

**PROPOSAL FOR A
FRAMEWORK OF INDICATORS
FOR ICZM**

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

**Proposal for a
Framework of Indicators
for ICZM**

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PREFACE

This document represents an intermediate output of the project's endeavor to formulate a practical set of indicators for Integrated Coastal Zone Management (Output 6.1 of the PDO-ICZMP Project). Indicators should make the process of ICZM accountable and structure its management activities, ranging from planning and priority setting of interventions to monitoring of performance.

Discussions that started mid 2002 have made clear that the development of one overall, multi-purpose set of indicators is not feasible and not even desired, given the many different ways indicators can be and are used. This resulted in a *framework of indicators* that could serve as a guideline for the development of specific -- use-oriented -- sets of indicators. Though the framework is general in the sense that only "dimensions" are identified for which specific indicators could be developed, it is ICZM-specific as in the process of their identification and selection, these dimensions were verified on their relevance for ICZM.

Guidance has been taken from the monitoring indicators being developed in the context of the National Strategy for Economic Growth, Poverty Reduction and Social Development for Bangladesh (known as IPRSP¹ (ERD, 2003)). Further linking to these national efforts is considered of paramount importance.

The present framework is being tested and will be further elaborated through a few concrete applications. An important activity in this respect is the development of the Integrated Coastal Resources Database (ICRD). Though both activities are intrinsically linked, it should be clearly understood that the indicator framework does not aim to structure the ICRD. The purpose of the framework is to identify indicators that provide information needed for management (and thus in fact represents a need assessment), while the database properly organizes data and information *for* and *on* these indicators in a structured, computerized search, storage and processing engine.

The indicator framework will be brought into discussion in the Project's Task Force on knowledge management, aiming at a concrete input from participating GoB agencies and external experts. Based on these experiences and expected feedback, it is intended to formulate a final version of the working paper at the end of 2003. Ultimately, full endorsement of ICZM partners is aimed at, which would importantly contribute to the integration of information and the development of shared criteria for ICZM.

¹ Interim Poverty Reduction Strategy Paper

SUMMARY

The framework structures the information that is needed for decision making processes in ICZM and would thus focus on the main objectives of ICZM that relate to: economic growth, socio-economic development and a sustainable environment. This drive for decision support is reflected in the *input-output-outcome* structure of the framework that considers *three sets of indicators*:

- ◇ *Management Input Indicators (MIIs)*, which represent changes in: the established institutional arrangements; the formulated policies and plans; or the direct interventions under implementation (e.g., characterized by the 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 the objectives of sustainable development.

Tables 2, 3 and 4 and the appendices A, B and C summarize the structure of the above three sets of indicators (in the same order).

Indicators for ICZM aim to measure conditions of the coastal zone (in terms of inputs, outputs and/or 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.

For different purposes in the ICZM decision-making process specific combinations are made of these MIIs, RBIs and DSIs. Under development with the PDO-ICZMP Project are the following combinations:

- ◇ a set of indicators that would have the main function of *characterizing the coastal zone* and highlighting its special opportunities and vulnerabilities in relation to the remaining part of the country;- related to ICZM’s goal to integrate the coastal zone in to national process.
- ◇ a set of indicators to assess and map *district level vulnerabilities* in terms of income, food, water, health and safety insecurities;
- ◇ a set of *livelihood or well being indicators* that basically aims at the establishment of a consistent and comprehensive livelihood database and knowledge portal for the coastal zone; and
- ◇ a set of aggregated *key indices for coastal development* to support policy and strategy formulation, providing a few representative characterizations of the coastal zone development conditions (compare, e.g., with UNDP’s human development index).

Furthermore, the framework aims to be driving structure for developing the knowledge base for ICZM, including the Integrated Coastal Resources Database and possible web-based knowledge portals.

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ACRONYMS

ANDI	African Nutrition Database Initiative
AsiaKIDS	Asia Key Indicators Data System
BBS	Bangladesh Bureau of Statistics
CCA	Common Country Assessment
CDS	Coastal Development Strategy
CFS	Committee on World Food Security
CN	Concept Notes
CZPo	Coastal Zone Policy
CZPr	Coastal Zone Profile
ERD	Economic Relations Division of the Ministry of Finance
DSI	Decision Support Indicator
FAO	Food and Agricultural Organization, United Nations
FIVIMS	Food Insecurity and Vulnerability Mapping System (launched by the heads of states of FAO-member countries during the World Food Summit in 1996)
GDI	Gender-related development index
HDI	Human Development Index
ICRD	Integrated Coastal Resources Database
ICZM	Integrated Coastal Zone Management
ICZMP	Integrated Coastal Zone Management Plan
IDG	International Development Goals
IPRSP	Interim Poverty Reduction Strategy Paper; published in Bangladesh under the name: a National Strategy for Economic Growth, Poverty Reduction and Social Development
LRB	Local Resource Base
MII	Management Input Indicator
MoWR	Ministry of Water Resources
OECD	Organization for Economic Cooperation and Development
PDO	Program Development Office for ICZM
PPP	Purchasing Power Parity
PRSP	Poverty Reduction Strategy Paper
RBI	Resource Base Indicator
SL-model	Sustainable livelihood model
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Program
WARPO	Water Resources Planning Organization

1. INTRODUCTION

1.1 Background and purpose

This report structures a framework of indicators to be used in the PDO-ICZMP Project. Its ultimate aim, however, is a wider application in the key stages of ICZM, designed as a continual process of identification, preparation, decision-making, implementation and evaluation of interventions. Indicators for ICZM would serve the purpose to structure and facilitate this process, to monitor it and make it accountable. Indicators should thus provide concrete and meaningful information of conditions and changes over time of inputs into the process of coastal development and their outputs and outcome.

In this context, *inputs* would refer, for example, to public expenditures, projects, training programs, or even the results of the PDO-ICZMP Project itself, such as the draft Coastal Zone Policy (CZPo), the Coastal Development Strategy (CDS) and the set of Concept Notes (CN) on proposed concrete interventions. *Outputs* relate mainly to changes in the state or conditions of the local resource base as a result of such inputs or autonomous developments, while *outcome* measures performance of these changes in terms of specified policy objectives, such as the increase of literacy rates and the reduction of poverty.

Obviously, indicators simplify a complicated development process. A set of meaningful and representative indicators, however, would facilitate monitoring and assessment of developments with and without interventions and ranking of planned interventions in terms of policy and management objectives. As such they can provide a concrete contribution to a difficult communication among stakeholders in the rationalization of multi-purpose decision-making processes.

The drive for the development and use of indicators for such complicated integrated management processes as ICZM is worldwide but has not yielded any comprehensive example. A study for the Scottish Coastal Forum -- in its endeavor to pursue a sustainable management of Scotland's coast through the introduction of ICZM (SECRU, 2001) -- concluded that:

- ◇ there are many good examples of indicator sets developed for measuring the state of the coastal zone, but they have concentrated on the state of the coastal environment with little consideration for the economic and social aspects; and
- ◇ the development of outcome indicators and their use to assess performance in terms of ICZM objectives, is still in its "infancy" and no standard formats do exist.

On the other hand, reference should be made to efforts of multinational agencies such as the World Bank and UNDP to develop indicators on human development and poverty. These indicators are designed for application on national and even bigger scales, but do certainly have elements that are useful for more detailed ICZM purposes. Reference is also made to the indicators developed in the context of the Interim Poverty Reduction Strategy Paper (IPRSP)². These indicators aim to develop a genuine monitoring framework for measuring the effect and efficiency of government intentions and interventions.

1.2 Objectives and scope

From the above appears that the development of a practical set of indicators for ICZM is a difficult and long-term task that needs continuous revision and updating/upgrading while being used. It has,

² Published under the name: National Strategy for Economic Growth, Poverty Reduction and Social Development (ERD, 2003)

however, the strong potential *to become a key to an operational process of integration and harmonization, and provide a ‘language of communication’ between the stakeholders of ICZM.* Already in this phase of preparation of ICZM, a framework of indicators will play a role in: structuring the integrated coastal resources database (ICRD); characterizing and describing the coastal zone (supporting among other things the drafting of a coastal zone profile); defining a district-level vulnerability profile; prioritization of issues and problems; and ranking of proposed interventions.

Indicators only tell a quantitative story, but as such can be of great help in a rational and efficient allocation of scarce resources, which aims to improve livelihood conditions. In a monitoring mode, indicators would allow following year-to-year developments and thus “measure” performance of interventions. In a predictive mode, they could contribute to a ranking of alternative interventions by measuring the extent to which objectives are met.

Such a framework of indicators should meet the following general conditions:

- ◇ it should be comprehensive and encompass inputs, outputs and outcome indicators;
- ◇ it should be driven by the goals and objectives of ICZM;
- ◇ it should be developed in partnership with stakeholders;
- ◇ it should be linked to set(s) of national/international indicators for development, for example, the indicators formulated in the IPRSP;
- ◇ it should be a framework in the true sense of the word and provide guidance for the development of individual sets of indicators for specific purposes; and
- ◇ it needs a host-organization that is mandated and equipped to take up the long term task to maintain the framework, collect the required data and disseminate the findings.

An additional characteristic of ICZM-indicators is worth mentioning here: as the focus is on the overall development of the coastal zone being a region that requires special attention, many of the indicators should be expressed in their relation to national averages or to values for the remaining part of the country.

1.3 Part of output 6, an integrated coastal resources knowledge base

The 1999 GoB Policy Note in which the need and approach for ICZM was presented³, emphasizes the need to improve the understanding of coastal zone processes and to establish a system for collecting data and synthesizing information that will directly serve the decision making process with clear analysis and depiction of trade-offs among various implementation alternatives. This includes knowledge for policy development, the formulation of strategies and plans and the preparation and implementation of interventions on different levels of management (national, regional and local) and by different actors (government agencies, NGOs, and the private sector (consultants and contractors). Following this “need assessment”, Output 6 of the PDO-ICZMP Project (the integrated coastal resources knowledge base) is considered a crucial component of the Project that aims to: make available and accessible existing knowledge; define gaps based on a need assessment; and coordinate activities for organizing the data and filling the knowledge gaps.

In this context it is important to distinguish between a database and a knowledge base. Data refer to facts, measures or descriptive elements whereas knowledge is a condition obtained, by a person or body, reflecting understanding of different processes and human behavior. Data are usually value free; they lead to knowledge through interpretation and analysis, which is subject to perceptions and beliefs and thus is not value free. A *base for knowledge* goes beyond a computerized database and would also try to capture, for example, practical experiences that are considered relevant for stakeholders.

³ Available in working paper WP001 of the PDO-ICZMP Project (PDO_ICZMP, 2002c).

The driving structure behind a knowledge base for ICZM is the here presented *framework of indicators* that “will directly serve the decision making process” (see above). This framework structures the information that is needed for these decision making processes and would thus focus on the main objectives of ICZM that relate to: economic growth, socio-economic development and a sustainable environment. This drive for a decision support is reflected in the *input-output-outcome* structure, the main “milestones” in any management process.

Concrete information and data under the PDO-ICZMP Project will be made available through the Integrated Coastal Resources Database (ICRD) and such tools as web-based knowledge portals. The ICRD intends to develop linkages with the National Water Resources Database and other databases of key projects and organizations in the coastal zone. Knowledge portals will give access to this database, but also, for example, to: state of the art descriptions of coastal zone processes and conditions; available literature; and an overview of expertise in Bangladesh. The framework of indicators would provide a reference for structuring these knowledge base components as is formally phrased in the previous section on objectives and scope.

1.4 The conceptual framework

1.4.1 Outline of the framework

As mentioned, the framework consists of three sets of indicators:

- ◇ management input indicators (MIIs), which – in principle -- represent different types of management inputs such as recurrent GoB expenditures, investments projects, plans, regulations focusing on the coastal zone, or training programs;
- ◇ resource base indicators (RBIs), which characterize the state of the local resource base; and
- ◇ decision support indicators (DSIs), which represent the objectives of ICZM.

Relations between these sets of indicators can be visualized through two cross-reference matrices (Figure 1). The first is an “objective” input-output matrix, showing the relation between the management inputs and the condition or state of the local resource base (LRB). The second matrix is referred to as a performance matrix, reflecting the value of changes in the LRB in terms of policy or decision-making criteria (DSIs).

