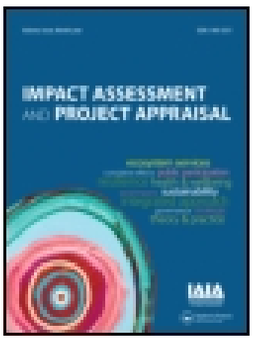

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Community values

The practice of social impact assessment in a developing country: the case of environmental and social impact assessment of Khulna–Jessore Drainage Rehabilitation Project in Bangladesh

Salim Momtaz

Environmental impact assessment (EIA) is a relatively new phenomenon in Bangladesh resource management. EIA received its legislative mandate in the passage of Environmental Conservation Act, 1995 (ECA '95). While investigation into socio-economic aspects of development has been a part of EIA since its inception, social impact assessment (SIA) never had any recognizable status in development planning. This paper examines a SIA conducted as a part of an EIA. It reveals that despite SIA's global status as a 'poor cousin' of EIA, it has been effectively incorporated into EIA. Community opinions and values collected through social assessment significantly influenced the final outcome of the process.

Key words: EIA; SIA; Bangladesh; drainage rehabilitation project

Salim Momtaz is a Lecturer in the School of Applied Sciences, Centre for Sustainable Use of Coasts and Catchments, University of Newcastle, Ourimbah, NSW 2258, Australia; E-mail: Salim.Momtaz@newcastle.edu.au. The author would like to thank Mr Mujibul Huq, Team Leader of this EIA/SIA, CEGIS, Dhaka, Bangladesh, for explaining various aspects of this study.

BANGLADESH HAD ITS FIRST EIA guidelines in 1992 for infrastructure development in the water sector (FAP, 1992). Despite weaknesses on the implementation side, EIA has become an integral part of project intervention (Momtaz, 2002).

First, this paper provides information on the evolution of environmental impact assessment/social impact assessment (EIA/SIA) in Bangladesh highlighting the context in which the SIA under review was conducted (CEGIS, 1998). Second, it introduces the proposed actions for which the EIA/SIA has been conducted and describes the geographical setting.

Third, the assessment methods used in impact identification and the potential social and economic impacts are explained. Finally, this paper concludes by revealing the SIA's role in the final decision about the project. It shows that given adequate financial and technical support, it is possible to conduct meaningful SIAs and incorporate proper community consultation and participation in the decision-making process in a developing country like Bangladesh.

Statutory foundation/institutional framework

Under the Environmental Conservation Act (ECA) '95 the Department of Environment (DOE) was established within the Ministry of Environment and Forest as the regulatory body responsible for

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enforcing the ECA '95 and the guidelines provided in the Environment Conservation Rules 1997 (ECR, '97) (BCAS, 1999). Although the proponents have the responsibility of conducting the EIA of development proposals, the responsibility to review EIAs for the purpose of issuing an Environment Clearance Certificate rests on the DOE (DOE, 1997).

There is no mention of SIA in any of the legal documents (ECA '95; ECR '97; DOE, 1997). Rather, the DOE's definition of the term 'environment' has been expanded to include human issues "the inter-relationship existing between physical properties of earth (water, air, soil) and living organisms (human beings, plants, micro-organisms)" (BCAS, 1999, page 39). DOE's *EIA Guidelines for Industries* is also inclusive as far as social issues are concerned. It explains "A comprehensive EIA … involves study of the probable changes in the physical and biological as well as socio-economic environment which may result from the proposed development activity or project …" (DOE, 1997, page 2).

One of the three major components in the checklist of environmental components is 'Human', under which are listed 'health and safety', 'social and economic' and 'aesthetic and cultural' components (DOE, 1997, page 68). Special emphasis on social issues can be found again in the section outlining various steps in EIA where public participation has been identified as an important ongoing activity in the assessment procedure: "Since the general public is the ultimate recipient of the economic benefits and environmental damages, an EIA study should involve the public as part of the decision-making process" (DOE, 1997, page 34).

In the Conservation Rules (ECR '97) human settlement has been declared as one of the 12 ecologically critical areas. This anthropocentric view of EIA indicates that assessments are carried out to minimize the effects of 'environmental damage' on humans. Thereby the significant importance of human factors of planned intervention is emphasized. As with developed countries, SIA originates from the definitions of environment in legislation and EIA guidelines (Cox *et al*, 2000).

