

DELINEATION OF THE COASTAL ZONE

Working Paper
WP005

Dhaka
December, 2003

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

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Dhaka, December 2003

SUMMARY

For the purpose of integrated coastal zone management (ICZM), this document specifies a coastal zone in Bangladesh, in which the vulnerabilities and opportunities require special management approaches.

The three basic natural system processes and events that govern opportunities and vulnerabilities of the coastal zone of Bangladesh are: tidal fluctuations; salinities (soil, surface water or groundwater); and cyclone and storm surge risk. Considering these three criteria, an assessment has been done on the delineation of the coastal zone. For each of these criteria, threshold values have been specified and corresponding impacted areas were determined.

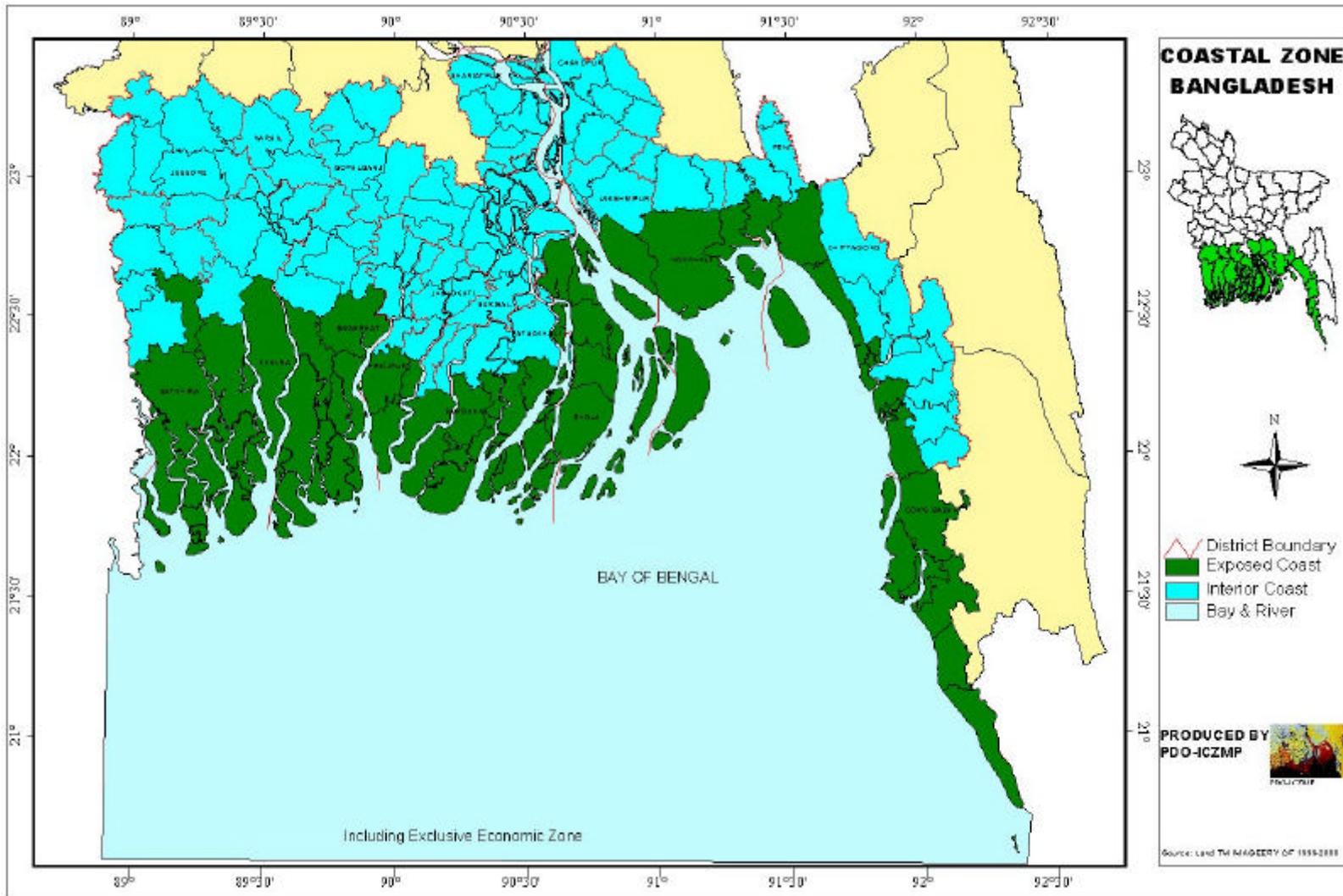
Based on these criteria, a proposal for coastal zone delineation was developed and subsequently discussed at different levels and finally at the 5th and 6th Inter-Ministerial Technical Committee meetings held on April 20, 2003 and October 25, 2003, respectively.

As per the proposal and decisions of these meetings, coastal zone of Bangladesh consists of 19 districts (see Map of the coastal zone of Bangladesh) comprising 147 upazilas (see Tables) and the Exclusive Economic Zone (EEZ).

Further, a distinction has been made between upazilas facing the coast or the estuary and the upazilas located behind them. A total of 48 upazilas in 12 districts that are exposed to the sea and or lower estuaries, are defined as the *exposed coast* and the remaining 99 upazilas of the coastal districts are termed *interior coast*.

In this working paper, approaches and methodologies, criteria and their justifications, threshold values for each of these criteria, data and analysis supporting the delineation and further subdivisions are described. Tables and maps are presented at the end of the report.

Map of the coastal zone of Bangladesh



Exposed and Interior Upazilas in the Coastal Zone

District	Upazilas	
	Exposed	Interior
Bagerhat	Mongla, Saran Khola, Morrelganj	Bagerhat Sadar, Chitalmari, Fakirhat, Kachua, Mollahat, Rampal
Barguna	Amtali, Barguna Sadar, Patharghata, Bamna	Betagi
Barisal		<i>Agailjhara</i> , Babuganj, Bakerganj, <i>Gaurnadi</i> , Hizla, Mehendiganj, Muladi, Wazirpur, Banari Para, Barisal Sadar
Bhola	Bhola Sadar, Burhanuddin, Char Fasson, Daulatkhan, Lalmohan, Manpura, Tazumuddin	
Chandpur		Chandpur Sadar, Faridganj, Haimchar, Hajiganj, Kachua, Matlab, Shahrasti
Chittagong	Anowara, Banskhali, Chittagong port, Double Mooring, Mirsharai, Pahartali, Panchlaish, Sandwip, Sitakunda, Patenga, Halisahar, Kotwali, Boijid Bostami,	Boalkhali, Chandanaish, <i>Lohagara</i> , Rangunia, Chandgaon, <i>Fatikchhari</i> , Hathazari, Patiya, Raozan, Satkania, Bakalia, Karanaphuli, Kulshi
Cox's Bazar	Chakaria, Cox's Bazar Sadar, Kutubdia, Ukhia, Maheshkhali, Ramu, Teknaf	
Feni	Sonagazi	Chhagalnaiya, Feni Sadar, <i>Parshuram</i> , <i>Daganbhuiyan</i>
<i>Gopalganj</i>		Gopalganj Sadar, Kashiani, Kotali Para, <i>Muksudpur</i> , Tungipara
Jessore		Bagher Para, Chaugachha, Jhikargachha, Manirampur, Abhaynagar, Keshabpur, Jessore Sadar, Sharsha
Jhalokati		Jhalokati Sadar, Kanthalia, Nalchity, Rajapur
Khulna	Dacope, Koyra	Batiaghata, Daulatpur, Dumuria, Dighalia, Khalishpur, Khan Jahan Ali, Khulna Sadar, Paikgachha, Phultala, Rupsha, Sonadanga, Terokhada
Lakshmipur	Ramgati	Lakshmipur Sadar, Raipur, Ramganj
Narail		Lohagara, Narail Sadar, Kalia, Narigati
Noakhali	Companiganj, Hatiya, Noakhali Sadar	Chatkhil, Senbagh, Begumganj
Patuakhali	Dashmina, Rangabali, Galachipa, Kala Para	Bauphal, Mirzaganj, Patuakhali Sadar
Pirojpur	Mathbaria	<i>Bhandaria</i> , <i>Kawkhali</i> , <i>Nazirpur</i> , <i>Pirojpur Sadar</i> , <i>Nesarabad (Swraupkati)</i>
Satkhira	Assasuni, Shyamnagar	Debhata, Kalaroa, Kaliganj, Satkhira Sadar, Tala
Shariatpur		Bhederganj, Damudya, Goshairhat, Naria, Palong, Zanjira

BACKGROUND

The delineation of the coastal zone in Bangladesh has been done by different agencies and from different perspectives. For example, the Soil Resources Development Institute and the Department of Public Health Engineering have their own definitions and coastal zone boundaries.

For ICZM purposes, the 1999 concept (MoWR 1999) note suggests as a starting point to take all sea and estuary facing administrative districts, including those along the lower reaches of the Meghna Estuary up to Chandpur and those facing the Tentulia and Baleswar Rivers. This led to a coastal zone consisting of 16 districts.

A more systematic approach to delineate the coastal zone was initiated in March 2002. The three basic natural system processes and events that govern opportunities and vulnerabilities of the coastal zone of Bangladesh are: tidal fluctuations; salinities (soil, surface water or groundwater); and cyclone and storm surge risk. Considering these three criteria, an assessment has been done on the delineation of the coastal zone. For each of these criteria, threshold values have been specified and corresponding impacted areas were determined.

Based on these criteria, a proposal for coastal zone delineation was developed. A thematic summary of this proposal was widely circulated & described in the Coast News, Issue 6 (April-June 2002) for comments & suggestion.

The proposal was presented and discussed in the Advisory Committee meeting of the PDO-ICZMP project on August 08, 2002 and during the Dialogue between September 29 and October 06, 2002.

The delineation of the coastal zone was discussed in detail during the 5th Inter-Ministerial Technical Committee Meeting of the ICZMP on April 20, 2003. In compliance with the decisions of the meeting, detailed & updated proposal for the 'Delineation of the Coastal Zone' was sent to 30 members/observers of the Technical Committee and three other experts on May 19, 2003.

Written comments were obtained from the following agencies/projects:

- Char Development & Settlement Project (CDSP)
- Bangladesh Parjatan Corporation
- Bangladesh Water Development Board (BWDB)
- Department of Fisheries (DoF)
- Disaster Management Bureau (DMB)
- Local Government Engineering Department (LGED)
- Forest Department (FD)

Based on those comments, a number of changes have been made in the document 'Delineation of the Coastal Zone'. A further discussion was made at the 6th Inter-Ministerial Technical Committee meetings held on October 25, 2003 where the delineation of the coastal zone was approved (Annex-A).

