

Impact Assessment of Credit Programme for the Tenant Farmers:
Baseline Report 2012

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TABLE OF CONTENTS

Acknowledgements	vii
Executive summary	ix
1. The Context	
1.1 Agrarian structure and tenancy market	1
1.2 The need for agricultural credit	4
1.3 The credit market	4
2. BRAC Tenant Farmer Development Project (BCUP)	
2.1 The project	7
2.2 The platform for service delivery: The Village Organization	8
2.3 BCUP programme outreach	9
2.4 The study	10
2.5 The design of the study	10
2.6 Quantitative evaluation design	11
2.7 Design of the qualitative assessment	11
2.8 Scope and structure of the baseline report	12
3. A theory of change for the BCUP	13
4. Methodology	
4.1 Sampling design	17
4.2 Branch selection and addressing the issue of control area contamination	17
4.3 Household selection	19
4.4 Baseline survey	21
4.5 Analytical technique used in this report	22
4.6 Power calculation	23
5. Results and discussion	
5.1 Socio-demographic profile	25
5.1.1 Distribution of households based on household size and age	26
5.1.2 School participation of children	26
5.2 Health profile	27
5.3 Nutritional status of children and mothers	28
5.4 Land ownership	31
5.5 Distribution of cultivated land	33
5.6 Tenancy market	34
5.7 Land utilization	37
5.7.1 Cropping pattern	38
5.7.2 Adoption of modern varieties	38
5.7.3 Rice yield	39
5.8 Asset holdings of the households	39
5.9 Credit market	42

5.10 Access to agricultural extension service	47
5.10.1 Expectations from BCUP's extension service	51
5.11 Household income	51
5.12 Expenditure and consumption	53
5.13 Incidence of poverty	55
5.14 Food security	56
5.14.1 Coping strategy adopted by households	56
5.15 Labour force participation	57
5.15.1 Labour force participation in economic activities	57
5.15.2 Female labour force participation	59
6. Conclusions	61
References	63

List of Tables

Table 1.1	Changes in the structure of land tenure, 1960 to 2008	2
Table 1.2	Changes in the importance of different tenancy arrangements in Bangladesh, 1983-84 to 2008	3
Table 1.3	Changes in the structure of farm holdings, 1983-84 to 2008	3
Table 1.4	Changes in the importance of different sources of credit, 1988 to 2008	5
Table 1.5	Accesses of different landownership groups to institutional credit, (% of households obtaining loans)	5
Table 2.1	Features of the BRAC, BCUP credit products	8
Table 2.2	BCUP programme roll out, December 2010 to October 2012	10
Table 4.1	Distribution of study areas	17
Table 4.2	Eligibility criteria used for study sample selection	20
Table 4.3	Sample statistics	20
Table 4.4	Estimated samples and actually surveyed samples for the baseline 2012	21
Table 4.5	Intra-cluster correlation and effect size	23
Table 4.6	Power for key outcome variables	24
Table 5.1	Demographic characteristics of the household	25
Table 5.2	Household size and age composition of the population	26
Table 5.3	School participation (per cent of the relevant age group) of children	27
Table 5.4	Health status (per cent)	28
Table 5.5	Treatment practice (per cent)	28
Table 5.6	Children under 5 by anthropometric indices, age and sex in different areas	30
Table 5.7	Percentage of under-5 Children by Anthropometric indices (HAZ, WHZ and WAZ)	30

Table 5.8	Characteristics of the mother by age, weight, height and BMI in different areas	31
Table 5.9	Percentage of mothers by BMI in intervention and control areas	31
Table 5.10	Land ownership of the households (in decimal per household)	32
Table 5.11	The pattern of distribution of land ownership (per cent)	32
Table 5.12	Inequality in the land ownership in the treatment and control villages	33
Table 5.13	Land tenure arrangement	33
Table 5.14	The pattern of distribution of landholding in the treatment and control groups	34
Table 5.15	Tenure Status of the Households (per cent)	35
Table 5.16	Distribution of owned land and the incidence of renting in (per cent of households)	35
Table 5.17	Importance of tenure arrangement for different land ownership group (per cent)	36
Table 5.18	Intensity of land use and cropping intensity (per cent)	37
Table 5.19	Land elevation status (per cent)	38
Table 5.20	Area under different crops	38
Table 5.21	Adoption of modern varieties in rice farming (per cent)	39
Table 5.22	Yield of Different Rice Varieties (M. Ton per Hectare)	39
Table 5.23	Average value of assets at current replacement cost ('000 Tk.)	40
Table 5.24	Household owning different kind of assets (per cent of all farms)	41
Table 5.25	Average size of assets (per 100 households)	42
Table 5.26	Credit market participation	43
Table 5.27	Sources of credit by farm size and tenure status (per cent of borrower)	45
Table 5.28	Size of loan (Tk.) and the interest charged by sources	46
Table 5.29	Pattern of credit utilization	46
Table 5.30	Exposure to agricultural extension service (per cent of households)	48
Table 5.31	Familiarity with agricultural extension service providers (per cent of households)	49
Table 5.32	Sources of information for improved crop management practice (per cent of households who reported access to media)	50
Table 5.33	Level and structure of household income (BDT/household)	52
Table 5.34	Distribution of household income, 2011-12	53
Table 5.35	Level of household expenditure (TK. per household)	53
Table 5.36	Per capita food intake (gram/day)	54
Table 5.37	Household lacking quality food in the diet (per cent)	55
Table 5.38	Measure of incidence of poverty	56
Table 5.39	Occurrence of food insecurity in different months	56
Table 5.40	Coping mechanism for addressing food-insecurity (per cent of households)	57
Table 5.41	Labor force participation in economic activities by gender	58
Table 5.42	Employment of male workers by economic activities	58

Table 5.43	Female participation in different economic activities	59
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List of Figures

Figure 1	VO formation and loan disbursement procedure	9
Figure 2	Farm level impact chain model of BCUP	15
Figure 3	Study areas	18
Figure 4	GIS mapping for southern region under study areas	19

List of Boxes

Box 1	Tenancy through a combination of diverse and co-existing forms	36
Box 2	Lending relationship between owners and tenants	45
Box 3	The intersection of rural credit and tenancy markets	46
Box 4	The significance of credit in livelihood strategies and trajectories	47
Box 5	The need of extension	49
Box 6	The long lasting impact of agricultural extension	50
Box 7	The significance of village shop for food security	57