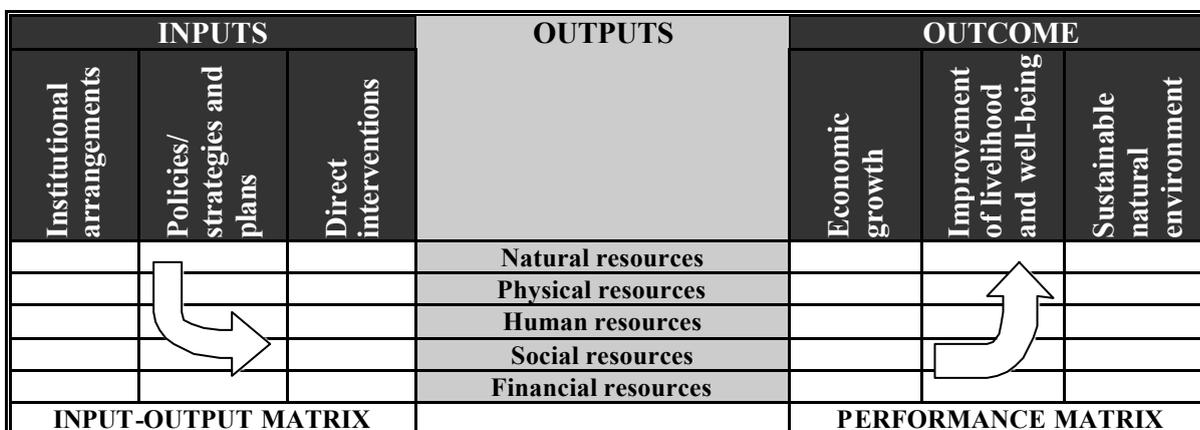


Figure 1: Schematic representation of the indicator framework

The indicator framework is closely related to the sustainable livelihood model (SL-model) and aims to be an operationalization of that model (PDO-ICZMP, 2002a).

The following general observations merit emphasis.

- Special attention will be given to indicators, which “measure” equity between and among different social groups and in particular gender.
- Two levels of indicators are distinguished:
 - ◊ aggregated *indices*, which broad-stroke reflect developments (examples are the internationally used human development index (HDI) or gender-related development index (GDI)); and
 - ◊ specific *indicators*, which reflect specific changes, for example in household income or area of wetlands.
- Aggregated related indices are usually used for policy purposes at a national level, while more specific indicators are needed for the ranking procedures for interventions. Specific indicators are in fact the (weighted) constituents of the composed indices.

1.4.2 Applying the framework

The framework conceptually differentiates between: MIIs that account how a certain strategy is translated into concrete actions or interventions; RBIs that reflect the impacts of such interventions on the local resource base; and DSIs that measure strategy-performance in terms of its objectives. However, in applying the framework, MIIs, RBIs and DSIs can be combined to support the multiple decision-making processes. This is schematically indicated in Figure 2, while Table 1 gives more details on possible users and uses. The table and figure show how for different purposes, input, output and outcome indicators may be combined in the three key stages the PDO-ICZMP Project is involved in.

- *Policy formulation.* This stage includes the justification of the special attention for the coastal zone. Indicators should be developed that describe the general characteristics of the coastal zone, address its special vulnerabilities and opportunities and justify the selection of priority issues and bottlenecks to be addressed. This could encompass input, output and outcome indicators, preferably expressed in relation to the remaining part of the country.
- *Strategy formulation.* In this process, policy objectives are concretized, institutional arrangements are specified and a portfolio of specified actions is formulated. Information on input, output and outcome indicators should facilitate measuring the effect of interventions in terms of the specified objectives, such as: targeted investments, special institutional arrangements, improvement of well-being, economic development, vulnerabilities and gender equity.
- *Specification of projects or interventions (concept notes).* This step relates to the (pre-) design of identified projects and interventions to decide on their feasibility and enable ranking in the process of strategy formulation. Indicators should cover standard measures to assess efficiency and effectiveness of environmental and social impacts.

1.5 Additional considerations

The following additional considerations on using the framework merit emphasis

- Figure 2 shows that the “chain” of inputs, outputs and outcomes is also subject to exogenous influences, or inputs that are beyond the control of the responsible management agencies. Examples are: climate change and sea level rise; world market prices; and demographic developments. Though decision-making focuses on inputs that are within the mandates of a corresponding management authority, exogenous developments (*scenarios*) provide the context in which the desired developments will take place and often affect the efficiency and effectiveness of such inputs. In structured decision-making processes, different scenarios are considered, representing alternative exogenous developments. Impacts of management inputs are then assessed under different scenarios. This implies that values of indicators that represent future changes should be linked to specific scenarios.
- Scenarios potentially would affect indicators from all three sets. For example: Bangladesh’ economic & political development would affect the allocation of GoB’s development budget (MII indicators); climate change and consequent sea level rise would have their impacts on the LRB (RBI indicators); while world economic and food market developments would affect employment levels and food security (DSI indicators).
- In its development stage, the framework proved to be an important and effective tool to agree between researchers, planners and decision-making agencies about the important components and relevant relations. For example, it proved to be instrumental in agreeing what the important aspects of livelihoods in the coastal zone and their vulnerabilities are. It also forced attention on the specification of objectives and decision-making criteria, which is an important step in a rational ICZM approach.
- The framework can also be used to help structuring and processing surveys, structuring databases (such as ICRD) and developing a computational framework to predict impacts of changes in the LRB on the DSIs.

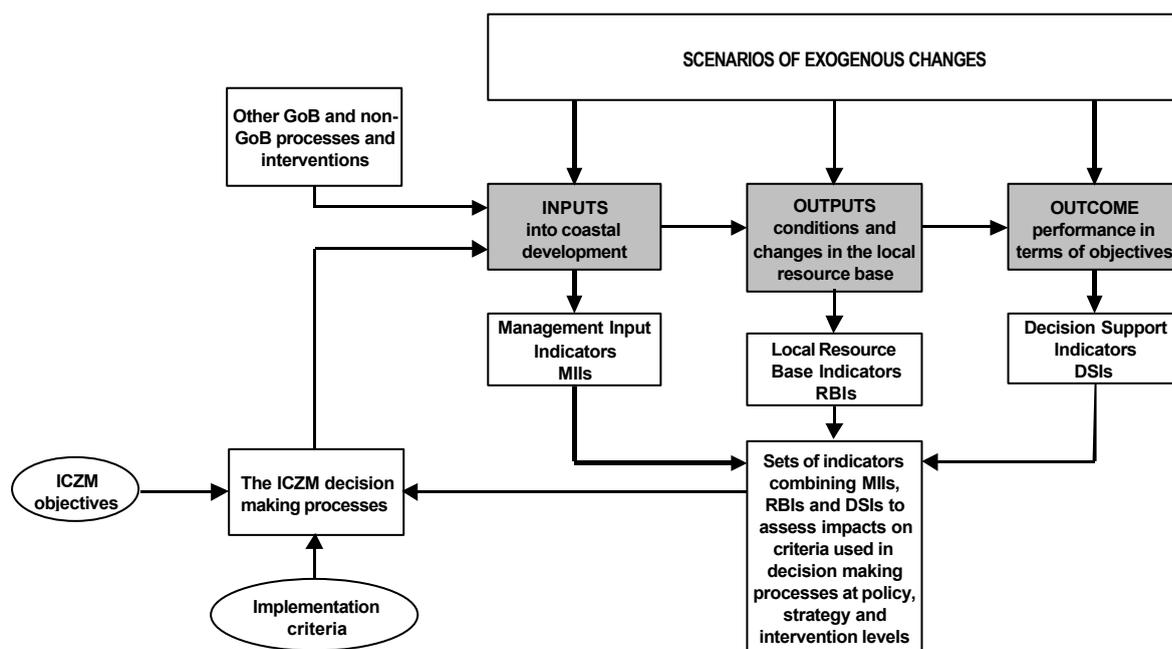


Figure 2: Schematic representation of the use of indicators in ICZM

1.6 Structure of the report

The framework of MII, RBI and DSI indicators is further elaborated in Chapter 2 in sections 2.1 to 2.3 and appendices A, B and C, respectively. Tables 2, 3 and 4 present the corresponding summary overviews of the main structure in terms of dimensions (or types of indicators).

Chapter 3 presents a brief review of indicators in use or under development with international organizations and the IPRSP. Though ready-made sets of indicators could not be found, the review is illustrative for the value attached in planning and policy formulation processes to the development of a meaningful set of indicators and the difficulties encountered.

Chapter 4 finally elaborates on the specific sets of indicators under development with the PDO-ICZMP Project. It is emphasized that it is an important aim of this document to contribute to structuring the discussions about these ICZM indicators, which are still (and will continue to be for some time to come) under development.

Table 1: Overview of use and users of indicators and required knowledge and indicators

Purpose information is needed for	Users	Required knowledge / information	Type of indicators (examples)
STEP: Policy formulation			
<ul style="list-style-type: none"> Justification of focus on coastal zone (CZ) development 	GoB; donors; general public	<ul style="list-style-type: none"> General understanding of conditions and processes and of issues, problems and opportunities Comparison CZ and country on livelihood and resource conditions Indication of trends and impacts 	<ul style="list-style-type: none"> CZ and Bangladesh (Bd) well-being: IPRSP; UN indices Resource availability (CZ and Bd): natural resources; density infrastructure Trends in both and in resource degradation
<ul style="list-style-type: none"> Identification and selection of priority opportunities and bottlenecks 	GoB; donors; general public	<ul style="list-style-type: none"> Expected consequences and impacts of alternative policies and the extent in which alternative policies comply with policy objectives and criteria 	<ul style="list-style-type: none"> CZ and Bd well-being Sustainability natural resources Comparison CZ and Bd
<ul style="list-style-type: none"> Outline of institutional arrangements 	GoB agencies; (donors)	<ul style="list-style-type: none"> Institutional mandates, capacities, . Linking mechanisms. Existing policies and regulations Political situation 	<ul style="list-style-type: none"> Policy statements relating to the CZ Attention CZ in IPRSP and 3-year rolling plans CZ committees
STEP: Strategy formulation			
<ul style="list-style-type: none"> Specification of policy objectives and criteria 	GoB; donors	<ul style="list-style-type: none"> Detailed understanding of conditions and p rocesses and of issues, problems and opportunities 	<ul style="list-style-type: none"> More detailed indices and indicators as above for justification of the CZ
<ul style="list-style-type: none"> Targeting regions, issues and social groups 	GoB; donors; executing agencies; beneficiaries	<ul style="list-style-type: none"> Differences among regions and target groups Importance of issues Implementation constraints (funds, technology, political will, ..) 	<ul style="list-style-type: none"> Detailed set of outcome indicators on well-being; sustainable environment and development CZ
<ul style="list-style-type: none"> Setting short term targets; selecting investment priorities; fund allocation 	GoB; private sector	<ul style="list-style-type: none"> Impacts on policy and strategy objectives Return on investments 	<ul style="list-style-type: none"> Detailed set of outcome indicators on well-being; sustainable environment and development CZ
<ul style="list-style-type: none"> Design of institutional arrangements and implementation mechanisms for the strategy 	GoB; donors; executing agencies	<ul style="list-style-type: none"> Institutional mandates, capacities, . Existing linking mechanisms. Political situation 	<ul style="list-style-type: none"> GoB and non-GoB involvement in the CZ
<ul style="list-style-type: none"> Design of monitoring mechanisms for the strategy 	GoB; donors; executing agencies	<ul style="list-style-type: none"> Objectives and criteria Institutional mandates, capacities 	
<ul style="list-style-type: none"> Increase understanding of coastal conditions and processes: identification of information needed for day to day management on a national and local level 	GoB; donors; executing agencies	<ul style="list-style-type: none"> Detailed understanding of conditions and processes CZ and issues, problems and opportunities Objectives; criteria; strategies Existing knowledge 	<ul style="list-style-type: none"> LRB characteristics Management inputs, such as projects
STEP: Specification of projects and interventions (concept notes)			
<ul style="list-style-type: none"> Design (pre -feasibility levels) of project and interventions 	GoB; executing agencies; beneficiaries	<ul style="list-style-type: none"> Specific project objectives, translated in criteria 	<ul style="list-style-type: none"> Specific project and strategy criteria
<ul style="list-style-type: none"> Design of implementation and monitoring arrangements for the intervention 	GoB; executing agencies; beneficiaries	<ul style="list-style-type: none"> Existing information Institutional context 	<ul style="list-style-type: none"> Efficiency and effectiveness indicators

2. STRUCTURING THE INDICATOR FRAMEWORK

As mentioned, sets of specific indicators will be designed for specific purposes (Section 1.3.2); the framework provides a general structure of categories and components with dimensions specifying aspects of the components that are representative and relevant for ICZM purposes. In some cases components have been subdivided in sub-components.

Dimensions in fact, outline the type of indicators -- or data layers in database terms -- that would fit under the corresponding components/sub-components. This implies that the distinction between sub-component and dimension depending on the level of detail that is assumed to be required for ICZM. For example: wind, rainfall, humidity, etc., can be considered sub-components of the component: meteorological conditions for which detailed information is relevant on spatial and time distribution and extreme events (dimension). As an alternative they could be considered dimensions of the component meteorological conditions, when only average values are important.

In the subsequent sections, component/sub-component structures are developed for each of the three sets of indicators: MIIs, RBIs and DSIs (see Section 1.3.1). The sub-division of components into sub-components has been limited as much as possible, the reason being that this structure could well develop into a “generic” data structure suitable for further guiding the construction and linking of databases.

Obviously, even such general structures include already choices that relate to the special context of the coastal zone and the ICZM process. It should be considered flexible and in this phase of the PDO-ICZMP Project is basically meant to serve as a checklist of the further design of operational sets of indicators that have to take into account specific purposes and data availability (Chapter 4)..