STUDY TEAM

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Delineation of the Coastal Zone

TABLE OF CONTENTS

SUMMARY	I
BACKGROUND	V
STUDY TEAM.....	VI
TABLE OF CONTENTS	VII
LIST OF TABLES	VII
LIST OF MAPS	VII
ACRONYMS.....	IX
GLOSSARY.....	X
1 INTRODUCTION AND APPROACH.....	1
2 LAND AREA.....	3
2.1 Criteria	3
2.1.1 Justification.....	3
2.1.2 Categorization and thresholds.....	3
2.1.3 Data sources and analysis.....	5
2.2 Results	6
2.3 Subdivisions of the Coastal Zone	7
3 SEA AREA	9
3.1 Definitions.....	9
3.2 Delineation of the Seaward Boundary	10
4 REFERENCE.....	11
ANNEX : MINUTES OF THE 6TH INTER-MINISTERIAL TECHNICAL COMMITTEE MEETING	37

LIST OF TABLES

Table 1: Overview of tidal water level stations, selected records and average annual fluctuations	13
Table 2: Value of the selected indicators of the coastal zone by district and upazila.....	17
Table 3: Upazilas of the coastal zone by presence of number of indicators above threshold level.....	23
Table 4: Area and population of coastal districts	25
Table 5: Legal status and statement of EEZ and territorial waters	27
Table 6: Bangladesh Straight Baseline System.....	29

LIST OF MAPS

Map 1: Location of tidal water level station and iso-fluctuation lines.....	31
Map 2: Soil salinity 1997	32
Map 3: Surface water salinity.....	33
Map 4: Ground water salinity.....	34
Map 5: Cyclone risk.....	35
Map 6: The coastal zone of Bangladesh differentiating exposed and the interior coast.....	36

ACRONYMS

BBS	Bangladesh Bureau of Statistics
BWDB	Bangladesh Water Development Board
CBRWSS	Coastal Belt Rural Water Supply and Sanitation
CCD	Coast Conservation Department, Sri Lanka
CEMP	Coastal Environmental Management Plan
DMB	Disaster Management Bureau
DPHE	Directorate of Public Health Engineering
EC	Electric Conductivity (in deciSiemen per meter: dS/m)
EEZ	Exclusive Economic Zone
EGIS	Environment and GIS Support Project for Water Sector Planning
FAO	Food and Agricultural Organization of the UN
GoB	Government of Bangladesh
GoN	Government of the Netherlands
ICZM	Integrated Coastal Zone Management
IUCN	International Union for the Conservation of Nature
MIM	Management Information & Monitoring Division of DMB
MoCA&T	Ministry of Civil Aviation and Tourism
MoFL	Ministry of Fisheries and Livestock
MoWR	Ministry of Water Resources
MPO	Master Plan Organization
NWMP	National Water Management Plan
NWMPP	National Water Management Plan Project
NWRD	National Water Resources Database
OGDA	Options for the Ganges Dependent Area
PDO-ICZMP	Program Development Office for ICZMP
SRDI	Soil Resources Development Institute
UN	United Nations
WARPO	Water Resources Planning Organization

GLOSSARY

The term "*coastal*" is, in the majority of cases, defined as a "*sea-land interface*" or "*a place where land, water and air meet*".

"*coastal zone*" is most frequently defined as "*land affected by its proximity to the sea and that part of the sea affected by its proximity to the land*" or, in other words, the area where the processes which depend on the sea-land interaction are the most intensive. This interface is taking place along two axes: the axis running along the coast and the axis perpendicular to the coastline.

Coastal zone always include floodplains, mangroves, marshes, and fringing coral reefs. In general, there are tide flats, as well as beaches and dunes, and multiple aerial foci for ICZM:

"*Coastal area*." is a notion, which is geographically broader than the coastal zone, the borders of which require a less strict definition. This notion indicates that there is a national or sub-national recognition that a distinct transitional environment exists between the ocean and terrestrial domains.

"Ocean waters" cover the largest part of the sea belt, up to 200 nautical miles off shore (Exclusive Economic Zone).

"*Coastal waters*" cover a narrow near- shore sea belt, its width varying from one country to another (in the United States this belt is approximately 3 miles wide).

'Inter-tidal area' is the area between the lowest' tide line and the shoreline (the landward extent of the tidal influence), including estuaries and coastal wetlands.

"*Coastline*" is the contact line dividing the land from the water bodies. It usually coincides with the line marking the landward extent of tidal influence.

"*Oceanfront or shorelands area*" is part of the land up to the highest line of tidal influence. This is a relatively narrow belt, with its inner borders usually reaching the first coastal road or encompassing the areas reserved for the public access to the coast, protection of sensitive habitats, etc. This belt is rarely wider than 1000 m.

"*Coastal uplands*" are defined as an area of the interior between the shorelands and most frequently, the highest peak of the closest mountain range. Sometimes, the depth of the belt is limited (for example, in the United States the limit is 5 miles).

"*Inland*" may be any area outside the aforementioned belts. However, it should not be considered as an altogether unimportant zone, since many processes affecting the state of the coastal zone originate in that area. Generally speaking, that coastal waters, inter tidal area, coastline, shore lands area and coastal uplands are the elements of the coastal zone.

1 INTRODUCTION AND APPROACH

The GoB policy note on ICZM (MoWR, 1999) specifies the coastal zone as follows.

1.3 Coastal areas are diverse in function and form: they do not lend themselves well to definition by strict spatial boundaries. Unlike watersheds, there are no exact natural boundaries that unambiguously delineate coastal areas.

1.4 Nevertheless, for management purposes, a variety of landwards and seawards boundaries, ranging from fairly narrow and precise ones to much broader and nebulous ones have been utilized around the world. Management boundaries are pragmatic, being influenced by the geographic scope of relevant management concerns, including biophysical, economic, social, institutional and organizational aspects. Therefore, the boundaries of a coastal area may change over time for management purposes, as the issues to be forged become more extensive or complex and require more far-ranging solutions.

1.5 We need not, therefore, worry much about our inability to develop a precise definition of a coastal zone. It is better to view this concept as a means of focusing attention on the emergence of an innovative framework for planning and management to help make wise and sustainable use of resources. In that spirit we may delineate coastal zone in line with recognized administrative boundaries in Bangladesh. To us, the coastal zone represents an area of transition where terrestrial and marine environments interact to form unique environmental conditions. For our purpose, the coastal zone of Bangladesh would include the greater districts of Chittagong, Noakhali, Barisal, Patuakhali and Khulna.

Based on the above description and faced with the need to define the seaward boundary, that was not considered in the GoB Policy Note, the land area of the 16 sea and estuary facing districts and the Exclusive Economic Zone (EEZ) as the sea area were selected as coastal zone in the Project's Inception Report (PDO-ICZMP, 2001). Administrative boundaries were considered to provide the proper context for the management orientation of ICZM.

Independently, delineation of the coastal zone in Bangladesh is done for many different purposes and from different perspectives. For example, the Soil Resources Development Institute (SRDI) specified "the coastal area which is affected by tidal changes in water level in the Bay of Bengal, extends up to 150 km from the coast". The SRDI definition incorporates the Bhola, Barisal, Patuakhali, Jhalkhati, Barguna, and Satkhira districts and part of the Cox's Bazaar, Chittagong, Feni, Noakhali, Lakshmipur, Pirojpur, Bagerhat and Khulna districts (SRDI, 2001).

DPHE defined a coastal belt as being "the area where saline water has intruded into shallow or deep aquifers or both" (DANIDA, 1999) and included 84 upazilas under the Khulna, Patuakhali, Barisal, Faridpur, Noakhali and Chittagong districts in the coastal zone.

This working paper specifies the coastal zone in Bangladesh for the purpose of integrated coastal zone management (ICZM), delineating a part of the country that requires special management approaches (PDO-ICZMP, 2002). The intention is to come to a broadly accepted delineation of an area that would be the focus of the innovative policy framework, the PDO-ICZMP project aims to develop. It is accepted that a broadly defined coastal zone will be useful to many management agencies and organizations that work in this area.

In developing the approach and the criteria to delineate the coastal zone for management purposes, a limited review was made of approaches used in other countries, including: Alaska and Germany (Hoozemans, *et.al*, 2001); Nicaragua (Koudstaal, 1996); the Netherlands (GoN, 1999); India (Aquaculture Authority, 2001); and Sri Lanka (CCD, 1997).

2 LAND AREA

2.1 Criteria

The literature review reveals that many criteria have been used to delineate the land area of the coastal zone. Most commonly, criteria relate to: natural system processes; economic opportunities (e.g., tourism); social aspects (e.g., fisher villages); and erosion prone areas. It appears that three basic natural system processes and events govern all these criteria: tidal water movements; salinity intrusion; and cyclones / storm surges. These criteria could be considered representative for the typical coastal vulnerabilities and opportunities. Considering these three criteria, a systematic and structural reassessment has been done to delineate the land area of the coastal zone of Bangladesh.

2.1.1 Justification

Tidal water movements. A dominating characteristic of the coastal areas is the daily water level fluctuations and the corresponding in- and outgoing water flows. These are the driving forces behind several physical processes such as: erosion and accretion, salinity intrusion and drainage congestion/inundations, which dominate ecosystems and human activities in the coastal area. Tidal fluctuations determine agricultural practices and set the timing of the movements of river transportation and riverine commercial activities. Filling and emptying of land areas during each tidal cycle result in tidal flows that bring new influxes of water and nutrients, maintain a variety of special ecosystems, such as mangrove forests, keep rivers and channels open for navigation and draining of adjacent land areas and sometimes are used to generate energy.

Salinity intrusion. The fluctuations of water levels and flows determine to a great extent the intrusion of saline waters; upstream river flows being the other main determining factor. Their combined effect results in a complicated situation in which the salinity contents of surface water bodies; groundwater aquifers and soils in the coastal zone vary from day to day and from season to season. This determines the availability of fresh water and suitability of land for human use and also sets the stage for special ecosystems.

Risk of cyclones and related storm surges¹. Bangladesh suffers from various natural hazards of which cyclones and associated storm surges are unique to the coast. High wind speeds up to 225 km/hr, but above all the consequent rise of sea water levels (surges) that can reach heights of 9 m., can create enormous damage to life, properties and ecosystems. Cyclone associated risks are high; leaving an impact that in many cases is beyond repair. The combined wind and surge effects make the coastal population extremely vulnerable, limiting them in their activities and development.

2.1.2 Categorization and thresholds

To limit the extension of the coastal zone to those areas where the above criteria have indeed an important influence on the daily activities of the population and on ecosystems, threshold levels have been determined for water level fluctuations, for salinities in surface water, groundwater and soils and for cyclone risks. These quantifiable indicators represent the three criteria mentioned in the above Section 2.1.1. An upazila-average value for one of these indicators above its corresponding threshold value would then be interpreted as the upazila being within the coastal zone with regard to the corresponding criterion.

¹ For reasons of simplicity, the combined risk of cyclones and related storm surges will be referred to in this report as cyclone risk.

Above the threshold levels, classes are identified, mostly taken from the data sources used, that give an indication of the seriousness of the impacts of the sea.

- *Tidal water movements.* The annual average of daily water level fluctuations (differences between high and low water levels during a day) has been taken to characterize the coastal zone from the perspective of the criterion “tidal water movements”. The following classes would roughly represent different tidal zones with respect to this criterion:

* <0.3 m	range of daily fluctuations
* 0.3-1 m	regular tidal movements
* 1-2 m	strong tidal movements
* > 2 m	very strong tidal movements

The annual average water level fluctuations between high and low water during a tidal cycle of 0.3 m were taken as the threshold value.

- *Salinity intrusion.* Three different indicators are used for soil, surface water and groundwater salinities.
 - ◇ Soil salinities are available from SRDI (2001). Dry season soil salinities were classified into the following groups of electric conductivity (the unit is deciSiemen per meter: dS/m):

* <4 dS/m	slightly saline
* 4-8 dS/m	slightly to moderately saline
* 8-15 dS/m	moderately to highly saline
* >15 dS/m	highly saline

Salinities of <4 dS/m are within the tolerance of the commonly grown crops and vegetation of the area (SRDI, 2001) and 4 dS/m accordingly is considered the threshold level for soil salinity.
 - ◇ Surface water salinity is categorized in the National Water Management Plan (WARPO, 2001) into the following groups (for average dry season values):

* <1 dS/m
* 1-5 dS/m
* 5-10 dS/m
* >10 dS/m

An electric conductivity of 5 dS/m can be considered as tolerance limit for fresh water vegetation and aquatic communities. In addition the SRDI report (2001) mentions a limit of 4 dS/m (soil salinity) above, which a salt tolerant variety has to be selected. Based on this information and using the available classification, a threshold level of 5 dS/m has been selected for surface water salinity.
 - ◇ Groundwater salinity. The ground water salinity has been categorized into the following groups (ESCAP/UN, 1987);

* <1d S/m
* 1-2 dS/m
* 2-5 dS/m
* 5-10 dS/m
* >10 dS/m

The Bangladesh standard for groundwater salinity is 600 mg Chloride per liter. As this value is widely exceeded in coastal areas, a more practical level of 1000 mg/l of Chloride has been suggested (ESCAP/UN, 1987). This would approximately correspond to a threshold of 2 dS/m (1000mg/l Chloride solution generates EC of 1.5 to 2 dS/m at 20-30 °C).

