

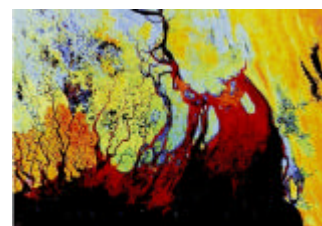
Government of the People's Republic of Bangladesh  
Ministry of Water Resources  
Water Resources Planning Organization (WARPO)

**Vulnerabilities, Opportunities & Emerging  
Issues as transpired from 4 regional workshops**

Working Paper  
WP003

Dhaka  
August 2002

Program Development Office  
Integrated Coastal Zone Management



**PDO-ICZM**

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

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Working Paper

WP003

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Dhaka, August 2002

# Vulnerabilities, Opportunities & Emerging Issues as Transpired from Four Regional Workshops

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## SUMMARY

Coastal zone is the site of a specific range of vulnerabilities, combined with unrealized development potentials that make the area unique. In 2001, attempts have been made to get an understanding of these vulnerabilities and potentials through initiating dialogue among participants in four regional workshops. Efforts were taken that a wide range of stakeholders attended these workshops.

Fish resources, coastal and marine, are rich in diversity but over-exploitation is recognized as catch of individual fisher decreasing. Pond aquaculture provides an alternative but people are not aware of the potentials. Shrimp in the coastal area is contributing to the regional economy, providing employment in general but specifically to women but is bogged down with many management problems like too many hatcheries, too many processing plants, virus infected fingerlings, destruction of biodiversity. Dry fish processing, duck rearing and turtle culture are other opportunities.

Salt farming is expanding and being established in non-traditional areas. Low intensive agriculture is being practiced with water-logging and salt-water intrusion remaining the root causes. Both conservation of indigenous varieties and extension of salt-tolerant modern rice varieties are needed.

Changing land use is going on continuously responding to population pressure. Agricultural land becoming converted to urban settlements, shrimp ghers, salt farms; mangrove forests are also being converted to shrimp ghers. Deterioration of Sundarbans and mangrove forests is reported to be ongoing. Lack of fresh water is contributing to this deterioration.

The coastal area has the opportunity to harness solar, wind and tidal energy. Exploration of gas and oil is a possibility but fear is there regarding environmental impacts of exploration, especially on the Sundarbans. Exploration of rare minerals from Cox's Bazar beach is another opportunity.

Ports, harbors and tourism are also contributing to the regional economy.

Cyclone shelters, polder system, coastal mangroves provide safety to coastal communities. However, inadequate number of cyclone shelters, ineffective polders and destroyed mangroves are all contributing to inadequate safety. Erosion renders hundreds homeless but settling on newly accreted lands are also making them risk-prone. Safety issues of marine fishers are not considered yet.

Climate change impacts are expected to effect the coastal zone very much. There is lack of data, however, emphasis is placed on community understanding.

While improving livelihoods of coastal communities should be of prime concern, it is recognized that the coast has the potential to diversify opportunities. Because of limited opportunities, there is migration to urban areas happening. Traditional skills, like mat weaving should be recognized and preserved. Learning from community or traditional knowledge ensures sustainable development.

In coastal area development, stakeholder's participation in both problem identification and planning is necessary. Lack of co-ordination exists between different development agencies and it is recognized that serious information gaps prevent co-ordination. Integration is required at the operational level. Area based plan is favored over sectoral planning. NGOs and media should play a positive role in coastal development.

Deteriorating law and order situation is affecting development, livelihood, resources and environment. Enforcement of regulations is the problem.

PHOTOGRAPHS



Khulna Workshop



Khulna Workshop



Noakhali Workshop



Noakhali Workshop



Patuakhali Workshop



Chittagong Workshop

## 1 BACKGROUND OF THE REGIONAL WORKSHOPS

During 2001, 4 Regional workshops were organised. The purposes of these workshops were:

- ◇ introduce of the PDO-ICZM to participants;
- ◇ initiate pro-active interaction with key projects, departments and NGOs of the region;
- ◇ make an assessment of on-going and planned activities;
- ◇ capture perception of participants on coastal zone, its resources and issues; and
- ◇ develop relationship with key people

### *Organization of the workshops*

In each region, contacts were made with an organisation to act as facilitating organisation. This facilitating organisation developed a participant list. Based on the list, invitations were sent. The facilitating organisation also arranged local logistics in relation to facilitate the workshop. **Table 1** gives an overview of the workshops organized. Attendance was satisfactory. Participants were from different sectors representing government and non-government. For most, it was the first contact with the PDO-ICZM. Discussions were held on mainly three aspects of coastal zone management – coastal resources, coastal people/ stakeholders and development challenges. The issues raised by the participants were regional as well as national.

### *Structure of the Working Paper*

In this working paper, attempt has been made to summarise discussions generated during the workshops. Special attention has been given to identify problems, new opportunities and emerging issues. It has to be realized that statements of the participants has been captured only and is the basis of preparing this paper. Many issues were raised and again many remained not mentioned. This paper may not have captured all the relevant issues. This working paper will be the basis for preparing a more detailed document incorporating existing information, experiences from on-going projects, earlier participatory exercises and the results of a household perception survey.

The summary has been prepared following the sustainable livelihood framework.

Following this background, Chapter 2 gives a summary of issues and Chapter 3 captures description of workshop statements. List of participants is provided in the Annex.

**Table 1: Basic information on the workshops**

Location	Date	Facilitating organisation	Participating organisations	No. of participants
Noakhali	April 16, 2001	Char Development & Settlement Project (CDSP)	<ul style="list-style-type: none"> <li>• Char Development &amp; Settlement Project</li> <li>• DPHE-DANIDA Coastal Belt Water Supply &amp; Sanitation Project</li> <li>• Local Initiatives for Farmer's Training Project (LIFT) - CARE</li> <li>• Poverty Alleviation Programme in Greater Noakhali District (ASA)</li> <li>• BRAC/CDSP Programme</li> <li>• Greater Noakhali Aquaculture Extension Project</li> <li>• SDC/LGED Noakhali Rural Infrastructure Development &amp; Maintenance Project</li> <li>• DANIDA/LGED Rural Infrastructure Development &amp; Maintenance Project</li> <li>• Agriculture Programme, MCC</li> <li>• Coastal Embankment Rehabilitation Project</li> </ul>	33
Khulna	August 20, 2001	Coastal Development Partnership (CDP)	<ul style="list-style-type: none"> <li>• GO : Dept. of Agricultural Extension, Dept. of Fisheries, Dept. of Forests</li> <li>• NGOs : CDP, JJS, Sushilon, CARE, Uttaran, Prodipon, Proshika, CCCCE, PPS</li> <li>• Media representing most local and national dailies</li> <li>• Khulna University</li> <li>• Bangladesh Frozen Food Exporters Association,</li> <li>• Khulna Chamber of Commerce &amp; Industry,</li> <li>• Khulna Development Authority</li> </ul>	55
Chittagong	December 23, 2001	Coastal Fisherfolk Community Network (COFCON)	<ul style="list-style-type: none"> <li>• GO : DoFisheries, Do Forests, DoEnvironment, BSCIC,</li> <li>• NGOs : UDDIPAN, CODEC, Ghashful, COSED,</li> <li>• Media representing local and national dailies</li> <li>• Chittagong University : Geography Dept., Inst. of Marine Sciences</li> <li>• Bangladesh Forest Research Institute</li> <li>• Coastal Embankment Rehabilitation Project,</li> <li>• Strengthening of Coastal Marine Fisheries Management Project</li> <li>• Chittagong Port Authority</li> </ul>	32
Patuakhali	December 30, 2001	Community Development Centre (CODEC)	<ul style="list-style-type: none"> <li>• GO : DAE, DoFisheries, Do Forests, DPHE, BADC, BARI, LGED</li> <li>• NGOs : ASA, ADAB, CODEC, Mass-Line Media Centre, Proshika MUK, Coastal NGO Forum, SSDP, Dhaka Ahsania Mission, PMUS</li> <li>• Press Club</li> <li>• Patuakhali-Barguna Aquaculture Extension Project</li> <li>• Small Holder Livestock Development Project</li> <li>• Rural Development Project - 16,</li> <li>• Strengthening of Coastal Marine Fisheries Project</li> <li>• DPHE-Danida Water Supply &amp; Sanitation Components</li> </ul>	31

## 2 SUMMARY OF ISSUES

This section contains two tables. Table 2 relates to livelihood assets, while Table 3 summaries issues related to vulnerabilities.