2.1 Management Input Indicators (MIIs)

MIIs’ main purpose is to provide information on the GoB and non-GoB efforts into coastal zone development. Direct interventions are the main management inputs into ICZM, but ICZM has a broader scope than providing a portfolio of interventions. Additional and equally important goals relate to establishing a policy framework to facilitate harmonization and coordination among the many different agencies, involved in coastal zone management. Such a framework would provide the basic conditions to successfully implement interventions.

MIIs would represent contributions to good governance, for example in the fields of sustainable resource management, empowering of local communities and public-private sector relationships. Three categories of management inputs are distinguished.

- *Institutional arrangements*. These provide the “context or management infrastructure” within which management actions are taken. They consist of the total of organizations, laws and regulations, and mechanisms for participation and democratic control.
- *Policies/strategies and plans* through which management agencies express -- at different levels of concretization – their intentions and commitments and makes themselves accountable towards the public at large.
- *Direct interventions* in the form of, e.g., annual budgets for operation and maintenance, investment projects, the introduction of user charges, or training and awareness building.

In Bangladesh' IPRSP (ERD, 2003) a pragmatic set of indicators is developed that mainly measures annual GoB expenditures allocated to areas (categories in terms of describing MII indicators) related to:

- ◇ rural development and infrastructure;
- ◇ social services (education; health; family planning; water supply);
- ◇ safety nets (food assisted programs; housing for rural shelter-less and urban slum dwellers; disaster management);
- ◇ public safety and well being (law and order); and
- ◇ credit for the poor and employment.

Such indicators obviously focus on the category "direct interventions". They are of course useful in the ICZM context, assuming that they can be differentiated for the 19 districts of the coastal zone. However, the following differences with MIIs for ICZM are worth mentioning.

- ICZM indicators are not meant to control GoB expenditures. They aim to characterize the coastal zone and compare the level of, e.g., GoB activities in the coastal zone with nation-wide averages.
- MIIs would also serve the purpose to "measure" the efficiency of the ICZM process itself and are indicative for ICZM's objective to integrate the coastal zone into the process of national development.
- MIIs would consider annual GoB expenditures, private investments and NGO activities in the context of ICZM. As mentioned, also the CZPo and CDS can be considered an input into management of the coastal zone. Measurement of many of these inputs will be qualitative.

The PDO-ICZMP Project will thus take a slightly different and somewhat broader approach than the IPRSP, considering the three categories of inputs from GoB and other agencies, mentioned above. Table 2 contains the proposed framework. Reference is also made to Appendix A, which contains a description of the dimensions of the MIIs.

2.2 Resource Base Indicators (RBIs)

RBIs are output indicators that would measure the results of the management inputs and/or scenario developments (Section 2.1) in terms of (changes in) the state and the characteristics of the LRB.

Following the SL-model, resources fall within five categories: natural; physical; human; social; and financial (this distribution is also used for the differentiation of household assets, one of the selected DSI categories). The main difference between a local resource and a household asset is the access. Safe groundwater or electricity may be regionally available but access for certain households may be limited. In case access is open and free of cost and the resource is not scarce, the local resource becomes a household asset.

Table 3 gives an overview of the components and sub-components considered and their dimensions for each of the local resource categories. Reference is also made to Appendix B for a description of these dimensions.

An important aspect of the LRB is that – in addition to offering opportunities for development -- it poses risks to individual households and make them vulnerable if they are not able to cope with the dynamics of these resources. RBIs should thus reflect:

- ◇ availability (or absence) and quality of the resources;
- ◇ normal variability and trends; and
- ◇ extreme events (shocks), due to natural hazards.

Table 2: Structure of the set of Management Input Indicators (MIIs)

Input category	Component / Subcomponent		Dimensions	
Institutional arrangements (=context for management)	Institutional and organizational infrastructure (at national, regional and local level)		- Structure of organizations and their mandates - Administrative boundaries - Capacities; financial, personnel - Linking mechanisms (protocols) for harmonization and coordination	
	Laws and regulations		- Environment related acts, ordinances - International treaties / conventions - Standards - Licenses - Special area declarations - Financial incentives	
	Mechanisms for democratic control and participation		- Representation of people in formally electoral bodies - Participation in the process of planning, decision making, design, implementation and control	
Policies/strategies and plans (=intentions of management)	Policies (Overall and Sectoral)		- Objectives - Implementation arrangements - Reference to CZ	
	Strategies and Plans (Overall and Sectoral)		- Objectives - Targets - Reference to CZ	
Direct interventions (=implementation of management intentions within the existing context)	Rural and urban infrastructure		- Investments (in roads, electricity, communication, cyclone shelter / flood protection, etc.) - Current expenditures (in roads, electricity, communication, cyclone shelter/flood protection, etc.)	
	Rural and urban social services		- Investments (in education, health, family planning, sanitation and water supply, etc.) - Current expenditures (in education, health, family planning, sanitation and water supply, etc.) - Awareness	
	Natural resources management (water, land, fish, forest, etc.)		- Monitoring and assessment - Control and enforcement - Dissemination and awareness	
	Safety nets	Food assisted program		- Volume (disbursements in national programs) - Effects (people reached)
		Housing		
		Disaster management		
	Public safety and well-being		- Efforts (public spending in law enforcing agencies) - Effects (rate of disposal of criminal cases)	
Production and income generating activities	Extension services		- Volume (budgets allocated in different area) - Effects (people reached)	
	Micro-credit			

All these aspects of resources may be subject to trends, which use to refer to exogenous influences such as climate change, world market prices and population growth. These trends are not considered part of the RBIs, they can, for example, be imposed on the resource base and then assessed in terms of changes in both RBIs and DSIs.

Table 3: Structure of the set of local Resource Base Indicators (RBIs)

Category	Component / Sub-component		Dimensions
Natural resources	Land	Agricultural land	- Area - Quality
		Settlement area/Industrial area/ Infrastructure	- Area - Quality (safety)
		Ponds and ghers	- Area - Physical condition - Productivity
	Surface Water	River	- Area - Water levels / flows
		Perennial water body	- Salinity - Pollution
		Floodplains	- Sediment quantity - Sediment quality - Connectivity - Productivity - Diversity
	Groundwater	Shallow aquifer	- Volume
		Deep aquifer	- Quality - Abstraction
	Sea	Estuary branches and coastal waters	- Area - Water levels / flows
		Deep sea	- Salinity - Pollution - Sediment quantity - Sediment quality - Productivity - Diversity
	Chars and inter-tidal areas		- Area and elevation - Erosion/accretion - Soil conditions
	Forests	Natural mangroves (Sundarban)	- Area
		Mangrove plantations	- Productivity
		Plain land forest	- Diversity
		Hill forest	
	Metrological conditions	Air	- Air quality
		Wind	- Distribution
		Rain fall	- Variation including
		Other (Humidity, Temperature, Sunshine, Evaporation)	
Fish and other aquatic resources (includes fresh water and marine fish, crab and shrimp)		- Productivity - Diversity	
Non-renewable resources	Gas and oil	- Availability (reserves)	
	Sand and minerals	- Quality - Abstraction	
Physical resources	Physical infrastructure	Protection (e.g. from flood, cyclone)	- Number of different infrastructure provisions
		Agriculture sector (irrigation, drainage)	- Quality /capacity of the provisions
		Power sector (generation, distribution)	
		Transport sector (for example, roads, railway, airports, navigation routes)	
		Communication sector (wired and wireless)	
		Education sector (e.g. schools, colleges)	
		Health sector (hospitals, health centers)	
		Industrial sector	
		Recreational facilities	

Category	Component / Sub-component		Dimensions
	Technology		- Use of equipment (e.g., use of HYV, tractor) - Use of fertilizers, etc
Human resources	Demography		- Size of the population - Composition - Distribution - Migration
	Health		- Physical status - Diseases
	Education and skills		- Primary - Secondary & above - Vocational training
	Awareness		- Safety - Environment
Social/ institutional resources	Institutional structure	GoB organizations at different levels	- Availability and capacity - Access and quality - Violence
		NGOs at different levels	
		FMOs/ CBOs registered and non-registered	
		Informal organizations	
	Cultural and social networks		- Membership - Leadership - Contribution
Safety nets	Food assisted programs	- Availability	
	Housing	- Access	
	Disaster management		
Financial resources	Savings	Private sector	- Deposited funds
		Public sector	
	Revenues		- Collected funds (from LDT, IPTT)
	Wages		- Total amounts paid - Fluctuations
	Credit	Conventional banking system	- Amounts
		Micro Finance Institutions	- Available - Access
Remittances		- Quantity	

2.3 Decision Support Indicators (DSIs)

DSI are outcome indicators. Their purpose is mainly to attach values to changes in the LRB in terms of criteria used in preparing decisions on policies, strategies or interventions. Preferably, the whole indicator framework is thus “objective driven”, implying that the need for information in support of decision-making, should “control” the information needed on the LRB and on the inputs that are relevant for changing the LRB.

A structure of DSIs is presented in Section 2.3.2, based on the goals and objectives for coastal development of which an overview is given in Section 2.3.1. It is emphasized that -- as shown in Figure 2 – DSIs, together with MIIs and RBIs, form an input into the sets of criteria and indicators to be developed for specific purposes and steps in the ICZM process. This is elaborated in Chapter 4.

2.3.1 Goal and objective driven

The specification of DSIs would start from the policy goals and objectives of ICZM. Though these have not yet formally been approved through a CZPo and CDS, the TAPP and other existing preparatory documents provide sufficient context. The development goals as defined in the TAPP relate to: poverty reduction, development of sustainable livelihoods and integration of the coastal zone

into the national processes. The CZPo, elaborating on these goals is most likely to add the objective of economic growth and development.

In the CDS, the broad development goals will be specified into more concrete development objectives for the coastal zone reflecting the special characteristics and problems of this zone and providing concrete targets. These objectives will address such issues as:

1. *economic growth*;
2. meeting *basic needs* & creating options for livelihood opportunities for coastal communities;
3. reduction of *vulnerabilities* and enhancement of coping capacities;
4. *sustainable management* of coastal resources;
5. *equitable distribution* of resources and economic benefits across social strata;
6. *empowerment* of coastal communities;
7. *promotion of gender equality and women's advancement*; and
8. preservation and enhancement of *critical ecosystems* and ecological processes.

2.3.2 DSI structure

The above goals and objectives are difficult to use for grouping and clustering of DSIs. This is partly because they are overlapping, partly because they serve a wide range of purposes at different levels and in different steps of ICZM and partly because they are difficult to quantify in terms of outcomes and are combined with information on inputs and outputs in supporting decisions. For this reason a more fundamental approach has been taken to give the DSIs the general structure of objectives related to sustainable development.

- *Economic growth*. Under this heading indicators should reflect regional economic conditions and developments.
- *Improvement of livelihoods and well-being*. Indicators should account for the reduction of poverty and vulnerability and safety against natural disasters, social and cultural conditions, equitable distribution (across social strata and gender) and access to basic needs.
- *Sustained natural environment*. Indicators would focus on the integrity of ecosystems and their wise use.

Table 4 gives an overview of the components, subcomponents and dimensions of outcome indicators, while Appendix C presents further considerations and more details.

Table 4: Structure of the set of Decision Support Indicators (DSIs)

Category of development	Component / Subcomponent		Dimensions
Economic growth	Gross regional product		- Annual GRP
	Foreign currency earning		- Annual regional export earning
	Employment		- Employment rates - Rural/urban distribution - Fluctuations (seasonal) - Disguised unemployment
	Marketable surplus in agriculture		- Volume - Value - Fluctuations (seasonal)
	Supply-demand conditions	Food items	- Value of CPI
	Non-food items	- Fluctuations (seasonal)	
Improvement of livelihoods and well-being	Income and expenditure	Income	- Levels
		Expenditure	- Distribution (Gini)
	Assets	Natural	- Owned properties - Access to common properties
		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
		Human	- Health - Education and skills - Knowledge & awareness
		Social	- Composition of HH - Level of empowerment - Cohesion and conflict resolution
		Financial	- Savings - Investments - Debts/loans
	Poverty		- Levels - Distribution
	Vulnerabilities	Food insecurity	- Availability - Access - Utilization
		Income insecurity	- Employment - Access to labor markets - Use of income
		Water insecurity	- Availability and access - Quality (Salinity and arsenic)
		Health and life insecurity	- Nutrition - Disasters - Law and order - Environmental hygiene - Availability and access to medical facilities
		Property and safety insecurity	- Disaster - Law and order - Social network
	Equities	Rural – Urban	- Income
		Rich - Poor	- Health - Food security - Water security and access to sanitation
Gender	Economic conditions	- Control of production means - Participation in labor force - Income and expenditures	

Category of development	Component / Subcomponent		Dimensions
		Health and nutrition	<ul style="list-style-type: none"> - Access to food - Access to health facilities - Maternal care
		Knowledge and skills	<ul style="list-style-type: none"> - Level of education and training - Applicability of education and training - Awareness
		Socio-cultural and political environment	<ul style="list-style-type: none"> - Security - Age of marriage - Mobility - Participation in decision making
Sustained natural environment	Estuarine dynamics		<ul style="list-style-type: none"> - Drainage conditions - Morphologic dynamics - Fresh/salt water balance
	Health of ecosystems	Mangroves	- Habitat area
		Marine	- Productivity
		Homestead gardens	- Biodiversity
		Wetlands	<ul style="list-style-type: none"> - endangered species - Isolation

3. REVIEW OF EXISTING INDICATORS

Indicators and indices are used around the world and in Bangladesh in many different contexts and for many different purposes. There is however little consistency and, as mentioned, no useful set of ICZM indicators is readily available (Section 1.1; SECRU, 2001). International organizations aim to focus on country-representative indicators or indices that are, for example, useful to assess the state of development of a country. Such indicators, however, cannot always be used inside a country to distinguish between regions or social groups. For purposes of reference, a quick analysis has been made of several resource and well-being indicators in use with multinational organizations.

