

Impact of *Char* Development and Settlement Project on Improving the Livelihood of *Char* Dwellers

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Abstract

The *Char* Development and Settlement Project (CDSP) was a joint initiative of the Embassy of the Kingdom of the Netherlands and the Government of Bangladesh to achieve sustainable livelihood development of coastal *char* dwellers in south-east Bangladesh. Third phase of CDSP (CDSP III) was implemented during 2005-2010 in *Boyer Char* of Noakhali district, by six government agencies and five local NGOs. BRAC coordinated the interventions of these local NGOs. This study aimed to evaluate CDSP III through assessment of indicators like employment, asset holding (natural, physical and financial), housing condition, education, food security, and crisis coping mechanism. Cross-sectional data collected in 2010 on both participants (from the programme area) and non-participants (from nearby *char*, which was not under project intervention) were used. Propensity Score Matching (PSM) technique was used for data analysis. The findings showed substantial improvement in livelihoods of the participant households in terms of food security, income, housing condition, asset holding, etc. Although CDSP had no built in education component, out of its own initiatives, BRAC education programme had established some non-formal primary schools in the area. However, findings showed only a modest impact on education. Enrolment rates were found to be very low, even less than the rate prevalent among the ultra poor. The number of educational institutions available were found to be inadequate for the requirement of the residents in the locality. For achieving sustainable livelihood improvement, the importance of education is inevitable; thus, further and innovative interventions, especially in the form of more educational institutions, by both public and private sectors are required. These new interventions, together with the existing programme components, can be expected to improve the livelihood of the *char* dwellers substantially.

Introduction

Due to its location on a Delta plain, Bangladesh is crossed over by several mighty rivers such as the Padma, the Meghna, the Jamuna, and their countless branches and tributaries on their way towards the Bay of Bengal. The monsoon typically overflows these rivers and carries substantial amount of silt, and deposits a huge part of that silt in the shallow water along the coastal belt, predominantly in the south-eastern region. Ultimately, this sedimentation leads to new land formation in the form of coastal *chars*. These *chars* are low-lying regions and the soil usually has relatively high salinity with low contents of other organic materials and mineral components (Brocklesby and Hobley 2003). This particular type of soil composition in coordination with the location, results in low fertility level and extremely dynamic physical environment that faces frequent changes over the years and even throughout the seasons (Chaudhury 2008).

According to the government rules, the Forest Department usually takes care of the newly emerged *chars* for a period of twenty years. This time is required for raising plantation and management of forests. The objectives of the Forest Department activities are to accelerate accretion, stabilize the land, and protect the mainland against storms and cyclones (CDSP 2007). However, among the *chars*, the ones which are less likely to be flooded by sea-water are in most cases occupied by the settlers migrating from the main land before the end of these twenty years. Due to widespread landlessness and poverty in the country, this type of migration is quite common¹. Even after the migration taking place, various forms of social unrests take place in the *char* regions, particularly to take control of the lands (Zaman 1991).

The bio-physical condition and location of the *chars* make it quite easy to understand that human life on these geographical settings is neither convenient nor easy. Isolation from main land and associated attributes, lack of infrastructure, disaster-prone nature, and powerlessness interlock the *char* dwellers into a downward spiral of poverty. This state of deadlocked poverty has been seen to be quite persistent due to the lack of adequate institutional intervention (Chowdhury 1988). Government sponsored interventions aimed at coastal *char* development started in late 1970s through the Land Reclamation Project. This project was jointly funded by the Government of Bangladesh and the Kingdom of the Netherlands. Under this project, *Char Baggar Dona-I* in Noakhali district was poldered, along with actions taken for settlement through provision of land titles and agricultural development.

¹ According to HIES 2005, about 43.8% of the rural people in Bangladesh are poor and 5.3% of the households in the country are absolutely landless; and more than half of the households (55.2%) owns less than 50 decimals of land (BBS 2007).

Understandably, there has been limited intervention by the government to promote development in these regions. In an attempt to address the myriad of issues in these areas, the Royal Netherlands Embassy and the Government of Bangladesh (specifically, the Ministry of Water Resources) initiated a *Char* Development and Settlement Project (CDSP) in the coastal areas of south-east Bangladesh in 1994. Under the initiative, third phase of the programme was implemented in *Boyer Char* in Noakhali district and other regions covered in the phase I and II. The programme aimed to improve the livelihoods of the newly migrated dwellers in the areas. To what extent the programme was successful in improving their livelihood is thus the key research question.

This study aimed to assess the impact of the CDSP interventions, with specific focus on: (i) the effect on livelihood strategy such as employment, (ii) the effect on asset holding (natural, physical and financial), (iii) the effect on vulnerability in terms of food security, crisis coping, etc., and (iv) the effect on education.

Project Overview

Objective

The broad objective of the CDSP is poverty reduction through improvement in economic situation and living conditions of people in the targeted region, with special emphasis on the poorest segment of the population. Underlying this broad objective there are a number of specific objectives, which aim to provide the participants with (i) access to credit, (ii) extension with regard to economic activities, (iii) access to safe water, health, and sanitation facilities, (iv) access to education and legal aid services, and (v) important lessons on disaster management. These programme objectives are sought through constructing embankment and cyclone shelters, ensuring appropriate environment for agriculture and non-agriculture opportunities, and providing awareness lessons and discussions regarding safe water, sanitation and so forth. From 1994 to 2010, CDSP has been implemented in three phases, starting successively in 1994, 2000, and 2005. The last of these three phases spanned from July 2005 to June, 2010.

Target group

CDSP targets the poor people of coastal *char* areas who are- landless labourers, destitute women, small tenants/landowners, and very small landowners and fishermen. All households in any particular intervention area are covered by the programme, since only vulnerable individuals and families usually decide to come and reside in the *chars*. According to government regulations, each household is entitled to 1-1.5 acres of land, and the Ministry of Land ensures the execution of this regulation.

Target area

Boyer Char, an island between *Hatiya upazilla* of Noakhali and *Ramgoti upazilla* of Laxmipur, was the most prominent target area of CDSP-III. In addition, the project also covered the CDSP-I and the CDSP-II areas (spread over the districts of Noakhali, Feni and Chittagong) of *Char Baggar Dona I and II*, *Char Majid*, *Char Bhatirtek*, *South Hatiya polder*, *Char Moradona*, *Polder 59/3B*, *Char Gangchil-Torabali*, *Char Lakshmi*, *Polder 59/3C*, *Bamni catchment area* and *Muhuri accreted area*. CDSP-III also aimed to focus on new *chars* where development programmes can be undertaken in future.

Gender balanced approach

As part of a gender balanced approach, CDSP-III aimed at full integration of both women's and men's concerns and experiences in planning, implementation and

monitoring of various sector-specific components. However, the project recognized that the factors that motivate men and women to participate and to adopt changes might be significantly different. This possible difference was always taken into account for project interventions.

Female farmers built up 25% of the Farmers' Forum. Women running the households either in the absence or irregular presence of husbands were given priority. Similar approach was followed in the social forestry component of the project, and it had 35% female membership. Women-headed households also got priority in the case of land settlement.

Programme components

The implementing Non-Government Organizations (NGOs) of CDSP-III took convenient and timely steps to serve the current *char* dwellers who had migrated from various nearby locations to the intervention areas/*chars* due to a host of reasons². Several components were simultaneously worked with to implement multi-dimensional programme interventions. A brief discussion of these components is provided below.

Group formation and savings management

In order to avail project benefits, the participants were required to be members of organized groups called the village organization (VO). A previous study shows that various non-financial benefits of the project attracted more people, in contrast to exclusively the financial services (Barua 2007). In addition to depositing their savings in the weekly forums of small groups of participating women, they were able to exchange their opinions and views on certain issues.

Water and sanitation

Various water-borne diseases and other health problems are quite frequent among the *char* dwellers, due to use of ditch and tidal water and lack of safe latrines (Banu 2002). Achieving improvement in the overall water and sanitation situation of the *char* dwellers was thus another major concern of the CDSP-III. Since the *chars* often lack safe drinking water and hygienic sanitation facilities, the project aimed to promote using safe drinking water and sanitary latrines among the participants, along with raising their awareness on these issues.

