

Water-Poverty Nexus in Rural Bangladesh – A Case Study

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Abstract

This paper examines the water-poverty linkage in the context of rural Bangladesh through a case study on Yusufpur – a Union of Charghat Upazilla in Rajshahi. The community's socio-economic profile is weaker compared to the average profile for rural Bangladesh in terms of household income, employment, land ownership and education. This was to a large extent due to the lack of availability of good quality water for household and agricultural purposes. The community suffers from three major water related problems – riverbank erosion, arsenic contamination in groundwater and drought in the dry season. These problems directly affect the entire socio-economic-political fabric of the community in a negative way. However, these problems can be dealt with through various structural and nonstructural options, which can be implemented jointly by the government, local community and relevant NGOs. Structural interventions such as revetments can help eliminate or minimize the human tragedy of relocating hundreds of people to new areas by preventing river-bank erosion. This inflicts both economic as well as psychological trauma upon the affected population. Providing safe drinking water is one of national priorities of the government and as such, this community should receive necessary help in setting up alternative drinking water supply systems, which would be affordable, reliable and safe. The most significant contribution can be made through providing irrigation water in the dry season. This would allow the farmers to change their age-old practice of growing only one rain-fed crop a year and switch to multiple crops / cash crops, and thereby increase their annual income by more than 50%. Once these crucial water related issues are resolved, the overall economic and social conditions will improve that will automatically lead to a decline in major social crimes such as smuggling of goods and even human beings – acts that are the outcome of sheer economic distress and ignorance.

Keywords: River Bank Erosion; Arsenic contamination; Droughts; Irrigation; Poverty; Interventions

Introduction

Yusufpur Union of Charghat Upazilla is a rural community in northwestern Bangladesh on the river Ganges, which is the study area of this paper. There is a unique interplay of water, poverty and human rights issues in this location. The area suffers from riverbank erosion, arsenic contamination in the drinking water sources and frequent droughts. As a result, the agriculture, which is the main source of employment in rural Bangladesh, is mostly limited to rainfed rice and sugarcane cultivation. The prevailing socio-economic condition is discouraging – with lower per capita income and land holding compared to the regional or country average (Table 1). The literacy rate in Yusufpur is higher than the country average mainly due to recent government and NGO initiatives. Despite this, incidences of crime and violence are commonplace, particularly household violence. The most serious social concern in this region is trafficking of young girls and women (to India), who might be later subjected to unsocial activities including prostitution.

Objectives

With this backdrop, the main objectives of this paper are to understand the extent of this water-poverty-human welfare linkage and suggest how water related interventions can be used as a means of improving the fate of this community in Yusufpur.

Methodology

The study was based on field visits and information collected from both primary and secondary sources. Primary socioeconomic data on the study area was collected through questionnaire survey and focus group discussions. Physical

conditions of the community and the water-community linkages (bank erosion, arsenic problem, lack of water for irrigation etc.) were observed and recorded during field visits and verified with the relevant government and NGO agencies or their official records. Meetings were also held with the local NGO officials, Chairman of the Union Parishad, and the officials of Bangladesh Water Development Board (BWDB) to validate the field observations and seek additional feedback.

Information collected was then analyzed to draw the conclusions presented in this paper.

Key Observations

Bank Erosion

The major water related issues faced by this community include riverbank erosion, arsenic contamination and drought. It has been determined through satellite imageries and field visits that a three-kilometer stretch of the bank line of the Ganges along the southern boundary of the study area is under attack from the river. According to the feedback from the local people, about 60 hectares of land has been lost in this area due to bank erosion between 1980 and 1999. This has caused relocation of some 270 households who were living in temporary shacks at the time of the field visit made in 2001. Due to the upstream river training works, the rate of erosion has increased in recent years along the Ganges, which may cause further miseries to the people of this community.

This problem of bank erosion cannot be solved directly by the local people and they urged that the government should step in and help through extending the bank protection scheme that currently exists for the nearby major city Rajshahi. This of course will require significant capital investment and a thorough benefit-cost analysis to assess if such an investment would be justified on economic grounds. The non-structural option for combating riverbank erosion is to relocate the affected population, which is what has happened here, but in an autonomous manner without any help or guidance from the government authorities.

