesis of the Delta, Bay of Bengal, Islands and chars
CLIMATE; Seasons, Rainfall, Evaporation and humidity, Temperature, Sunshine, Wind
GEOLOGY AND SOILS; Geological history, History of the formation of Bangladesh, History of the formation of the delta and estuary, Geomorphology, Soils, Typology, Soil nutrient status, Agro-ecological zones, Acid sulphate soils, Land type, Mineral resources
HYDROMORPHOLOGY; The water resources system, Introduction, Rivers and channels, Flood plains, Intertidal lands, Ponds and beels (lakes), Groundwater aquifers, The sea, Fresh water inflow, Tides, Waves, Salinity processes, Sediments, erosion and accretion, Sediment transport processes, Sediment characteristics & concentrations, Accretion and erosion, Remote sensing and surveys
ECOLOGY; Aquatic ecosystem, Marine ecosystem, Brackish water ecosystem, Freshwater ecosystem, Terrestrial ecosystem, Forests, Interspersed / Interconnected ecosystems, Floodplain ecosystem, Mangrove ecosystem, Island ecosystem, Peninsula ecosystem, Conservation of the ecosystems and biodiversity
HAZARDS; Cyclones, Storm surges, Tornados, Floods, Drought, Earthquakes, Arsenic levels, Salinity, Water logging, Pollution, Global climate change and sea level rise
<i>PART 3: HUMAN CONDITIONS</i>
DEMOGRAPHY; Population, Characteristics: Rural, Urban, Age- and sex-composition; life expectancy, Ethnic composition, Migration patterns and trends, Population Projection
GENDER ASPECTS & STATUS; Gender in the coast, Gender status analysis, Women's participation in public life, Gender in CZ: disparity & status
LIVELIHOODS; Education, Health and health services, Drinking water and sanitation, Housing, Livelihood activities, Land distribution, Social stratification, Income and poverty, Vulnerabilities
<i>PART 4: INFRASTRUCTURE</i>
INFRASTRUCTURE FOR LAND AND WATER MANAGEMENT AND DISASTER PREPAREDNESS; Polders, Cross dams, Erosion protection, Disaster Preparedness, Domestic water supply
INFRASTRUCTURE FOR ECONOMIC ACTIVITIES; Agriculture, Fisheries and aquaculture, Forestry, Industry, Tourism
INFRASTRUCTURE FOR HEALTH, EDUCATION, SERVICES AND TRANSPORTATION; Health infrastructure, Sanitation infrastructure, Education infrastructure, Public services, Transportation
<i>PART 5: SOCIO-ECONOMIC CONDITIONS</i>
SOCIO-ECONOMIC SETTING; National economic significance of the coastal zone, Gross Domestic Product (GDP), Private sector, Labor force and employment situation, Income and expenditure
ECONOMIC ACTIVITIES; Agriculture, Forestry, Fisheries, Aquaculture, Industrialization, Tourism

FINANCIAL RESOURCES; Investments, Social safety nets & micro-credits, Savings
PART 6: INSTITUTIONAL ARRANGEMENTS
INSTITUTIONS AND ORGANIZATIONS; National government institutions, Local government institutions, Private sector, NGOs and CBOs, Informal institutions, Networking
LAWS AND REGULATIONS; Relevant laws and ordinances, Establishment of special areas, Standards, Enforcement
INTER-INSTITUTIONAL COORDINATION; Role of different organizations, Communication lines and procedures, Disaster management, National Water Resources Council, Proposed co-ordination mechanism for coastal management
INTERNATIONAL CONVENTIONS AND ORGANIZATIONS; International conventions and treaties, Supporting international & regional organisations
POLICIES, STRATEGIES AND PLANS; The coastal zone in national strategies and long-term plans, The coastal zone in sector policies, National plans of coastal zone relevance, Policy note on ICZM, Coastal Zone Policy (CZPo), Coastal Development Strategy (CDS)
PROJECTS
KNOWLEDGE BASE & MANAGEMENT; Introduction, Knowledge Management Approaches, Data collection and monitoring, Databases on water and other natural resources, National Water Resources Database, Proposed Integrated Coastal Resources Database (ICRD), Knowledge Dissemination & Communication, Capacity Building for Knowledge Users

APPENDIX 3: DATA LAYERS IN THE PROPOSED INTEGRATED COASTAL RESOURCE DATABASE (ICRD)

As on December 2004

Sl. No	Group	Component	Sub-component	Name of the Data Layer
Existing Data layers in ICRD				
1	NRE	Land	Agricultural Land	Agricultural Land Types, 1999
2	NRE	Land	Agricultural Land	Soil Properties (Physical) in Selective Islands
3	NRE	Land	Agricultural Land	Soil Properties (Chemical) in Selective Islands
4	NRE	Land	Agricultural Land	Soil Conditions
5	NRE	Land	Ponds and Ghers	Pond and Shrimp Ghers (Area), 2001-02
6	NRE	Land	Settlement Area/Industrial Area/ Infrastructure	Land Used Information
7	NRE	Land	Settlement Area/Industrial Area/ Infrastructure	Godown Facility
8	NRE	Land	Settlement Area/Industrial Area/ Infrastructure	Utilities Information
9	NRE	Land	Settlement Area/Industrial Area/ Infrastructure	Irrigation Facilities
10	NRE	Land	Settlement Area/Industrial Area/ Infrastructure	Social Information
11	NRE	Land	Settlement Area/Industrial Area/ Infrastructure	Educational Institutions
12	NRE	Land	Settlement Area/Industrial Area/ Infrastructure	Health related Information
13	NRE	Land	Settlement Area/Industrial Area/ Infrastructure	Agricultural Product
14	NRE	Land	Settlement Area/Industrial Area/ Infrastructure	Development Projects
15	NRE	Ground Water	Shallow Aquifer	Shallow Aquifer of Some Thanas
16	NRE	Meteorological Condition	Wind	Wind Speed of Selective Area, 2000
17	NRE	Meteorological Condition	Wind	Cyclone Landfall of Selective Area, 2001
18	NRE	Fish and other Aquatic Resources	Fish and other Aquatic Resources	Fish Catch from Main Sources
19	NRE	Fish and other Aquatic Resources	Fish and other Aquatic Resources	Fish Catch by Species, 2000-2001
20	NRE	Non-renewable Resources	Gas and Oil	Natural Gas Field Information, June 2004
21	NRE	Non-renewable Resources	Sand and Minerals	Mineral Resources
22	NRE	Health of Ecosystems	Mangroves	Threatened Living Things
24	ECO	Macro Economics	Foreign Currency Earning	Investments and Export in EPZs
25	ECO	Sectoral Economic Activities	Agriculture	Plantation in Selective Area
26	ECO	Sectoral Economic Activities	Agriculture	Crop Production of Some Districts, 1998-99
27	ECO	Sectoral Economic Activities	Agriculture	Rice Production
28	ECO	Sectoral Economic Activities	Agriculture	Agriculture Labor Households, 1996
29	ECO	Sectoral Economic Activities	Agriculture	Rural Households by Farm size, 1999
30	ECO	Sectoral Economic Activities	Agriculture	Forest Coverage, 2001
31	ECO	Sectoral Economic Activities	Agriculture	Forest Products from Sundarban, 2001
32	ECO	Sectoral Economic Activities	Industry	Salt Cultivation of Some Thanas, 2002-03
33	ECO	Sectoral Economic Activities	Industry	Handloom Units, 1991
34	ECO	Sectoral Economic Activities	Industry	Brick Kiln Information
35	ECO	Sectoral Economic Activities	Industry	Visitor Arrivals by Zone
36	ECO	Sectoral Economic Activities	Services	Growth Center, 1996
37	ECO	Sectoral Economic Activities	Fishery	Harvesting Method by Selective Area, 2002
38	ECO	Sectoral Economic Activities	Fishery	Employment Status by Livelihood Groups, 2002
39	ECO	Sectoral Economic Activities	Fishery	Shrimp Fry Collectors of Selective Area, 2002
40	ECO	Sectoral Economic Activities	Fishery	Marine Craft and Gear, 2000-2001
41	ECO	Sectoral Economic Activities	Fishery	Marine Fisheries Status, 2003
42	ECO	Sectoral Economic Activities	Fishery	Shrimp Fry Availability in Selective Area
43	ECO	Sectoral Economic Activities	Fishery	Shrimp Hatcheries
44	ECO	Sectoral Economic Activities	Fishery	Shrimp Production
45	ECO	Macro Finances	Savings	Bank Advances and Deposits