Health and family planning

Distant living from the mainland limits the *char* dwellers' access to proper and timely healthcare facilities. To address this problem, the project provided medical services to the participants. These services included health and nutrition education, family

² Some of the main reasons are mentioned in the 'Results & Discussion' section of this paper.

planning, immunization, and some basic curative facilities. These services were provided in the *char* areas through paramedics, *Shasthya shebikas* (female health workers), and trained traditional birth attendants (TBA).

Palli Shamaj

Palli Shamaj is a social development initiative of BRAC that works at the grassroots level to reduce violation of human rights, dowry, divorce, and early marriage within the communities. Reduced occurrence of these untoward incidences helps empower the *char* dwellers, and creates an environment where they can exercise their rights and powers (Rashid and Alim 2005).

Human rights and legal education (HRLE)

Lack of adequate social and economic development forces the *char* dwellers to be susceptible to various forms of social exploitation. CDSP-III aimed to achieve increased awareness of the participants as well as the general community members through legal literacy courses. The programme also provided the *char* dwellers with various forms of legal support. As part of this HRLE programme, frequent workshops with community leaders, training sessions for staff of partner NGOs, and paralegal classes at the VO level were arranged.

Homestead crop cultivation

This component aimed to engage the participating women in economic activities within their homestead. It promoted kitchen gardening for various seasonal vegetables. The programme provided the participants with training to materialize the project effectively. Usually, participants with adequate homestead land were selected and trained for this project to successfully execute this intervention.

Social forestry

Forestation is vital to the *char* dwellers for protection against devastating cyclones and other frequent natural calamities. Under its social forestry component, CDSP-III thus carried out extensive plantation in and around homesteads and farmlands of the participants.

Poultry and livestock programme

Poultry and livestock rearing is considered to be a very important source of income for poor people in the rural areas of Bangladesh. Rearing poultry and livestock in the traditional method is more common among women, and it demands comparatively little amount of space and time. However, this traditional income generating activity has its problems, too. The poultry and animals reared in this method frequently fall victim to unhygienic feeding, various types of diseases, lack of treatment, etc. The poultry and livestock programme of CDSP worked to promote poultry and livestock rearing among the participants, by providing proper training, inputs, and marketing services among the VO members.

Disaster management

Drought, excessive rainfall, flood, water logging, etc. are some of the most common disasters faced in the coastal *chars*. CDSP attempted to raise awareness about these disasters and ways to cope with them among both the members of the VOs and the community people in general. During the regular group meetings, the partner NGOs arranged discussions on disaster preparedness, significance of different warning signals, locations of emergency shelters, ways to protect assets, surviving through the disasters and so forth.

Capacity building training

The programme held capacity building training sessions for implementing agencies and the staff. Training such as- *Shasthya shebika* (SS) training, TBA training, poultry worker, social forestry, *Palli Samaj*, etc. were mutually exclusive and given to people who work as catalysts for community development in the target areas.

Additional activities

In addition to the components discussed above, CDSP-III was involved with a few other activities in the target areas, with support from other BRAC programmes. Two such components of great importance are mentioned below.

Education support

Supported by the Education Support Programme of BRAC, the partner NGOs operate 35 non-formal primary schools in their working areas. It is worth mentioning here that these schools were not funded by the Embassy of the Kingdom of the Netherlands, but solely by BRAC. In addition, there are 19 other schools operating in the various cyclone shelters³. Before CDSP intervention, there were no non-formal school in these areas. Some of the parents used to send their children to the existing government primary schools, even though those schools are located far away from the respective villages. The expenditure of the government primary schools is too high for many of the poor families to bear. For all these problems, instead of sending school-going aged children to school, parents are often leaned to engaging them in income generating activities. A previous study shows that programme intervention in the form of non-formal schools brought positive changes in the children's lives (Banu 2002).

Tuberculosis support

The programme participants received support in the form of awareness lessons and treatment for tuberculosis (TB). This support was provided by the tuberculosis component of the BRAC Health Programme. Frequent discussion sessions were held

³ These schools are yet to be registered, and are currently operated informally by local residents.

to raise awareness among the participants regarding TB, and its diagnosis and treatment. For affected patients, BRAC SSS performed the task of providing free medicines and ensuring taking the medicine in their presence.

Implementing agencies

The project was implemented by the Bangladesh Water Development Board, in collaboration with five other departments: Local Government and Engineering Department, Ministry of Land, Department of Public Health Engineering, Department of Agriculture Extension, and Forest Department. Particular responsibilities of these six governmental implementing agencies are described below.⁴

Bangladesh Water Development Board (BWDB)

BWDB, the lead agency in CDSP-III, was responsible for implementing the water management-related infrastructure such as embankments, sluices, closures and excavation/re-excavation of *Khals* for drainage. It promoted participatory water management following the principles of integrated water resource management, the national water policy and the guidelines for participatory water management.

Local Government and Engineering Department (LGED)

The LGED was responsible for implementation of the internal infrastructure in *Boyer Char* such as rural roads, bridges, culverts, bus stand, ponds and cyclone shelters.

Ministry of Land (MoL)

The Ministry of Land was responsible for the land settlement programme. Other components are the construction of houses and ponds, and the computerized land records management system.

Department of Public Health Engineering (DPHE)

The DPHE was in charge of carrying out the works related to drinking water supply and sanitation. Major activities with regard to water supply were the installation of deep tube wells, pond-sand filters (in ponds located in areas where groundwater is not suitable for drinking), and rainwater harvesting system.

Department of Agriculture Extension (DAE)

The Department of Agricultural Extension, an agency of the Ministry of Agriculture, was responsible for applying the concept of productivity zones and the use of the Technology Source Book, along with some other lessons learnt in CDSP-II.

⁴ Source: The CDSP-III website. <http://www.cdsp.org.bd/agencies.htm>

Forest Department

This department functions under the Ministry of Environment and Forest. Its coastal forest division at Noakhali was responsible for the implementation of all forestry activities in the project, such as group formation, social forestry in *Boyer Char* polder, foreshore and mangrove plantations.

NGO involvement

BRAC was in charge of coordinating the interventions of five local NGOs in *Boyer Char* which were responsible for directly working with the *char* dwellers. These NGOs are: Dwip Unnayan Sangstha (DUS), Homeland Association for Social Improvement (HASI), Sagarika Samaj Unnayan Sangstha (SSUS), Unnayan Parikolpanay Manus (UPOMA) and Noakhali Rural Action Society (N-RAS). Each of these five NGOs had specific working areas in the target *chars*: DUS- Chairman Khal and Chatla Khal; HASI- Tankir Khal-1 and Gabtali Khal-4; SSUS- Basumajir Khal and Hatiya Khal; UPOMA- Gabtali Khal-1 and Gabtali Khal-2; and N-RAS- Tankir Khal-1 and Gabtali Khal-2. Their intervention covered the following sectors: homestead crops (not being done by DAE in CDSP-III), social forestry geared towards the homestead (not being done to the same extent by DOF under CDSP-III), water and sanitation, along with a number of sectors that fell outside the purview of CDSP-III: poultry and livestock, human rights, community development, health and family planning, credit and disaster management. The work was carried out under a contract directly with the funding agency, i.e. the Embassy of the Kingdom of the Netherlands (EKN).

Methods

Data

In the absence of any baseline survey on the CDSP III, a mid-term evaluation was conducted based on cross-sectional data (Barua 2007). For the mid-term evaluation of CDSP III, a survey was conducted in 2007 with a sample of 800 households, taking 10% from each local NGO involved in the project implementation. The surveyed households were selected randomly from a population census conducted by different implementing NGOs. The questionnaire was administered to the main female member (i.e. VO member) of the households.

For end-line evaluation (i.e. the present study), the same households surveyed in 2007 were revisited in 2010, and 592 households were successfully surveyed from the original pool. However, the absence of any baseline data has presented difficulties in being able to attribute the changes in outcome variables to programme effect. To overcome this problem, non-intervened households from the nearby *char* areas were included in the 2010 survey. *Naler Char* adjacent to the intervention *char* (i.e. the *Boyer Char*) was identified as a potential comparison area. This *char* has not yet been subjected to any major development initiative, except a few by some local NGOs. The rationale behind surveying non-intervention households was to control for the counterfactual that might be experienced by the intervention *char* dwellers. A total of 1,023 households from the *Naler Char* were randomly selected for the survey. Since baseline information was not available, recall method was used to collect some baseline information (for 2005) for both groups, so that some kind of matching between the two groups could be done. It should be noted here that the information of 2005 is intended to represent the pre-intervention status of the households.

