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ABSTRACT

Jamuna Multipurpose Bridge (JMB) project was the first of its kind which incorporated resettlement activities facilitating livelihood restoration of the project affected people (PAP). This study was an endeavor to reveal the livelihood status of the PAP after the implementation of the project in 1998, using both quantitative and qualitative methods. Findings revealed that though the livelihood of the PAP were affected due of loss of land or other assets and/or change of occupation, failure to utilize the compensation money, unavailability of skill development training they could manage to restore their livelihood during the post-project time. Regardless of the category of PAP, the rates of literacy (59%) as well as the use of tube well water (99%), sanitary latrine (40%), and electricity (50%) increased in both districts during the post-project time from that of pre-project time. Additionally, the status of child immunization (86% in Tangail and 91% in Sirajganj) and the use of contraceptive (61% in Tangail and 67% in Sirajganj) was also higher than the national status after the bridge construction. Self-rated food security status showed the reduced proportion of deficit households i.e. from 64% during the pre-project time to 55% during post-project time. All these factors indicated the improvement of quality of life during the post-project time. However, the PAP faced difficulty since agriculture was severely affected due to land acquisition and people shifted to non-farm activities. The logistic regression indicated that the probability of reporting good quality of life was less likely among the poor, who owned less than 50 decimals of land as well as the PAP who were in Sirajganj compared to their counterparts. The JMB resettlement policy and activities were not always appreciated by the PAP and thus, a future resettlement activity for any similar project needs revision to make it more effective for livelihood restoration with minimum difficulties.

EXECUTIVE SUMMARY

BACKGROUND

Land acquisition and involuntary public displacement was unavoidable during construction of the Jamuna multipurpose bridge. However, project-affected persons (PAP) were given compensation for their lost properties through a resettlement programme. This was a pre-requisite for receiving fund from the World Bank, Asian Development Bank and Japan Bank of International Cooperation. BRAC in collaboration with the World Bank conducted a socioeconomic survey among the PAP in the affected areas in 1992. The World Bank again requested BRAC to conduct a survey among the same PAP to examine their current livelihood status in 2009. However, due to unavailability of database from the previous study, a cross-sectional assessment was done as an alternative and the findings were compared with the previous results and available national data. Additionally, this study presents the changes, if any, on livelihood status, living standard and quality of life of the affected people as a result of resettlement intervention.

METHODS AND MATERIALS

This study was conducted in Sirajganj and Tangail districts where the Jamuna bridge was constructed to improve communication between the western and eastern parts of the country. Both quantitative and qualitative methods were followed to collect information. The quantitative data were collected in two phases. In the first phase, reconnaissance survey was done to identify the present location of the PAP. In the second phase, 1,550 households were selected randomly from the identified households. Except tenant cultivators almost equal numbers of PAP were selected from the land losers, squatters, and other occupational categories. In parallel, a qualitative study was also done to complement and triangulate findings of quantitative study. Qualitative data were collected through focus group discussion, in-depth interviews and case studies. To assess the livelihood and living standard various indicators such as demographic information, education, occupation, ownership of assets, income, loans and savings, use of safe water, sanitation, child immunization, contraceptive use were considered. Quality of life was measured using global single question.

KEY FINDINGS

Findings reveal that about 90% of the PAP could be traced during the follow-up and 12% of the households were split over time. The average household size decreased from 6 to about 5 persons. Literacy rate increased from 40% in 1993 to 59% in 2009, which was similar to national literacy rate. Proportion of literate people was significantly higher in the west bank (Sirajganj) compared to the east bank (Tangail) of the Jamuna river. Similarities between the PAP of two banks were noted in terms of availability of healthcare services and ownership of land. More than 99% of the households had access to tubewell water for drinking, cooking and washing. Majority of the households used sanitary latrines for defecation, however, half of the latrines were found without water seal. A higher proportion of PAP who lived in the government resettlement sites used sanitary latrines compared to others. Vaccination coverage among children aged 12-23 months was more than 88%. Contraceptive use rate among currently married women (<49 years old) was found to be 61%. Prevalence of these two indicators was higher than the national rates.

Self-rated food security status reveals that the proportion of deficit households reduced from 64% in 1993 to 55% in 2009. Results also show that half of the PAP was below the poverty line, which was close to the reported national poverty line. Proportion of non-poor was significantly higher in the east bank compared to the west bank. A similar trend was observed between the

two banks in self-rated food security and quality of life. Logistic regression indicates that probability of reporting good quality of life was less likely among the poor, who owned less than 50 decimals of land and people in the west bank (Sirajgani) compared to their counterparts. Among the four categories of PAP, landowners possessed higher amount of movable and immovable assets as well as higher annual income. In all the indicators landowners and tenant cultivators were found to be in better state compared to the squatters and other categories. More than 90% of people opined that communication system was improved due to construction of the bridge. Similarly they also mentioned that availability of healthcare services improved much over time and people had easy access to good healthcare services.

A considerable number of people switched to non-farm activities such as pulling rickshaws or vans and doing business or service due to the shrinking of agricultural activities. Clothes business became popular due to improved communication. Many people reported that they sold clothes/dresses in the nearby districts as off-season farm activities. Presence of Non-Government Organizations (NGOs) increased access to formal microfinance and savings substantially. NGOs also provided some skill development training as well as health and hygiene education among the small proportion of PAP. Participants opined that due to price hike of land and receiving compensation in several installments a considerable number of people could not buy the same amount of land they lost. Majority of the people used compensation for consumption such as buying food, treatment, festivals and construction and/or repairing of houses. As a result, ownership of agricultural land decreased substantially. However, the resettlement process allowed some people to obtain homestead land in the government resettlement sites who did not have any homestead at all.

Findings imply that the living standard of people improved as they had more dresses to put on, had access to safe water and sanitation as well as the literacy rate increased notably. Contraceptive use rate among the currently married women was reasonable and the child vaccination coverage was optimal. About 50% of the households had access to electricity and majority of the houses were made of corrugated tin. All these indicators can be considered as proxy of good living standard. The participants expressed dissatisfaction about the disbursement procedures of compensation and notification of house removal as they spent significant amount of money for drawing compensation and relocation of houses.

RECOMMENDATIONS AND CONCLUSION

Based on the findings and literature review the following recommendations are made which may help addressing any upcoming resettlement protocol in a better way.

1. Acquisition of agricultural land for any infrastructure development should be avoided or kept at minimum level. However, whenever involuntary acquisition is unavoidable for agricultural or homestead land potential income generating activities should be introduced before acquisition and thereby affected people may restore and maintain their livelihood without major difficulties.
2. The house removal notification must allow sufficient time to avoid unanticipated panic among the affected people and to minimize relocation expenditure. Appeal for reasonable extension of time for removal of houses might be considered, if any.
3. The compensation should be given in one installment to ensure its appropriate use, which may reduce the transport cost and loss of income due to absence from work.
4. Location of the government resettlement areas must be selected in places having good communication system and adequate income generating opportunities. These may facilitate to restore and maintain livelihood of the resettled people with minimal difficulties.
5. Resettlement areas should have educational institutes, forestation, healthcare facilities and markets before handing over those to the beneficiaries.

6. People should be adequately aware of the benefits of relocating in the government resettlement sites. This could be helpful to increase interest among the PAP about the resettlement sites.
7. Unused acquired land can be leased out legally to the affected people for their use and thereby government may have some revenues.
8. Provision of skill development training must be made easily available among the affected people and should be prioritized in the resettlement action plan.
9. Targeted programme is necessary for the indirectly affected people i.e. squatters and other categories of the PAP to restore their livelihood, since significantly higher proportion of people in these two groups were found marginalized compared to the directly affected.
10. Along with the government interventions reputed NGOs working for livelihood development of the disadvantaged people might be involved for initiating targeted income generating activities for the affected people. However, a mechanism might be developed to monitor activities of the newly established NGOs working in such areas to prevent any form of unanticipated incidents like disappearing with savings of the affected people.

Finally, this study concludes that existing resettlement plan should be revised to make it more effective and thus in future PAP of similar projects may restore and maintain their livelihood with minimal difficulties.

BACKGROUND

INTRODUCTION

Jamuna multipurpose bridge (JMB) is a huge physical infrastructure in Bangladesh serving for the national framework of economic development since its inauguration on the June 23, 1998. The contribution of JMB is not only restricted directly to the communication between the eastern and western part of the country, but also extends to improved regional socioeconomic development in Tangail, Sirajganj and beyond.

In a country like Bangladesh where population density is 1123 per sq. km (CIA 2009), giant physical construction causes massive involuntary displacement of people. In thriving economies with greater momentum for infrastructure development the unavoidable eviction of people is considered as a common side effect. The situation is quite intricate due to the necessity of resettling people to execute any project contributing to general welfare or be significantly important for national and regional development. The successful rehabilitation and relocation of the project-affected persons (PAP) is often undermined for achieving greater economic goals. Social science studies report that involuntary displacements create a feeling of insecurity among the affected people due to sudden disruption in their livelihood associated with physical and mental stresses. Forced displacement and/or unsuccessful resettlement might be quite sensitive leading to socio-political problems e.g., induced landlessness, homelessness, marginalization, unemployment, reduced food security, increased morbidity, limited access to common property and social disarticulation (Cernea 1995). However, for the sustainability of any development intervention having socioeconomic impact on the livelihood of stakeholders, it requires successful resettlement and livelihood restoration programmes. The resettlement and restoration interventions are generally expected to make use of existing synergies and contribute to the prevailing scenario of rapid economic growth.

The construction of JMB, a project jointly financed by the World Bank (WB), Asian Development Bank (ADB), Japan Bank for International Cooperation (JBIC) and the Government of Bangladesh (GoB), is considered as an amazing national experience in terms of socioeconomic and environmental aspects. The bridge construction itself did not require land acquisition, whereas the construction of the two guide bunds, a hard point and approach roads required land acquisition and the associated public displacement. Alam (1995) mentioned that the construction of bridge end facility area together with approach roads needed to acquire 5,800 acres of land. Acquisition of 4,000 acres of land directly (6,156 households) and indirectly (6,182 households) affected 12,330 households. The land acquisition affected six unions of two *upazilas* (Kalihati and Bhuapur) of Tangail district and five unions, one municipal ward of two *upazilas* (Kamarkhand and Sirajganj) of Sirajganj district. Due attention was paid by the GoB and the co-financiers on the social and environmental components of such development to keep up to the international standards. Several policy mechanisms were incorporated for the effective compensation process for the PAP who sacrificed for a national need. The project has formally endorsed resettlement of the PAP as an integral part. The underlying goal was to improve the living standard of PAP, if impossible, at least help them so that they can retain their previous standard of living. The preparation and implementation of a formal Resettlement Action Plan in 1993 was of enormous importance, as that was the first such intervention in Bangladesh.

The GoB gained an enormous experience from the whole process of JMB construction and the associated land acquisition, compensation disbursement, and livelihood restoration activities. Bangladesh is the biggest delta in the world crossed by hundreds of water bodies which requires construction of bridges of different scales for infrastructure development. Certainly, JMB would

not be the only one of its kind and the experiences from the JMB would be used for the betterment of upcoming large scale constructions requiring due resettlement. Similar to the JMB the government initiative for the construction of Padma multipurpose bridge is also expected to have huge involuntary land acquisition, public and infrastructure displacement and thereby requires resettlement intervention for a considerable number of people.

Both short-term and long-term monitoring and evaluation is required for finding the success of any policy intervention. The researchers and funding agencies conducted several studies to evaluate the Resettlement Action Plan adopted for JMB (Rahman 2001, Siddiqui 1998, Zaman 1996, Barua et al. 1993). Of these, most of the studies reported on the short-term effects of the JMB on the livelihood of PAP and the aspects of resettlement strategy. Hence this study might provide important insights into the livelihood status and quality of life of the affected people after more than 10 years of resettlement. The term livelihood has been defined to be comprised of capabilities, assets and activities required for living. Livelihood sustainability indicates the ability to cope with and recover from stresses and shocks and maintain or enhance livelihood capabilities and assets both for present and in the future without undermining the natural resource base (Chambers and Conway 1992). Research indicates that livelihood insecurity implies heightened risk and uncertainty for households thereby increased vulnerability (Bhandhari and Grant 2007).

Various indicators were considered to explore livelihood status. These include ownership of land, savings, income, assets, economic status, literacy, occupation, use of contraception, child immunization and provision of safe water and sanitation. The United Nations also includes similar indicators for assessing the livelihood (United Nations 2007). However, in some instances it might not be possible to consider all the indicators for any specific study. Bhandari and Grant (2007) used four indicators for assessing economic status such as landownership, employed members in the households, annual agricultural income, and food sufficiency. For social security they considered three indicators such as i) access to safe drinking water and sanitation; ii) access to market ; iii) access to health and education services. Quality of life (QoL) was assessed using a global single question since assessing the QoL using a global single question is pervasive and its predictive power has been mentioned elsewhere (Fayers and Machin 2001, Nilsson et al. 2006).

RESETTLEMENT OF PAP IN JAMUNA BRIDGE AREAS

Due to strong advocacy of the planners, environmental and social activists, human rights groups and NGOs, the multilateral agencies compelled to bring about policy changes with regard to public resettlement and relocation (Sharma 2003, Siddiqui 1998). The World Bank adopted a policy and specific operational guidelines titled *Operational Directive 4.30: Involuntary Resettlement*. However, a revised version is followed at present for bank-financed projects to overcome or mitigate the socioeconomic and cultural impacts of development projects. The Operational Directive 4.30 explained the objective of the Bank resettlement policy as to confirm that the Bank-financed project-affected people due to displacement should receive benefit from the project. Furthermore, the resettlement should form an integral part of project design and should put due attention to a number of policy considerations, including (i) avoiding or minimizing resettlement where feasible, (ii) developing resettlement plans where resettlement is unavoidable, and that such plans should include compensation for losses at full replacement cost, as well as assistance and support with the move, (iii) community participation in planning and implementing resettlement, (iv) social and economic integration of the resettled people into the host communities, and (v) provision of land, housing, infrastructure and other compensation to the adversely affected population (World Bank 2001).

Within the scope of the resettlement policy directive it is clearly stated that all the unavoidable displacement and relocation requiring resettlement programme must be development oriented. It is also compulsory to take all steps to prevent dislocation rather merely limited to cash compensation. It requires dealing with economic, technical, cultural and social-organizational factors in an integrated manner, which can help settlers rebuild a self-sustained production base and improve, or at least restore, their former living standard and income. However, there are several trade-offs to keep the international standards of resettlement programmes in a developing

country like Bangladesh, where there is a clear lack of legal framework supporting such programme. Meanwhile, in the prevailing situation the resettlement approach taken by the multilateral agencies is often ad hoc, project specific and consistent with the country's existing land acquisition laws. This situation leads to variations in resettlement packages and benefits (Zaman 1996).

To implement the resettlement programme for Jamuna bridge a preliminary Resettlement Action Plan was prepared in 1990 by Randell Plamer Tritton, NEDECO and Bangladesh Consulting Ltd., which underwent revision in 1993 as Revised Resettlement Action Plan (RRAP) for providing resettlement services and compensation for the PAP. The RRAP based on the BRAC survey and prepared with assistance from the World Bank for implementation had the following important features (Rahman 2001, Siddiqui 1998),

- i. A brief overview of land acquisition and the nature and magnitude of land loss (both agricultural and homesteads) directly and indirectly affected PAP. It advocated for compensation for all quantifiable losses at a full replacement cost.
- ii. A resettlement policy included 14 categories of PAP and their entitlements and benefits. These included transfer grants, house construction grants, owner-cultivator grants, farm worker grants, non-farm worker grants, tenant cultivator's grants, dismantling and removal grants, reconstruction grants for commerce and industry, replacement land stamp duty grants, grants to cover premium, grant to cover maximum allowable replacement value (MARV), grants for *uthulis*/squatters to purchase homestead land. The RRAP had also provision to cover rights of flood and erosion-affected people caused by the Jamuna bridge project.
- iii. A development plan for resettlement, soft-term interest-free loans for replacement land, training, employment, small business, and reforestation programmes for the PAP at an estimated cost constituting 8% of the total project costs. Involvement of NGOs in implementing different programmes was an important policy consideration.
- iv. A Resettlement Unit headed by a project director with two field offices (Tangail on the east bank and Sirajganj on the west) and staff for supervision and implementation of the RRAP. It was planned that at least half of the total affected people would be formally resettled at the resettlement sites.
- v. A work plan was prepared for execution of the RRAP during 1993-97. Within the scope of the plan social welfare programmes e.g. healthcare, education etc. were to be undertaken.

SCOPE AND OBJECTIVES

The government of Bangladesh prepared a RRAP for implementing the JMB project which was also a prerequisite for getting fund from the World Bank. To facilitate preparation and implementation of the resettlement action plan Barua et al. (1993) conducted a study on behalf of the World Bank. In 2009, the World Bank intended to see the long-term effect of resettlement intervention and to observe how successful were the displaced people restoring their livelihood.

Broad objective

The broad objective of the proposed study is to revisit the PAP who had been affected by land acquisition, displacement or resettlement and find out the efficacy of the adopted resettlement and livelihood restoration interventions to mitigate the impacts of the JMB project.

Specific objectives

- i. To examine the livelihood status of the involuntary affected people in the JMB resettlement areas.

- ii. To explore the processes and dynamics through which affected people managed (fully, partially) to reconstruct their livelihood in a new location.
- iii. To explore the ways in which land tenure systems changed as a consequence of the land acquisition and resettlement programmes.
- iv. To identify categories of people who managed to restore their pre-project living standards and those who did not, and explore the reasons if some interventions proved to be more effective than others in reaching the stated policy goals.
- v. To identify livelihood restoration options emerged endogenously in the affected communities, which could be incorporated into the drafting of a new resettlement programmes in conjunction with the Padma bridge construction.
- vi. To explore the institutional aspects that underpinned the implementation of the Jamuna bridge resettlement programme and look at the best practices and lessons learned from the experiences of the different government bodies and civil society groups involved in its implementation.

METHODS

STUDY AREA AND STUDY DESIGN

This study was conducted in Sirajganj and Tangail districts where the Jamuna bridge was constructed in 1998 to improve road and railway communication systems between the eastern and western parts of the country. Both quantitative and qualitative methods were adopted. Informed consent was obtained in this regard.

SAMPLE SIZE

The sample size was calculated based on landownership of the PAP. It was assumed that half of the households became landless due to the resettlement programme. Four groups of PAP i.e. landowners, tenants, squatters and other landless professionals with or without homestead were considered to ensure significant reflection of the sample size to a greater degree. These categorizations were found in previous database collected from the Rural Development Movement (RDM) office. The sample size for each category was calculated to be 384 households within 95% of confidence interval. The total sample size was thus 1,536 and rounded to be 1,550 households, of which 1485 households were interviewed. The proportion of tenant was slightly lower in the sample due to unavailability of enough PAP in the tenant category in Sirajganj. No-response rate was about 3%, as during the interview some of the households' respondents were not available.

DATA COLLECTION

Data were collected in two phases. In the first phase, reconnaissance survey was carried out to identify the PAP, while in the second phase, quantitative survey was administered. To complement the findings of quantitative study and for triangulation a qualitative survey was conducted.

Reconnaissance survey

It was not possible to retrieve the database of earlier study conducted by Barua et al. (1993) on JMB resettlement project. As an alternative method a cross sectional design was followed. The research team met the key personnel involved in the Jamuna Bridge Resettlement Project and officially visited the Bangladesh Bridge Authority (BBA) and Rural Development Movement (RDM) as a part of the initial activity. RDM provided a database of PAP with name, ID number, address, etc. This database was used for the reconnaissance survey to physically identify the PAP and find their present address.

Survey questionnaire

Three modules of structured questionnaires were developed. The first module was used for reconnaissance survey, the second one was for socioeconomic survey and the third module was for community survey. The quantitative survey aimed to collect data on (1) the economic status of the project affected households, (2) the effect of the JMB project on the household asset, occupation, and income, (3) present status of households, (4) landownership pattern, (5) household infrastructure, (6) safe water use, (7) personal hygiene, (8) child immunization, (9) resettlement compensation usage, (10) and overall quality of life.

For approach roads and embankment it was necessary to acquire quite a lot of land, which might involve a whole village. This also might have affected some institutions lying within the acquired land, for example mosque, school, *bazaar*, etc. The third set of questionnaire was used to collect data on the kind and number of social institutions presently available and acquired earlier within the surveyed area, the institutions which were established by the government to substitute the acquired ones as well as the distance of those institutions from the Jamuna bridge. English versions of the questionnaires used for quantitative surveys are attached as Appendix A and B.

Quantitative study

A field trial of the draft questionnaire was conducted in the eastern part of the bridge before finalization. Thirty enumerators were recruited and given hands on training for two days on data collection. All the enumerators were divided into groups of two for the mock test to evaluate their performance. The enumerators worked into two groups of equal number in the eastern and western part of the project led by two supervisors in each site. Researchers checked the performance of the enumerators at field level and provided necessary instructions where difficulties were identified.

Data processing

The supervisors and enumerators checked all the completed questionnaires everyday in the field. In most cases the questions were pre-coded. However, the open-ended questions were coded later after receiving all the survey questionnaires from the enumerators at the BRAC data processing office. Before data entry every questionnaire was checked for errors.

Qualitative study

Qualitative data were collected through FGD, key informant interviews (KII) and collection of life histories (LH) in both sides of the bridge. In Tangail, 4 FGDs with male and 2 FGDs with female entitled persons (EP) were done, whereas in Sirajganj there were 3 FGDs with male and 1 with female. Eighteen KIIs were conducted in Tangail and 12 in Sirajganj. Life histories were collected for 12 PAP in Tangail and 8 in Sirajganj. The qualitative study involved detail exploration of the findings of the quantitative study. A detail description of the qualitative study tools is attached in Appendix C. For collecting qualitative information a checklist was prepared and used to conduct FGDs, KIIs and obtained LHs.

The villages were selected purposively from three locations, (1) government resettlement site, (2) resettlement sites within 2 km of the affected village, and (3) inter- and intra-district migration sites of PAP. The whole qualitative data were collected in two phases (1) general information collection from institutions and key informants, and (2) exploration for specific information from the PAP. The field activities of the enumerators were closely monitored. The questions and queries were clarified through group discussion between enumerators and the researcher at the field.

DEFINITION OF TERMS USED IN THE STUDY

Household (HH) and household head

A household (HH) or *Khana* was considered as a group of persons living together and eating from the same kitchen. There might be more than one house or structure to live in and to carry out other group activities. The income earned by one or more members was shared by the group equally or on an agreed basis. Decisions regarding operation of the group might be made singly or collectively. The household head was the person who influenced the decision-making process most, and was more conversant about the household economy than other members.

Project affected persons (PAP)

As it appears in the World Bank policy guidelines, the PAP were the household members who were affected by land acquisition for the JMB project. There were also a broad division among the

PAP, i.e. (i) the households which lost land used for homestead, farming or other purposes, and (ii) those who did not lose land but were affected indirectly, partially or completely losing their previous or current income opportunities and habitat. The PAP received compensation as tenant, landowner, squatter and others. Data were analyzed based on these four categories.

Tenant /share croppers

In the preliminary survey the tenants were identified as those people who rented in land for cultivation or other purposes. For this study also this category of PAP was identified as it was done in the earlier study. Tenants were indirectly affected people as they did not lose their land but their means of income were affected due to the acquisition of those lands which they used for farming.