- *Cyclone risk.* A cyclone risk map, prepared by the Management Information & Monitoring (MIM) Division of the Disaster Management Bureau (DMB) in 2001, was available that distinguishes between the following risk zones:
 - * No risk
 - * Wind risk
 - * Risk (low risk as mentioned in 2003)
 - * High Risk

Further communications have happened with the Disaster Management Bureau (DMB) in 2003. Both the “risk” and “high risk” zones have been incorporated as coastal zone.

2.1.3 *Data sources and analysis*

This section presents details on the data used and the analyses performed to assess representative values for the indicators identified in the previous section.

Tidal water fluctuations

For 114 BWDB tidal water level stations (Table 1) one year of daily water levels (high and low water levels every day) were collected from the National Water Resources Database of WARPO. For this purpose, the last available entire year at any particular station has been selected.

In each station, the difference between the daily high and daily low is taken as the tidal fluctuation for that day. The selected indicator is then calculated by taking the average of these daily fluctuations over the year (Table 1). These values were plotted and iso-fluctuation lines were drawn representing the boundaries of the above-mentioned classes: 0.3; 1; and 2 meter (Map 1).

Soil salinity

For the assessment of soil salinities, a soil salinity map has been used as prepared by SRDI using 1997 data (SRDI, 2001: map 6). This map is reproduced as Map 2.

Surface water salinity

For the assessment of surface water salinities in the south western part of the country, the surface water salinity map of the study on the Options for the Ganges Dependent Area (OGDA) have been used (NWMPP, 2001: Figure 5.6). Assessment of the surface water salinities in the remaining part of the country was based on two sources: (i) the “coastal area and water salinity map” of the SRDI study (SRDI, 2001; map 4); and (ii) 2 dS/m salinity contour line maps of the Meghna Estuary Study (MES, 2001, Figure 5a). Based on this information and expert judgement, Map 3 has been drafted, that has been used to estimate the upazilas-average surface water salinity values.

Groundwater salinity

Ground water salinities have been estimated from the groundwater isohaline map prepared by the Master Plan Organisation (ESCAP/UN, 1987: Fig. 3). This isohaline map shows the electric conductivity (EC) in micro mhos/cm. These are converted to dS/m in Map 4 of this report (1000 micro mhos/cm = 1 dS/m).

Cyclone risk

The cyclone risk map (Map 5) has been copied from the map of the DMB, referred to above. The map has been adjusted to accommodate few upazilas considered under low cyclone risk being

suggested by in 2003 by DMB (Saiful Islam, DG, in charge, DMB dated 11.06.2003 letter no DMB/Plan/ICZMP-8/2001-783.)

Interpretation of maps

Based on the maps 1 to 5, upazila-average values for the different indicators have been estimated. Table 2 gives the results for the upazilas in the finally selected 19 districts (Section 2.2).

2.2 Results

Depending on the indicator values, upazilas and districts are classified. Upazilas are considered coastal upazilas when the value for at least one of the parameters is above the corresponding threshold values. Districts are considered to be a coastal district when they “house” at least one coastal upazila. Based on this definition and the above analysis using the three criteria: tidal water movements, salinity intrusion and risk of cyclones, 133 upazilas of 19 districts (total 147 upazilas) received the identification “coastal”, labeling these 19 districts as “coastal districts”. Table 3 gives an overview. Below, additional considerations are given on the extent of the different indicators, leading to a distinction of different coastal areas.

- *Tidal water movements.* Tidal water level fluctuations above the threshold limit are found in a total of 128 upazilas of 18 districts (87% of all upazilas). Only the Jessore District does not have tidal fluctuations above threshold level. In a total of 63 upazilas under 11 districts fluctuations are more than 2 m, while in 46 upazilas under 11 districts and in 19 upazilas under 6 districts, tidal water level fluctuations are between 1 to 2 and between 0.3 to 1 m., respectively (Table 2).
- *Salinity.* Salinity levels above threshold values in the soil, surface or groundwater, are found in 97 upazilas of 17 districts (66% of all upazilas). In Chandpur and Shariatpur districts salinity levels were found to be below threshold levels. Soil salinities are found above threshold levels in a total of 93 upazilas of these 17 districts; surface water salinities in a total of 65 upazilas of 10 districts and groundwater salinities in a total of 45 upazilas of 8 districts (Table 2).
- *Risk of cyclones.* A total of 48 upazilas of 12 districts (33% of all upazilas) are within the cyclone H and L risk areas. All these upazilas are facing the sea or lower estuaries (Table 2).

In all 48 upazilas (12 districts) with cyclone risks, salinity and tidal movement indicators are also above threshold level. Together they are considered the “*first tier* of coastal upazilas” facing the sea and or the lower estuaries, where interaction with the marine environment is most intensive. This area will be referred to as ***exposed coast***.

A *second tier* of coastal upazilas consists of 44 upazilas (11 districts) in which two indicators, viz. tidal water fluctuations and salinities, were found to have values above threshold levels.

The *third tier* of coastal upazilas incorporates 41 upazilas (10 districts) where only one indicator is found having values above threshold levels. In 5 of them (2 districts) salinity threshold levels are exceeded, while in 36 out of the 41 (in 8 districts), tidal fluctuations are found above threshold levels. Only in 14 upazilas (5 districts) none of the indicator-values passed threshold levels.

Upazilas in the second and third tier together constitute the ***interior coast***.

Map 6 delineates the coastal zone differentiating exposed and the interior coasts and includes exclusive economic zone for Bangladesh.

Table 4 gives an overview of the main characteristics of the coastal districts in terms of area and population.

2.3 Subdivisions of the Coastal Zone

As mentioned earlier, the coastal zone has been sub-divided for many different purposes, mostly based on hydrological, geophysical and cyclone risk criteria (Chapter 1). There are other subdivisions which have descriptive and analytical uses and support specific management purposes.

Examples are the following.

- Geo-morphological and hydrological regions:
 - ◊ hydrological regions and estuaries (WARPO, 2001); and
 - ◊ eastern, central and western region (ESCAP/UN, 1987).
- Different ecosystems and ecological region:
 - ◊ biozones (Nishat *et.al.*, 2002); and
 - ◊ agro ecological zones (FAO, 1988).
- Regions with different risks and vulnerabilities:
 - ◊ cyclone risk zone (WARPO, 2001); and
 - ◊ bank erosion prone areas (WARPO, 2001).
- Regions with different opportunities of coastal livelihoods:
 - ◊ shrimp farms (IUCN, 2003); and
 - ◊ tourism development regions (MoCA&T, 1992).

3 SEA AREA

3.1 Definitions

For the sea area, delineation is also proposed to be based on management requirements. In this context it is relevant to give an overview of the 5 different kind of zones, that have different management perspectives, as defined in the Territorial Waters and Maritime Zones Act, 1974, Section 2.

- *Territorial waters.* The Sovereignty of the Republic extends to the territorial waters (as well as the air space over and the bed and subsoil under), of which the limits will be declared through official Gazette notification. In the notification a *baseline* should be defined from which the territorial waters will be measured. Waters on the landward side shall form part of the internal waters of Bangladesh. Territorial waters have special meaning for the right of innocent passage for foreign ships, with special reference to warships (Section 3²).
- *Contiguous zone.* In this zone -- extending seawards 6 miles from the outer boundary of the territorial waters -- the government may exercise special powers relating to: security; immigration and sanitation; and customs and other fiscal matters (Section 4).
- *Economic zone.* By notification in the official Gazette, the government may declare any area of the high seas adjacent to the territorial waters to be the economic zone and specify its limits. In this zone property rights of all living and non-living resources on or under the sea-bed and subsoil or on the water surface or within the water column are vested in Bangladesh (Section 5).
- *Conservation zone.* This kind of zones may be established through notification in the official Gazette in areas of the sea adjacent to the territorial waters for the purpose of protecting living resources of the sea from indiscriminate exploitation, depletion or destruction (Section 6).
- *Continental shelf.* On the continental shelf of Bangladesh -- comprising the seabed and subsoil of the submarine areas adjacent to the coast of Bangladesh (or of any island, rock or composite group thereof constituting part of the territory of Bangladesh) -- the government would grant licenses or permissions to explore or exploit any resources (excluded for fishing by non-mechanically propelled vessels). Its limits can be established by notification in the official Gazette (Section 7).

Based on the above definitions, it is proposed to consider the economic zone as the sea area of the coastal zone. It is in this zone that the interests in all living and non-living resources is vested in Bangladesh. This zone corresponds to the exclusive economic zone (EEZ) as defined by the United Nations in the international Law of the Sea (UN, 1997).

Table 5 gives an overview of different statements on the EEZ and territorial waters in the Law of the Sea and different GoB laws and policy documents.

² These sections refer to sections of the Territorial Waters and Maritime Zones Act, 1974.

3.2 Delineation of the Seaward Boundary

In accord with the specifications of the Law of the Sea (UN, 1997), the Bangladesh Government has defined the base line and consequently the territorial waters and the Exclusive Economic Zone (EEZ) in Proclamation No. LT-I/3/74 of 13 April 1974. Reference is made to Table 5. Table 6 presents the Bangladesh Straight Baseline System as specified in the mentioned proclamation.

From among all different zones, Exclusive Economic Zone (EEZ) is included in the coastal zone of Bangladesh.

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Table 1: Overview of tidal water level stations, selected records and average annual fluctuations

Station ID	Station name	Avg. fluctuation	Data collection period	
			Start date	Completion date
1	Bagerhat	1.80	3.31.95	3.30.96
102	Bhatiapara	0.47	1.1.95	12.31.95
103	Bardia	0.61	4.1.81	3.27.82
104	Manikdah	0.36	1.1.78	12.31.78
105	Off take of Atharoba	0.49	1.1.95	12.31.95
106	Patgati	1.43	3.31.83	3.30.84
107A	Nazirpur	0.73	3.31.95	3.30.86
107	Pirojpur	1.44	3.31.95	3.30.96
107.2	Rayenda	1.75	4.4.95	3.31.96
108	Chardoani	1.78	3.31.95	3.30.96
120	Telpari	1.68	3.31.95	3.30.96
121	Enayethat	1.69	3.31.95	3.30.96
121A	Magnaghat	2.63	3.31.83	3.30.84
122	Sandwip	4.35	3.31.90	3.30.91
125	Outfall Karnafuli	1.34	3.31.95	3.30.96
129	Basantapur	3.74	3.31.95	3.30.96
130	Kaikhali	3.36	3.17.93	3.16.94
136	Kawkhali	1.18	3.31.85	3.30.86
136.1	Umedpur	1.43	3.31.95	3.30.96
152	Kodala	0.83	3.31.78	3.30.79
152A	Chandragona	0.75	3.31.78	3.30.79
153	Chittagong	3.32	3.31.87	3.30.88
154	Patenga	3.12	4.1.86	3.31.87
162	Jhikargacha	0.10	3.31.94	3.30.95
163	Tala Magura	2.47	3.31.95	3.30.96
164	Chandkhali	3.57	3.31.95	3.30.96
165	Kobadak Forest Office	2.83	3.31.95	3.30.96
176	Lemsikhali	3.53	3.31.95	2.29.96
18	Barisal	0.95	3.31.95	3.30.96
18.1	Bakerganj	1.25	3.31.95	3.30.96
182	Companyganj	2.88	3.31.94	3.30.95
183	Kaitpara	1.08	3.31.95	3.30.96
184	Patuakhali	1.48	4.1.86	2.8.87
185	Galachipa	1.69	3.31.87	3.30.88
19	Mirjaganj	1.58	3.31.95	3.30.96
194	Fatehpur	0.19	3.24.78	3.23.79
195	Jalirpar	0.16	3.31.77	3.30.78
196	Satpar	0.31	3.31.77	3.30.78
197	Tentulia	0.38	3.31.79	3.30.80
198	Haridaspur	0.40	3.31.95	3.30.96
20	Amtali	1.83	3.31.95	3.30.96
200	Saflapur (Moheskhali	2.84	3.31.95	3.30.96
204	Chiringa	0.09	3.31.95	3.30.96
213	Haripur (C&B Road Cr	0.07	3.31.94	3.30.95
217	Kala Chandpur	0.68	3.31.94	3.30.95
217A	Lohagara	0.47	3.31.94	3.30.95
218	Bardia	1.81	2.1.83	1.31.84
219	Gazirhat	1.64	3.31.94	3.30.95
220	Khepupara	2.05	3.31.86	3.30.87