Case study: Khulna–Jessore drainage

The Centre for Environmental and Geographic Information Services (CEGIS) is an agency under the Ministry of Water Resources, Government of Bangladesh, and was the first to develop EIA guidelines in 1992 for physical intervention in the water sector (FAP, 1992). In this section, I review a major environmental assessment conducted by CEGIS in 1998 that also included a SIA (CEGIS, 1998). Difficulties of conducting social assessment in developing countries are yet to be explored thoroughly. It is worth noting that this SIA is conducted in a socio-political setting where:

- SIA does not have a legislative mandate;
- socio-economic data, especially for rural areas, are not necessarily readily available or reliable;
- community participation and public inquiry practiced in western democracies are non-existent; and
- conducting SIA is a complicated resource-consuming exercise, the quality of which is often determined by the requirements of donor agencies.

Statement of proposed action

Siltation of waterways and subsequent continuous waterlogging in the Khulna–Jessore region (project area) has been a major environmental problem for the region and has received much attention lately. New areas go out of cultivation every year because of continuous sedimentation. Waterlogging is a major cause of deterioration in public health and damage to infrastructure, houses and plantations.

In the absence of measures to reduce sedimentation in riverbeds and establishment of a sustainable drainage system (which may be called 'the zero option'), the entire project area could become permanently waterlogged and unsuitable for human habitation. Some corrective measures during the past few years have brought respite to the people, but a long-term resolution to the drainage congestion problem was needed.

Four options were considered to resolve the problem:

- a major regulator at Shibnagar (SIB) to regulate inflow and outflow of tidal waters;
- a major regulator at Madhukhali (MAD);
- the Kedara Tidal Basin (KTB); and
- the Tidal River Management (TRM) (see Figure 1).

The objectives of the EIA/SIA under review were to evaluate the environmental and social consequences of the proposed interventions and recommend the option that would ensure an environmentally sustainable and socially viable solution to the drainage congestion problem. The EIA/SIA team consisted of 15 specialist members and received taka (tk) 5,131,000 or approximately US$1,20,000 (exchange rate in 1998 was US$1 = tk 44) to conduct the study.

According to CEGIS (1998) the four options for intervention represent two basically different approaches:

- In the KTB and TRM options tidal basins are implemented. These will generate tidal flows in the river system. Regulators are only used on a local scale, to control inflow and outflow of the beels (wetlands/ swamps) if desired. These tidal flows are expected to maintain the river cross sections as designed for drainage purposes.
- The two regulator options, MAD and SIB, represent major regulators in the south of the project area. These regulators have the capacity to create