Landowner/land loser

This category of PAP is directly affected by the JMB project because the landowners lost the land used for either homestead or farming or the both. For the evaluation of landownership pattern data of pre-project and post-project period were collected on different types of land e.g., homestead, farmland, fallow land and pond. These data were used as a basis for depicting the landownership and land use pattern. People who owned land and lost land during the bridge construction were mentioned as landowners during the quantitative survey.

Squatter

Squatters were considered as PAP who lived in government or privately owned land and did not pay any rent for using land. People falling in this category might own agricultural or other land. They often lived in their own village, carried out their usual occupational activities but might still remain in the main stream of the local communities.

Others

The PAP who did not fall in the other three categories e.g. tenant, landowner and squatter but were compensated due to occupational change, relocation of any structure falling within the project area. The example of this category could be businessmen, day laborers or owner of any structure like store room, etc.

Economic status of the household

Economic status of the households was determined in two ways. The first one was based on the self perception of the respondents and the second one is based on the pre-determined criteria, which was followed by BRAC to identify the poor people to be included in the poverty alleviation programme. For self perception a single question was posed to the respondents to categorize their households based on their income and expenditures. Four possible answers such as always deficit, occasional deficit, break even and surplus were considered. To examine the economic status based on pre-determined criteria land and occupation of the earning members of the household were considered. If household owns less than 50 decimal of land and any member of the household sells manual labor for 100 days or more in a year to maintain livelihood was considered as poor otherwise non-poor.

Quality of life

Quality of life refers to subjective and multi-dimensional concept, which has received wider recognition as a useful outcome in health and social care research (Bowling 2005, Skevington and O'Connell 2004). It is also expressed as individual's perception of their position in life with particular reference to the culture and value systems in which they live in relation to their goals, expectations, standards and concerns (WHOQOL 1998). Quality of life was assessed using single question, "How is your quality of life?" Four response options were provided such as very good,

good, poor and very poor in extracting data. Each respondent was allowed to provide single response.

DATA ANALYSES

Both bi-variate and multivariate analyses were performed to examine the association of covariates with outcomes of interest, differences if any between and within groups. In bi-variate analyses t-test and chi-square test were done while for multivariate analyses logistic regression was done. Data were analyzed using version 13 of SPSS.

RESULTS

This chapter presents demographic and social characteristics, landownership pattern before and after the land acquisition, movable and immovable assets, land tenure status, occupation, training, income, savings and loan, disbursement procedures and use of monetary compensation received by the PAP, quality of life, and present settlement pattern and resettlement preference. The findings of both qualitative and quantitative studies have been incorporated in relevant places and some case studies have been presented at the end of the results section. Furthermore, results of this study have been compared with the earlier study conducted in this area as well as with available national level data. This comparison might allow examining present and past livelihood status of the affected people.

DEMOGRAPHIC AND SOCIAL CHARACTERISTICS

Demographic information

The list of PAP collected from the RDM office enlisted 16,523 affected people in both Tangail and Sirajganj, of which 14,892 (90%) PAP could be identified during the reconnaissance survey. A total of 1,811 (12%) PAP in both districts split and formed new households (Table 1).

Table 1. PAP identified during reconnaissance survey by districts (%)

District	RDM enlisted PAP	PAP identified in present study	Households split
Tangail	9284	8444 (91.0)	840 (10.3)
Sirajganj	7239	6448 (89.1)	971 (15.1)
All	16523	14892 (90.0)	1811 (12.0)

The unit of analyses was considered to be household (HH). Out of the total number of households sampled, 787 households were in Tangail and 698 in Sirajganj. The average household size was slightly larger in Sirajganj (5.2) compared to Tangail (4.8) (Table 2). Based on the category of PAP, which was determined during the acquisition of properties, 32% was landowner, who lost land due to the construction of bridge. The rest of the PAP belonged to the three categories e.g. 20% tenants, 26% squatters and 22% from the others category.

Table 2. Distribution of study population, households and average household size

Household type	Tangail			Sirajganj		
	# of population	# of HH (%)	Average HH size in person	# of population	# of HH (%)	Average HH size in person
Tenant	872	200 (25.4)	4.4	585	105 (15.0)	5.6
Landowner	1186	225 (28.6)	5.3	1214	234 (33.5)	5.2
Squatter	936	196 (24.9)	4.8	1016	200 (28.7)	5.1
Others	795	166 (21.1)	4.8	808	159 (22.8)	5.1
Total	3789	787 (100.0)	4.8	3623	698 (100.0)	5.2

The landowners in Tangail had the largest household size compared to the other three categories, while in Sirajganj tenants had the largest average household size. In previous study the average household size of the two districts was found to be 6.4 (Barua *et al.*, 1993). The average household size at national level was reported to be 4.8 (BBS 2004).

Figure 1. Average household size in pre- and post-project periods

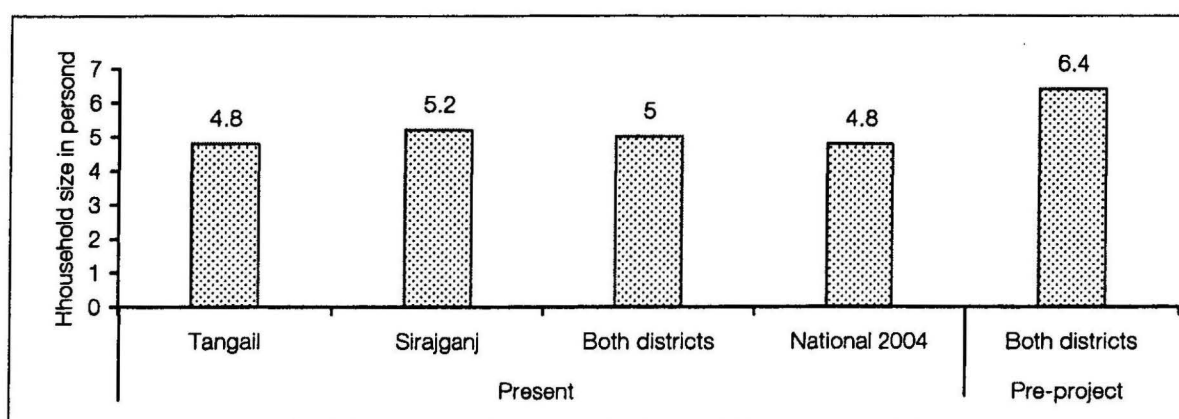


Fig. 1 clearly shows that household size was reduced compared to the pre-project time. This could be due to the splitting of households and increased awareness among the people about family planning.

Distribution of population by age group

Distribution of the study population based on age indicates an identical trend in both of the districts (Appendix D1). In Tangail, 32% of the total population was within the age group of <15 years, which was 31% in Sirajganj. Again 48% and 50% of the total population in Tangail and Sirajganj respectively were found within the age group of 15-49 years. About 20% of the total population was within 50-64+ years age group and showed similar trend in Tangail and Sirajganj.

Sex composition

The sex composition of the population in both districts shows similar trend (Appendix D2). The men to women ratio was 106:100 both in Tangail and Sirajganj. At the national level men to women ratio was reported to be 105:100 (BBS 2007). Men and women ratio varies across age groups, in the older age groups (40-64+ years) men outnumbered women similar to the overall status, which indicates longer life span of men in both districts. Similar findings were observed in the previous study (Barua *et al.* 1993).

Marital status

Marital status of the HH members was considered for ≥10 years old population. In Tangail, about 50% of men and women were married, whereas 48% was in Sirajganj. A total of 296 widowed, 25 divorced and 12 separated individuals were found in the two districts (Table 3). It also shows that in both districts around one-fourth of the total married men and women fall within the age group of 15-29 years, while more than half of the married people were found within the age group of 30-54 years (Appendix D3).

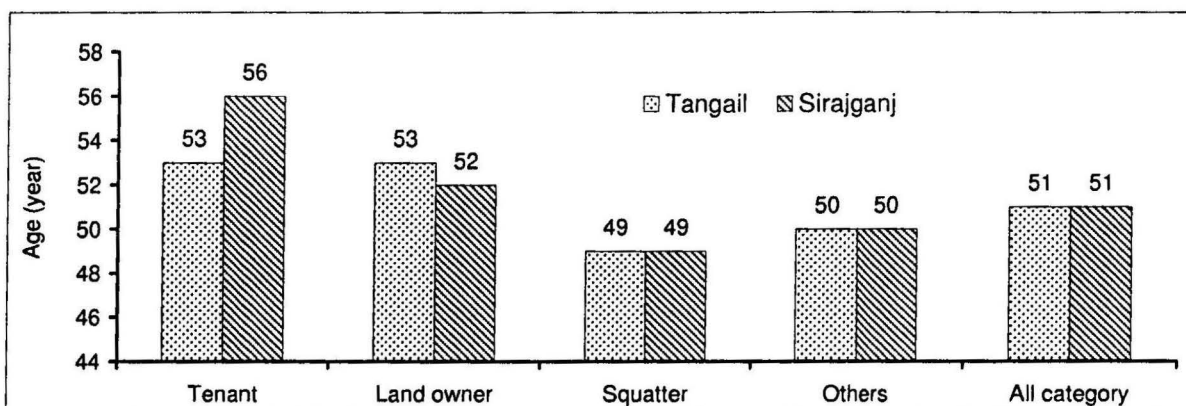
Table 3. Marital status of study population by districts (%)

Marital status	Tangail	Sirajganj	Total
Below 10 years	708 (18.7)	688 (19.0)	1396 (18.8)
Married	1880 (49.6)	1747 (48.2)	3627 (48.9)
Unmarried	1032 (27.2)	1024 (28.3)	2056 (27.7)
Widowed	152 (4.0)	144 (4.0)	296 (4.0)
Divorced	11 (0.3)	14 (0.4)	25 (0.3)
Separated	6 (0.2)	6 (0.2)	12 (0.2)
n	3789 (100.0)	3623 (100.0)	7412(100.0)

Barua *et al.* (1993) found that in the age groups of 15-29 years more than 50% of the people were married in Tangail and 45% in Sirajganj. Within the age group of 30-49 years 94% were

married in both districts. It also shows that in Tangail higher proportion of married people was in the group of 15-29 years compared to that of Sirajganj. However, within the age group of 30-49 years about 95% of the people were married in both districts (Appendix D3). In Tangail, 2% of the total people were widowed within the age group of 15-49 years and 1% in Sirajganj. However, an equal proportion of widowed were found both in Tangail and Sirajganj in the age range of 50-65+ years. Barua *et al.* (1993) found widowed people having age range ≥ 50 were 8% and 24%, respectively in Tangail and Sirajganj. There was no significant difference of average age of household heads in both districts. However, there was a significant ($p < 0.001$) difference among the average age of household heads of different categories in both districts, tenant category shows higher average age compared to the others (Fig. 2). Households with older head could be an indication of having more than one wage earning member in the family.

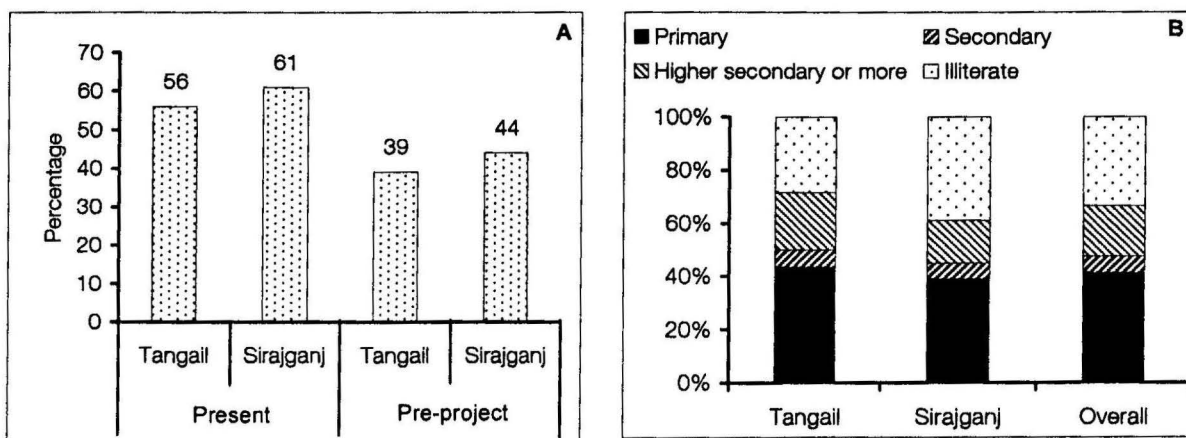
Figure 2. Average age of HH heads by PAP categories



Literacy

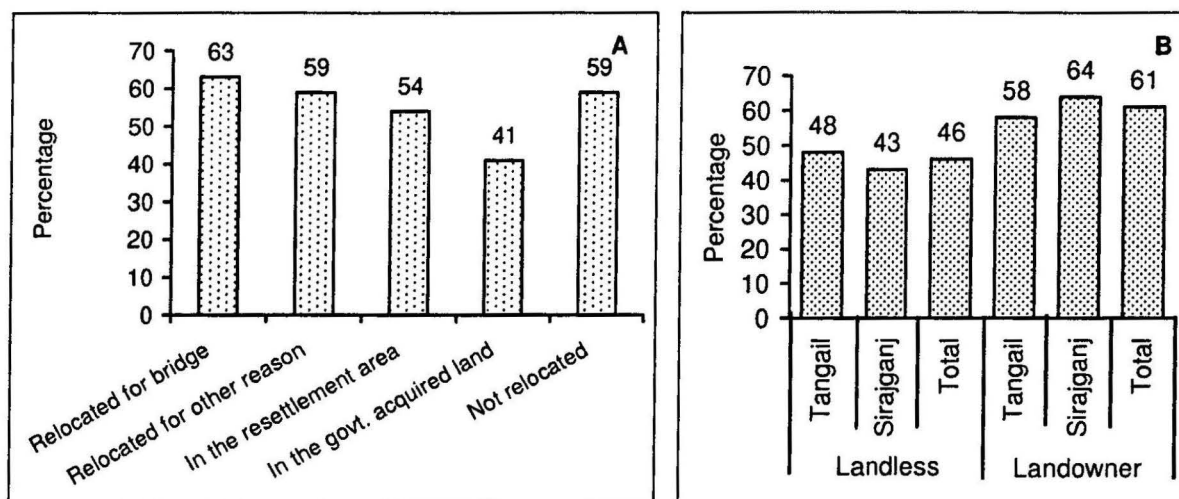
The literacy rate was considered for the population aged ≥ 6 years. In Tangail, 56% of the population was found to be literate, while it was 61% in Sirajganj (Fig. 3A). Among the literates around 28% of the population obtained primary education in Tangail, but it was considerably higher in Sirajganj (39%). However, higher proportion of people in Tangail obtained secondary and above education compared to that of Sirajganj (Fig. 3B). Barua *et al.* (1993) also found higher literacy rate in Sirajganj (44%) at all levels compared to that in Tangail (39%). Similar trend was noted in this study as well. However, higher number of people was reported to obtain education beyond primary level in Tangail. Overall, literacy rate in both the districts was found to be 59% among people aged ≥ 6 years.

Figure 3. Literacy rate of study population (A) at present and pre-project time, (B) percentage of population with different levels of education



The national literacy rate among population aged ≥ 15 years was found to be 49% (Kabir 2009). The stratified analysis further shows that literacy rate among population aged ≥ 15 years was 49% in both districts, of which 45% was in Tangail and 53% in Sirajganj. With regard to the category of household, population of the landowner category in both districts had higher literacy rate compared to other three categories (Appendix D4). Literacy rate of household heads was also much higher among the landowners compared to other three categories of PAP (Appendix D5). The literacy rate of people still living in the acquired land was the lowest, while it was higher among people living in the resettled households (Fig. 4A). Additionally, in both districts households with landownership had higher literacy rate compared to the landless households (Fig. 4B).

Figure 4. The literacy rate of population living in HHs (A) located according to resettlement pattern and (B) present landownership pattern



The literacy rate was higher among men compared to women (Table 4). More men obtained higher secondary or above level of education than women. Barua *et al.* (1993) reported that 46% of men and 33% of women were literate in Tangail, which was 50% for men and 36% for women in Sirajganj.

Table 4. Educational status of the study people by sex

District	Educational status	Men (%)	Women (%)
Tangail	Illiterate	692 (39.6)	804 (48.0)
	Primary	496 (28.4)	474 (28.3)
	Secondary	400 (22.9)	342 (20.4)
	Higher secondary or higher	158 (9.0)	55 (3.3)
	n	1746 (100.0)	1675 (100.0)
Sirajganj	Illiterate	607 (36.2)	661 (42.0)
	Primary	661 (39.4)	603 (38.4)
	Secondary	276 (16.5)	254 (16.2)
	Higher secondary or higher	133 (7.9)	54 (3.4)
	n	1677 (100.0)	1572 (100.0)

The literacy rate in both the districts increased over time. The literacy rates in Tangail and Sirajganj were 39% and 44% respectively during the pre-project time (Barua *et al.* 1993). Among the household heads in Tangail 28% were found to have primary or higher level education, while in Sirajganj it was 34%. Among the formal and informal educational institutions government primary schools in both the districts were found to draw more students compared to others (Table 5). In Sirajganj, more (54%) students attended government primary schools than Tangail (38%). However, non-government primary schools were found to be more popular in Tangail compared

to Sirajgongj (5%). About 3% of the students attended BRAC school in Sirajganj whereas 2% in Tangail. *Madrassa* students were reportedly higher in Tangail (7%) than Sirajganj (2%).

Table 5. Type of educational institutions attended by study area (%)

Type of institution	Tangail	Sirajganj	Total
Government primary	714 (37.1)	1073 (54.2)	1787 (45.8)
Non-government primary	169 (8.8)	100 (5.0)	269 (6.9)
BRAC school	36 (1.9)	54 (2.7)	90 (2.3)
Other NGO school	12 (0.6)	4 (0.2)	16 (0.4)
Secondary school	656 (34.1)	521 (26.3)	1177 (30.1)
Higher secondary school	206 (10.7)	190 (9.6)	396 (10.1)
<i>Madrassa</i>	132 (6.8)	38 (1.9)	170 (4.4)
Other institutions	0 (0)	1 (0.1)	1 (0.02)
n	1925 (100)	1981 (100)	3906 (100)

Lack of awareness, unwillingness to attend schools, distant location and limited number of educational institutions and involvement in agriculture and household chores in childhood were major constraints for education during the pre-project period in the study area. Enrollment in secondary school was almost impossible in the affected areas before construction of the JMB. Number of students in schools and *madrassas* increased after the resettlement due to increased awareness, higher number of educational institutions, introduction of stipend, and providing education materials at free of cost. People perceived that educated children in future would be married off with good spouses and may have better job. The resettlement unit of Jamuna Multipurpose Bridge Authority established some schools and colleges to promote education among the PAP. They also provided monetary support to the educational institutions.

Use of tubewell water

Availability and access to safe water source are important indicators of livelihood status. Hence information was collected on sources of water for various uses. More than 99% of the households had access to tubewell water for drinking, cooking and washing (Table 6).

Table 6. Distribution of study households and usage of water for various purposes and its source

Usage of water	Source of water	Tangail number of hh and (%)	Sirajganj number of hh and (%)	Total number of hh and (%)
Drinking	Tubewell	786 (99.9)	697 (99.9)	1483 (99.9)
	Well	1 (0.1)	1 (0.1)	2 (0.1)
Cooking	Tubewell	786 (99.9)	697 (99.9)	1483 (99.9)
	Well	1 (0.1)	1 (0.1)	2 (0.1)
Dish washing	Tubewell	784 (99.6)	695 (99.6)	1479 (99.6)
	Pond	1 (0.1)	1 (0.1)	2 (0.1)
	Well	2 (0.3)	1 (0.1)	3 (0.2)
	River	0	1 (0.1)	1 (0.1)
Washing hands and mouth	Tubewell	782 (99.4)	694 (99.4)	1476 (99.4)
	Pond	3 (0.4)	2 (0.3)	5 (0.3)
	Well	2 (0.3)	1 (0.1)	3 (0.2)
	River	0	1 (0.1)	1 (0.1)
Bathing	Tubewell	648 (82.3)	519 (74.4)	1167 (78.6)
	Pond	99 (12.6)	124 (17.8)	223 (15.0)
	Well	3 (0.4)	0	3 (0.2)
	River	35 (4.4)	40 (5.7)	75 (5.1)
	Canal	2 (0.3)	15 (2.1)	17 (1.1)

However, the household members used water for bathing from different sources, predominantly from tubewell followed by pond, river, canal and well. The usage of water from other sources for bathing was due to nearness of pond or river or canal, hair affected by tubewell water, and their habitual behaviour. Nevertheless, it is noteworthy that only around one-fourth of the tubewells in the households was found to have *pucca* basement (Table 7). Barua *et al.* (1993) found that 44% of the households in Tangail owned tubewell, which was 49% in Sirajganj.

Table 7. Status of the platform of tubewells in both districts

Status of the platform of the tubewells	Tangail (%)	Sirajganj (%)	Total (%)	p value
<i>Kancha</i>	599 (76.1)	500 (71.8)	1099 (74.1)	ns
<i>Pucca</i>	188 (23.8)	196 (28.2)	384 (25.9)	
n	787 (100)	696 (100)	1483 (100)	

The qualitative study revealed that during the pre-project time the number of tubewells was much less. Several neighboring households jointly installed tubewell and shared the facility. The PAP reported that some people used to drink water from open sources like river and pond during the pre-project times. However, after the JMB project the number of tubewells installed in the villages increased and people used to drink tubewell water.

Use of sanitary latrine and personal hygiene

Sanitary latrine use was found to increase in post-project time compared to the pre-project time. The ownership of sanitary latrine was much higher among both landowners and tenant share croppers compared to the squatters and others categories of PAP (Table 8). It shows that 72% of the households in Tangail and 68% in Sirajganj owned sanitary latrine, with no significant difference ($p < 0.001$). However, not all the sanitary latrines had water seal perfectly.