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EXECUTIVE SUMMARY

Due to the ineffectiveness of conventional microcredit and formal banking systems to reach agricultural credit to marginal and small farmers who dominate the agrarian structure in Bangladesh, BRAC designed an innovative project titled 'Tenant Farmers Development Project (*BorgaChashi Unnayan Prakalpa* (BCUP)) to provide credit and extension services to small scale tenant farmers. The Bangladesh Bank (Central Bank of Bangladesh) provided BRAC in October 2009 a refinancing facility of Tk. 500 crore (USD 70 million) at low cost (5 per cent annual rate of interest). The fund was given initially for three years with a target of reaching 300,000 farmers with credit within this period. The target group was tenant farmers with a size of farm of up to two acres that are either fully (pure tenant) or partially (tenant-owner) rented from others under different tenancy arrangements. In 2012, the Bangladesh Bank approved extension of the project for another three years.

The BCUP provides a customized credit service to farmers who cultivate land owned by others either fully or partially. The farmers are provided loans at subsidized rate of interest of 10 per cent per year on flat rate. The effective rate of interest comes to about 15 to 20 per cent on declining balance method, depending on the mode of repayment of the principal and interest due. According to the rules of the Microcredit Regulatory (MRA) of the Bangladesh Bank, NGOs can charge up to a maximum of 27 per cent rate of interest on declining balance for their microfinance operations. Although the provision of extension service is not stipulated in the terms and conditions of the project contract, BRAC decided to include extension services on the premise that improved farming practices could increase the profitability of farming and thereby improve the capacity of the borrowers to repay the loan.

The project initially targeted male farmers of the tenant farm households by organizing them into informal Village Organization (VO), following the Microfinance delivery system in Bangladesh. The organization meets once a month with the project's credit and extension staff, where the problems of farmers (insects and diseases, accessing inputs, etc.) are discussed extensively and installments of the repayments are collected. However, during the implementation of the project it was revealed that in many tenant households women acted as farm managers while men were basically engaged in rural non-farm activities. Women were also engaged in vegetable production and in poultry and livestock rearing activities around the homestead which helped them generate a regular stream of income, thus facilitating repayment of loans in small installments on a regular basis.

The project was initiated in 2009 and by October 2012 the project had organized 286 thousands tenant farmers (55 per cent women) into 13,960 village organizations and disbursed a cumulative loan amount of Tk. 612 crores (USD 75.6 million) of which Tk.163 crore remains outstanding (BRAC, 2012). The rate of recovery of the loan in due time is 91.7 per cent.

Because of the significance of this innovative programme for tenant farmers and for overall development of the agricultural sector in Bangladesh, there is a substantial interest in evaluating the impact of the programme and understanding the processes through which the BCUP promotes livelihoods of tenant farmers, increases farm productivity and improves food security and nutritional status of tenant households. Accordingly, the study entitled '*Impact assessment of credit programme for the tenant farmers*' has been initiated to look into the casual relationship between outcome and intervention, and assess the overall impact of the programme on the tenant farmers' livelihoods, productivity, and food security and nutritional status.

The study is based on a mixed method approach where both quantitative and qualitative methods are employed. To integrate the qualitative data within quantitative facts '*merging data*' method (which involves combining the qualitative data in the form of text or images with the quantitative data in the form of numeric information) was followed.

A randomized control evaluation design was adopted to evaluate the BCUP. Initially, the programme identified the potential 40 branch offices to scale up the programme in the year 2012. The research team then randomly drew twenty (20) treatment branches for intervention and the rest twenty (20) branches were designated as control branch offices. Six villages were selected randomly from each treatment and control branch among all the villages within the 8 kilometer radius of the branch catchment area. Thus, 240 villages were selected for this study. A census was conducted in 240 villages covering 61,322 households for detecting eligible households. Then eligible households were identified from the treatment and control villages respectively by following the household eligibility criteria. Total number of eligible households were 4,228 and 3,335 in the treatment and control areas, respectively. A total of 2,164 households were selected in treatment villages and 2,167 households were selected as sample households in the control villages. Thus, a total of 4,331 households were selected for the quantitative baseline survey. The Survey was successfully conducted on 4,301 households which included 2,155 in treatment areas and 2,146 in control areas. For qualitative study twenty four tenant farmers from twelve villages and six districts belonging to six BRAC operation divisions were selected. For the anthropometric survey all the households with at least one child under the age of five were selected. A total of 1,607 households satisfied this criterion, on whom the anthropometric survey was conducted.

The evaluation is being conducted using two rounds survey data: baseline (before intervention: early June- early August 2012) and end-line (after intervention: mid June-mid August 2014). During the two years interval between these two surveys, the participant farmers are expected to make a full utilization of two years cycle of loans, extension services, etc. to be offered by the BCUP programme. Using the baseline information, powers for key outcome variables were recalculated and significantly high levels of powers were obtained for most of the outcome variables; however, 15% increase in the yield rate may not be realistic. Thus, the sample size

adopted in this study may not detect the effect of size and the issue needs to be taken into consideration for the final evaluation design. Following the follow-up round of data collection (in 2014), the survey data will be analyzed to compare the changes experienced by the treatment groups with the changes experienced by the control groups. Thus the “Intention-to-treat (ITT) effect” of the programme will be estimated. The qualitative component, on the other hand, will meet the same 24 tenant farmers at the end line to trace back and understand those ‘processes’ through which the participant tenant farmers experienced such outcomes in their lives and livelihood trajectories.

The purpose of this report is to describe what the baseline results reveal about tenant farmers in Bangladesh. The report highlights the similarities and differences between BCUP clients (treatment groups) and non-client tenant farmers (control groups). The baseline data also provide extensive information on the socioeconomic profile of tenant farmers and elucidates the context in which the tenant farmers and small holders operate their agricultural livelihoods.

The results indicate similarities among the most of the outcome indicators between treatment and control groups. Statistically significant (often weakly significant) differences were found between treatment and control areas with respect to household income (although per capita income is not highly significant), access to credit, some types of asset holding, some health indicators and cropping intensity. But normalized difference was found to be less than 0.25 for most of the variables. Moreover, no systematic pattern in the difference between treatment and control areas was observed. In some cases treatment areas were better off and in some cases control areas were better off.

