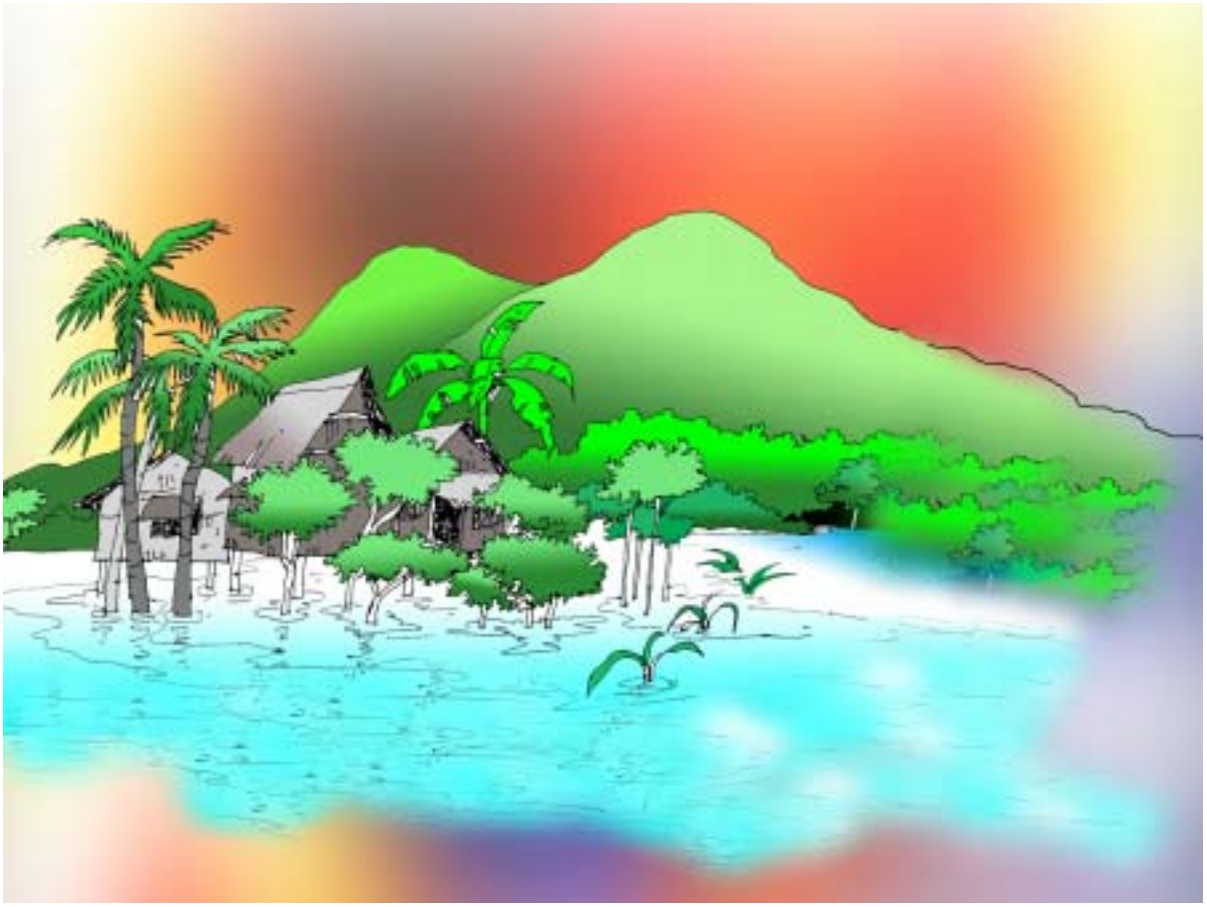
The Southwest Area Integrated Water Resources Planning and Management Project

"The people are very unhappy at the present situation and want solutions to their problems by rehabilitation schemes implementation…"



* The full version of the research by Md Sarwar Hosain and Kh. Azizulh Haque Moni of Ulashi Sreejony Sangha (USS), Jessore, Bangladesh is available at http://www.forum-adb.org.