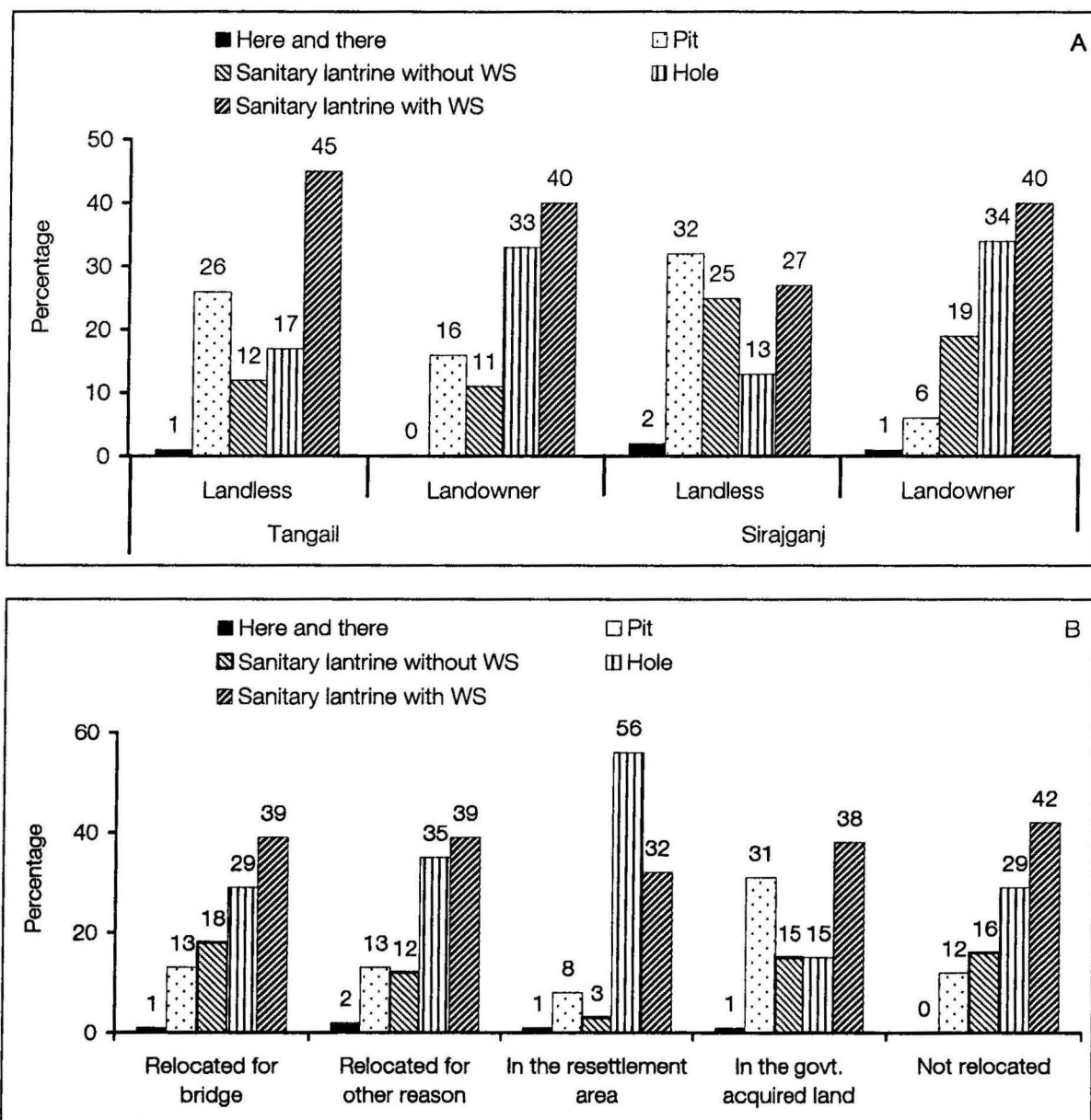
The reported sanitary latrines were further checked by the enumerators during interview whether the latrines were protected with water seal. This procedure revealed that 31% of sanitary latrines were protected with water seal device in Tangail and 30% in Sirajganj. The sanitary latrines mentioned to have water seal were physically checked and were found present in 93% cases in Tangail and 97% in Sirajganj (Appendix D6). A substantial proportion of people (>25%) used latrines with hole and pit in both districts. Around 1% of households reported that they did not use lavatory at all.

Table 8. Type of sanitary latrine used by different household categories in both districts

Site	Type of latrine	Tenant # and (%)	Landowner # and (%)	Squatter # and (%)	Others # and (%)	Total # and (%)
Tangail	Hole	30 (15.0)	43.0 (19.2)	35 (17.9)	30 (18.1)	138 (17.6)
	Pit	14 (7.0)	26.0 (11.6)	24 (12.2)	22 (13.3)	86 (10.9)
	Sanitary without WS	54 (27.0)	81.0 (36.2)	57 (29.1)	44 (26.5)	236 (30.0)
	Sanitary with WS	102 (51.0)	73.0 (32.6)	78 (39.8)	70 (42.2)	323 (41.1)
	No fixed place	0 (0.0)	1.0 (0.4)	2 (1.0)	0 (0.0)	3 (0.4)
	Total	200 (100.0)	224.0 (100.0)	196 (100.0)	166 (100.0)	786 (100.0)
Sirajganj	Hole	5 (4.8)	13 (5.6)	33 (16.5)	15 (9.4)	66 (9.5)
	Pit	22 (21.0)	28 (12.0)	55 (27.5)	32 (20.1)	137 (19.6)
	Sanitary without WS	35 (33.3)	109 (46.6)	39 (19.5)	34 (21.4)	217 (31.1)
	Sanitary with WS	42 (40.0)	83 (35.5)	65 (32.5)	78 (49.1)	268 (38.4)
	No fixed place	1 (1.0)	1 (0.4)	8 (4.0)	0 (0.0)	10 (1.4)
	Total	105 (100.0)	234 (100.0)	200 (100.0)	159 (100.0)	698 (100.0)

Nevertheless, further stratified analyses based on the categories of PAP and location of the HHs show that in both districts higher proportion of landowners had sanitary latrine with water seal (Fig. 5A). However, the households which were resettled in the government resettlement area showed a higher tendency to use water sealed sanitary latrines compared to those of other resettlements (Fig. 5B).

Figure 5. Sanitary latrine usage with regard to landownership (A) and resettlement of household (B)



It was intended to know what proportion of respondents washed their hands with soap or other personal hygiene materials. Only 27% of respondents in Tangail and 35% in Sirajganj used soap for washing hands after defecation (Appendix D7). More than half of the people reported to use ash or soil for washing hands after defecation. The enumerators physically checked whether ash or soil was kept nearby the latrine (Appendix D8). It was revealed that in Tangail 65% of the respondents using ash/soil for hand-washing duly kept it near the latrine, which was comparatively better in Sirajganj (79%).

Qualitative study showed that during pre-project time people used more pit and temporary latrines with fences made of jute sticks, bamboo, etc. The post-project condition was

comparatively better in terms of use of sanitary latrine among the PAP. It was reported that pit latrines in the resettlement sites were replaced with ring slab provided by the Jamuna Multipurpose Bridge Authority (JMBA).

Contraceptive use among currently married women (15-49 years old)

There were 742 currently married women comprising 40% of the total women population in Tangail district, which was 37% (649) in Sirajganj. The average age of currently married women in both districts was almost identical (Appendix D9). Fig. 6 shows that the currently married women in Sirajganj (67%) used more contraceptive than in Tangail (61%). This is higher than national rate of contraceptive use (BDHS 2007).

There was higher tendency of contraceptive use among women from landless households in Tangail than that of Sirajganj as well as landowners in Tangail. However, contrary to the women from landowner category in Tangail, the same of Sirajganj showed higher contraceptive adoption (Fig. 7A).

Nevertheless, the women from households located in the government resettlement site showed maximum contraceptive adoption than any other pattern of resettlement. Women from households which did not resettle at all showed minimum tendency to contraceptive adoption (Fig. 7B).

Figure 6. Percentage of currently married women using contraceptive in both districts

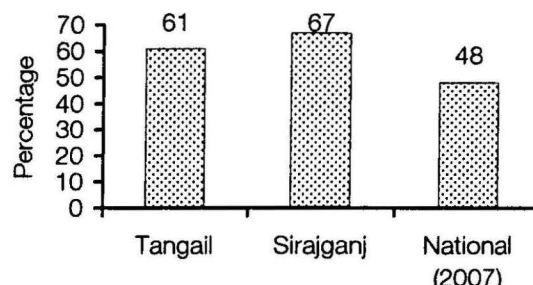
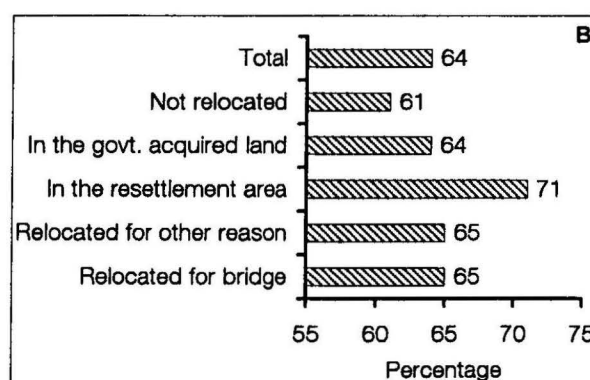
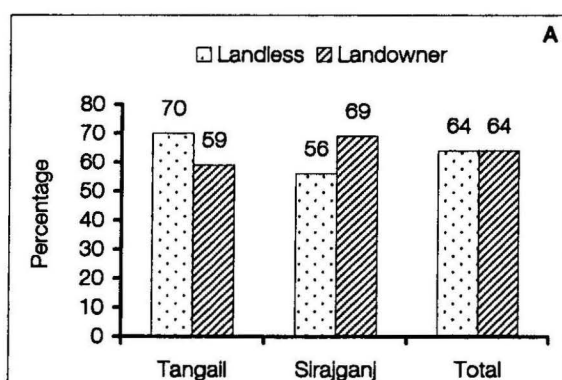


Figure 7. Percentage of currently married women using contraception according to landownership (A) and resettlement pattern of households (B)



Among the four previous categories of PAP a higher proportion of women from squatter category reported to use contraceptives than the other three categories (Table 9). Oral pill was found to be most popular means of family planning in both districts followed by injection, ligation, and condom (Appendix D10). Oral pill had higher acceptance in Sirajganj (72%) compared to Tangail (59%). The higher rate of contraceptive use in Sirajganj could be due to more activity of health workers there. However, in both the areas about 61% of users bought contraceptives from the shops (Appendix D11 & D12). Despite the involvement of hospitals in family planning campaign the adoption of family planning methods was low among the PAP during the pre-project period. However, the awareness regarding family planning improved over time and during post-project time people preferred to have less children.

Table 9. The number of currently married women from different categories of households in both the districts adopting contraceptives (%)

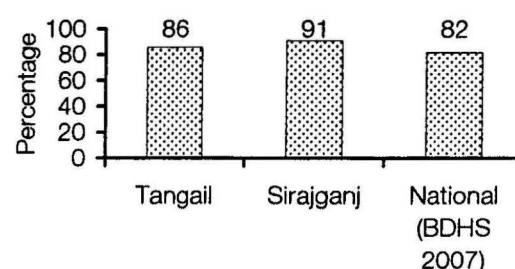
District	Use of contraceptive	Tenant	Landowner	Squatter	Others	Total	p value
Tangail	Yes	99 (56.9)	133 (59.9)	127 (66.8)	93 (59.6)	452 (60.9)	p>0.001
	No	75 (43.1)	89 (40.1)	63 (33.2)	63 (40.4)	290 (39.1)	
Sirajganj	Yes	63 (61.8)	160 (72.7)	125 (68.7)	86 (59.3)	434 (66.9)	
	No	39 (38.2)	60 (27.3)	57 (31.3)	59 (40.7)	215 (33.1)	

Child immunization (aged 12-23 months) and perception about health care services

Immunization coverage was universal for all vaccines among 12-23 months old children in both the districts (Appendix D13). The coverage was found to be much higher than national coverage (Fig. 8).

Various opinions regarding the incidence of illness were revealed since some informants opined that more illnesses and diseases occurred during the pre-project time due to lack of awareness. On the contrary, some other informants said that less illnesses and diseases occurred in pre-project time due to various reasons such as i) consumption of self-produced fresh vegetable and sufficient food and ii) staying at open extended homestead with open fresh air and sun light. In the past cholera, pox and some other fatal diseases occurred. Illnesses and diseases occurred more at present due to i) decrease in nutritional level because of less food intake, ii) use of chemical fertilizer in producing various food grains, and iii) congested plot in the resettlement site.

Figure 8. Vaccination coverage among children aged 12-23 months by areas and national coverage



During the pre-project period patients suffering from serious diseases had to travel longer distance for treatment at hospital. Patients suffering from common illnesses and diseases sought treatment from *kabiraj* (for herbal and spiritual healing) and *palli chikitsak*. In addition, patients suffering from fatal disease had to reach launch/boat *ghat* on their feet or to be carried on stretcher and then took boat for traveling to Sirajganj for treatment at hospitals. Besides, patients also sought treatment from physicians at Bhuapur. However, during the post-project period patients could seek treatment from physicians and hospital at Bhuapur, Ellenga and Tangail easily due to availability of improved transportation, communication, and treatment facilities.

LANDOWNERSHIP PATTERN, OTHER MOVABLE AND IMMOVABLE ASSETS

Landownership

For information regarding landownership of surveyed households only land with legal ownership was considered. However, the documents showing evidence of legal ownership of land claimed by the households were not physically checked. Only the oral statements of the households were considered for legal ownership of the land. In the earlier study Barua *et al.* (1993) mentioned that 398,154.51 decimals of land of different categories were acquired for the Jamuna bridge construction. Of these 327,451.70 decimals of land were located in Tangail and 70,702.81 decimals were in Sirajganj. Of the total acquired land, 83% were agricultural land, 10% homestead, and the rest were from fallow and other land.

However, in this study information were collected about households which lost land due to JMB project implementation as well as the other three categories who might not own land during the pre-project time but owned land during the post-project time. Among the surveyed households the landownership pattern changed by several means since the bridge construction. Other than losing land due to government acquisition, the households also purchased and sold land, lost land due to river erosion which ultimately changed landownership pattern. Present study revealed that farmland or land used for agriculture had been most severely affected due to land acquisition in both districts (Table 10). In Tangail, 37% of the total agricultural land was acquired and in Sirajganj it was 23%. However, of the total acquired land in both the districts 87% was agricultural land. Present landownership data of two districts indicate that 82% of the households in Tangail owned 39,727 decimals of land of different categories and in Sirajganj 86% households owned 34,678 decimals of land (Table 11). Nevertheless, the data also show that in Tangail the average amount of land for every household was 61 decimals and in Sirajganj it was 58 decimals.

Table 10. Amount of land (decimal) acquired by JMB project and the amount of residual land

Landtype	Tangail			Sirajganj			Total		
	Amount of land before JMB	Amount of land acquired	Remaining (%)	Amount of land before JMB	Amount of land acquired	Remaining (%)	Amount of land before JMB	Amount of land acquired	Remaining (%)
Homestead	8247	2189	73.5	6249	1597	74.4	14496	3786	73.9
Farmland	52435	19600	62.6	42094	9797	76.7	94529	29397	68.9
Fallow land	1710	391	77.1	1458	39	97.3	3168	430	86.4
Other land	129	27	79.1	803	62	92.3	932	89	90.5

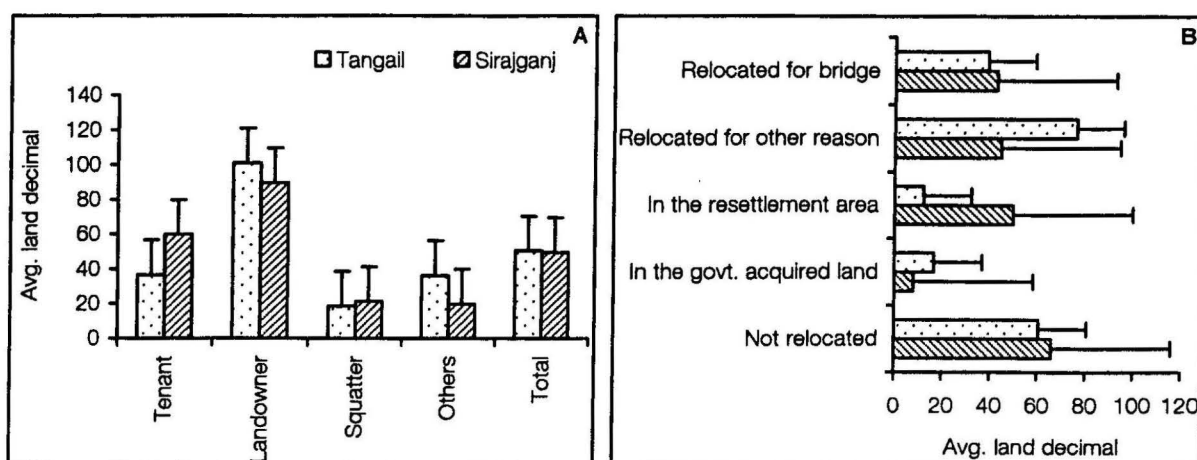
Table 11. Current landownership status in both districts

Landownership pattern	Tangail		Sirajganj	
	Number of household s and (%)	Amount of land decimal	Number of households and (%)	Amount of land decimal
Owned by household	648 (82.3)	39727	599 (85.8)	34678
Land sold after bridge construction	43 (5.5)	1728	92 (13.2)	5404
Land purchased after bridge construction	310 (39.4)	8920	260 (37.2)	6030
Land lost by river erosion	56 (7.1)	7992	8 (1.1)	597

The landownership pattern of different categories of households shows that the average amount of land owned by the landowner category in Tangail had more land (101 decimals) compared to that of Sirajganj (90 decimals). The tenant category in Tangail owned less land compared to Sirajganj (Fig. 9A). The squatters in both districts showed identical pattern in terms of landownership. The others category in Tangail owned more land compared to that of Sirajganj. It is worthy to note again that the category of households mentioned here have been made depending on the compensation disbursement during the bridge construction and does not necessarily state the post-project status of the households. From the findings of this study it can be stated that other than landowners compensated for losing land, present landownership pattern shows that the other three household categories, who did not lose land or might not own land during the pre-project time, however, owned land during the post-project time.

Fig. 9B shows the average landownership of households resettled in different areas. Households, in both of the districts, still located on the government acquired land had the lowest average amount of land compared to other four resettlement patterns. Households located in the resettlement area of Tangail owned more average land than that of Sirajganj (Fig. 9B).

Figure 9. Average landownership (in decimal) of different categories of households (A) and resettlement pattern of households (B) in both districts



Houses and other structures

Table 12 shows that in both the districts around 40% of the households did not relocate due to the bridge construction and they were found in the same place as they were before the bridge construction. Apart from that in the both districts around 7% of households were still located in the government acquired land and did not relocate to new site, even though they received compensation for the land acquisition and resettlement. However, around one-third of the households relocated due to the bridge construction, with identical trend between the districts. About 8% of the households in Tangail and 6% in Sirajganj were found to be rehabilitated in the government resettlement area. The rest of the households relocated for other reasons. Household relocation of different categories in both districts separately shows that the squatters resettled most followed by the landowners, others, and tenant categories (Appendix D14, D15).

Table 12. Location of households in both districts after the bridge construction

Location of households	Tangail	Sirajganj	Total
	Number of households (%)	Number of households (%)	Number of households (%)
Relocated due to the bridge construction	255 (32.4)	217 (31.1)	472 (31.8)
Relocated for other reasons	93 (11.8)	103 (14.8)	196 (13.2)
Relocated in the resettlement area	56 (7.1)	46 (6.6)	102 (6.9)
The household is in government acquired land	59 (7.5)	53 (7.6)	112 (7.5)
The household has not been relocated	324 (41.2)	279 (40.0)	603 (40.6)
Total	787 (100)	698 (100)	1485 (100)

Opinions regarding the river erosion and land accretion show that 65% of respondents in Tangail and 60% in Sirajganj opined for reduced riverbank erosion. While 46% and 51% household heads, respectively in Tangail and Sirajganj, opined for increased land accretion. However, majority of the household heads (>80%) in both the districts agreed that reduction of flood intensity was observed after the bridge construction.

Fascinating information was found through qualitative research. It shows that in Tangail district many project-affected people relocated in suitable residual land instead of relocating in the government resettlement site. They did not want to relocate in the resettlement site as they were skeptical about the social environment of the resettlement site and suspected that living in colony might breach seclusion (*pardah*) of women. Adult males guarded for the whole night immediately after relocation in the resettlement site. Some participants mentioned that the reasons associated with not to relocate in the resettlement site were i) small sizes of plots in the resettlement site unsuitable for large joint families, ii) inconvenience of constructing several houses in small plots, iii)

lack of enough space for rearing livestock, etc. Nevertheless, unwillingness of the households to go far away from the residual lands was found another psychological factor for not moving to the resettlement site. Many people wanted to live within a short distance from the affected village, which was close to a business and commercial centre, for example, Gobindashi in Tangail. A considerable number of PAP had land in char and they were not willing to relocate in the resettlement site. There was also preference of *upazila* head quarters for resettlement among the PAP. In Tangail district some people left the resettlement site after selling their plots.

Duration of establishment of the houses also gives an indication about the relocation pattern. About 76% households in Tangail and 79% in Sirajganj were built about 6 years earlier (Appendix D16). Barua et al. (1993) found that 85% of the households in Tangail and 89% in Sirajganj were more than 6 years old. The reduction of number of old households in the present study might be considered as an indication of relocation and splitting of households in recent times.

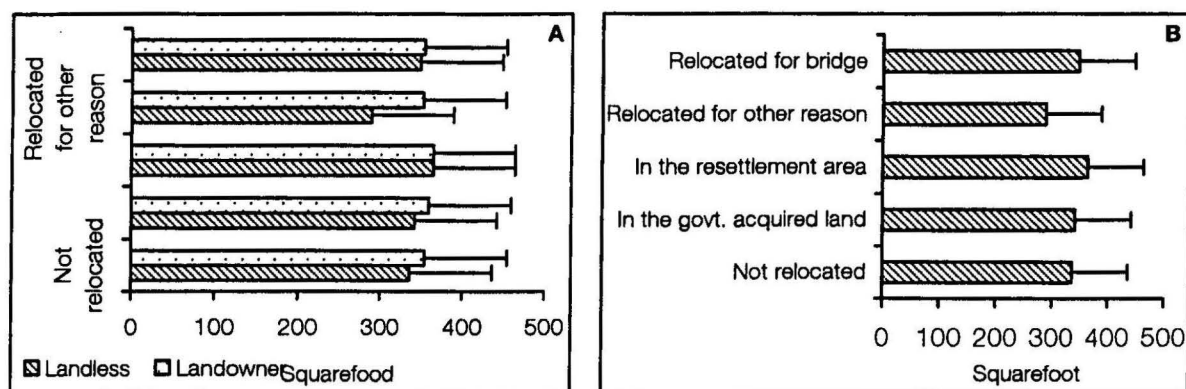
The households in the project-affected districts were found to be comprised of a main house accommodating bed room, living room, kitchen and/or other rooms together or separated and used for cooking, accommodating cattle and/or poultry, place for rice husking, small industry, shop, etc. It was observed from the study that 3,660 rooms were found in both the districts accommodating 1,485 households. Around 41% of the rooms were used for sleeping, 29% for kitchen and 5% for sitting. Fourteen percent of the rooms were used for accommodating cattle possessed by the households in both the districts. In Tangail the average number of rooms owned by the households was 3 while it was 2 in Sirajganj (Appendix D17). Barua et al. (1993) found that nearly 56% of the household rooms were used for sleeping or living, which was considerably higher than that found in the present study. However, around 24% of the rooms were used for cattle and poultry, which was only around 15% in the earlier study. This indicates that more of the households were involved in rearing cattle and poultry than pre-project time. However, out of 1,485 households surveyed in both the districts one household lost the house for river erosion and it was not possible to collect relevant data. The average number of rooms for every household was 3 in Tangail and 2 in Sirajganj. There was a significant difference in average household size of both the districts regardless of the household category. Among different categories of households in both districts the landowner category had bigger household size compared to other three household categories. However, landowners of Sirajganj had more space (399.7 square foot) compared to that of Tangail (376.8 square foot) (Table 13). Households of other category in Sirajganj had a minimum space to live (267.2 square foot).