Beside the quantitative analysis, some qualitative exploration was also conducted based on in depth interviews. Four women were selected purposively based on the different level of impacts (as identified from the quantitative information) they had experienced. Researchers from RED visited the selected women and conducted in-depth interviews about their background, livelihood, disaster management abilities, programme impacts and so on.

Quality control measures

Forty enumerators were recruited for the quantitative survey. Before the survey, a five-day long extensive training session on the questionnaire, followed by field-testing, was conducted for the selected enumerators. During the data collection period, researchers and field operation staff from RED conducted regular as well as random spot checks. In addition to this, all the completed questionnaires were cross-checked

everyday by each team at the field-office and all corrective measures were undertaken when and where necessary.

The collected data were verified to address any inconsistency, wrong recordings and/or coding in the field. Questionnaires were further checked by a separate Data Management Section in Dhaka before entering it in the computer. After recording all data, necessary measures were subsequently undertaken to check for entry errors.

Analytical technique

For the intervention households, two rounds of survey data (midline in 2007 and end-line in 2010) were available. Thus, a trend analysis was conducted on the key outcome variables for the intervention households to have a sense of how those variables had changed during 2007-10. However, this change (if any) may not be directly attributable to programme effect as some other factors might have been associated with it.

To estimate the programme impact, the analysis of the cross-section data for 2010 was done and a comparison was made between two groups of households (intervention and non-intervention). Based on 2005 data, Propensity Score Matching (PSM) method was used to match the intervention and comparison households, such that households from both groups would have a similar trajectory, had the programme intervention not taken place. The PSM process was as follows:

- 1) Firstly, a probit model using recalled data for 2005 ⁵(before intervention) was estimated,
- 2) Secondly, the balancing properties of the data were checked,
- 3) Thirdly, boot-strap standard error was estimated using 100 replications, and
- 4) A Kernel-based estimation was used.

⁵ Probit regression results of the propensity score matching is presented in Annex 1.

Results and Discussion

Reasons for relocating to/settling in the *char*

Available literature identifies increasing land dispossession of small peasant producers (resulting from highly skewed pattern of land ownership), declining rural economy and growing insecurity in the rural regions as some of the reasons for poor households' moving to the newly emerged and consequently vulnerable *chars* (Gillespie 2010). Various natural calamities also frequently cause the landless poor to migrate to the *chars*. The end-line survey conducted in 2010 sought to record the reasons which led the surveyed *char* dwellers to migrate to the coastal *chars*. Analyzing this information, it was found that riverbank erosion was the predominant reason for the surveyed households' migration to the *chars*. Riverbank erosion caused about 77% and 95% of the households, respectively, from the intervention and the non-intervention groups to move to the *chars* (Table 1). Forcible acquisition and the consequent migration caused about 18% of the intervention households and 3% of the non-intervention households to move to the *chars*. For both riverbank erosion and forcible acquisition, the differences between the two groups were found to be significant at 1% level. Unavailability of any other land and some other issues also caused the migration of some of the households.

Table 1. Reasons for migrating to the *char*

Main reason for migrating to the <i>char</i> (% of households)	Intervention (1)	Comparison (2)	Difference (3=1-2)
Riverbank erosion	77.3	94.8	-17.5***
Forcible acquisition	17.8	2.7	15.2***
No other land	2.9	1.3	1.5
Other	2.0	1.2	0.8

Note: *** denotes statistical significance at the 1% level.

Changes in key outcome variables during 2007-2010

As mentioned earlier, a proper baseline survey was not conducted to record the households status before programme intervention. However, for the intervention households, data from two rounds of surveys (mid-line and end-line) were available. Using the two-round survey data it was intended to study how the key outcome variables changed during 2007-2010 (Table 2).

Table 2. Changes in key outcome variables during 2007-2010

Key outcome variable	2007 (Mid-line)	2010 (End-line)
No. of livestock (mean)	1.50	1.66
No. of shop (mean)	0.04	0.04
No. of boat (mean)	0.011	0.044
No. of rickshaw/van (mean)	0.06	0.23
No. of big trees (mean)	9.71	28.57
Use tube well water (% of households)	87	97
Eligible women adopted family planning (% of women)	71	78
Always faced food deficit (% of households)	13.8	4.55
Faced food deficit at times (% of households)	46.8	33.16
Amount of savings in the NGO (Taka, mean)	697	2243
Per capita annual income (Tk., 2010 constant price, mean)	8693	10768

In case of owning livestock such as cows or bulls, analysis showed improvement of the participant households from 2007 to 2010. Similarly, the number of boat and rickshaw/van holding was also found to have significantly increased. One of the most significant improvements was noticed in the average number of big trees each household owned in 2010, compared to that of 2007. On average, each household owned about 10 big trees in 2007, which went up to 29 in 2010. This remarkable improvement was probably caused by the programme intervention directly in the form of seedlings supply, and indirectly, through lessons designed to promote awareness on environmental sustainability and related issues. Per capita income was also found to increase significantly, from Tk. 8,693 to Tk. 10,768 during 2007-2010 (24% increase).

Programme impacts

Impact on assets

Table 3 presents information on the households' physical and natural asset holding. On average, intervention households reported having 21 decimals of cultivable land, which was quite high compared to the average cultivable land holding of comparison households (9.7 decimals). The direction of the difference remained the same in case of homestead land holding; about 30 decimal for intervention households versus 22 decimal for comparison households. The intervention households appeared to be better off compared to the comparison households also in terms of average number of poultry and livestock holding. Empirical evidence shows that livestock and poultry holding is significantly and negatively associated with poverty in rural Bangladesh (Kotikula *et al.* 2010). Positive impact on this type of asset is thus expected to contribute significantly towards reducing vulnerability of the intervened households.

Table 3. Impact on physical and natural assets (PSM results)

Assets	Intervention	Comparison	Difference
	(1)	(2)	(3=1-2)
Cultivable land (decimals, mean)	21.01	9.74	11.27***
Homestead land (decimals, mean)	29.89	21.9	7.99***
No. of duck/hen (mean)	10.1	9.2	0.80*
No. of cow/bull (mean)	2.2	1.6	0.60***
No. of goat/sheep (mean)	0.6	0.5	0.10
No. of rickshaw/van (mean)	0.23	0.03	0.2**
No. of boat (mean)	0.04	0.01	0.03***
No. of shop (mean)	0.04	0.03	0.01
No. of fishing net (mean)	0.6	0.3	0.3
No. of big trees (mean)	28.6	8.9	19.7***
No. of chairs (mean)	0.8	0.5	0.3***
No. of table (mean)	0.5	0.2	0.3***
Owned television (% of households)	2	1	1**
Owned cell phone (% of households)	41	29	12***
No. of stored sarees (mean)	2.4	1.2	1.2***

Note: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively.

As can be seen from Table 3, possession of rickshaw/van and boat was affected positively by the programme intervention, implying that the intervention households were able to use their income from other productive sources (such as, poultry, seeds, etc. received from the programme) for investment into rickshaw/van. In addition, the programme provided seedlings to the households and they were encouraged to nurture the seedlings properly, since the trees grown up from the seedlings might be source of both tangible and intangible benefits for the households. The tangible benefits from trees could be fruit, fuel, fodder and/or timber generating income for the households; while the protection provided by the larger trees against cyclone, tidal surge would be the intangible benefits for the *char* dwellers. It was found that the average number of big trees (each valued at least Tk. 100) each household possessed was significantly higher (28.6) for the intervention households compared to that of the comparison households (9). Intervened households were also found to possess a higher number of chair and table, often considered as luxurious goods. While mean number of chair holding was 0.8 for the intervention households, the corresponding figure for the comparison households was found to be 0.5. However, only 2% of the intervention households and 1% of the comparison households reported having television; but the difference between the two groups was found to be statistically significant.

The proportion of households having cell phones was found to be much higher for the intervened households. To be specific, 41% of the intervention households and 29% of the comparison households reported having cell phones and the difference was statistically significant at 1% level. Another indicator used for assessing households' economic status was the number of stored sarees each household had for the main female member, for wearing on special occasions. The mean number of sarees was found to be 2.4 for the intervention households and 1.2 for the

comparison households. The difference between the two groups was statistically significant at 1% level. This indicates that quality of livelihoods improved remarkably due to programme intervention.