The Ulashi Sreejony Sangha believes that the EIA process for this water resourcemanagement project in Bangladesh could be enhanced by tailoring adaptation assistance to local needs in order to address pressing local vulnerabilities on the basis of participatory climate change impact assessment methodologies.

Integrated water resources management is highly relevant in adapting to climate change. The conservation of catchment areas, improvement of water management system (esp. irrigation), and flood control are types of anticipatory adaptation.[1] But this is not apparent in the case of the ADB-financed Southwest Area Integrated Water Resources Planning and Management Project (SWAIWRPMP) in the flood-prone country of Bangladesh.

Project Description

On 23 November 2005, the application of Bangladesh for a $20-million loan (to partly finance the Southwest Area Integrated Water Resources Planning and Management Project) got a nod from ADB. As reported in the Summary EIA (July 2005): "The Project aims to rehabilitate and upgrade the existing flood control and drainage/irrigation (FCD/I) schemes in the southwest region of Bangladesh, so as to achieve their maximum development potentials in terms of agricultural and fishery production and incomes of beneficiaries in a sustainable manner." The Project—which will benefit about 0.8 million rural population, the majority of whom are poor—covers about 100,000 hectares (ha), particularly the Chenchuri Beel FCD/I Scheme and the Narail FCD/I Scheme.[2]

The major water management problems that this project will try to address include the following: (i) low reliability of flood protection because of degraded flood embankments, river erosion along the lower Nabaganga River, and leakage from regulators; (ii) overdrainage in higher lands; (iii) congested drainage in low-lying areas due to siltation in the drainage canals; (iv) shortage of irrigation water and occasional salinity intrusion from surrounding rivers in the dry season due to leakage through regulators or lack of them.

The two subprojects entail the following:

(i) Preparing integrated water management plans (IWMPs);
(ii) Delivering improved water management infrastructure and support services for agriculture and fishery development and piloting mitigation of arsenic contamination; and
(iii) Strengthening institutions to undertake sustainable operation and maintenance of these facilities.

Scope of the EIA

According to the Halcrow Group Ltd., UK (the firm that prepared the EIA), the EIA was made in accordance with the *Environmental Assessment Guidelines* of the Asian Development Bank (ADB, 2003) and ADB's *Guidelines for Selected Agricultural and Natural Resources Development Projects* (1991). It also took into consideration the guidelines prepared by the Government of Bangladesh: *Guidelines for Environmental Impact Assessment (EIA)* prepared by FPCO (1992), along with the *Manual for Environmental Impact Assessment* (ISPAN 1995) and the *Guidelines for Environmental Assessment of Flood Control, Drainage and Irrigation Projects* (WARPO, 2001). Following the "List of Contents" prescribed by ADB's *Environmental Assessment Guidelines*, the EIA report provided a description of the Project; the environmental setting covering the physical, biological and socio-economic environments; the project alternatives; anticipated environmental impacts and mitigation measures; economic assessment; the institutional requirements, the environmental monitoring program and the Environmental Management Plan; and overview of the involvement of the public in the assessment.

[1] See, for example, Cap-Net, *IWRM as a Tool for Adaptation to Climate Change: Training Manual and Facilitator's Guide*, July 2009. See also, GWP, *Climate Change Adaptation and Integrated Water Resources Management – An Overview*, Technical Committee Policy Brief 5, Global Water Partnership, 2007 and Roel Slootweg, *Integrated Water Resources Management and Strategic Environmental Assessment Joining Forces for Climate Proofing*, Perspectives on Water and Climate Change Adaptation No. 16, Co-operative Programme on Water and Climate (CPWC) and the Netherlands Commission for Environmental Assessment (MER), 2009.

[2] The Chenchuri Beel subproject provides flood protection for a total of 25,560 ha (net cultivated area of 17,900 ha) through 86 kilometers (km) of embankments. Meanwhile, the Narail subproject comprises two hydrological systems divided by the Gobra khal in the middle of the subproject area. It provides flood protection for 31,600 ha (net cultivated area of 23,440 ha) with 33 km of flood embankment along the right bank of the Chitra River in the southern system.