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Table 1 Socio-economic indicators of Yusufpur

Indicator	Yusufpur	Bangladesh*	Unit
Monthly income (household)	2000	7500	Taka
Landless (no agricultural land or land holding less than 50 decimal)	65	56	Percent
Percent of population below poverty live (daily food intake below 2200 Kcal)	56	50	Percent
Literacy rate (people with primary and higher level education)	69	53.7	Percent

*Source: BBS (2001)

Table 2 Net benefit from different crops grown in Yusufpur

Crops	Productivity (mond/bigha)	Price (Taka/mond)	Cost (Taka/bigha)	Revenue (Taka/bigha)	Net Benefit (Taka/bigha)
Sugarcane	225	38.5	2500	8862.5	6162.5
Rice (HYV)	15.5	265	450	4107.5	3657.5
Rice (local)	7.5	-	-	-	-
Wheat	11	350	325	3850	3525
Mosure	4	1000	175	4000	3825

Source: Field visit and questionnaire survey

However, people often lose their occupation and source of income (e.g., land) due to physical relocation in addition to suffering from serious personal stress and agony (Haque 1986, Hutton 2000, Quadir 2003). This is the human dimension of the impact of river bank erosion on a community and such an impact cannot be accurately translated into monetary terms. If structural measures are resorted to, it may be possible however to get free or very cheap labor from the affected community members as their contribution to a potential solution (such as bank revetment) which may reduce the total cost of the project that BWDB might undertake.

Arsenic Contamination

According to the field tests carried out by the Department of Public Health Engineering (DPHE) all over Bangladesh (except the Chittagong Hill Tracts), about 27% of the 'shallow' tubewells (less than 150 m deep) have arsenic levels above the Bangladesh Standard of 50 microgram per liter (BGS and DPHE, 2001). People expressed anger when they were told about the problem by DPHE officials without giving the villagers any alternative. In fact, some people were seen using water from "red" labeled tubewells for drinking and cooking as the only alternative was to collect water from ponds (very few are in good condition) and the river Ganges. But in either case, water could not be used for drinking directly and women, who are primarily in charge of water collection, would have to walk a long distance (sometimes more than a kilometer) just to collect a pitcher full of water (for more on gender implications of drinking water crisis in Bangladesh, see Sultana and Crow, 2002). This is why, despite being aware of the potential health risk, the poor people of Yusufpur consider using arsenic contaminated tubewell water a lesser risk and a personal convenience.

The study area is located in one of the driest part of the country with mean annual precipitation of only about 1450 mm compared to the country average of about 3000 mm. This indicates why not much water is available here in the dry season for irrigation.

In fact the option of rainwater harvesting does not seem to be suitable option here as rains are few and far between and not adequate to ensure a reasonable amount of reliable supply for an extended period of time.

Unfortunately, no generally acceptable solution to this problem has arrived yet. NGOs and government agencies have carried out experiments with various filtration and treatment methods with mixed results (Adeel and Ali, 2002). In most cases, people used these options as long as these were provided to them free of cost and were supported technically and financially when needed. In general, people seemed to have accepted the tubewell based water supply system well and if lowering the tubewells to a greater depth would solve the problem, the villagers would welcome it because of the convenience of using hand tubewells. The other option that showed some promise elsewhere was the rural piped water system that drew water using deep (turbine) tubewells that pumped water from depths usually greater than 500 feet. This option has been tried in a number of communities but its success critically hinges on the ability of the community members to bear the O&M related expenses. This study area being a largely impoverished community, success of this concept at Yusufpur seems doubtful.

Combating Droughts through Irrigation

Lack of water and extreme weather condition do not allow the people of Yusufpur to grow more than one crop annually – the major crop being rainfed rice, sugarcane, wheat and pulses. The absence of boro rice and more water demanding vegetables in the dry season clearly indicates that this is a water deficient area.