Impact on housing

Table 4 shows information regarding various descriptive and quantitative features of the households' homestead. Majority of the households in both the intervention and the non-intervention groups reported having 2-3 rooms in their homestead; no significant difference was found between the two groups in this regard. In the case of homestead with only one room, the proportion was much higher among the comparison group and the difference was statistically significant. On the other hand, the proportion of households using 4 or more rooms was found to be higher for the intervened households, further supporting the fact that due to programme intervention, households' housing condition improved significantly. The intervention households also appeared to be better off in terms of having a separate kitchen. More specifically, while 77% of the intervention households reported having a separate kitchen, this proportion was 60% for the non-intervention households.

Table 4. Impact on housing condition (PSM results)

	Intervention (1)	Comparison (2)	Difference (3=1-2)
<i>No. of rooms used by the households:</i>			
1 room (% of households)	18.0	37.8	-19.7***
2-3 rooms (% of households)	59.9	55.9	4.0
4 or more rooms (% of households)	22.0	6.2	15.8***
<i>Have separate kitchen (% of households)</i>	76.8	59.7	17.1***
<i>Main material of wall:</i>			
Bamboo (% of households)	73.5	91.1	-17.6***
Tin/wood (% of households)	26.3	8.9	17.4***
Cement (% of households)	0.2	0	0.2

Note: *** denotes statistical significance at the 1% level.

Information on construction material of the main living room was collected to understand the housing condition. Bamboo was reported as the most common material used for the walls for both groups of households; but the proportion of households reporting bamboo as the main material for their walls was found to be higher for the non-intervention households. On the other hand, a significantly higher proportion of intervention households (26%) had tin/wood walls compared to non-intervention households (9%).

However, walls made of cement were found to be almost non-existent. The absence of cement made walls may suggest a lower income group in the first glance; however, some factors must be kept in mind when drawing such conclusion. *Chars* have an environment that is quite different from the mainland, since the permanency of the structures on them is precarious at best, especially during monsoon seasons. The survey also recorded information on the amount of money spent on housing

improvement in the last one year. Analysis showed remarkable improvement in the housing status of the intervention households. As can be seen from Table 5, on average, the intervention households spent Tk. 18,802 on housing improvement in the one year before the survey; for the comparison households, this amount was Tk. 4,850. The difference was statistically highly significant.

Table 5. Housing improvement in last one year (PSM results)

	Intervention (1)	Comparison (2)	Difference (3=1-2)
Amount of money spent (Tk.)	18802	4850	13952***
<i>Main source of money (% of households)</i>			
Income	68.9	36.0	32.9***
Savings	10.7	34.5	-23.8***
Loans	20.4	27.8	-7.4**
Other (sold possessions/charity)	0	1.7	-1.7

Note: ** and *** denote statistical significance at the 5% and 1% levels, respectively.

The most common source of expenditure for housing was found to be households' income for both groups, but the proportion was higher for intervention households (i.e. 69% for the intervention households and 36% for the comparison households). For the comparison group, previously saved money was another important source for financing housing improvement. But for the intervention group, only 11% of the households used saved money for housing improvement. The difference between the two groups was statistically significant. Again, more households from the comparison group used loans to finance housing improvements, compared to the intervention households. In a few cases, households from the comparison group got the money to be spent on housing improvement through selling possessions or charity, but this was non-existent among the intervention households, indicating that the intervened households were financially more secured.

Impact on education

Analysis of net primary enrolment (children aged 6-10 years who were enrolled in primary school) showed that the rate for the boys was 57% in the intervention group and 58% in the comparison group (Table 6). Among the girls, the corresponding proportions were found to be 60% and 63% respectively. Neither of the differences was statistically significant, indicating that programme had no significant impact on net primary enrolment. Furthermore, the rate was found to be quite low compared to the national rates and even the rates for the extreme/ultra poor households in Bangladesh. Among the ultra poor households in the poorest regions of Bangladesh, the net primary enrolment rate for boys and girls were found to be 74% and 76% respectively (Sulaiman 2009). However, compared to the intervention households, the net secondary enrolment rates of both boys and girls were higher for the intervened households and the differences were statistically significant, indicating that programme had some impact on net secondary enrolment.

Table 6. Impact on education (PSM results)

Enrolment Rates	Intervention	Comparison	Difference
	(1)	(2)	(3=1-2)
Net primary enrolment (boys) (%)	57.2	58.1	-0.9
Net primary enrolment (girls) (%)	59.5	63.1	-3.5
Net secondary enrolment (boys) (%)	7.3	1.4	5.9***
Net secondary enrolment (girls) (%)	9.1	2.2	6.9***

Note: *** denotes statistical significance at the 1% level.

Education is the most important human capital and it is the key to reduce poverty, particularly keeping back from intergenerational transmission of poverty. A voluminous evidence base suggests that education is negatively associated with poverty (Kotikula *et al.* 2010, BBS 2007). CDSP had no direct component related to education, except that BRAC, under its own initiative is running some schools. But it is expected that through the livelihood improvement there might be an impact on education. The major factor hindering government intervention towards promoting education in the *chars* is a jurisdictional one. More specifically, these newly immersed *chars* have not been brought under the jurisdiction of local government, i.e. it has not yet been announced which unions the different *chars* belong to. As most government programmes/projects consider the unions as the basic geographic unit of operation, this situation creates a problem in case of introducing public educational institutions in the *chars*.

Impact on water and sanitation

When analyzing data on water sources, it was observed that tube well was the most common source of drinking water for both intervention and non-intervention households (Table 7). However, the proportion of non-intervention households using tube well was slightly higher (2%) than that of the intervened households. This indicates that the comparison area underwent some development in terms of supplying safe water to the dwellers. This whole scenario changed with regard to source of non-drinking water.

Table 7. Source of drinking and non-drinking water (PSM results)

Sources	Intervention	Comparison	Difference
	(1)	(2)	(3=1-2)
<i>For drinking water:</i>			
Open sources (% of households)	2	0.6	1.3**
Tube well (% of households)	96.9	98.9	-1.9**
Deep well (% of households)	1	0.4	0.6
<i>For non-drinking water:</i>			
Open (% of households)	78.5	92.1	-13.7***
Tube well (% of households)	21.2	7.9	13.3***
Other (% of households)	0.3	0	0.3

Note: ** and *** denote statistical significance at the 5% and 1% levels, respectively.

The most common sources of non-drinking water for both groups were various open sources. In comparison to 79% of the intervened households depending on open sources for non-drinking water, this proportion was 92% for non-intervention households. The rest of the households used mostly tube well water for non-drinking purposes. But unlike the case of drinking water sources, a higher proportion of the intervention households (21%) relied on tube well compared to non-intervention households (8%) for non-drinking purposes.

Analytical findings showed quite a poor case scenario regarding sanitation. In the end-line, 21% of the intervention households reported using open places for defecation (Table 8). This proportion was alarmingly higher for the non-intervention households (88%). Among the intervention households, the majority (78%) used ring/slab latrines (without a water-seal). Only 1% of the intervention households were found to use properly built sanitary latrines (with a water-seal), while almost none of the non-intervention households used such latrine.

Table 8. Type of latrine used by households (PSM results)

	Intervention (1)	Comparison (2)	Difference (3=1-2)
Open places (% of households)	20.9	88	-67.1***
Ring/slab (% of households)	77.9	11.7	66.2***
Sanitary (% of households)	1.2	0.3	0.9**

Note: ** and *** denote statistical significance at the 5% and 1% levels, respectively.

Impact on income and employment

Table 9 shows the respondent households' per capita annual income. The average per capita income for the intervention households was found to be Tk. 10,768, while the same for the comparison households was Tk. 9,364. Therefore, on average, the intervention households' per capita annual income was Tk. 1,404 higher than that of the comparison households, and this difference was found to be statistically significant at 1% level. This difference can be interpreted as the programme's positive impact on the participant *char* dwellers' earned income. As the asset holding of the intervened households increased significantly due to programmatic intervention, positive impact on per capita income was expected.