The need for the two subprojects were based on several appraisals[3] of these flood control and drainage infrastructure projects implemented during the early 1980s, whose findings indicated that "original project objectives (i.e., controlled flooding drainage and irrigation promoting extensive cultivation) were not met" and that facilities constructed were "not functioning well." The studies also concluded that there was a need for additional improvements in the current drainage systems that would require rehabilitation and new construction of facilities in order to enhance water utilization for agriculture and fisheries.

In general, the project EIA found minimal adverse environmental and social impacts which mitigation measures can easily address:

The EIA concluded that the successful implementation of the project "will serve as a model to demonstrate the process of achieving substantial under-achieved development potentials of existing flood control, drainage, and irrigation systems while sustaining their benefits through effective stakeholder participation."

Climate Risk Oversight

The project area consists of several beels (pond or wetland) and is surrounded by two big rivers—the Chitra and Nabaganga. Water availability determines the course of agriculture, fishery and other sources of livelihood. The effects of climate change, as well as the morphological changes, are severe in the project

Some Anticipated Adverse Impacts	
Physical environment	• Dust, noise and air pollution • Possible damage to local vegetation and topsoil • Degraded soil quality due to improper use of fertilizers and pesticides • Depletion of organic material and nutrient content in the soil • Possible increased salinity • Siltation may occur and hamper the functioning of structures • Erosion is already taking place and further erosion attacks may occur in the future • There may be some water pollution from the construction site
Biological environment	• Minor to medium disturbance to the aquatic environment, with detrimental effect on capture fisheries • Moderate, overall negative impact on fish habitats and fish migration
Human and economic development	• A few enterprises will have to be relocated to make land availablefor new embankments and khals. • The two subprojects together will involve acquisition of 56.4 ha of land for construction of project infrastructures. • This will affect 546 households, out of which 149 would requirerelocation due to acquisition of their homesteads. • 132 residential/commercial structures will be affected. • Reduction in capture fisheries is considered to have a medium negative impact. • The implementation of arsenic mitigation will create minor disturbances.
Quality of life values	• There is a risk that the opportunities for improved water management is captured by a small number of interested groups and operating facilities for the sake of their own benefits alone, affecting the livelihoods of the excluded stakeholders.

Source: ADB, 2005

[3] Environmental Impact Assessment (Chenchuri Beel and Narail Subproject) prepared by Halcrow Group Ltd., UK for the Asian Development Bank, June 2005.

SHRIMP CULTIVATION IN THE BEEL AREA. According to the community, the full implementation of the project could accelerate the cultivation of shrimp as it has been experienced in Khulna-Jessore Drainage Rehabilitation Project (KJDRP).
Photo taken by Md. Sarwar Hossain/USS Jessore Bangladesh.

area, as can be gleaned from climate change evidence and impact assessment acquired through community surveys, focus group discussions and case studies conducted in several Narail subproject villages.[4] A review of the National Adaptation Programme of Action (NAPA) and other studies also points to this fact. However, the subprojects offer the usual structural solutions designed for complementing high external input agriculture and aquaculture development that studies prove may be highly inappropriate for the project area, especially as it has been established as one of the most drought-prone areas in Bangladesh.