**Table 2: Summary of issues related to livelihood assets**

Problems & opportunities	Issues
<b>Related to natural resources</b>	
Fish resources	<ul style="list-style-type: none"> <li>▪ Rich in diversity</li> <li>▪ Marine fish contributes but can be expanded</li> <li>▪ Expansion of fish culture in homestead ponds and closed water bodies</li> <li>▪ Fish &amp; duck culture together around ponds</li> <li>▪ Increase in per unit area production</li> </ul>
Shrimp farming	<ul style="list-style-type: none"> <li>▪ Processing plants too many</li> <li>▪ Hatcheries are also too many</li> <li>▪ Fingerlings come from both hatchery &amp; natural sources</li> <li>▪ Despite many hatcheries, fingerlings are imported</li> <li>▪ Imported fingerlings are virus infected, danger to industry &amp; economy</li> <li>▪ Negatively affected socio-economy and environment</li> </ul>
Over-exploitation of fish resources	<ul style="list-style-type: none"> <li>▪ Control &amp; conservation efforts needed</li> <li>▪ Catch of individual fisher decreasing</li> <li>▪ Fishers sliding below poverty line</li> <li>▪ Complete depletion of stock feared</li> </ul>
Pond culture	<ul style="list-style-type: none"> <li>▪ People not aware about potentials</li> <li>▪ Low cost technology available</li> <li>▪ Training needed</li> </ul>
Shutki (dry fish) processing	<ul style="list-style-type: none"> <li>▪ Activity starting in new areas (Patuakhali)</li> <li>▪ Training on hygienic production techniques needed</li> </ul>
Turtle culture	<ul style="list-style-type: none"> <li>▪ Turtles usually caught from natural sources, marketed &amp; exported</li> <li>▪ Stock depleting</li> <li>▪ Culturing possible</li> </ul>
Salt farming	<ul style="list-style-type: none"> <li>▪ Expanding</li> <li>▪ Credit &amp; marketing support needed</li> <li>▪ Conversion of agricultural land</li> <li>▪ Making land unsuitable for agriculture again</li> </ul>
Land & agriculture	<ul style="list-style-type: none"> <li>▪ Top soil removed, soil quality damaged, conservation of top soil needed</li> <li>▪ Conservation of indigenous varieties needed</li> </ul>
Low agricultural production	<ul style="list-style-type: none"> <li>▪ Water-logging &amp; salt-water intrusion are the causes</li> <li>▪ Winter crops cannot be grown properly</li> <li>▪ Cropping intensity cannot be increased</li> </ul>
Soil & water salinity	<ul style="list-style-type: none"> <li>▪ Cropping intensity cannot be increased</li> <li>▪ Many rabi crops cannot be grown</li> <li>▪ Saline water cannot be used for irrigation</li> <li>▪ Salt tolerant crops &amp; varieties needed</li> <li>▪ Research Findings not suitable</li> <li>▪ Farmers reluctant to adopt new technologies</li> <li>▪ Coconut cultivation can be expanded</li> <li>▪ Duck rearing can be expanded</li> </ul>
Bathan (livestock rearing)	<ul style="list-style-type: none"> <li>▪ Decline need to be arrested</li> </ul>



Problems & opportunities	Issues
Newly accreted land	<ul style="list-style-type: none"> <li>▪ Settlement opportunity to many</li> </ul>
Khas lands	<ul style="list-style-type: none"> <li>▪ Need to bring into productive use</li> </ul>
Changing landuse	<ul style="list-style-type: none"> <li>▪ Going on continuously</li> <li>▪ Responding to population pressure</li> <li>▪ Shrimp culture &amp; water logging damaging sustainability of the land</li> <li>▪ Chokoria mangrove converted to shrimp farm, natural habitat lost forever</li> <li>▪ Dangerous for sustainable environment &amp; bio-diversity conservation</li> <li>▪ Large projects contributing to environmental concerns questionable</li> </ul>
Sunderbans/mangrove forests	<ul style="list-style-type: none"> <li>▪ Deterioration of the forest</li> <li>▪ Mismanagement of the FD</li> <li>▪ Degradation affects other resources</li> <li>▪ Need for management research</li> </ul>
Sunderbans at risk due to oil and gas exploration activities	<ul style="list-style-type: none"> <li>▪ Confusion in the public mind as to the environmental and socio-economic impacts of exploration activities</li> <li>▪ The use of dynamite for exploration for oil and gas in block 5 may cause land depression</li> </ul>
Wood cutting in forests	<ul style="list-style-type: none"> <li>▪ Income of Bawalis come only from wood cutting</li> <li>▪ Do not receive full benefit</li> </ul>
Honey collection in forests	<ul style="list-style-type: none"> <li>▪ Collection by inefficient methods</li> <li>▪ Destroying habitat of honeybees</li> </ul>
Fresh water	<ul style="list-style-type: none"> <li>▪ Imbalance between fresh and saline water occurring</li> <li>▪ Sunderban is suffering from lack of fresh water (top dying)</li> <li>▪ Proposed GRRP and Ganges Barrage are expected to maintain a balance</li> </ul>
Pollution & natural resources	<ul style="list-style-type: none"> <li>▪ An area of 30sq.km of water area is affected.</li> <li>▪ DDT, as high as 12 times, are being applied during dry fish processing.</li> <li>▪ Need for demarcation of polluted and non-polluted zone</li> <li>▪ Awareness program is necessary for mitigation and improvement</li> </ul>
Minerals	<ul style="list-style-type: none"> <li>▪ Exploration of rare minerals from Cox's Bazar beach</li> </ul>
Coral reef	<ul style="list-style-type: none"> <li>▪ St. Martins is the only coral reef of the country – in the early stage of formation</li> <li>▪ Illegal harvesting of corals on-going</li> <li>▪ Protection &amp; conservation needed</li> </ul>
Natural energy sources	<ul style="list-style-type: none"> <li>▪ Harnessing of solar, wind and tidal energy needed</li> <li>▪ Limitless possibility exists – creates new jobs</li> <li>▪ Positive pilot exercises to be replicated</li> </ul>
<b>Related to technical resources</b>	
Cyclone shelter	<ul style="list-style-type: none"> <li>▪ Inadequate protection</li> <li>▪ Inadequate number</li> <li>▪ Poor accessibility</li> </ul>
Sea-facing embankment	<ul style="list-style-type: none"> <li>▪ Inadequate protection against storm surges</li> <li>▪ Low embankment crest</li> <li>▪ Limited resource</li> <li>▪ Mangrove forests / Sunderbans has protective role</li> </ul>