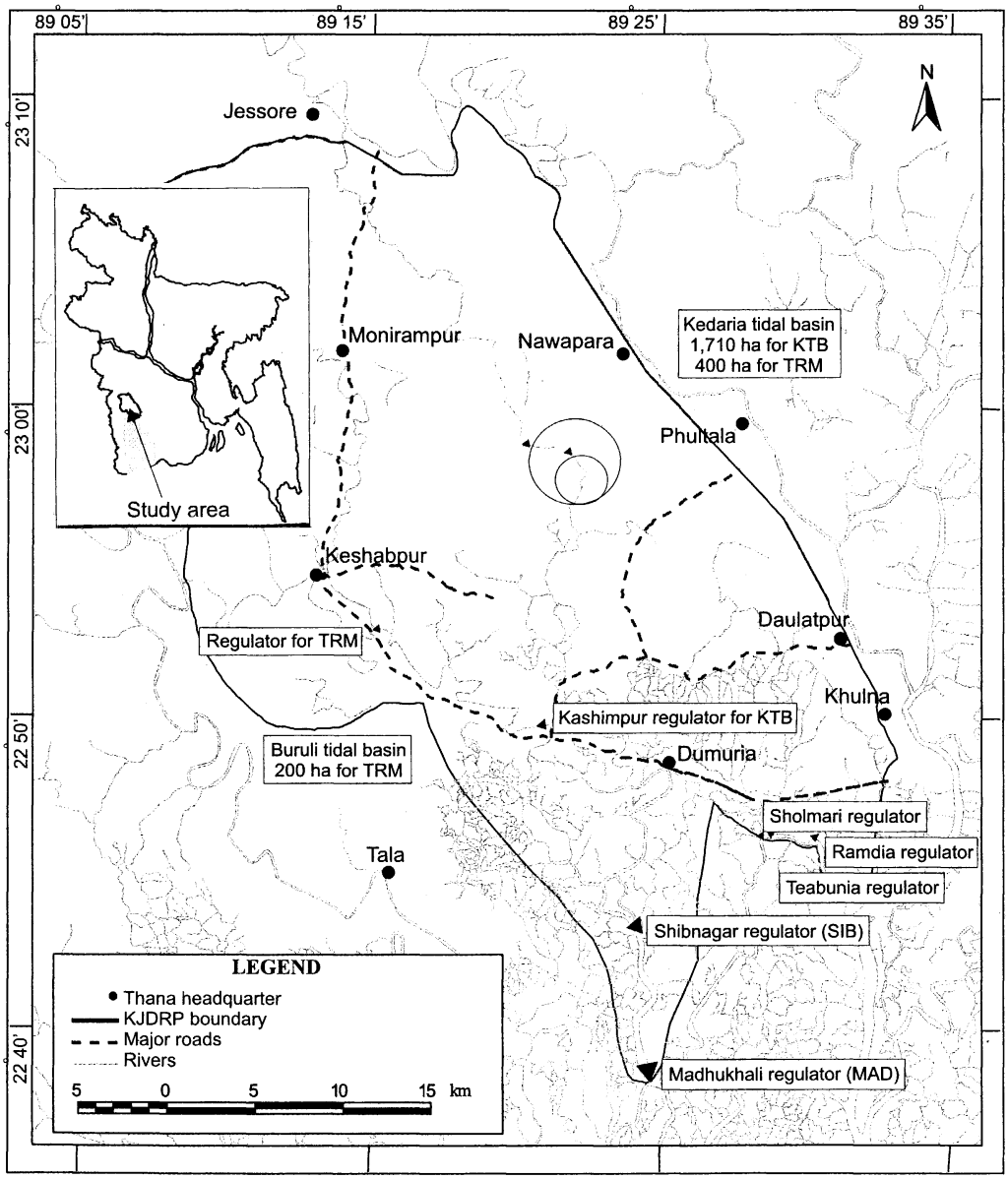

Figure 1. Map of the study area and the locations of the proposed project options
Source: Adapted from CEGIS (1998)

a more or less stagnant basin and prevent sediments and salinity from entering this area.

Geographical setting

The proposed drainage rehabilitation project is located in the southwestern part of Bangladesh and includes parts of both Khulna and Jessore districts (Figure 1). This region, characterized by dying rivers, is a part of a moribund delta created by siltation. The total project area is 127,800 hectares with an estimated population of 1.1 million in 1997 (CEGIS, 1998). The area in which intervention impacts are studied extends about 120 km to the south of the project area, toward the Bay of Bengal. This area includes the Sundarbans (mangrove forest in the south) which has recently been declared as a UNESCO (UN Educational, Scientific and Cultural Organization) world heritage site.

Rice is the major crop in the project area. Total annual paddy production inside the project area is 350,000 tons. Since 1994, the agricultural production of the area has been decreasing as a result of flooding. A total of 54,600 ha of floodplain and beels are available for open-water fisheries in the project area. Total production of open-water fish is estimated at 8,620 tons. Total pond area within the project is 2,898 ha, total pond production being 2,320 tons. Shrimp farming is an important income-earning activity in fresh water areas as well as in areas where salinity is relatively low. Currently, a 1,202 ha area is available for shrimp farming. Total shrimp production is 420 tons.

Since waterlogging has disrupted agricultural activities, many people have had to change their occupation from agriculture to various non-agricultural activities. The prominence of fishing as an occupation is on the increase. In certain areas, over 70% of

households have fishing as their main occupation. A decrease in the percentage of households (13%) in agricultural farming reflects a major shift from the traditional dependence on agriculture. Use of stagnant water has reportedly caused various health problems such as diarrhea, dysentery and skin disease. Percentages of households reporting an increase in incidence of these diseases are 88.7, 79.4 and 47.5 respectively (CEGIS, 1998).