Sl. No	Group	Component	Sub-component	Name of the Data Layer
46	ECO	Macro Finances	Wages	Wage Rate of Agriculture Laborers of some districts
47	ECO	Macro Finances	Wages	Wage Rate of Construction Laborers of some districts
48	ECO	Credit	Credit	Credit Disbursement by Krishi Bank
49	ECO	Credit	Credit	Micro finance of Local NGOs
50	ADM	Institutions and Organizations	GoB Organizations	Agricultural Research Facilities (NARS)
51	ADM	Institutions and Organizations	GoB Organizations	Government Project
52	ADM	Institutions and Organizations	NGOs	Grameen Bank branches, 2001
53	ADM	Institutions and Organizations	NGOs	NGOs Distribution
54	ADM	Institutions and Organizations	NGOs	NGOs Distribution by Sectoral Activities
55	ADM	Institutions and Organizations	NGOs	National NGOs Members
56	ADM	Institutions and Organizations	NGOs	NGO projects
57	ADM	Institutions and Organizations	NGOs	NGOs Activities over Street Children
58	ADM	Institutions and Organizations	Informal Organizations	Non-profit Institutions of Selective Districts
59	ADM	Administrative Area	Administrative Area	Administrative Units
60	ADM	Administrative Area	Administrative Area	District and Upazila Name
61	ADM	Administrative Area	Administrative Area	Protected Areas
63	FUN	Safety Nets	Food Assisted Program	VGD Allocation by Thana
65	FUN	Safety Nets	Food Assisted Program	Rural Development Program of WFP
67	FUN	Safety Nets	Food Assisted Program	Boyoshko Bhata Program
68	FUN	Safety Nets	Food Assisted Program	Dustha Mohila Bhata Program
70	HUM	Demography	Demography	Life Table for Bangladesh Population, 2000
74	INF	Protection	Protection	Cyclone Shelter Number
75	INF	Protection	Protection	Cyclone Shelter (Purpose Built) Number
76	INF	Protection	Protection	Polder (124) Features of Selective Districts
77	INF	Protection	Protection	Flood Protection Infrastructures of Selective Districts
78	INF	Communication Sector	Communication Sector	Telephone Connection by Zone
79	INF	Protection	Protection	Cyclone Shelter Information By Thana
80	INF	Agriculture Sector	Agriculture Sector	Aquaculture Production Infrastructure
81	INF	Agriculture Sector	Agriculture Sector	Fisheries Service Centers
82	INF	Agriculture Sector	Agriculture Sector	Storage Facility of Selective Districts
83	INF	Agriculture Sector	Agriculture Sector	Pumps Installation
84	INF	Agriculture Sector	Agriculture Sector	Rice Processing Infrastructure
85	INF	Agriculture Sector	Agriculture Sector	Irrigation Projects
86	INF	Agriculture Sector	Agriculture Sector	Irrigation Units
87	INF	Power Sector	Power Sector	Power Plants of BPDB
88	INF	Power Sector	Power Sector	REB Stations
89	INF	Power Sector	Power Sector	Power Volt Sale of Selective Districts
90	INF	Power Sector	Power Sector	Wind Turbine Installations
91	INF	Transport Sector	Transport Sector	Export and Import at Ports
92	INF	Transport Sector	Transport Sector	Mooring Places for Ferries in Selective Districts
93	INF	Transport Sector	Transport Sector	Railway Route of Selective Districts
94	INF	Transport Sector	Transport Sector	Road Density
95	INF	Transport Sector	Transport Sector	Roads Statistics of Selective Districts
96	INF	Health Sector	Health Sector	Health Facilities
97	INF	Health Sector	Health Sector	Family Planning Assistant
98	INF	Health Sector	Health Sector	Hospital Status
99	INF	Health Sector	Health Sector	Sanitary Latrine Sales Center of Selective Districts
100	INF	Health Sector	Health Sector	Sinking Deep Tube Well
101	INF	Health Sector	Health Sector	Rural Water Supply by Thana, 2002
102	INF	Health Sector	Health Sector	Rural Water Supply by District, 2001
103	INF	Health Sector	Health Sector	Tube Well Number in Selective Districts
104	HUM	Human and Household Assets	Education and Skills	Primary Educational Status
105	HUM	Human and Household Assets	Education and Skills	Literacy Percentage for Urban Population, 1999
106	HUM	Human and Household Assets	Education and Skills	Literacy Rates
107	HUM	Human and Household Assets	Education and Skills	Educational Status, 1991
108	NRE	Health of Ecosystems	Mangroves	Educational Data (BANBEIS) by Upazilla
109	INF	Education Sector	Education Sector	Educational Data (BANBEIS) by District

Sl. No	Group	Component	Sub-component	Name of the Data Layer
110	HUM	Human and Household Assets	Health	Arsenic Contamination in Drinking Water
111	HUM	Human and Household Assets	Health	Household by Type of Latrine
112	HUM	Human and Household Assets	Health	Households by Source of Water
113	HUM	Human and Household Assets	Health	Health Status of Children
114	HUM	Human and Household Assets	Health	Infant Mortality Rate and Fertility Rate, 1997
115	HUM	Human and Household Assets	Health	Calorie and Protein Intake
116	HUM	Human and Household Assets	Health	Morbidity from Disease
117	HUM	Human and Household Assets	Health	Sanitation Behavior
118	HUM	Human and Household Assets	Health	Communicable Disease Information by Zone, 1998
119	HUM	Human and Household Assets	Health	Sanitation Status, 2001
120	HUM	Human and Household Assets	Health	Drinking Water Status, 2001
121	HUM	Social Assets	Social Assets	Household Social Assets in PDSCL
122	HUM	Social Assets	Social Assets	Marital Status of Women
123	HUM	Financial Assets	Financial Assets	Household by Crisis Coping Measures, 1999
124	HUM	Financial Assets	Financial Assets	Income Disposal in PDSCL
125	HUM	Financial Assets	Financial Assets	Financial Assets in PDSCL
126	HUM	Financial Assets	Financial Assets	Households (Urban) by Main Source of Income
127	HUM	Financial Assets	Financial Assets	Vulnerabilities by Occupations in PDSCL
128	HUM	Financial Assets	Financial Assets	Credit Source
129	HUM	Natural Assets	Natural Assets	Household by Land Holding Group
130	HUM	Natural Assets	Natural Assets	Land Owned by Farm Size
131	HUM	Natural Assets	Natural Assets	Land Ownership Pattern
132	HUM	Natural Assets	Natural Assets	Agriculture Land Per Person, 1996
133	HUM	Natural Assets	Natural Assets	Agriculture Land Holding Status, 2001
134	HUM	Physical Assets	Physical Assets	Household as Per Cattle Holding, 1996
135	HUM	Physical Assets	Physical Assets	Household by Electricity Connection in Selective Districts
136	HUM	Physical Assets	Physical Assets	Household by Wall Material in Selective Thanas, 1991
137	HUM	Physical Assets	Physical Assets	Households by Roof Material by Selective Thanas, 1991
138	HUM	Physical Assets	Physical Assets	Households (Urban) by Roof Material by Selective Thanas, 1992
139	HUM	Physical Assets	Physical Assets	Housing Condition, 1991
140	HUM	Physical Assets	Physical Assets	Physical Asset Ownership, 1991
141	HUM	Physical Assets	Physical Assets	Households with Electricity Connection, 1991
142	HUM	Physical Assets	Physical Assets	Electricity Supply Status, 2001
143	HUM	Income	Income	Household by Main Source of Income, 2002
144	HUM	Income	Income	Households by Poverty Measures, 1998
145	HUM	Income	Income	Household Expenditures, 2002
146	HUM	Income	Income	Poverty Incidence, 1999
147	HUM	Demography	Demography	District Area and Population
148	HUM	Demography	Demography	Population in Rural and Urban Settings
149	HUM	Demography	Demography	Migration Direction (Domestic)
150	HUM	Demography	Demography	Religious Communities of Selective Districts
151	HUM	Demography	Demography	Population Distribution in Urban, 1991
152	HUM	Demography	Demography	Household and Population by Sex, 2001
153	HUM	Demography	Demography	Household Characteristic
154	HUM	Demography	Demography	Immigrants Number
155	HUM	Demography	Demography	Life Expectancy at Birth
156	HUM	Demography	Demography	Life Expectancy at Birth by Year
157	HUM	Demography	Demography	Migration (Lifetime Internal) of Bangladesh
158	HUM	Demography	Demography	Migration Status, 1991
159	HUM	Demography	Demography	Population by Age Group, 1991
161	HUM	Demography	Demography	Population of Municipalities and SMA, 2001
162	HUM	Demography	Demography	Population of Urban in Selective Districts, 1999
163	HUM	Demography	Demography	Population Projections
164	HUM	Demography	Demography	Migration of Respondents of PDSCL
165	HUM	Demography	Demography	Sex Ratio by Age Group, 2001
166	HUM	Demography	Demography	Upazila Statistics, 2001