Table 13. Average area of house in both districts according to category of PAP

District	Category of households	Total area ft. ²	Average area ft. ²	Number of households	Minimum area ft. ²	Maximum area ft. ²
Tangail	Tenant	69329	346.6	200	36.0	1012.5
	Landowner	84778	376.8	225	78.8	1386.0
	Squatter	62046	316.6	196	121.5	1057.5
	Others	54356	327.4	166	72.0	1440.0
Sirajganj	Tenant	37685.3	358.9	105	112.5	1242.0
	Landowner	93523.5	399.7	234	78.8	2227.5
	Squatter	60761.3	305.3	199	27.0	2025.0
	Others	42491.3	267.2	159	9.0	562.5

The average area of main house according to landownership (Fig. 10A) and resettlement pattern (Fig. 10B) shows that landowners had slightly bigger houses. However, households still located in the government acquired land had the lowest average size of houses.

Fig. 10. Average area of houses (in square foot) according to landownership (A) and resettlement pattern of households (B)



Corrugated tin was the predominant construction material used in the houses (Appendix D18). In 84% of the households of both the districts the walls were made of tin, while around 98% of the houses had the tin-made roof. However, the floors of the houses were predominantly *kancha* (88%).

Livestock and poultry

In both the districts not all PAP had livestock of all kinds. Some of them had either cow, goat, lamb, poultry birds, or several kinds of them, while some other did not have any kind of livestock at all. Nevertheless, in Tangail among different kinds of livestock and poultry cow, goat, chicken and duck were the most frequent (Appendix D19). The average number of cow, goat, lamb, chicken and duck in every household in Tangail were 2, 2, 2, 5 and 6 respectively with the average unit prices in order of Tk.14,150, Tk.1,922, Tk.1,106, Tk.156 and Tk.141.

Similar to Tangail cow, goat, lamb, chicken and duck were more predominant among the households having livestock in Sirajganj with an average number of 2, 2, 3, 7 and 8 in every household and average unit price of them were Tk.12,175, Tk. 2,032, Tk. 3,517, Tk. 151 and Tk.141, respectively. The distribution of livestock according to the household category show that landowners had more average number of cow, goat, chicken, duck and pigeon compared to the other categories (Appendix D19).

Table 14. Average number of livestock (LS) in the households (HH) according to previous categories

Category	Tenant			Landowner			Squatter			Others		
	# HH	Avg. LS	Std. Dev.	# HH	Avg. LS	Std. Dev.	# HH	Avg. LS	Std. Dev.	# HH	Avg. LS	Std. Dev.
Cow	104	2	2	146	3	2	77	2	1	77	2	1
Goat	44	2	1	91	2	2	80	2	1	49	2	1
Lamb	4	1	1	8	3	3	2	2	1	2	5	4
Pig	2	3	1	0	0	0	0	0	0	0	0	0
Chicken	128	6	8	176	6	5	143	4	3	106	7	19
Duck	63	3	2	78	13	53	39	4	4	35	3	3
Pigeon	10	9	4	14	8	4	6	8	5	9	9	9

The prices of livestock during the pre-project and post-project times would be totally different and comparison of values of livestock might not be representative. Thus, analyses are more appropriate based on the average number of livestock. Barua *et al.* (1993) found that average number of livestock and birds owned by the PAP was reduced due to land acquisition. The

livestock could be considered as a source of cash income for the households. Reduction of average number of livestock indicates reduction of moveable asset among the households. Nevertheless, with regard to the category of PAP the landowners had higher average number of livestock and poultry compared to the other three categories (Table 14).

Ownership of major trees

Ownership status of major trees among the PAP shows that in both of the districts coconut, mango, jackfruit, areca nut, hog plum and *guava* trees were common. Other than the fruit trees there were also trees for timber and fuel wood as well as bamboos. These trees could be considered as a source of both tangible and intangible benefits for the households. Tangible benefits of trees could be in the form of fruits and timber or fuel wood, while providing sheds and green environment could be considered as the intangible benefits for the households. The average number of various trees, either fruit trees or other trees for timber or fuel wood, was higher in Tangail compared to Sirajganj (Appendix D20). Landowners had more average number of trees either for fruit or for timber and fuel wood (Table 15).

Table 15. Total and average number of trees in every household of both the districts by the previous categories of households

Type of trees	Tenant (n = 305)		Landowner (n = 459)		Squatter (n = 396)		Others (n = 325)		All (n = 1485)	
	Total	Avg.	Total	Avg.	Total	Avg.	Total	Avg.	Total	Avg.
Coconut	265	1	522	1	142	0	210	1	1139	1
Mango	1003	3	2042	4	1219	3	942	3	5206	4
Jackfruit	722	2	1661	4	972	2	790	2	4145	3
Areca nut	1505	5	2609	6	587	1	1295	4	5996	4
Hog plum	38	0	70	0	20	0	18	0	146	0
<i>Guava</i>	195	1	313	1	233	1	168	1	909	1
Other fruit	204	1	845	2	706	2	569	2	2324	2
Other timber	1560	5	4424	10	2121	5	1066	3	9171	6
Fuelwood	86	0	235	1	276	1	74	0	671	0
Bamboo	9227	30	20193	44	2990	8	9129	28	41539	28

The average value of trees was Tk. 8,357 in Tangail and Tk. 8,241 in Sirajganj (Appendix D21). An appraisal was also made on the fruits collected from the household trees which were used for household consumption and the excess was sold in the market. The average annual value of fruit produced in every household of Tangail was Tk. 1,781 and in Sirajganj it was Tk. 1,519 (Appendix D22). During the pre-project time every household had an average of 3 coconut, 11 mango, 8 jackfruit, 33 areca nut, 7 *guava* and 94 other major trees in every household of Tangail district, while the same in Sirajganj was in the order of 4, 6, 6, 17 and 74 in every household. If we compare the present finding of the average number of trees of different kinds in every household of both the districts with that of pre-project time it clearly shows a reduction in terms of number of trees and the benefit from them.

Amenities/utilities

Around half of the total households in both the districts had access to electricity. However, the electricity use in Sirajganj was higher than Tangail (Fig. 11). Among the four categories of PAP higher proportion of tenant share croppers and landowners used electricity in both the districts compared to the others and squatters (Appendix D23).

Less number of households located in the government acquired land used electricity compared to the other resettlement sites. However, maximum proportion of households used electricity, which did not relocate at all (Fig. 11B). Besides, in both of the districts straw and plant

residuals were the predominant source of fuel for cooking followed by other minor sources like fuel wood and cow-dung (Table 16). Majority of the households (around 75%) in both districts dumped off the household residues in a fixed place rather than spreading over different places or dumping off abruptly (Table 17).

Figure. 11. Present and pre-project scenario of electricity usage in both districts (A) and resettlement pattern of households (B)

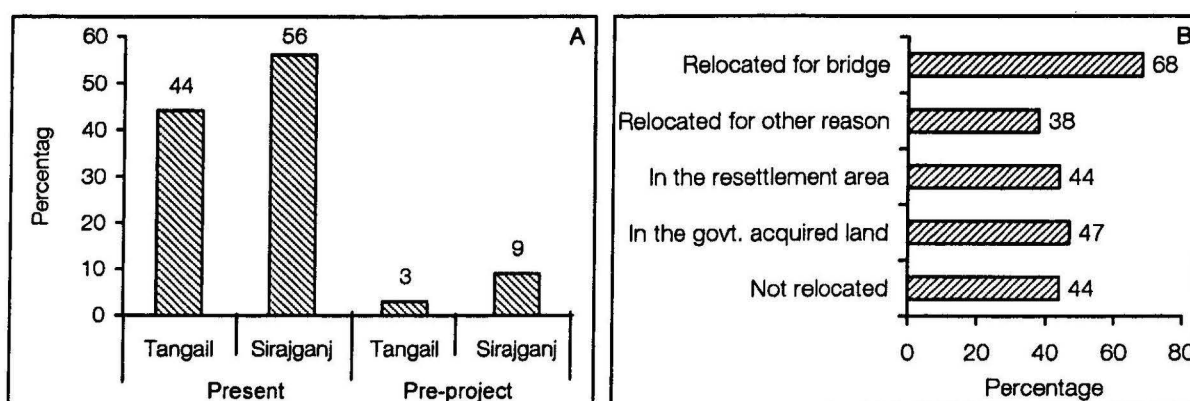


Table 16. Type of fuel used for cooking in the households of both districts

Type of fuel	Tangail # of households (%)	Sirajganj # of households (%)	Total # of households (%)
Fuel wood	206 (26.2)	172 (24.6)	378 (25.5)
Straw	489 (62.1)	448 (64.2)	937 (63.1)
Dried cow dung	91 (11.6)	66 (9.5)	157 (10.6)
LP gas	1 (0.1)	12 (1.7)	13 (0.8)
Total	787 (100)	698 (100)	1485 (100)

Table 17. Dumping off household wastes in both districts

Dumping off household waste	Tangail	Sirajganj	Total
	Number of households (%)	Number of households (%)	Number of households (%)
Here and there	218 (26.7)	145 (20.8)	363 (24.4)
Fixed place	569 (72.3)	553 (79.2)	1122 (75.6)
Total	787 (100)	698 (100)	1485 (100)

Multiple answers were considered

Household land tenure arrangement, occupation, income, deposit and debt

Tenure arrangements

The land tenure arrangement of the two districts shows that 19% of total households in Tangail and 15% in Sirajganj cultivated only self-owned land with an average land size of 76 and 60 decimals respectively (Table 18). A higher percentage of households in Sirajganj had the mixed land tenure pattern with own and/or rented in and/or rented out, compared to that of Tangail. Barua *et al.* (1993), also found a drastic reduction of the number of households cultivating own land in both the districts, which were 57% and 49% respectively in Tangail and Sirajganj during the pre-project time.

Table 18. Post-project land tenure arrangement in Tangail and Sirajganj

Tenure type	Tangail				Sirajganj			
	# of house-holds (%)	Own land avg. decimal	Rented in avg. decimal	Rented out avg. decimal	# of house-holds (%)	Own land avg. decimal	Rented in avg. decimal	Rented out avg. decimal
Cultivate own land	150 (19.1)	75.9	-	-	107 (15.3)	60.4	-	-
Cultivate own and rent-in	101 (12.8)	72.1	84.9	-	98 (14.0)	44.7	73.7	-
Cultivate own and rent-out	31 (3.9)	177.5	-	70.8	42 (6.0)	167.1	-	79.5
Rent-out all	24 (3.0)	70.3	-	70.3	21 (3.0)	156.3	-	156.3
Rent-in all	148 (18.8)	-	70.9	-	98 (14.0)	-	64.0	-
Cultivate own and rent-in/out	14 (1.8)	100.0	52.4	35.5	35 (5.0)	73.2	69.1	41.7

It also shows that 27% of total households in Tangail and 25% in Sirajganj cultivated only owned land with an average land size of 165 and 118 decimals in pre-project time (Table 19), which was much higher than the post-project scenario. A higher proportion of households in Tangail (17.8%) was tenant farmers renting in land compared to that of Sirajganj (6%).

Table 19. Pre-project land tenure arrangement in Tangail and Sirajganj

Tenure type	Tangail				Sirajganj			
	# of HHs %	Own land avg. decimal	Rented in avg. decimal	Rented out avg. decimal	# of HHs %	Own land avg. decimal	Rented in avg. decimal	Rented out avg. decimal
Cultivate own land	247 (27.4)	165.4	-	-	227 (25.2)	117.5	-	-
Cultivate own and rent-in	82 (9.1)	10.4.1	98.4	-	92 (10.2)	64.7	109.1	-
Cultivate own and rent-out	7 (0.8)	155.4	-	98.4	16 (1.8)	436.8	-	195.8
Rent-out all	2 (0.2)	170.0	-	170.0	6 (0.7)	147.0	-	147.0
Rent-in all	160 (17.8)	-	89.9	-	54 (6.0)	-	88.7	-
Cultivate own and rent-in/out	-	-	-	-	7 (0.8)	144.7	64.6	44.3

The change of landownership pattern could be explained by the land acquisition for bridge construction and failure of the PAP to buy new land to adjust the lost land. A number of reasons behind their failure to buy new land were revealed. However, PAP who were squatters and did not have any land during the pre-project time got landownership due to resettlement in the government resettlement site. A woman of squatter group in her LHs opined, *"Previously I was an 'uthuli' and now I have got a permanent address due to obtaining homestead land in the government resettlement area"*.

The reasons behind not purchasing land were revealed as i) lack of surplus agricultural land, ii) compensation was quite less than the price of available land, iii) affected people were skeptical about ownership of land, iv) they were not allowed to purchase land of any PAP, and v) inadequate saleable land, as people did not want to sell land without any emergency such as accident, marrying daughter off etc. Furthermore, within the scope of the policies land procurement was a pre-requisite for getting full compensation. The scenario reflects difficulties of land purchase in a land scare country like Bangladesh.

Occupation

The post-project occupation of study population in both districts shows that other than housewives and students, day labor was the most frequent occupation followed by agricultural activities. Proportion of day laborers was higher in Sirajganj compared to Tangail where

comparatively more people were involved in farming (Table 20). This finding contradicts with the findings of Barua *et al.* (1993) reporting farming as the predominant occupation of PAP.

Table 20. Post-project occupation of PAP in both districts

Occupation	Post-project occupation		Pre-project occupation	
	Tangail number of people (%)	Sirajganj number of people (%)	Tangail number of people (%)	Sirajganj number of people (%)
Day labour	424 (12.4)	645 (19.9)	322 (13.1)	433 (18.0)
Agriculture	303 (8.9)	178 (5.5)	348 (14.2)	207 (8.6)
Business	213 (6.2)	177 (5.4)	96 (3.9)	103 (4.3)
Employment	150 (4.4)	133 (4.1)	35 (1.4)	63 (2.6)
Student	985 (28.8)	833 (25.6)	649 (26.4)	685 (28.4)
Housewife	1059 (31.0)	972 (29.9)	845 (34.4)	764 (31.7)
Unemployed	185 (5.4)	240 (7.4)	106 (4.3)	136 (5.6)
Others	102 (3.0)	71 (2.2)	53 (2.2)	20 (0.8)
Total	3421 (100)	3249 (100)	2454 (100.0)	2411 (100.0)

Other than farming, study and housekeeping, more or less similar proportion of people in both districts was involved in business and service. If we compare the post-project occupational composition with that of the pre-project time we find that in both of the districts the proportion of people involved in study and housekeeping were similar to the post-project time (Table 20). However, more people were involved in farming in both of the districts earlier. In contrary to Sirajganj, proportion of post-project day labours in Tangail showed a slight reduction than earlier. Additionally more people in both districts were found to be involved in business and employment compared to that of pre-project time.

Pre- and post-project occupation of household heads shows that during the pre-project time there was less number of day labour household heads in Tangail compared to present (post-project) time. However, in squatters and others categories proportion of day labours was reduced than the pre-project time. The overall number of household heads having occupation as day labor reduced slightly in the present time. The most notable change of occupation was found in farming. Considerably higher proportion of household heads from tenant (53.5%) and landowner (46.3%) category were involved in farming during the pre-project time, which reduced to 40.6% and 32.9% respectively currently. The overall percentage of household heads involved in farming reduced from 35.5% to 26.7% in Tangail. Considerably higher percentage (19.8) of household heads got involved in business and service compared to that was earlier (13.7%) (Fig. 12, 13).

Similar to the occupational change of household heads in Tangail there were also reduction in farming during the post-project time (18%) compared to that of pre-project time (23.4%). More people from the tenant and landowner category were involved in day labor in the present time. During the pre-project time the majority of the PAP were agricultural farmers and agricultural labourers. They used to work for cultivation of various crops like paddy, jute, *china*, onion, wheat, sesame, potato, garlic, nuts, Boro, IRRI, tobacco and various types of pulses (*khesari*, and *mash kalai*) in their land. Those who were landless also had opportunity to work as agricultural wage labourers. Those days they consumed their self produced food and used to buy kerosene oil, salt, and clothes. It revealed that affected people who compelled to purchase land in longer distance after resettlement had difficulty in cultivation of their land. Those farmers' difficulty perpetuated throughout the whole cycle of agricultural activities i.e. during tilling, transplanting, weeding through harvesting crops. They found more difficulty in carrying harvested paddy and other crops to their residences due to long distance. More importantly, those who relocated in Gorilabari and Beltia villages had to move through the cantonment or the path lied along the southern boundary of the cantonment. Presence of cantonment hampered their free movements with goods and commodities.

Figure. 12. Post-project and pre-project occupation of household heads of different categories in Tangail

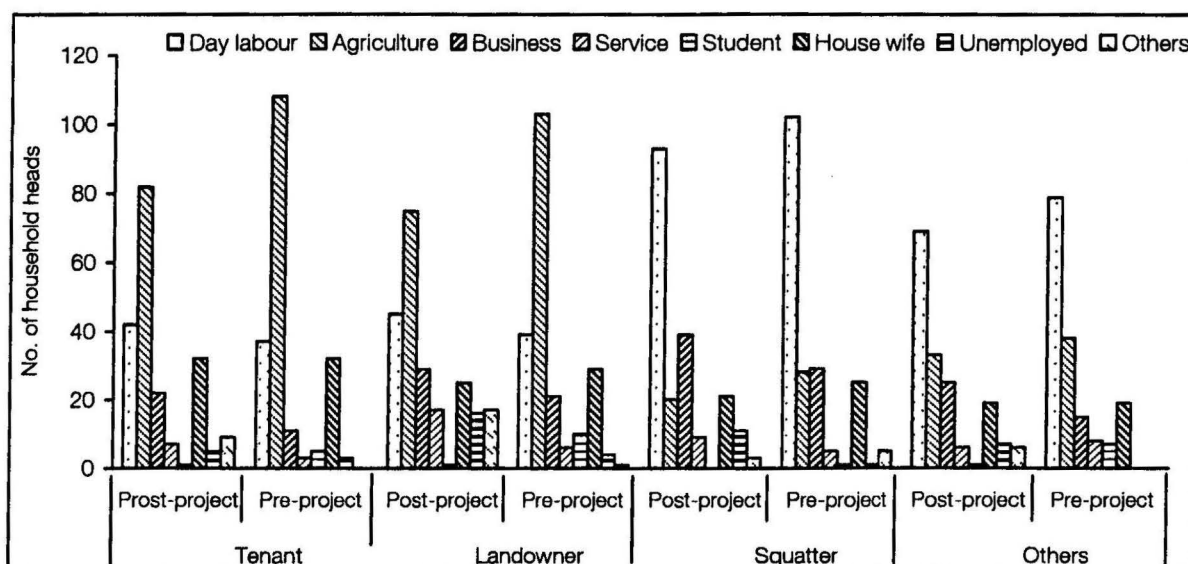
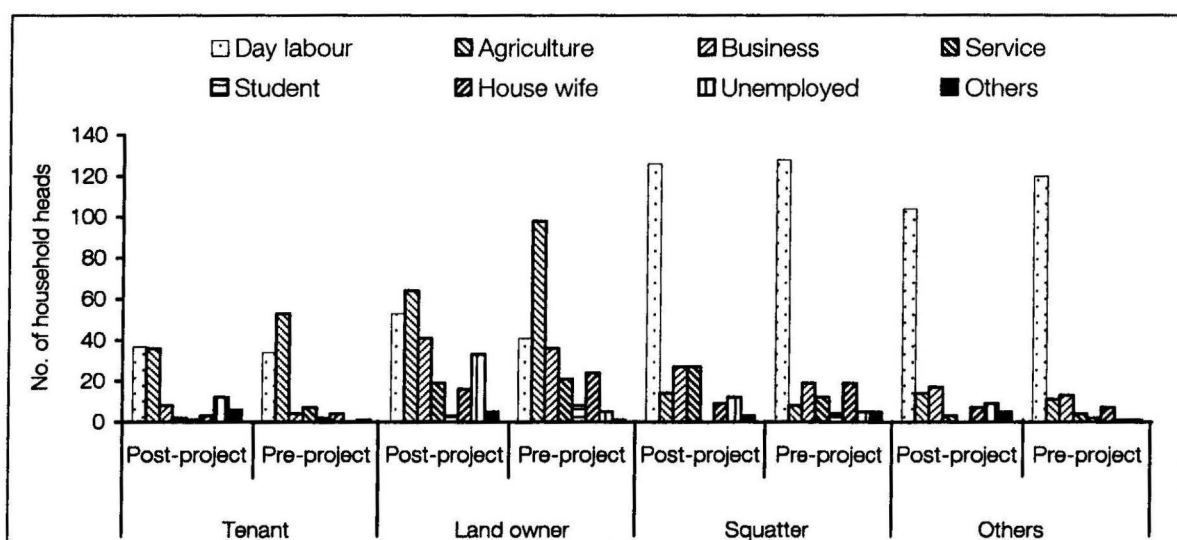


Figure. 13. Post-project and pre-project occupation of household heads of different categories in Sirajganj



Distribution of occupation of PAP by age group shows that considerable number of women within 15 years and older age group were involved in house keeping in both of the districts. People between 5-29 years age groups were involved in study. However, people involved in farming and day labor were from all age groups ranging from 10 to >65 years. Comparatively more people of the middle age group ranging from 25-50 years in Tangail were involved in business and employment, while people of the same age group in Sirajganj were more involved in working as day labours (Appendix D24 and D25). Occupational shifting of household heads in both districts showed that there were higher shifts from farming or agriculture to other occupations e.g., day labour (4%), business (3%) and being unemployed (3.6%). A considerable proportion of household heads moved to business from day labour (around 3%), day labour to farming (2%) and being unemployed (2.6%). Around 72% of the household heads had no occupational changes (Appendix D26).

Qualitative study indicated that during the pre-project time people who sold dresses had capital ranging from approximately Tk. 8,000 to Tk. 12,000 for their business. They used to sell

dresses in Pabna, Rajshahi, Khulna, Jessore, and some other districts. They used to buy Tangail *sharis*, print *sharis*, three pieces, and *lungi* from Karotia and Shahzadpur markets. Carrying clothes from Karotia was time consuming and tedious due to poor communication. They were also engaged in agricultural activities. The peddling of clothes/dresses increased due to better transportation and communication facilities available after construction of the Jamuna Bridge. They also sold clothes in foot paths in different *haats*. During the post-project time they required capital ranging from Tk. 25,000 to Tk. 30,000 for buying clothes from Karotia market for their business. In pre-project time one piece of *shari* was sold at various prices ranging from Tk. 200-800. They could make profit ranging from Tk. 1,500-2,500 in a 7-10 days trip. During the post-project time those who were peddling clothes could earn Tk. 8,000-10,000 per month. One respondent said, "My household made Tk. 27,000 profit by peddling dresses in the Ramadan month only." Peddling clothes was considered as a profitable occupation during the post-project times.

During the pre-project period agriculture in self-owned land or share cropping was the most common occupation followed by fishing, pulling rickshaw van, peddling clothes and business. The shifting of occupation was not easy in many instances. For example, people who were involved in river transport activities wanted to shift to road transport activities during the post-project time, but they experienced either resistance or less cooperation from the existing road transport workers. A considerable number of people who had limited agricultural land had to involve in day labour (pre-dominantly non-agricultural) during the post-project time. However, day labour and pulling rickshaw were not considered as prestigious as agriculture.

Female household members were involved in various housekeeping and agricultural works e.g., preserving food grains, seed storing, rearing livestock and poultry. The activities of housewives in the post-project time were more related to income generating activities like embroidery works, sewing and stitching on *kantha*, making *sika*, rearing livestock and poultry etc. Women involvement in such activities contributed to improve the household livelihood standard due to increased income. Furthermore, it also led to empowerment of women.