About 70% of the cultivated land is used to grow sugarcane, which is essentially a rainfed crop requiring little additional care. Farmers, being risk averse, prefer to grow sugarcane because it is more drought tolerant and less capital intensive. There is a local demand for sugarcane from nearby sugar mills. Due to the lack of training and necessary cash, people sell sugarcane straight to the sugar mill agents rather than trying to add value to their produce by making *gur* (brown sugar) and marketing this locally and in Rajshahi, which is famous for its brown sugar.

Based on net profit per unit of cultivated area as shown in Table 2, it is evident that growing sugarcane was indeed a rational choice for the farmers of Yusufpur. Whereas net profit from rice, wheat and lentil varied from Taka 3600 per bigha (Local unit used to measure area; 1 bigha = 30 decimal) to Taka 3800 per bigha, the same from sugarcane was more than Taka 6000 per bigha.

Table 3 Key observations and suggestions

Issue	Possible Intervention	Implementing Agency	Sponsor	Expected Result
River bank erosion	Bank protection and groynes	BWDB	GOB	No more environmental refugee
	Relocation of the affected households	Local government, NGOs	GOB/donors	No more environmental refugee but social disruption
Arsenic in drinking water	Pump water from deeper arsenic free aquifers	DPHE, NGO, local initiatives	GOB/ NGO/ local	Convenient drinking water source
	Low cost filtration/ treatment methods; rainwater harvesting	NGO/ local initiatives	NGO/ local initiatives	Arsenic concentration lowered or arsenic free water is used from alternative sources
Drought	Irrigation from the Ganges (LLP) or deep tube well	BDWB/LGED/ NGO	GOB/donors	Longer term solution leading to higher agricultural income and employment
Agriculture	To grow combination of rice, wheat and/or pulse instead of mainly sugarcane	DAE, NGO	GOB, NGOs /local initiatives	Will generate more benefit, Tk. 11000/Bigha compared to sugarcane Tk. 6000/Bigha).
Income / poverty	Introduce vocational training on poultry, livestock and fisheries and <i>gur</i> making etc. Micro credit programs of NGOs	GOB, NGOs	GOB, NGOs	Will increase income, employment and contribute to alleviating poverty
Trafficking	Through awareness, counseling, motivation and rehabilitation programs. Increase activity of law enforcing agencies.	NGOs, Police Dept.	GOB, NGOs and local initiatives	Will reduce trafficking. Moreover, improving overall socio-economic conditions will also help reduce children/women trafficking

BWDB: Bangladesh Water Development Board; GOB: Government of Bangladesh; NGO: Non -Governmental Organization; DPHE: Department of Public Health Engineering; LGED: Local Government Engineering Department; DAE: Department of Agricultural Extension

These calculations are however based on the assumption that the crops are only grown once a year as it is presently the case in Yusufpur. However, if irrigation water was made widely available, the scenario could change drastically. A few farmers were already using LLP to irrigate rice fields in the dry season and their average net income was around Taka 11,000 per bigha. This is an indication of the significant potential benefit that dry season water availability can contribute to the community of Yusufpur.

The extension department of the Thana Agriculture Office (TAO) can play a very important role in this regard by demonstrating to the farmers that there are alternatives to the age-old tradition of relying on a single rain-fed crop. NGOs can also play a role in mobilizing local people and representatives so that they can bargain for an irrigation scheme in this area. If such a scheme is built, NGOs can also help ensure participation of the stakeholders in operation and management activities of the scheme.

Suggestions for a Better Future

Due to the lack of own resources and limited access to government authorities, people of Yusufpur appeared to have surrendered themselves at the mercy of mother nature. Their problems were further compounded by the weak socio-economic and political fabric of the community, which had lead to some vicious social crimes such as smuggling of

goods and trafficking of women and children across the border with India.

This apparently hopeless situation in Yusufpur can be significantly changed through a range of technical, financial and social initiatives that would include river bank protection works, better water management, small scale irrigation, alternative drinking water sources, micro credits, education and training programs, and awareness building. These programs can be initiated and implemented jointly by the public and private agencies through free and fare stakeholder participation. Table 3 summarizes the major findings and suggestions of this study.

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