Sl. No	Group	Component	Sub-component	Name of the Data Layer
167	HUM	Demography	Demography	Urban Slums Statistics in Selective Thanas, 1997
168	HUM	Demography	Demography	Tribal Population, 1991
169	FUN	Safety Nets	Food Assisted Program	Population Percentage Comparison for Selective Divisions, 1991
175	HUM	Human and Household Assets	Health	Acid Attack Cases, Division wise Comparison
176	HUM	Human and Household Assets	Health	Violent Occurrences, Division wise Comparison
203	NRE	Land	Ponds and Ghers	Pond and Shrimp Gher Area
204	NRE	Meteorological Condition	Rainfall	Cyclonic Storm Chronology
205	NRE	Meteorological Condition	Wind	Cyclonic Floods (Historical)
206	NRE	Meteorological Condition	Wind	Cyclone Landfall Distribution (Monthly), 1891-1991
207	NRE	Meteorological Condition	Wind	Cyclone Path in Bangladesh
208	NRE	Meteorological Condition	Wind	Cyclone Land Fall Information (Recent Past)
209	NRE	Meteorological Condition	Wind	Cyclones Occurrence over 200 Years
214	NRE	Sea	Estuary Branches and Coastal Waters	Tide Level Variation (Mean) over Year
215	NRE	Sea	Deep Sea	Wave Height Prediction
216	NRE	Surface Water	River	Main River Length
217	NRE	Surface Water	River	Drainage Systems with Major Rivers in KJDRP
219	NRE	Surface Water	Floodplains (Wetland)	Floodplain of Major Types
227	ADM	Institutions and Organizations	GoB Organizations	National Water Resources Council Meetings
231	ADM	Institutions and Organizations	GoB Organizations	Authorities with Sanctioning or Registration
232	ADM	Institutions and Organizations	GoB Organizations	Sponsoring Agencies with Responsibilities
233	ADM	Institutions and Organizations	GoB Organizations	Union Parishad Activities
235	ADM	Institutions and Organizations	GoB Organizations	ICZM Objectives and Coastal Zone Definitions Relationship
236	ADM	Institutions and Organizations	NGOs	COFCON members
238	ADM	Institutions and Organizations	NGOs	NGO Selection Criteria of ECFC
239	ADM	Institutions and Organizations	FMOs/ CBOs	WMF Draft By-laws (in Bangla) in KJDRP
240	ADM	Institutions and Organizations	FMOs/ CBOs	Agreement between BWDB-WMA in KJDRP
241	ADM	Institutions and Organizations	FMOs/ CBOs	Management Guidelines for Leased Properties in KJDRP
242	ADM	Institutions and Organizations	FMOs/ CBOs	WMA Sample By-laws of (in Bangla) in KJDRP
243	ADM	Institutions and Organizations	FMOs/ CBOs	Local Level Institutions of CDSP with Domains
244	ADM	Institutions and Organizations	FMOs/ CBOs	LADC Information in CDSP, 2002-2003
245	ADM	Institutions and Organizations	FMOs/ CBOs	Local Level Institutions of CDSP
246	ADM	Institutions and Organizations	FMOs/ CBOs	VO and Different Institutions Relationship
247	ADM	Institutions and Organizations	FMOs/ CBOs	SPC Information in CDSP, 2002-2003
249	ADM	Institutions and Organizations	FMOs/ CBOs	PC and SPC Structure
250	ADM	Institutions and Organizations	FMOs/ CBOs	Institutions Facilitated by ECFC
251	ADM	Institutions and Organizations	FMOs/ CBOs	Water Management System of CDSP
252	ADM	Institutions and Organizations	NGOs	NGOs Sectoral Distribution
253	ADM	Institutions and Organizations	GoB Organizations	Institutional Linkage in Fisheries Sector
254	ADM	Institutions and Organizations	GoB Organizations	NARS Organogram
255	ADM	Institutions and Organizations	GoB Organizations	SBSUA Project's Implementing Arrangement
256	ADM	Institutions and Organizations	Informal Organizations	Institutional Environment Components
257	ADM	Institutions and Organizations	GoB Organizations	Knowledge Base Indication of Development Projects
258	ADM	Laws and Regulations	Laws	Laws Related to ICZM
259	ADM	Laws and Regulations	Regulations	Environment Treaties
260	ADM	Laws and Regulations	Laws	Notification on Aquaculture and Hatchery Declared Industry
261	ADM	Laws and Regulations	Laws	Bangladesh Water and Power Development Board Order, 1972
262	ADM	Laws and Regulations	Laws	Notification on Shrimp Fry Catching
263	ADM	Laws and Regulations	Laws	Notification and ordinance on
270	ADM	Laws and Regulations	Laws	Land Management Manual
271	ADM	Laws and Regulations	Laws	Marine Fisheries Ordinance 1964
272	ADM	Laws and Regulations	Laws	Notification on Banning Shrimp Fry Import
273	ADM	Laws and Regulations	Laws	Notification on Land Development tax
274	ADM	Laws and Regulations	Laws	Notification on Shrimp Committee Revised
275	ADM	Laws and Regulations	Laws	Notification on Shrimp Committee

Sl. No	Group	Component	Sub-component	Name of the Data Layer
276	ADM	Laws and Regulations	Laws	Notification on Tank Act
277	ADM	Laws and Regulations	Laws	Notification on Shrimp Land
278	ADM	Laws and Regulations	Laws	Shrimp Sector Legal and Institutional Review
279	ADM	Laws and Regulations	Laws	Notification on Shrimp Tax on Benefited Land
280	ADM	Laws and Regulations	Laws	Tanks Improvement Act 1939
281	ADM	Laws and Regulations	Laws	The East Bengal Protection and Conservation of Fish Act, 1963
282	ADM	Laws and Regulations	Laws	Fish and Fish Product Ordinances, 1983
283	ADM	Laws and Regulations	Laws	Fish Protection and Conservation Rules, 1985
284	ADM	Laws and Regulations	Laws	Fish Protection and Conservation Ordinance, 1982
285	ADM	Laws and Regulations	Laws	Water Pollution Ordinance
287	ADM	Mechanism of Participation	Participation	Guidelines for PC in CDSP
288	ADM	Mechanism of Participation	Participation	Guidelines for Fishing Village Selection of ECFC
289	ADM	Mechanism of Participation	Participation	Guidelines for SPC in CDSP
290	ADM	Mechanism of Participation	Participation	Guidelines of CDSP, GPP, and GPWM
291	ADM	Mechanism of Participation	Participation	Guidelines of O&M for WMC in CDSP
318	ECO	Macro Finances	Wages	National Women Policy
325	ECO	Macro Finances	Wages	Agriculture Wage Rate Fluctuation
326	ECO	Macro Finances	Wages	Agriculture Daily Wage Rates
329	ECO	Sectoral Economic Activities	Fishery	Shrimp Export Earnings for Bangladesh
333	ADM	Institutions and Organizations	GoB Organizations	Government Project Coverage for Urban
336	ADM	Institutions and Organizations	NGOs	NGOs Activities in Southwest Region
337	ADM	Institutions and Organizations	NGOs	NGOs Distribution by Activity and Location
338	ADM	Institutions and Organizations	FMOs/ CBOs	Investment in IGAs of KJDRP, September 2002
339	ADM	Institutions and Organizations	FMOs/ CBOs	WMO Contribution and Assessed Revenue in the KJDRP
340	ADM	Institutions and Organizations	FMOs/ CBOs	WMOs Funds Raised in KJDRP, September 2002
341	ADM	Institutions and Organizations	FMOs/ CBOs	WMA - WMF Committee of KJDRP
342	ADM	Institutions and Organizations	FMOs/ CBOs	Meetings and Consultations Held in KJDRP
343	ADM	Institutions and Organizations	FMOs/ CBOs	Assets Leased to WMAs in KJDRP, December 2002
344	ADM	Institutions and Organizations	FMOs/ CBOs	WMO Distribution by Zone in KJDRP, September 2002
345	ADM	Institutions and Organizations	FMOs/ CBOs	Campaign Materials Distributed in KJDRP, September 2002
346	ADM	Institutions and Organizations	FMOs/ CBOs	Institutional Development Related Milestones in KJDRP
347	ADM	Institutions and Organizations	FMOs/ CBOs	Beneficiary Number Received Training in KJDRP
348	ADM	Institutions and Organizations	FMOs/ CBOs	VOs and VDCs Status in ECFC, June 2003
349	ADM	Institutions and Organizations	FMOs/ CBOs	WMO Funds in KJDRP, September 2003
352	ADM	Laws and Regulations	Laws	Shrimp Related Laws and Relevance
355	ECO	Macro Economics	Employment	Labor Force (Active)
356	ECO	Macro Economics	Employment	Livelihood Activities Combination
357	ECO	Macro Economics	Employment	Private Sectors Contribution in Economy
358	ECO	Macro Economics	Employment	Livelihood Group (Major) Distribution
360	ECO	Macro Economics	Employment	Occupations of Slum Dwellers of Selective Area
361	ECO	Macro Economics	Employment	Occupations of Floating Population of Selective Area
363	ECO	Macro Economics	Employment	Fisher Household Statistics
366	ECO	Macro Finances	Wages	Agriculture Daily Wage in Char Mora Dona
369	ECO	Sectoral Economic Activities	Agriculture	Irrigation Status in Selective Districts, 1998-99
370	ECO	Sectoral Economic Activities	Agriculture	Female Headed Farm Households by Zone
372	FUN	Expenditures on Natural Resources Management	Water	Expenses in CDSP Area (2000 - 2002)
373	ADM	Institutions and Organizations	NGOs	NGOs Services to Disadvantaged Children in Selective Districts
374	ECO	Macro Economics	GDP	Sectoral Distribution of GDP
375	NRE	Surface Water	River	Coastal River
Data layers collected from NWRD				
17	NRE	Surface Water	River	Tidal Water Level of BWDB