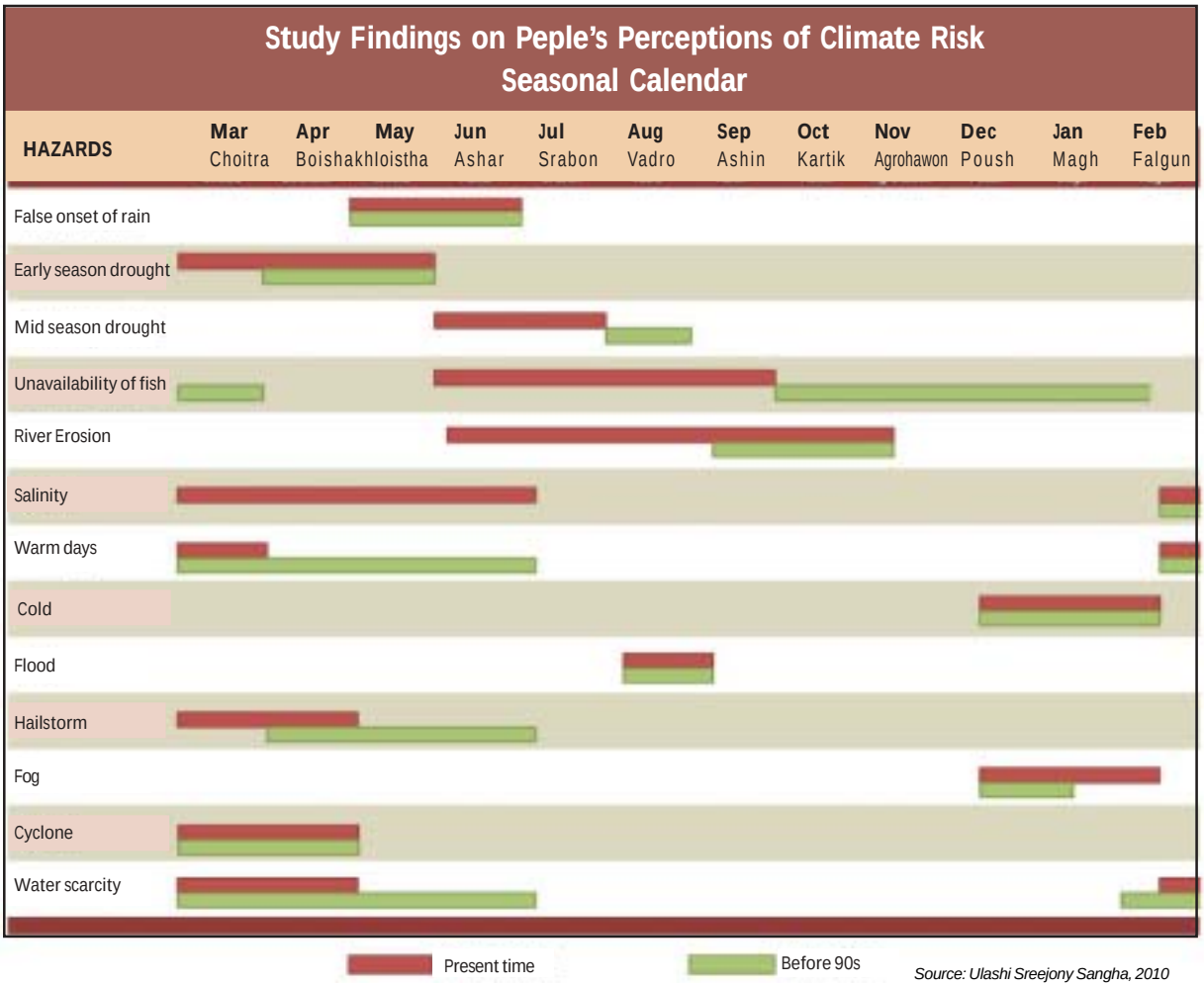
The problem matrix prepared by the communities suggests that climatic factors such as rainfall, erratic temperature, drought, salinity, and river erosion are affecting livelihoods. The causal loop diagrams, problem matrix, seasonal calendar and case studies developed by the communities suggest that climate change might have triggered the changes in livelihood patterns in the region through the influence of the hydrometeorological events. For instance, the chart 'Trends of Livelihood' constructed by the communities pointed out that agriculture and direct nature-based sources of livelihoods are declining over time while new kinds of jobs, most of which were absent in the past, like "stationary shop" and "day labor" are increasing. This indicates that natural productivity is falling sharply, responding to the environmental changes that are occurring in the region.