Problems & opportunities	Issues
Ineffective polder system	<ul style="list-style-type: none"> <li>▪ Eroding embankment, too close to the shore</li> <li>▪ No provision for hard protection</li> <li>▪ Poor O &amp; M</li> <li>▪ Low quality construction</li> <li>▪ Mangrove forests / Sunderbans has protective role</li> <li>▪ Embankment cuts</li> <li>▪ Faulty or missing structures</li> <li>▪ Inside canals and outside rivers need re-excavation</li> </ul>
Erosion of foreshore/coastline	<ul style="list-style-type: none"> <li>▪ Destruction of foreshore mangrove forests</li> </ul>
Re-excavation of rivers	<ul style="list-style-type: none"> <li>▪ Siltation of rivers</li> <li>▪ Rivers provide network for water transport</li> <li>▪ Helps in irrigation</li> </ul>
Hatcheries & modern technology	<ul style="list-style-type: none"> <li>▪ Excess number of hatcheries but located in one place</li> <li>▪ Private entrepreneurs are encouraged to develop hatcheries at different locations</li> <li>▪ Increase in unit area shrimp production can release land for other use</li> </ul>
Modern agricultural technology	<ul style="list-style-type: none"> <li>▪ Salt tolerant varieties should be developed</li> <li>▪ Low cost technologies should be developed</li> <li>▪ Coconuts cultivation can be expanded</li> <li>▪ 70-80% of the research findings of BARI is not applicable in the coastal zone</li> </ul>
Ports & harbour	<ul style="list-style-type: none"> <li>▪ Important for regional trade &amp; commerce</li> <li>▪ Navigability of Mongla Port, intermittent dredging needed</li> </ul>
Tourism	<ul style="list-style-type: none"> <li>▪ Need of infrastructure</li> </ul>
Improved technology v/s employment	<ul style="list-style-type: none"> <li>▪ The conversion to container system has negatively affected the job security</li> </ul>
<b>Related to human resources</b>	
Safety of fisher (Marine)	<ul style="list-style-type: none"> <li>▪ Fishing boats seldom has light source</li> <li>▪ Lack of life saving equipments</li> <li>▪ Licensing of boats without inspection</li> <li>▪ Need to change height of Kuakata Light-house</li> </ul>
Slow acceptance of new technology	<ul style="list-style-type: none"> <li>▪ Farmers' attitude towards modern technologies is not so positive due to some reasons</li> </ul>
People are assets	<ul style="list-style-type: none"> <li>▪ Involved in a number of traditional livelihood activities.</li> <li>▪ Often making handicrafts, katha, pati are not being recognized as occupation.</li> </ul>
<b>Related to financial and economic resources</b>	
Financial sustainability	<ul style="list-style-type: none"> <li>▪ Earning foreign exchange should not be our main concern</li> <li>▪ Livelihoods of the people should be the main concern</li> </ul>
Lack of diversified livelihood	<ul style="list-style-type: none"> <li>▪ Migration to urban areas happening</li> <li>▪ Living on few resources causing depletion</li> <li>▪ Modern technology restricting job opportunities</li> <li>▪ Coast has potential to diversify opportunities</li> </ul>
Employment in shrimp farming	<ul style="list-style-type: none"> <li>▪ Employment opportunity for women</li> <li>▪ Encouraging change from traditional occupation</li> <li>▪ Banning of fry collection rendering women unemployed</li> <li>▪</li> </ul>
Mat weaving	<ul style="list-style-type: none"> <li>▪ Part-time occupation for women</li> <li>▪ Re-introduction of Meley or Ciperus grass needed</li> </ul>

Problems & opportunities	Issues
<b>Related to institutional assets</b>	
Lack of community participation	<ul style="list-style-type: none"> <li>▪ Stakeholders do not participate in problem identification</li> <li>▪ Organisations identify problems, results not communicated to community</li> <li>▪ Stakeholders not involved in planning and in M&amp;E</li> <li>▪ Active participation of people can help in solving problems (TRM in Khulna-Jessore)</li> <li>▪ Motivation is important</li> <li>▪ Overall development plan encourages people to participate</li> <li>▪ Training is needed</li> </ul>
No effort to tap traditional knowledge	<ul style="list-style-type: none"> <li>▪ Learning from community is key to sustainable development</li> <li>▪ Need to recognise that traditional knowledge exists and important</li> <li>▪ Use traditional knowledge to make development plans</li> </ul>
Interference at local level affecting implementation	<ul style="list-style-type: none"> <li>▪ Interference of local level politicians and elites in the field level implementation</li> </ul>
Deteriorating law & order situation	<ul style="list-style-type: none"> <li>▪ Improved law &amp; order precondition for development</li> <li>▪ Threats livelihood security</li> <li>▪ Illegal resource harvesting connected to law &amp; order</li> </ul>
Lack of co-ordination	<ul style="list-style-type: none"> <li>▪ Serious information gap exists, prevents co-ordination</li> <li>▪ Objectives of certain activity contradict others</li> <li>▪ Strong networking needed</li> <li>▪ Integrating organisations is a difficult task</li> <li>▪ Require strong command to over-ride conflict demand and specific interest</li> <li>▪ Integration at operational level needed</li> </ul>
Basis of planning faulty	<ul style="list-style-type: none"> <li>▪ Sectoral plans emphasizes one sector at the expense of others (shrimp over agriculture)</li> <li>▪ Area basis planning needed</li> <li>▪ In an area, harmonies activities of all departments</li> <li>▪ Information (database) important for planning</li> </ul>
Uncertain role of NGOs	<ul style="list-style-type: none"> <li>▪ NGOs are taking many diverse roles</li> <li>▪ Advocacy role is important</li> <li>▪ More active role of women NGOs needed</li> <li>▪ Donors support to NGOs not coordinated</li> <li>▪ There is overlapping in support to NGOs</li> <li>▪ Lack of transparency of certain NGOs</li> <li>▪ Wide gap in GO-NGO collaboration</li> <li>▪ Positive attitude of high officials needed</li> </ul>
Difficult role of media	<ul style="list-style-type: none"> <li>▪ Unavailability of information</li> <li>▪ Journalists threatened for objective reporting</li> <li>▪ Journalists also abuse media power</li> <li>▪ Media can take more positive role</li> </ul>
Legal problems	<ul style="list-style-type: none"> <li>▪ Enforcement problem</li> <li>▪ Regulators are often different organisation</li> <li>▪ Regulations are necessary for conservation and management</li> <li>▪ Regulations without measures of rehabilitation not effective (Banning of shrimp fry collection)</li> <li>▪ NGOs can take rehabilitation programmes</li> </ul>
Stronger co-operation among regional countries	<ul style="list-style-type: none"> <li>▪ Need for co-operation</li> <li>▪ Exchange of information on water pollution</li> </ul>

**Table 3: Summary of issues related to vulnerability context and exogenous agents**

<b>Vulnerability context</b>	
Unprecedented flood of 2000	<ul style="list-style-type: none"> <li>▪ Water carrying capacity of rivers</li> <li>▪ Unplanned shrimp cultivation</li> </ul>
Vulnerability to cyclones & storm surges	<ul style="list-style-type: none"> <li>▪ The area is subject to high tidal variation, monsoon flooding and tropical cyclones</li> <li>▪ Three cyclones caused death of 500,000 people</li> <li>▪ Sundarbans protect the coastal region from the effects of cyclones and tidal surges</li> </ul>
<b>Exogenous agents</b>	
Climate change/sea level rise	<ul style="list-style-type: none"> <li>▪ No systematic research</li> <li>▪ Community understanding needed (CARE initiative)</li> </ul>



### 3 DESCRIPTION OF WORKSHOP STATEMENTS

#### 3.1 Natural resources

##### **Fish resources**

There are 450 rivers in the coastal region. In Khulna region, there are about 200 species of fish and shrimps, of which 53 are fresh water varieties and 124 brackish/saline varieties. There are 24 species of shrimps in the region. The total annual catch from the estuarine rivers of this region amounts to about 7000 tons. (Khulna Workshop).

Marine fisheries include both industrial and artisanal fisheries. Around 95% of the marine fish productions are contributed by the artisanal sector (Chittagong Workshop).

In 2000-2001 the number of trawlers in the Chittagong region inventoried was 100 of which 55 were for shrimp and 45 for fish (Chittagong Workshop).

In the Patuakhali region 475 species of marine fish are observed. Some other coastal resources are - shrimp, fishermen in the coastal area, riverine and coastal area, Bay of Bengal, canals and ponds (Patuakhali Workshop).

Bangladesh exported 30,000 metric tons of frozen shrimps and fish during the last year, which represented only 1.9% of the total imports of the consuming countries. Out of the 30,000 tons, 2000 MT originated from the sea, 21,000 MT were cultivated in brackish water and 7000 MT were freshwater varieties (Khulna Workshop).

##### **Shrimp farming**

Shrimp culture activities had started in the districts of Satkhira, Khulna and Bagerhat since 1960s within the Water Board's polders. The polders were constructed to protect the agricultural lands from the incursion of saline water. Rise of the demand of Brackishwater Shrimp (Bagda; *P. monodon*) in the international market has had stimulated the interest of its culture. Presently its culture has taken a massive horizontal expansion and engulfed the entire coastal part of the country especially in the adjoining areas of Sundarbans (Khulna Workshop).