Table 9. Per capita annual income (PSM results)

	Intervention (1)	Comparison (2)	Difference (3=1-2)
Per capita average annual income (in Taka)	10768	9364	1404***

Note: *** denotes statistical significance at the 1% level.

After looking at income related information, it might be interesting to look at the various activities the working-aged members (15-60 years) were involved with to generate this. The activities of the working-aged members have been disaggregated

into few categories (Table 10). It was observed that hours devoted to day labour was lower for the intervention group. But hours devoted to self-agriculture and to livestock and poultry rearing were higher among them. This probably indicates that intervened households' access to credit helped them to invest in this type of earning activities.

Table 10. Impact on employment of working-aged males (PSM results)

Total hours spent in last one year on	Intervention	Comparison	Difference
	(1)	(2)	(3=1-2)
Household chores	21	38	-16
Agriculture	529	410	119***
Day labour	622	969	-348***
Livestock and poultry	233	147	86***
Fishing	118	138	-20
Driver	138	172	-34
Business	133	111	22
Others	139	35	104***

Note: *** denotes statistical significance at the 1% level.

In terms of the number of hours spent per working-aged women per year within a household, it was found that the members of the intervention households passed less time doing household chores in contrast to their comparison group (Table 11). The rationale behind this is that the participating women were involved more in income generating activities, thus giving them comparatively less time otherwise. Another important impact of the programme was found on the number of hours spent by women towards taking care of livestock and poultry. Working-aged females from the intervention households were found to spend more time, than their comparison counterparts, in taking care of livestock and poultry. This difference can be attributed to the credit and training facilities provided by the implementing NGOs. Although the difference between the intervention and comparison households in terms of time spent working as a day labourer was found to be significant, time devoted to this activity was small enough to be considered negligible.

Table 11. Impact on employment of working-aged females (PSM results)

Total hours spent in last one year on	Intervention	Comparison	Difference
	(1)	(2)	(3=1-2)
Household chores	1470	1656	-186***
Agriculture	12	16	-4
Day labour	17	10	7***
Livestock and poultry	714	665	48*
Fishing	5	3	2
Business	8	7	1
Others	101	38	63***

Note: *** and * denotes statistical significance at the 1% and 10% level, respectively.

Impact on financial market participation

One of the main components of the CDSP intervention was the provision of credit for participant households. Similar to the BRAC microfinance model, the partner organizations formed village organizations (VO), and all the microfinance activities were conducted based on the VO. It was found that the intervention households' mean amount of outstanding loan was almost double that amount for the comparison households (Table 12). Around 81% of the outstanding loans of the intervention households were from the NGOs while it was 67% for the comparison households. This indicates that in the comparison area there were some NGO activities. It is often argued that in the absence of an adequate supply of formal loans, informal loans, particularly from moneylenders, is largely prevalent in rural Bangladesh. Mallick (2009) showed that interest rate for moneylender loan is 103%. On the other hand, Sinha and Matin (1998) reported that about 87% of rural households in the northern Bangladesh borrow from informal sources. However, it was found from the current study that the dependency on moneylenders was quite low for all the surveyed households.

Table 12. Impact on financial market participation of the *char* dwellers (PSM results)

	Intervention (1)	Comparison (2)	Difference (3=1-2)
Amount of average outstanding loan (Taka)	11789.52	7362.34	4413.19***
<i>Loan source (% of households):</i>			
NGOs	81.10	67.04	14.06***
Friends/relatives	12.21	14.45	-2.22
Money lender	3.31	4.70	-1.4
Others (shop etc.)	3.30	13.79	-10.49***

Note: *** denotes statistical significance at the 1% level.

Impact on food security

During the survey, information was collected on food expenditure for the last three days using recall method. Table 13 shows information on per capita food expenditure. For all the food items, except cereal, the intervention households spent a significantly higher amount of money, compared to the non-intervention households. For example, while non-intervention households reported spending Tk. 14 on edible meat/fish/egg in three days before the survey; intervention households spent Tk. 24 on the same item. Similarly positive impacts were found on the per capita expenditure on vegetables. One can thus speculate that this would have an impact on nutritional status. In the case of per-capita expenditure on cereal, both groups spent similar amount of money in three days prior to the survey; and the difference in expenditure of the two groups was not statistically significant. This is because, in rural areas people always try to take adequate rice even if they are poor, but they compromise on other items such as meat, fish, egg, etc. the prices of which are usually quite high.

Table 13. Impact on food expenditure (PSM results)

Per capita expenditure on last three days (Tk.)	Intervention	Comparison	Difference
	(1)	(2)	(3=1-2)
Cereal	39.9	39.1	0.9
Lentil	4.2	2.2	2.0***
Edible oil	4.0	3.6	0.3**
Meat/fish/egg	23.8	13.8	10.0***
Vegetables	8.3	5.4	2.9***
Salt and spices	4.3	2.8	1.5***
Others	15.7	5.4	10.3***

Note: ** and *** denote statistical significance at the 5% and 1% levels, respectively.

Information was also collected on the households' food security based on respondents' self-perception. Table 14 shows substantial improvements in households' self-perceived food security. For example, while 66% of the households in the comparison group reported to face food deficit (either always or occasionally), the corresponding proportion among the intervened households was found to be 38%. On the other hand, 38% of the comparison households reported of never having meals with only rice, while the corresponding proportion was 57% in the intervention group. Proportion of households who were able to manage at least two square meals a day was found to be significantly higher among the intervention group.

Table 14. Impact on food security (PSM results)

	Intervention	Comparison	Difference
	(1)	(2)	(3=1-2)
Could manage at least 2 meals a day over last year (% of HHs)	95.3	82.8	12.5***
<i>Food security status (% of households):</i>			
Always deficit	4.5	6.3	-1.8
Sometimes deficit	33.2	59.7	-26.6***
Evened out	41.2	30.4	10.8***
Always surplus	21.0	3.4	17.6***
<i>Only had rice to eat (% of households):</i>			
Never	56.9	38.4	18.5***
1-3 times/month	30.8	47.7	-16.8***
1-2 times/week	11.8	13.0	-1.2
3 or more times/week	0.5	0.9	-0.4

Note: *** denotes statistical significance at the 1% level.

Training and support

Since training on various activities was an important component of CDSP, information was collected to find out the proportion of respondents who had received training as well as other support. PSM results showed that about 60% of the intervention households received training on poultry rearing, compared to only 3% of the non-intervention households (Table 15). This indicates that *Naler Char* which was

used as comparison area for this study had not undergone adequate intervention till date to provide livelihood support to the local inhabitants. When analyzing whether the households received any seedlings, similar results were found; i.e. the comparison group received almost no such support. However, about 43% of the households from the comparison group received training on disaster management, against 86% of the intervention households.

Table 15. Impact on training and support (PSM results)

	Intervention (1)	Comparison (2)	Difference (3=1-2)
<i>Received training:</i>			
On poultry rearing (% of households)	59.4	2.8	56.7***
On disaster management (% of households)	86.2	42.9	43.3***
Received seedlings (% of households)	89.6	2.0	87.6***

Note: *** denotes statistical significance at the 1% level.

Crisis and incidence coping up

Various forms of crisis/incidence both idiosyncratic and covariate are likely to negatively affect the economic status of the households. This can happen for two reasons, either because the shocks often leave the households with significant asset depletion directly or because households themselves often are to sell the productive assets to cope up with the incidence/crisis. Feelings of insecurity, uncertainty and defencelessness can aggressively diminish the current state of well-being (Calvo and Dercon 2007). The end-line survey sought to collect information on various shocks faced by the participants in one year before the survey. As can be seen from Table 16, while about 18% of the intervention households reported having faced some kind of natural calamity in the preceding one year, this proportion was substantially higher at 56% for the comparison households. It is pertinent to note here that although both *Boyer Char* and *Naler Char* are located very close to the Meghna River, the *Boyer Char* has seen much development with regard to preventing it from various forms of natural disaster. A dam was built around the *Boyer Char* and there are also a number of cyclone centres.

The direction of the difference between the two groups of households remained the same for severe illness of earning member, illness of a family member (other than the earning member), ruined crops, and death of poultry and livestock. That is, in all these cases, the intervention households reported being better off, compared to the comparison households. The differences between the two groups were always found to be statistically significant.