Erratic rainfall, drought and the extended summer, and salinity have increased the production costs. Crops production now is heavily dependent on foreign seeds, fertilizers and "artificial" water sources. There may be some pockets of improvements in productivity but, generally, sources of livelihood are degrading and climate change, whether directly or indirectly, has induced more poverty.

The seasonal calendar at the next page reveals that rising temperatures, more than any other risk, is the most substantial hazard currently affecting subproject communities. Temperature has been observed to rise during all seasons, but now especially beginning March, and even during the winter season. Early season and mid-season drought comes as consequences of rising temperature. Before the 1990s, early to mid-season drought occured from March to May and August. At present, rising temperatures have extended the periods of drought from March to August. Salinity, which is a rare occurence during the 90s, is now felt for extensive periods, and is also very much correlated with rising temperatures and drought. Rising temperatures also emerged as the topmost concern from the other tools used to determine community perception of climate risks, such as the problem matrix and causal loop. Such changes have spelled disaster for agriculture and fish production.

PROTECTING NATURAL WETLANDS. Infrastructure projects could alter this type of natural wetland.
Photo taken by Md. Sarwar Hossain/USS Jessore Bangladesh.

[4] These are in areas where the ADB and Bangladesh Water Development Board conducted a rapid project appraisal in 2008, specifically in the villages of Noagram, Kolamon Khali, Sulto gram, Mulia, Singa and Chchuri.



Source: Ulashi Sreejony Sangha, 2010

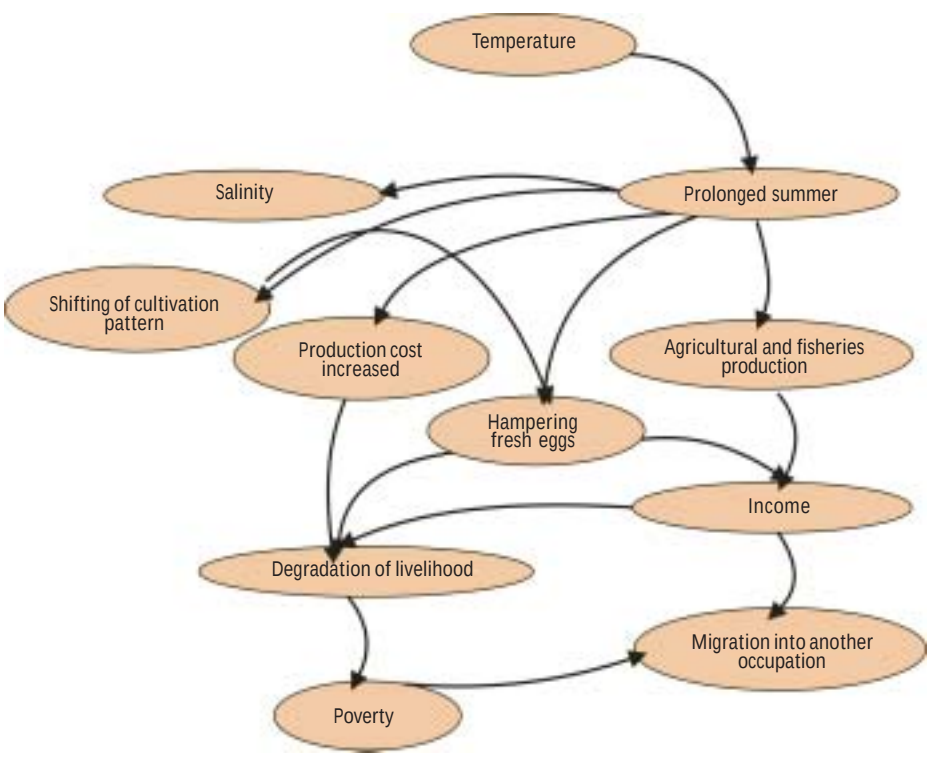
The seasonal calendar of livelihood activities, livelihood trends and adaptation practices shown at the next page reveal that crop cultivation of boro and aman has not changed but farmers reported that their production costs rose due to their utilization of water-dependent foreign seeds, fertilizers and pesticides, while crop yield was reduced by almost 50 percent as a result of the severity of drought and salinity. Fishing activities are now substantially reduced compared to the 90s, as fishermen revealed that salinity and water scarcity affected fish breeding grounds, damaging fish eggs. People are also leaving their traditional occupation to engage in other forms of livelihood. Overall, the trends show less dependence on paddy farming, fishing, and cattle raising and more shifts to day labor, as people engage in small business, stationary shops, rickshaw pulling and other alternative means of living.