This study confirms the findings on the trend of transformation in tenurial arrangement that is practiced through diverse and co-existing forms (Bayes and Hossain 2011). Historically, sharecropping had been the dominant system in the tenancy market. But the gradual expansion of high yielding varieties of rice and wheat cultivation with the aid of ground water irrigation, technological adaptation and market linkages have left strong imprints on the agricultural landscape and agrarian relations in Bangladesh. In order to facilitate the adoption of high yielding modern rice varieties (MVs), the sharecropping system is giving way to cash oriented fixed rent seasonal tenancy or mortgage and lease-hold tenancy with duration of one to seven years.

The study also highlights the credit market condition and the subsequent credit need of the tenant farmers. Although the farmers in the study areas urge for large amount and long-term institutional loans for agricultural development and poverty reduction, only a small share of the tenant households (3.4 per cent) get credit from institutional banks and co-operatives. The inability of banks to meet the farmers’ large amounts of credit needs largely account for the wide influence of traditional money-lenders and informal lending institutions in rural areas that charges exorbitantly high interest rate. However, as the qualitative research demonstrates, tenant farmers expressed positive interest in BCUP’s microcredit

service, the loan repayment system of BCUP appeared to them to fit with their livelihoods strategy. Thus, the BCUP can go a long way towards fulfilling the credit needs of the tenant farmers.

The study also reveals the extension needs of the tenant farmers. Only 34 per cent of the tenant households were familiar with the agricultural personnel, whereas, only 4 per cent of the household received some kind of training from the extension service providers. These numbers are poor by any criterion and suggests for broadening the provision of extension services towards the tenant farmers.

The study reflects the depravity of the tenant farmers in Bangladesh. The average per capita income of the tenant households (USD 269) is lower than the national per capita income of USD 848 (GoB 2012). The mean years of schooling of the household (3 years) was found to be much lower than the national mean years of schooling i.e. 4.8 years (HDRO, 2012). The incidence of poverty (Head count Ratio) as measured by cost of the basic needs method was about 60 for the surveyed households, which was much higher than the rural Head Count Ratio (HCR) of 35.2, (BBS 2011). The tenant households were also found to suffer from relative credit deprivation compared to other segments of populations. Also their access to extension services was found to be very low. Against this context, the BCUP was designed to meet the working capital needs of the tenant farmers who now constitute almost half of the farmers in the country. In accordance with the initial thought of the programme development, the baseline survey results show that there is indeed a high demand for services that BCUP is offering to the tenant farmers in Bangladesh.

The context **1**

1.1 Agrarian structure and tenancy market

The incidence of rural landlessness has been steadily increasing in Bangladesh. Households who do not own any land at all has increased from 10.2 per cent in 1996 to 12.8 per cent in 2008, while those who do not own any cultivable land increased from 27 per cent to 40 per cent over this period (BBS 1999, 2011). The share of the functionally landless households defined in Bangladesh as those who own less than 0.5 acre (that cannot provide a significant source of income) increased from 37 per cent to 59 per cent during 1987 to 2008 (Hossain and Bayes 2009). Landless and marginal land holding farmers enter into farming activities through the tenancy market. The change in the structure of land tenure over 1960-2008 can be seen from Table 1.1. It may also be noted that the number of farm households have increased from 6.1 million in 1960 to 9.97 million in 1983-84 and further to 14.87 million in 2008, despite rapid rural urban migration of population. Those who leave farms in favour of non-farm activities in rural and urban areas do not sell their land. Rather, they rent it out to poor relatives or former agricultural labours. So, the number of small and marginal farms continues to increase and the farm size gets smaller. The average farm has declined from 1.43 ha in 1960 to 0.92 ha in 1983-84 and further to 0.60 ha in 2008 (Table 1.1). The proportion of tenant farms and land transacted in the tenancy market remained almost stagnant till 1996, but the tenancy market has become more vibrant in recent years. In 2008, nearly 44 per cent of the farmers are tenants (pure or part-tenant) and they operate nearly 45 per cent of the cultivated land in the country. The land rented in from others is mostly used for crop cultivation. The area transacted in the tenancy market was only 18 per cent in 1960. It increased slowly to 20 per cent in 1983-84, and further to 25 per cent in 1996; but since then it has increased rapidly to 33 per cent by 2008.

A longitudinal national level sample survey (Hossain *et al.* 1994, Nargis and Hossain 2006, Hossain and Bayes 2009) that generated panel data from 62 randomly selected villages from 57 districts noted some qualitative changes in the tenancy market over the period 1988-2008. Usually large and medium landowners rent out land in small parcels to small and marginal farmers who have some land of their own and rent-in additional land to make a viable holding. Landless households are not preferred in the tenant because they do not have farm experience, and lack working capital to operate the farm efficiently. So, the pure tenant households were rare till 1996 (Table 1.1)¹. But the incidence of pure tenancy has increased rapidly in

¹ In the Agricultural Censuses (1960, 1983-84, 1996 and 2008), Pure Tenant Farmers are defined as those who do not own any land (not even homestead land) but operate a farm renting in land from others.

recent years due to the vast expansion of microcredit to landless and near landless households. Hossain and Bayes (2009) defined pure tenants as those who do not have any cultivated land but operate farms entirely rented from others. According to this definition, the number of pure tenant farms increased from 14 per cent in 1988 to 38 per cent in 2008, while their share of cultivated land increased from only 7 per cent in 1988 to 19 per cent in 2008.