Station ID	Station name	Avg. fluctuation	Data collection period	
			Start date	Completion date
222	Noakhali	0.03	3.31.94	3.30.95
23	Kalaroa	0.10	3.31.95	3.30.96
239	Lakshmipur	0.08	3.31.94	3.30.95
240	Bhawaniganj	0.10	3.31.94	3.30.95
24	Benarpota	1.81	3.31.95	3.30.96
241	Khulna	2.26	3.31.95	3.30.96
242	Jalma	2.27	12.5.80	12.4.81
243	Chalna	2.97	3.31.95	3.30.96
244	Mongla	2.91	3.31.95	3.30.96
248	Dohazari	0.92	3.31.95	3.30.96
249	Ichakhali	2.41	4.2.78	3.31.79
25	Chapra	3.32	3.31.95	3.30.96
250	Banigram	3.27	3.31.95	3.30.96
253	Sarupkati	0.91	3.31.95	3.30.96
253A	Uzirpur	0.70	3.31.95	3.30.96
254	Satkhira	0.81	1.15.82	1.14.83
254.5	Elarchar	0.93	3.31.95	3.30.96
255	Shovanali	3.36	12.24.79	3.31.80
256	Habraganj	2.89	4.1.79	3.31.80
257	Malipur (C&B Rd.Brid	0.04	3.31.94	3.30.95
258	Paikgacha	3.13	3.31.95	3.30.96
259	Nalianala (Hadda)	3.02	3.31.95	3.30.96
26	Protapnagar	3.63	3.31.95	3.30.96
27	Keshabpur	0.23	3.31.94	3.30.95
276	Satnal	0.44	3.31.94	3.27.95
277	Chandpur	0.84	3.31.94	3.30.95
277.3	Nilkamal	1.12	3.31.94	3.27.95
277.5	Char Kurulia	0.97	3.31.77	3.30.78
288	Offtake in Meghna	1.70	3.31.82	3.30.83
288.3	Tongibari	1.12	4.1.95	3.31.96
288.4	Bholakheyaghat	1.19	3.31.95	3.30.96
289	Dhulia	1.05	3.31.85	3.30.86
29	Sutarkhali F.O.	3.03	3.31.95	3.30.96
290	Dasmunia	1.25	3.31.85	3.30.86
30	Afraghat	1.26	3.31.94	3.30.95
300	Gournadi	0.29	3.31.95	3.30.96
31	Gilatola	1.49	12.4.80	12.3.81
316	Teknaf	2.38	3.31.87	3.30.88
318	Babuganj	0.71	3.31.95	3.30.96
320	Hizla	1.05	3.31.95	3.30.96
323	Abupur	1.12	3.31.95	3.30.96
321	Hatiya	4.02	3.31.94	3.30.95
37	Jhalakati	0.96	3.31.94	3.27.95
37.5	Betagi	1.41	3.31.95	3.30.96
38	Bamna	1.61	3.31.95	3.30.96
38.1	Barguna	1.96	3.31.95	3.30.96
39	Patharghata	2.04	3.31.95	3.30.96
41	Cox's Bazar	1.87	3.31.90	3.30.91
55	Khator Magura	0.96	3.31.94	3.30.95
56.1	Narail	1.12	3.31.94	3.30.95
56	Gobrahat	0.80	3.31.84	3.30.85
59	Raipur	0.15	3.31.77	3.30.78

Station ID	Station name	Avg. fluctuation	Data collection period	
			Start date	Completion date
60	Hajimara	0.26	3.31.77	3.30.78
79	Matlab Bazar	0.63	3.31.94	3.30.95
85	Sobhapur	0.66	4.1.83	3.31.84
86	Dhumghat	0.06	3.31.94	3.30.95
87	Sonapur	0.15	3.31.94	3.30.95
93.6L	Wari	0.21	3.31.77	3.30.78
94	Tarpasa	0.24	3.31.95	3.30.96
278	Daulatkhan	2.08	3.31.95	3.30.96
279	Tajumuddin	2.23	3.31.95	3.30.96
28	Dumuria	3.2	3.31.95	3.30.96
95	Sureswar	0.40	3.31.95	3.30.96
128	Shakra	3.80	3.31.95	3.30.96

Source: National Water Resources Database (NWRD, WARPO); analyzed by PDO-ICZMP.

Table 2: Value of the selected indicators of the coastal zone by district and upazila

District code	District	Upazila/thana code	Upazila/thana	Salinity (dS/m)				Average tidal fluctuation over the year (m)	Cyclone risk status
				Soil	Surface water	Ground-water	Overall salinity status above threshold (presence/absence)		
01	Bagerhat	08	Bagerhat Sadar	4-8	>10	2-5	***	>2	
		14	Chitolmari	>15	5-10	2-5	***	>2	
		34	Fakirhat	>15	5-10	2-5	***	>2	
		38	Kachua	4-8	5-10	2-5	***	>2	
		56	Mollahat	4-8	5-10	2-5	***	>2	
		58	Mongla	>15	>10	>10	***	>2	H
		60	Morelganj	4-8	>10	5-5	***	>2	L
			Rampal	4-8	>10	2-5	***	>2	
			Sarankhola	>15	1-5	>10	**	>2	H
04	Barguna	09	Amtali	>15	1-5	>10	**	1-2	H
		19	Bamna	4-8	5-10	5-10	***	1-2	L
		28	Barguna Sadar	4-8	1-5	>10	**	1-2	H
		47	Betagi	4-8	5-10	5-10	***	1-2	
		85	Patharghata	>15	1-5	>10	**	>2	H
06	Barisal	02	Agailjhara	<4	<1	1-2		<0.3	
		03	Babuganj	<4	<1	1-2		0.3-1	
		07	Bakerganj	4-8	<1	1-2	*	1-2	
		10	Banaripara	<4	<1	1-2		1-2	
		32	Gauronadi	<4	<1	1-2		<0.3	
		36	Hizla	<4	<1	1-2		0.3-1	
		51	Barisal Sadar	4-8	<1	1-2	*	1-2	
		62	Mehendiganj	<4	<1	1-2		0.3-1	
		69	Muladi	<4	<1	1-2		0.3-1	
09	Bhola	94	Wazirpur	<4	<1	1-2		0.3-1	
		18	Bhola Sadar	4-8	1-5	2-5	**	>2	H
		21	Burhanuddin	8-15	1-5	2-5	**	>2	H
		25	Char Fasson	>15	>10	2-5	***	>2	H
		29	Daulatkhan	4-8	1-5	2-5	**	>2	H
	Lalmohan	>15	1-5	2-5	**	>2	H		

District code	District	Upazila/ thana code	Upazila/thana	Salinity (dS/m)				Average tidal fluctuation over the year (m)	Cyclone risk status
				Soil	Surface water	Ground- water	Overall salinity status above threshold (presence/absence)		
		65	Manpura	>15	1-5	2-5	**	>2	H
		91	Tazumuddin	4-8	1-5	2-5	**	>2	H
13	Chandpur	22	Chandpur Sadar	<4	<1	<1		0.3-1	
		45	Faridganj	<4	<1	<1		0.3-1	
		47	Haimchar	<4	<1	<1		1-2	
		49	Hajiganj	<4	<1	<1		0.3-1	
		58	Kachua	<4	<1	<1		0.3-1	
		76	Matlab	<4	<1	<1		0.3-1	
		95	Shahrasti	<4	<1	<1		0.3-1	
15	Chittagong	04	Anowara	4-8	5-10	<1	**	>2	H
		08	Banshkhali	4-8	5-10	<1	**	>2	H
			<i>Biojdbostami</i>	4-8	5-10	<1	**	1-2	H
			<i>Bakalia</i>	<4	<1	<1		1-2	
		12	Boalkhali	<4	<1	<1		1-2	
		18	Chandonaish	<4	<1	<1		>2	
		19	Chandgaon	<4	<1	<1		1-2	
		20	Chittagong Port (Bandar)	4-8	5-10	<1	**	>2	H
		28	Double Mooring	4-8	5-10	<1	**	>2	H
		33	Fatikchari	<4	<1	<1		<0.3	
			<i>Halisahar</i>	4-8	5-10	<1	**	>2	H
		37	Hathazari	<4	<1	<1		>2	
			<i>Karnaphuli</i>	4-8	5-10	<1	**	1-2	
		41	Kotwali	4-8	5-10	<1	**	1-2	
			<i>Kulshi</i>	4-8	5-10	<1	**	1-2	H
		47	Lohagara	<4	<1	<1		<0.3	
		53	Mirsarai	4-8	5-10	<1	**	>2	H
		55	Pahartali	4-8	5-10	<1	**	>2	H
		57	Panchlaish	4-8	5-10	<1	**	>2	H
		61	Patiya	<4	<1	<1		1-2	
			<i>Potenga</i>	4-8	5-10	<1	**	>2	H
		70	Rangunia	<4	<1	<1		1-2	

District code	District	Upazila/ thana code	Upazila/thana	Salinity (dS/m)				Average tidal fluctuation over the year (m)	Cyclone risk status
				Soil	Surface water	Ground- water	Overall salinity status above threshold (presence/absence)		
		74	Rawzan	<4	<1	<1		1-2	
		78	Sandwip	4-8	5-10	<1	**	>2	H
		82	Satkania	<4	<1	<1		0.3-1	
		86	Sitakunda	4-8	5-10	<1	**	>2	H
22	Cox's Bazar	16	Chakaria	>15	5-10	<1	**	>2	H
		24	Cox's bazar Sadar	>15	5-10	<1	**	>2	H
		45	Kutubdia	>15	5-10	<1	**	>2	H
		49	Maheshkhali	8-15	5-10	<1	**	>2	H
		66	Ramu	>15	5-10	<1	**	>2	H
		90	Teknaf	>15	5-10	<1	**	>2	H
		94	Ukhia	8-15	5-10	<1	**	>2	H
30	Feni	14	Chagalnaiya	<4	<1	<1		0.3-1	
		25	Dagonbhuiya	<4	<1	<1		<0.3	
		29	Feni sadar	<4	<1	<1		>2	
		51	Parshuram	<4	<1	<1		<0.3	
		94	Sonagazi	8-15	5-10	<1	**	>2	H
35	Gopalganj	32	Gopalganj Sadar	<4	<1	<1		0.3-1	
		43	Kashiani / Kasiani	<4	<1	<1		0.3-1	
		51	Kotalipara / Kowtalipara	<4	<1	<1		0.3-1	
		58	Muksudpur	<4	<1	<1		<0.3	
		91	Tungipara	8-15	1-5	<1	*	0.3-1	
41	Jessore	04	Abhaynagar	4-8	<1	<1	*	<0.3	
		09	Bagherpara	<4	<1	<1		<0.3	
		11	Chaugacha / Chowgacha	<4	<1	<1		<0.3	
		23	Jhikargacha / Jhikorgacha	<4	<1	<1		<0.3	
		38	Keshabpur	4-8	<1	<1	*	<0.3	
		47	Jessore Sadar	<4	<1	<1		<0.3	
		61	Manirampur	<4	<1	<1		<0.3	
		90	Sharsha	4-8	<1	<1	*	<0.3	
42	Jhalokati	42	Jhalokati Sadar / Jhalkathi	4-8	<1	1-2	*	1-2	
		43	Kanthalia / Kathalia	4-8	<1	1-2	*	1-2	