The EIA/SIA team divided the study area into two parts — the project area and the external impact area — which are subdivided into zones and sub-zones. The project area is sub-divided into four hydrological zones. A critical zone has been defined, which consists of the most affected area.

Identification of key social impacts

The EIA/SIA team employed standardized procedural steps (well documented in Burdge, 1999; Gilpin, 1995; Thomas, 1998) to conduct this study with some modifications to suit local socio-economic conditions. A number of established methods of social research have been adopted to predict impacts and gather information at the scoping phase. These are as follows:

Rapid rural appraisal (RRA) RRA is a qualitative survey methodology using a multi-disciplinary team to formulate problems for agricultural research and development (Chambers, 1992). The multidisciplinary study team carried out a number of reconnaissance trips to the field and generated a significant amount of local-level information through RRA. This helped them to identify geographical areas that would require intensive field-level investigation and to finalize the set of indicators that could be used in the assessment.

A total of 60 locations were identified for data collection through RRA. The study paid special attention to gender-related issues at each location. These included homestead activities as well as participation in income-generating agricultural and fishing activities outside the homestead. Feedback was received from male as well as female inhabitants on gender participation in these activities, associated problems and prospects. Local women were also consulted with regard to their perception of the possible impacts of the proposed interventions.

Standardized procedural steps with modifications to suit local socio-economic conditions were used, and established methods of social research were adopted to predict impacts: rapid rural appraisal; community participation; and multi-criteria analysis

Community participation The EIA/SIA team conducted thorough community consultations. It is stated in the EIA/SIA that during the entire course of the study, care was taken to ensure maximum public participation in generating information relating to the various socio-economic and environmental criteria and indicators, and in determining their relative weights. One of the results of this public participation was the realization by the team that the general public had a different opinion from the regulator option of the feasibility studies: the public preferred the tidal basin option (KTB and TRM), which was later found to be the most viable.

Multi-criteria analysis (MCA): A MCA was conducted to assess environmental and social consequences of all options. The SIA/EIA study analyzed, in quantitative terms, paddy and fish production and their impacts on employment, income distribution and protein availability. Moreover, through field surveys, the perceptions of the local population in the project area were collected on expected impacts on socio-economic conditions. Figure 2 reveals the criteria and indicators.

Through these methods the EIA/SIA team identified that the proposed options would have varying degrees of positive impacts on such socio-economic factors as occupation, income, capture fisheries, homestead inundation, health, education, and women's activities.

Measuring and interpreting identified social impacts

The community social issues that need to be considered in SIAs are well documented in Burdge (1999), Vanclay (1999) and in the work on international social impact assessment guidelines currently being developed by the International Association for Impact Assessment (IAIA). The long list of social impact processes and actual impacts that is derived as a result reflects the authors' experiences in western societies.

There is as yet no such guidance for SIA practitioners in developing countries. This is probably one of the reasons why Burdge (2002) describes SIA as an orphan of the EIA process. Modak and Biswas (1999) identify SIA as an emerging development in EIA and list some social impact variables without actually looking separately into impact processes and actual impacts as conceptualized by Vanclay (1999; 2002). However, CEGIS followed the guidelines of the Asian Development Bank.

In a poor country like Bangladesh, economic issues are intertwined with social ones. This is more so in rural areas where social activities are centered around farming. No attempt was made in this