Table 1.1. Changes in the structure of land tenure, 1960 to 2008

Type of holding	1960	1983-84	1996	2008
All holdings (000)	6,139	9,970	11,798	14,870
Operated area (000 ha)	8.80	9.18	8.08	8.88
Owner farmer				
% of farms	60.7	62.6	61.6	56.7
% of land operated	53.6	58.5	58.5	54.7
Part-time tenant farmers				
% of farms	38.8	36.0	34.9	40.2
% of land operated	45.2	40.9	39.6	43.4
Pure tenants				
% of farms	1.6	1.4	3.5	3.1
% of land operated	1.1	0.5	1.9	1.9

Sources: Central statistical office, Pakistan and Bangladesh Bureau of Statistics: Reports of census of agriculture, 1960, 1983-84, 1996 and 2008

The terms and conditions of tenancy have also undergone significant changes over the last two decades. Till the mid-1980s, the predominant tenancy arrangement was sharecropping under which the harvest is shared according to certain proportion (usually 50:50) and the cost of production (except labour) is also shared by the land owner and the tenant (Hossain 1977). The sharecropping arrangement helps sharing the risk of cultivation between the landowner and the tenant, which is considered as an efficient tenancy arrangement (Cheung 1969; Jannuzi and Peach 1980; Mandal 1980). Recent agricultural censuses show a substantial decline in the importance of share tenancy in favour of fixed rent arrangement and other longer term lease contracts. One such contract is locally known as “*Khai-Khalasi*” under which land is leased against a fixed amount of advanced rent for a fixed number of years of operation and the land is returned when the landowner pays back the lease money. The change in the importance of different tenancy arrangement since 1983-84 can be noted from Table 1.2. With the landless and near landless households increasingly depending on the tenancy market for their livelihoods, the declining importance of sharecropping with the landowner, access to credit to tenant farmers have assumed more importance for financing working capital needs, purchasing of agricultural machinery and equipment, and leasing land from the market.

Table 1.2. Changes in the importance of different tenancy arrangements in Bangladesh, 1983-84 to 2008

Tenancy arrangement	1983-84 Agricultural census		2008 Agricultural census	
	% of tenant farms	Share (%) of rented land	% of tenant farms	Share (%) of rented land
Share tenancy	70.2	74.0	43.0	41.3
Fixed seasonal rent	10.1	10.0	25.3	23.8
Lease arrangement	4.2	4.0	10.6	11.0
<i>Khai-Khalasi</i>	4.1	4.0	4.1	4.3
Land on mortgage	11.4	8.0	17.0	19.6

Source: BBS, Reports of agricultural census, 1983-84 and 2009

As a result of continued pressure of population on limited land resources (150 million people dependent on 8.8 million ha of land) the farm size is getting smaller over time and the proportion of small and marginal farmers have been growing. At the same time rural households with relatively larger size of land owned that accumulates some surplus from the adoption of improved technologies are investing the surplus in rural non-farm activities or migrating to urban areas in search of better economic opportunities. They are renting-out their land in small parcels to landless, marginal or small farmers through tenancy system, keeping ownership rights of the land. Hossain and Bayes (2009) reported from their longitudinal survey data that the amount of owned farm-land has decreased among marginal farmers, but the total cultivated land under their command has increased through accessing land from the tenancy market. The change in the structure of farm holdings can be noted from Table 1.3. The number of farms cultivating land in sizes of up to 0.4 ha (less than 1.0 acre) defined as marginal farms increased from 40% of all farms in 1983-84 to 50 per cent in 2008. The proportion of marginal and small farms together holding up to 1.0 ha (less than 2.5 acre) increased from 70 per cent to 83 per cent and their control over operated land increased from 28.7 per cent to 49.6 per cent within 1983-84 to 2008. At the other end farms with holdings of over 2.0 ha has declined from 11.8 per cent to only 4.5 per cent, and their share of operated land declined from 43.8 per cent to only 22.7 per cent within the 25 year period. The large and upper middle farms are gradually disappearing in Bangladesh giving way to marginal and small farm dominated agrarian structure.

Table 1.3. Changes in the structure of farm holdings, 1983-84 to 2008

Farm size (ha)	1983-84 National sample survey			2008 National sample survey		
	% of farms	% of land	Tenants (%)	% of farms	% of land	Tenants (%)
up to 0.4 (Marginal)	40.1	7.6	26.7	50.1	15.3	32.3
0.4 to 1.0 (Small)	29.9	21.1	44.7	33.0	34.3	47.3
1.0 to 2.0 (Lower middle)	18.2	27.5	48.8	12.5	27.8	46.3
2.0 to 3.0 (Upper middle)	6.7	17.5	40.6	3.0	11.6	40.4
Over 3.0 (Large)	5.1	26.3	34.3	1.5	11.1	38.9
Total	100.0	100.0	37.4	100.0	100.0	39.3

Source: BBS: Reports of the sample survey under the agricultural censuses, 1983-84 and 2009

1.2 The need for agricultural credit

The above overview of the transformation of the agrarian structure indicates a growing need for agricultural credit to sustain technological progress and productivity growth in agricultural sector of Bangladesh. The small farmer has very little surplus production over consumptions of self-produced goods that they can sell in the market for purchasing agricultural inputs. With the introduction of improved agricultural technologies, agricultural credit has come to be recognized as an indispensable input for crop production. For traditional crop varieties, the farmer used to supply most of the inputs from the household. The new crop varieties require large amount of “out of pocket” expenses for the purchase of modern agricultural inputs – seeds, chemical fertilizers, pesticides and irrigation expenses. Inability to make to finance such working capital needs would hinder adoption of improved technologies.

The marginal and small farmers, however, rarely have access to credit from formal financial institutions. The cost of provision of small loans that these farmers need is much higher than the rate of interest that the government fixes for lending to farmers. Tenant farmers virtually have no access to institutional credit as they do not have any asset to provide as collateral against the loan. On the demand side, illiterate farmers do not feel comfortable with the formalities required for contracting loans with the financial institutions. Funds can be borrowed from informal sources such as traditional moneylenders, traders and well-to-do land owners in the village, against collateral of land, household effects or advanced sale of crops and labour at below market prices. Payment of interest charges on such high cost loans (usury) constitute a major drain on the income of the borrowing household, that affects their livelihood, and sometimes make them perpetually indebted to the moneylender (Bhaduri 1973).

Recent literatures (Sriram 2007, Wakilur *et al.* 2011) provide evidence of strong positive correlation between agricultural credit at reasonable cost and agricultural production. Carter (1989) argued that credit affects agricultural performance by relaxing the working capital constraints, inducing farmers to adapt the new technologies and indulge in intensive use of fixed resources. Credit availability enables the farmers to manage their land and other fixed assets, to smooth the consumption during the crop production cycle, and thereby, raise the farm productivity and reduce dependence on high cost informal markets.

1.3 The credit market

In Bangladesh, available studies indicate limited contribution of formal financial institutions such as banks and farmer cooperative in financing the capital needs of the agriculture sector. A large scale farm survey² conducted by the International Fertilizer Development Centre (IFDC) in partnership with the Bangladesh Agricultural

² The survey covered 2,400 randomly selected farm in 117 villages from 20 sub-districts scattered throughout the country (Sidhu and Banante 1984).