District code	District	Upazila/ thana code	Upazila/thana	Salinity (dS/m)				Average tidal fluctuation over the year (m)	Cyclone risk status
				Soil	Surface water	Ground- water	Overall salinity status above threshold (presence/absence)		
		73	Nalchity / Nalchhiti	4-8	<1	1-2	*	1-2	
		84	Rajapur	4-8	<1	1-2	*	1-2	
47	Khulna	12	Batiaghata	8-15	5-10	1-2	**	>2	
		17	Dacope	>15	>10	>10	***	>2	H
		21	Daulatpur	8-15	1-5	1-2	*	>2	
		30	Dumuria	8-15	5-10	1-2	**	>2	
		40	Dighalia	8-15	5-10	1-2	**	>2	
		45	Khalishpur	8-15	5-10	1-2	**	>2	
		48	Khan Jahan Ali	8-15	5-10	1-2	**	>2	
		51	Khulna Sadar	8-15	5-10	1-2	**	>2	
		53	Koyra	>15	>10	>10	***	>2	H
		64	Paikgachha	>15	>10	1-2	**	>2	
		69	Phultala	8-15	5-10	2-5	***	>2	
		75	Rupsha	8-15	5-10	2-5	***	>2	
		85	Sonadanga	8-15	5-10	2-5	***	>2	
		94	Terokhada	4-8	5-10	1-2	**	>2	
51	Lakshmipur	43	Lakshmipur Sadar	4-8	<1	<1	*	<0.3	
		58	Raipur	4-8	<1	<1	*	>2	
		65	Ramganj	<4	<1	<1		<0.3	
		73	Ramgati	8-15	<1	<1	*	>2	H
65	Narail	28	Kalia	4-8	<1	<1	*	1-2	
		52	Lohagara	<4	<1	<1		0.3-1	
		76	Narail Sadar	<4	<1	<1		0.3-1	
			<i>Narigati</i>	4-8	<1	<1	*	1-2	
75	Noakhali	07	Begumganj	<4	<1	<1		<0.3	
		10	Chatkhil	<4	<1	<1		<0.3	
		21	Companiganj	8-15	5-10	<1	**	>2	H
		36	Hatiya	>15	5-10	5-10	***	>2	H
		80	Senbagh	<4	<1	<1		1-2	
		87	Noakhali Sadar	8-15	5-10	1-2	**	>2	L
78	Patuakhali	38	Bauphal / Bawphal	4-8	5-10	2-5	***	1-2	

District code	District	Upazila/ thana code	Upazila/thana	Salinity (dS/m)				Average tidal fluctuation over the year (m)	Cyclone risk status
				Soil	Surface water	Ground- water	Overall salinity status above threshold (presence/absence)		
		52	Dashmina	8-15	5-10	2-5	***	1-2	L
		57	Galachipa	8-15	5-10	5-10	***	1-2	H
		66	Kalapara	>15	>10	>10	***	>2	H
		76	Mirzaganj	8-15	5-10	2-5	***	1-2	
		95	Patuakhali Sadar	8-15	1-5	2-5	**	1-2	
			<i>Rangabali</i>	8-15	5-10	5-10	***	1-2	H
79	Pirojpur	14	Bhandaria	4-8	5-10	2-5	***	1-2	
		47	Kawkhali	4-8	<1	2-5	**	1-2	
		58	Mathbaria	8-15	5-10	2-5	***	1-2	L
		76	Nazirpur	4-8	<1	2-5	**	1-2	
		80	Pirojpur Sadar	8-15	1-5	2-5	**	1-2	
		87	Nesarabad (Swarupkati)	<4	<1	2-5	*	1-2	
86	Shariatpur	14	Bhedarganj	<4	<1	<1		1-2	
		25	Damudya	<4	<1	<1		1-2	
		36	Goshairhat	<4	<1	<1		1-2	
		65	Naria	<4	<1	<1		1-2	
		69	Shariatpur Sadar (Palong)	<4	<1	<1		1-2	
		94	Zanjira	<4	<1	<1		1-2	
87	Satkhira	04	Asasuni	8-15	5-10	2-5	***	>2	L
		25	Debhata	4-8	5-10	2-5	***	1-2	
		43	Kalaroa	<4	5-10	5-10	**	1-2	
		47	Kaliganj	<4	5-10	5-10	**	>2	
		82	Satkhira Sadar	4-8	5-10	1-2	**	1-2	
		86	Shyamnagar	>15	>10	>10	***	>2	H
		90	Tala	>15	5-10	<1	**	>2	

Exposed upazila

New upazila/thana (Population Census 2001, preliminary report, BBS)

*Presence of salinity over thresh hold level in a media.

Table 3: Upazilas of the coastal zone by presence of number of indicators above threshold level

Districts	Exposed Upazilas		Interior Upazilas		Upazilas meeting none of the criteria
	Upazilas meeting 3 criteria (tidal movements, salinity & cyclone risk)	Upazilas meeting 2 parameters (tidal movements & salinity)	Upazilas having 1 parameters tidal movements	Upazilas having 1 parameters salinity	
Bagerhat	Mongla, Sarankhola, Morelganj	Bagerhat Sadar, Chitolmari, Fakirhat, Kachua, Mollahat, Rampal,			
Barguna	Amtali, Bamna, Barguna Sadar, Patharghata	Betagi			
Barisal		Bakerganj, Barisal Sadar	Banaripara, Wazirpur, Muladi Mehendiganj, Babuganj, Hizla		Gauronadi, Agailjhara,
Bhola	Bhola Sadar, Burhanuddin, Char fasson, Daulatkhan, Lalmohan, Manpura, Tazumuddin				
Chandpur			Haimchar, Matlab, Chandpur Sadar, Hajiganj, Kachua, Faridganj, Shahrasti		
Chittagong	Anowara, Banskhali, Chittagong Port/Bandar, Panchlaish, Potenga, Sitakunda, Halisahar, Kotwali, Double Mooring, Mirsharai, Pahartali, Sandwip, Biojdbostami,	Karanaphuli, Kulshi,	Hathazari, Chandonaiish, Boalkhali, Rangunia, Patiya, Bakalia, Rawzan, Satkania, Chandgaon		Fatikchari, Lohagara
Cox's Bazar	Chakaria, Cox's bazar Sadar, Kutubdia, Maheshkhali, Ramu, Teknaf, Ukhia				
Feni	Sonagazi		Feni Sadar, Chagalnaiya		Dagonbhuiya, Parshuram
Gopalganj		Tungipara	Kashiani, Gopalganj Sadar, Kotalispara		Muksudpur
Jessore				Abhaynagar Keshabpur, Sharsha	Jhikorgacha, Bagherpara, Manirampur, Chowgacha, Jessore Sadar
Jhalokati		Jhalokati Sadar, Nalchity, Rajapur, Kanthalia			
Khulna	Dacope, Koyra	Batiaghata, Daulatpur, Dumuria, Dighalia, Khalishpur, Khan Jahan Ali, Khulna Sadar, Paikgachha,			

Districts	Exposed Upazilas		Interior Upazilas		
	Upazilas meeting 3 criteria (tidal movements, salinity & cyclone risk)	Upazilas meeting 2 parameters (tidal movements & salinity)	Upazilas having 1 parameters		Upazilas meeting none of the criteria
			tidal movements	salinity	
		Phultala, Rupsha, Sonadanga, Terokhada			
Lakshmipur	Ramgati	Raipur		Lakshmipur Sadar, Ramganj,	
Narail		Kalia, Naragati	Narail Sadar, Lohagara		
Noakhali	Hatiya, Noakhali Sadar, Companiganj		Senbagh		Begumganj, Chatkhil
Patuakhali	Dashmina, Galachipa, Kalapara, Rangabali	Bauphal, Mirzaganj Patuakhalisadar			
Pirojpur	Mathbaria	Bhandaria, Nazirpur, Kawkhali, Pirojpur Sadar, Nesarabad (Swarupkati)			
Satkhira	Asasuni, Shyamnagar	Debhata, Kalaroa, Kaliganj, Satkhira Sadar, Tala			
Shariatpur			Naria, Palong, Zanjira, Damudya, Bhedarganj, Goshairhat		

Table 4: Area and population of coastal districts

No.	District	Area (sq. km) ¹	Population 1991 ¹	Population 2001 ²
1	Bagerhat	3959	1,431,332	1,516,820
2	Barguna	1831	775,693	845,060
3	Barisal	2785	2,207,426	2,348,440
4	Bhola	3403	1,476,328	1,703,200
5	Chandpur	1704	2,032,449	2,241,020
6	Chittagong	5283	5,296,127	6,543,860
7	Cox's Bazar	2492	1,419,260	1,759,560
8	Feni	928	1,096,745	1,205,980
9	Gopalganj	1490	1,060,791	1,151,800
10	Jessore	2567	2,106,996	2,469,680
11	Jhalakhati	749	666,139	692,680
12	Khulna	4394	2,010,643	2,357,940
13	Lakshmipur	1456	1,312,337	1,486,540
14	Narail	990	655,720	694,900
15	Noakhali	3601	2,216,685	2,570,640
16	Patuakhali	3221	1,273,872	1,464,800
17	Pirojpur	1308	1,063,185	1,099,780
18	Satkhira	3858	1,597,178	1,845,120
19	Shariatpur	1182	953,021	1,080,680
Total		47201	30,651,927	35,078,500