Household income

In Tangail, agriculture was the main source of annual household income, responded by more than 52% of the household heads. Selling labor for non-farm activities was another common source of income followed by business, service and day labour for agriculture. Further stratified analyses based on sources of income show that in Tangail annually on average Tk. 54,509 was earned from business, Tk. 36,121 from non-agricultural day labor, Tk. 19,496 from agriculture and Tk. 50,772 from service.

Table 21. Source of income in both districts of the study area

Source of income	Tangail		Sirajganj	
	Number of households and (%)	Average income Tk.	Number of households and (%)	Average income Tk.
Agriculture	411 (52.2)	19496	355 (50.9)	26872
Day labour (agriculture)	123 (15.6)	25924	187 (26.8)	23726
Day labour (non-agriculture)	302 (38.4)	36121	339 (48.6)	33780
Fishing	18 (2.3)	15161	19 (2.7)	11415
Service	149 (18.9)	50772	107 (15.3)	46069
Remittance	72 (9.1)	93828	22 (3.2)	60591
Pension	5 (0.6)	86840	6 (0.9)	47896
Business	197 (25.0)	54509	147 (21.1)	83406
Old age allowance	18 (2.3)	2618	27 (3.9)	3284
Widow allowance	14 (1.8)	3800	8 (1.1)	3675
VGD	12 (1.5)	5417	5 (0.7)	2915
Food for education	34 (4.3)	1319	12 (1.7)	1575
Food for work	5 (0.6)	13400	2 (0.3)	2900
Others	2 (0.3)	13000	1 (0.1)	15000
All	787 (100.0)		698 (100.0)	

Similarly, in Sirajganj agriculture was the most frequent income source (51%) of the households, followed by non-agricultural day labor, business, day labour for agriculture, service etc. However, the average income of households in Sirajganj from business was found to be higher than that of Tangail (Table 21). In Tangail, 89% of the household income came from agriculture and 78% in Sirajganj. Earning from both agricultural and non-agricultural day labour was the second most common occupation followed by business and service in both of the districts during pre-project time. Barua *et al.* (1993) also indicated agriculture as the most common source of income among the PAP.

The household income in last one year shows that landowners of Sirajganj had higher average annual income compared to the same category of households in Tangail (Table 22). In both of the districts tenant cultivators had the second highest average total annual income. Nevertheless, in both districts landowners had maximum average annual income among all categories. It is quite interesting that although agricultural land reduced due to construction of the JMB, however, due to adoption of High Yield Variety (HYV) agriculture remained the primary source of income for the PAP even after the bridge construction.

Table 22. Average annual total income of households in Tangail and Sirajganj according to category of households

Category	Tangail		Sirajganj	
	No. of households	Average total annual income Tk.	No. of households	Average total annual income Tk.
Tenant	200	53726	105	59153
Landowner	225	74498	234	76477
Squatter	186	52196	196	47952
Others	166	51140	159	52429
All	777	61219	694	63936

Around 53% households in Tangail and 62% households in Sirajganj reported to sell manual labour more than 100 days a year. In both districts selling labour more than 100 days a year was frequent among squatters than the other three categories. The tenants of Tangail used to sell more daily labour compared to that of Sirajganj. Proportion of poor people was higher among others and squatters categories compared to the tenant and landowners (Table 23).

Table 23. Percentage of households having member who sells manual labour more than 100 days a year and economic status of the households (%)

District	Tenant	Landowner	Squatter	Others	Total
Tangail	53.5	36.0	62.2	63.3	52.7
Sirajganj	56.2	35.9	80.0	81.1	61.9

Skill development training for the affected people

Regardless of category of PAP 89% in Tangail and 96% in Sirajganj mentioned that they did not receive any skill development training. Qualitative study showed that DORP, RADOL, Krishan, Udayan Sangha and Sonar Bangla NGOs provided occupational and income generating training to the PAP. Training schemes included health and hygiene, vegetable gardening, poultry rearing training etc. DORP offered honorarium to participants during the training at a rate of Tk. 200 after three days of training. DORP also gave micro credit support to the trainees for income generating activities. Some other NGOs namely RADOL, Krishan, Udayan Sangha and Sonar Bangla imparted training about transplantation of saplings.

Outstanding loan

Information regarding outstanding loan shows that majority of the households (67%) in both districts had outstanding loans, 64% and 68% respectively in Tangail and Sirajganj. The major sources of loan were NGOs, friends, relatives, neighbors, debts in the shops and local

moneylenders (Table 24). It is noteworthy that people were more interested to borrow money from NGOs than other sources. In Tangail, around 47% of the households borrowed money from NGOs, which was only 38% in Sirajganj (Appendix D27). This gives the indication of higher NGO activity in Tangail compared to Sirajganj. Similarly the average loan size was found to be higher in Tangail compared to Sirajganj. In both of the districts higher proportion of people in squatter category had outstanding loan.

Table 24. Number and percentage of households having outstanding loan in both districts

District	Outstanding loan	Tenant	Landowner	Squatter	Others	Total
Tangail	Households having loan (%)	126 (63.0)	122 (54.2)	145 (74.0)	113 (68.1)	506 (64.3)
	Average amount of loan Tk.	16615	21596	20735	20003	19780
	n	200	225	196	166	787
	Households having loan (%)	73 (69.5)	150 (64.1)	142 (71.0)	110 (69.2)	475 (68.1)
Sirajganj	Average amount of loan Tk.	16933	24694	19193	10365	18686
	n	105	234	200	159	698

In terms of average amount of loan in both districts the landowner category shows bigger amount compared to other three categories (Table 24). However, if we compare the present finding with the earlier study it shows that only 39% of the households had outstanding loan. Of these, 37% was in Tangail and 44% in Sirajganj (Barua *et al.* 1993).

With regard to the resettlement pattern of households in both districts there was no significant difference in terms of having outstanding loan. However, the average amount of loan the households had varied according to the resettlement pattern (Table 25). Household not relocated at all had the maximum average amount of outstanding loan compared to the other three patterns of resettlement.

Table 25. Number of households having outstanding loan and average amount of loan (in Taka) according to resettlement pattern

Resettlement pattern	Number of households resettled	Number of households having loan (%) Tk.	Average amount of loan Tk.	Std. Deviation Tk.	Minimum loan Tk.	Maximum loan Tk.
Relocated due to bridge	472	326 (69.1)	27639	66125	100	1000000
Relocated for other reason	196	133 (67.9)	26869	49060	20	300100
Relocated in the resettlement site	102	68 (66.7)	28968	47292	500	300000
In the government acquired land	112	75 (67.0)	13531	20694	100	155000
Not relocated	603	379 (62.9)	34410	112260	100	1650000
Total	1485	981 (66.1)	29164	82772	20	1650000

Savings

About 67% of households reported that they saved money either in bank or NGO or as cash in hand or loan given to others (Table 26). Higher proportion of the households in Tangail district saved money in different NGOs (42%), whereas in Sirajganj the tendency was more to keep cash in hand (32%, Appendix D28). The average amount of savings was found to be higher in Sirajganj compared to that of Tangail. In both districts landowners had higher average amount of savings

compared to the other three categories. The amount of average savings was Tk. 29,835 in Tangail and Tk. 28,359 in Sirajganj. Barua *et al.* (1993) found that only 10% of households in Tangail and 5% in Sirajganj had savings.

Table 26. Number and percentage of households having deposited money in both districts

District	Deposit of money	Tenant	Land owner	Squatter	Others	Total
Tangail	Households having	133	129	132	113	507
	deposited money (%)	(66.5)	(57.3)	(67.3)	(68.1)	(64.4)
	Avg. amount Tk.	7848	12719	6922	2787	7942
	n	200	225	196	166	787
Sirajganj	Households having	58	182	126	112	478
	deposited money (%)	(55.2)	(77.8)	(63.0)	(70.4)	(68.5)
	Avg. amount Tk.	14914	20608	13070	2141	13385
	n	105	234	200	159	698

Table 27 shows the information with regard to the savings of households' resettlement pattern in both districts. Households located on the government acquired land had higher tendency to save money compared to the other resettlement pattern. However, households which did not resettle at all had the maximum amount of saved money.

Table 27. Number of households having savings and average amount of savings (in Tk.) according to resettlement pattern

Resettlement pattern	Number of households resettled	Households having savings (%)	Avg. amount of savings Tk.	Std. Deviation Tk.	Min-max. Tk.
Relocated for bridge	472	270 (57.2)	17319	78895	20-1007000
Relocated for other reason	196	123 (62.8)	17388	125709	10-1390000
Relocated in the resettlement site	102	61 (59.8)	9349	23586	100-150000
In the government acquired land	112	62 (67.0)	9148	30216	40-201500
Not relocated	603	341 (56.6)	22407	183270	10-2600000
Total	1485	857 (57.7)	18195	132937	10-2600000

Self-rated economic status and quality of food

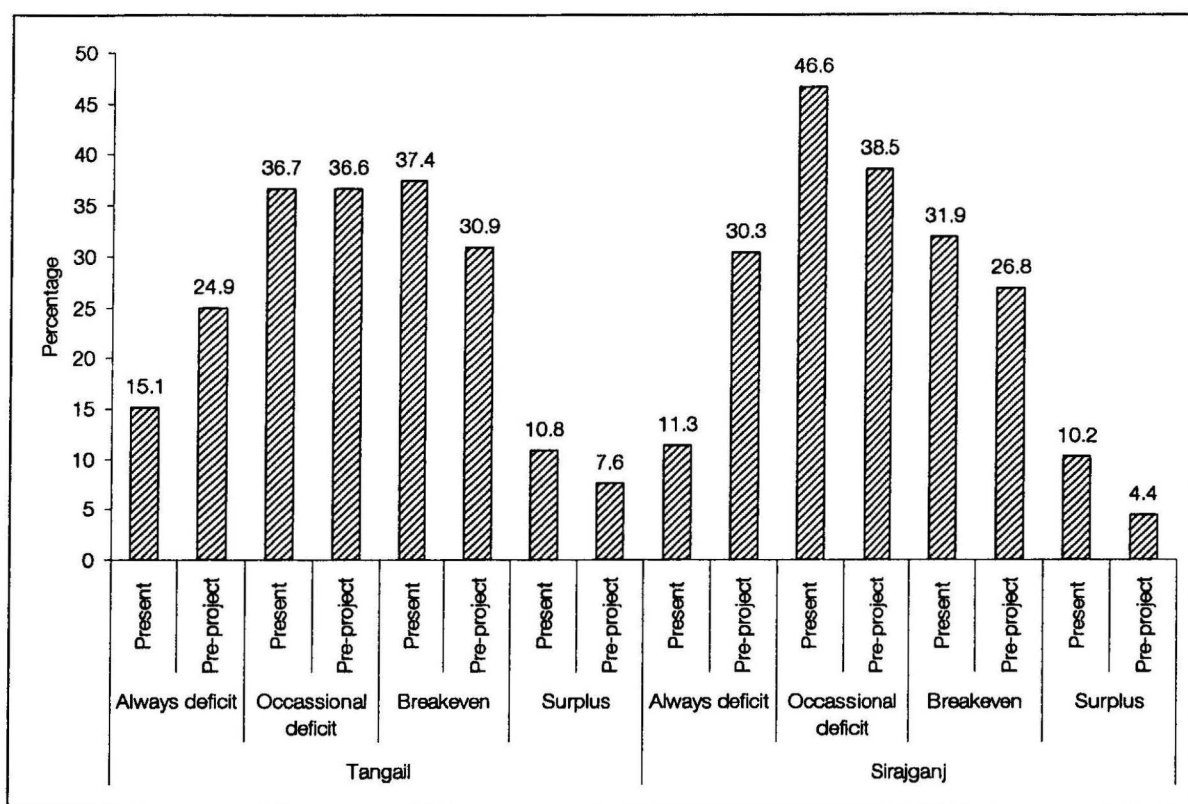
Among the four previous categories of households both in Tangail and Sirajganj, less proportion of landowners rated their economic status as always in deficit (Table 28). Households from others and squatter category in both districts, rating their economic status as always in deficit, were found to be more vulnerable than the landowners and tenants. The same economic scenario was reflected when the economic status was considered as surplus.

Table 28. Self rated economic status of different previous categories of households

Self-rated economic status	Tangail				Sirajganj			
	Tenant # and (%)	Land owner # and (%)	Squatter # and (%)	Others # and (%)	Tenant # and (%)	Land-owner # and (%)	Squatter # and (%)	Others # and (%)
Always deficit	27 (13.5)	22 (9.8)	38 (19.4)	32 (19.3)	11 (10.5)	9 (3.8)	31 (15.5)	28 (17.6)
Occasional deficit	67 (33.5)	64 (28.4)	93 (47.4)	65 (39.1)	42 (40.0)	91 (38.9)	114 (57.0)	78 (49.1)
Breakeven	85 (42.5)	107 (47.5)	45 (22.9)	57 (34.3)	44 (41.9)	95 (40.6)	43 (21.5)	41 (25.8)
Surplus	21 (10.5)	32 (14.2)	20 (10.2)	12 (7.2)	8 (7.6)	39 (16.7)	12 (6.0)	12 (7.5)

However, the overall scenario of self rated economic status of the PAP shows improvement during the post-project times when compared to that of the pre-project time reported by Barua *et al.* (1993) (Fig. 14). The qualitative study showed that during the pre-project time people consumed milk, *aman* and *aus* rice, home made bread, fish and fresh vegetable, of which a significant proportion came from their farmland produced by themselves. However, during the post-project time they were more dependent on purchasing foods. The rice variety of IRRI were grown and consumed more frequently by the farmers. Regarding the quality of food some households opined that during the pre-project time they used to consume more self-grown food, while presently they consumed foods mainly bought from the market which were grown by using chemical fertilizer and insecticides. The households opined for higher food price during the post-project time. Nevertheless, some of the households opined that they consumed better food during the post-project time though the food price increased.

Figure 14. Present and pre-project self rated economic status of the households in both districts



Again, it was intended to know their opinion regarding spending surplus money. A higher proportion of PAP in Tangail wanted to buy land compared to Sirajganj (Appendix D29). Furthermore, PAP in Sirajganj liked to invest in agricultural activities while in Tangail business was the most popular sector. Around 83% households in Tangail and 63% households in Sirajganj did not mention any option for the investment of surplus money.

Disbursement and utilization of monetary compensation

Disbursement of compensation

In Tangail, the average compensation for each household was calculated to be Tk. 32,626 while in Sirajganj Tk. 17,571 (Table 29). However, the amount of compensation fixed by the government varied depending on the amount of land acquired, resettlement of households, loss of house or other structures, loss of occupation, loss of accommodation etc. It also indicates that there is a gap between the amount of compensation fixed for the households and the amount received by the PAP.

Table 29. Amount of money allocated and received as compensation in both districts

Compensation	Tangail			Sirajganj		
	Number of households	Total amount Tk.	Avg. Tk.	Number of households	Total amount Tk.	Avg. Tk.
Amount of money allocated	773	25219644	32626	695	12211565	17571
Amount of money received	773	24435535	31570	695	9345284	13466

Several problems related to the appraisal of lost properties and in fixing compensation were revealed. Poor record keeping by the landowners and respective responsible offices as well as providing less time to draw compensation were reported to be major problems in this regard. Compensation could not be drawn due to problem with the 1962 land record. A number of affected people were deprived of their compensation because of giving 'no claim undertaking'. Complain was raised by affected people for not giving compensation against land under the main component of the Jamuna Bridge. However, resettlement unit clarified that main component of the Bridge was constructed on eroded land. Previous owners (until erosion of land) could not draw compensation for eroded land as it was considered as government land. It was reported that a considerable number of the affected people could not draw full money even after more than one decade due to non-release of acquired vested property from vested property list and existence of land dispute under litigation, etc.

The compensation for the PAP losing land was disbursed in four phases e.g., 1) cash compensation under the law (CCL), 2) premium, 3) maximum allowable replacement value (MARV) and 4) stamp duty. Drawing compensation in different phases by affected siblings was cumbersome due to communication cost and also loss of daily income. To avoid such loss "no claim undertaking" was authorized in favor of one by his/her siblings. However, the rigid payment modality did not support such "no claim undertaking" in other phases of compensation disbursement e.g., premium, MARV and stamp duty. Thus the some of the PAP were deprived of their shares of compensation due to the bureaucratic process. However, among the children it was a frequent tendency to deprive the sisters from their compensation share.

MARV was allocated to the PAP for the purchase of new land as a substitute for the lost land. However, the PAP found difficulty in drawing MARV after purchasing land due to complexity with documents. Several other problems related to complexities in drawing compensation included i) unavailability of DC award book within the required time, ii) landownership dispute, iii) time bound compensation disbursement allowing insufficient time to solve ownership disputes as well as arranging necessary documents, and iv) some middlemen manipulating and harassing the PAP.

Both in Tangail and Sirajganj districts poor and elderly people experienced more difficulty in drawing compensation and grants due to lack of knowledge and experience about the procedures as well as hesitation to access the authorized offices. The affected people were harassed in many instances and the responsible authorities took longer time to disburse compensation.

Bribe related issues

A question was posed to know what proportion of people provided bribe for getting compensation. It shows that 18% of people gave bribe in getting compensation. Of these, a higher proportion of people in Tangail gave bribe compared to people in Sirajganj (Table 30).

Table 30. Proportion of people gave bribe for receiving compensation by districts

Gave bribe for compensation	Tangail, # of households and (%)	Sirajganj, # of households and (%)	Total, # of households and (%)
Yes	200 (25.4)	74 (10.6)	274 (18.5)
No	587 (74.6)	624 (89.4)	1211 (81.5)
Total	787 (100)	698 (100)	1485 (100)

The employees of DC office created a situation for taking bribe against payment of compensation revealed from the qualitative study. If there was any spelling mistake found in the names of PAP then the officials demanded bribe. In such circumstances, the PAP sought assistance from *matbbar* or local leaders to mediate the process of offering bribe. According to informants, the affected people could get compensation within two days if they gave bribe. The affected people were compelled to pay about 10% of compensation money to DC administration as bribe to draw cheque of CCL. In Sirajganj district some of the affected people were deprived from compensation due to lack of deeds and documents of acquired land. However, they were given compensation if they gave bribe to the concerned officials. Those who took bribe warned the affected people not to disclose the incident. However, a very few respondents in Tangail district said that they did not offer bribe prior to drawing compensation as they had all necessary deeds, documents, and receipts of tax payment against acquired land and homestead.

Utilization of compensation

The compensations received by the PAP had been used for a number of different uses in different extents. In both of the districts the compensation money was spent for family expenditure (55%). Repairing houses, purchase of land, health care expenditure, business, farming, wedding and other ceremonial expenditure were among the other notable causes of spending compensation money (Table 31).

Table 31. Utilization of compensation by households in both districts

Use of compensation	Tangail	Sirajganj	Total
	Number of households (%)	Number of households (%)	Number of households (%)
House repairing	280 (35.6)	270 (38.7)	550 (37.0)
Land purchase	145 (18.4)	167 (23.9)	312 (21.0)
Business	33 (4.2)	23 (3.3)	56 (3.8)
Farming	34 (4.3)	60 (8.6)	94 (6.3)
Debt repayment	23 (2.9)	47 (6.7)	70 (4.7)
Family expenditure	445 (56.5)	377 (54.0)	822 (55.4)
Health expenditure	52 (6.6)	70 (10.0)	122 (8.2)
Payment for returning borrowed land	6 (0.8)	1 (0.1)	7 (0.5)
Wedding and ceremonial expenditure	33 (4.2)	30 (4.3)	63 (4.2)
Deposit in bank	3 (0.4)	1 (0.1)	1 (0.1)
Others	50 (6.4)	53 (7.6)	103 (6.9)
n	787 (100)	698 (100)	1485 (100)

It is quite interesting that only 18% of the households in Tangail and 24% in Sirajganj invested compensation money for purchasing land as a permanent means of livelihood restoration. However, if we consider the amount of the total money spent for different purposes we can find that 37% of the total money in Tangail was spent for land purchase, while only 25% was spent for the same purpose in Sirajganj. Less households in Tangail spent money for land purchase compared to Sirajganj but the total amount of money spent was higher in Tangail. It might be due to fact that land was more expensive in Tangail (Appendix D30).

Around 54% of the total money in Sirajganj was spent for house repairing and consumption, while it was only 40% in Tangail. A similar scenario was noted in earlier study (Barua *et al.* 1993). However, out of the total money 17.5% in Tangail was spent for consumption, which was 29% in Sirajganj. About 22% of compensation was spent for land purchase in Tangail and 17% in Sirajganj.

Quality of life

Assessment of quality of life may further provide an idea about the overall scenario in terms of the livelihood standard of the PAP. Table 32 shows that a higher proportion of tenants and landowners rated their quality of life as good compared to the squatters and others categories. Significantly higher proportion of poor PAP rated their quality of life as poor compared to the non-poor (Table 33).

Table 32. Quality of life of respondents by categories of affected people (%)

Status of quality of life	Tenant	Landowner	Squatters	Others	All
Good quality of life	60.3	62.2	37.2	40.7	50.4
Poor quality of life	39.7	37.8	62.8	59.3	49.6
n	305	458	388	323	1474

Table 33. Quality of life of respondents by economic status of the households (%)

Status of QoL	Poor	Non-poor	All	P value
Good quality of life	33.3	67.1	50.4	p<0.001
Poor quality of life	67.3	33.9	49.6	
n	673	817	1490	

It indicates that significantly higher proportion of study participants in Sirajganj rated their quality of life as poor compared to the participants in Tangail district. In the present study around half (50%) of the participants rated their quality of life as poor (Table 34).

Table 34. Quality of life of respondents by location of the households (%)

Status of QoL	Tangail	Sirajganj	All	P value
Good quality of life	55.3	44.4	50.4	p<0.001
Poor quality of life	44.7	55.6	49.6	
n	817	673	1490	

Probability of rating good quality of life was less likely among the people in Sirajganj compared to Tangail (OR 0.66). Women were less likely to rate good quality of life than men. Participants who owned ≥ 50 decimals amount of land were more likely to rate good quality of life compared to who owned ≤ 50 decimals amount of land. Participants of deficit households were less likely to rate good quality of life. Households owned ≤ 50 decimal of land and any member of the household selling manual labor for ≥ 100 days in a year (non-poor) to maintain financial needs of the households were less likely to rate good quality of life compared to their counterpart. Compared to the landowners' probability of rating good quality of life was lower among the squatters and other categories of PAP (Table 35).

Table 35. Odds of reporting good quality of life (QoL) among the study participants

Predictors	OR	95% CI	p value
Areas			
Tangail	1		
Sirajganj	0.66	0.50-0.85	p<0.01
Land size			
Less than 50 decimal	1		
50 decimal and above	1.9	1.3-2.7	p<0.001
Self-rated economic status of household			
Non-deficit	1		
Deficit	0.09	0.07-0.12	p<0.001
Sex of the respondents			
Men	1		
Women	0.75	0.57-0.99	P<0.05
Economic status			
Non-poor	1		
Poor	0.53	0.39-0.72	p<0.001
Category of PAP			
Landowner	1		
Tenant	0.71	0.49-1.0	ns
Squatters	0.66	0.45-0.97	p<0.05
Others	0.64	0.43-0.94	p<0.05

Present settlement pattern and resettlement preferences

Availability of educational, religious, social institutes and healthcare facilities

Acquisition of some of the educational, religious and social institutes falling within the acquired land during the construction of Jamuna Bridge might be unavoidable. In some instances relocation of these institutions might not be feasible rather establishing a new one. JMBA while implementing the RRAP established several social institutions after the bridge construction. Thus, it was observed that there was a considerable increase of various institutes and medical facilities after the implementation of JMB (Table 36).