Research Council (BARC) during 1979-81 reported that only 14 per cent of farm households received credit during 1979/80 and only 11 per cent in 1981/82. The survey also noted that the credit obtained from formal financial institutions was concentrated in the hands of medium and large land owners. For example, during 1981/82 dry season when the irrigated rice farming (*boro*) was practiced, only 1.2 per cent of farmers with holdings of up to 0.4 ha had accessibility of credit from the formal financial institutions, compared to 7.7 per cent for middle farmers (with holdings of 1.0 to 2.0 ha) and 7.2 per cent for large farmers.

The changes in the access to credit to rural households over 1988-2010, as revealed from the longitudinal survey data maintained by Hossain *et al.* (1994) and Nargis and Hossain (2006) can be noted from Table 1.4.

Table 1.4. Changes in the importance of different sources of credit, 1988 to 2008

Sources of loan	% of households borrowing from the source		% share of the loan		Average loan per borrowing household (US\$)	
	1988	2008	1988	2008	1988	2008
Commercial banks	9.0	4.8	20.7	21.0	136	735
Microfinance Organizations	3.8	34.1	8.7	37.0	102	184
Friends and relatives	16.9	4.9	33.6	26.8	115	920
Moneylenders	14.6	4.6	39.0	14.8	155	537
All sources	44.3	44.8	100.0	100.0	131	374

Source: Hossain and Bayes (2009): Rural Economy and Livelihoods: Insights from Bangladesh. Dhaka: AH Development Publishing House.

The tenant farmers have restricted accessibility to formal credit sources due to various formalities and rigidities in terms and conditions. Hossain and Bayes (2009) showed that only 26 per cent of total institutional credit in rural Bangladesh is used for agricultural purpose. They also showed that only 1.5 per cent of the farmers owning less than 0.20 hectare of land had access to bank credit while 20 per cent of the farmers owning above 2.0 hectares of land could avail bank loan (Table 1.5). Because of the collateral requirement of *Krishi* bank and other Government institutions, small and landless farmers are deprived from access to credit.

Table 1.5. Accesses of different landownership groups to institutional credit, (% of households obtaining loans)

Size of land owned (ha)	Commercial banks		Microfinance Organizations	
	1988	2008	1988	2008
Up to 0.2	4.7	1.5	3.7	39.6
0.2 to 0.4	8.0	6.8	6.0	30.6
0.4 to 1.0	14.4	8.8	4.2	28.5
1.0 to 2.0	14.6	9.1	2.2	23.0
Over 2.0	12.2	20.0	2.0	10.6
Total	9.0	4.5	3.8	34.1

Source: Hossain and Bayes (2009): Rural economy and livelihoods insights from Bangladesh

Most of the microfinance programmes do not serve the poorest (Morduch *et al.* 2002; Quach *et al.* 2003). Remenyi *et al.* (2000) argued that the effect of credit on household income varied with the degree of poverty, the effect being higher in case of those who are just below the poverty line than those who are well below the poverty line. Coleman (2002) also concluded that the welfare impact of microfinance to the poorer people is largely insignificant. The NGOs loan disbursements are conditioned by land holdings requirement. Since they focus mainly on non-farm activities, the marginal farmers are subsided. It has been recognized that conventional microfinance is not suitable for agriculture. For example, Lianto (2005) argued that overcoming the barriers to agricultural microfinance goes beyond the simple provision of credit, extends outside agriculture, and shuns a “one size” fits for all approach.

The above discussion clearly indicates the need for agricultural credit facilities by which collateral, higher interest rates, low outreach and need-based problems would be deemed. Against the above backdrops, BRAC introduced the BCUP to bring the remaining excluded population segments and economic sectors into financial inclusion.

BRAC tenant farmer development project (BCUP) 2

2.1 The project

Due to the ineffectiveness of conventional microcredit and formal banking systems for the farming community especially the tenant farmers in Bangladesh, BRAC, the largest NGO in Bangladesh and the globe, introduced the 'Tenant Farmers Development Project' (*Borga Chashi Unnayan Prakalpa* (BCUP)), with a low-interest revolving fund from the Bangladesh Bank (Central Bank of Bangladesh) under its financial inclusion strategy. The project was initiated in December 2009 (*Boro* season of 2010) with Tk. 5,000 million (USD 70 million) as revolving loan fund with a rate of interest of 5 per cent per month (the rate at which commercial banks can borrow fund from the Central Bank). The fund was given initially for three years with a target of reaching 300,000 farmers with credit within this period. The target group was tenant farmers with a size of farm of up to two acres that are either fully (pure tenant) or partially (tenant-owner) rented from other under different tenancy arrangements. In 2012, Bangladesh Bank approved extension of the project for another three years.

The BCUP provides a customized credit services to farmers who cultivate land owned by other either fully or partially. The farmers are provided loans at subsidized rate of interest which is a flat rate of 10 per cent per year. The effective rate of interest comes to about 15 to 20 per cent on declining balance depending on the mode of repayment of the principal and interest due. According to the rules of the Micro-Credit Regulatory of the Central Bank, NGOs can charge up to a maximum of 27 per cent rate of interest on declining balance for their microfinance operations. Although the provision of extension service is not stipulated in the terms and conditions of the project contract, BRAC decided to include extension services on the premise that improved farming practices could increase the profitability of farming and thereby improve capacity of the borrowers to repay the loan.

The main objective of the project is to reduce the dependence of tenant farmers on high-cost informal markets for financing their working capital needs, since they do not have access to formal financial institutions for various reasons. These poor farmers are also usually bypassed by the extension service of the Department of Agricultural Extension (DAE) under the Ministry of Agriculture. So, the additional objective of the project is to provide them knowledge on modern technology and crop management practices.

The detailed characteristics of the BCUP can be seen from Table 2.1.