FIVIMS

An useful source of information proved to be the Food Insecurity and Vulnerability Mapping Systems⁴ (FIVIMS), which has made a concerted effort to measure the presence or risk of food insecurity. Based on existing data collection systems, FIVIMS developed a set of core indicators, consisting of 15 information domains (e.g.: food consumption status; health status; demographic conditions; economic conditions; food availability; and food access), which aims to support the national indicator selection for FIVIMS (FIVIMS, 2002). This list has been compiled from the following sources:

- ◇ the Committee on World Food Security at its 26th and 27th Sessions (used for its annual assessments of the world food security situation);
- ◇ the FAO Secretariat for preparing annual reports on The State of Food Insecurity in the World, for monitoring Agenda 21, for nutrition country profiles and vulnerable group profiles, and for developing food access and vulnerability indices;
- ◇ the African Nutrition Database Initiative (ANDI);
- ◇ the Asia Key Indicators Data System (Asia KIDS);
- ◇ the Organisation for Economic Cooperation and Development (OECD) 2000 for monitoring the International Development Goals (IDGs) of the Millennium Summit; and
- ◇ the UNDAF Guidelines for Common Country Assessment (CCA).

Tables 5 and 6 summarize the FIVIMS list of indicators, selectively adapted to the ICZM concept of indicators. (FIVIMS does not consider input indicators).

The Committee on World Food Security (CFS) has selected seven core food security and nutrition indicators for monitoring progress towards the World Food Summit goals on a global level (Table 7) and 16 indicators for regular monitoring of the “food economy” (Table 8).

⁴ An initiative launched by the heads of states of FAO-member countries during the World Food Summit in 1996.

Table 5: Resource base indicators used with international organizations

Indicators	FIVIMS								
	CFS	FAO Secretariat	ANDI	Asia Kids	OECD	UN/CCA	HDR	IPRSP, Bangladesh	NR/E
Arable land per person									
Land use change									
Land area protected as % of total arable land									
Total human induced soil degradation									
Severely degraded land as % of total area									
Carrying capacity of land									
Percentage of land with erosion risk									
Intensity of fresh water use from renewable internal source									
Wetlands (percentage of the country)									
Intensity of fresh water use from renewable internal source									
Forest area as % of total land area; forest (percentage of the country)									
Mangrove areas (% of total area)									
Tree density outside forest									
Average annual rate of deforestation									
% of change in km ² of forest land in the past 10 years									
National monthly rainfall index									
Urban air pollution									
Percentage of population affected by draught and natural disaster									
% of birth attended by trained personnel									
Immunization coverage									
Contraceptive prevalence rate									
Ratio of non-agriculture wage rate for M&F									
Share senior officials, managers, professionals									
% of trained teachers									
Urban / rural population share									
Energy use in agriculture									
No. of schools, vocational training center									
Electricity coverage, no of consumers									
Kilometers of rural roads by quality category									
# of arsenic free tub wells in arsenic affected areas									
Cropped areas as % of total area									
Share of agriculture in GDP									
Wages by economic activity (real \$ per day)									
Employment of population of working age (%)									
Growth in GDP									
Micro credit coverage and size									

Table 6: Well-being indicators used with international organizations

Indicators	FIVIMS							IPRSP, Bangladesh
	CFS	FAO Secretariat	ANDI	Asia Kids	OECD	UN/CCA	HDR	
Life expectancy at birth								
Infant mortality rate (%)								
Under 5 mortality rate (%)								
Income poverty								
Adult literacy rate								
Gross enrolment								
Primary enrolment								
Secondary enrolment								
Percentage of population with access to adequate sanitation								
People living below national poverty line (%)								
Per capita rice/wheat production in the region								
Percentage of population under nourished								
Employment of population of working age								
Percentage of income spent on food								
Percentage of population with access to safe water								
Total fertility rate								
Maternal mortality								
Female under weight severe, under 5 % of male								
Female mortality 1-4 years (% of male)								
Female literacy rate; female (7+) literacy (% of male)								
Female enrolment at tertiary level (% of Male)								
Girl net enrollment rate in primary school								
Female enrolment at secondary level (% of Male)								
Female underweight								
Share in parliament seats								
Share in senior officials, managers, professionals								
Wages by economic activity								
Share of agriculture in GDP								

Table 7: Core indicators selected by the Committee on World Food Security

Food security and nutrition	Indicators
Food consumption	Average per person dietary energy supply (DES)
	Cereals, roots and tubers as % of DES
	Percentage of population undernourished
Health status	Life expectancy at birth
	Under-5 mortality rate
Nutritional status	Proportion of children under 5 that are under weight, stunted or wasted
	Percentage of adults with body mass index (BMI) < 18.5

Table 8: Monitoring indicators selected by the Committee on World Food Security

Food security and nutrition	Indicators
Economic conditions	GNP per capita
	Growth in GNP per capita
	GNP per capita at Purchasing Power Parity
Food availability	Food production index by country
	Volume of production, food use, trade and stock changes for major food commodities by, commodity groups and by country groupings
	Ratio of 5 major grain exporters supplies to requirements
Food access	Gini index of income distribution
	People living below national poverty line
	People living on less than \$1 per day
Stability of food supply and access	Index of variability of food production
	Food prices index
	Changes in cereal production in low income food deficit countries (LIFDCs) with and without China and India
	Export price movements fro wheat, maize and rice
Risks hazards and shocks	Number of countries facing food emergencies

UNDP

UNDP proposed a set of estimating indices to estimate country conditions with respect to the human development, human poverty, gender equity and gender empowerment. Below, an overview is given of these UNDP indicators (copied from technical note 1 of UNDP, 2002). Table 9 gives an overview.

- *The human development index (HDI)* is a summary measure of human development. It measures the average achievements in a country in three basic dimensions of human development:
 - ◊ a long and healthy life, as measured by life expectancy at birth;
 - ◊ knowledge, as measured by the adult literacy rate (with two-thirds weight) and the combined primary, secondary and tertiary gross enrolment ratio (with one-third weight); and
 - ◊ a decent standard of living, as measured by GDP per capita (PPP US\$⁵).
- *The human poverty index for developing countries (HPI-1)*. While the HDI measures average achievement, the HPI-1 measures deprivations in the three basic dimensions of human development captured in the HDI:
 - ◊ a long and healthy life-vulnerability to death at a relatively early age, as measured by the probability at birth of not surviving to age 40;
 - ◊ knowledge-exclusion from the world of reading and communications, as measured by the adult illiteracy rate; and
 - ◊ a decent standard of living-lack of access to overall economic provisioning, as measured by the percentage of the population not using improved water sources and the percentage of children under five who are underweight.

⁵ PPP=purchasing power parity.

Table 9: UNDP indices for human development and poverty reduction

Data	Index ^{1,2)}	Level for which data available		
		National	District	Upazila
Life expectancy: total, male, female	HDI, GDI	Yes		
Adult literacy: total, male, female	HDI, GDI	yes	yes	
Gross enrolment: total, male, female	HDI, GDI	yes	yes	
Gross domestic product	HDI	yes	yes	
% of population not using improved water source	HPI-1	yes		
% of children under 5 who are underweight	HPI-1	yes		
Probability at birth of not surviving to age 40	HPI-1	??		
Adult illiteracy rate (1 - literacy rate)	HPI-1	yes	yes	
Females as % of population	GDI	yes	yes	
Women's % share of MPs	GEM	yes		
Women's % share of legislators, senior officials and managers	GEM	??		
Women's % share of professional & technical positions	GEM	??		
Estimated earned income for women and men	GEM	calculate ²⁾	calculate ²⁾	

Source: UNDP, 2002

Note1: HDI: Human development index; HPI-1: Human poverty index for developing countries;

GDI: Gender related development index; GEM: Gender empowerment measure.

Note 2: The method for calculating the indices are given in the technical note on the indices in the Human Development Report, 2002 (UNDP, 2002).

- *The gender-related development index (GDI)*. While the HDI measures average achievement, the GDI adjusts the average achievement to reflect the *inequalities* between men and women in the following dimensions:
 - ◊ a long and healthy life, as measured by life expectancy at birth;
 - ◊ knowledge, as measured by the adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio; and
 - ◊ a decent standard of living, as measured by estimated earned income (PPP US\$).
- *The gender empowerment measure (GEM)*. Focusing on women's opportunities rather than their capabilities, the GEM captures gender in equality in three key areas:
 - ◊ political participation and decision-making power, as measured by women's and men's percentage shares of parliamentary seats;
 - ◊ economic participation and decision-making power, as measured by two indicators: women's and men's percentage shares of positions as legislators, senior officials; and managers and women's and men's percentage shares of professional and technical positions;
 - ◊ power over economic resources, as measured by women's and men's estimated earned income (PPP US\$).

Bangladesh' IPRSP

In the context of the Bangladesh' IPRSP, a set of indicators and headline indicators have been developed to monitor the poverty parameters in line with the targets set in the millennium development goal (ERD, 2003). Most importantly these indicators would include concrete information about inputs, disaggregated in time (quarterly) and space (district levels).

Table 10: Indicators developed in the IPRSP

Data	Level for which data available		
	National	District	Upazila
Indicators in light of Millennium Development Goals (MDGs)			
Income poverty	yes	Yes	yes
Adult literacy	yes	Yes	
Primary enrolment	yes	yes	yes
Secondary enrollment	yes	yes	yes
Infant mortality rate (IMR)	yes	yes	yes
Under-five mortality rate	yes	yes	yes
Maternal mortality rate	yes	yes	yes
Population growth	yes	yes	yes
% children underweight	yes	yes	yes
Reduction in anti female bias			
Female (7+) literacy (% of male)	yes	yes	yes
Female enrollment at tertiary level (% of male)	yes	yes	yes
Female underweight moderate of severe, <5 years (% of male)	yes		
Female underweight severe, < 5 years (% of male)	yes		
Female mortality, 1-4 years (% of male)	yes	yes	

Source: ERD, 2002

4. INDICATORS AND CRITERIA FOR ICZM

4.1 Introduction

As mentioned in the previous chapters, indicators will be selected for such specific purposes as indicated in Table 1, using the framework of Chapter 2 as a checklist in combining input, output and outcome indicators. Selected indicators should be meaningful, in the sense that they are sensitive to and for the changes that should be assessed. For example, river discharge indicators that should reflect the impact of a flood storage reservoir should be different from river discharge indicators that reflect the navigability of rivers. In addition, attention has to be given to data availability, accessibility and reliability when making final selections.

Presently (September 03), the following sets of indicators are identified or in development in the PDO-ICZMP Project.

- A set of indicators that would have the function of *characterizing the coastal zone* and highlighting its special opportunities and vulnerabilities in relation to the remaining part of the country. This set of indicators provides basic information on the coastal zone. In an attempt to collect, interpret and disseminate such a set of basic information a first version of a Coastal Zone Profile is under development. Comparisons are made between the coastal zone and Bangladesh, supporting the justification of special management arrangements for the coastal zone. Reference is made to Section 4.2 for more details.
- A set of indicators to assess and map *district level vulnerabilities* in terms of income, food, water, health and safety. This set is under development through a FAO-funded project that aims to develop a methodology to define vulnerability profiles on a district level that can be used in the country as a whole in the context of FIVIMS (to be concluded at the end of 2003). Section 4.3 gives more details.
- A set of *livelihood or well being indicators* that basically aims at the establishment of a consistent and comprehensive livelihood database for the coastal zone. This is a long-term endeavor that also would aim to structure surveys and to start functioning as a guideline and depository for the many fragmented but useful survey activities carried out in the coastal zone. It is intended to develop an outline of such an indicator set in the second half of 2003 and to assess the feasibility to further elaborate such a set into an extension of the Knowledge Portal on Estuary Development (CEGIS, 2003).
- Indicators that would measure the *integration of the coastal zone into national developments*. This set of indicators refers to one of the development goals of ICZM and has relevance to support the justification of special management arrangements for the coastal zone. Section 4.4 gives more details.

Section 4.5 below gives tentative consideration on the use of general criteria and aggregated indices in the processes of policy and strategy formulation for ICZM.