Table 36. Number of social institutions available, acquired and founded in both districts

Type of community facility	Present		Acquired		Newly established	
	Tangail	Sirajganj	Tangail	Sirajganj	Tangail	Sirajganj
Mosque	220	137	11	5	63	40
Madrasa	63	44	4	4	19	13
Moktob	122	67	4	3	28	28
Graveyards	45	35	5	2	8	4
Temple	28	22	1	0	2	0
Primary School	95	42	5	1	40	4
Secondary School	17	20	1	1	2	8
Social Organization	72	56	4	1	33	34
Public/Private Medical Center	28	19	0	0	10	8
Market Place	27	24	3	1	8	3
Others	28	11	0	1	6	6

Advantages from the JMB for the PAP

The opinions regarding the benefits of Jamuna bridge construction show that households of all categories responded positively about the improvement of (more than 95%) communication in both of the districts (Table 37). A considerable number of people opined that it increased employment opportunity and the price of land went up in Tangail. However, in Sirajganj more people opined that it increased price of land together with increased employment and business opportunities

Table 37. Opinion on benefits of Jamuna bridge construction according to household category and areas (%)

Benefit of Jamuna bridge construction	Tangail				Sirajganj			
	Tenant	Landowner	Squatter	Others	Tenant	Landowner	Squatter	Others
Ease of communication	200 (100.0)	215 (95.6)	193 (98.5)	165 (99.4)	102 (97.1)	221 (94.4)	188 (94.0)	153 (96.2)
Increased trading	33 (16.5)	25 (11.1)	28 (14.3)	28 (16.9)	14 (13.3)	31 (13.2)	48 (24.0)	16 (10.1)
Increased land price	24 (12.0)	38 (16.9)	12 (6.1)	15 (9.0)	38 (36.2)	103 (44.0)	19 (9.5)	17 (10.7)
Increased employment	50 (25.0)	34 (15.1)	30 (15.3)	36 (21.7)	24 (22.9)	37 (15.8)	57 (28.5)	34 (21.4)
No benefit at all	10 (5.0)	1 (0.4)	1 (0.5)	12 (7.2)	2 (1.9)	15 (6.4)	7 (3.5)	10 (6.3)
Others	7 (3.5)	6 (2.7)	15 (7.7)	6 (3.6)	0 (0.0)	3 (1.3)	11 (5.5)	1 (0.6)
n	200 (100.0)	225 (100.0)	196 (100.0)	166 (100.0)	105 (100.0)	234 (100.0)	200 (100.0)	159 (100.0)

The qualitative study found that prior to the bridge construction a huge volume of fruit, vegetable and other fresh raw material were damaged due to slow river transport system.

Improved communication system facilitated the establishment of more local markets where the farmers could directly sell their produced food items and got higher price. The agricultural activities were modernized during the post-project time due to the use of HYV of seeds, diversification of crops, using chemical fertilizer, irrigation and power tiller machine etc. The modernization of farming system was opined to contribute positively in income generation and ensuring food security of the households.

There was ease of physical mobility of people after the JMB construction, which enhanced the business activities and services of PAP and other household members. Moreover, the availability of gas favored the establishment of industries in the area and created job opportunities for the locals. Many of the PAP benefited from working directly in the bridge construction as labors and suppliers.

With regard to the improvement of services like education, healthcare, law and order situation the PAP agreed about the improvement of facilities after the bridge construction. PAP opined that more schools, colleges and *madrassas* were established during the post-project time, which significantly increased the literacy in both districts. Similarly the health care facilities improved due to improved communication and availability of health services. Disputes over landownership reduced after the bridge construction as well as improvement of law and order situation due to the presence of cantonment.

Livelihood status of PAP was found to improve compared to that of pre-project time. Even though some families were severely affected due to acquisition of agricultural and homestead land, they could restore or even improve their standard of living during the post-project time. Their own effort, higher job opportunities, increase of land price and involvement in different income generating activities during the post-project time also influenced the amelioration of livelihood status. Some of the squatters opined about positive effect of resettlement in the government site. PAP opined that due to resettling in the government resettlement site they got a permanent address of their households, could avoid uncertainties and problems arising from river erosion. Furthermore, they got access to better utilities like safe water, education and healthcare.

Disadvantages of the JMB

Regardless of a number of advantages experienced by the PAP due to construction of the JMB, they also mentioned several disadvantages. PAP who lost land strongly opined losing land as a major demerit of JMB construction. However, the squatter and others categories in Tangail opined mostly for loss of homestead as a major disadvantage. Some other disadvantages are changes of occupation and reduction of income (Table 38).

Table 38. Opinion on the demerits of Jamuna bridge construction according to household category of Tangail and Sirajganj

Demerits	Tangail				Sirajganj			
	Tenant	Landowner	Squatter	Others	Tenant	Landowner	Squatter	Others
Losing land or home stead	39 (19.5)	219 (97.3)	151 (77.0)	67 (40.4)	33 (31.4)	228 (97.4)	45 (22.5)	48 (30.2)
Change of occupation	29 (14.5)	27 (12.0)	25 (12.8)	22 (13.3)	18 (17.1)	5 (2.1)	13 (6.5)	8 (5.0)
Income reduction	23 (11.5)	30 (13.3)	13 (6.6)	30 (18.1)	20 (19.0)	38 (16.2)	16 (8)	21 (13.2)
No demerit at all	57 (28.5)	2 (0.9)	30 (15.3)	55 (33.1)	53 (50.5)	5 (2.1)	134 (67)	85 (53.5)
Others	81 (40.5)	4 (1.8)	5 (2.6)	12 (7.2)	1 (1.0)	4 (1.7)	3 (1.5)	5 (3.1)
n	200	225	196	166	105	234	200	159

The PAP who lost either homestead or agricultural land reported the difficulties of drawing compensation for the lost property. They had to visit different land offices for collection of documents and deeds to prove the legal status of the ownership. They spent some money as bribe to get the compensation money smoothly. It also happened that there were disputes over landownership and it required long time to solve the dispute. Some of the PAP were deprived of compensation due to phasing out of the compensation without paying for their lost properties.

However, the loss of agricultural land and leasing out led to income reduction for some households immediately after the JMB construction. The situation became worse due to the failure of PAP to buy equivalent amount of new land near their household. Furthermore, in some instances the PAP of landowner category could not cultivate their residual land freely due to the restriction imposed by the JMBA. Some of them had to face difficulty in cultivating land situated in long distances. This caused reduction of household crop production and subsequent income loss. Loss of income contributed to family disputes and disruption among the affected households. Changes of occupation from agriculture to other activities were associated with reduction of income among some of the PAP.

People who did not have their own land and used to live on others land, either government or private, as squatters faced hardships after the displacement. PAP who resettled in *char* land had to face difficulty due to increased river erosion after the establishment of dams for bridge construction. After the displacement they stayed on road side for one year and did not get any regular work. However, one year later they resettled in the government resettlement site.

At the initial stage unavailability of sufficient healthcare facilities and lack of security in the resettlement site were reported. Female household members faced difficulty in commuting between the resettlement site and Sirajganj town for getting healthcare. Lack of sufficient drainage system and height of the hard point caused water logging in the resettlement site, which also caused the incidents of malaria among the inhabitants, revealed from the focus group discussions of the PAP.

Case studies

As part of the qualitative study and to supplement the findings of quantitative study several LHs were collected, which have been added here as case studies of PAP. This may allow having deeper insights about the resettlement and livelihood restoration processes of the affected people. A total of four case studies have been presented below from different categories of PAP. To maintain confidentiality of the participants the nick names have been used.

Case study 1: A squatter became a landowner

Johor (75 years old) presently living in the resettlement site of Sirajganj was compensated as an *uthuli*/squatter during the Jamuna bridge construction. He came from a farmer family of Nalsia village in Bhuapur upaziala of Tangail district, who were affected from severe river erosion for several times. Due to loss of agricultural land his occupation changed from farmer to daily wage labor. Johor was brought up by his elder sister after his father's death and got married in Chatragacha village, where he was living with his wife, two daughters and two sons in a traditional tin-shed house before the land acquisition for Jamuna Bridge. His daily earning was ranging from Tk. 40 to Tk. 50, which was the only income for his household expenditure. Meanwhile, his house was acquired by the government for which he was noticed by the Sirajganj Deputy Commissioner (DC) office as well as verbally by the *Union Parishad* chairman during 1992-93. A total Tk. 8,000 was given to him as compensation for removing his house after due appraisal by the DC office. Johor spent some money as bribe for receiving the compensation, but he was also informed of having scope to get household plot at the government resettlement site. He mentioned that he got short time for house removal. Due to sudden demolition of his house he took temporary shelter on others' homestead. Afterwards he relocated himself in the government land of Sayedabad until he got 2.5 decimals free of cost plot in the resettlement site. Spending an amount of Tk. 11,000, which was borrowed from his relatives, Johor could manage to buy 2.5 decimals additional land with his government allocated plot.

At the initial stage the resettlement area was like a desert and the wind blown sand frequently contaminated their food. Johor was the only earning member for all with sporadic work opportunity. In the new place there was limited opportunity to get work as agricultural day labor due to reduced farmland. He could not manage to work for the construction of Jamuna bridge like some other people from the resettlement site and he frequently traveled to Sirajganj town for work. During the pre-project period Johor's family could consume self-grown vegetable and could borrow food grains from the neighbors, if necessary. The loan could be paid in exchange of work in those households. Additionally, building rapport with the neighbors in the resettlement site was another hardship for Johor's family. The family had to starve often when Johor failed to earn money. No training was given to him for enhancing his income generation skill. In the recent times he faced difficulty to get work due to old age and illness.

Even though he passed his life in a subsistence family with lack of cash, he became the owner of a household land. He was happy as he could manage to marry off his two daughters. One of his sons was living in his father-in-law's house and the other one was living in another house in the resettlement site. In the resettlement site the settlers got access to tubewell water set up by the Resettlement Unit of JMBA. Before that they used the river water for different household works. Afterwards, he set up a tubewell in his household for getting access to safe water. He could manage to make relationship with the neighbors in the resettlement site after passing some time. He opined that lack of education and absence of close relatives were the hurdles for him to make good decision during crisis. Finally, he mentioned, *"How could I improve my economic condition, since I passed my whole life for dismantling and reconstructing houses?"*

Case study 2: Not resettling in the resettlement site was a great mistake

Miran (56 years old) is a farmer in Gorilabari village of Tangail who passed class eight. The annual income and expenditure of his household were Tk. 100,000 and Tk. 80,000 respectively. Though his wife was illiterate, but his three sons passed Kamil, Secondary School Certificate (SSC) and class nine, while two daughters passed SSC. His sons and daughters were between 15 and 25 years old and unmarried. His elder son used to send remittance for the family from abroad. Miran came from an economically well off joint family consisting of 50 members owning 100 *bighas* (3300 decimals) land mostly located in the Gorilabari, Jamunabali and Sarifabad *mouzas*. They only needed to buy salt, kerosene, edible oil and clothes for household consumption. However, afterwards he and his four other brothers split and formed separate households before the land acquisition for Jamuna bridge. His three sisters were married off and went to their father-in-laws' houses. During the pre-project time their family faced severe river erosion and loss of homestead before settling in the stable land of Gorilabari village.

The land acquisition process for the Jamuna Bridge construction took over some of his land in Gorilabari *mouza* for which Miran received Tk. 93,000 per acre (100 decimals) as CCL as well as premium against acquired land and standing crops. He also received compensation for every square feet of the acquired house. He and his brothers could manage to buy 56 decimals of homestead land, 1.5 km away from their former house in Gorilabari, at the rate of Tk. 200,000 per acre, of which his land was of approximately 11 decimal. He and his brothers made separate houses adjacent to each other. Regarding receiving compensation and plan for resettlement his elder brother was the key decision maker on behalf of the family. Miran and his brothers encountered problems like flooding, less welcoming attitude from the neighborhood, distant location of their farmland, transporting crops from farmland to houses over the cantonment and lack of good road network connecting to the bus and rail transport systems.

Apart from the compensation grants (CCL, MARV and house relocation) Miran also received 10 saplings, sanitary latrine and a shared tubewell. He mentioned that he spent 10% of the CCL as bribe. Miran could manage to spend some of his compensation money for purchasing new land, though not in equal amount he lost. Rest of the compensation money was spent for making new houses and for household consumption. He opined that lack of knowledge of the PAP about land related issues and price hike of land hindered the purchase of new land.

Comparing the pre-project scenario with that of the post-project, Miran mentioned that he could produce more than 100 *maunds* of rice as main crop together with jute, onion, wheat, sesame, potato and various types of lentils. At present he has to buy onion at price of Tk. 40 per kg whereas he stored onion in pre-project time. His annual income decreased due to decrease of farmland. He had to commute longer distance for getting *madrassa* education during the pre-project time. However, new *madrassa* was established with financial assistance from the villagers as well as the Resettlement Unit during the post-project time. The new *madrassa* was imparting education up to intermediate level not only for boys but also for girls. In pre-project time people had to travel longer distance for accessing healthcare facilities, Miran opined. They also sought for herbal and spiritual treatment. However, during the post-project times the availability of doctors, hospitals as well as other medical facilities increased. There was better access to safe water during the post-project time due to increased number of tubewells, while people used *kancha* well for water during the pre-project time. He noticed that the living standard improved in the post-project time compared to the pre-project time. However, he mentioned that the nutritional level decreased due to consumption of many foods bought from the market which were grown with the application of chemical fertilizer and other harmful chemicals. While in the pre-project time they consumed fresh fishes caught from the Jamuna river, home grown vegetable, fruits and milk. People used to entertain the guests and relatives with *dudh pitha* (traditional cake/bread soaked in sweet milk after mixing molasses/date molasses) in winter season. Both men and women used to wear more diverse clothes in the post-project times compared to that of pre-project.

Miran mentioned that the RDM officials informed him about the resettlement programme under Jamuna Bridge resettlement project. He was informed that roads would be constructed in the resettlement site together with other facilities like electricity supply, establishment of schools and hospitals. Though the RDM officials assured him and also his brothers about the opportunity to get plot in the resettlement site, they were unwilling to resettle there. The reasons behind not relocating in the resettlement site were i) the resettlement site was located in another *upazila* instead of their own *upazila*, ii) small sizes of plots and iii) lack of enough space for rearing livestock. However, during the post-project time Miran thought that the decision of not resettling in the resettlement site was a blunder. Thus, he afterwards applied for allocation of a plot in the resettlement site.

Case study 3: Sabina could manage to restore her livelihood after the bridge construction

Sabina (50 years old) was a housewife educated up to class five and lived in a joint family of Gorilabari mouza before the pre-project time. River erosion compelled her father-in-law to shift to Gorailabari from Jamunabali *mouza*. Her father-in-law's household was comprised of her father-in-law, her husband and six brothers-in-law. During the post-project time her household included her husband, three sons and one daughter. The pre-project economic condition of her father-in-law's household was good. Out of the total land her husband inherited a total of 5 *bighas* (165 decimals) in Gorilabari and Khasbiara *mouza*, which was acquired for the Jamuna bridge and received compensation share for houses, homestead land, agricultural land, trees and standing crops. He purchased 66 decimals of land after the land acquisition, of which he sold out 33 decimals to go abroad for overseas job and better income. Afterwards, Sabina Begum together with her two sons and one daughter lived in the household. Her elder son became a policeman and the other children were studying at different levels. Both her husband and elder son contributed for family income by sending money.

With regard to the land acquisition and resettlement of Jamuna bridge Sabina mentioned that only one week time was given for the removal of 4 thatch houses, 3 tin-shed houses and 1 broken house from her father-in-law's homestead during the pre-project time. The time was insufficient and the RDM officials helped them to dismantle and relocate the houses on the residual land. The residual land was preferred for resettlement even though RDM informed them about the opportunity to get homestead land in the resettlement site. Her younger brother-in-law, who was familiar with land related documents, drew compensation from the DC office on behalf of their extended family and distributed among the brothers. Sabina mentioned that it took three

years to buy new land with the CCL money due to increase of land price and lack of available land to purchase. It disrupted agricultural activities, which led her husband to involve in clothes business. Her husband did this business couple of years even after the resettlement, until going abroad. She said that it was expected the contractors of the Jamuna Bridge would employ local people for the construction jobs, but it did not happen to that extent as was expected.

However, DORP, an NGO imparted poultry rearing training to the affected people and provided honorarium to the trainees. The trainees were given micro-credit support for starting income generating activities. BRAC also provided micro-credit facilities to the affected people. In pre-project time her household cultivated various crops and did not need to buy food for their consumption. They used to buy only kerosene oil, salt, and clothes. They sold various surplus agricultural products such as lentils, garlic, and other crops at local markets. Sabina mentioned about better education facility due to establishment of more educational institutions and better quality during the post-project time. She also opined about improved communication and availability of better health care services in Ellenga and Tangail. Establishment of more tubewells and supply of ring slab latrines by RDM improved the water and sanitation scenario in the post-project time.

She concluded that her household was needy immediately after the land acquisition and relocation. However, the situation changed gradually due to more income of her husband from abroad and her son from job. Additionally, the manifold increase of land price enhanced financial security to her household. She was happy since she could also manage to continue cultivating the existing agricultural land.

Case study 4: Jamuna bridge construction increased income from clothes business

Mukul (50 years old) was living in the resettlement site of Tangail with his wife and two sons. He married off his only daughter immediately after relocating in the resettlement site. His elder son got married and led his separate family. One of the younger sons was studying in class eight and the other was in the primary school of the resettlement site. He got a share of Tk. 85,000 as compensation for the acquisition of his father's 165 decimal agricultural and homestead land as well as houses, banana plants, mango trees, bamboo clumps and guava trees. However, he claimed that no compensation was given for their acquired tube-well. For drawing compensation he did not give bribe as he had all necessary deeds, documents, and receipts of tax payment. He together with his father and brothers resettled in their residual land immediately after the land acquisition. However, massive river erosion and flood compelled them to resettle in the resettlement site, where they made separate houses.

He spent his compensation for i) purchasing plots in the resettlement area, ii) construction of houses, iii) marrying off daughter and iv) for treatment. He stayed at hospital for 3 months for the treatment of broken leg due to a truck accident. In this circumstance, his wife had to take loan from NGOs. His household borrowed Tk. 50,000 from Setu (NGO), Tk. 15,000 from DORP, and Tk. 20,000 from *Polli Daridra Bimochon*. His household was paying Tk. 2,600 per week as installment of loan repayment.

Mukul had been involved in clothes-business for more than a decade. He sold clothes in Pabna, Rajshahi, Khulna, Jessore, and other districts as well as on the footpaths of markets. He purchased clothes from the renowned Karotia clothes market. In the pre-project time he faced difficulty to buy clothes from Karotia due to poor communication system. He had to travel on feet during dry season and by boat during monsoon from their village to Gobindashi to ride on the bus to travel between Gobindashi and Karotia market. He used to sell various clothes i.e. Tangail *sharis*, print *sharis*, and three pieces. He took buses and launch at Gobindashi and Bhuapur ferry ghat for traveling to above mentioned districts for selling clothes. In pre-project time his capital was Tk. 12,000 for clothes-business. He used to sell one pair of *shari* at various rates, such as Tk. 400, Tk. 1,000, and Tk. 1,600. At the end of a week long peddling he could make profits ranging Tk. 1,500 to Tk. 2,500. The profession was tedious and less profitable during the pre-project time. However, the construction of Jamuna bridge and the improved road network leading to

better communication system changed the scenario in the post-project time. He needed to invest Tk. 30,000 for the business, but he could easily travel to Karotia, Jokarchar, Bajitpur and Tangail clothes market to purchase clothes and as well as selling them easily in different districts. In the post-project time his household income increased many-folds. He could earn Tk. 8,000-10,000 monthly. Mukul made profit of Tk. 27,000 in the last Ramadan month. He sold clothes and cultivated land in the pre-project time. In the post-project time his household was solely dependent on clothes business. His father had houses made of thatch and catkin in char village before the bridge construction, while after the bridge construction he could manage to build tin-made houses and his family kept their houses clean. However, his family had to buy all kinds of vegetable and food items from the market after the land acquisition due to dependence on business only.

Mukul mentioned that during the pre-project time the school was located in far distance, so enrollment of students was lower. Children who enrolled and continued studying had to struggle for traveling long distances. A considerable number of boys assisted their fathers in agricultural activities. However, the post-project situation was different as more schools were located in close distance and thereby enrollment increased with the availability of better quality education. Boys did not need to assist their fathers for agricultural activities due to decreased agricultural activities, opined Mukul. In pre-project time people suffered from less illness due to consumption of self produced fresh vegetable. However, to seek treatment they found difficulty in commuting between their village and Gobindashi due to lack of good communication. They used to walk during dry season and traveled by boat during monsoon. From Gobindashi they had to take bus, rickshaw and/or van to reach Bhuapur to get medical facilities. After the resettlement they could easily commute between resettlement site and any hospitals to get improved treatment.

Mukul mentioned that he and his family members used to put on old and torn out clothes in the pre-project time. As a farmer people did not feel the necessity to have clean and new clothes. However, after the Jamuna bridge construction the mobility of the household members increased and they owned 4/5 set of clothes. His sons did not want to wear old dresses rather they wanted new shirts, pants and shoes. He realized that they were leading life differently in a literate society of modern age.

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DISCUSSIONS AND CONCLUSION

This study examined livelihood status of PAP who were affected either directly or indirectly due to the construction of Jamuna bridge, and thereby received compensation to restore and maintain their livelihood. An optimistic impact emerged on several indicators such as communication, literacy, sanitation, child immunization, provision of healthcare services, economic status, and savings. The resettlement process allowed obtaining homestead land among the landless people such as squatters, which was important for this segment of people. On the other hand, negative impact noted on ownership of land especially agricultural land and livestock rearing which was obvious due to lack of adequate agricultural land and enough space as they had earlier. Due to substantial price hike of land a considerable number of people could not buy the same amount of land they lost. Instead they began business, bought rickshaw, van and mortgaged in land. The situation was aggravated further as the affected people were not allowed to buy land in other districts to avoid complex administrative procedures by the implementing agencies. Although land is a good proxy for livelihood in rural Bangladesh, however, availability of other sources of income played alternative role in maintaining and restoring livelihood.

Findings from the quantitative data clearly show that proportion of poor people reduced substantially over time. This is supported by two important indicators such as self-rated food security status and economic status assessed based on predetermined criteria. In recent times reduction of poverty level in rural areas of Bangladesh was noted (Hossain 2009). However, it is worthy to note that as the PAP are special group hence higher proportion of poor people might be among them. Interestingly, comparison with national level data clearly indicates that they were able to return to their livelihood status through income generation activities and resettlement intervention. It is attributable from the findings that resettlement intervention created an enabling environment to operate their income earning activities. Furthermore, this study implies that the living standard of people improved, as people owned more dresses, literacy rate increased and most people possessed corrugated tin-made houses. All these indicators can be considered as proxy of good living standard. Improvement of literacy rate has close link with the livelihood improvement in terms of adoption of modern technique for agriculture, gender equity, women empowerment, family planning, reduced child mortality, improved maternal health, and reduction of diseases (Oxenham 2008). The lower rate of displacement among affected people also suggests that resettlement process provided an enabling condition in the areas. The occupational status of some people changed due to the involuntary displacement as anticipated. However, in absence of adequate agricultural activities people who were involved in this sector switched to other non-farm activities, business and services. Business opportunities notably increased as people could move to any place within a short possible time. Availability of diverse transport options made lives of the people easier. Many people were involved in clothes business across the nearby districts. It is worth noting that both Tangail and Sirjaganj districts are famous for loom factories and the products of loom factories are very popular among the people. A considerable number of agriculture wage labors switched to pulling rickshaw and vans. These activities allowed them to maintain their livelihoods.