Table 2.1. Features of the BRAC BCUP credit products

Components	Features	Purpose covered
General credit	Credit limit: Taka 5,000-30,000; Duration: 6-10 months; Grace period: 1 month Instalment: Monthly; Interest rate: 10% (flat)	Reduce working capital deficiency and reliance on non-institutional money-lenders
Machinery credit	Credit limit: Taka 30,000-120,000 Duration: 6-10 months; Grace period: 1 month Instalment: Monthly; Interest rate: 10% (flat)	Incentive to the tenant farmers to modernize and increase productivity in agriculture.
Land lease credit	Credit limit: Taka 30,000-60,000 Duration: 6-10 months; Grace period: 1 month Instalment: Monthly; Interest rate: 10% (flat) BRAC acts as a mediator between tenant farmers and land-owners	It will increase the access to land through tenancy in the short run and increase their entitlements to land in the long run.
Livestock credit	Same as general credit	Stimulating household based entrepreneurial capability.
Extension services	Training on modern cropping mechanism and livestock rearing mechanism. Provide information regarding product and input market through VO meeting and over telephone and field visiting.	Development of skilled manpower and reduce the information asymmetry.

The project initially targeted male members of the tenant farm households by organizing them into informal associations. The association organizes meeting once a month which is attended by the project's credit and extension staff, where the problems of farmers (insects and diseases, accessing inputs, etc.) are discussed and instalments of the repayments are collected. However, during the implementation of the project it was revealed that in many tenant households women were found to act as farm managers while men were basically engaged in rural non-farm activities. Women were also engaged in vegetable production and in poultry and livestock rearing activities around homestead. This helped them generate a regular stream of income that facilitated repayment of loans in small instalments on a regular basis. So, it was projected to include women along with men in the village organization of the tenant farmers. It is expected that the project will contribute to faster adoption of improved technologies thereby, increasing the land and labour productivity and total factor productivity as well. Thus, farm productivity and profitability of the tenant farmers will increase, which will ultimately help improvement of their livelihoods and nutritional status.

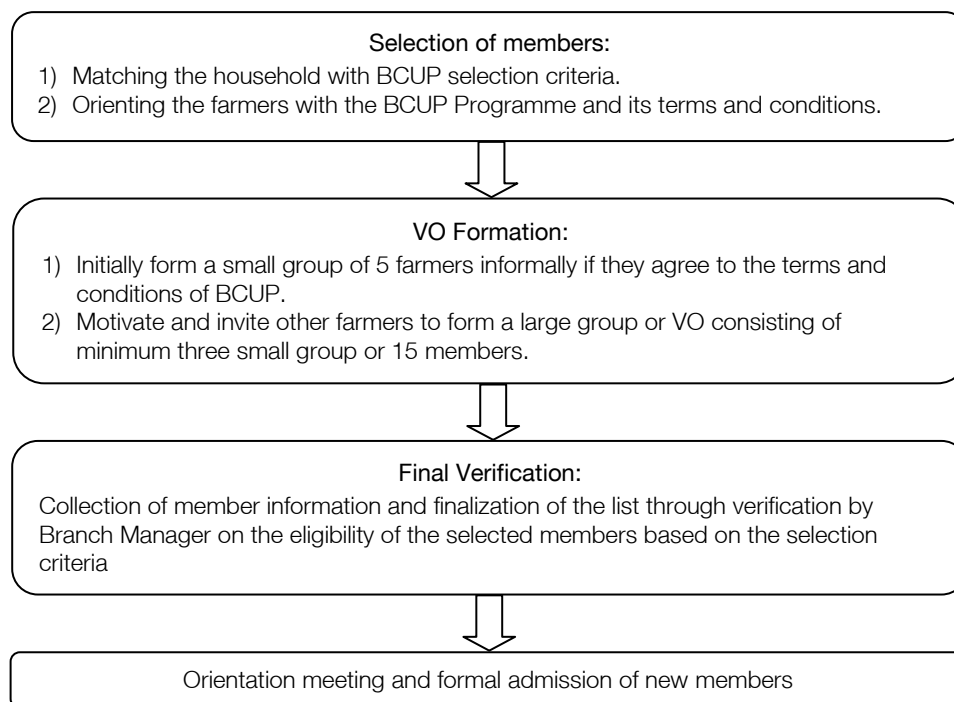
2.2 The platform for service delivery: The Village Organization

An important feature of the programme is the formation of Village Organization (VO) as the platform for the delivery of services. In the VO, members are grouped in teams of five members, and four to eight teams consisting of 20 to 40 members

forming the village level informal tenant farmer association. The VO meets once every month on a fixed day and time which is attended by the BCUP Programme Organizer and an agricultural technician. Apart from the discussion of loan proposal and collection of repayment of the instalment dues and the deposit of savings, farmers can get agricultural information, advice and training from the Agriculture Development Officer (ADO).

Households are selected for loan disbursement by few stages of verification. After screening and verification of information, members are formed into small groups. A Village organization (VO) is formed by combining at least three small groups. Figure 1 shows the whole process of VO formation and loan disbursement.

Figure 1. VO formation and loan disbursement procedure



2.3 BCUP programme outreach

BCUP is targeted to reach all 484 *Upazilas* (sub-districts) of Bangladesh in successive phases. By September 2012, it reached to 212 *Upazilas*. Table 2.2 shows the outreach of the programme. Initially BCUP was targeted to only male tenant farmers, but now it is also working with female tenant farmers.

Table 2.2. BCUP programme roll out, December 2010 to October 2012

Name of Components	Cumulative position of BCUP			Gender disaggregation, October 2012		
	December 2010	December 2011	October 2012	Female	Male	Total
Tenant farmer association (No.)	7,579	10,826	13,980	5,899	8,081	13,980
Members enrolled (000)	141	220	286	153	133	286
Active borrower (000)	109	156	209	114	95	209
Loan disbursement (Tk. crore (10 million))	159	372	611	177	435	612
Farmers trained (000)	51	92	121	26	96	121

Source: BRAC Agriculture and Food Security Programme, MIS Report, November 2012

2.4 The study

BRAC has perceived that BCUP will facilitate greater access to the credit and extension services to the tenant farmers. By reducing the credit constraints with improved knowledge of modern technology and crop management practices, this intervention will significantly increase farm productivity and improve livelihoods of the tenant farm households. For the purpose of the evaluation of the BCUP programme, a randomized control trial (RCT) design was adopted. The purpose of this baseline report is mainly to provide a thorough analytic overview on the current status of the tenant and marginal farmers in Bangladesh using the baseline data, and a comparison between treatment and control area which is expected to provide an insight with regard to balancing of the randomization. BRAC initiated the credit programme with the premise that marginal and tenant farmers are in fact credit-constrained. This baseline report provides detailed information on the access of the tenant and marginal farmers to credit.