4.2 Indicators for describing and characterizing the coastal zone and its processes

- The interactions among the natural system, physical system, human use regimes and various management processes determine the state and status of the coastal resources and people's livelihoods. The data and information to be collected and made accessible for the ICZM process should thus describe and represent the knowledge on the state of the resources and their hazards,

the physical infrastructure, the people and their livelihoods, and the institutional setting and management inputs, including protocols and legislation.

- The PDO-ICZMP Project embarked on composing a Coastal Zone Profile (CZPr), that aims to bring such basic information together for internal use and dissemination and to present brief interpretations on coastal zone conditions, where possible in comparison with the overall situation in Bangladesh. In this context a set of indicators has been selected, driven by the availability of data. This set of indicators has been framed and structured under the broad categories: natural condition; human condition; infrastructure; regional socio-economic condition; and institutional setting. Appendix D presents an overview of the selected indicators for inclusion in a first version of CZPr. It is emphasized that the CZPr is meant to be a flexible document that will be adapted as new information becomes available, for example through the intended feed-back with government agencies.

4.3 Vulnerability indicators

As mentioned in Section 4.1, a study is ongoing that aims to provide a comprehensive picture of vulnerabilities affecting different groups of people living in the coastal zone of Bangladesh. The study tries to answer the following questions:

- ◇ who are the vulnerable people in the coastal zone;
- ◇ what are people vulnerably to;
- ◇ where are they located and how many they are; and
- ◇ why are they vulnerable?

Important outputs of this study are vulnerability maps and vulnerability profiles and a series of information products about different types of securities.

For the selected components and dimensions in Table 4, the study started to develop in its first phase a tentative list of indicators as follows:

- i. identification of indicators which represent the endogenous factors (asset based coping capacity);
- ii. identification of exogenous factors (vulnerability context);
- iii. assessment of the impact of exogenous factors on the 5 types of well being;
- iv. identification of indicators that represent the impacts; and
- v. screening of all indicators on the basis of relevance, simplicity and data availability.

Table 11 contains the results of the first phase of the mentioned study. This result is based on desk studies that will be complemented with field consultations in the second phase and case studies in the third phase (conclusion end 2003).

4.4 Indicators to measure integration into the national development process

The connotation of this coastal zone development goal is that in terms of inputs, outputs and outcomes, the coastal zone should be at least at the same level as the remaining part of the country. For example: in terms of inputs, GoB budget allocations should be at least at the same level; in terms of outputs, the density of education and health infrastructure should be similar as for the remaining part of the country; and in terms of outcomes, poverty and human development indicators should not deviate from the national averages.

Table 11: Indicators to characterize the insecurities of coastal livelihoods

Dimension	Type of indicators	Measurable indicator
Food security	Availability of food	Per capita cereal production
		Cropping intensity
		Damage to production from flood and cyclones
		% of area under polders
	Access to food	Per capita food intake (K.cal)
		Number of farming households
		Employment rate
		Per-capita income
		Std. of wage rate
	Utilization of food	Std. of price
Female literacy		
Access to safe water		
Income security	Availability of income	Per-capita income
	Access to labor market	Employment rate
		% of non farm activities
		Std. of wage rate
		Disease attack
	Use of income	Adult literacy
		Adult literacy
% of income spent on food stuff		
Water security	Quantity	% of people with safe drinking water
	Quality	No. of people affected by salinity
		No. of people affected by arsenic
Health and life security	Nutrition and life	Malnutrition (MUAC)
		Malnutrition (stunting)
		Malnutrition (wasting)
		Mortality rates (under 5)
	Natural disasters	No. of people at risk of death from storm surge
	Environmental Hygiene	Diarrhoea
		Sanitation
		Female literacy
		Literacy rate (7+)
	Medical infrastructure	No. of hospital beds per 1000 population
No. of medical centers per 1000 population		
Security of property (safety)	Natural disaster	No. of kuccha houses in cyclone & flood risk area
		No. of livestock at risk of death from storm surge
		No. of people living in erosion prone area
	Law and order	Housing condition (pacca)
		Law and order
	Social network and safety nets	Migration

Note: This table is a working version of an ongoing project on vulnerability profiles for the coastal zone, that will be concluded in December 2003.

Table 12: Examples of indicators for assessing integration of the coastal zone into national processes

Component	Subcomponent	Indicator
Institutional arrangements		
Institutions and organizations	National and regional levels	# of civil district level civil servants employed per capita
		# of civil servants per capita employed in social sectors: health and education
Physical resources		
Physical infrastructure	Roads	GoB annual expenditure (Tk/yr) per district
		Density of primary roads (km/km ² ; km/cap) per district
		Density of secondary roads (km/km ² ; km/cap) per district
	Electricity supply	GoB annual expenditure (Tk/yr) per district
		Connection rate net (%) per district
	Health centers	GoB annual expenditure (Tk/yr) per district
		NGO annual expenditure (Tk/yr) per district
		# beds per cap per district
	Educational centers	GoB annual expenditure (Tk/yr) per district
		NGO annual expenditure (Tk/yr) per district
		# teachers per cap (district)
	Technology	Farming practices
# pilot farms		
Social and livelihood conditions		
Population	Size and distribution	M/F ratio
		Average age: total, male, female
		Growth rate
		Urban/rural distribution
		% of male migrating
Livelihood conditions	Income	Per capita GDP at current market prices (Tk)
		Industrial wage rate (Tk) for unskilled laborers
	Health	Immunization rate: total, male, female
		Infant mortality rate (IMR) and nutrition status of children
		Incidence of communicable diseases and malaria
	Education	Adult literacy: total, male, female
		Gross enrolment: total, male, female
	Vulnerabilities	
	Safety nets	
	Equity	
Economic conditions		
Direct interventions	Public infrastructure	Annual per capita investment
	Industry	Annual per capita investment
	Services	Annual per capita investment
Gross Regional Product	Total	Annual GRP
Financial resources	Credit	Annual disbursement per X no of people through conventional banking system
		Annual disbursement per X no of people through MFIs
Production and income generating activities	Extension services	No of extension workers ant amount spent per X no of HHs in agriculture sector
		No of extension workers ant amount spent per X no of HHs in the fisheries sector
		No of extension workers ant amount spent per X no of HHs in the forestry sector

To account for this “CZ integration into national development”, the following main categories are identified for comparison:

- ◇ institutional arrangements, specifying the facilities available;
- ◇ physical infrastructure: available basic infrastructure and expenditures and provisions made for the development and maintenance of this infrastructure;
- ◇ natural resources
- ◇ social and livelihood conditions, focusing on poverty, vulnerability and equity aspects; and
- ◇ (regional) economic conditions.

To facilitate a meaningful comparison with the remaining part of the country, indicators should not refer to specific coastal features such as cyclone shelters, but to general development issues such as the infrastructure of roads and health centers or mortality and literacy rates. Table 12 gives a first selection of such indicators.

4.5 Criteria and indices for policy and strategy formulation

Indices and core indicators as used by CFS and UNDP (tables 7 to 9) seem to be useful for purposes of policy and strategy formulation. Their main function would be: (i) for high level planning & decision making purposes; and (ii) to assess the development of the coastal zone, annually.

Two kind of activities are envisaged to elaborate on such indices for the PDO-ICZMP Project.

- *Application of national and international indices*, e.g., on human development and poverty at a district level. It is uncertain whether the existing aggregate indicators, designed on the basis of national statistics, serve this purpose and yield meaningful information. This has to be analyzed.
- *Development of a set of indices linked to the specific objectives of coastal development*. Below some examples are given of indices that will be considered for further development under the PDO-ICZMP Project.
 - ◇ Economic Development Index, composed from indicators on: regional income; employment; and infrastructure provisions.
 - ◇ Prospects for Economic Development Index, which may be a composite of indicators on: investments; literacy level; infrastructure provisions; and available natural resources.
 - ◇ Indices of human development and livelihood conditions. Examples are: human development index; and household vulnerability index; Such indices could combine different aspects such as:
 - * poverty (life expectancy; education; income);
 - * vulnerability;
 - * HDI;
 - * equity; and
 - * gender empowerment.
 - ◇ Sustained Environment Index, e.g., considering concrete indicators on: endangered species; area of wetland per capita; and special status area per capita.

Different techniques are available for composing indices out of several concrete indicators (UNDP, 2002).

Standardization of indicators:

E.g.: life expectancy: actual value 45 yrs; maximum 85; minimum 25.

Standardized life expectancy indicator (values between 0 and 1) would be: $(45 - 25)/(85-25) = 0.33$

Relating to a reference value (e.g., percentages)

E.g.: relative per capita income for the coastal zone is 80% of the national per capita income

Equally Distributed Equivalent Percentage (EDEP) index:

$$\text{EDEP} = \{[\text{FPS} * \text{FI}^{-1}] + [\text{MPS} * \text{MI}^{-1}]\}^{-1}$$

F/MPS = female / male population share in decimal numbers

F/MI = female / male index in percentages

$$\text{E.g.: } \{[.53 * 25^{-1}] + [.47 * 75^{-1}]\}^{-1} = \{0.0212 + 0.0063\}^{-1} = 36$$

The ideal value is 50; EDEPs are often indexed against this ideal value: $36/50 = .72$

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APPENDIX A: MANAGEMENT INPUT INDICATORS

Management inputs are considered under three categories:

- ◇ institutional arrangements;
- ◇ policies, strategies and plans; and
- ◇ direct interventions and actions.

Table 2 in the main text (Section 2.1) presents a tabulated structure of these three categories, their (sub) components, and dimensions. For better understanding of the structure of MIIs, reference is also made to version 2 of the Global Water Partnership's toolbox for integrated water resources management (GWP, 2003). In this report, practical examples are given of: the enabling environment; institutional roles; and management instruments.

A1 INSTITUTIONAL ARRANGEMENTS

Institutional arrangements provide the “context or infrastructure” within which management actions are taken. They consist of three distinctive components:

- ◇ **institutional and organizational infrastructure**: including national, regional and local levels. Includes structure of organization and their mandates, administrative boundaries, capacities; financial, personnel; protocols
- ◇ the set of **laws and regulations** that facilitate managers to take actions by managers when preparing for and taking actions⁶
- ◇ Includes Environment related acts, ordinances ;International treaties / conventions; Standards; Licenses; Special; area declarations; Financial incentives; and
- ◇ **mechanisms for democratic control and participation** that make managers interacting with and accountable towards the beneficiaries.

These arrangements reflect the “the institutional capital” and define the “quality of governance”.

A1.1 Institutional and organizational infrastructure

The institutional and organizational infrastructures are functional at different levels like national, regional and local (district) levels. Characterization of the infrastructure of institutions and organizations has at least the following dimensions:

- ◇ the overall structure of agencies and institutes at national, regional and local levels and their respective mandates, representing the distribution of responsibilities and tasks within the overall structure;
- ◇ administrative boundaries that determines the levels
- ◇ the capacities and capabilities of each of the relevant agencies in terms of, among other things: available staff, expertise and budgets; and
- ◇ the linking mechanisms, i.e. working protocols in place for harmonization and coordination.

All these three dimensions are relevant in the context of designing a policy framework for ICZM through the CZPo and CDS. Indicators would identify the special arrangements made for the coastal

⁶ Formally, this is an important component of institutional arrangements, in particular when preparing for and implementing management interventions. Customs and norms are, however, not subject of management interventions, and this component is not included in Table 2.

zone in terms of: special institutes; special staffing of regional offices of national institutes; special committees to address coastal zone problems; and special zones such as marine parks.

A1.2 Laws and regulations

The legal regime aims to facilitate the many different possible types of management interventions. This would include, e.g.: regulations for land acquisition, environmental related laws, acts, ordinances, licensing systems for groundwater extraction and fishing; and water quality standards. The legal regime would also encompass a financial incentive structure, including: taxes; subsidies; charges; and penalties. Preliminary orientations have indicated that the actual legal regime has no major gaps and that improvement of management of the coastal zone depends more on proper implementation and enforcement of the existing laws and regulations than on defining new ones. For this reason, this component is not further elaborated.

A1.3 Democratic control and participation

This component includes information on the representation of people in the formally elected bodies and participation of people in the process of planning, decision making, design, implementation and control. However, the democratic processes on local level are concerned, is beyond the control of coastal zone managers. The establishment of guidelines on participatory procedures on such typical coastal zone issues as land development, however, could certainly be seen as a management input into ICZM.

A2 POLICIES, STRATEGIES AND PLANS

At different levels of concretization, policies, strategies and plans represent the principles and intentions of the government for development, providing guidelines for interventions. Leaving aside the overlapping connotations of these terms, the hierarchy they represent can be explained as follows:

- ◇ *policies* would state the overall objectives and establish the principles and priorities of the approach of the government;
- ◇ *strategies* would typically translate these general objectives and commitments into concrete -- say 5-year -- targets and develop the structures for implementation; and
- ◇ *plans*, finally, prepare for actions to meet the strategic targets, including the allocation of required resources.

A2.1 Policies

Policies are formulated mainly at a national level. They would distinguish between:

- ◇ overall policies, with obviously special reference to the CZPo and CDS; and
- ◇ sector-policies.