Interesting to note that, availability of healthcare services important to give relief of severely ill people was quite difficult before the bridge construction. Research indicates that provision of better healthcare services may save unexpected healthcare expenditure, which is important for poor people (Su *et al.* 2006). Access to safe water, sanitation and child immunization may have impact on health status of individuals. It may have further impact positively on income erosion and healthcare expenditure due to less prevalence of illness. Therefore, it is reasonable to attribute that such improvement was possible due to the resettlement intervention.

Presence of NGOs increased access to formal microfinance opportunities and potentials of savings substantially. Furthermore, as NGOs provided skill development training, this might have crucial role in restoring and maintaining livelihoods. Impact of microfinance on livelihoods and the role of NGOs in improving human skill development are well documented (Bali *et al.* 2008). This also shows a strong involvement of PAP with NGOs.

Similarities and differences were present in some of the indicators between the east and west banks of affected people. Differences are reflected in terms of economic status and quality of life. In the contrary, similarities are noted in terms of availability of healthcare services and ownership of land. However, some variations between the areas are likely as people in the east bank enjoyed relatively diverse benefits than the west (Sirajganj) i.e. government resettlement area in the east (Tangail) bank was well connected with the town, they received higher compensation for their lost properties. Furthermore, people in the east bank experienced several positive aspects compared to the west e.g., proximity to and communication with the capital of Bangladesh, thereby cumulative effects might be expected. As a result, it is likely that more people in the east bank of the river would enjoy good quality of life and better economic status.

As indicated the government resettlement areas were not fully developed while handing over the plots to the beneficiaries and created some difficulties at the initial stage. For instance, due to lack of educational institutes they faced problem for enrolment of their children. Other problems included lack of healthcare services, markets and security, distant location from the town as well as from their residual land and relatively small size of plot. Due to lack of good communication between the government resettlement sites and other areas it was not quite easy for the resettled people to involve in income earning activities and they experienced difficulty to perform agricultural activities in their residual land.

It is worthy to note that affected people were not happy enough with the compensation payment modality and the procedure of notice provided for house removal. Some people thought that they got minimal time to remove their houses and it required substantial amount of money for transportation cost. In getting compensation, affected people experienced various complexities, spent money for bribe and received compensation in several installments. Therefore, they could not use a substantial amount of the received compensation for productive purposes.

Nevertheless, this study entails several strengths and weaknesses to reach its objectives. The PAP migrated to the districts other than Tangail and Sirajganj were not possible to physically trace within the provided time frame. The migrated PAP might be different in terms of socio-demographic profile compared to the non-migrants, which might have an impact on the results. In cases, where the families were found split and formed new households and the legal awardees not living in the new HHs were excluded from the sampling. Therefore, only those who were physically available with the valid compensation card were considered for the sampling of this study. This also might have an impact on the results. Within the scope of the study it was not possible to verify the legal validity of landownership claimed by the respondents and information was collected based on self reporting. However, use of self-reported data in assessing various socioeconomic indicators is common. The strength of the study includes inclusion of both quantitative and qualitative methods, which allowed triangulation of the findings and provided more in-depth insights about various indicators. Selection of PAP through sample randomization helped to avoid selection bias and provided overall scenario of the PAP.

Based on the findings following recommendations are made which may help addressing the resettlement protocols in a better way and thereby restoration of livelihoods of affected people might be easier.

1. Acquisition of agricultural land for any infrastructural development should be avoided or kept at minimum level. However, whenever agricultural or homestead land acquisition is unavoidable potential income generating activities should be introduced prior to the acquisition, so that affected people may restore and maintain their livelihood without any major difficulties.

2. During notification of house removal enough time might be given to avoid unanticipated panic among the affected people and to minimize relocation-related expenditure. Appeal for extension of time for removal of houses may be considered.
3. The compensation should be distributed in one installment to ensure its appropriate use, which may reduce the transportation cost and loss of income due to absence from work.
4. Location of the government resettlement areas must be selected in places having good communication system and adequate income earning opportunities. These may facilitate to restore and maintain livelihood of the resettled people with minimal difficulties.
5. Resettlement areas should have educational institutes, healthcare facilities and markets before handing over those to the beneficiaries.
6. People should be adequately aware of the benefits of relocating in the government resettlement sites. This could be adopted to increase interest among the PAP to resettle in the resettlement sites.
7. Unused acquired land can be leased out legally to the affected people for their use and thereby government may earn some revenues.
8. Provision of skill development training should be made easily accessible among the affected people and should be prioritized in the resettlement action plan.
9. Targeted programme is necessary for the indirectly affected people i.e. squatters and other categories of the PAP to restore their livelihood since significantly higher proportion of people in these two groups were found marginalized compared to the directly affected.
10. Along with the government intervention protocols reputed NGOs working for livelihood development of the disadvantaged people might be involved to initiate targeted income generating activities for the affected people. However, a mechanism might be developed to monitor activities of the newly established NGO activities in such areas to prevent any form of unanticipated incidents like disappearing with savings of the affected people.

Finally, it can be concluded that existing resettlement plan should be revised to make it more effective and thus in future PAP in similar projects may restore and maintain their livelihood with minimal difficulties, if replicated in any upcoming project.

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Appendix A

Impact Assessment of Jamuna Bridge Resettlement Project 2009 Research and Evaluation Division, BRAC

A. General Particulars

1. Village: _____ Neighborhood: _____ Union: _____

Area: _____ Thana: _____ District: _____

Name of the awardees: ID number:

2. Total amount of land owned: (Decimal)

3. Does anyone of the household work for 100 days or more in a year? Yes No

4. How good can you run your family with the present income?

Always shortage Sometimes shortage Breakeven Surplus

5. What is the present location of the household?

Government Resettlement Area Elsewhere

6. What are your benefits for the construction of Jamuna Bridge?

Ease of communication

Increased trading

Higher land price

Increased employment

Others

7. What are the demerits of the construction of Jamuna Bridge?

Loss of land or house

Occupation change

Reduced income

1. Information on household members

Code for relation with the household head, Husband/wife = 1, Son/daughter = 2, Brother/sister = 3, Father/mother = 4, Grandson/granddaughter = 5, Daughter in law = 6, Others = 7

Gender code: Male = 1, Female = 2

Code for occupation: Day laborer = 1, Farming = 2, Business = 3, Service = 4, Student = 5, household work = 6, Others = 7

Code of education: Illiterate = 1, Primary = 2, Secondary = 3, Higher secondary or higher = 4

Code for educational institution for Government primary = 1, EPAC school = 2, Other NGO school = 3, Secondary = 4, Higher secondary or higher = 5

Code for marital status: Married = 1, Single = 2, Widowed = 3, Divorced = 4

Code of NGO: BRAC = 1, Proshika = 2, ASA = 3, Others = 4

2. Landownership, lost and remaining land

Landownership before the bridge construction (Decimal)

[Land leased by the awardees is included, and land leased to the awardees is excluded]

Household land:

Farm land

Fallow land

Others

Land lost due to bridge construction (Decimal)

Household land:

Farm land

Fallow land

Others

Condition of the remaining land: [If the amount of lost land is less]

Owned by the household:

Sold:

Others (please mention)

3. List of awardees those do not live in the household:

[They have legal right for land with the people living in the household (e.g., married sister)]

Have legally received the compensation awarded by the JMBA, but do not live in the household.

Yes:

No:

4. If the answer is yes, then

Name of the awardees:

Father's/husband's name:

Address:

Amount of compensation (Taka)

5. Household and other constructions

[Note: If the household has been transferred then at the time of land acquisition household and other structures should be recorded. While if the household is not transferred then present household and other structures should be recorded]

6. Has the household been transferred after the JMBA acquired the land?

Yes

No

7. Description of household and other structures

Serial no. of the structure:

Utility of the structure: Agriculture Household Business Others

Year of construction:

Floor size of the structure:
 Number of rooms:
 Construction material (Wall and roof):

Concrete Non-concrete Semi-concrete

C. Safe water use

1. What kind of water do you use for the following purposes?

Work Water source* If the answer is not 1 then the reason

	Tubewell	Pond	Well	River	Canal-lake	Reason
a. Drinking	1	2	3	4	5	
b. Cooking	1	2	3	4	5	
c. Dish washing	1	2	3	4	5	
d. Hand and face wash	1	2	3	4	5	
e. Bath	1	2	3	4	5	

* Interviewer: If the respondent uses water from multiple sources then ask for the main source and mark the box for that source.

The main reason for not drinking tubewell water: Arsenic contaminated 1, No tubewell available 2, Rice/curry becomes dark 3, Tubewell is far apart 4, Others, mention 5

2. How is the basement of that tubewell (please check): Muddy Cemented

3. Where is household waste dumped off? : Here and there Certain place

4. What kind of fuel is used for cooking in the household?

Fuel wood Straw & husk

Dried cow dung LP gas

Electric heater Kerosene

5. Do the household members use electricity? Yes No

6. How is the condition of the river bank erosion in the nearby areas after the Jamuna Bridge construction?

Increased Reduced Unchanged

7. How is the condition of charland accretion in the nearby area after the Jamuna bridge construction?

Increased Reduced Unchanged

8. How is the effect of flooding in the nearby areas after the Jamuna bridge construction?

Increased Reduced Unchanged

D. Personal hygiene

1. What kind of lavatory do you usually use? Hole Pit Sanitary or slab
Here and there others (please note)

(If the answer is 2, 3 please check the condition for clarity)? Correct n-correct

2. Do you wash your hand after returning from the lavatory?

Don't wash Only with water With soap With ash/mud
Others (please mention).....

(When the answer is please check whether there is ash/mud nearby the lavatory)

Yes

E. Family planning practice

Please fill up the table for married and potent but not pregnant woman in the household.

Line no.	Name of the potent married woman	Age	If presently any contraceptive is used? Yes, 1 No, 2	If the answer for column 4 is Yes, then please fill up the process code	From where do you avail the process?	How do you collect the process materials? Purchase, 1 Free, 2	Who has motivated?
1	2	3	4	5	6	7	8

Code for column 5: Oral pill 1, Injection 2, IUD 3, Condom 4, Norplant 5, Ligation 6, Others 7

Code for column 6: Retail shop 1, Government hospital 2, Government health worker 3, BRAC health nurses 4

Code for column 8: BRAC PO 1, Government worker 2, BRAC health nurses 3, VO member 4, midwife 5, self 6, Others 7.

F. Child Immunization

Please fill up the table only for the children noted in column 10 of Section B having age class (0-71 months) after checking the available immunization card or in consultation with their mother when the card is unavailable.

Line no.	Name of the kid	Age		Immunization card available? Yes 1, No 2	Dose of immunization						BCG	Measles	Status of immunization? Complete 1, Partial 2, None 3	Reason for not taking immunization
		Year	Month		1st	2nd	3rd	1st	2nd	3rd				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

In columns from 6 to 13 please write 1, if immunized and 0, if not immunized

Code for column 15: The health center is far 1, Not necessary 2, Scared 3, The card is lost and the health worker did not immunized 4, The health worker did not come 5, Others 6

G. Compensation Information

1. How much money was fixed for the compensation?Taka
2. How much money did you receive as compensation? Taka
3. If the compensation money was not received, mention the reason behind that.

4. How did you spend the money of compensation?

Expenditure of compensation	Code	Amount of money
House repairing	1	
Land purchase	2	
Debt repayment	3	
Family expenditure	4	
Health expenditure	5	
Payment for returning leased land	6	
Wedding and other ceremonial expenditure	7	
Deposit in bank	8	
Others	9	

5. Information regarding household income.

Source of income	Code	Amount of income (Taka)
Farm land	1	
Day labourer (Agriculture)	2	
Day labourer (Non-agricultural)	3	
Fishing	4	
Service	5	
Remittance	6	
Pension	7	
Business	8	
Aid for old people	9	
Aid for widow	10	
Aid for hapless	11	
Food for education	12	
Food for work	13	
Total income	14	

6. Description of non-agrarian asset.

Name of asset	Code	Number	Price (Taka)
Cow	1		
Goat	2		
Lamb	3		
Pig	4		
Others	5		
Chicken	6		
Duck	7		
Pigeon	8		
Others	9		

7. Description of fruits and other plants.

Name of plants	Code	Number	Price (Taka)
Coconut	1		
Mango	2		
Jackfruit	3		
Grapes	4		
Areca nut	5		
Amra	6		
Guava	7		
Other fruit tree	8		
Other woody plant	9		
Fuel wood	10		

8. Description of savings.

Where deposited	Code	Amount (Taka)
Bank		
BRAC		
Credit given to others		
Cash in hand		
Deposited in other NGO		

9. Description of loan or credit.

Source of credit or loan	Code	Amount (Taka)
Bank		
BRAC		
Friend/relative/Neighbor		
Credited in the shop		
From other NGO		

10. Landownership.

Landownership	Present amount of land (Decimal)	Amount of land before bridge construction (Decimal)
Household		
Farmland (cultivation of own land)		
Land lease granted to other		
Land lease taken from other		
Fallow land		
Pond		

11. Training related information:

Has anyone of your household got training to increase income after the starting of Januna Bridge construction? Yes ☐ No ☐

12. If Yes, what kind of training have been given,

- 1)
- 2)
- 3)

13. Who have provided the training? BRAC ☐ Other NGO ☐ Government organization ☐

14. How do you rate your quality of life? Very good ☐ good ☐ poor ☐ very poor ☐

Name of the interviewer:

Date of interview:

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Appendix B

Impact Assessment of Jamuna Bridge Resettlement Project 2009 RED, BRAC

Questionnaire for surveying resettlement of the community facilities

1. Village: _____ Area: _____ Union: _____

Thana: _____ District name: _____ District code:

Name of the respondent:

Address of the respondent:

Sex: Male 1 Female 2

2. How far is the village from the Jamuna Bridge? km

3. What types of social institutions are there in this village?

Mosque	1	Number
Madrasa	2	Number
Moktob	3	Number
Graveyard	4	Number
Temple	5	Number
Primary school	6	Number
Secondary school	7	Number
Social club	8	Number
Government/private health care centre	9	Number
Haat/bazar	10	Number
Others	11	Number

4. Which social institutions or their lands have been acquired by the government due to the Jamuna Bridge construction?

Mosque	1	Number
Madrasa	2	Number
Moktob	3	Number
Graveyard	4	Number
Temple	5	Number

Primary school	6	Number
Secondary school	7	Number
Social club	8	Number
Government/private health care centre	9	Number
<i>Haat/bazar</i>	10	Number
Others	11	Number

5. Which social institutions have been established newly after the Jamuna Bridge construction?

Mosque	1	Number
<i>Madrasa</i>	2	Number
<i>Moktob</i>	3	Number
Graveyard	4	Number
Temple	5	Number
Primary school	6	Number
Secondary school	7	Number
Social club	8	Number
Government/private healthcare centre	9	Number
<i>Haat/bazar</i>	10	Number
Others	11	Number

6. How far are the following institutions from this village in km (If that institution is not located in the village)?

Mosque	1	Distance
<i>Madrasa</i>	2	Distance
<i>Moktob</i>	3	Distance
Graveyard	4	Distance
Temple	5	Distance
Primary school	6	Distance
Secondary school	7	Distance
Social club	8	Distance

Government/private healthcare centre
Haat/bazar

9
10

Distance	
Distance	

Others

11

Distance	
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Name of interviewer

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ID

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Date:

Appendix C

Methods for Qualitative Methods for Study on Jamuna Bridge Resettlement Programme

Methods	Informants and respondents	Numbers of FGDs, KIs, Life Histories to be conducted			Total
		Bhuapur, Tangail	Sirajganj		
FGDs [Second phase 1-part] KI [First phase]	Male Entitled Persons (EPs)	4 [1 FGD at resettlement site; 1 FGD at Gorialabari; 1 FGD at Chintamani; and 1 FGD at Pathailkandi]	3 [1 FGD at resettlement site; 1 FGD at Deragati; and 1 FGD at Konabari]		7
	Female EPs	2 [1 FGD at resettlement site; 1 FGD at Pathailkandi]	1 [1 FGD at resettlement site; 1 FGD at Banbaria/Paikpara/Puthiabari]		3
	EPs, UP chairman & member and matbars of affected villages	9 [2 Gorialabari; 2 Chintamani; 2 Pathailkandi; 1 resettlement site; 1 Motaleb Chairman; 1 Ramjan Chairman]	6 [1 resettlement site; 1 Deragati; 1 Chairman; 1 Banbaria/Char Malsapara/Chatiantala; 1 Hosenpur; 1 any affected village]		15
	Implementing NGOs (Team leaders of implementing NGO; Project Manager; Grievance redress committee members; Data base Manager; Village Resettlement Workers)	6 [1 team leader (RDM); 1 project manager (RDM); 1 grievance redress committee members; 1 supervisor; 2 village resettlement workers]	4 [1 project manager (RDM)/ grievance redress committee members; 1 supervisor; 2 village resettlement workers]		10
Life Histories [Second phase 2-part]	JMBA-RUs [Field Office & Headquarters] Project Director (PD); Deputy Director (HQ); Deputy Director (RU-Field Offices, Bhuapur, Tangail and Sirajganj); Assistant Director (HQ); Assistant Director (RU-Field Offices, Bhuapur, Tangail and Sirajganj); Surveyors; Canoongu; Accounts Officer	3 [1 PD/DD/AD; 1 surveyors; and 1 canoongu/accounts officer]	2 [1 PD/DD/AD; 1 surveyors/canoongu/accounts officer]		5
	Male EPs	8 [2 Gorialabari; 2 Chintamani; 2 Pathailkandi; 1 resettlement site; 1 Motaleb Chairman]	5 [1 resettlement site; 1 Deragati; 1 chairman; 1 Banbaria/char Malsapara/Chatiantala; 1 Hosenpur/any affected village]		13
	Female EPs	4 [2 Gorialabari; 2 Chintamani; 1 Pathailkandi; 1 resettlement site]	3 [1 resettlement site; 1 Deragati; 1 Banbaria/Char Malsapara/Chatiantala/Hosenpur/any affected village]		7

First phase of qualitative study:

Reconnaissance --> Qualitative survey and parallel to quantitative survey [institution and key informants]

Steps should be taken for qualitative study:

- training to be imparted to research assistants after one week of starting reconnaissance survey and ended with reconnaissance survey
- to get insights from findings of reconnaissance survey
- findings of qualitative study for three week long fieldwork to be disseminated in second workshop

Second phase of qualitative study

More details --> explore in details the findings from quantitative survey [institution and households]

Appendix D

Appendix D1. Distribution of study population by age group and districts

Age group	Population and percentage		
	Tangail	Sirajganj	Total
0-<5	290 (7.7)	284 (7.8)	574 (7.7)
5-<10	417 (11.0)	404 (11.2)	821 (11.1)
10-<15	510 (13.5)	425 (11.7)	935 (12.6)
15-<20	398 (10.5)	405 (11.2)	803 (10.8)
20-<25	284 (7.5)	374 (10.3)	658 (8.9)
25-<30	262 (6.9)	250 (6.9)	512 (6.9)
30-<35	163 (4.3)	172 (4.7)	335 (4.5)
35-<40	266 (7.0)	200 (5.5)	466 (6.3)
40-<45	252 (6.7)	209 (5.8)	461 (6.2)
45-<50	196 (5.2)	189 (5.2)	385 (5.2)
50-<55	255 (6.7)	230 (6.3)	485 (6.5)
55-<60	142 (3.7)	173 (4.8)	315 (4.3)
60-<65	112 (3.0)	111 (3.1)	223 (3.0)
65+	241 (6.4)	197 (5.4)	438 (5.9)
n	3788 (100.0)	3623 (100.0)	7411 (100.0)

Appendix D2. Distribution of study population by sex and districts (%)

Age group	Tangail		Sirajganj	
	Men	Women	Men	Women
0-<5	161 (8.3)	129 (7.0)	146 (7.8)	138 (7.8)
5-<10	203 (10.4)	214 (11.6)	202 (10.8)	202 (11.5)
10-<15	282 (14.5)	228 (12.4)	200 (10.7)	225 (12.8)
15-<20	227 (11.7)	171 (9.3)	224 (12.0)	181 (10.3)
20-<25	142 (7.3)	142 (7.7)	215 (11.5)	159 (9.0)
25-<30	147 (7.6)	115 (6.2)	137 (7.4)	113 (6.4)
30-<35	67 (3.4)	96 (5.2)	93 (5.0)	79 (4.5)
35-<40	81 (4.2)	185 (10.0)	77 (4.1)	123 (7.0)
40-<45	123 (6.3)	129 (7.0)	87 (4.7)	122 (6.9)
45-<50	105 (5.4)	91 (4.9)	92 (4.9)	97 (5.5)
50-<55	125 (6.4)	130 (7.1)	111 (6.0)	119 (6.8)
55-<60	77 (4.0)	65 (3.5)	97 (5.2)	76 (4.3)
60-<65	64 (3.3)	48 (2.6)	66 (3.5)	45 (2.6)
65+	143 (7.3)	98 (5.3)	116 (6.2)	81 (4.6)
n	1947 (100.0)	1841 (100.0)	1863 (100.0)	1760 (100.0)

Appendix D3. Distribution of married people in both districts by age group (%)

Age group	Tangail	Sirajganj	Total
10-<15	11 (0.6)	2 (0.1)	13 (0.4)
15-<20	60 (3.2)	63 (3.6)	123 (3.4)
20-<25	159 (8.5)	184 (10.5)	343 (9.5)
25-<30	201 (10.7)	189 (10.8)	390 (10.8)
30-<35	153 (8.1)	157 (9.0)	310 (8.5)
35-<40	257 (13.7)	190 (10.9)	447 (12.3)
40-<45	237 (12.6)	199 (11.4)	436 (12.0)
45-<50	186 (9.9)	179 (10.2)	365 (10.1)
50-<55	230 (12.2)	209 (12.0)	439 (12.1)
55-<60	124 (6.6)	149 (8.5)	273 (7.5)
60-<65	95 (5.1)	91 (5.2)	186 (5.1)
65+	167 (8.9)	135 (7.7)	302 (8.3)
n	1880 (100.0)	1747 (100.0)	3627 (100.0)

Appendix D4. Educational status of population in both districts by household category (%)

District	Educational status	Tenant	Landowner	Squatter	Others
Tangail	Illiterate	373 (47.4)	404 (37.5)	392 (46.5)	327 (45.9)
	Primary	214 (27.2)	284 (26.3)	263 (31.2)	209 (29.3)
	Secondary	163 (20.7)	275 (25.5)	160 (19.0)	144 (20.2)
	Higher secondary or more	37 (4.7)	115 (10.7)	28 (3.3)	33 (4.6)
	n	787 (100.0)	1078 (100.0)	843 (100.0)	713 (100.0)
Sirajganj	Illiterate	189 (35.6)	318 (28.9)	414 (45.9)	347 (48.4)
	Primary	204 (38.4)	393 (35.8)	400 (44.3)	267 (37.2)
	Secondary	104 (19.6)	270 (24.6)	75 (8.3)	81 (11.3)
	Higher secondary or more	34 (6.4)	118 (10.7)	13 (1.4)	22 (3.1)
	Total	531 (100.0)	1099 (100.0)	902 (100.0)	717 (100.0)