Table 16. Vulnerabilities faced by the households (PSM results)

Shocks faced in the past 12 months (% of households)	Intervention	Comparison	Difference
	(1)	(2)	(3=1-2)
Natural calamity	17.8	55.9	-38.1***
Severe illness of the earning member	0.6	5.0	-4.3***
Illness of a non-earning family member	0.5	6.0	-5.5***
Ruined crops	29.9	41.8	-11.9***
Riverbank erosion/cyclone	6.2	1.2	4.0***
Death of poultry/livestock	45.9	51.9	-6.0**

Note: ** and *** denote statistical significance at the 5% and 1% levels, respectively.

After looking at various vulnerabilities/disasters faced by the intervened households, the mechanisms they adopted to deal with the financial repercussions of such shocks were analysed. Analysis showed that on average, the intervened households spent Tk. 1,825 for the incidence/crisis faced in the preceding one year, and for the comparison households the corresponding amount was Tk. 2,758 (Table 17). A substantially large proportion of the households from both groups (87% from the intervention group and 48% from the comparison group) reported doing nothing for the crisis/incidence. Compared to about 7% of the intervention households, a higher proportion (13%) of the comparison households had to reduce their household expenditure in order to manage money for coping with crisis/incidence. Even for the other mechanisms, the proportions of the comparison households adopting those were always higher than that of the intervention households. All of these differences were found to be statistically significant at 1% level.

Table 17. Coping mechanism of crisis/incidence (PSM results)

	Intervention	Comparison	Difference
	(1)	(2)	(3=1-2)
Average money spent for the crisis/incidence (in Taka)	1825.42	2757.67	-932.15**
<i>Mechanism adopted to fund the crisis (% of households who faced shocks):</i>			
Did nothing	86.5	47.9	38.6***
Reducing HH expenditure	6.5	12.6	-6.1***
Spent savings	4.7	20.9	-16.2***
Others (sent children to work, migrated, begging, charity, loans etc)	2.1	17.1	-14.9***

Note: ** and *** denote statistical significance at the 5% and 1% levels, respectively.

Self-perception on livelihood changes

Information was collected to assess the respondents' self-perception with regard to livelihood changes. Comparison of the data for intervention and non-intervention households suggested positive changes/improvements for the intervened households (Table 18). Compared to 41% of the non-intervention households, about 75% of the

intervention households were found to believe that their borrowing ability had improved in the last three years. This high level of confidence among the intervention households was also reflected in the respondents' responses regarding the perceived amount of money they can borrow when necessary. This also reflects the fact that due to their improved financial condition, their credit rating within the community had improved. While, on average, respondents from the non-intervention group thought they could borrow Tk. 7,887, those from the intervention group thought that the amount could be about Tk. 11,785. Again, a significantly higher proportion of respondents from the intervention group thought that both their economic condition and their ability to cope up with crisis had improved in the last three years.

Table 18. Self-perceived livelihood changes (PSM results)

	Intervention (1)	Comparison (2)	Difference (3=1-2)
Respondent's perceptions of how much money they can borrow when needed (in Taka)	11784.8	7886.9	3898***
Improved borrowing ability in last three years (% of households)	75.4	41	34.4***
Improved economic condition in last three years (% of households)	74.9	40.3	34.6***
Improved ability to cope up with crisis during last three years (% of households)	79.3	37.7	41.6***

Note: *** denotes statistical significance at the 1% level.

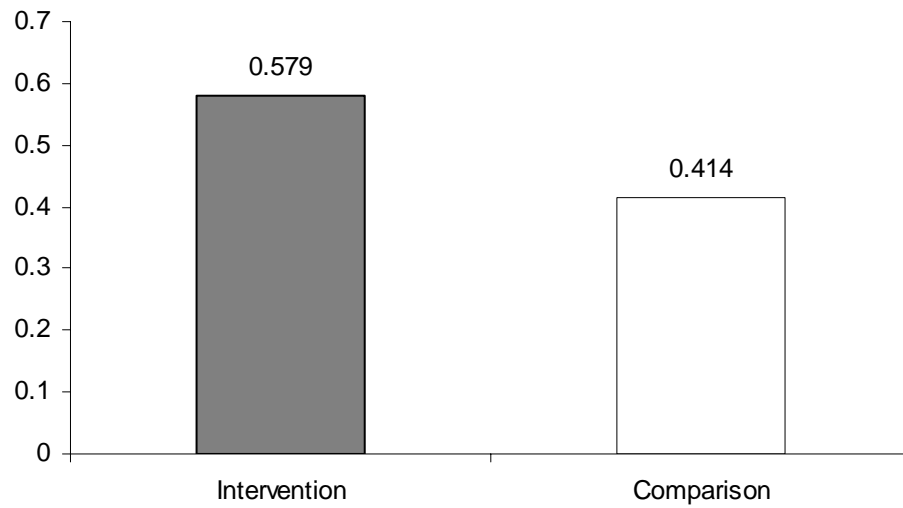
Table 18 suggests that the programme had significant positive impact on the livelihoods of participant households. Most importantly, the participant women's level of confidence regarding their financial improvement and handling various related issues have reached quite high level.

Social and legal awareness

As part of programme support, the participants were provided with awareness training on various social and legal issues. CDSP assumed and operated on the premise that knowledge among the participants would reduce the risk of exploitation. Even within the households, the awareness on various social issues is important. For example, if parents know about the legal age of marriage and the problems associated with early marriage they may be less likely to marry off their children before appropriate age. To analyze the respondents' awareness on various social and legal issues, an index was constructed. Questions related to the legal age of marriage, divorce laws and so forth were used to create this index. For each indicator, a value of '1' was assigned for correct answer, and '0' for wrong answer. Then after summing up the scores it was divided by the total number of indicators used. The maximum value of the index was 1 and minimum 0. Analyzing the index using propensity score matching, it was found that the mean index for the intervention households was significantly higher than that of the comparison group, which gives an indication that programme had positive impacts on the awareness of

the participant women (Fig. 1). An indicator-specific analysis was also conducted (Annex 2). This analysis revealed that for almost all indicators, the programme had positive impacts.

Figure 1. Impact on awareness (PSM results)



Stories Behind the Numbers: Qualitative Case Studies

Marzan Begum

The youngest of the three siblings, Marzan Begum spent better part of the past 50 years in Hatia, Noakhali. She recalled that her father would make house roofs for a living, while her mother was a homemaker. Eventually, she reached the age of 15 when her parents decided to marry her off. By then her two older sisters were married as well. However, unlike her sisters, her marriage was set with someone who was not too well off. Due to malicious representation on the part of her in-laws, she didn't realize until after her wedding that her husband was only a day labourer. As it appeared to be too late to remedy the problem, she started her life as a homemaker in the new household.

As the years rolled on after the wedding, Marzan Begum had six children. Being a conscious mother, she had decided to send all of her children to Hatia primary school. However, as luck would have it, one fateful year, the riverbank erosion took away the only land that they had including all their earthly possessions. Becoming both homeless and penniless, they decided to move to a nearby area called Berikul, where her husband started working as a day labourer.

Before her wedding, Marzan Begum had a comfortable life. Her father earned enough to provide the siblings with food three times a day and at least two new dresses every year. But all that had changed since her wedding. Her husband earned anywhere between Tk. 0 to Tk. 200 per day. The work was unsteady and precarious. Whenever her husband earned extra, they would try their best to save for a rainy day.

It was at this point that they heard of *Boyer Char*, a substantially large landmass that had risen and dried up within the river. The land was cheap and the family decided to relocate to improve their luck in 1997. All of their children were still quite young when they moved to the new land. As it happens with any relatively unused *char*, the area was a virtual forest. Marzan Begum recalled that cleaning up the land they had grabbed was one of the longest and the most arduous job they had to do. As the children were very young then, they had no one else to work in the family. Income was very meagre and both she and her husband had to work to keep themselves afloat. They could not afford adequate food, maybe once or twice a day. Marzan, along with the rest of the family, also had to drink salty water at the beginning as clean water was not an option.

As a common phenomenon throughout the country pertaining to *chars*, large groups of land grabbers described as 'pirates' by the local people often end up having

bloody clashes to establish dominance over the new land. These pirates then let poor people into these lands for settlement and tax them on a regular basis against the threat of violence, arson and even murder.