Shrimp is cultivated in 1,40,000 hectares of land. Out of the 124 processing plants in Bangladesh, only 61 are running. Even out of those 61 plants, only 39 are running well. The plants are remaining idle because of insufficient raw material. Though the combined processing capacity of the 124 plants is 2 lakh Mt, they are able to process only 30,000 Mt. 1.2 million people are directly or indirectly involved in the shrimp industry (Khulna Workshop).

With the introduction of coastal shrimp aquaculture and deep-sea fishery trawlers in the country, shrimp catches have been steadily increasing during the last 15 years (Khulna Workshop).

In the saline water shrimp cultivation is possible especially in Kalapara and Galachipa (Patuakhali Workshop).

Though import of prawn fingerlings was strictly prohibited yet it was imported & introduced into our water body. Consequently virus spread and this sector is facing a huge economic loss. Loss in shrimp farming will be a loss to both regional and national economy (Chittagong Workshop).

When shrimp fries/fingerlings were imported & introduced, eventually virus spread and shrimp business was declined due to mortality. (Chittagong Workshop).

The implication of shrimp culture in the pattern of land use changes, socio-economy and environment in 10 thanas viz., Shyamnagar, Debhata, Kaligonj, Paikgacha, Botiaghata, Dacope, Rampal, Fakirhat, Mongla and Kalapara were investigated. The conditions with respect to various socio-economic and environmental parameters were looked into at three time periods viz., 1975, 1985 and 1999. The conditions prevailed during 75 were considered as the representative of the situations of that time and as shrimp culture progressed since then, comparison for the conditions of different parameters were made with those of 1985 and 1999. The investigation showed that shrimp culture has broad negative implications on the socio-economy and environment of the areas as a whole. The results have been discussed in the light of available information and empirical ideas in the sector (Khulna Workshop).

### **Over-exploitation of fisheries, making fishers poorer**

For sustainable development of the Marine fisheries, a need for control and conservation is needed. The coastal water of Bangladesh has been over fished. There is practically no control on the fishing effort. The fishing effort is increasing day by day and the catches are decreasing. The impact of the phenomenon is being felt, as the fishermen are increasingly moving downward below the poverty line. If this excessive fishing pressure is not decreased, we may see a complete depletion of the stock in near future (Chittagong Workshop).

### **Pond culture – low cost, part of homestead**

The people are not conscious of the potential of the ponds and are dependent on the captured fishes. So the production is much less (the rate is 2 kg per decimal) in this region. But the trend is changing. The average pond size is 10 decimal and contribution to the livelihood is only 3%. Low cost technologies are being developed to raise the production up to 12 kg per decimal. Different stakeholders are trained on the fisheries culture (Patuakhali Workshop).

### **Ponds & waterbodies**

Every 2 out of 5 families have ponds in Patuakhali – Barguna region. The number totaled 235 thousand and the area 9000 acres. But many of them are small. There are also many closed river arms where fish production can be increased. In those ponds along fish culture, livestock specially duck culture can be done. In the rainy season most of the land is flooded. Fish culture can be done by managing this water. If fresh water is stored in the canals, this can be used for rabi crop cultivation (Patuakhali Workshop).

Khas water areas in the Patuakhali – Barguna region of around 600 hectares have been identified from where fish can be extracted and the production will be 2000 ton. These figures are for only 5 thanas. If 12 thanas are considered then the estimate will be tripled. The semi closed khash water bodies will be closed after construction of sluice gates (Patuakhali Workshop).

### **Shutki production & processing – training needed**

Shutki is produced also in Kuakata and Ashar char of Taltali. But the production techniques are not hygienic. Some people come from Chittagong and give loan to the local people. Then they buy it. Thus the local people are benefiting (Patuakhali Workshop).

Fish captured in the Patuakhali area can be processed into Shutki. But local people are not aware of it and they do not have any training on it (Patuakhali Workshop).

### **Culturing turtles can be lucrative**

In the neighboring Indian State of West Bengal, turtles are being cultivated, and the practice can be replicated in Bangladesh. Instead of depending on the depleting natural sources, cultured turtles could be exported, and can also have a lucrative market (Khulna Workshop).

**Salt farming**

Salt sector is one of the vital factors in the coastal areas. So promotional efforts of salt industry should be taken up in terms of giving loan, facilitating marketing and ensuring production of white (refined) salt where a minimum investment would be required (Chittagong Workshop).

**Salt farming & ecological problem**

Along the coastal plains of the Moheskhali Island, the rapidly growing salt farming are engulfing the traditional agricultural lands, creating a number of ecological problems (Chittagong Workshop)

**Conservation of topsoil important**

The soil and water of the coastal region is the real resource. It takes ages to create the topsoil, but if the soil quality is destroyed by the use of chemical fertilizers, it will again take years to repair the damage. Whatever development strategy we use, it must be such as will do least damage to the ecosystem of the region (Khulna Workshop).

**Preserve indigenous varieties**

By the introduction of HYV rice, many indigenous varieties have become extinct. There is need for conserving indigenous varieties for the sake of bio-diversity (Khulna Workshop).

**Soil & water salinity limit agricultural production**

Due to late harvesting of T. Aman crops, many rabi crops are not growing well. Soil and water salinity are limiting factors for extension of Rabi crops (Patuakhali Workshop).

Water is a huge resource in the coastal region. But due to salinity problem this cannot be utilized properly in Patuakhali / Barguna. During winter when water is needed for irrigation the river and canal water (especially in Lalua, Andharmanik, Tetulia) starts to become saline. So winter crops cannot be grown properly and cropping intensity cannot be increased (Patuakhali Workshop).

**Water-logging & salt-water intrusion limit agricultural production**

Agricultural production in many polders is low due to water logging and salt-water intrusion. Faulty or missing wafer management structures force people to make their own cuts in the embankments, which create dangerous weak spots in the embankments (Noakhali Workshop).

**Livestock**

Duck farming has huge potential in the Patuakhali region if feed can be provided. Breed of livestock can be improved by importing types from foreign countries (Patuakhali Workshop).

**Bathan (system of livestock rearing) declining**

Rakhals and bathans are declining in the Patuakhali region (Patuakhali Workshop)

**Accretion of lands, new opportunities**

The coastal lands of Bangladesh are being formed by the rivers, which criss-cross them bringing sediment from further inland, and by various marine, estuary and coastal processes, which continuously shift, sort and modify the sediments. New alluvial land is continuously formed in the process. Immediately, it becomes home to many (Noakhali Workshop).

**Khas lands should be used for productive purposes**

Lakhs of acres of khas land were lying unused, as well as the numerous newly formed islands of the coast, all of which can be counted as resources, and which could be used for productive purposes (Khulna Workshop)



Khas land can be utilized by govt. proclamation, for a variety of development efforts like plantation, elevating grazing land, erecting embankment and raising plantation on it, protection of sea resources & mangrove plants which would contribute in boosting up national economy and providing employment to the people (Chittagong Workshop).

### **Sustainability of the land**

Shrimp cultivation and water-logging have damaged the sustainability of the land (Khulna Workshop).

By means of the Tidal River Management (TRM) concept, the people had demonstrated in Beel Dakatia in 1990 that the water-logging issue could be solved by the deposition of tide-borne silt (Khulna Workshop).

### **Continuously altered landuse – dangerous for sustainable environment**

Due to rapid population growth and scarcity of land based resources, the coastal regions have now been taken as new areas of resource exploration and development activities. As consequence, the landuse pattern along this belt is now continuously being altered, some of which are dangerous for sustainable environment and bio-diversity conservation (Chittagong Workshop).

### **Coastal landscape provides diverse opportunities**

The coastal belt is the zone of land-ocean interface extending from the limit of regular tidal effect to the outer edge of the continental shelves. This belt is characterized as the ground with full of organic and inorganic resources. The coastal belt of Bangladesh can be delineated by its unique geomorphic features, river networks and coastal dynamics. This typical coastal ecosystem of the country is the place of harmonic coexistence and breeding ground of tropical diverged flora and fauna species. The inner shelf water-mass of Bangladesh is rich in marine fishes, zoo-and phyto-plankton and other non-living resources. Due to rapid population growth and scarcity of land based resources, the coastal regions have now been taken as new areas of resource exploration and development activities. (Chittagong Workshop).