Sl. No	Group	Component	Sub-component	Name of the Data Layer
20	NRE	Surface Water	River	Salinity (Monthly) of BWDB
21	NRE	Surface Water	River	Sediment Data of BWDB
23	NRE	Surface Water	River	Water Level Stations of BIWTA
25	NRE	Surface Water	River	Tidal Water Level Stations Overview
26	NRE	Surface Water	River	Salinity Levels
27	NRE	Surface Water	River	Salinity Impact in Sundarban
29	NRE	Surface Water	River	Surface Water Quality in Chittagong
31	NRE	Surface Water	River	Surface Water Quality in Khulna
33	NRE	Surface Water	River	Tidal Water Level Stations
34	NRE	Surface Water	Perennial water body	Beels Area
44	NRE	Chars and Inter-tidal areas		Islands and Chars Information
51	NRE	Forests	Plain land forest	Forest Land Information
55	NRE	Meteorological conditions	Wind	Wind Speed (Average)
67	NRE	Meteorological conditions	Rain fall	Rainfall (Average), 1999
69	NRE	Meteorological conditions	Other	Relative Humidity (Average)
71	NRE	Meteorological conditions	Other	Sunshine Hours
72	NRE	Meteorological conditions	Other	Temperature (Maximum and Minimum)
83	NRE	Fish and Other Aquatic Resources		Fish Catch from Beel
85	NRE	Fish and Other Aquatic Resources		Fish Catch from Boar
87	NRE	Fish and Other Aquatic Resources		Fish Catch Data
89	NRE	Fish and Other Aquatic Resources		Fish Catch from Flood Land
91	NRE	Fish and Other Aquatic Resources		Fish Catch from Captain Lake
93	NRE	Fish and Other Aquatic Resources		Fish Catch from Marine Source
95	NRE	Fish and Other Aquatic Resources		Fish Catch from Pond
97	NRE	Fish and Other Aquatic Resources		Fish Catch from River
99	NRE	Fish and Other Aquatic Resources		Fish Catch from Shrimp Farm
101	NRE	Fish and Other Aquatic Resources		Fish Catch from Water Area
132	HUM	Demography		Household Information 1981
134	HUM	Demography		Household Information 1991
143	HUM	Demography		Population Census 1974
145	HUM	Demography		Population Census 1981
147	HUM	Demography		Population Census 1991
160	HUM	Demography		Tribal Population 1991
164	HUM	Human and household assets	Health	Arsenic Concentration Information
174	HUM	Human and household assets	Health	Malnutrition Information
179	HUM	Human and household assets	Health	Disease and health Parameters, 1995
180	HUM	Human and household assets	Health	Disease and health Parameters, 1996
181	HUM	Human and household assets	Health	Disease and health Parameters, 1997
182	HUM	Human and household assets	Health	Disease and health Parameters, 1998
237	HUM	Income		Household Income (Average)
242	HUM	Income		Hard Core and Basic Poverty
311	ECO	Sectoral Economic activities and production system	Agriculture	Crop Loss by Natural Calamities
319	ECO	Sectoral Economic activities and production system	Agriculture	Crop Prices at Harvest
323	ECO	Sectoral Economic activities and production system	Agriculture	Rural Households Distribution
326	ECO	Sectoral Economic activities and production system	Agriculture	Cropping Status, 1996

Sl. No	Group	Component	Sub-component	Name of the Data Layer
328	ECO	Sectoral Economic activities and production system	Agriculture	Rural Households by Farm Category
351	ECO	Sectoral Economic activities and production system	Fishery	Shrimp Area
352	ECO	Sectoral Economic activities and production system	Fishery	Shrimp Production Information
353	ECO	Sectoral Economic activities and production system	Fishery	Marine Craft and Gear Information
354	ECO	Sectoral Economic activities and production system	Fishery	Fish Catch from Inland Waters
355	ECO	Sectoral Economic activities and production system	Fishery	Fish Catch from Ponds
356	ECO	Sectoral Economic activities and production system	Fishery	Fish Catch from Main Resources
498	ADM	Administrative area		Administrative Units
499	ADM	Administrative area		Union Name
Data layers to be collected				
1	ADM	Policies		Water Supply and Sanitation Policy (National)
2	ADM	Policies		Rural Development Policy (National)
3	ADM	Policies		Education Policy (National)
4	ADM	Policies		Industrial Policy
5	ADM	Policies		Health Policy
26	ADM	Plan		Environmental Management Plan
27	ADM	Plan		Water Management Plan (National)
28	ADM	Plan		Disaster Management Program
29	ADM	Plan		Forestry Master Plan
30	ADM	Plan		Tourism Master Plan
31	ADM	Institutions and organization	GoB organizations at different level	Mandates and Activities of GoB
32	ADM	Institutions and organization	GoB organizations at different level	Authority Level (National, Zila and Upazial)
33	ADM	Institutions and organization	GoB organizations at different level	Ongoing and Upcoming Project/Plan of Different Agencies
34	ADM	Institutions and organization	GoB organizations at different level	Focal Points of Coastal Related Activities
58	ADM	Institutions and organization	Informal organizations	Line Agencies Description
59	ADM	Institutions and organization	Informal organizations	Overseas Organization
60	ADM	Institutions and organization	Informal organizations	Institution Information (Research and Educational)
61	ADM	Institutions and organization	Informal organizations	International Organization
62	ADM	Institutions and organization	Informal organizations	Community Center
63	ADM	Institutions and organization	NGOs at different level	Mandates and Activities of NGOs
131	ADM	Laws and regulations	Regulations	Rules and Regulation (Govt.)
132	ADM	Laws and regulations	Regulations	Rules and Regulation (NGOs)
141	ADM	Strategies		ADP from National Funding
142	ADM	Strategies		ADP from International Funding
143	ADM	Strategies		Bio-Diversity Convention
144	ADM	Strategies		Wetlands Convention (Ramsar)
145	ADM	Strategies		Marine Pollution Prevention Convention
147	ADM	Administrative area		Economic Zone (Exclusive)
185	ECO	Macro economics	Employment	Economic Hardship
186	ECO	Macro economics	Employment	Livelihood Opportunities and Threats
187	ECO	Macro economics	Employment	Employment Rates
188	ECO	Macro economics	Employment	Human Development Index
189	ECO	Macro economics	Employment	Poverty Index
194	ECO	Macro finances	Revenue	Revenues by Sector
204	ECO	Sectoral economic activities and production system	Agriculture	Agricrops (Cost and Return)
245	ECO	Sectoral economic activities and production system	Industry	Fish Processing Industries
246	ECO	Sectoral economic activities and production system	Industry	Shrimp Processing Industries
247	ECO	Sectoral economic activities and production system	Industry	Fish (Dry) Processing Industries
248	ECO	Sectoral economic activities	Industry	Salt Production and Processing Industries

Sl. No	Group	Component	Sub-component	Name of the Data Layer
		and production system		
249	ECO	Sectoral economic activities and production system	Industry	Agro Processing Industries
250	ECO	Sectoral economic activities and production system	Industry	Shipping Industries
251	ECO	Sectoral economic activities and production system	Industry	Ship Breaking Industries
252	ECO	Sectoral economic activities and production system	Industry	Industry
253	ECO	Sectoral economic activities and production system	Industry	Industrial Effluent by Category
254	ECO	Sectoral economic activities and production system	Industry	Salt Cultivation Farms
255	ECO	Sectoral economic activities and production system	Industry	Tourist Spots (Major)
256	ECO	Sectoral economic activities and production system	Industry	Tourist Spots (Potential)
257	ECO	Sectoral economic activities and production system	Industry	Tourist Spots Accessibility
258	ECO	Sectoral economic activities and production system	Industry	Tourist Spot
259	ECO	Sectoral economic activities and production system	Industry	World Heritage Sites
261	FUN	Expenditures on natural resources management	Fish	Fishing Expenditure and Investment
262	FUN	Expenditures on natural resources management	Forest	Forest Plantation Expenditure and Investment
266	FUN	Expenditures on rural and urban infrastructure	Roads	Road Construction Expenditure and Investment
267	FUN	Expenditures on rural and urban infrastructure	Electricity	Electricity Supply Expenses
268	FUN	Expenditures on rural and urban infrastructure	Communication (tel)	Tele-Communication Expenses
270	FUN	Expenditures on rural and urban social services	Education	Educational Expenditure and Investment
271	FUN	Expenditures on rural and urban social services	Health	Health Sector Expenses
272	FUN	Expenditures on rural and urban social services	Family planning	Family Planning Expenses
273	FUN	Expenditures on rural and urban social services	Sanitation and water supply	Sanitation and Water Supply Expenses
274	FUN	Production and income generating activities	Extension services	Extension Services Expenses
275	FUN	Public safety and well-being	Law enforcement	Law Enforcement Expenses
276	FUN	Safety nets	Housing	Housing Expenditure and Investment
277	FUN	Safety nets	Disaster management	Disaster Management Expenditure and Investment
286	HUM	Demography		Population Occupation
287	HUM	Demography		Working Class Information
340	HUM	Human and household assets	Health	Waste Water Sources
341	HUM	Human and household assets	Health	Water Supply by Thana (Rural)
342	HUM	Human and household assets	Health	Water Supply by Thana (Urban)
343	HUM	Human and household assets	Health	Nutrition by Thana
344	HUM	Human and household assets	Health	Water Supply System
412	INF	Communication sector		Mobile Phone Communication
413	INF	Communication sector		Internet Communication
420	INF	Health sector		Health Centers
429	INF	Power sector		Biogas
430	INF	Power sector		Solar Power
431	INF	Power sector		Wave Energy
432	INF	Power sector		Wind Energy
433	INF	Power sector		Stirling Energy