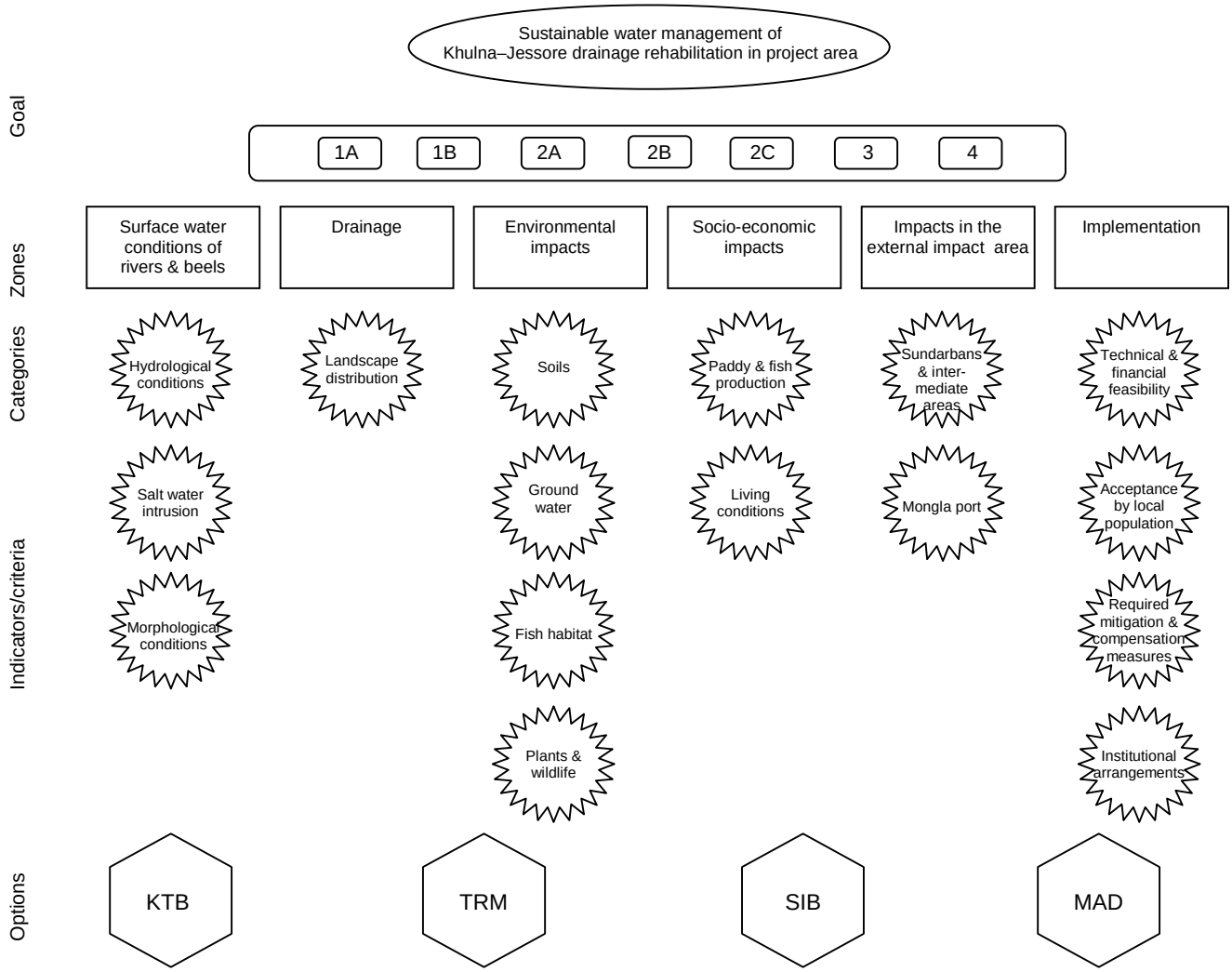

Figure 2. Multi-criteria analysis — hierarchy of criteria and indicators

EIA/SIA to separate social from economic impacts. Nor was there any attempt to follow a particular list of social impacts.

The study focused on socio-economic issues while identifying social impacts and looked into social issues from two broad perspectives. The first relates to production where both agriculture and fisheries figure prominently. It was realized that removal of the drainage constraint, which was the primary aim of the project, would lead to an increase in paddy and fish production. Therefore distribution of these products among the various categories of household was looked into with a view to understanding the impacts of the proposed action on

Table 1. Criteria and corresponding indicators signifying living conditions and their assessment

Criteria	Indicator	Assessment of high value
Occupation	Number of farming households as a proportion of wage-labor households	Desirable
Income	Household income of small landowners as a proportion of household income of large landowners	Desirable
Capture fisheries	Percentage of households who feel that capture fisheries resources will become more favorable	Desirable
Homestead inundation	Percentage of household running the risk of being inundated because of waterlogging	Undesirable
Health	Percentage of households affected by water-borne diseases	Undesirable
Education	Percentage of households sending their children to school	Desirable
Women's activities	Percentage of households whose women report possible improvement in homestead and other activities	Desirable

Source: CEGIS (1998)

poverty alleviation — an important indicator of positive social change in rural Bangladesh.