### **Sunderbans**

The Sunderbans contributed about 45% of the revenue earning of the Forest Department. The deterioration of the forest has been caused by mismanagement by the Forest Department, warning that this degradation of the Sunderbans will also affect other resources, such as fish and other aquatic species, which depend on huge quantities of forest debris, which decomposes in the water to produce nutritious food for aquatic animals. The instance of the Chakoria Sunderbans on the Chittagong coast, which has been totally denuded as a result of shrimp cultivation (Khulna Workshop).

The coastal region of Khulna is one of the best breeding and feeding grounds in the world for innumerable varieties of aquatic fauna. This is because of the considerable amount of debris from the Sundarban Forest, which decomposed in the water to become excellent organic food for fish and other marine life (Khulna Workshop).

### **Sunderbans at risk due to oil and gas exploration activities**

A production sharing agreement (PSA) has been signed between Shell and Petrobangla, granting the former the right to explore and develop oil-gas resources in Block Nos. 5 and 10. Though the Sundarban Reserve Forest and much of its Impact zone fall within Block 5, there is considerable confusion in the public mind as to the environmental and socio-economic impacts of exploration activities (Khulna Workshop).

The use of dynamite for exploration for Oil and Gas exploration in Block 5 may cause land depression (Khulna Workshop).

**Mangrove forests**

In Patuakhali-Barguna region, 60 thousand acres mangrove plantation, 21 thousand acres natural mangrove forest, 22 hundred acres strip plantation along roads, feeder roads, 5 hundred acres non mangrove foreshore plantations are present. The standing value of the resources would be 2 thousand crore taka (Patuakhali Workshop).

**Mangrove ecosystem at Chokoria destroyed**

The vast deltaic landmass at the mouth of the Matamohori rive was once covered with dense mangrove forest, called the Chakoria Sundarban. Due to rapid expansion of shrimp farming in last two decades, this valuable natural habitat is lost forever, with the outburst of a series of social and environmental complexities (Chittagong Workshop).

**Need for forest management research**

Conduction of Forest management research for developing a sustainable plantation management plan which would ensure protection of life & property, show the benefit of coastal forestry (Chittagong Workshop).

**Inefficient methods destroying habitats of honeybees, threatens livelihood of mawalis**

Sundarbans is a valuable resource for the production of honey, but the honey and beeswax collectors destroying the habitat of honeybees by their crude and inefficient methods of collection (Khulna Workshop).

The bee keepers are earning profits of up to one lakh taka per annum from their apiaries (Khulna Workshop).

**Need of freshwater to maintain balanced ecosystem**

The top-dying of 45 million Sundari trees in the Sundarban is an enormous loss to the country. The imbalance of fresh water and saline water may be the main cause. The Gorai River Rehabilitation Project and the proposed Ganges Barrage may restore the water balance in the region and help the Sundarbans to become healthier (Khulna Workshop).

**Concern over polluted water, awareness program needed**

300 registered/unregistered pesticides are causing pollution; 25% of these are being deposited on river or seabed. An area of 30sq.km of water area is affected. DDT, as high as 12 times, are being applied during dry fish processing. Asbestos is being dismantled in open fields at ship breaking yards (Chittagong Workshop).

The cement industries established at Mongla are polluting the environment, and the workers in the factories are facing health problems. (Khulna Workshop).

Since this is a potential source of resource, measures are to be taken to demarcate polluted and non-polluted zone for the sake of development of resources (Chittagong Workshop).

Different sources of pollution like pesticide, industrial effluents, ship breaking disposals etc. and suggested that awareness program might be launched for necessary mitigation and improvement of the situations (Chittagong Workshop).

**Minerals and heavy metals in sandy beaches: exploration is essential**

The sands of Cox's Bazar contain many rare minerals. Exploration should be started immediately (Khulna Workshop).

**Conservation of coral (St. Martins island) reef**

The coral reefs of St. Martin's Island are also potential resource. But the reef is in the early stages of formation and needs to be protected from the poachers who illegally collect coral, thus damaging a resource of great potential. This coral reef must be protected and conserved (Khulna Workshop).

**Natural energy sources – window for new opportunities**

In the coastal belt solar energy can be used for around eight months. Grameen Soura Shakti, a sister concern of Grameen Bank has proved that it is possible in the Patuakhali / Barguna region (Patuakhali Workshop).

The wind of the coastal areas could be harnessed to produce electricity. The tides can also be used for that purpose. With new energy sources, new economic opportunities can be created (Khulna Workshop).

### 3.2 Technical/physical resources

**More cyclone shelters needed**

Another part of the inadequate protection system is an inadequate number of cyclone shelters and a poor communication and transportation system in the polder areas (Noakhali Workshop).

**Inadequate protection from tidal surges and cyclones**

Embankment crest levels typically provide protection from 7 to 12 year storm surge return period only (2% wave overtopping level). Also cuts in the embankment system may let storm surge and tidal waves enter the polder. The funds available do not permit construction of clearly higher embankments (Noakhali Workshop).

The National Water Policy 1999 aims at protection of coastal lands from tidal flooding and cyclone surges. Effective works are yet to be done. (Noakhali Workshop).

**Polders are no more that effective**

The main problems that the coastal polder system is facing are insufficient protection against cyclones, sub-optimal agricultural production due to missing or faulty water control structures and fast deterioration of the embankment system due to erosion and lack of maintenance. The institutional capacity of the implementation and operation and maintenance organizations is also low resulting in sub-optimal use of available resources, poor maintenance and low quality of implementation (Noakhali Workshop).

**Embankments are eroding, foreshore mangrove plantations destroyed**

Erosion of the foreshore and the embankment system is a continuous problem. The embankments are facing erosion caused by cyclone surges and related waves, monsoon waves and rains, river currents and human and animal activities (Noakhali Workshop).

One typical reason for erosion is destruction of the foreshore mangrove forests that has resulted in increasing beach erosion and erosion of the embankments. Second basic erosion case is that many embankments were constituted at beach, so that embankment toes lay below normal high tidal water levels, and the funds did not allow provision for hard protection for the embankment. Many of the existing hard protections, which were constructed, have also failed due to imperfect design or low quality of construction (Noakhali Workshop).

**Re-excavation of canals & rivers needed**

The embankments were constructed mainly in the Pakistan period for flood and saline water protection. Scope of agriculture facilities was not considered. If the canals and rivers in the polder

areas are re-excavated to supply irrigation water, then these will also become a resource (Patuakhali Workshop).

### **Rivers contribute to regional economy**

Rivers of the coastal region enable cheap transportation in addition to producing wealth in the form of fish and other aquatic products (Khulna Workshop)

### **Shrimp hatcheries**

We have excess number of hatcheries, so price of fry are often so competitive that commercial production of fry is not lucrative business (Chittagong Workshop).

There was no local hatchery in the Patuakhali region. Seeds are brought from Khulna region. So survival rate was low. Private entrepreneurs are encouraged to develop hatcheries. (Patuakhali Workshop).

### **Scientific methods can release lands from shrimp farming**

The production of cultivated shrimps per hectare is only 250 kg which is far below the international average. Scientific methods to cultivate shrimps to increase per hectare production to 1000 or 1200 kg, while reducing the area, thus releasing land for food production. This will also reduce environmental degradation (Khulna Workshop).

That technology is available to enhance per hectare production of shrimp in Bangladesh. As brackish water shrimp cultivation damages the environment, reduce the area while enhancing rate productivity by technological means (Khulna Workshop).

### **Salt-tolerant varieties needed**

As there are salinity problem in this region so salt tolerant varieties should be developed through screening, research and innovation. Low cost involving easy management technologies should be developed (Patuakhali Workshop).

### **Coconut cultivation can be expanded**

Shrimps and brackish water fish can be reared in saline water, and coconuts can be cultivated on saline soil (Khulna Workshop).

### **Routine research findings not applicable**

In fact 70-80% of the research findings of BARI is not applicable in the coastal zone. Homestead vegetation, livestock, fishery are other target areas. Soil fertility management and water management through salinity management are other aspects of research (Patuakhali Workshop).