Important dimensions of policies are their objectives and implementation arrangements and reference to the existence of an approved overall CZ policy. In addition, they would account for the specific attention the CZ receives in other policies, such as the Fish Policy (MoFL, 1998). In this context, reference is made to an analysis made of 13 GoB policy documents (PDO-ICZMP, 2003a).

A2.2 Strategies and plans

Strategies and plans could be;

- ◇ overall strategies, with obviously special reference to the CZPo; and

- ◇ sector-strategies.

Strategies refer to concrete elaboration of policies in terms of either implementation mechanisms or targets. Following the strategy action oriented plans can be developed at national or regional levels and for the country as a whole or for specific sectors. Examples of strategy include PRSP, AES, and national plans relevant for ICZM are: the various five-year plans (expected to be replaced by three-year rolling planning procedures); the national environmental management plan; and the water management plan.

Regional strategy and plans do not yet exist. Development of coastal development strategy and implementation of a system of District Development Plans, that seems to be under consideration for general planning purposes, would certainly serve the goals of ICZM and provide an important instrument in the required management coordination.

Relevant dimensions of strategy and plans relate to their objectives, targets and to the resources allocated to their implementation. Indicators would of course account for either the existence of specific plans for the coastal zone or for the relevance of more general plans for the coastal zone.

A3 DIRECT INTERVENTIONS

Formally, management interventions would consist of:

- i. physical measures to change the availability and access to coastal resources;
- ii. implementation incentives that will induce users of coastal resources to a desired behavior (e.g., water charges, fish licenses);
- iii. training and dissemination measures to increase the skills and awareness of the population; and
- iv. institutional arrangements for the implementation of (i), (ii) and (iii).

Interventions are thus of different types and will be applied in different sectors (water, health, education, etc) and by different agencies (GoB agencies, NGOs and private organizations). To account for this complex system of direct management inputs, relevant sectors have been selected as “components” to which different agencies contribute in the form of different types of inputs. Adapted from the IPRSP (ERD, 2002), the following components have been selected;

- ◇ rural and urban infrastructure
- ◇ social services in rural and urban areas
- ◇ natural resource management
- ◇ safety nets
- ◇ public safety and well-being
- ◇ credit for the poor
- ◇ employment generating activities

A3.1 Rural and urban infrastructure

Different types of infrastructure are relevant in rural and urban settings. Critical provisions for development and well-being would be, e.g., roads and cyclone shelters in rural areas and piped water supply and sewer systems in urban areas (this is included under social services, next section). Indicators would differentiate between investments and recurrent expenditures for maintenance. Infrastructure development is generally considered the responsibility of the government. Investments and recurrent cost, however, should also consider the NGO and commercial sectors. For example, through the development of mobile networks, the communication (telephone) infrastructure seems to become more and more the domain of private investments.

A3.2 Social services rural and urban areas

This component relates to the sectors: education, health, family planning and sanitation and water supply. Inputs from GoB and NGOs consist mainly of investments, maintenance and training and awareness building.

A3.3 Natural resources management

Water, land, fish, forest are the selected resources that require dedicated management inputs in the context of ICZM. Such inputs may come from different sources: GoB, non-GoB, NGOs and private. In principle they may consist of: physical measures; implementation incentives (such as: ban on fry catching, water pricing); and training and dissemination. Under this component only the “soft” inputs are considered (infrastructure inputs are under rural and urban infrastructure: Section A3.1).

Indicators would relate to the following dimensions of management:

- ◇ monitoring and assessment of the status of the resource and its utilization (stock taking);
- ◇ maintenance and control and enforcement of resource utilization; and
- ◇ dissemination and awareness building on the corresponding resource.

Indicators could be expressed, for example, in terms of budgets available for monitoring, the management of protected areas or the enforcement of protective regulations, such as fish catching regulations.

A3.4 Safety nets

Tentative findings of a study done by the PDO-ICZMP Project (PDO-ICZMP, 2003b) indicates that the coastal area is equally endowed with safety nets as the remaining part of the country. However, the higher level of vulnerabilities might well justify a focus on the coastal zone and safety nets would thus become an important management input in the coastal zone. Under this component direct interventions are: food assisted programs, low cost housing and disaster management. Dimensions relate to the total volume of the efforts, for example in terms of disbursements in national programs, or to the effectiveness and efficiency of these inputs in terms of people served.

A3.5 Public safety and well-being

In the coastal area this aspect needs specific attention because of the remoteness of some of the coastal areas and the absence of law and order on coastal char lands. The main subcomponent is law enforcement. Inputs can be accounted for in terms of public spending in law enforcing agencies (dimension: efforts) and the rate of disposal of criminal cases (dimension: effectiveness / efficiency), which on an input level can be accounted (ERD, 2002). Law enforcement is particularly relevant on coastal char lands.

A3.6 Production and income generating activities

Two subcomponents are identified: production oriented extension services and micro-finance. Though the purpose of the extension services is increase in production, improvement of income positions is also an important objective, related to employment opportunities.

The same study as mentioned above under safety nets (PDO-ICZMP, 2003b) also concluded that the coastal area is equally endowed with micro-finance activities as the remaining part of the country. However, also for this kind of inputs, a higher level could be justified because of the higher level of vulnerabilities in the coastal zone.

APPENDIX B: RESOURCE BASE INDICATORS

Resource base indicators consider five main categories: natural, physical, human, social and financial resources. See also Section 2.2 and Table 3 of the main text.

B1 NATURAL RESOURCES

Natural resources encompass the main components land, water and air as well the renewable resources (biological) and non-renewable (minerals) resources they contain. The dynamics and utilization of these natural resources are complex and selections have been made of their most relevant components in the context of ICZM. This refers especially to water and land, which in the Bangladesh estuarine environment is a too broad classification to do justice to the many and livelihood-determining aspects of the natural environment. In subsequent sections, the selected subcomponents and dimensions of each of these components are specified to facilitate a further selection of concrete indicators.

B1.1 Land

Indicators would reflect the quantity (extensions / area) and quality (including safety) of land resources in terms of their specific use. The following types of land-use have been selected.

- *Agriculture land* (F_1 , F_2 , F_3), encompassing different land elevations. Quality of the land can be expressed through the following dimensions:
 - ◊ safety from hazards, e.g. crop damage by flood or storm surges of certain frequency;
 - ◊ cropping intensity; and
 - ◊ soil quality (fertility, salinity, moisture; can be expressed in terms of yields (t/ha/yr)).
- *Settlement areas* (includes industrial areas and the areas where infrastructures are built) consisting of higher elevation land (F_0) for urban and industrial areas and rural homesteads. Main dimensions would relate to extensions and safety from hazards, e.g., from flood or storm surges (e.g., in terms of empoldered areas).
- *Ponds and ghers*, referring to man-made structures for the production of fish and shrimp. Quantity dimension would specify the area, while quality dimension shall cover their physical conditions and productivity (yield).

B1.2 Surface water

Surface water resources has been described in to three main subcomponents viz. rivers, perennial water bodies and floodplains (seasonal)

River includes estuarine rivers and associated channels while the perennial water bodies are the beels and baors that contain waters through out the year while floodplains are seasonally flooded lands. Following dimensions of all these three subcomponents shall be characterizing the surface water;

- ◊ area: total area covered ;
- ◊ water quantity: average levels/flows, peak flows, low flows, seasonal variability, extreme events;
- ◊ salinity (water quality)
- ◊ pollution: (BoD, fecal coliforms);
- ◊ sediment quantity: concentrations and volumes (load); and
- ◊ sediment characteristic and quality: grain size, composition and fertility.

- ◇ connectivity
- ◇ productivity
- ◇ diversity

B1.3 Groundwater

Groundwater has two subcomponents: deep and shallow aquifers. They are both characterized through the following dimensions:

- ◇ volume: level, seasonal variation, recharge;
- ◇ quality: salinity, arsenic contamination; and
- ◇ use or abstraction rates.

B1.4 Sea

Two sub components have been considered; coastal waters including estuary branches and deep sea. Both are characterized by following dimensions

- ◇ area: total area covered ;
- ◇ water quantity: average levels/flows, peak flows, low flows, seasonal variability, extreme events;
- ◇ salinity (water quality): over the seasons and fluctuations
- ◇ pollution: e.g. BoD, toxic heavy metals
- ◇ sediment quantity: concentrations and volumes (load); and
- ◇ sediment characteristic and quality: grain size and composition.
- ◇ productivity
- ◇ diversity

B1.5 Chars and inter tidal areas

The dynamic *inter tidal areas and corresponding coastal char* formation are important features of the Bangladesh coastal areas and an important resource (new lands). They are properly characterized by: the total area; their elevation; the conditions of the soil; and the erosion/accretion balance.

- ◇ area and elevation; quantity of land including elevation information (quality)
- ◇ erosion and accretion balance; and
- ◇ soil conditions of newly formed lands, depending on, e.g., grainsize of deposited sediments.

B1.6 Forest

Forest in the coastal zone is dominated and characterized by mangroves and in particular the Sundarbans. There are also limited evergreen forests in the coastal zone. To combat the tremendous decline of forest areas in the coast line mangroves plantations are being created with significantly different characteristics from the natural mangroves areas, such as the Sundarbans. The following subcomponents describe the main forest activities in the coastal zone:

- ◇ natural mangroves, including the Sundarbans;
- ◇ mangroves plantations;
- ◇ plain land forest (social forestry using a variety of trees).
- ◇ hill forest (mainly remnant residual evergreen forest covers the slopes of the southeastern hills); and

These different types of forests can be characterized by:

- ◇ their extension (coverage area, density);
- ◇ productivity; and
- ◇ diversity.

B1.7 Meteorological conditions

Air is a crucial resource while meteorological conditions provide important possibilities and constraints for human activities. Relevant for ICZM are the following aspects (subcomponents):

- *Air* as a substance, characterized by its quality.
- *Wind* as a hazard and as a source of energy, characterized by its distribution in space and its variation in time including extreme events (intensity and frequency of storms and cyclones).
- *Rainfall* as important source for water and as a hazard, characterized by its distribution and variation (including extreme events: floods and droughts).
- *Others (humidity, temperature, evaporation, sunshine)* are important parameters for growth processes, also characterized by their distribution and variation.

B1.8 Fish and other aquatic resources

This component includes fresh water fish, marine fish, crabs and shrimp and from the open water and capture fisheries regime; aquaculture has been included under ponds and ghers (land component). The main dimensions characterizing these resources are: productivity and diversity.

B1.9 Non-renewable resources

Only the following two types of non-renewable resources are considered.

- *Oil and gas*. This is an important resource to consider in the future development of the coastal zone. In terms of management, however, it seems to be beyond the reach of ICZM. The availability and abstraction / exploitation rate as a politically decided value, could be considered an exogenous management variable.
- *Sand and minerals* as a resource refer to mining activities from beaches (considered non-renewable) to extract valuable materials. Dimensions are: availability; quality; and abstraction.

B2 PHYSICAL RESOURCES

Physical resources as part of the LRB could be elaborated under two components: (i) different types of physical infrastructure available in the area; and (ii) the technologies available at local level.

- Physical infrastructure component has been described by following sub components all of which could be characterize by the numbers and provisions including their capacity and quality;
 - ◇ protection (e.g. flood, cyclone)
 - ◇ agriculture sector (irrigation, drainage)
 - ◇ power sector (generation, distribution)
 - ◇ transport sector (for example, roads, railway, airports, navigation routes)
 - ◇ communication sector (wired and wireless)
 - ◇ education sector (e.g. schools, colleges)
 - ◇ health sector (hospitals, health centers)

- ◇ industrial sector
- ◇ recreational facilities

Indicators would account for the presence / availability of different infrastructure provisions (at local level) and their capacity and quality. For example, while total mileage of roads would be considered as an indicator for available infrastructure, vehicles of different kinds per sq km, or, persons traveling per day by different kinds of vehicles could be considered to reflect the status of transportation service. As for power, an interesting indicator would be the kW availability to a specific unit of the population.

- *Technology* as a resource relates mainly to management technologies for primary sector production (agriculture and fish/shrimp). Indicators would measure equipment available and the level of use of pesticides and fertilizers.

B3 HUMAN RESOURCES

In characterizing the human resource base, four components are distinguished.

- The *demographic characteristics*, describing the size of the population, composition and distribution of the population and their migration patterns. Indicators under this category aim also to give a general impression of the position and condition of women, which, e.g., facilitates a comparison with their situation in Bangladesh as a whole. Examples of such indicators are: male/female ratio (0-14, 15-49, 50 and older); percentage of permanent and seasonal female headed households; fertility rate; and female/male migration rates.
- Health: Important dimensions of health are the physical condition and the incidence of diseases.
- Education/skills, relate to general education at different levels (incl. literacy rate) and vocational training.
- Awareness. Important dimensions of awareness refer to the state of knowledge and understanding of safety and environmental conditions.

B4 SOCIAL RESOURCES

This category encompasses the components: institutional structure; social and cultural traditions and norms; and the condition with respect to safety nets.