Sl. No	Group	Component	Sub-component	Name of the Data Layer
436	INF	Protection		Cyclone Shelter
437	INF	Protection		Cyclone Shelter (Tertiary)
438	INF	Protection		Killars for Livestock
439	INF	Protection		Safety Situation
440	INF	Protection		Warning System
441	INF	Protection		Safety Standard (flooding)
442	INF	Protection		Earthquake Magnitude
443	INF	Protection		Earthquake Damages
444	INF	Transport sector		Shipping/Port
450	NRE	Chars and Inter- tidal areas		Chars and Islands
451	NRE	Chars and Inter- tidal areas		Land Reclamation (Char)
452	NRE	Chars and Inter- tidal areas		Khaslands (Char)
453	NRE	Chars and Inter- tidal areas		Islands Communication
454	NRE	Chars and Inter- tidal areas		Cox's Bazar Sea beach
455	NRE	Chars and Inter- tidal areas		Kuakata Sea beach
456	NRE	Chars and Inter- tidal areas		Detail Information of St. Martin
457	NRE	Chars and Inter- tidal areas		Detail Information of Nijhum Dwip
459	NRE	Fish and Other Aquatic Resources		Fish habitat
460	NRE	Fish and Other Aquatic Resources		Aquatic/Fisheries Species
481	NRE	Forests	Mangrove plantations	Mangrove Forest Species (Flora)
482	NRE	Forests	Plain land forests	Social Forest
483	NRE	Forests	Plain land forests	Reserved Forest
484	NRE	Forests	Plain land forests	Terrestrial habitats (Flora)
485	NRE	Forests	Plain land forests	Animals and Wild Life
486	NRE	Forests	Plain land forests	Birds
487	NRE	Forests	Natural mangroves (Sundarban)	Mangrove Species (Natural)
489	NRE	Ground water	Shallow aquifer	Aquifer (Shallow)
490	NRE	Ground water	Shallow aquifer	Groundwater Level Declination
493	NRE	Ground water	Deep aquifer	Aquifer (Deep)
494	NRE	Health of ecosystems	Homestead gardens	Habitats (Flora)
495	NRE	Health of ecosystems	Homestead gardens	Homestead Area
498	NRE	Health of ecosystems	Marine	Marin Plants Products
499	NRE	Health of ecosystems	Marine	Seaweeds and Sea grass
500	NRE	Health of ecosystems	Marine	Coral Reef
501	NRE	Health of ecosystems	Marine	Coral Ecosystem
502	NRE	Health of ecosystems	Marine	Crab, Oysters, clams, mollusks culture etc.
503	NRE	Health of ecosystems	Marine	Sea turtle, crocodiles, sea snakes etc.
504	NRE	Health of ecosystems	Wetlands	Phytoplankton
505	NRE	Land	Agricultural land	Soil Salinity
506	NRE	Land	Agricultural land	Soil Attribute Data
507	NRE	Land	Agricultural land	Soil Salinity Distribution
518	NRE	Land	Settlement area/ Industrial area/ Infrastructure	Soil Mapping Unit
519	NRE	Land	Settlement area/ Industrial area/ Infrastructure	Land use
520	NRE	Land	Settlement area/ Industrial area/ Infrastructure	Land use (Change)
521	NRE	Meteorological conditions	Air	Air Quality
522	NRE	Meteorological conditions	Rainfall	Strom Charge
523	NRE	Meteorological conditions	Rainfall	Storm Surge by Thana
524	NRE	Meteorological conditions	Wind	Cyclone Center
525	NRE	Meteorological conditions	Wind	Cyclone Frequency
526	NRE	Meteorological conditions	Wind	Cyclone Zone
543	NRE	Non-renewable resources	Gas and Oil	Potential Zone (Natural Gas and Oil)
546	NRE	Non-renewable resources	Sand and minerals	Natural Coal
547	NRE	Non-renewable resources	Sand and minerals	Marine Pollution
548	NRE	Non-renewable resources	Sand and minerals	Biomass Fuels
549	NRE	Non-renewable resources	Sand and minerals	Heavy Mineral
554	NRE	Surface Water	Floodplains (wetland)	Flood

Sl. No	Group	Component	Sub-component	Name of the Data Layer
555	NRE	Surface Water	Floodplains (wetland)	Damages
557	NRE	Surface water	River	Siltation
558	NRE	Surface water	River	Erosion and Accretion
559	NRE	Surface water	River	Erosion and Accretion (Probable Area)
560	NRE	Surface water	River	Tidal Bores
561	NRE	Surface water	River	Water Level (Monsoon)
562	NRE	Surface water	River	River Discharge to Bay of Bengal
563	NRE	Surface water	River	Offshore Wave Characteristics
564	NRE	Surface water	River	Detail River Data from IRS Images
565	NRE	Surface water	River	River Stations (Port and Ferighat)

APPENDIX 4: OUTPUT-WISE LIST OF PUBLICATIONS

Status : July, 2005

Output 1: Coastal Development Strategy

- ◆ Vulnerabilities, Opportunities & Emerging Issues as Transpired from Four Regional Workshops (WP003), August 2002*
- ◆ Proceedings of Preliminary Consultation on (CDS) Coastal Development Strategy (WP032), December 2004
- ◆ Coastal Development Strategy: Unlocking the potentials of the Coastal Zone, Draft, May, 2005
- ◆ Proceedings of District & Local Level Consultations on the Draft Coastal Development Strategy (WP-039), May, 2005

Output 2: Coastal Zone Policy

- ◆ Coastal Zone Management: an Analysis of Different Policy Documents (WP009), January 2003*
- ◆ Status of Implementation of Selected National Policies (WP010), April 2003*
- ◆ The process of Policy & Strategy Formulation (WP020), August 2003*
- ◆ Delineation of the Coastal Zone (WP005), December 2003*
- ◆ Proceedings of the District Level Consultations on the draft Coastal Zone Policy (WP026), December 2003*
- ◆ Coastal Zone Policy (Bangla), January, 2005*
- ◆ Coastal Zone Policy (English), April, 2005*

Output 3: Priority Investment Program

- ◆ Inventory of Projects & Initiatives in the Coastal Zone (WP006), November 2002*
- ◆ Inventory of Projects & Initiatives in the Coastal Zone (WP025), December 2003*
- ◆ Role of the Private Sector An assessment of the status in the coastal zone of Bangladesh (WP- 028), February 2004*
- ◆ Contribution of Integrated Coastal Zone Management Plan Project towards formulation of the Poverty Reduction Strategy Paper (PRSP) for Bangladesh, February 2004*
- ◆ Priority Investment Program: Criteria & Procedures Approach of project formulation through multi stakeholder consultation discussion (Draft), August 2004
- ◆ Inventory of Projects & Initiatives in the Coastal Zone (WP033), December 2004*
- ◆ Investment and Financing Strategy for Coastal Zone Development in Bangladesh, (WP037), April 2005

Output 4: Enhancing Livelihood Capacities

- ◆ Resource Use by Indigenous Communities in the Coastal Zone; July 2001*
- ◆ Perceptions of Direct Stakeholders on Coastal Livelihoods (WP004), September 2002*
- ◆ Coastal Livelihoods: An Introductory Analysis (WP011), January 2003*
- ◆ Program for the Poor: A report on existing social safety net and micro-finance activities (WP012), March 2003*
- ◆ Coastal livelihoods; situations and context (WP 015), June 2003*
- ◆ Urban Poor in the coastal zone (WP 021), August 2003*
- ◆ Women of the Coast A Gender Status Paper on the Coastal Zone (WP027), January 2004*
- ◆ Approaches for Mainstreaming Gender (WP036), December 2004*

Output 5: Enabling Institutional Environment

- ◆ Institutional Review of Selected Govt. Agencies Relevant to the Coastal Zone; November 2001*
- ◆ Analysis of Projects Contributing to the ICZM Process; January 2002*
- ◆ Local Level Institutional Arrangements in Khulna-Jessore Drainage Area; a case study (WP013), May 2003*
- ◆ A systems Analysis of Shrimp Production (WP014), June 2003*
- ◆ Review of Local Institutional Environment in the Coastal Areas of Bangladesh (WP018), June 2003*

- ◆ Local Level Institutional Arrangements in CDSP; a case study (WP019), August 2003*
- ◆ NGOs in Coastal Development (WP022), August 2003*
- ◆ Local level Institutional Arrangements in ECFC (Empowerment of Coastal Fisher folk Community) Project (WP023), September 2003*
- ◆ Proceedings of the Orientation Session for Focal Points on ICZM (WP024), October 2003*
- ◆ Compendium on Selected Laws Relating to and/or having Bearing on Costal Areas (WP029), March 2004
- ◆ Institutional Arrangements for ICZM Models of Good Practice (WP034), December 2004*

Output 6: Integrated Knowledge Base

- ◆ Inventory of Coastal & Estuarine Islands & Char Lands, March 2002*
- ◆ KNOWLEDGE PORTAL ON ESTUARY DEVELOPMENT, February 2003*
- ◆ Knowledge Portal on Estuary Development, methodology paper (WP017), May 2003*
- ◆ Proposal for Framework of Indicators for ICZM (WP016), September 2003*
- ◆ WHERE LAND MEETS THE SEA A Profile of the Coastal Zone of Bangladesh, July 2004
- ◆ Areas with Special Status in the coastal zone (WP030), July 2004*
- ◆ Knowledge Management Approach and Social Communication (WP035), December 2004*
- ◆ Coastal Land Use and Indicative Land Zones (WP040), June 2005