DYING BIODIVERSITY. The adverse effect of rising salinity on biodiversity.
Photo taken by Md. Sarwar Hossain/USS Jessore Bangladesh.

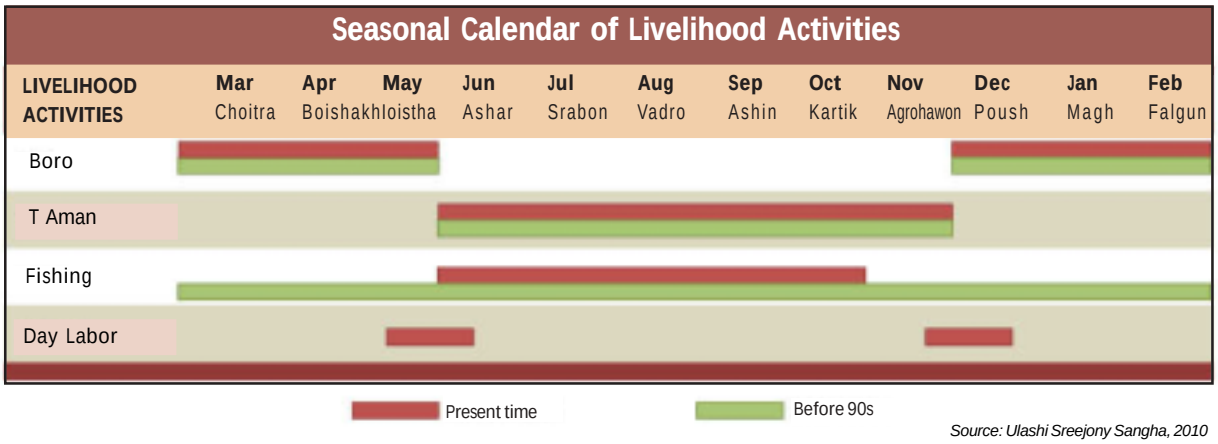
Problem Matrix				
Sl no	**Problem**	**intensity x frequency**	**Score**	**Rank**
1.	Rainfall	4 x2	8	4
2.	Drought	5 x3	15	2
3.	Lack of fish	4 x2	8	4
4.	Fog	2 x2	4	5
5.	Salinity	4 x2	8	4
6.	**Temperature**	**5 x5**	**25**	**1**
7.	Hail Storm	2 x2	4	5
8.	Flood	0	0	
9.	Cyclone	1 x1	1	7
10.	Riverbank erosion	1 x2	2	6
11.	Lack of irrigation water	4 x3	12	3
12.	Drinking water	0	0	

Score = $\sum$ *intensity*$_i$ x *frequency*$_i$ / N*i* = 1, 2, 3,... N *Source: Ulashi Sreejony Sangha, 2010*

Causal Loop Diagram



Source: Ulashi Sreejony Sangha, 2010



Source: Ulashi Sreejony Sangha, 2010

Source of livelihood trends (i)

Source of livelihoods	Time land Mark After 2000	Time land Mark 90s	Time land Mark Ershad Era
Paddy	+++	++++	+++++
Fish	+++	++++	++++
Gardening	+	+++	
Cattle	+++	++++	++++
Tree Product	++	+++	+++
Van/ Rickshaw Pullar	++++	++	
Stationary Shop	+++	+	+
Labor	+++	+	+
Small Business	++++	++	++