- The *institutional structure* would consider a great variety of public, private and civil society organizations, such as: formal GoB agencies at national, regional and local levels; community based and functional management organizations such as water management organizations; NGOs, banks and political and religious organizations. Indicators could reflect the availability and capacity of these of these organizations and their accessibility and quality. An important (quality-) dimension is the law and order situation expressed in indicators reflecting the incidence of violence.
- *Social and cultural networks* that create senses of belonging and corresponding norms and values. Important dimensions are memberships, leaderships and contributions
- *Safety nets* refer to food-assisted programs, low cost housing and disaster management. Indicators would reflect the number of people covered through the related inputs. Important dimension of indicators are availability and access to these provisions.

B5 FINANCIAL RESOURCES

The financial resources in the region may accrue from either within the region itself or from outside. Within the region the following resources are distinguished.

- *Savings* generated in the private sector as well as the public sector would constitute a major financial resource in the region.
- Another component of financial resource from within the region would be the *revenues* generated, mainly in the form of Land Development Tax (LDT) and the Immovable Property Transfer Tax (IPTT) that applies to the registration of land when ownership changes. It should be realized that these financial resources are not necessarily made available in their entirety to the region.
- *Wages* earned by skilled and unskilled labor in different sectors would also reflect a financial resource. The total amount paid is considered as one of the dimension (quantity) while seasonal fluctuations covers another dimension of wages

Apart from the financial resources generated from within, there are external injections of such resources into the region.

- The *credit* distributed by the conventional banking system of the country plays a significant role in this context. Besides, there are various Micro-Finance Institutions (MFI), both in the public and private sectors, which disburse credit for various activities to be undertaken by the people securing credit from them. The role of NGOs in Bangladesh in this regard is quite well-known.

Remittance is another financial resource that has been characterized by quantity. Special attention might be given to the deposits made by Bangladeshi working abroad.

APPENDIX C: DECISION SUPPORT INDICATORS

Section 2.3 of the main text explains that three categories of indicators have been selected to represent the main concerns of sustainable development: economic growth; improvement of livelihoods and well-being; and a sustained natural environment. Table 4 gives a tabular overview.

C1 ECONOMIC GROWTH

The following components are considered to represent this category.

- A major component in assessing the economic condition of a region would be the *Gross Regional Product (GRP)*. Annual sector-wise GRP should give a good understanding of the regional economic condition.
- The *export earning of the region* would provide an extra insight into its economic condition. The main export commodity to be considered here would be shrimp (bagda as well as golda).
- Another important component in the given context would be the *employment situation* in various sectors and sub-sectors. One would be interested in employment in rural as well as urban areas. Seasonality of employment and the level of disguised unemployment will be of relevance here.
- *Marketing activities* can portray certain aspects of economic conditions of a region. Given that agriculture is the major sector in the region, marketable surplus in this sector could be assessed here. It would be necessary to cover paddy as well as other important crops. Data on both volume and value of marketable surplus (annual and seasonal) would be of interest.
- The Consumer Price Index (CPI) would reflect the relative *supply-demand conditions* of the basic items of consumption in the region. Both food and non-food items should be covered and any seasonal variability should be deciphered.

C2 IMPROVEMENT OF LIVELIHOODS AND WELL-BEING

Well-being is measured through assets and the income households can generate with those assets. Vulnerability, equity and gender highlight specific perspectives of these well-being components. For example, vulnerability refers to, e.g., income or health insecurity, while equity and gender look into distributional aspects of vulnerability, income and assets. On the other hand scarcity of assets, income and security resulted into poverty by accumulation which could be another component. These categories have been brought up to this level of DSIs because they represent the specific objectives of vulnerability reduction and (gender) equity of ICZM.

C2.1 Income and expenditure

Income and expenditure component has two separate and highly related sub components viz. income and expenditure. Focus is on income in cash. Under this heading, levels of income are defined for different sectors of the economy. In addition to levels of income, distribution is an important concern because a community with a high income is not necessarily better off than a community with a lower income if the income accrues to only a small group of well-off people, while others living in poverty. Inequalities in income are usually measured through the “Gini coefficient”, which accounts for the percentage of households in different income categories.

This is a different type of equity as considered under the heading Equity (Section 2.4) which focuses on target groups.

The expenditure is very important in determining the economic condition of the target groups. The percentage of income spent on consumption, activities and investment or social tax is highly relevant. These are the dimensions that characterizes expenditure.

C2.2 Assets

Assets reflect the resources available at household level. They basically consist of household “owned” capacities and capabilities and accessible local resources. This accessibility is an important concern and a potential subject for the CDS. Assets increase the flexibility to choose and in particular reduce the vulnerability for extreme events and seasonal variabilities.

Detailed data on household level are scarce. An important source for information is BBS’ household and expenditure surveys (BBS, 1998), which is frequently repeated, but only published in an aggregate form. Following the livelihood model, the five sub-components are considered.

- *Natural assets* at a HH level has two dimensions:
 - ◊ the household-owned properties, such as acres of agriculture and/or homestead land and ponds; and
 - ◊ the HH’s access to common properties or long-term license/lease from private & public resources (measured in licensed or leased areas or extractions related to such resources as: sw, gw, fish, forest, and grazing land).
- *Physical assets* consider the following dimensions:
 - ◊ household properties, such as: houses; household amenities (radio, TV, etc); production units(tractors, rickshaws, livestock, fishing gears, fruit trees);
 - ◊ access to new varieties, fertilizers, pesticides (measured through application rates); and
 - ◊ access to utilities and public facilities (electricity supply, telephone, tube well, piped water supply, sewerage facility, latrine).
- *Human assets* relate to individual members of a household (the household as a whole is included under social assets). Important dimensions are threefold:
 - ◊ health of individual household members (expressed through such indicators as: life expectancy (M/F), maternal mortality, infant mortality (M/F), nutrition (M/F));
 - ◊ education and skills (type of indicators: average years of schooling (M/F), # of literates (M/F); # of primary school graduates (M/F); # of professionals in households); and
 - ◊ level of awareness on natural hazards (e.g., warning signals), resource depletion (e.g., over-fishing), health (e.g., availability of safe water), relief and rehabilitation programs (e.g., VGD card).
- *Social assets* refer to the household as a unit and their relationships with the “environment”, encompassing the more formally structured institutional environment. Main dimensions are:
 - ◊ HH composition, e.g., in terms of size and dependency ratio;
 - ◊ level of empowerment, for example represented by the extent of memberships of NGOs, WMOs, and access to or support from GoB institutions, for example measured through the number of court cases filed; and
 - ◊ level of cohesion and conflict resolution mechanisms inter and intra households.
- *Financial assets* would relate to:
 - ◊ HH savings and insurances, measured through values of saving accounts, insurance premium;
 - ◊ investments, characterized by part of income invested in assets and in productive activities; and
 - ◊ debt–loan in terms of values of debts and repayment rates.

C2.3 Poverty

The poverty is the result of number of factors including lack or scarcity of assets, having no or less resilience to hazards and disasters and unable to under take activities following the vulnerability as mentioned. Levels and distribution dimensions characterize poverty.

C2.3 Vulnerabilities

The reduction of vulnerabilities of people living in the coastal zone is an important objective of ICZM. This stems from the recognition that: (i) people in the coastal zone are suffering from several vulnerabilities in a combination, that is typical for the coastal zone; and (ii) these vulnerabilities are an important bottleneck in the sustainability of livelihoods and socio-economic development of the coastal zone.

Vulnerability in this context thus has the clear connotation that people have to cope with a series of risks⁷ -- incorporated in the changes and dynamics of their coastal environment - that affect the sustainability of their livelihoods up to a degree that they become unsustainable. This implies that vulnerability is a function of factors that are both exogenous and endogenous to the households. Exogenous factors relate to all aspects of the local resource base (natural, physical, human, social and financial) and may have the nature of:

- ◇ trends, e.g., the depletion of natural resources and inflation;
- ◇ shocks, such as cyclones and earth quakes; and
- ◇ seasonal variations, such as incorporated in the hydrological cycle and agriculture dominated labor markets.

Endogenous factors comprise the assets (capital) of the households, such as storm-proof housing, access to cyclone shelters, savings and sufficient income generating family members to recover from losses.

In developing an approach to visualize vulnerabilities (e.g., through vulnerability maps and vulnerability profiles), starting point has been the following principal *well-being securities* (based on the household perception survey, literature and expert opinions):

- ◇ income
- ◇ food
- ◇ water
- ◇ health and life
- ◇ property and safety

All insecurities are a function of exogenous and endogenous factors and have a temporal dimension (they can be chronic or transitory). For further specification of these “vulnerability dimensions”, guidance has been taken from the approach in developing measures for food security in Bangladesh (VAM, 2002). This draft working paper defines food security as: *access at all times to sufficient safe and nutritious food which meet dietary needs and food preferences for an active and healthy life* (from: World Food Summit, 1996).

- *Food security*. The VAM paper (2002) recognizes three key aspects of food insecurity:
 - ◇ availability of food (regional production);

⁷ A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets now and in the future, while not undermining the natural resource base (Carney, 1998, cited from PDO-ICZMP, 2002a, Annex A).

- ◇ access to food (rural: access to land, non-agricultural employment, level of education, gender; urban: education, employment and social links); and
- ◇ utilization of food (eating habits, hygiene).

The VAM document (2002) also refers to the use of “outcome indicators” such as birth weight, as proposed for the new national nutrition program in Bangladesh (World Bank, Unicef and WFP). These outcome indicators may be less suitable for ICZM’s purposes as an important aim is to relate indicators with determining factors in the local resource base.

- *Income security.* In accord with above definition of food security, income security could be defined as: sufficient income at all times to stay out of poverty. Types of indicators would relate to:
 - ◇ employment opportunities (regional employment rates, source of income, variability);
 - ◇ access to labor market (education, skills); and
 - ◇ use of income (consumption, production, investments, social payments).
- *Water security* is defined in terms of its domestic use: access at all times to sufficient safe water to meet all personal needs for an active and healthy life. Important dimensions are availability and access to water and water quality (salinity, Arsenic).
- *Health and life security* relates to illness and accidental death. Households perceive to be highly vulnerable to illness and death of income-generating family members. Key dimensions are not only food and water security. Additionally important dimensions of an active and healthy life are:
 - ◇ nutrition
 - ◇ natural disasters (occurrence, awareness, availability of shelter, relief and rehabilitation);
 - ◇ law and order situation;
 - ◇ environmental hygiene; and
 - ◇ availability, access and use of medical infrastructure, facilities.
- *Security of properties (safety).* This relates to loss of land and different kind of other properties, such as homestead and cattle. Key types of indicators are:
 - ◇ natural disasters (occurrence of cyclones, floods and erosion);
 - ◇ law and order; and
 - ◇ social network and safety nets.

C2.4 Equities

Equity relates to the distribution between and among different (social) groups of: income; assets; or vulnerabilities. An important concern, e.g., is that interventions should not only improve the overall living conditions in the coastal zone but their benefits should in particular reach the most vulnerable people. The project has selected 4 target groups: rural and urban wage labourers; small farmers and fishers. Equity is expressed as the relation for selected indicators between these groups and the population in the coastal areas or the country as a whole. The types of indicators that seem relevant are:

- ◇ income;
- ◇ health;
- ◇ food security; and
- ◇ water security and access to sanitation

More traditional equity considerations relate to gender, which has been considered an explicit component of livelihood conditions and well-being (next section).

C2.5 Gender

“Gender equality is a core development issue – a development objective in its own right and provides an equally desirable perspective as the goal of poverty reduction and human development.” This quotation is taken from the IPRSP (ERD, 2002). This strategy includes clear objectives and targets in relation to gender equality and specifies policies and institutional actions for women’s advancement and removing gender gaps. Reference is also made to the gender equity indices developed by the UNDP and applied in their human development report 2002 (UNDP, 2002):

- ◇ a gender-related development index (GDI) aiming to adjust the average achievement as measured by the human development indicator (HDI) to reflect the inequalities between men and women; and
- ◇ a gender empowerment measure (GEM) focusing on women’s opportunities in terms of political and economic participation and control over economic resources.

A (first) set of possible gender equity indicators -- with the explicit purpose to measure changes in gender relations -- has been identified in the mission report of Ms. Marianne Nugteren (PDO-ICZMP, 2002b). Taking into account the above national and international approaches, the following categories and corresponding dimensions have been identified for ICZM.