### **Duck rearing, opportunity in saline environment**

Salinity and water-logging have put an end to agricultural activities in the region. But even a saline environment could be productively utilised by rearing ducks and cultivating salinity-tolerant varieties of rice. Production of 6 tons per hectare has been achieved with BRRI 41 variety of rice (Khulna Workshop).

### **Ports & harbour**

The Mongla port is losing navigability for want of dredging. Intermittent dredging will not be enough; constant dredging is needed to maintain the channel. All ports have dredgers, but Mongla does not have one. This affects income of the port and trade in the region (Khulna Workshop).

### **Tourism**

Tourists' places in the Patuakhali region - like Kuakata and Hiron Point of Patharghata can be developed further. This will boost regional economy (Patuakhali Workshop).

### **Technology affecting employment**

The conversion to container system in marine transportation have negatively affected the job security of 6000 dock labourers at Mongla port. (Khulna Workshop).

## **3.3 Human resources**

### **Ensuring safety of the fishers**

There is a proposal to increase the height of the light- house present at Kuakata so that it is visible from far. Deep sea going boats should have provision of light source on the boat. Moreover, owners of the trawlers do not keep the life saving equipments in the boats. Marine Mercantile Department has some responsibilities to check these during licensing. Strict supervision can ensure safety of the fisher (Patuakhali Workshop).

### **Reluctance to adopt new technologies**

Farmers' attitude towards modern technologies is not so positive due to some reasons. Farmers generally do not accept cost involving, labor—consuming but high production technologies. (Patuakhali Workshop).

### **Women in livelihood activities**

Poor men and women can be involved in fish culture in the khash waterbodies (Patuakhali Workshop)

Many women are making handicrafts, katha, pati. But they do not get any recognition (Patuakhali Workshop).

Only women should be involved in fish and duck culture and in homestead gardening (Patuakhali Workshop)

The inhabitants of the coastal region of Khulna are involved in a number of traditional livelihood activities. Males spend long periods of time within the Sundarbans. The women and children of their families collect shrimp fry from the rivers. They have their own sorrows and difficulties. We need to think about them, because they are the skilled manpower of the region (Khulna Workshop).

## **3.4 Financial & economic resources**

### **Sustainability, not foreign exchange should be the main concern**

Earning foreign exchange should not be our main concern, but sustainability of the land and the livelihoods of the people should be the main concerns. The use of containers has reduced job opportunities for dock labourers. (Khulna Workshop).

### **Migration due to limited livelihood opportunities**

67% of the total people are migrating towards the big cities area from coastal districts. The main professions of the people living in the coastal zone are fishermen and peasants. But they cannot live there for various reasons like erosion, poor economic conditions. One thing must be remembered that the coastal zone has plenty of resources. But due to lack of proper management, the resources are depleting day by day. There may be other reasons of people's migration (Chittagong Workshop).

### **Less jobs encouraging migration from the region**

The main cause of migration of people from this area to other is joblessness (Patuakhali Workshop).

**Shrimp farming offers employment opportunity to women**

In the Coastal belt, a large numbers of women are employed in shrimp related activities particularly fry collection and gher labour. They make three meals in a day that was never seen 15 years ago. There have been positive socio-economic changes for majority of the peoples over the last couple of years. Income level, standard of living, food security have reportedly improved. People, mainly the women strongly resent over the banning of the fry collection because they will become unemployed (Khulna Workshop).

About 2 lakhs shrimp fry collectors catch about 47 crores of shrimp fry annually (Khulna Workshop).

**Meley or Ciperus marsh grasses wiped out, affected livelihood of thousands**

In the Khulna region, shrimp cultivation had driven away, among other things, a species of marsh grass known as Meley or Ciperus, the flower stalks of which are used to weave mats. As a result, thousands of women who used to weave mats as part time occupation were deprived of that source of income. Recently, Uttaran (an NGO) has arranged for cultivation of this Meley marsh grass, which resulted in higher profits, while at the same time provided raw material for the women mat weavers. (Khulna Workshop).

**3.5 Institutional assets****Organisations identify problems, not stakeholders**

The constraints of the present activities are that the problems are not identified by the stakeholders themselves. Organizations identify the problems on behalf of them. Stakeholders are involved at the implementation level, but not in planning, monitoring and evaluation phases of the projects. Even they are sometimes not informed about the results (Patuakhali Workshop).

**Participation of fisherfolk for sustainable management**

The socio-economic development of fisherfolk is also necessary. For this, there is a need to motivate them to take part in participatory for sustainability of fisheries resources and environment. They have to be provided with training on craft and gear efficiency, post harvest fisheries technology, marketing systems, monetary management, other income generating options etc. in order to increase their incomes. All aspects of human development indices should be upgraded in order to achieve the socio-economic development of the fisherfolk. A comprehensive approach incorporating all the sector involved in fisherfolk development such as health, education, sanitation, settlement is needed for the overall development of fisherfolk. A project with external assistance is needed in this respect (Chittagong Workshop).

**Active participation of people can only solve problems**

Without the active participation of people, issues of river management and water-logging cannot be solved. (Khulna Workshop).

**Learning from community**

Learning from community and peoples' accessibility to resources are the keys (Chittagong Workshop).

**Community participation can help tap traditional knowledge**

The traditional knowledge of the people is an important resource. Participation of community is essential to exploit traditional knowledge in development (Khulna Workshop).

**Interference at local level affecting implementation**

The main development challenge is the interference of local level politicians and elites in the field level implementation of national programs. Though policy makers are preparing the programs in an unbiased way it becomes difficult to implement in the field (Patuakhali Workshop).

**Improved law and order – a precondition for development**

Establishment of law and order should be the first activity for any development initiative. He lamented the fast increasing illegal arms in the region, and crimes of hijacking, holding for ransom, snatching, toll collection, women and child trafficking etc. prevalent in the region. The recent instances of death of tiger of old age and poaching of tigers. If such things continue, we will have no more tigers to protect (Khulna Workshop).

Law and orders is the precondition for development. There is no law and order in this region. The pirates and robbers have made the Sundarban a safe haven for themselves. There is no security of life and property for those who earn their livelihood in the Sundarbans. It is also said that the Sundarban is also a safe place for secret training of fundamentalist terrorist cadres. All these terrorists and pirates are protected by a handful of powerful people in the city. The excessive extraction of forest resources is due to the demands of these terrorists (Khulna Workshop).

**Lack of coordination among different organizations**

There is a serious lack of coordination, as well as information gap, among various project agencies working in the region. It is also true that some components of certain projects are contradictory to those of some others. The NGOs working in the region are generally implementing their own projects according to their own perceptions. But there is a serious lack of an integrated and comprehensive outlook in them. (Khulna Workshop).

**Establishment & strengthening of networking**

There is total lack of integration of the developmental efforts in the coastal areas. Will require establishment of strong network activities (Chittagong Workshop).

**Integration requires strong command**

Integrating organization is a difficult task. Will requires strong command to over-ride the interest and conflicting demand of different ministries (Khulna Workshop).

**Integration at operational level**

Bottom up integration of planning for ensuring real developmental process is necessary. For example, Government prohibited the use of behundi net, push net for some obvious reasons but did not make arrangements for alternative job opportunities. The problem remained. In the same way, ship breaking is emerging as an expanding industrial activity along the coast. This is creating migration of fishers, poor working conditions, etc. So operational aspects of integration should be emphasized (Chittagong Workshop).

**Integrating livelihood activities**

Livelihood activities like agriculture, forestry, shrimp cultivation, fishing and cattle and poultry rearing should be integrated (Khulna Workshop).

**Area based plan needed**

In Satkhira, many agricultural lands have been converted into shrimp farms. There is no harmony among different departments. Area based development activities are needed (Patuakhali Workshop).

**Institutional co-ordination is necessary for fisheries management**

Many more boats catch fish than the capacity. Judicial exploitation and scientific management is necessary. So all fishing boats are trying to be brought under the licensing scheme. Coordination is necessary with Coast Guard, Navy, NGOs and other departments in this respect. Natural fish stock is depleting due to overexploitation (Patuakhali Workshop)..