Living in the Coast, a series of synthesis documents

- ◆ Living in the Coast People and livelihoods, March 2004*
- ◆ Living in the Coast: Problems, Opportunities & Challenges, June 2004*
- ◆ Living in the Coast: Measuring Quality of Life, May 2005
- ◆ Living in the Coast: Urbanization, June 2005

Project Documents

- ◆ Technical Assistance Project Proforma - TAPP (approved in August 2000)
- ◆ Inception Report, January 2001
- ◆ Progress Report 1, August, 2002
- ◆ Previous Initiatives and Base Conceptual Documents (WP001): a compilation of GoB policy Note and other concept papers on ICZM of development partners, prepared during 1999, May 2002*
- ◆ ICZM Dialogue on Conceptualization & Design: Proceedings & Position Paper (WP008), November, 2002*
- ◆ Work Plan 2002, June 2002
- ◆ Work Plan 2003, October 2002
- ◆ Progress Report 2, February, 2003
- ◆ Progress Report 3, August, 2003
- ◆ Recasted / Revised Technical Assistance Project Proforma - TAPP, (approved in October 2003)
- ◆ Position Paper (for the Joint Review Mission), October 2003
- ◆ Work Plan 2004, October 2003
- ◆ Progress Report 4, February, 2004
- ◆ Work Plan 2004 (revised), April 2004
- ◆ Progress Report 5, August, 2004
- ◆ 2nd Revised Technical Assistance Project Proforma - TAPP, (approved in November 2004)
- ◆ Work Plan 2005, October 2004
- ◆ Progress Report 6, February, 2005

Workshop Proceedings

- ◆ Proceedings of the Round Table Discussion: Status of Activities in the Coastal Zone of Selected Government Departments; April 2001.
- ◆ Proceedings of the Regional Workshop: Status of Activities in the Coastal Zone of Selected Projects/ Programs Active in Noakhali; May 2001
- ◆ Proceedings of Regional Round Table Discussion: Status of Activities in the Coastal Region of Khulna; October 2001
- ◆ Proceeding of the National Workshop on "Vision Development for the Coastal Zone of Bangladesh; January 2002
- ◆ Proceedings of the Regional Round Table Discussion: Status of Activities in the Coastal Region of Chittagong/ Cox's Bazar; January 2002
- ◆ Proceedings of the Regional Round Table Discussion: Status of Activities in the Coastal Region of Patuakhali/ Barguna; January 2002
- ◆ Proceedings of the Orientation Session for Focal Points on ICZM (WP024), October 2003
- ◆ Proceedings of the District Level Consultations on the draft Coastal Zone Policy (WP026), December 2003
- ◆ Proceeding of the Technical Discussion on Coastal Land Zoning (WP031), October, 2004
- ◆ Proceedings of Preliminary Consultation on (CDS) Coastal Development Strategy (WP032), December 2004
- ◆ Proceedings of District & Local Level Consultations on the Draft Coastal Development Strategy (WP039), May, 2005
- ◆ Proceeding of the Round Table Discussion on Holistic Approach for Sustainable Management of St. Martin's Island (WP038), May, 2005

Information Dissemination Materials:

Coast News (English version)	Tata rekha (Bangla version)	Press-Clippings
Issue 1 : April 2001 *	-	Issue 1: March 2001
Issue 2: July 2001 *	-	Issue 2: May 2001
Issue 3 : October 2001 *	-	Issue 3: July 2001
Issue 4: January 2002 *	-	Issue 4: September 2001
Issue 5 : April 2002 *	-	Issue 5: November 2001
Issue 6 : July 2002 *	Issue 6: July 2002 *	Issue 6: January 2002
Issue 7: October 2002 *	Issue 7: October 2002 *	Issue 7: March 2002
-	Issue 8: June 2003 *	Issue 8: May 2002
-	Issue 9: December 2003 *	Issue 9: July 2002
Issue 10: June 2004 *	Issue 10: June 2004 *	Issue 10: September 2002
Issue 11: September 2004 *	Issue 11: September 2004*	
Issue 12: December 2004 *	Issue 12: December 2004*	
Issue 13: March 2005 *	Issue 13: March 2005*	
Issue 14: June 2005	Issue 14: June 2005	

- ◆ Brochure, August 2004
- ◆ CD (containing reports & documents), updated version

* Reports are down loadable from the Website: www.iczmpbangladesh.org

APPENDIX 5: KNOWLEDGE GAP ASSESSMENT

Table 1: Knowledge Required for Management Input Indicators (MIIs)

Knowledge Requirement			Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies
Input category	Component / Subcomponent	Dimensions			
Institutional arrangements (=context for management)	Institutional and organizational infrastructure (at national, regional and local level)	<ul style="list-style-type: none"> ▪ Structure of organizations and their mandates ▪ Administrative boundaries ▪ Capacities; financial, personnel ▪ Linking mechanisms (protocols) for harmonization and coordination 	<ul style="list-style-type: none"> - Centralized (at ministries) and agency level knowledge on structure, mandate, linking mechanisms - Agency level knowledge on capacities (financial and personnel) 	<ul style="list-style-type: none"> - Linking mechanisms (protocols) for harmonization and coordination 	Ministries Planning Commission, ERD Departments / Agencies
	Laws and regulations	<ul style="list-style-type: none"> ▪ Environment related acts, ordinances ▪ International treaties / conventions ▪ Standards ▪ Licenses ▪ Special area declarations ▪ Financial incentives 	<ul style="list-style-type: none"> ▪ Agency level knowledge on environment related acts, ordinances, standards, special area declaration ▪ Centralized (ministries) and agency level knowledge on financial incentives ▪ International treaties and conventions 	<ul style="list-style-type: none"> ▪ Resource user's understanding of laws, regulations, standards, licenses ▪ Legislation on ICZM issues ▪ Understanding of rules & international conventions related to marine fisheries 	Ministries (especially MoE&F) Departments / Agencies (especially DoE, FD, DoF, IUCN)
	Mechanisms for democratic control and participation	<ul style="list-style-type: none"> ▪ Representation of people in formally electoral bodies ▪ Participation in the process of planning, decision making, design, implementation and control 	<ul style="list-style-type: none"> ▪ Scattered information on the people's participation in the election process of the formally elected bodies 	<ul style="list-style-type: none"> ▪ Participatory planning, decision making, design and implementation and control 	Election Commission Research organizations Election monitoring organizations Resource management agencies Projects
Policies/strategies and plans (=intentions of management)	Policies (Overall and Sectoral)	<ul style="list-style-type: none"> ▪ Objectives ▪ Implementation arrangements ▪ Reference to CZ 	<ul style="list-style-type: none"> ▪ Sectoral policies contain sectoral objectives, implementation arrangements and reference to CZ 	<ul style="list-style-type: none"> ▪ Interpretation and implementation of various policy instruments 	Ministries
	Strategies and Plans (Overall and Sectoral)	<ul style="list-style-type: none"> ▪ Objectives ▪ Targets ▪ Reference to CZ 	<ul style="list-style-type: none"> ▪ Sectoral strategies and plans at agency level 	<ul style="list-style-type: none"> ▪ ICZM concept and tools including decision support systems and communication means 	Concerned agencies

Knowledge Requirement			Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies			
Input category	Component / Subcomponent	Dimensions						
Direct interventions (=implementation of management intentions within the existing context)	Rural and urban infrastructure	<ul style="list-style-type: none"> ▪ Investments (in roads, electricity, communication, cyclone shelter / flood protection, etc.) ▪ Current expenditures (in roads, electricity, communication, cyclone shelter / flood protection, etc.) 	<ul style="list-style-type: none"> ▪ Centralized (at ministries) and agency level information for individual sector 		Concerned agencies (DPHE, DAE, WASA, PDB, REB, LGED, BWDB, etc.) Ministries (especially Ministry of Finances) Planning Commission, ERD IMED			
	Rural and urban social services	<ul style="list-style-type: none"> ▪ Investments (in education, health, family planning, sanitation and water supply, etc.) ▪ Current expenditures (in education, health, family planning, sanitation and water supply, etc.) ▪ Awareness 	<ul style="list-style-type: none"> ▪ Centralized (at ministries) and agency level information for individual sector 		Concerned agencies (DPHE, HP&FW, DoE, WASA, etc.) Ministries (especially Ministry of Finances) Planning Commission, ERD IMED			
	Natural resources management (water, land, fish, forest, etc.)	<ul style="list-style-type: none"> ▪ Monitoring and assessment ▪ Control and enforcement ▪ Dissemination and awareness 	<ul style="list-style-type: none"> ▪ Piece meal and scattered information 		DAE MoA FD DoF DLS BWDB LGED BADC DPHE MoL			
	Safety nets	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Food assisted program</td> <td rowspan="3"> <ul style="list-style-type: none"> ▪ Volume (disbursements in national programs) ▪ Effects (people reached) </td> </tr> <tr> <td>Housing</td> </tr> <tr> <td>Disaster management</td> </tr> </table>	Food assisted program	<ul style="list-style-type: none"> ▪ Volume (disbursements in national programs) ▪ Effects (people reached) 	Housing	Disaster management	<ul style="list-style-type: none"> ▪ Centralized (at ministries) and agency level information for individual sector 	<ul style="list-style-type: none"> ▪ Effect of the programs on target group
Food assisted program	<ul style="list-style-type: none"> ▪ Volume (disbursements in national programs) ▪ Effects (people reached) 							
Housing								
Disaster management								