Appendix D5. Educational status of household heads in both districts by household category (%)

District	Educational status	Tenant	Landowner	Squatter	Others
Tangail	Illiterate	154 (77.0)	144 (64.0)	157 (80.1)	121 (72.9)
	Primary	22 (11.0)	25 (11.1)	19 (9.7)	20 (12.0)
	Secondary	19 (9.5)	31 (13.8)	16 (8.2)	16 (9.6)
	Higher secondary or more	5 (2.5)	25 (11.1)	4 (2.0)	9 (5.4)
	n	200 (100.0)	225 (100.0)	196 (100.0)	166 (100.0)
Sirajganj	Illiterate	70 (66.7)	109 (46.6)	152 (76.0)	123 (77.4)
	Primary	23 (21.9)	67 (28.6)	42 (21.0)	24 (15.1)
	Secondary	7 (6.7)	41 (17.5)	4 (2.0)	8 (5.0)
	Higher secondary or more	5 (4.8)	17 (7.3)	2 (1.0)	4 (2.5)
	n	105 (100.0)	234 (100.0)	200 (100.0)	159 (100.0)

Appendix D6. Water seal present in the sanitary latrine (%)

Water seal present	Tangail	Sirajganj	Total
Yes	518 (93.0)	469 (96.5)	987 (94.6)
No	39 (7.0)	17 (3.5)	56 (5.4)
n	557 (100)	486 (100)	1043 (100)

Appendix D7. Behavior of washing hands after defecation (%)

Wash with	Tangail	Sirajganj	Total
Only water	87 (11.1)	66 (9.5)	153 (10.3)
Soap	215 (27.3)	244 (35.0)	459 (30.9)
Ash or soil	485 (61.6)	387 (55.4)	872 (58.7)
Others	0	1 (0.1)	1 (0.1)
n	787 (100)	698 (100)	1485 (100)

Appendix D8. Whether ash/soil is kept nearby the latrines by districts (%)

Ash/soil is present nearby the lavatory	Tangail	Sirajganj	Total
Yes	445 (64.9)	500 (79.5)	945 (71.9)
No	241 (35.1)	129 (20.5)	370 (28.1)
n	686 (100)	629 (100)	1315 (100)

Appendix D9. Total number and average age of currently married women in both districts

District	Number of currently married women (%)	Average age (year)
Tangail	742 (40.3)	31.9
Sirajganj	649 (36.9)	31.5

Appendix D10. Type of contraceptive adopted by the respondents in both districts (%)

Type of contraceptive	Tangail	Sirajganj	Total
Oral pill	267 (58.6)	313 (71.8%)	580 (65.0%)
Injection	113 (24.8)	90 (20.6%)	203 (22.8%)
IUD	4 (0.9)	0	4 (0.4%)
Condom	40 (8.8)	23 (5.3%)	63 (7.1%)
Norplant	3 (0.7)	1 (0.2%)	4 (0.4%)
Ligation	28 (6.1)	9 (2.1%)	37 (4.1%)
Others	1 (0.2)	0	1 (0.1%)
Total	456 (100)	436 (100.0)	892 (100%)

Appendix D11. Sources of contraceptives in both districts (%)

Source of contraceptives	Tangail	Sirajganj	Total
Retail shop	242 (53.1)	225 (51.7)	467 (52.4)
Government hospital	85 (18.6)	28 (6.4)	113 (12.7)
Government health worker	128 (28.1)	182 (41.8)	310 (34.8)
Others	1 (0.2)	0	1 (0.1)
Total	456 (100.0)	435 (100.0)	891 (100.0)

Appendix D12. Collection process of contraceptive by districts (%)

Collection process	Tangail	Sirajganj	Total
Purchase	303 (66.4)	236 (54.3)	539 (60.5)
Free of cost	153 (33.5)	199 (45.7)	352 (39.5)
Total	456 (100.0)	435 (100.0)	891 (100.0)

Appendix D13. Immunization coverage of both districts (%)

Areas	Tangail	Sirajganj	Total
BCG	96.8	98.4	97.6
polio1	95.2	98.4	96.8
polio2	95.2	98.4	96.8
polio3	95.2	98.4	96.8
dpt1	96.8	98.4	97.6
dpt2	96.8	98.4	97.6
dpt3	98.4	98.4	98.4
Measles	85.7	90.5	88.1
n	63	63	126

Appendix D14. Resettlement of households in Tangail according to category (%)

Reason for relocation	Tenant	Landowner	Squatter	Others	Total
Relocated for the bridge	28 (14.0)	79 (35.1)	113 (57.7)	35 (21.1)	255 (32.4)
Relocated for other reasons	29 (14.5)	33 (14.7)	9 (4.6)	22 (13.3%)	93 (11.8)
Located in the resettlement area	0 (0.0)	11 (4.9)	36 (18.4)	9 (5.4%)	56 (7.1)
Located on the acquired land	7 (3.5)	15 (6.7)	22 (11.2)	15 (9.0%)	59 (7.5)
Not replaced	136 (68.0)	87 (38.7)	16 (8.2)	85 (51.2%)	324 (41.2)
Total	200 (100.0)	225 (100.0)	196 (100.0)	166 (100.0)	787 (100.0)

Appendix D15. Resettlement of households in Sirajganj according to category (%)

Reason for replacement	Tenant	Landowner	Squatter	Others	Total
Replaced for the bridge	15 (14.3)	71 (30.3)	95 (47.5)	36 (22.6)	217 (31.1)
Replace for other reasons	20 (19.0)	39 (16.7)	15 (7.5)	29 (18.2)	103 (14.8)
Located in the resettlement area	1 (1.0)	12 (5.1)	30 (15.0)	3 (1.9)	46 (6.6)
Located on the acquired land	0 (0)	1 (0.4)	30 (15.0)	22 (13.8)	53 (7.6)
Not replaced	69 (65.7)	111 (47.4)	30 (15.0)	69 (43.4)	279 (40.0)
Total	105 (100.0)	234 (100.0)	200 (100.0)	159 (100.0)	698 (100.0)

Appendix D16. Duration of establishment of the houses

Duration of establishment	Tangail	Sirajganj	Total	p value
	Number and percentage of households	Number and percentage of households	Number and percentage of households	
1-<5	149 (18.9)	110 (15.8)	259 (17.5)	p<0.001
6-<10	153 (19.4)	162 (23.2)	629 (42.4)	
11-<15	355 (45.1)	274 (39.3)	629 (42.4)	
16-<20	77 (9.8)	62 (8.9)	139 (9.4)	
20+	53 (6.7)	89 (12.8)	142 (9.6)	
n	787 (100.0)	697 (100.0)	1484 (100.0)	

Appendix D17. Houses and other structures by type of use

Usage of rooms	Tangail		Sirajganj	
	Total number of rooms (%)	Avg. number of rooms for every household	Total number of rooms (%)	Avg. number of rooms for every household
Bed room	785 (39.1)	1	694 (42.0)	1
Kitchen	623 (31.0)	1	438 (26.5)	1
Living room	88 (4.4)	0	77 (4.7)	0
Cowshed	294 (14.6)	0	230 (13.9)	0
Poultry room	197 (9.8)	0	171 (10.4)	0
Husking room	9 (0.4)	0	16 (1.0)	0
Industry room	0 (0.0)	0	8 (0.5)	0
Shop	5 (0.2)	0	11 (0.7)	0
Others	7 (0.3)	0	7 (0.4)	0
Total	2008 (100.0)	3	1652 (100.0)	2
n	787		698	

Appendix D18. Structure of house in both districts according to previous category of households (%)

Part of house	Kind of structure	Tenant # and (%)	Landowner # and (%)	Squatter # and (%)	Others # and (%)	Total # and (%)
Wall	<i>Pakka</i>	3 (1.0)	31 (6.8)	5 (1.3)	4 (1.2)	43 (2.9)
	<i>Tin</i>	269 (88.2)	396 (86.3)	315 (79.7)	266 (81.8)	1246 (84.0)
	<i>Bamboo</i>	33 (10.8)	32 (6.8)	75 (19.0)	55 (16.6)	193 (13.0)
Roof	<i>Pakka</i>	0 (0.0)	9 (2.0)	2 (0.5)	3 (0.9)	14 (0.9)
	<i>Tin</i>	304 (99.7)	447 (97.4)	385 (97.5)	315 (96.9)	1451 (97.8)
	<i>Bamboo</i>	1 (0.3)	3 (0.7)	8 (2.0)	7 (2.2)	19 (1.3)
Floor	<i>Pakka</i>	22 (7.2)	78 (17.0)	18 (4.6)	17 (5.2)	135 (9.1)
	<i>Kancha</i>	272 (89.2)	365 (79.5)	371 (93.9)	300 (92.3)	1308 (88.1)
	<i>Half pakka</i>	11 (3.6)	16 (3.5)	6 (1.5)	8 (2.5)	41 (2.8)
n		305	459	395	325	1484

Appendix D19. Number of livestock in both districts

District	Tangail				Sirajganj			
	Number of house-holds	Total # of livestock and poultry	Avg. # of livestock and poultry	Average price Tk.	Number of house-holds	Total # of livestock and poultry	Avg. # of livestock and poultry	Average price Tk.
Cow	244	552	2	14150	160	394	2	12175
Goat	186	409	2	1922	78	147	2	2032
Lamb	8	19	2	1106	8	23	3	3517
Pig	1	2	2	150	1	4	4	113
Chicken	345	1808	5	156	208	1413	7	151
Duck	149	958	6	141	66	512	8	141
Pegion	33	267	8	98	6	73	12	92

Appendix D20. Number of trees and their distribution among households in both districts

Type of trees	Tangail			Sirajganj			Total		
	# of trees	# of HHs %	Average # of trees	# of trees	# of hhs %	Average # of trees	# of trees	# of HHs %	Average # of trees
Coconut	715	317 (40.3)	1	424	171 (24.5)	1	1139	488 (32.9)	1
Mango	2960	571 (72.6)	4	2246	502 (71.9)	3	5206	1073 (72.3)	4
Jackfruit	2792	550 (69.9)	4	1353	364 (52.1)	2	4145	914 (61.5)	3
Areca nut	4832	304 (38.6)	6	1164	97 (13.9)	2	5996	401 (27.0)	4
Hog plum	80	37 (4.7)	0	66	44 (6.3)	0	146	81 (5.5)	0
Guava	533	244 (31.0)	1	376	190 (27.2)	1	909	434 (29.2)	1
Other fruit	1412	203 (25.8)	2	912	183 (26.2)	1	2324	386 (26.0)	2
Other timber	4362	345 (43.8)	6	4809	294 (42.1)	7	9171	639 (43.0)	6
For fuel wood	303	51 (6.5)	0	368	68 (9.7)	1	671	119 (8.0)	0
Bamboo	26146	233 (29.6)	33	15393	163 (23.4)	22	41539	396 (26.7)	28
n		787			698			1485	

Appendix D21. Value of trees in both districts

Type of trees	Tangail			Sirajganj		
	Total price Tk.	Number of HHs having saleable trees	Avg. for every HH Tk.	Total price Tk.	Number of HHs having saleable trees	Avg. for every HH Tk.
Coconut	198910	313	253	183225	162	263
Mango	1112387	567	1413	1442855	484	2067
Jackfruit	1472696	546	1871	863382	348	1237
Areca nut	256085	301	325	65630	83	94
Amra	9170	36	12	28520	39	41
Guava	34410	237	44	24630	148	35
Other fruit	168460	189	214	142450	160	204
Other timber	2279007	339	2896	2167150	286	3105
For fuel wood	98500	51	125	110800	67	159
Bamboo	947275	230	1204	723240	161	1036
n	787			698		

Appendix D22. Value of fruits in both districts

Type of trees	Tangail			Sirajganj			Total		
	Total price of fruit Tk.	Number of hhs having saleable fruits	Avg. price of fruit for every HH Tk.	Total price of fruit Tk.	Number of HHs having saleable fruits	Avg. price of fruit for every hh Tk.	Total price of fruit Tk.	Number of HHs having saleable fruits	Avg. price of fruit for every HH Tk.
Coconut	81270	172	103	44580	97	64	125850	269	85
Mango	403720	453	513	406660	391	583	810380	844	546
Jackfruit	409532	435	520	213810	235	306	623342	670	420
Areca nut	193790	227	246	61230	69	88	255020	296	172
Amra	13650	23	17	10500	30	15	24150	53	16
Guava	46805	201	59	21775	140	31	68580	341	46
Other fruit trees	254245	451	323	93505	239	134	347750	690	234
n		787			698			1485	

Appendix D23. Electricity usage in both districts according to the category of households (%)

District	Tenant # of households	Landowner # of households	Squatter # of households	Others # of households an	Total # of households
Tangail	110 (55.0)	89 (39.6)	77 (39.3)	69 (41.6)	345 (43.8)
Sirajganj	64 (61.0)	163 (69.7)	80 (40.0)	86 (54.1)	393 (56.3)

Appendix D24. Post-project occupation of people by age group in Tangail district (%)

Age group	Day labor	Agri-culture	Business	Employ-ment	Student	House-wife	Un-employed	Others	Total
6-<10	4 (0.9)	7 (2.3)	0 (0.0)	0 (0.0)	300 (30.5)	2 (0.2)	18 (9.7)	9 (8.8)	340 (9.9)
10-<15	18 (4.2)	5 (1.7)	5 (2.3)	5 (3.3)	439 (44.6)	3 (0.3)	32 (17.3)	3 (2.9)	510 (14.9)
15-<20	51 (12.0)	13 (4.3)	9 (4.2)	24 (16.0)	200 (20.3)	49 (4.6)	42 (22.7)	10 (9.8)	398 (11.6)
20-<25	43 (10.1)	10 (3.3)	17 (8.0)	28 (18.7)	36 (3.7)	126 (11.9)	20 (10.8)	4 (3.9)	284 (8.3)
25-<30	45 (10.6)	25 (8.3)	29 (13.6)	27 (18.0)	7 (0.7)	110 (10.4)	15 (8.1)	4 (3.9)	262 (7.7)
30-<35	14 (3.3)	19 (6.3)	22 (10.3)	15 (10.0)	2 (0.2)	89 (8.4)	2 (1.1)	0 (0.0)	163 (4.8)
35-<40	30 (7.1)	12 (4.0)	28 (13.1)	16 (10.7)	0 (0.0)	178 (16.8)	1 (0.5)	1 (1.0)	266 (7.8)
40-<45	61 (14.4)	27 (8.9)	26 (12.2)	9 (6.0)	0 (0.0)	127 (12.0)	0 (0.0)	2 (2.0)	252 (7.4)
45-<50	50 (11.8)	20 (6.6)	27 (12.7)	8 (5.3)	1 (0.1)	88 (8.3)	1 (0.5)	1 (1.0)	196 (5.7)
50-<55	47 (11.1)	51 (16.8)	16 (7.5)	8 (5.3)	0 (0.0)	126 (11.9)	4 (2.2)	3 (2.9)	255 (7.5)
55-<60	24 (5.7)	29 (9.6)	16 (7.5)	6 (4.0)	0 (0.0)	59 (5.6)	5 (2.7)	3 (2.9)	142 (4.2)
60-<65	17 (4.0)	28 (9.2)	6 (2.8)	1 (0.7)	0 (0.0)	41 (3.9)	10 (5.4)	9 (8.8)	112 (3.3)
65+	20 (4.7)	57 (18.8)	12 (5.6)	3 (2.0)	0 (0.0)	61 (5.8)	35 (18.9)	53 (52.0)	241 (7.0)
Total	424 (100.0)	303 (100.0)	213 (100.0)	150 (100.0)	985 (100.0)	1059 (100.0)	185 (100.0)	102 (100.0)	3421 (100.0)

Appendix D25. Post-project occupation of people by age group in Sirajganj (%)

Age group	Day labor	Agri-culture	Business	Employ-ment	Student	House-wife	Un-employed	Others	Total
6-<10	2 (0.3)	2 (1.1)	0 (0.0)	1 (0.8)	273 (32.8)	3 (0.3)	22 (9.2)	11 (15.5)	314 (9.7)
10-<15	21 (3.3)	2 (1.1)	5 (2.8)	2 (1.5)	338 (40.6)	12 (1.2)	40 (16.7)	5 (7.0)	425 (13.1)
15-<20	82 (12.7)	12 (6.7)	9 (5.1)	20 (15.0)	164 (19.7)	74 (7.6)	36 (15.0)	8 (11.3)	405 (12.5)
20-<25	105 (16.3)	16 (9.0)	22 (12.4)	26 (19.5)	45 (5.4)	132 (13.6)	21 (8.8)	7 (9.9)	374 (11.5)
25-<30	73 (11.3)	8 (4.5)	19 (10.7)	24 (18.0)	13 (1.6)	103 (10.6)	7 (2.9)	3 (4.2)	250 (7.7)
30-<35	43 (6.7)	9 (5.1)	22 (12.4)	18 (13.5)	0 (0.0)	77 (7.9)	3 (1.3)	0 (0.0)	172 (5.3)
35-<40	47 (7.3)	9 (5.1)	19 (10.7)	9 (6.8)	0 (0.0)	113 (11.6)	1 (0.4)	2 (2.8)	200 (6.2)
40-<45	52 (8.1)	10 (5.6)	19 (10.7)	10 (7.5)	0 (0.0)	115 (11.8)	2 (0.8)	1 (1.4)	209 (6.4)
45-<50	58 (9.0)	15 (8.4)	10 (5.6)	10 (7.5)	0 (0.0)	90 (9.3)	4 (1.7)	2 (2.8)	189 (5.8)
50-<55	54 (8.4)	27 (15.2)	24 (13.6)	6 (4.5)	0 (0.0)	106 (10.9)	12 (5.0)	1 (1.4)	230 (7.1)
55-<60	49 (7.6)	25 (14.0)	14 (7.9)	3 (2.3)	0 (0.0)	63 (6.5)	14 (5.8)	5 (7.0)	173 (5.3)
60-<65	35 (5.4)	15 (8.4)	7 (4.0)	1 (0.8)	0 (0.0)	39 (4.0)	9 (3.8)	5 (7.0)	111 (3.4)
65+	24 (3.7)	28 (15.7)	7 (4.0)	3 (2.3)	0 (0.0)	45 (4.6)	69 (28.8)	21 (29.6)	197 (6.1)
Total	645 (100.0)	178 (100.0)	177 (100.0)	133 (100.0)	833 (100.0)	972 (100.0)	240 (100.0)	71 (100.0)	3249 (100.0)

Appendix D26. Occupational changes of household heads in both districts

Occupational changes	Tangail	Sirajganj	Total
	Number of household heads (%)	Number of household heads (%)	Number of household heads (%)
Farming to labor	37 (4.7)	25 (3.6)	62 (4.2)
Farming to business	27 (3.4)	18 (2.6)	45 (3.0)
Farming to unemployment	25 (3.2)	29 (4.2)	54 (3.6)
Farming to service	4 (0.5)	2 (0.3)	6 (0.4)
Business to unemployment	10 (1.3)	8 (1.1)	18 (1.2)
Business to labor	5 (0.6)	9 (1.3)	14 (0.9)
Unemployment to Business	3 (0.4)	5 (0.7)	8 (0.5)
Service to unemployment	6 (0.8)	7 (1.0)	13 (0.9)
Unemployment to service	2 (0.3)	2 (0.3)	4 (0.3)
Labor to farming	14 (1.8)	16 (2.3)	30 (2.0)
Labor to Business	28 (3.6)	13 (1.9)	41 (2.8)
Labor to service	5 (0.6)	6 (0.9)	11 (0.7)
Labor to unemployment	15 (1.9)	23 (3.3)	38 (2.6)
Business to farm	8 (1.0)	3 (0.4)	11 (0.7)
Service to farm	2 (0.3)	9 (1.3)	11 (0.7)
Student to labor	4 (0.5)	4 (0.6)	8 (0.5)
Student to farm	2 (0.3)	2 (0.3)	4 (0.3)
Student to business	5 (0.6)	1 (0.1)	6 (0.4)
Student to service	5 (0.6)	3 (0.4)	8 (0.5)
Unemployment to labor	6 (0.8)	12 (1.7)	18 (1.2)
Service to labor	1 (0.1)	5 (0.7)	6 (0.4)
Unchanged	573 (72.8)	496 (71.1)	1069 (72.0)
Total	787 (100.0)	698 (100.0)	1485 (100.0)

Appendix D27. Source of loan for the households of both districts

Source of loan	Tangail # of households and (%)	Sirajganj # of households and (%)	Total # of households and (%)
Bank	56 (7.1)	63 (9.0)	119 (8.0)
BRAC	25 (3.2)	38 (5.4)	63 (4.2)
Friend/relative/neighbor	138 (17.5)	171 (24.5)	309 (20.8)
Shop	51 (6.5)	176 (25.2)	227 (15.3)
Other NGO	347 (44.1)	161 (23.1)	508 (34.2)
Moneylender	46 (5.8)	60 (8.6)	106 (7.1)
n	787	698	1485

Appendix D28. Place of savings by districts

Where deposited	Tangail # of households and (%)	Sirajganj # of households and (%)	Total # of households and (%)
Bank	59 (7.5)	47 (6.7)	106 (7.1)
BRAC	13 (1.7)	41 (5.9)	54 (3.6)
Gives as loan	7 (0.9)	16 (2.3)	23 (1.5)
Cash in hand	96 (12.2)	221 (31.7)	317 (21.3)
Deposited in other NGO	332 (42.2)	153 (21.9)	485 (32.7)
Total	507 (64.4)	478 (68.4)	985 (66.3)
n	787	698	1485

Appendix D29. Amount and percentage of households from different categories interested to spend surplus money

Intention	Tangail				Sirajganj			
	Tenant (%)	Landowner	Squatter	Others	Tenant	Landowner	Squatter	Others
Purchase new land	19 (9.5)	19 (8.4)	14 (7.1)	5 (3.0)	7 (6.7)	14 (6.0)	4 (2.0)	6 (3.8)
Agriculture	5 (2.5)	3 (1.3)	1 (0.5)	2 (1.2)	18 (17.1)	33 (14.2)	9 (4.5)	13 (8.2)
Business	7.0 (3.5)	11.0 (4.9)	8.0 (4.1)	4.0 (2.4)	8 (7.6)	34 (14.6)	19 (9.5)	5 (3.1)
Deposit	5 (2.5)	6 (2.7)	3 (1.5)	8 (4.8)	1 (1.0)	6 (2.6)	18 (9.0)	4 (2.5)
Furniture purchase	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (1.7)	2 (1.0)	1 (0.6)
Others	4.0 (2.0)	6.0 (2.7)	2.0 (1.0)	3.0 (1.8)	4 (3.8)	12 (5.2)	6 (3.0)	12 (7.5)
Not applicable	160 (80.0)	180 (80.0)	168 (85.7)	144 (86.7)	67 (63.8)	130 (55.8)	142 (71.0)	118 (74.2)
n	200	225	196	166	105	233	200	159