Source: Ulashi Sreejony Sangha, 2010

Trends in livelihood activities (ii)

Livelihood activity	In Past	Present	Future
Household maid	Rare	Common	Increased
Paddy husking	Common	Increased	Decreased
Boiling paddy	Common	Increased	Decreased
Labor	Rare	Increased	Increased
Rickshaw Puller	Common	Increased	Increased
Agriculture	Common	Increased	Decreased
Fishery	Common	Decreased	Decreased
Shrimp Cultivation	Rare	Increased	Increased

Source: Ulashi Sreejony Sangha, 2010

Adaptation Practice			
Current Risk	**Current Trend**	**Anticipated Impact**	**Adaptation Practice**
Salinity	Increasing	▪ Reduced agricultural and fish production; damaged fish eggs	
Erratic Rainfall	Increasing	▪ Decrease in agricultural production, specially hampering *aus* and *aman*, *til* and *jute* during the panicle and spikelet initiation time ▪ Upper land crops are dying for lack of water ▪ Production cost increased	▪ Cultivating hybrid instead of local variety ▪ Dependency on fertilizers and boring for irrigation
Temperature	Increasing	▪ Weather is getting warmer and seems to be intolerable ▪ Dependency on fertilizer and ground water instead of rain water, which used to nourish the soil naturally ▪ *Aus* production is becoming rare; farmers are struggling with other local crops varieties ▪ Salinity is increasing due to the warm weather; which makes the water evaporate more quickly	▪ Cultivating hybrid instead of local variety ▪ Dependency on fertilizer and boring for irrigation ▪ Local people used to install tube wells in 80-100 ft depth, but now the depth is 150-200 ft.
Salinity	Increasing	▪ Fish and eggs are dying ▪ Rice production is becoming difficult	▪ Shrimp cultivation
Flood	Decreasing	▪ Losing the fertility of soil for lack of sediment	▪ Dependent on fertilizer
Riverbank erosion	Decreasing		

Source: Ulashi Sreejony Sangha, 2010

Climate Change Assumptions in the EIA

It is clear that climate change was not considered or given due attention in the EIA, i.e., climate change assessment was not part of the project design; no clear adaptation linkages were presented. The National Adaptation Programme of Action (NAPA) of Bangladesh had already been published in 2005. The project inception report was submitted in 2007. It goes without saying, therefore, that climate change should have already been a major consideration even at the design phase of the project.

INTOLERABLE. Fish are dependent on this wetland biodiversity for breeding and feeding. Fish resources are now declining due to intolerable salinity level.
Photo taken by Md. Sarwar Hossain/USS Jessore Bangladesh.

An integrated hydrology/water management climate change impact assessment framework could have been useful to identify and evaluate possible and/or appropriate adaptation strategies. A community, demand-driven approach in determining area vulnerabilities and risks is also warranted. For instance, the communities have reported that they are not really experiencing flood in a way that entails huge infrastructural work. Flood shelters (a recommendation in the NAPA) would probably suffice but this has been totally ignored in the project discussion.

Clearly, the ADB has not learnt any lesson from the Khulna-Jessore Drainage Rehabilitation Project (KJDRP). In the KJDRP project area, flood, erosion and sedimentation are the common negative outcomes that show how the ADB's irresponsibility, lack of foresight and imagination have jeopardized "the sustainability of natural resources and endanger the livelihood of the millions of people who are dependent upon those resources."[5]

The ADB has failed to mainstream and link the climate change issue in the said development project, and to adequately consider the climate change implications of the proposed project, if any, through their EIA process.

Incorporating Climate Change Considerations in the Integrated Water Resources Planning and Management Project

In a developing country such as Bangladesh, where the development of the agriculture and the fisheries sector remains a paramount task, the issue of climate change should be given priority. Both the NAPA and the Poverty Reduction Strategy Paper (IMF Country Report No. 05/410, October 2005) have identified climate change as one of the important concerns for water resource management. It is not too late for the ADB to re-assess and re-tool itself concerning this matter.