**Establishment of marine fisheries database needed**

The information collected by the different organization and the Marine Fisheries Office are scattered. There is a need to compile and document all the information regarding Marine Fisheries in order to provided the much needed information in policy formulation. A modern fully equipped information system should have to be developed in this connection (Chittagong Workshop).

**Advocacy role of NGOs**

There have been many remarkable initiatives by the peoples' organizations, local, national and international NGOs, the government agencies and academicians, to understand the issues confronting this region and to devise appropriate solutions for them. Various advocacy campaigns of NGOs in this region have attracted national and international attention, such as on KJDRP, on Shrimp Cultivation, on Sundarban Bio-diversity, on Oil and Gas Exploration, etc (Khulna Workshop).

**More role for women NGOs**

Women and women NGOs are usually not preferred due to corruption among the officers. NGOs working for the women should be preferred in development initiatives (Patuakhali Workshop).

**Donor support to NGOs**

Some other problems are – overlapping tendency of the NGOs and donors, lack of coordination, implementation of the key concepts of the donors without considering the demand of the local people, lack of transparency and good governance in the NGOs (Patuakhali Workshop).

**Gaps in GO-NGO collaboration**

There also exists a wide gap in GO-NGO collaboration. The matter of integration should prevail in both govt. & non-govt. initiatives in social forestry to manage cyclone & tidal bore, production of salt, cultivation of multiple crop and control of coastal pollution(Khulna Workshop).

There is no accepted system or norm in the department to coordinate with the NGOs working in the agriculture field. Some sort of forum of those NGOs should be established to coordinate with the DAE. Thus harmonization will be possible (Patuakhali Workshop).

The development challenges in these respects include lack of motivation of local people, influence of local elite persons and lack of cooperation from different government organizations. Positive attitudes of the high officials of the government organizations towards NGOs are required (Patuakhali Workshop).

**Media has a role in development**

The main problem during working is the unavailability of information in different organizations and insecurity of the journalists. Journalists were threatened several times due to published news relating to discrepancies of different activities. There are also divisions among the journalists. Many people abuse their designation. If all these problems are solved, then the journalists will be able to help the development initiatives much more effectively. There is lack of integration among different organizations working at the field level. Integration is necessary (Patuakhali Workshop).



### **Regulatory mechanism needed to contain marine fisheries**

Fishing effort control is only possible through the containment of fishing activities. All the fishing in the marine fisheries sector must come under the management initiatives of the Marine Fisheries Wing. In this context the registration and licensing of all fishing boats (mechanized/non mechanized), the provision of identity cards for the fisherfolks and the mandatory provision of supplying catch statistics by the fishing vessel will help to achieve a great step to conserve and regulate the marine fisheries resources. (Chittagong Workshop).

### **Regulation without rehabilitation will not be effective**

In the present situation, the fisherfolk are greatly outnumbered and the implementation of fisheries regulation would have a negative social effect on the fisherfoiks as their fishing activities have to be reduced substantially in order to implement an effective management and conservation regime. This work in not possible if there is no rehabilitation scheme under place (Chittagong Workshop).

Laws are not sufficient to retard the trend of over-exploitation as alternative income opportunities could not be provided. NGOs can play a big role in providing income opportunities to the local people especially during the jatka catching period. Training to the fishers should be provided on scientific preservation techniques and fishing laws. Some infrastructures like cold storage should be built (Patuakhali Workshop).

### **Co-operation among regional countries**

There is a need of collaboration & integration of GO & NGOs of India & Bangladesh as water pollution in water often results from upstream India (Chittagong Workshop).

## **3.6 Vulnerability context**

### **Flooding in south-west, not experienced before**

The flood that devastated the entire southwestern border region in 2000, where floods have never been seen for more than half a century. Unplanned shrimp cultivation and unplanned development had restricted the navigability and water carrying capacity of the rivers (Khulna Workshop).

### **Cyclones & storm surges claim lives**

The area is subject to high tidal variation, monsoon flooding and tropical cyclones, the larger of which tend to damage infrastructure and cause heavy loss of life. Three of them (1970, 1974 and 1991) had storm surge height 8m or over. As a consequence about 500 000 people have lost their lives (Noakhali Workshop).

### **Mangroves save lives**

25000 acre mangrove forest of Chakaria has been totally converted into shrimp farms during 1985-95 period. Areas, 20 km north from Badar Khali, were covered with forest before 70s. No dead body was found there during earlier cyclones. But after 1991 and 94's cyclones, dead bodies were found. It was mainly due to the absence of mangrove forests in that area. The cyclone casualty in the Chakaria in 1970 was 500 and it rose to 10,000 in 1991 (Patuakhali Workshop).

The role played by the is also important. 1.7% of the world's cyclonic storms occur in the Bay of Bengal, out of which 10% hits the mainland of Bangladesh. The force of the storms and their accompanying tidal bores are minimized by the Sundarbans. Without this buffer, human and material loss would have been enormous (Khulna Workshop).

### 3.7 Exogenous agents

#### **Sea level change, systematic research needed**

Sea Level Changes in Bangladesh is now being considered as one of the most potential natural hazard as derived from the greenhouse and global warming components and would inundate most of the coastal districts of the country, if it happens as prediction. But unfortunately, except the IPCC global sea level rise scenerios, no systematic research on this coastal issue has yet been undertaken in Bangladesh (Chittagong Workshop).

#### **New initiative to make community understand climate change**

CARE is going to implement a long-term project to address the effects of Climate change. Temperature rise, rise in sea level, climatic excesses such as storms, cyclones etc. will be more frequent and intense than ever before. He stated that the objectives of the project is to “Reduce the vulnerability to Environmental changes caused by Climate Change”. CARE will not directly implement the project, but will implement the project through partner NGOs (Khulna Workshop).



## ANNEX: LIST OF PARTICIPANTS

Projects/programs	Name of participant & position	
<b>Noakhali Workshop</b>		
Char Development & Settlement Project - II	Mr. Md. Aman Ullah, Executive Engineer Mr. S. M. Ataur Rahman, Sub-Divisional Engineer Mr. Md. Mazharul Islam Talukder, Asstt. Engineer	Mr. M. A. Sekendar, Deputy Team Leader Mr. M. A. Latif, Socio-Economic Advisor Mr. Mahfuzur Rahman, Data Monitoring Engineer
SDC/LGED & DANIDA/LGED Noakhali Rural Infrastructure Development & Maintenance Project	Mr. Md. Abdul Quader, Executive Engineer, Noakhali Mr. M. N. Alam, Executive Engineer, Laxmipur Mr. M. Anisur Rahman, Asstt. Engineer, Noakhali	Mr. Md. Moslah Uddin, Asstt. Engineer, Noakhali Mr. M. A. Latif, Team Leader Mr. Md. Zafrul Quddus, Training Specialist
Coastal Embankment Rehabilitation Project - II	Mr. Syed Ahmed, Superintending Engineer	Mr. Md. Ahasan Ullah, Executive Engineer
Greater Noakhali Aquaculture Extension Project (GNAEP)	Mr. Wahidun Nabi Chowdhury, Project Director Mr. Md. Abdul Kaiyum, Assistant Director	Mr. Abul Hossain Mr. Masud Rana
DPHE-DANIDA Water Supply & Sanitation Components	Mr. A.Y. M. Imtiazul Haque, Deputy Team Leader	Mr. Anisur Rahman Sarkar, Senior Engineer
Agricultural Programme, Mennonite Central Committee (MCC)	Mr. Derek A. U. D'Silva, Administrator Ms. Nadene Sawyer, Horticulturist Ms. Shinjita Alam, Programme Co-ordinator	Ms. Tandra Barua, Programme Co-ordinator Mr. Joel Ward, Livestock Research Assistant Mr. M.H.M. Mostafa Rahman, Fisheries Technical Officer
Poverty Alleviation Programme in Greater Noakhali (ASA)	Mr. A.B.M. Asaduzzaman, Project Chief Mr. Anowar Hossain	Mr. Biswajit Saha Ms. Rehana Ferdousi
BRAC-CDSP	Mr. Md. Younus Miah, Project Liaison Officer Mr. Radheshaym Sutradhar, Sector Specialist (Agriculture)	Mr. Md. Moniruzzaman, Regional Co-ordinator, BRAC-BDD, Noakhali
<b>Khulna Workshop</b>		
Department of Fisheries	Mr. S.M. Nazrul Islam, FSO	Mr. Md. Rokibuddin Biswas Asst. Director
Department of Agriculture Extension	Mr. B.M.S. Alam, Deputy Director	Mr. Golam Azam Chowdhury Agriculture Engineer
Forest Department	Mr. A.K.M. Ruhul Amin Head of Division Extension & Education Unit / SBCP	Mr. Md. Belayet Hossain SBCP Forest Department
Jagrata Juba Shangah (JJS)	Mr. ATM Zakir Hossain Mr. Abdul Malek, Area Manager	Mr. Ratan Kumar Das, A P O