¹) Source: BBS, 1994

²) Source: BBS, 2003

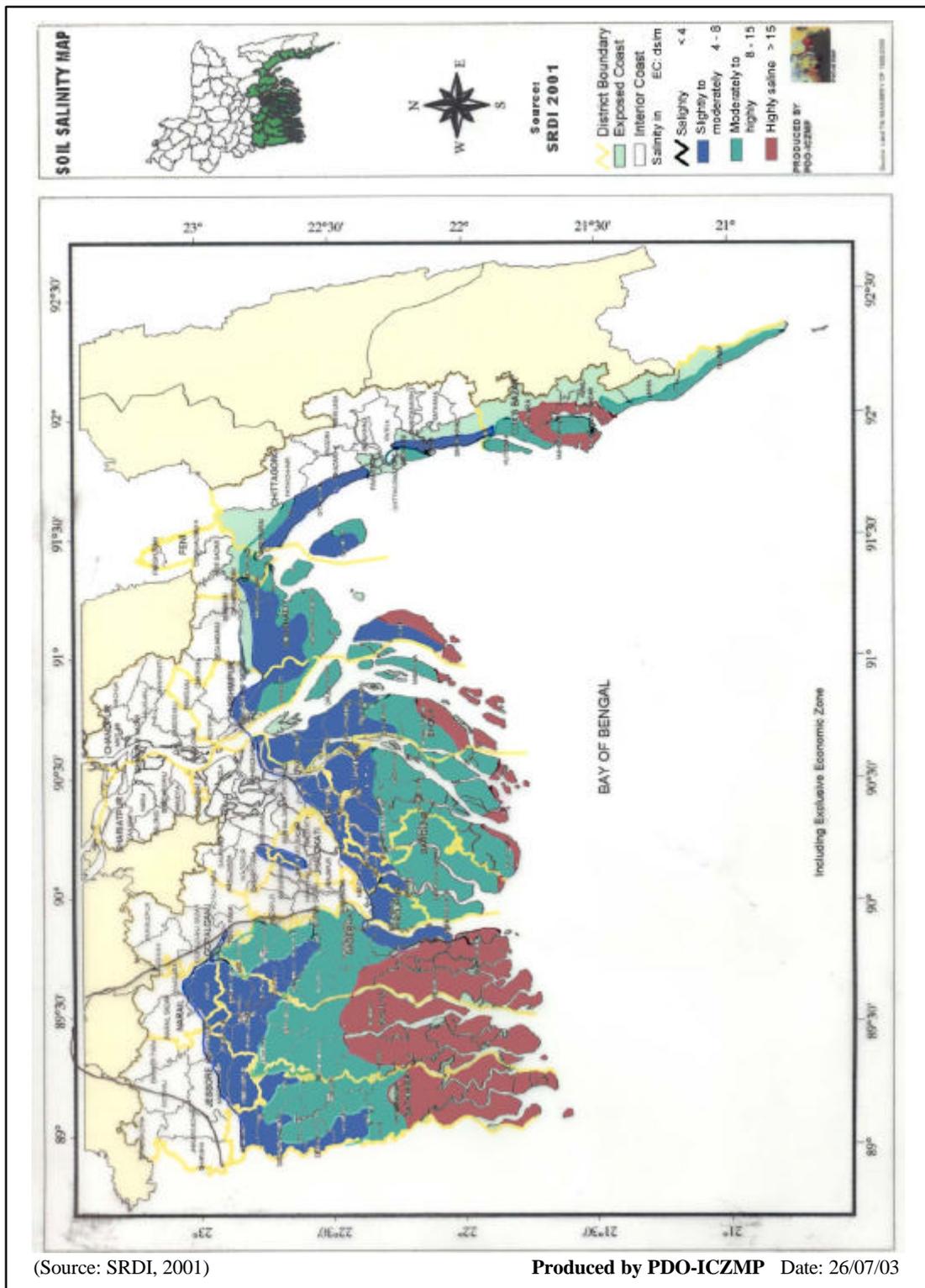
Table 5: Legal status and statement of EEZ and territorial waters

Zones	The Law of the Sea (UN, 1997)	Proclamation No LT-I/3/74 of the Government of Bangladesh of 13 April 1974	Marine Fisheries Ordinance, 1983 (Ordinance No XXXV of 1983)	National Fish Policy 1998 (MoFL, 1998)
EEZ	<p>PART V: EXCLUSIVE ECONOMIC ZONE</p> <p><i>Article 56. Rights, jurisdiction and duties of the coastal State in the exclusive economic zone</i></p> <p>1. In the exclusive economic zone, the coastal State has:</p> <p>(a) sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds;</p> <p>(b) jurisdiction as provided for in the relevant provisions of this Convention with regard to:</p> <p>(i) the establishment and use of artificial islands, installations and structures;</p> <p>(ii) marine scientific research;</p> <p>(iii) the protection and preservation of the marine environment;</p> <p>(c) other rights and duties provided for in this Convention.</p> <p>2. In exercising its rights and performing its duties under this Convention in the exclusive economic zone, the coastal State shall have due regard to the rights and duties of other States and shall act in a manner compatible with the provisions of this Convention.</p> <p><i>Article 57. Breadth of the exclusive economic zone</i></p> <p>The exclusive economic zone shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured.</p>	<p>3. The baselines from which territorial waters shall be measured seaward are the straight lines linking successively the baseline points set out below: (<i>see Table 7 of this PDO-ICZMP report</i>).....</p> <p>In exercise of the powers conferred by sub-section (1) of section 5 of the Territorial Waters and Maritime Zones Act, 1974 (Act No. XXVI of 1974), the Government is pleased to declare that the Zone of the high seas extending to 200 nautical miles measured from the baselines shall be the economic zone of Bangladesh.</p>	<p>2. Definitions</p> <p><i>-In this Ordinance, unless there is anything repugnant the subject or context.-</i></p> <p>(a) “Bangladesh Fisheries Waters” means the territorial waters and economic zone of Bangladesh as declared by the Government under the Territorial Waters and Maritime Zones Act, 1974 (XXVI of 1974), and any other marine waters over which has, or claims to have, jurisdiction under law with respect to the management, conservation and development of the marine living resources;</p>	<p>In Chapter 2 on fisheries resources in Bangladesh, the coastal areas are defined to include the water areas of the exclusive economic zone.</p>
Territorial zone	<p>PART II. TERRITORIAL SEA AND CONTIGUOUS ZONE</p> <p>SECTION 1. GENERAL PROVISIONS</p> <p><i>Article 2. Legal status of the territorial sea, of the air space</i></p>	<p>1 In exercise of the powers conferred by sub-section (1) of section 3 of the Territorial Waters and Maritime Zones Act, 1974 (Act No. XXVI of 1974),</p>		

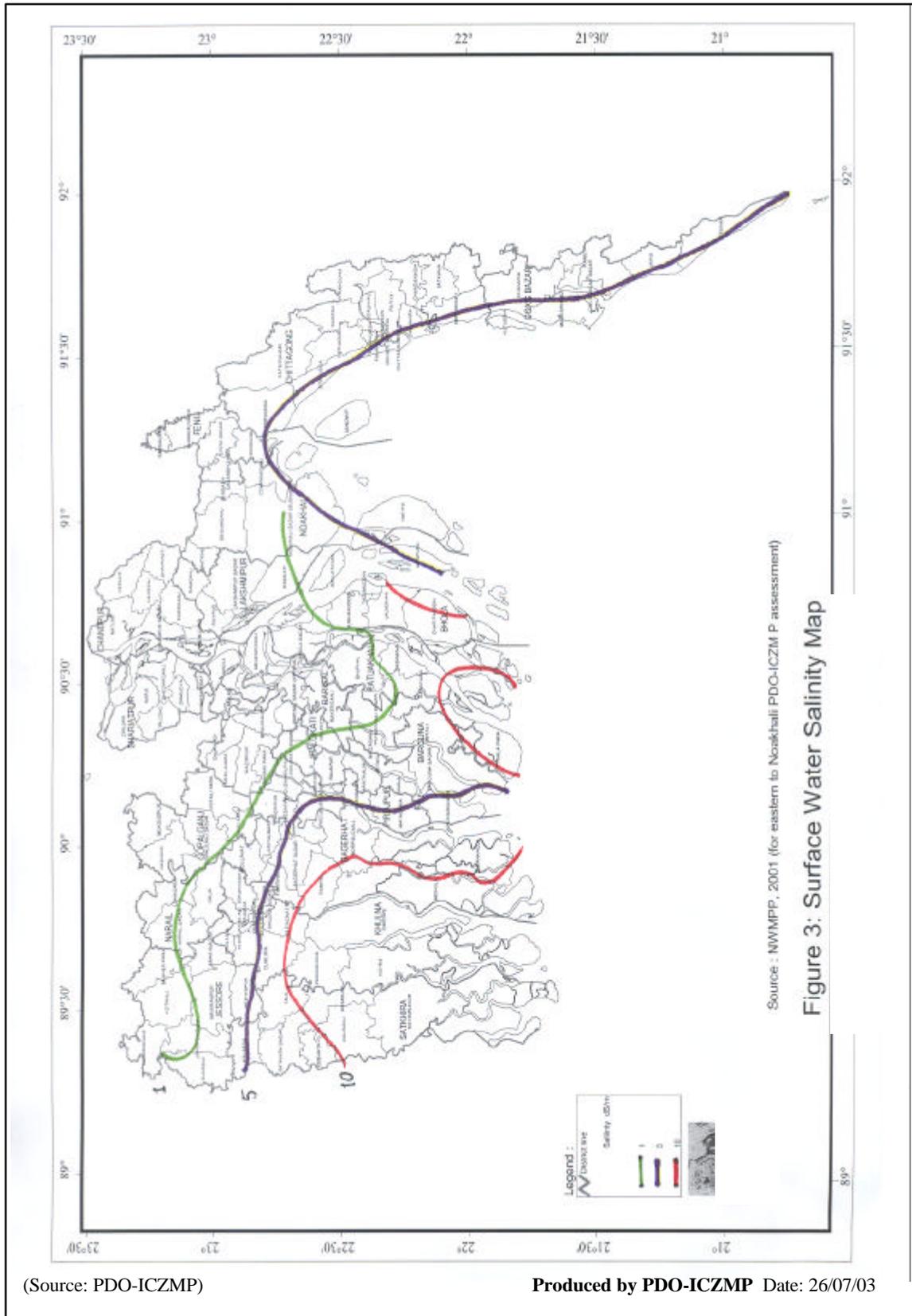
Zones	The Law of the Sea (UN, 1997)	Proclamation No LT-I/3/74 of the Government of Bangladesh of 13 April 1974	Marine Fisheries Ordinance, 1983 (Ordinance No XXXV of 1983)	National Fish Policy 1998 (MoFL, 1998)
	<p><i>over the territorial sea and of its bed and subsoil</i></p> <p>1. The sovereignty of a coastal State extends, beyond its land territory and internal waters and, in the case of an archipelagic State, its archipelagic waters, to an adjacent belt of sea, described as the territorial sea.</p> <p>2. This sovereignty extends to the air space over the territorial sea as well as to its bed and subsoil.</p> <p>3. The sovereignty over the territorial sea is exercised subject to this Convention and to other rules of international law.</p> <p>SECTION 2. LIMITS OF THE TERRITORIAL SEA</p> <p><i>Article 3. Breadth of the territorial sea</i></p> <p>Every State has the right to establish the breadth of its territorial sea up to a limit not exceeding 12 nautical miles measured from baselines determined in accordance with this Convention.</p>	<p>and in super session of any previous declaration on the subject, the Government is pleased to declare that the limits of the sea specified in paragraph 2 beyond the land territory and internal waters of Bangladesh shall be the territorial waters of Bangladesh</p> <p>2 The limits of the sea referred to in paragraph 1 shall be twelve nautical miles measured seaward and the baselines set out in paragraph 3 so that each point of the outer limit of the sea to the nearest point inward on the baselines is twelve nautical miles.</p>		