In the project objectives, the enhancement of livelihood through agriculture and fishery development was specified as an important issue. The ADB, however, has failed to indicate whose development and what development it was carrying out. Credit, tree plantation, fisheries development and other non-structural agricultural support measures are included in the main approaches but these were not clearly articulated during the project conception. One of the recommendations in the NAPA is to conduct studies in order to understand local coping mechanisms in the face of drought; invention of drought-resistant, saline-tolerant crop; no-tillage cultivation approach; and flood shelter, among others. However, the ADB failed to tackle these aspects.

Despite the EIA's attempt to be comprehensive (as per the general guidelines), the EIA report falls short in further elucidating important topics such as ecology,

PUBLIC PARTICIPATION. The community calls for public participation in protecting and identifying erosion-prone areas.
Photo taken by Md. Sarwar Hossain/USS Jessore Bangladesh.

[5] **S. Jahangir Hasan Masum, "**Climate Fund Not to be Entrusted to IFIs: A Lesson from the ADB Experience in Bangladesh," 15 December 2008. Available at: http://www.forum-adb.org/inner.php?sec=4&id=52&b=1

problem, increased salinity and intrusion, change in the river morphology, and more importantly, climate change. These might have been mentioned in passing, but the impact of the project and the total environment on the socio-economic conditions and livelihood patterns in the community remains missing.

UNUSUALLY DRY. No water in chachuri beel even during the rainy season.
Photo taken by Md. Sarwar Hossain/USS Jessore Bangladesh.

THE COMMUNITY SPEAKS. The research team facilitates the Focus Group Discussion (FGD).
Photo taken by Md. Sarwar Hossain/USS Jessore Bangladesh.

Concluding Remarks

In spite of the potential adverse impact of climate change and the availability of various tools for investigating its dimensions, actual environment impact assessment with respect to water management has yet to fully integrate climate change analysis. For one, the integrated water resources management (IWRM) tool paves a good opening for adaptation to climate change. There is a wide latitude, therefore, to incorporate climate change assessments into the EIA process. For instance, water allocation mechanisms and flood/drought management (as part of IWRM) can be readily categorized in the universe of coping mechanisms with respect to climate variability.[6]

The EIA process for this particular ADB project could be enhanced by tailoring adaptation assistance to local needs in order to address pressing local vulnerabilities on the basis of robust climate change impact assessment methodologies. Needless to say, this also entails involving the affected stakeholders early on and giving them substantive participation in the planning and designing stages and meaningful participation in the local decision-making processes.

Efforts to develop guidelines and regulations to incorporate climate change impacts into the EIA process for projects in the water sector, for instance, are already on the way. In fact, "the Ministry of Environment of Spain considers EIA as an entry point to integrate adaptation to climate change across sectors since the Ministry can use its current legal mandate to do this" (Agrawala et al., August 2010).[7] In the case of Bangladesh, its National Water Management Plan Project (2005)[8] "recommends the inclusion of climate change considerations into the EIA process, in particular, in the development of baselines describing the environment," though "this document does not provide any further guidance on how to do this" (Agrawala et al., August 2010). In addition, Bangladesh's NAPA "recognizes that climate change issues are not adequately considered during the design of water resources structures" and that "the lack of proper assessment of climate change in designing and implementing structures make structural interventions more prone to climatic hazards." (Agrawala et al., August 2010).

[6] See Cap-Net, *IWRM as a Tool for Adaptation to Climate Change: Training Manual and Facilitator's Guide*, July 2009.
[7] Agrawala S., A. Matus Kramer, G. Prudent-Richard and M. Sainsbury, "Incorporating Climate Change Impacts and Adaptation in Environmental Impact Assessments: Opportunities and Challenges", *OECD Environmental Working Paper No. 24*, OECD Publishing, August 2010.
[8] Government of the People's Republic of Bangladesh, *National Water Management Plan Project: Guidelines for Environmental Assessment of Water Management (Flood Control, Drainage and Irrigation) Projects*, Ministry of Water Resources, 2005.