When Marzan's family first came to *Boyer Char*, they had to bribe the local pirates. They sold their fishing net for Tk. 1,600 and bought 150 decimals of land in *Boyer Char*. They had to give an additional Tk. 1,200 as tax to the pirates for the land. This pirate problem continued till 2005, and they kept on getting robbed on a regular basis. In 2004, the army/navy took an initiative and drove the pirates away by 2005.

The CDSP then came to the *char* headed by BRAC and five other NGOs. During the beginning of the programme, Marzan took training in social forestry in 2006 where she learned about how to take care of trees. She got fruit trees from the programme such as *amlaki*, *kamranga*, *jolpai*, *boroi*. She got 26 trees in the first round and 27 trees in the second round. She also got latrines (an open one previously). Upon receiving the training, she took out three subsequent loans from the CDSP.

A lot has changed since the turbulence of the initial days. Now, all of Marzan's children except one daughter is married. Her oldest son is around 30 now. Though her sons live in separate houses, they have taken up the responsibility for their upkeep. The oldest son works on their own land, while the second son has his own tailoring shop. Marzan used the first loan of Tk. 3,000 to buy livestock and poultry. Later on she took out two more loans of Tk. 8,000 and Tk. 10,000 with which she mortgaged in more land (around 150 decimals) and also bought supplies for her son's tailoring shop. During her leisure period, she makes chicken baskets and pottery which her husband sells in the local market. Marzan Begum claims that she no longer has to yearn for food and clothing as everything is being taken care of. Now she can manage three meals a day with vegetables, fish, meat, etc.

Bibi Hajera

Bibi Hajera grew up living in Hatia for 25 years. She had three siblings. Her mother was a housewife, while her father earned a living through cultivating their own lands. Growing up in a conservative household, all the four sisters were sent to the local madrasa for education. Her early life was quite comfortable. They were never left wanting for food or clothes. She boasted that they had meat to eat at least twice a week and had fishes almost every day. However, by the time she reached 15, misfortune had struck and all the land that her family owned was lost to riverbank erosion. In an effort to reduce the number of mouths to feed, her parents married all the three daughters off within a short duration of time.

Hajera's husband was a day labourer from the next village who moved to Hatia after their wedding. Like her mother, Hajera continued to take care of the household while her husband earned their bread through working as day labourer. As part of the dowry, her father had given them 20 decimals of land bought in another location, away from their own. With the savings from her husband's work, they managed to

buy another 80 decimals of land adjacent to the previous one. But as luck would have it, the next year that land was eroded by the river as well.

Income was running low for the family, especially since they had four children within that time. To look for green pastures, they moved to a neighbouring area called Berikul along with her parents, where Hajera had three more children. This newly merged large household would rely on the earnings of Hajera's father and her husband. Following her parent's footsteps, Hajera sent her daughters to study in *madrassa* while the sons were sent out to work. Within a short time after moving to Berikul, Hajera's father passed away, exacerbating the situation as they needed to feed the whole family from one person's income as opposed to two. Expenditure on food was sparse; more often than not, they could afford to eat only once a day, on good days.

When they initially moved from Hatia to Berikul, they took with them two cows, two calves and a few chickens. However, when they reached Berikul, they were forced to sell these animals because they were squatting and the animals were difficult to keep. Within a couple of years of moving to Berikul, they were forced out by some of the locals over a trivial dispute. This is when they decided to relocate to *Boyer Char* in 1999. They sold all their animals for approximately Tk. 20,000, from there, Tk. 14,000 was used to buy about 150 decimals of already cleaned land and the rest was used to pay taxes to the pirates. These pirates were ruthlessly cruel and were actually snakes in human skin, said Bibi Hajera.

For the first few years, the situation was even worse for them than it was in Berikul. Not only were they often forced to go without food for days and drink saline water, pirates would frequently come to demand taxes. As her husband was working away on the mainland, Hajera needed to deal with these pirates. The inability to pay was never accepted as an excuse. If she couldn't pay, they used to take something else from the household in return. At the point when they had nothing left, the pirates set fire to her house and threatened to kill her family members. Hajera's family ended up borrowing from neighbours and friends, and caught fish from the nearby villages to keep themselves afloat. Having depleted all their savings for the land, they had no other choice but to borrow. Every other month, Hajera's husband would return with Tk. 3,000 - Tk. 5,000 and would leave again.

Hajera said that the CDSP could not have come at a better time. The government forced the pirates out of the area. The project created a physical infrastructure in the area in the form of roads, provided access to fresh water, etc. But the best part of the programme was that they provided her with training and the necessary capital to start her own business in agriculture. She received training on social forestry and received seeds with which she started earning income to supplement her husband's.

During the last five years, she utilized her resources and training and took three consecutive loans. With the first one of Tk. 3,000, she purchased more seedlings to increase her capital base. Her diligence had paid off and she was able to establish herself as one of the local seed providers in the area. At present, she maintains her

own commercial nursery. A year later she took out another loan of Tk. 6,000 and received training on making paper bags and *murir moa* (puffed rice cake). By this time her husband had quit working as a day labourer and began working with Hajera to expand their business. She would be the one making the products, while her husband would take those to the market for selling. She had recently taken out a third loan of Tk. 10,000 with which she bought paddy from the farmers to make them into rice.

Though she recalls her previous days with fondness and reflects on the struggles that they had to go through, Hajera now thanks her luck for her current state of being. She says happily that now she is able to feed her children and her mother quality food three times a day. She is able to buy them clothes when needed and sends all her children to the local school. Her husband helps her run the business. She feels grateful that her family was able to stick together for both the good and the bad times.

Kaiser Begum

Second of five children, Kaiser Begum was born in Ramgoti and moved to Hajari *Char* when she was young. As a young girl, she recalled having a comfortable life despite not being very well off. Her father earned a living of making pottery, while her mother was housewife. But as she grew older, the situation changed. Her father, for unknown reasons, ended up disappearing from home for long time. It became an increasing struggle for her mother to feed the large family. Her mother was ultimately forced to take the children out of school and to send them to work. More often than not, the entire family was forced to sustain on plain rice with chillies.

Like many other poverty stricken families where the girls are wedded off at a very young age, Kaiser Begum was married off to a man from Ramgoti at the age of 15. After the wedding, she moved back with her husband to her birthplace. Her husband was quite poor and worked as a day labourer from which he earned about Tk. 100-Tk. 200 per day. Rather than being provided for and protected by her husband, Kaiser Begum became a target for domestic violence from both her husband and her mother-in-law, as her parental family could not provide any dowry. Not only did they both beat her regularly, they barely fed her and took away all but the clothes she was wearing. Not being able to endure the abuse for too long, Kaiser moved back to her mother's family in Hajari *Char*. After four years, when her mother-in-law passed away, her husband came back for her. In an effort to start afresh, they decided to move to *Boyer Char* in 1998. At this point she had two daughters.

When they moved to *Boyer Char*, she says that the place was comparable to a mangrove swamp. After purchasing some land with Tk. 5,000 that her mother had given her, it took Kaiser Begum and her husband nearly a year to get it cleaned up. Within the next few years she had two more daughters and one son. Coping was very difficult for Kaiser Begum with so many mouths to feed. More often than not, they would have to borrow rice and other food items from neighbours. In addition to that, they had to deal with the pirates who would demand taxes precariously. During such an incident when they weren't able to pay, the pirates severely beat her

husband and set fire to their house. However, despite their obvious financial difficulties, they sent all their children to school. Her husband quit working as a day labourer at that point and worked on their field to cultivate crops. During the birth of their last child, Kaiser Begum became quite ill and they had to sell all their crops to bear the medical expenses.

In 2005, the CDSP intervened into the area. With the assistance of the government the pirates were driven out. Roads and other important infrastructures such as safe water lines, schools and cyclone shelters were built. Kaiser received training in social forestry and received seeds for investment in addition to a sanitary latrine for her household. Taking on additional responsibilities, she took further training as a *Shasthya shebika* to supplement her income and to help those around her. After the completion of mandatory training, she took a loan of Tk. 3,000 and spent it for household expenditures. She paid it back gradually from her own earnings from some other projects.

The year after that, she took another loan of Tk. 4,000, which she used to buy a calf. After it became a full grown cow, she sold it for a profit. She took another loan soon afterwards to finance her daughter's wedding. Recently she took another loan of Tk. 8,000 with which she bought two more calves.