Table 6: Bangladesh Straight Baseline System

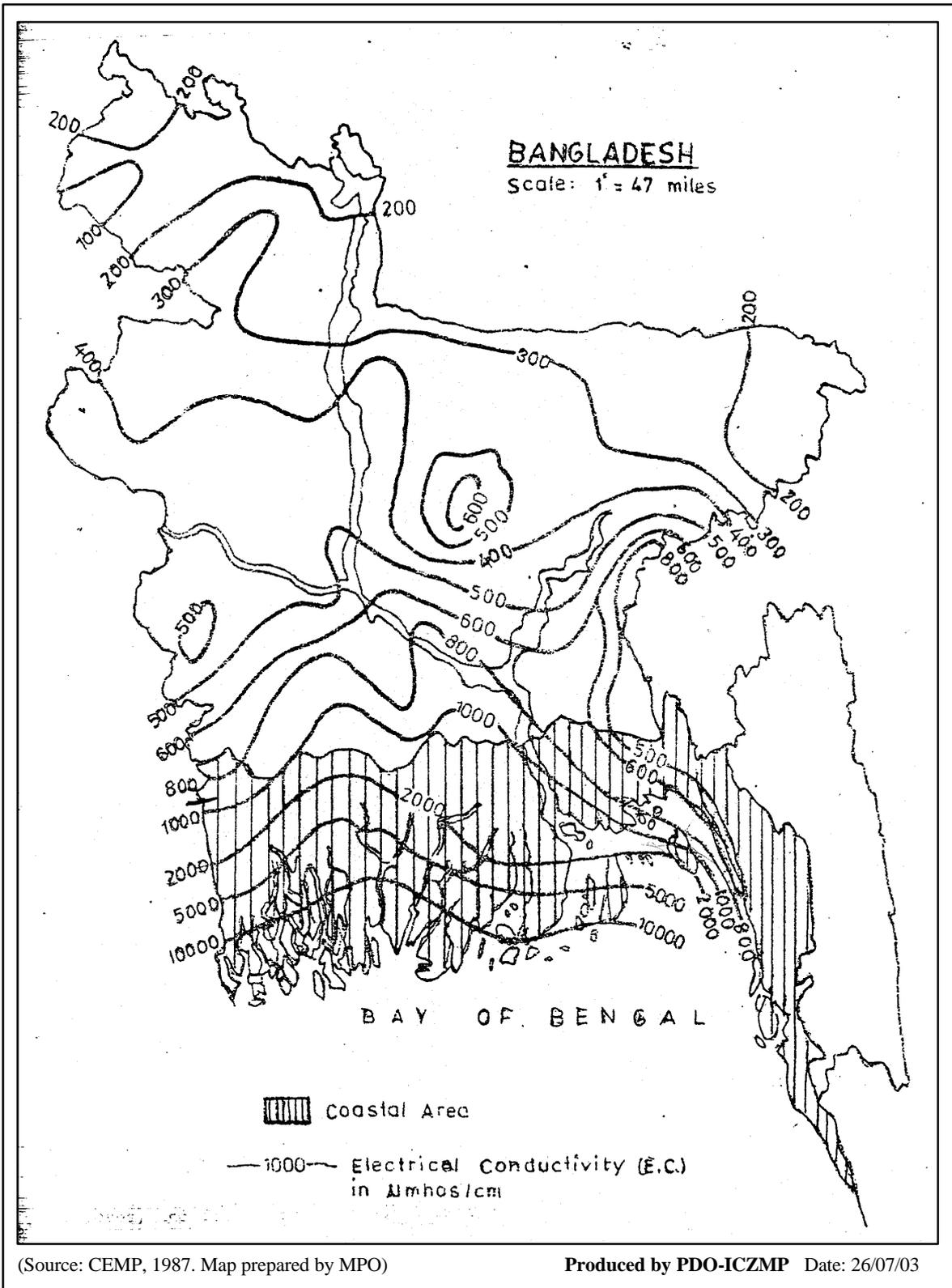
Point	Latitude North	Longitude East
No. 1	21° 12' 00"N.	89° 06' 45" E.
No. 2	21° 15' 00"N.	89° 16' 00" E.
No. 3	21° 29' 00"N.	89° 36' 00" E.
No. 4	21° 21' 00"N.	89° 55' 00" E.
No. 5	21° 11' 00"N.	90° 33' 00" E.
No. 6	21° 07' 30"N.	91° 06' 00" E.
No. 7	21° 10' 00"N.	91° 56' 00" E.
No. 8	21° 21' 45"N.	92° 17' 30" E.



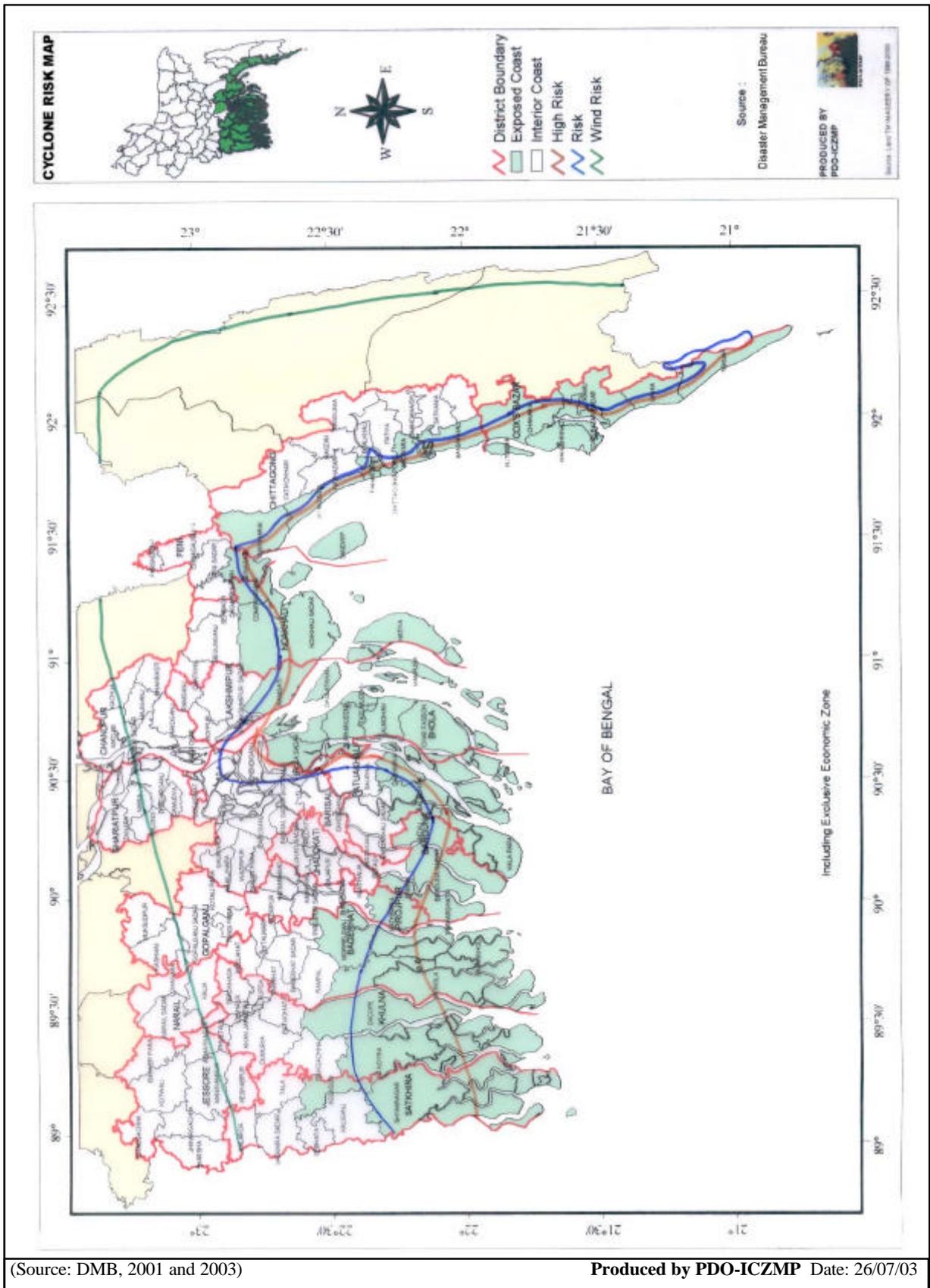
Map 2: Soil salinity 1997



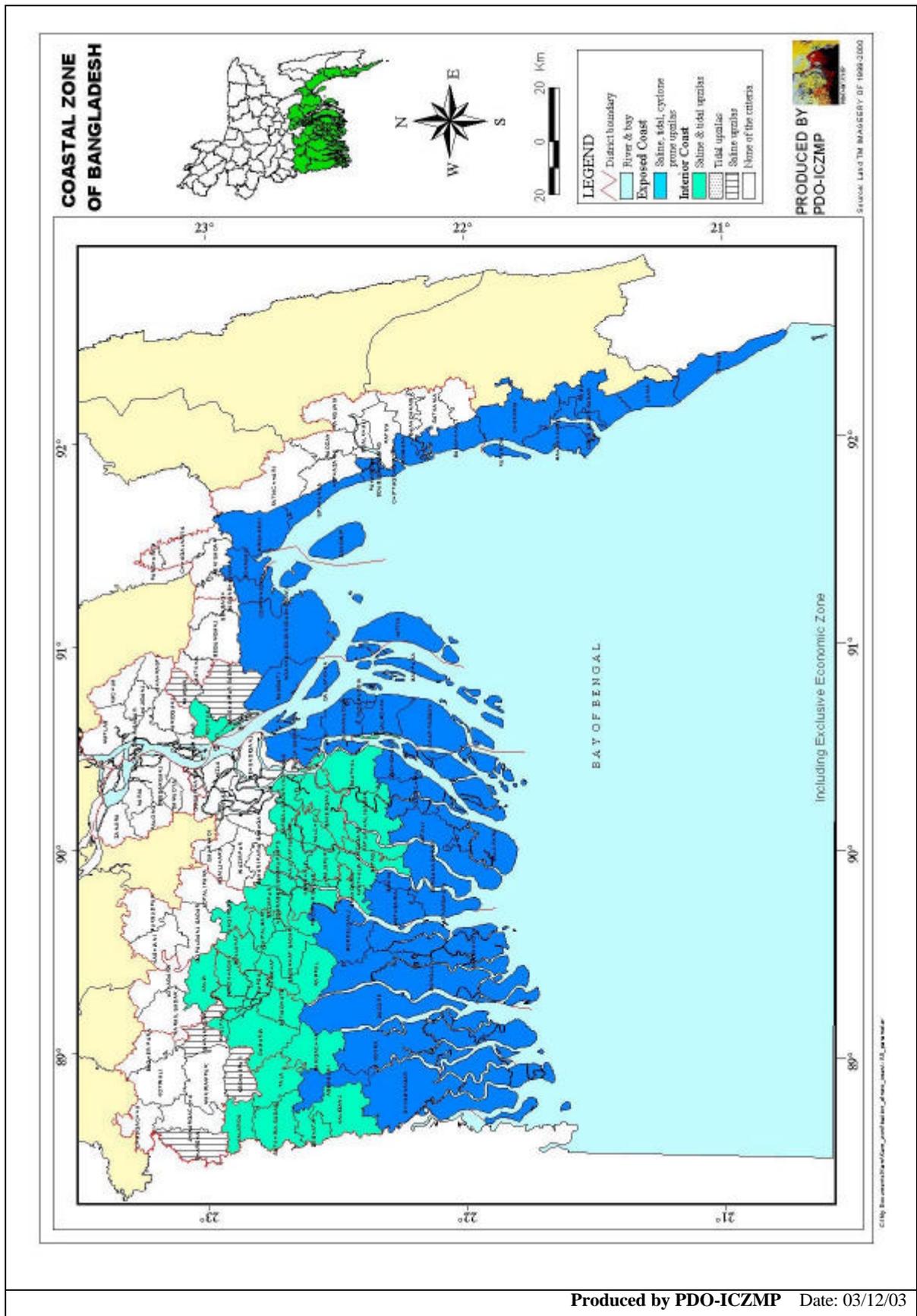
Map 3: Surface water salinity



Map 4: Ground water salinity



Map 5: Cyclone risk



Map 6: The coastal zone of Bangladesh differentiating exposed and the interior coast

ANNEX : MINUTES OF THE 6TH INTER-MINISTERIAL TECHNICAL COMMITTEE MEETING

Government of the People's Republic of Bangladesh
Ministry of Water Resources
Section. Dev.4

No MoWR. Dev.4/Netherlands-1/99(Vol.-1)/348

Dated: 22 November 2003

Sub: Minutes of the 6th meeting of the Inter-ministerial Technical Committee (TC) for the Integrated Coastal Zone Management Plan (ICZMP) Project.

The 6th meeting of the Inter-ministerial Technical Committee for the Integrated Coastal Zone Management Plan (ICZMP) Project was held on 25th October, 2003 at 11.30 hrs in the conference room of the Ministry of Water Resources. Mr. Md. Sayef Uddin, Secretary, Ministry of Water Resources chaired the meeting. List of participants of the meeting is shown in Annexure-'A'

2. The Chairman welcomed all present in the meeting. He invited Dr. M. Rafiqul Islam, Team Leader (TL) of ICZMP project to present the agenda of the meeting.
3. Dr. M. Rafiqul Islam made an agenda-wise presentation of issues, as circulated earlier in working paper.