Projects/programs	Name of participant & position	
Coastal Development Partnership (CDP)	Mr. Asraful Alam Tutu, Coordinator Mr. Kazi Zaved Khalid Mr. Mizanur Rahman Mr. Marina Juthi Mr. Anwar Firoze	Mr. W. Zaman Tito Mr. Md. Saeedur Rahman Mr. S.Z. Sarwar Ahmed Mr. Kamrul Hassan
Shushilan	Mr. Mostafa Aktheruzzaman	
CARE	Mr. Najir Ahmed Khan Asst. Project Coordinator Md. Abdur Razzaque Technical Officer	Mr. Mukul K. Biswas Asst. Project Officer Mr. Jainal Abedin Project Development Officer
Uttaran	Mr. Mahtab Uddin, Coordinator	
Prodipaon	Mr. Mujibur Rahman, Coordinator	
Proshika	Mr. Abdus Sobhan, Area Co-ordinator	
CCCCE	Mr. Firoz Ahmed	
PPS	Mr. Abdus Sabur, Co-ordinator	Mr. Md. Shafiur Rahman
The Daily Prabantton	Mr. Shahedul Huq, Reporter	Mr. A. Gaffar, Photo Journalist
Daily Purbanchal	Mr. Md. Alamgir	Mr. M.A.Hassan, Photo Journalist
Daynik Anirban	Mr. Harun Ur Rashid	
Bangladesh Observer	Mr. Rahul Raha	
The Daily Janakantha	Mr. Gouranga	
Daily Bhorer Kagoj	Mr. S.M. Habib	
The Daily Janmobhumi	Mr. Debrato Roy, Photo Journalist	
Jugantor & Pathokar Kagoj	Mr. Zahedul Islam, Photo Journalist	
The Daily Tathya	Mr. A. Malek, Photo Journalist	
Daily Sangabad	Mr. Manik Shah	
Environmental Science Discipline, Khulna University	Mr. Mollah Md. Safique Rahman	Dr. Dilip K. Datta
URP Discipline, Khulna University	Dr. Md. Gulam Murtaza	
Forestry & Wood Tech. Discipline, Khulna University	Prof. M A Rahman	
FMRT Discipline, Khulna University	Dr. M.S. Shah, Professor	Dr. S.K. Shah Mr. Jafaet Manik
Bangladesh Frozen Food Exporters Association	Mr. S. Humayun Kabir Director, Anan Sea Food Ind. Ltd.	
Khulna Chamber of Commerce & Industry	Mr. Kazi Jalaluddin Asst. Vice President	
Khulna Development Authority	Ms. Syeda Lila Nargis	
<b>Chittagong Workshop</b>		
Dept. of Environment	Mr. Md. Ismail	Mr. A. K. M. Rafiqul Islam

Projects/programs	Name of participant & position	
Bangladesh Small & Cottage Industries Corporation (BSCIC)	Mr. Abdul Matin Deputy General Manager	
Bangladesh Forest Research Institute (BFRI)	Dr. Neaz Ahmed Siddique Divisional Officer	Mr. Md. Abu Shahid Khan
Forest School	Mr. Zahid Hasan	
Institute of Marine Science, Chittagong University	Dr. Yusuf Sharif Ahmed Khan, Professor Professor Dr. Nani Gopal	Dr. Nuruddin Mahmud Professor
Dept. of Geography, Chittagong University	Dr. Shahidul Islam Professor	
Strengthening of Coastal Marine Fisheries Management (Dept. of Fisheries)	Mr. Md. Iqbal Haroon	
Coastal Embankment Rehabilitation Project (CERP)	Mr. Someswar Das , Mangrove Specialist	
Community Development Centre (CODEC)	Dr.Khursid Alam Executive Director	Mr. S. M. Giasuddin
COFCON	Mr. Mahbulul Hassan Chief Coordinator	Mr. M. K. Almamun Assistant Program Officer
United Development Initiative for Program Action (UDDIPAN)	Mr. A. Khaleque	Mr. Md. Taslim Uddin
Dwip Unnayan Shangstha (DUS)	Mr. Atul K Majumder	
Integrated Social Development Effort (ISDE)	Mr. Nazer Hossain, Director	Mr. Nurul Hossain Program Manager
GHASHFUL	Ms. Shamsun Nahar Paran Executive Director	Ms. Shipra Barua
Society for Health & Development (SHED)	Mr. Chandam Das	
COSED	Mr. Md. Shahadat Hossen Executive Director	Mr. S. M. A. Jabber Director (Research)
Daily Star	Mr. Ataul Gani Suman, Journalist	
Dainik Purbokon	Mr. Rupam Chakrabarti, Journalist	
Bangla Bazar Patrika	Mr. Kashem Mahmud, Journalist	
Ctg. Port Authority	Capt. A. Islam Ctg. Port Authority Chittagong Phone: 723721	

Projects/programs	Name of participant & position	
<b>Patuakhali Workshop</b>		
LGED	Mr. Md. Khalilur Rahman, XEN	Mr. Jyotirmay Mohante Assistant Engineer
Forest Department	Mr. Abdur Rahman Assistant Conservator of Forest	
Department of Fishery	Mr. Tazul Islam Semiabat Fisheries Survey Officer	
Department of Agriculture Extension	Mr. Md. Fazlul Hoque Deputy Director	Mr. A. Z. M. Momtazul Karim U.A.O. Patuakhali Sadar
Bangladesh Agriculture Research Institute (BARI)	Mr. Shikder Rafiquzzaman Principal Scientific Officer	
Bangladesh Agricultural Development Corporation (BADC)	Mr. Abdus Sobhan Deputy Director	
DPHE – DANIDA Water Supply and Sanitation Component	Mr. A. N. M. Mizanur Rahman Resident Engineer	Ms. Fazilatun Nessa Socio-economic Advisor
Strengthening of Coastal Marine Fisheries Project	Mr. Bankim Chandra Biswas Assistant Director	Mr. Sanjay Kumar Mohanto Marine Fisheries Officer
Rural Development Project - 16	Ms. Bimal Chakraborty Senior Socio-economic Advisor	
Patuakhali Barguna Aquaculture Extension Project	Mr. Erik H. J. Keus Training and Extension Advisor Danida Mr. Nityananda Bala Fisheries Program Coordinator	Mr. Mostafa Anwar Pasha Assistant Director
Danida Smallholder Livestock Development Project 2	Mr. Md. Rafiqul Islam Area Coordination Officer	
Coastal NGO Forum	Mr. A. H. Mansur Chair Person	
Patuakhali Mahila Unnayan Samity (PMUS)	Ms. Monwara Hakim Chair Person	
CODEC	Mr. Badiul Alam Khan Manager Disaster Management Program	
Mass-Line Media Centre	Mr. Mir Shahidul Alam Media Centre Chief	
Proshika MUK	Mr. Md. Ali Ahad, Zonal Coordinator	
ASA	Mr. Selim Reza Regional Manager	
Dhaka Ahsania Mission	Ms. N. R. Musfika Laiju District Coordinator	
Southern Socio Economic Development Program (SSDP)	Mr. Md. Habibur Rahman Executive Director	
ADAB	Mr. Sabbir Ahmed, Trainer	
Press Club	Mr. Md. Zakir Hossain Secretary	