Now, the smile on Kaiser Begum is infectious as she describes the difficult time she has had to pass. Her oldest daughter, now 18, was married off to a local fisherman a couple of years ago, and has already made Kaiser a grandmother. Her house is surrounded by trees which she had planted in 2005 from the CDSP grant and on the side is a medium sized nursery from where she sells seedlings. Her house is no longer a shack but a house with tin wall and four rooms.

Maruma Begum

Maruma Begum faced recurring challenges and hardships to overcome problems throughout her life. Though she was born in Chargachi, her family became landless due to riverbank erosion, and had to move to Ramgoti when she was very young. After the initial stage, the family managed to buy 80 decimal of land in Ramgoti, while Maruma's father started working as a sharecropper.

While Maruma's family was settling in Ramgoti, they faced a financial challenge. Maruma's older sister got married, and the family went broke after the wedding. In the following days, they could hardly manage one or two meals a day which consisted mostly of vegetables. Maruma, herself, got married at the age of 20. Recalling their financial hardship, she mentioned that before the wedding, she had only two *kameezes*⁶.

⁶ *Kameeze* is one of the most common outfits of Bangladeshi women/girls.

Maruma's husband was a trawler driver in Chittagong and came home once in every three months. Her financial situation improved little after she started living with her husband, in the sense that she could then afford three meals a day. Whenever her husband was away for work, she used to live with her parents. Five years after the wedding, she moved to her brother-in-law's house in Ramgoti. The three youngest of Maruma's children were born during her stay at the brother-in-law's house. Since he was also very poor, Maruma's husband sent money for both the families. Even though the families were not too worse off, none of Maruma's children went to school. The two families shared two rooms of the house for about 10 years.

Then, about 13 years ago, Maruma and some other neighbours got to know about *Boyer Char*, and decided to move there with the hope of obtaining some land. They managed to buy some land, but had to spend considerable time to clean them up. At certain stage of her relocation Maruma faced challenges from the land grabbers, However, she was able to regain her land.

After moving to the *char*, Maruma spent their savings of Tk. 5,000 to meet consumption expenditure. Her husband suddenly became paralyzed. She could not even afford to take him to the doctor. At this point, she had no way other than starting to cultivate the land herself. Gradually, her younger daughter also started earning money by selling shrimp fry. After becoming old enough, Maruma's son started helping her in the field. But as the daughter got a little older, she was unable to continue her earning activities.

Poverty did not loosen its grip on Maruma's family for another four to five years. As the CDSP started its project intervention in *Boyer Char*, Maruma received training from the project to become a TBA. She was also a VO leader. Additionally, she received training in social forestry and poultry, and received inputs like seeds, chickens, ducks, and a deep tube well from the programme. In order to supplement her income, she also mortgaged in her livestock on a regular basis.

As things slowly started to appear a little promising, in 2006 Maruma took her first loan of Tk. 3,000 from the programme and invested it in cultivation. The following year, she took another loan of Tk. 8,000 for household improvement. In 2008, she took the third loan of Tk. 15,000 and married off her eldest daughter. It is worth mentioning that she used this money for various wedding expenses, and refused to pay any dowry. Soon afterwards however, her daughter became very ill due to kidney failure and ultimately passed away quite soon. They made an unsuccessful effort for bearing the medical expenses through mortgaging and selling parts of their land. But all these efforts failed. The family is still paying to release the mortgaged land.

Later on, Maruma took the fourth loan of Tk. 20,000, which she used for two purposes. With this money, she married off her second daughter, and opened a betel leaf store for her husband. Now, Maruma's son earns through fishing and cultivation. Occasionally, he also gives his father a hand with the betel leaf store. Poverty continues to hover around Maruma's family, as she is still repaying the loan she took for her second daughter's marriage and has multiple non-formal loans (some as

high an interest rate as 60%). Nevertheless, she feels more confident than earlier, and states that she would have been miserable without the loans. She thinks about her future very positively and hopes that things will improve once her third daughter is married off and her son starts doing better, financially.

Conclusion

Chars are low-lying regions of soil within water bodies, typically just above the water level created by sedimentation from various rivers meandering through the country and land accretion. Despite appalling conditions, a large number of families, due to abject poverty and lack of alternatives, are often forced to relocate to such temporary lands battling precarious weather and adverse living conditions. As these families are often hard to reach through mainstream anti-poverty programmes, it drastically reduces opportunities to promote social and economic development within these communities. In an attempt to address these issues, the *Char* Development and Settlement Project (CDSP) was initiated by the Embassy of the Kingdom of the Netherlands and the Government of Bangladesh in 1994. Third phase of the programme was implemented in *Boyer Char* in the Noakhali district. Analysis of the *char* dwellers' livelihoods reveals that programme intervention significantly increased the per capita income of the participants. They were found to have a higher standard of living (measured by housing condition, asset holding, and food expenditure) compared to their counterparts. Furthermore, income generating assets such as rickshaws/vans, boats, small shops and fishing nets showed remarkable improvement due to the intervention. Consequently the working-aged members were found to rely less on day labouring, and more on self-employment in livestock and poultry rearing. Respondent women's awareness on various social and legal issues was also found to be affected positively by programme intervention.

In case of education, results showed that although there were no significant differences among the two groups in terms of net primary enrolment rates for both boys and girls, there was some modest impact on net secondary enrolment rates for both the sexes. However, our findings showed that enrolment rate was very low compared to the national average and even to the ultra poor households, who represent the least advantaged group. It is a well-recognized fact that sustainable development cannot be achieved without the bare minimum level of education (Kotikula *et al.* 2010). Therefore, to achieve the programme objective of overall livelihood development of the *char* dwellers, programme designed for *char* areas must effectively put emphasis on education. In addition to the private/non-government interventions, some government interventions would also prove to be quite helpful in this regard. The newly immersed *chars* are yet to be brought under the jurisdiction of the local government and this situation creates a problem in case of introducing public educational institutions in the *chars*. Taking care of this problem immediately is, therefore, a priority for achieving higher enrolment rates, and in turn educational improvement, in these areas.

The success of the CDSP is remarkable but the fact that the programme was operated with the full support of some of the local NGOs, made the situation significantly more fluid. The reason behind this is that these NGOs are significantly

more aware of the ground situations and are in a position to deal with localized problems such as social unrest, earning members' trust, basic operational acceptability and so forth more efficiently and effectively. As a result of this, one of the important lessons that came out of the CDSP exercise was to work in conjunction with the locals when dealing in precarious regions such as the *Boyer Char*.

It was found from the case studies that many of the livelihood improvements were directly attributable to the intervention through the development of infrastructure in the area besides the remarkable performance of microfinance, as the respondent revealed during the interview. It was found that the development of roads, some educational institutions, provision of safe drinking water in the *char*, and foremost, the level of security provided by driving out the pirates from the area had contributed significantly in improving the quality of livelihood the *char dwellers* experience. This study concludes that the community level intervention is immense and the *Boyer Char* can be referred to as a microcosmic case study for the rest of the nation.

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Annex

Annex 1. Probit regression results for matching intervention and comparison group

	Coefficient	z-value
Anybody in the HHs worked as day labour (Yes=1, No=0)	-0.21***	-2.80
Owned cultivable land (Yes=1, No=0)	-0.16	-1.44
Owned homestead land (Yes=1, No=0)	-0.15	-0.92
Wall of the main living room is made of wood (Yes=1, No=0)	-0.57***	-4.62
Owned livestock (Yes=1, No=0)	0.49***	7.17
Source of drinking water (Tube well=1, Others=0)	0.97***	7.59
Constant	-0.16	-1.13

Annex 2. Impacts on social and legal awareness of the respondent women (Indicator specific analysis) (% of respondents)

Issues	Intervention	Comparison	Difference
<i>Knows the:</i>			
Marriage age for boys	50	13	37***
Marriage age for girls	80	35	44***
Way to proceed with divorce	20	2	18***
Punishment for giving/receiving dowry	16	3	13***
Legal age of voting	71	61	10***
Inheritance laws	65	40	25***
Consequences for abusing women	80	92	-13***
Consequences for abusing children	82	84	-3

Note: *** denotes statistical significance at the 1% level