Compliance on the decisions of the 5th Technical Committee Meeting

- i. These were all complied and generated no further discussion.

Coastal Zone Delineation

- ii. As per decision of 5th TC meeting, the meeting would finalize the coastal zone delineation. The TL informed the meeting that as per decision of 5th TC meeting, "Delineation of Coastal Zone" proposal was sent to 30 members/observers of the TC on May 19, 2003 with a request to send written comments. He added that reminder was issued on July 23, 2003; six members sent written comments. He further stated that necessary changes in the "Delineation of Coastal Zone" proposal were made on the basis of the comments. He also showed changes on maps.

The Chairman then requested the participants to discuss on the issue of "Delineation of Coastal Zone". Dr. Md. Giasuddin Khan, Chief Fisheries Extension Officer, DoF suggested drawing a boundary line of Exclusive Economic Zone (EEZ) in the map of the coastal zone. It was explained that this was being done in a separate exercise and an exact boundary of EEZ would be required at this stage of ICZM preparation.

Coastal Zone Policy (CZPo)

- iii. The TL explained the steps so far taken in the formulation of the draft policy including recently concluded consultation at 19 coastal districts. He mentioned about the possible next steps to finalize the CZPo by December 2003.

The Chairman suggested that the draft policy should be circulated immediately to all the members of the TC giving adequate time for having their comments.



Issue arising out of SPEC meeting at the Planning Commission

- iv. TL then informed that Special Project Evaluation Committee (SPEC), in its meeting on August 2, 2003, suggested inclusion of Palli Karma Shahayak Foundation (PKSF) as a member of the Focal Points of the project.

The Chairman enquired whether the opinion of PKSF to be included as focal Point had been sought. All agreed to establish a Focal Point at the PKSF.

Priority Investment Program: Development of Concept Notes

- v. Then the TL presented the "Concept Note" issue. He explained the idea of the concept note with its principles, scope and structure. The concept note issue generated a lively discussion among the participants including the Chairman, DG-BWDB, DG-WARPO, RNE Representative, Chief Planning-BWDB. All contributed valuable suggestions regarding the concept note.

Status Information

- vi. Approval of the revised TAPP: It was informed that the revised TAPP was approved on October 21, 2003.
- vii. Focal Points: 28 of 34 Focal Points established. An Orientation session of Focal Points was held on September 15, 2003.
- viii. Task Forces: Two of the three task forces formed and met twice already. Task Force on Policy could not be formed as nominations from some ministries were yet to be obtained.
- ix. Review Mission: It was informed that the review mission started on October 26, 2003.
- x. Progress: Detailed in annex.

4. After detailed discussion, the following decisions were taken:

- a. Coastal Zone of Bangladesh would comprise of 19 districts, 147 upazillas (as listed in Annex-B) and the Exclusive Economic Zone (EEZ).
- b. Coastal Zone Policy (CZPo) draft would be circulated to all TC members by 1st week of November 2003 for comments. 7th TC meeting would be held during 3rd or 4th week of November 2003 so that the same could be sent to Cabinet by the end of December 2003.
- c. PKSF would be requested to give their views on the decision of SPEC meeting on August 2, 2003 about inclusion of PKSF as Focal Point of ICZMP project.
- d. Concept notes should be :
 i. Ideas were agreed in the meeting but criteria and other aspects would be decided in future TC meeting.
 ii. Formats should be prepared as close as possible of existing GoB Proformas (i.e. TAPP, PC, PP, PPP, etc.)
 iii. Assessment would be based on quantitative (as close as possible) rather than qualitative measures.
 iv. Concept notes would be circulated among members for comments.
- e. The MoWR would send further reminders for nominations for the task force on Policy & Strategy.
5. The meeting ended with a vote of thanks from the chair.

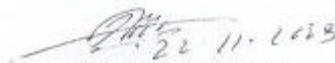
Sd/-
 22-11-2003
 (Md. Sayef Uddin)
 Secretary

No MoWR. Dev.4/Netherlands-1/99(Vol.-1)/348

Dated: 22 November 2003

Copy forwarded for information and necessary action to:

1. Member (Agriculture, Water Resources & Rural Institutions), Planning Commission, Dhaka.
2. Chairman, Bangladesh Parjaton Corporation, Dhaka.
3. Joint Secretary, Ministry of Water Resources.
4. Director General, Bangladesh Water Development Board, Dhaka.
5. Director General, WARPO, Dhaka and Member-Secretary, TC, ICZMP Project.
6. Director General, Department of Environment, Dhaka.
7. Director General, Department of Livestock, Dhaka.
8. Director General, Department of Fisheries, Dhaka.
9. Director General, Department of Land Records and Surveys, Dhaka.
10. Director General, Disaster Management Bureau, Dhaka.
11. Director General, Department of Agriculture Extension, Dhaka.
12. Chief Conservator of Forest, Dhaka.
13. Managing Director, Bangladesh Shipping Corporation, BSC Bhaban, Saltgola, Chittagong.
14. Executive Chairman, Bangladesh Agriculture Research Council, Dhaka.
15. Chief Engineer, Local Government Engineering Department (LGED), Dhaka.
16. Chief Engineer, Department of Public Health Engineering (DPHE), Dhaka.
17. Head of the Department, Department of WRE, BUET, Dhaka.
18. Head of the Department, Department of Soil Science, Dhaka University.
19. Dean, Faculty of Agriculture, Bangladesh Agricultural University, Mymensingh.
20. Director, Naval Head Quarters, Operations Branch, Directorate of Naval Operations, Banani, Dhaka.
21. Additional Director General (Planning), Bangladesh Water Development Board, Dhaka.
22. Chief Planning, Bangladesh Water Development Board, Dhaka.
23. Project Director, CDSP-II, Bangladesh Water Development Board, Dhaka.
24. Country Representative, IUCN Bangladesh Country Office, Dhaka.
25. Chairman, Bangladesh Unnayan Parisad, Dhaka.
26. President, Chittagong Chambers of Commerce, Chittagong.
27. President, ADAB, Dhaka.
28. Team Leader, PDO-ICZM, Dhaka.
29. Team Leader, CDSP-II, Noakhali.
30. Team Leader, MES-II, Dhaka.
31. First Secretary (Development), The Royal Netherlands Embassy, Dhaka.
32. Ms Paula Barrett, Programme Officer, DFID, Bangladesh Office, H#42, R#28, Gulshan, Dhaka.


 (Talat Mahmud Khan)
 Senior Assistant Secretary
 Phone: 7165931

c.c.

1. PS to Secretary, Ministry of Water Resources.
2. PO to Additional Secretary/Joint Secretary/Joint Chief/Deputy Secretary (Dev.2), MoWR.

Annexure-'A'

List of Participants

Ministry of Water Resources

1. Mr. Md. Abdur Razzak, Joint Chief
2. Mr. Md. Mojibur Rahman, Deputy Secretary (Dev.2)
3. Mr. Md. Talat Mahmud Khan, Senior Assistant Secretary (Dev. Section-4)

BWDB

1. Mr. Mukhlesuzzaman, Director General
2. Mr. Md. Anwar Hossain Bhuiyan, Chief Planning
3. Mr. Md. Habibur Rahman

WARPO

1. Mr. H.S.M Faraque, Director General
2. Mr. Dhali Abdul Qaim, PSO

ICZMP

1. Mr. M. Rafiqul Islam, Team Leader

IWM

1. Mr. Jalaluddin Md. Abdullah, Deputy Executive Director

CDSP

1. Mr. Abdul Zaliqwhah, PD, CDSP-II
2. Mr. Md. Badiul Alam, Deputy Secretary, MoL, Project Co-ordinator, CDSP-II
3. Mr. Shuarl P. Pearson

DAE

1. Mr. Md. Mahbabul Hoque, Additional Director

LGED

1. Mr. Md. Shahidul Haque, Executive Engineer.

DLRS

Mr. Md. Ghulam Shafeque Mia, Director (Survey)

Agriculture University

1. Prof. Lutfur Rahman, Director, CL.

BARC

1. Mr. Md. Sk. Ghulam Hussain, CSO (Forest)

DPHE

1. Mr. Md. Nazrul Hoque, Executive Engineer, Noakhali, Division.

Department of Livestock

1. Dr. Mohd. Sultan Mohiuddin, Director.

DoE.

1. Dr. Mostafa Kamal Farooque

Bangladesh Portjon Corporation

1. Mohammed Ahsanullah, General Manager(Planning)

DMB

1. Mr. Md. Majibur Rahman, Director

DoF

1. Dr. Md. Giasuddin Khan, Deputy Director

NHQ

1. Lt. Cdr. Manjur Hossain.

Royal Netherlands Embassy

1. Ms. Caro Krijger, Second Secretary, Water Sector.

Annexure – ‘B’

List of 19 zilas & upzilas in the coastal zone

District	Upazilas	
	Exposed	Interior
Bagerhat	Mongla, Saran Khola, Morrelganj	Bagerhat Sadar, Chitalmari, Fakirhat, Kachua, Mollahat, Rampal
Barguna	Amtali, Barguna Sadar, Patharghata, Bamna	Betagi
Barisal		<i>Agailjhara</i> , Babuganj, Bakerganj, <i>Gaurnadi</i> , Hizla, Mehendiganj, Muladi, Wazirpur, Banari Para, Barisal Sadar
Bhola	Bhola Sadar, Burhanuddin, Char Fasson, Daulatkhan, Lalmohan, Manpura, Tazumuddin	
Chandpur		Chandpur Sadar, Faridganj, Haimchar, Hajiganj, Kachua, Matlab, Shahrasti
Chittagong	Anowara, Banskhali, Chittagong port, Double Mooring, Mirsharai, Pahartali, Panchlaish, Sandwip, Sitakunda, Patenga, Halisahar, Kotwali, Boijid Bostami,	Boalkhali, Chandanaish, <i>Lohagara</i> , Rangunia, Chandgaon, <i>Fatikchhari</i> , Hathazari, Patiya, Raozan, Satkania, Bakalia, Karanaphuli, Kulshi
Cox's Bazar	Chakaria, Cox's Bazar Sadar, Kutubdia, Ukhia, Maheshkhali, Ramu, Teknaf	
Feni	Sonagazi	Chhagalnaiya, Feni Sadar, <i>Parshuram</i> , <i>Daganbhuiyan</i>
<i>Gopalganj</i>		Gopalganj Sadar, Kashiani, Kotali Para, <i>Muksudpur</i> , Tungipara
Jessore		Bagher Para, Chaugachha, Jhikargachha, Manirampur, Abhaynagar, Keshabpur, Jessore Sadar, Sharsha
Jhalokati		Jhalokati Sadar, Kanthalia, Nalchity, Rajapur
Khulna	Dacope, Koyra	Batiaghata, Daulatpur, Dumuria, Dighalia, Khalishpur, Khan Jahan Ali, Khulna Sadar, Paikgachha, Phultala, Rupsha, Sonadanga, Terokhada
Lakshmipur	Ramgati	Lakshmipur Sadar, Raipur, Ramganj
Narail		Lohagara, Narail Sadar, Kalia, Narigati
Noakhali	Companiganj, Hatiya, Noakhali Sadar	Chatkhil, Senbagh, Begumganj
Patuakhali	Dashmina, Rangabali, Galachipa, Kala Para	Bauphal, Mirzaganj, Patuakhali Sadar
Pirojpur	Mathbaria	<i>Bhandaria</i> , <i>Kawkhali</i> , <i>Nazirpur</i> , <i>Pirojpur Sadar</i> , <i>Nesarabad (Swraupkati)</i>
Satkhira	Assasuni, Shyamnagar	Debhata, Kalaroa, Kaliganj, Satkhira Sadar, Tala
Shariatpur		Bhederganj, Damudya, Goshairhat, Naria, Palong, Zanjira