Knowledge Requirement			Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies
Input category	Component / Subcomponent	Dimensions			
	Public safety and well-being	<ul style="list-style-type: none"> ▪ Efforts (public spending in law enforcing agencies) ▪ Effects (rate of disposal of criminal cases) 	<ul style="list-style-type: none"> ▪ Centralized (ministry) information on public spending in law enforcing agencies ▪ Scattered and local level knowledge on the rate of disposal of cases at local Police Stations and Courts 	<ul style="list-style-type: none"> ▪ Effect of law – enforcing initiatives 	Police Department BDR Ansar and Village Police Ministry Planning Commission
	Production and income generating activities	Extension services Micro-credit	<ul style="list-style-type: none"> ▪ Volume (budgets allocated in different area) ▪ Effects (people reached) 	<ul style="list-style-type: none"> ▪ Centralized (ministries) and agency level information for individual sector on budgets allocated in different areas and number of people reached 	<ul style="list-style-type: none"> ▪ Effect of the extension services and micro-credit programs DAE MF-Institutions Banks NGOs

Table 2: Knowledge Required for Resource Base Indicators (RBIs)

Knowledge Requirement			Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies	
Resource Base category	Component / Subcomponent	Dimensions				
Natural resources	Land	Agricultural land	Area Quality	<ul style="list-style-type: none"> Agency level information on area and quality of agricultural land 	DAE BADDC SRDI BARC BARI BRII	
		Settlement area / Industrial area / Infrastructure	Area Quality (safety)	<ul style="list-style-type: none"> Agency level information on specific use of land 	<ul style="list-style-type: none"> Detail land use including patterns and trends at sub-district level Criteria for land use planning and zoning Digital Terrain Model with a 50 m resolution 	SPARRSO BBS SoB GSB
		Ponds and ghers	Area Physical condition Productivity	<ul style="list-style-type: none"> Agency level information on area, physical condition and productivity of land 	<ul style="list-style-type: none"> Sustainable shrimp production system and conflict mitigation measures 	DoF DAE
	Surface Water	River	Area Water levels / flows Salinity Pollution Sediment quantity Sediment quality Connectivity Productivity Diversity	<ul style="list-style-type: none"> Agency level information on area, water level / flows, salinity 	<ul style="list-style-type: none"> Sediment behavior and distribution in the deep sea and along the coast Use of scarce fresh water in the coastal island and mainland 	BWDB RRI DoF BBS SPARRSO CEGIS IWM WARPO BUET
		Perennial water body Floodplains				
	Groundwater	Shallow aquifer	Volume	<ul style="list-style-type: none"> Volume, quality and abstraction of groundwater from shallow and deep aquifers 	<ul style="list-style-type: none"> Volume, quality and abstraction of groundwater from shallow and deep aquifers 	DPHE WARPO IWM BWDB BUET GSB
		Deep aquifer	Quality Abstraction			
Sea	Estuary branches and coastal waters	Area Water levels / flows	Water level or flow models	<ul style="list-style-type: none"> Temporal estimates of water level / flows 	WARPO BWDB	

Knowledge Requirement			Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies									
Resource Base category	Component / Subcomponent	Dimensions												
	Deep sea	Salinity Pollution Sediment quantity Sediment quality Productivity Diversity		<ul style="list-style-type: none"> • Sediment behavior and distribution in the deep sea and along the coast • Information on species diversity • Bathymetry of the shallower parts of the Bay of Bengal • Salinity profile • Tidal behavior 	IWM IUCN									
	Chars and inter-tidal areas	Area and elevation Erosion / accretion Soil conditions		<ul style="list-style-type: none"> • Amount and land level, erosion / accretion and soil condition in the chars and inter-tidal areas • Hydrology / hydraulics of the accreted area with tidal movement and velocities • Morphology and morphological processes • Predictive methods for future shaping of coastal zone • Analysis of land values gained and lost through erosion and accretion 	BWDB SoB GSB SPARRSO IWM BIDS									
	Forests	<table border="1"> <tr> <td>Natural mangroves (Sundarban)</td> <td rowspan="4">Area Productivity Diversity</td> </tr> <tr> <td>Mangrove plantations</td> </tr> <tr> <td>Plain land forest</td> </tr> <tr> <td>Hill forest</td> </tr> </table>	Natural mangroves (Sundarban)	Area Productivity Diversity	Mangrove plantations	Plain land forest	Hill forest	<ul style="list-style-type: none"> ▪ Agency level information on area and productivity 	<ul style="list-style-type: none"> ▪ Potential of mangroves for the sustainable production of a range of products ▪ Resource degradation process ▪ Floral and faunal diversity 	FD DoE DAE DoF				
Natural mangroves (Sundarban)	Area Productivity Diversity													
Mangrove plantations														
Plain land forest														
Hill forest														
	Meteorological conditions	<table border="1"> <tr> <td>Air</td> <td>Air quality</td> <td rowspan="4"> <ul style="list-style-type: none"> ▪ Air pollution in the coastal cities ▪ Cyclone and Storm surge prediction ▪ Physical impact of climate change ▪ Hydro-meteorological condition </td> </tr> <tr> <td>Wind</td> <td>Distribution</td> </tr> <tr> <td>Rain fall</td> <td>Variation including extreme events</td> </tr> <tr> <td>Other (Humidity, Temperature, Sunshine, Evaporation)</td> <td></td> </tr> </table>	Air	Air quality	<ul style="list-style-type: none"> ▪ Air pollution in the coastal cities ▪ Cyclone and Storm surge prediction ▪ Physical impact of climate change ▪ Hydro-meteorological condition 	Wind	Distribution	Rain fall	Variation including extreme events	Other (Humidity, Temperature, Sunshine, Evaporation)				BMD DoE BMD BWDB
Air	Air quality	<ul style="list-style-type: none"> ▪ Air pollution in the coastal cities ▪ Cyclone and Storm surge prediction ▪ Physical impact of climate change ▪ Hydro-meteorological condition 												
Wind	Distribution													
Rain fall	Variation including extreme events													
Other (Humidity, Temperature, Sunshine, Evaporation)														

Knowledge Requirement			Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies	
Resource Base category	Component / Subcomponent	Dimensions				
	Fish and other aquatic resources (includes fresh water and marine fish, crab and shrimp)		Productivity Diversity	Agency level scattered knowledge on productivity of few species	<ul style="list-style-type: none"> ▪ Fish diversity and productivity ▪ Spawning ground of the key fish species ▪ Location of fishing grounds for demersal stock ▪ Assessment mechanism of fisheries ▪ Population dynamics of important species ▪ Fish health management ▪ Impact of inshore artisanal gears ▪ Hilsa management ▪ Pelagic fishery potential ▪ Management of trawl fishery ▪ Value adding techniques for sea fish ▪ Fisheries resources map 	DoF
	Non-renewable resources	Gas and oil Sand and minerals	Availability (reserves) Quality Abstraction	Agency level information on availability, abstraction rate and quality of gas and oil	<ul style="list-style-type: none"> ▪ Impact of natural gas extraction ▪ Availability of sand and minerals 	GSB BOGMC
Physical resources	Physical infrastructure	Protection (e.g. from flood, cyclone) Agriculture sector (irrigation, drainage) Power sector (generation, distribution) Transport sector (for example, roads, railway, airports, navigation routes)	Infrastructure quantity Quality /capacity of the provisions	Agency level information on the number and capacity of different types of infrastructure of different sectors	<ul style="list-style-type: none"> ▪ Suitable and appropriate knowledge to identify interventions regarding accretion and erosion ▪ Assessment of the impact of the interventions ▪ Assessment techniques for calculating project benefits and impacts ▪ Guidelines and strategy for sustainable polder development 	DAE MoA FD DoF DLS BWDB LGED BADC DPHE PDB REB

Knowledge Requirement			Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies
Resource Base category	Component / Subcomponent	Dimensions			
	Communication sector (wired and wireless) Education sector (e.g. schools, colleges) Health sector (hospitals, health centers) Industrial sector Recreational facilities			<ul style="list-style-type: none"> ▪ Soft methods for embankment and foreshore erosion control ▪ Innovative and appropriate (friendly) water control structure ▪ Status of cyclone shelter 	BRTC R&HD BR NSC BIWTA BTTB B Post Office BEPZA MoH&FW BSCIC MoTextile CEGIS IWM Bangladesh Betar Bangladesh Television MoI
	Technology	Use of equipment (e.g., use of HYV, tractor) Use of fertilizers, etc		<ul style="list-style-type: none"> ▪ Efficient honey collection method ▪ Harnessing techniques of solar, wind and tidal energy ▪ Low-cost economically beneficial techniques for making handicrafts, katha, pati ▪ Improved marine fishing techniques ▪ Fish drying techniques ▪ Turtle cultivation technology ▪ Salt and water logging tolerant crops ▪ Cropping techniques in saline environment 	BBS DAE BADC