- *Economic conditions.* Measuring inequality in economic conditions could be accounted for through the following types of indicators:
 - ◇ control of means and factors of production (land, credit, animals, labour, water, agricultural inputs);
 - ◇ participation in labour force (total work load and gender division of labor); and
 - ◇ income and expenditures (wage rates, estimated income, expenditure patterns).
- *Health and nutrition.* Gender inequality can be reflected through differences in:
 - ◇ access to food and water (calorie intake; access to safe drinking water in %);
 - ◇ access to medical health facilities; and
 - ◇ maternal care and major types of illnesses.
- *Knowledge and skills* relates to education / experience and to awareness (mainly related to disasters and natural resources deterioration). Levels can be measured through the following types of indicators:
 - ◇ level of education and training (literacy rate female/male by age group, enrolment levels in primary and secondary schools, drop out rates for girls and boys);
 - ◇ value / utility / applicability of levels of education and training (women are lower paid and often need higher educations than men); and
 - ◇ awareness (availability, access and relevance)
- *Socio-cultural and political “environment”* refers to the image and status of women in the society and to the cultural, institutional and legal constraints preventing women’s access to available resources and services. This has many aspects, of which the following are tentatively selected for possible indicators:
 - ◇ security and safety (violence against women inside and outside the house);
 - ◇ early marriage and marriage settlements;
 - ◇ mobility of women compared to men; and
 - ◇ participation in organisation and decision-making.

C3 SUSTAINED NATURAL ENVIRONMENT

The time-scale of this obligate national objective is different from that of the objectives on economic growth and well-being. Indicators related to these last two objectives reflect the need for immediate actions and quick results, while sustainable natural resources are considered crucial to support economic development and well-being in the longer run. “Measuring” and valuating the impact of changes on this objective is proposed through the main areas of “environmental concerns” in terms of both systems and processes. The areas that have been selected are: estuarine dynamics; and health of ecosystems. Dimensions of each of them are specified below.

C3.1 Estuarine dynamics

This component represents the concern that human interventions within and outside the region disrupt irreversibly the natural estuary development processes. Examples are: empolderments that prevent subsidence and sea level rise to be compensated by sedimentation and rising land levels, resulting in drainage congestions; silting up of river branches that would bring fresh water to the coast, due to reduced flows; and fresh water aquifers becoming saline because of over-extraction and sea level rise.. On the other hand morphologic dynamics are expected to increase because of changes in the distribution of peak and low water flows due to human interventions such as deforestation and climatic changes.

Estuarine dynamics could be characterized by following dimensions:

- ◇ the drainage conditions;
- ◇ the morphologic dynamics and
- ◇ the salt/fresh water balance.

Quantifiable indicators are difficult to imagine. It could be considered to introduce for this criterion indicators that represent expert judgments. Such an assessment by experts could focus on the “natural” functions of any estuary: Flood attenuation and drainage; fresh water retention and production; salinity control; tide and storm surge regulation; sediment transport and retention; waste assimilation.

C3.2 Health of ecosystems

Four types of ecosystems are considered to be representative for the coastal ecosystems and need special attention: *mangrove ecosystems*; *wetlands*; *Marine ecosystem*; and *homestead gardens*. Their “health” can be measured through such indicators as: habitat area; productivity; biodiversity (endangered species); and isolation.

APPENDIX D: OVERVIEW OF INDICATORS FOR CHARACTERIZATION OF THE COASTAL ZONE

Natural condition	
Geography	
Bangladesh and the coast	Map: The Ganges-Brahmaputra River Basin; drainage areas main rivers
Bay of Bengal	Map: Characteristics of the Bay of Bengal; depth contours
Islands and chars	Map: Change in size & shape of islands and chars in the Meghna Estuary
	Islands and chars; Number, area and population of the chars by district
Climate	
Rain fall	Annual total rainfall at selected stations 1990-1999 (mm)
	Monthly average rainfall in coastal stations in 1999 (mm)
Evaporation and humidity	Average monthly relative humidity in %
	Figure: Average monthly evaporation and rainfall in coastal stations (1992-2002) (mm)
Temperature	Monthly mean maximum and minimum temperatures at selected coastal stations 1992-2000
	Mean daily maximum and minimum temperatures in °C (1992-2000)
Sunshine	Hours of bright sunshine in coastal areas (averages from 1997-2001)
Wind	Monthly average wind speed in coastal stations
	Map: Cyclone risk map captured by PDO from a hardcopy map published by Ministry of Relief Disaster Management Bureau, Govt. Of Bangladesh, 2001.
Geology and soils	
Geological history	Figure : Geological map of the Meghna estuary
Geomorphology	Figure : Geomorphological map of the Meghna estuary plain
Soils	Figure : General soil map of Bangladesh
	Agro-ecological zones; distribution and soil characteristics
Land classification and land use	Agricultural land type classification of the coastal area (flood phase)
	Land use data for the coastal zone 1998-2003
Mineral resources	Natural gas reserve and production (billion cubic foot) as on 1997
	Mineral resources (sand minerals & hard rocks from the coastal zone of Bangladesh; location and reserve
Hydromorphology	
Hydrological system	The Bangladesh Straight Baseline System points
Ponds & Beels	Distribution and area of ponds in the coastal region during 1999-2000
	Area of Beels in the coastal zone
Sedimentation	Figure : Annual sediment discharge of fine and coarse materials of the Ganges and Jamuna (1966-1991)
	Figure : Spatial variability of average sediment concentration in the Meghna estuary system
	Summary of erosion and accretion in the Meghna estuary during 1973-2000
Ecology	
Vegetation	Changes in area occupation by forest types (1959-95)(%)
Fauna	Threatened animal species in the coastal areas of Bangladesh; Red data book listed by IUCN
Protected areas	Protected areas in Bangladesh
Ecologically Critical Areas (ECAs)	Threats to the ECAs in the Cox's Bazar area
Wetlands	Ecosystem functions of a generalized coastal wetland
Hazards	
Cyclones	Recorded cyclones over the last 200 years (1795-1998)
	Distribution of cyclone landfall over the coasts and months; frequency analysis (1891-1991)

	Monthly distribution of cyclone landfall over the period 1891 - 1991
	Recent past events of cyclone land fall: characteristics, areas, and nr of victims (1960-1994)
Storm surges	Historical cyclonic floods: nr of victims in relation to surge heights (1874-1995)
	Offshore cyclone surge levels at six 2nd CERP polders
Tornados	Tornado incidence and casualties (1964-1993)
Arsenic levels	Arsenic contamination in shallow tube wells
	Arsenic contamination in drinking water
Climate change and sea level rise	Climate change scenarios
Ecosystem degradation	Human actions and their impacts on coastal ecosystems
	Figure: Removal of natural mangrove forest in the Chakaria area over the last century
Salinity levels	Salinity levels in ppm
	Figure: Intrusion of the 1 ppt isohaline during the dry season
Human condition	
Demography	
Population	Household and population data of census 2001
	Coastal Population in exposed and interior upazilas (based on 1991 census)
	Projection of Coastal Zone Population (2001-2050) (in millions)
	Figure: Projected population in rural, urban areas of Coastal Bangladesh
Age- and sex-composition; life expectancy	Figure: Population in 1991 by age groups (percentages)
Migration patterns and trends	Immigrants in coastal districts based on 1991 census
	Direction of domestic migration based on 1991 census (%)
Urbanization	Urban area and population area in 1981 & 1991; population 1964-2001
Livelihood	
Education	Literacy rates (%), 1991
	Primary schools 1994/95 - 1998/99 (government and non-government)
	Primary school teachers 1994/95 - 1998/99
	Number of secondary schools 1994/95 - 1998/99
	Colleges in the coastal zone (former divisions; 1998-99)
Health and health services	Infant Mortality Rate (IMR) and nutrition status of children (based on 1991)
	Number of family planning assistant; 1994/95-97/98
	Sanitation data from some coastal areas (percentages); UNICEF&BBS 2001
	Types of latrines (% of households) UniCEF 2000
	Communicable diseases and malaria (1998)
Gender aspects	Gender division of labour PDO-ICZM, 2002
Livelihood activities	Combinations of livelihood activities PDO-ICZM, 2002
Social stratification	Distribution of rural HH in the coastal zone 1960-1996
	Differences between the poor and the non-poor PDO-ICZM, 2002
	Distribution of major livelihood groups in the coastal zone 2001
Income and poverty	Per capita GDP at current market price (Tk) 1995/96-99/00
	Industrial wage rates (Tk) for unskilled laborers 1995/96-99/00
	Figure: Agriculture daily wage rates 91/92-97/98
Vulnerabilities	Figure: Declining land availability 1960-96
	Figure: Fluctuation of agriculture wage rate
	Figure: Crisis coping by poor households (based on 1999)
Infrastructure	
Infrastructure for land, water management and disaster preparedness	
Polders	Summary of features of 124 polders; CERP 2000
	Figure: Map of coastal polders
Flood protection	Summary of selected flood protection infrastructure
Disaster Preparedness	Purpose-built Shelters cyclone shelters

Agricultural water supply	Irrigation status in the coastal region in 1998-99 (ha)
Domestic water supply	Shallow and deep tube-wells for domestic water supply in coastal areas 1991/92-97/98
Infrastructure for economic activities	
Agriculture	Rice processing infrastructure (1989-90)
	Godowns, silos (1991), and cold storage (1996) facilities
Fisheries and aquaculture	Marine craft and gear in 2000-01
	Shrimp hatcheries in the coastal zone producing Bagda PL
	Aquaculture production infrastructure (1998-99)
	Fisheries service
Infrastructure for health, education, supplies and transportation	
Health infrastructure	Health facilities, 1996-97
Sanitation infrastructure	Distribution of household by type of latrine (UNICEF 2000)
	Production and sales centers sanitary latrines (1996-97)
Electricity	REB stations in the coastal zone; status December 2000
	Percentage of households with electricity connection, 1991
	Sales of solar home systems; upto June 2002
Renewable energy	Wind turbine installations in the coastal zone
Telephone	Number of land phone connections 192/93-99/00
Roads and railways	Road lengths (km) and road density (1996)
Ports and waterways	Number of mooring places for ferries; Position as on June 2001
Land Ports	Container handled at Chittagong port in (calendar years) 1977-2001
Socio-economic conditions	
Socio-economic setting	
National economic significance of the coastal zone	Sectoral contribution of GDP at current price
	GDP in 1999-2000 at market prices and constant prices
Labour force and employment situation	Active labour force (15 years and older); male female disaggregated (95/96 and M/F & U/R disaggregated for 1999-2000)
	Distribution of major livelihood groups(based on 1996 agriculture census)
Income and expenditure	Household expenditures of income groups* (% of income) (based on BBS 2000 expenditure survey)
	Average wage rate of agriculture labourers at current price (Taka) (91/92-97/98)
	Average wage rate of construction labourers at current price (Taka) (91/92-97/98)
	Average industrial wage rate for unskilled laborer 95/96-99/00
Land distribution	Distribution of rural households by farm size and district (based on BBS1999)
	Pattern of landownership (based on BBS1999)
Housing and amenities	Wall and roof materials used (BBS, 1994)
	Numbers and percentages of household sources of water (UNICEF 2000)
	Progress of sinking deep tube wells in saline coastal areas (89/90-97/98)
	Progress of sinking hand pumps/shallow tube wells in saline coastal areas (91-98)
	Progress in the installation of hand/Tara pumps (94-97)
Economic activities	
Agriculture	Coastal zone rice production in 1993-94 and 1997-98
	Gross cropped area, cropping intensity, and paddy production, 1996
	Areas (ha) and production (mt) of cereals, 1998-99
	Areas (ha) and production (mt) of other food crops, 1998-99
	Areas (ha) and production (mt) of fibre crops, 1998-99
	Areas (ha) and production (mt) of "drug and narcotic" crops, 1998-99
	Areas (ha) and production (mt) of other food crops, 1998-99
	Significance of agricultural production in the coastal zone (based on BBS2001)
	Average 1994-95 to 1998-99 crop prices at harvest (Taka/100 kg)
Cattle holding in 1996	
Forestry	Forest Area, 1996-97

	Forest products from reserve forests
	Mangrove plantation in the coastal zone; upto 2000
Fisheries	Capture fisheries production from main resources (96/97-2000/2001)
	Marine fisheries sub-sectors (2003)
	Total catch from inland waters in the coastal zone (1997-98) in mt
	Total catch from inland waters in the coastal zone (1997-98) in mt
Aquaculture	Features of the production of shrimps (2002)
	Shrimp production in the coastal zone, 1996-97 and 2000-01
Industrialization	Export and import tonnage at Chittagong and Mongla ports, 1990-2000 (mt)
Tourism	Visitor Arrivals in coastal BPC hotels & Motels (2002)
Financial resources	
Investments	Grameen Bank branches, 2001
Credit	Micro-credit by major national NGOs, 2001
	Selected safety nets and micro-credit programs (2001)
	Bank deposits in 1993-94, 1995-96 and 1999-00 (million Tk)
Institutional arrangements	
Laws and regulations	
Relevant laws and ordinances	List of relevant laws (text)
Standards	Standard values for sewage effluent (1999)
	Inland surface water standards for biological contamination (1999)
	Inland surface water standards for some physical and chemical contaminants (1999)
Safety nets	Food-assisted safety net programs (in million Taka) (96/97-2000/01)
Special areas	Management status of protected areas in the coastal zone
Inter institutional coordination	
Communication lines and procedures	Organizations and their role in coastal issues, as given in policy documents
Projects	
	Ongoing projects in the coastal zone (end 2002)

(Note: This table refers to a summary overview of the structure and qualitative information used in the working draft of the coastal zone profile presently under development).