The second perspective relates to the living conditions of the general people within the project area. In defining the living conditions, the criteria used are those that the inhabitants of the project area suggested themselves. Table 1 presents an overview of the criteria and indicators used and their assessment in terms of desirability.

Occupational impact In the past, when the project area was experiencing the problem of waterlogging, farming was the principal occupation of the majority of households. Under the changing circumstances, people moved to other occupations. Therefore, occupational well-being has been taken as a criterion in determining living conditions.

The indicator used was the ratio of the number of farmer households to the number of wage-labor households. The higher the value of this ratio, the greater would be the well-being. This is for the obvious reason that because of the higher status of farming, rural households in the project area would prefer to have the occupation of farming over that of wage laborer. The data for occupational well-being show that the most favorable value emerges in the case of the tidal river-management option (TRM) (Table 2).

Impact on income (paddy and fish production) Another criterion used in assessing living conditions is income. Continuous waterlogging in the area has resulted in lower levels of income for many households. This indicator was selected with the objective of assessing the relative income of small landowners (up to 2 ha) compared to that of large landowners (over 3 ha) from paddy and fish production. Therefore, this indicator is the ratio of average income earned by a small landowner to that earned by a large landowner. Higher values of the ratio would indicate better relative income for the small landowners.

A detailed analysis of the cropped areas based on the land-type distribution for the different options and the cropping patterns for the different land types in the different zones helped estimate the incomes from paddy and fish production. The results show an increase in paddy production from the zero option to the tidal basin options. Data further reveal benefits of tk 415 million to tk 515 million (approximately US$9.5–12 million) per year from paddy production, and losses of tk 220–320 million (US$5–7.5 million) per year from fisheries, for tidal basin and regulator options, respectively. This results in a net benefit for all options of about tk 175–200 million (US$4–4.5 million) per year.

The EIA/SIA team was mindful that incremental profits from paddy would mainly go to the relatively land-rich farmers, whereas losses in open-water fisheries would be borne mainly by the land-poor households. This inequitable distribution of benefits was believed to create social problems in local communities. The team made a number of recommendations to enhance the benefits to the poorer households and minimize disproportionate distribution of benefits.

Homestead inundation It was a general belief among the majority of households that the level of inundation under the zero option was too debilitating for

Table 2. Values of living condition indicators for the different options in comparison with zero option

Indicator	Comparison with zero			
	Tidal basin		Regulator	
	KTB	TRM	SIB	MAD
No. of farming households as a proportion of wage-labor households. (value for option divided by value for zero option)	1.9	**2.4**	1.8	1.9
Household income of small landowners as a proportion of household income of large landowners (value for option divided by value for zero option)	**1.1**	**1.1**	1.0	1.0
Percentage of households who feel that capture fisheries resources will become more favorable	70	**75**	–70	–75
Percentage of household running the risk of being inundated due to water logging. (value for option minus value for zero option)	–11	–9	**–16**	**–16**
Percentage of households affected by waterborne diseases (value for option minus value for zero option)	–7	–7	–10	**–11**
Percentage of households sending their children to school (value for option minus value for zero option)	10	7	13	**15**
Percentage of households whose women report possible improvement in homestead and other activities	30	**35**	–30	–25

Note: Values in bold indicate the best option for each criterion
Source: Adapted from CEGIS (1998)

Table 3. Comparison of socio-economic impacts of the options against the present situation

Criteria and indicators	Tidal basin options	Regulator options
Paddy and fish production		
Total production	Paddy production greater and open-water fisheries reduced	Paddy production will be 5% higher than under the tidal options. However, reduction in open-water fisheries will neutralize this
Per capita protein intake	*Per capita* protein intake reduced	*Per capita* protein intake is even lower because of the greater decline in open-water fisheries resources
Living conditions		
Household income	Relation between income earned by small and large landowners will become more favorable	Relation between income earned by small and large landowners will not improve (because of reduced opportunity of earning extra income through open-water fisheries activities)
Homestead inundation	No inundation expected	No inundation expected
Health	Reduction of water-borne diseases; sanitation problem may not be completely solved if not enough dry land is available around homestead	Substantial reduction in water-borne diseases. Better sanitary conditions will also be expected under the relatively greater availability of dry land around homesteads. Shortage of water for cleaning and bathing purposes may pose some problems
Education	Improved access to educational institutions	Improved access to educational institutions
Homestead activities	Homestead activities expected to become easier	Possibility of local water-shortage

Source: CEGIS (1998)

domestic life and that a situation comprising lower inundation would allow them better access to fish resources. The SIA revealed that risk of household inundation would reduce for each of the options.