Knowledge Requirement			Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies	
Resource Base category	Component / Subcomponent	Dimensions				
Human resources	Demography	Size of the population Composition Distribution Migration	Data on the size, composition and distribution of population	<ul style="list-style-type: none"> Migration pattern 	BBS NIPORT	
	Health	Physical status Diseases	Agency level information on communicable diseases	<ul style="list-style-type: none"> Physical status of human health 	BBS NIPORT UNICEF Directorate of Health	
	Education and skills	Primary Secondary & above Vocational training	Agency level information on number of students, institutions and teachers	<ul style="list-style-type: none"> Quality of education received by the students 	BANBEIS DoPE DoNFE DoSHE DoTE UGC MoE & F MoRA	
	Awareness	Safety Environment		<ul style="list-style-type: none"> People's awareness on environmental hygiene 	DoE	
Social/ institutional resources	Institutional structure	GoB organizations at different levels	Availability and capacity Access and quality Violence	Centralized (ministries) and agency level information on the number and capacity of institutions	<ul style="list-style-type: none"> Accessibility of people to GoB departments and NGOs Extent of CBOs and informal organizations Extent and effect of violence 	Line agency NGOs BBS Police Directorate BRDB
		NGOs at different levels				
FMOs/ CBOs registered and non-registered						
Informal organizations						
	Cultural and social networks	Membership Leadership Contribution	Membership in the NGOs and MF-Institutions			BIDS

Knowledge Requirement			Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies	
Resource Base category	Component / Subcomponent	Dimensions				
	Safety nets	Food assisted programs Housing Disaster management	Availability Access	Agency level information on the disbursement of goods and services	▪ Accessibility of the people and effect of the programs on target people	DMB DoRR MoDM&R WFP
Financial resources	Savings	Private sector Public sector	Deposited funds	Agency level information on savings	▪ Disaggregated data on savings ▪ Deposited funds in the private sector	Bangladesh Bank Commercial Banks
	Revenues		Collected funds (from LDT, IPTT)	Information at district administration		DC Office
	Wages		Total amounts paid Fluctuations	- Wages received by unskilled and skilled agricultural, daily, industrial labors	▪ Spatial and seasonal fluctuations of wages ▪ Female agricultural wage rate	BBS
	Credit	Conventional banking system Micro Finance Institutions	Amounts Available Access	▪ Agency level information on the amount of credit disbursed and number of recipients	▪ Information on the accessibility of the poor people in these institutions	Bangladesh Bank Bank MF Institutions
	Remittances		Quantity		▪ Remittances received in each years and their destination	NBR

Table 3: Knowledge Requirement for Decision Support Indicators (DSIs)

Category of development	Knowledge requirement		Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies	
	Component / Subcomponent	Dimensions				
Economic growth	Gross regional product		• Annual GRP	Gross regional products	BBS	
	Foreign currency earning		▪ Annual regional export earning	Centralized (ministries) and agency level information on the export earning from different sectors	▪ Regional distribution of export earning	
	Employment		- Employment rates - Rural/urban distribution - Fluctuations (seasonal) - Disguised unemployment	Knowledge on employment rate and rural / urban distribution	▪ Fluctuations in employment and disguised unemployment	BBS
	Marketable surplus in agriculture		- Volume - Value - Fluctuations (seasonal)			BBS DAE DoFood
	Supply-demand conditions	Food items Non-food items	- Value of CPI - Fluctuations (seasonal)			BBS CAB
Improvement of livelihoods and well-being	Income and expenditure	Income	- Levels		▪ District level distribution of income and expenditure ▪ Monetization of rural and urban sectors	BBS
		Expenditure	- Distribution (Gini)			
	Assets	Natural	- Owned properties - Access to common properties		▪ Trends in common property resources ▪ Water resource use map	DC Office BBS
Physical		Owned properties (houses, household amenities such as radio, TV etc.) Access to new technology (e.g. HYV, fertilizer etc.) Access to utilities, local facilities	Knowledge on people's owned properties and adoption new technologies	▪ Access to utilities and local facilities	BBS DAE	

Category of development	Knowledge requirement		Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies	
	Component / Subcomponent	Dimensions				
		Human	Health Education and skills Knowledge & awareness	Agency level information on spreading of diseases, demographic characteristics, mortality rates, etc. Information on education and skill	<ul style="list-style-type: none"> ▪ Physical condition of health ▪ People's knowledge and awareness 	BBS
		Social	Composition of HH Level of empowerment Cohesion and conflict resolution	Composition of HH	<ul style="list-style-type: none"> ▪ Level of empowerment ▪ Cohesion and conflict resolution 	BBS BIDS Research Organization
		Financial	Savings Investments Debts / loans	Agency level information on savings	<ul style="list-style-type: none"> ▪ Disaggregated information on savings, investments and debts 	Bangladesh Bank Banks MF-Institutions
	Poverty		Levels Distribution	Information on number of people under different lines of poverty in different districts		BBS Planning Commission WFP FAO
	Vulnerabilities	Food insecurity	Availability Access Utilization	Per capita food production Cropping intensity Damage to food production from natural disasters Poldered area Per-capita food intake Number of farming households Employment Per capita income Wage rate variability Price variability Female literacy Access to safe water		BBS WFP

Category of development	Knowledge requirement		Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies
	Component / Subcomponent	Dimensions			
		Income insecurity	Employment Access to labor markets Use of income	Per-capita income Employment Non-farm employment opportunities Adult literacy Wage rate variability Diseases Adult literacy Income spent on food	BBS
		Water insecurity	Availability and access Quality (Salinity and arsenic)	Access to safe drinking water Salinity level Arsenic level	BBS DPHE
		Health and life insecurity	Nutrition Disasters Law and order Environmental hygiene Availability and access to medical facilities	MUAC Stunting (height for age) Wasting (weight for height) Mortality rates Longevity Population at risk of death from storm surge Diarrhea Sanitation Female literacy Literacy rate Hospital beds Medical centers	BBS Police Directorate DMB DoE MoH&FW
		Property and safety insecurity	Disaster Law and order Social network	Number of kuccha houses in cyclone and flood risk area Number of livestock at risk of loss from storm surge Number of people living in erosion prone area Housing condition Reported crimes Migration	<ul style="list-style-type: none"> ▪ Effect of floods from eastern hill catchments Police Directorate DMB Research Organization

Category of development	Knowledge requirement		Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies	
	Component / Subcomponent	Dimensions				
	Equities	Rural – Urban	Income Health Food security Water security and access to sanitation	Income level distribution	<ul style="list-style-type: none"> ▪ Health security in rural-urban and rich-poor strata ▪ Food security in rural-urban and rich-poor strata ▪ Water security and access to sanitation in rural-urban and rich-poor strata 	BBS NIPORT UNICEF WFP
		Rich - Poor				
	Gender	Economic conditions	Control of production means Participation in labor force Income and expenditures	Participation in labor force	<ul style="list-style-type: none"> ▪ Decision making process, women’s access to and control over production means ▪ Disaggregated information on income and expenditure 	BBS MoW&CA BRDB DWA
		Health and nutrition	Access to food Access to health facilities Maternal care	Agency level information on the people’s access to maternal care facilities	<ul style="list-style-type: none"> ▪ Access to food and health facilities 	BBS UNICEF NIPORT MoW&CA Directorate of Health
		Knowledge and skills	Level of education and training Applicability of education and training Awareness	Level of education and training received from the formal institutions	<ul style="list-style-type: none"> ▪ Applicability of education and training ▪ Awareness of coastal women regarding sustainable development and their position 	BBS MoW&CA UNICEF
Socio-cultural and political environment	Security Age of marriage Mobility Participation in decision making	Age of marriage	<ul style="list-style-type: none"> ▪ Security, Mobility and Participation in decision making 	BBS		
Sustained natural environment	Estuarine dynamics	Drainage conditions Morphologic dynamics Fresh / salt water balance		<ul style="list-style-type: none"> ▪ Morphology and morphological process ▪ Predictive methods for future shaping of coastal zone 	BWDB IWM CEGIS	
	Health of ecosystems	Mangroves Marine	Habitat area Productivity	<ul style="list-style-type: none"> ▪ Quantifiable market values of environmental goods and 	FD DoF	

Knowledge requirement			Status of existing Knowledge	Knowledge Gap (KG)	Relevant partners / agencies
Category of development	Component / Subcomponent	Dimensions			
	Homestead gardens Wetlands	Biodiversity Endangered species Isolation		services <ul style="list-style-type: none"> ▪ Pollution hot spots ▪ Forest health index map ▪ Effect of industries (especially ship breaking) and port activities ▪ Pollution hotspots ▪ Stock assessment of mangrove flora and fauna ▪ Protection and conservation techniques of coral reefs ▪ Conservation of indigenous varieties of rice and other crops ▪ Comprehensive estimates of pollution load and their effect in the water-bodies ▪ Impact of land based pollution ▪ Impact of coastal aquaculture ▪ Biodiversity - shared stocks & exotics ▪ Research on toxicity levels in fish/shellfish 	DoE IUCN IWM MoEF