Health impact As a result of the continuous water-logged situation, many parts of the study area have encountered increased incidences of water-borne diseases such as diarrhea and dysentery. The indicator used here was the percentage of households affected by such diseases. The data reflect that the incidence of water-borne diseases is expected by the people to go down with the implementation of any of the options, since there would be less inundation.

Impact on education Residents reported that the water-logged situation has caused many households to restrict their children from going to school: this has been used as a criterion for assessing expected changes in living conditions. The indicator for education used in this context has been the percentage of households sending their children to school. This would increase for all of the options. The participants expressed their expectation that all options would provide them with easier access to educational institutions, since they would facilitate better road communication and transportation.

Impacts on women's activities The EIA/SIA team asked the respondents whether women's domestic (looking after children, kitchen gardening, livestock rearing, arranging food for family members) and outside activities (in the agricultural or fisheries sector) would improve as a result of the various interventions. The data show that KTB and TRM (tidal basin option) would result in an overall improvement, while SIB and MAD (regulator option) would worsen the situation.

Scores assigned to the indicators

Using field-level information generated by the study, scores were assigned to the different criteria along the zero option as well as the proposed options (Table 2). The basis of these data has been the information gathered on the indicators through RRA.

In terms of overall living conditions, there has been a general preference in the community for the tidal basin options.

Recommendations based on the SIA

Although some indicators for regulator options scored better than tidal basin options, considering all the factors together and values derived (Table 2), the study team came to the conclusion that the socio-economic impacts were likely to be more favorable for the tidal basin options than for the regulator options. The team recommended the tidal basin option as the one that offered resolution to the water-congestion problems as well as providing the potential for improvement in social and economic well-being of local residents.

The ultimate goal of the development project was to ensure a better living for the local people who had been suffering socially and economically for a long time as a result of perennial inundation caused by siltation of the local waterways

Thus, environmental and social considerations both support the tidal basin option. This option was also financially more viable and had wide community acceptance.

The comparison of options in terms of the socio-economic impacts is summarized in Table 3 where issues are addressed relating to paddy and fish production and to living conditions. It substantiates the decision in favor of the tidal basin options.

Discussion

The major objective of the interventions was to create sustainable water-management conditions. The EIA/SIA was intended to see how environmental consequences of the various options proposed would affect the local community and how the positive impacts might be enhanced and the negative effects avoided, minimized or mitigated. Thus, the ultimate goal of the development project was to ensure a better living for the local people who had been suffering socially and economically for a long time as a result of perennial inundation caused by siltation of the local waterways.

The main findings of this review are:

- despite SIA's poor status, the EIA/SIA team made a sincere effort to examine the likely consequences of various options employing a combination of established methods of social investigation;
- the affected community received adequate opportunity to participate in the SIA and made significant contributions towards the selection of the best option; and
- findings of this SIA influenced Government's final decision about the drainage rehabilitation project.

The Government and the donor agency — Asian Development Bank — accepted the recommendation to implement the tidal basin option in Beel Kedaria in the Khulna–Jessore Drainage Rehabilitation Project (KJDRP), which went into operation in 2002. A recent e-mail correspondence with Mujibul Huq (2002, 26 September), the Team Leader of this EIA/SIA project, reveals that the potential of the tidal basin option to improve the living conditions together with the community support for this option were the greatest influences on the donor's decision to go ahead with this option.

The importance of social factors is also reflected in the fact that, after the completion of EIA/SIA of KJDRP, the CEGIS was given the responsibility of preparing an environmental and social management plan for the region. Subsequently, the Bangladesh Water Development Board employed the Centre to carry out environmental, socio-economic and institutional monitoring of KJDRP.

CEGIS has been working closely with the nine zonal Water Management Associations in the preparation of an integrated water resources management (IWRM) plan. Each association has prepared a management plan for its zone. The Centre is now working with the Water Management Federation (of nine zonal associations) in the integration of these zonal plans into one IWRM plan for the Khulna–Jessore drainage project.

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