2.5 The design of the study

The study is based on a mixed method approach where both quantitative and qualitative data were employed to evaluate the impact of the programme. In order to find out multi-faceted impact of the intervention, a structured questionnaire was administered to collect quantitative data from the sample households. In addition, to get a deeper understanding of the process of impact and the context of its happening, in-depth interview, case study, and key informant interview methods were employed to get qualitative data from both the household and the community level.

The integration of the two methodologies can be instructive in broadening the ability of the researchers to examine not only the relationship between the credit intervention and development outcomes, but also to understand the dynamic processes which are involved in it and illuminate the context within which they take

place. To integrate qualitative data within quantitative facts 'merging data'³ method (which consists of combining the qualitative data in the form of text or images with the quantitative data in the form of numeric information) was followed.

2.6 Quantitative evaluation design

The purpose of the quantitative evaluation is to assess the impact of the programme on the BCUP participants by comparing them with a control group having similar households but not benefiting from the programme. Both the treatment and control groups were interviewed before the project intervention as a part of the baseline survey and these groups will be interviewed again after two years⁴. The impact will be assessed by comparing changes in the credit availability and knowledge of improved farming practices, land use and cropping pattern, land and labour productivity, farm and non-farm income, consumption pattern, savings and asset holding, and nutritional status of the household members. The information on the control households will be used to allow for any other changes that may be happening in the population in general that has nothing to do with the intervention under the project.

The impact evaluation has followed a clustered randomization at the BRAC branch level (a branch office is the lowest administrative unit of BRAC which covers intervention area of about 6-8 km radius). The baseline survey was done in June-July, 2012 which will be conducted again in 2014 to generate panel data on the same households. Sampling techniques are detailed in section 4 of this report.

2.7 Design of the qualitative assessment

The quantitative component of this impact evaluation study aims to measure the impacts of the project based on some key outcome variables (per capita income, per capita food expenditure, farm productivity and nutritional status of the women aged between 15 to 49 years), as accurately as possible. The qualitative component, on the other hand, documents the unique 'outcomes' of individual clients rather than for measures of outcomes standardized across all clients. Importantly, it seeks to trace back and understand those 'processes' through which the participant tenant farmers experience such outcomes in their lives and livelihood trajectories. In addition, it seeks to assess the strengths and weaknesses of BCUP programme in the lived experience and views of the participants.

³ Creswell, JW (2010) *Best Practices for Mixed Methods Research in Health Sciences*, Office of Behavioural and Social Science Research, p. 5

⁴ Initially, it was planned to cover one cropping calendar but latter it was decided to extend for two cropping calendars. It is argued that during the two years interval between these two surveys, the participant farmers are expected to make a full utilization of two years cycle of loans, extension services, etc. to be offered by the BCUP programme. Because this time frame is usually required for materializing the benefits to be generated from the BCUP services and having visible impacts on the farm productivity, livelihoods, etc.

The main assumption of this research is to explore the links between concepts like credit, tenure, livelihood strategy, food security, agricultural extension, farm productivity, market and household income which are dynamic and also much of it account for qualitative (Maxwell and Wiebe 1999). A clearer conception of the dynamic relations involves looking them through the historical perspective of individual livelihood trajectories or styles (Haan and Zoomers 2005).

A Qualitative Longitudinal Research (QLR) has been designed to gain learnings from the lives and livelihoods of twenty-four tenant farmers. The research team will return to the same interviewees after a period of one year to discern 'changes in the making' which occur in real time as effects of the programme or the absence of it.

A team of six anthropologists have conducted their fieldworks in twelve villages located in six different districts. Each of them covered two villages from treatment and control areas in a four week period. Besides interviewing the farmers, they have gathered data on agricultural and farm livelihood contexts of each village to understand the influence the contexts have on the actions of tenant farmers.

The QLR embodies a range of mainly in-depth interview, life history, ethnographic and participatory methods. The qualitative data have been mainly collected as audio recording. 'A deeper look into the lives of programme participants is essential to understand the nuances behind the RCT results', as Karishma Huda, Social Policy Specialist at Development Pathways, states in her recent blog⁵. Importantly, qualitative data regarding 'how' and 'why' will aid in interpreting the patterns in the quantitative data concerning 'what.' Besides, it will provide the BCUP programme credible evidence on its performance.

2.8 Scope and structure of the baseline report

This report presents the findings of the baseline quantitative and qualitative survey. It describes the characteristics of the treatment and control groups, and assesses how similar the two appear to be. It presents the baseline level of key indicators of the demographic characters, occupations, land and other assets, production, food security, income, consumption and expenditure, credit and extension, health and nutrition, anthropometrics, etc. These indicators will form the basis for the impact evaluation once the follow-up survey has been conducted.

After this introductory section two, section three reminds the theory of change for the BCUP that informs the evaluation, while section four describes the methods of investigation with sampling procedure and balancing of the households. Section five describes findings from the survey including basic household characteristics of households and the baseline levels of the welfare indicators; and finally section six draws the main conclusions.

⁵ <http://microfinance.cgap.org/author/karishma-huda/>

A theory of change for the BCUP **3**

The analysis of the programme impacts originates from a theory of change that recognizes the overall effectiveness of credit and extension services to the tenant farmers, while promoting broader developmental impacts. The central arguments include:

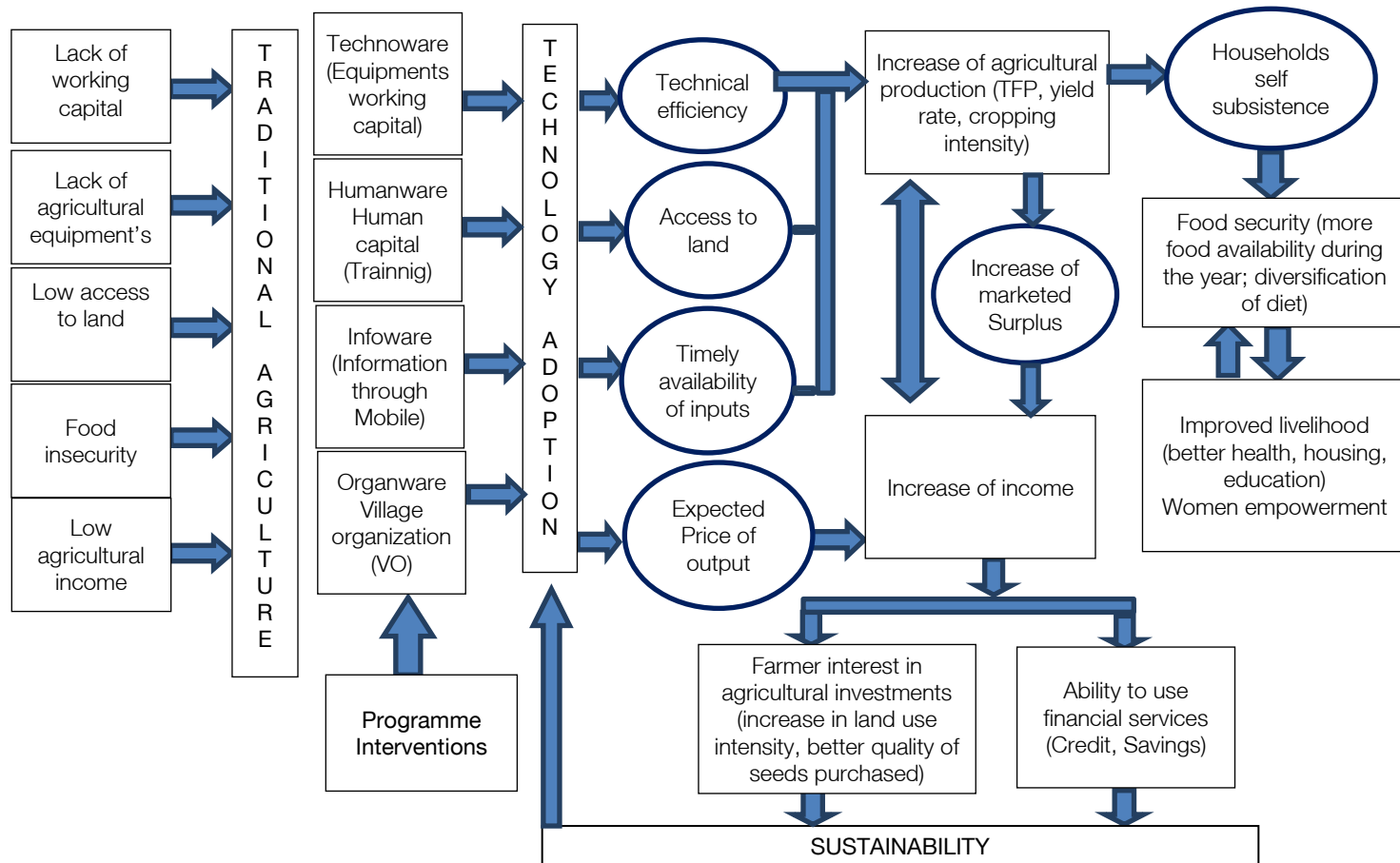
- The BCUP is a matching between government and non-government development initiatives where a low-cost credit is ensured by government through provision of a subsidized loan fund and its outreach is ensured by NGO's country-wide infrastructure. From reviewing its intrinsic features it is expected that, the project will be able to provide credit to poor farmers at a lower interest rate (as charged by formal banks) and having comprehensive outreach (as ensured by MFIs) of credit simultaneously.
- Low interest rate and flexibility in loan repayment schedule will also help farmers fetch fair prices of their produce. Under normal circumstances to repay money-lenders exploitive loans, farmers are often forced to sell their crop immediately after the harvest when prices remain low. With BCUP loans, it is anticipated that the poor marginal and small tenant farmers will have capacity to hold the produce in stock till the prices reach the normal level.
- Higher productivity requires adoption of improved technology, finer crop management practices, and optimum use of inputs. For this to happen substantial working capital is required. This investment could come either from farmers saving or borrowings of funds from the market. In Bangladesh, small and marginal farmers can hardly save enough from the production after meeting the household needs. Therefore, by relaxing the liquidity constraints of small farmers, the BCUP will contribute to the adoption of improved technologies and farming practices and higher use of modern inputs such as irrigation water and chemical fertilizers. This will eventually enhance the agricultural productivity.
- With higher productivity this would increase household income, consumption of food and improve healthcare. Increased earnings would enable these farmers to spend a larger proportion of their income to access quality and safe food and to diversify the food basket. Such changes will lead to improvement of the nutritional status of the household members.

Figure 2 illustrates this theory of change. It represents a tree of effects of the programme by separating the different levels of its influencing strategy according to a Log Frame hierarchy (Inputs > activities > outputs > outcomes> impact). It shows that due to the programme intervention farmers will adapt the modern technology. Outputs are farmers' technical efficiency; they have increased access to capital,

and timely availability of inputs etc. The outcomes are the increased farm productivity that will increase the self-sufficiency in access to food for the borrower households. The impact is the increased marketed surplus of the farmers and higher cash income that will help the households to meet the non-food basic needs. These two factors (subsistence, income) will improve the food security, access to education for the children, improved healthcare, better housing, and improved nutrition.

Another important aspect is sustainability of the outcomes and impact. Figure 2 also shows that higher incomes will increase the farmer's ability to save and acquire farm and non-farm assets that will contribute to further technological progress and higher incomes in the following periods.

Figure 2. Farm level impact chain model of BCUP



Methodology 4

4.1 Sampling design

A Randomized Control Trial (RCT) was followed at the branch office level with a total of 40 branches. BRAC in every year usually expands BCUP intervention areas to its own defined potential areas considering different agro-ecological conditions (such as elevated, flood-prone, saline land) and level of infrastructure development (such as access to irrigation and proximity to market). Following this procedure, the BCUP programme people identified 40 potential branches to extend the BCUP in the year 2012. The research team then randomly drew 20 branch offices from these 40 offices for intervention and the rest 20 branch offices were designated as control areas. Table 4.1 shows the distribution of these areas by number of districts, *upazilas*, unions and villages. From each branch offices six villages were randomly drawn and, census was carried out in both the treatment and control villages. Using the census information, eligible households were identified following the programme eligibility criteria. At this stage, it was not known who among these eligible households would participate in the programme. However, disregarding this, a proportion of the eligible households was selected randomly for survey because a certain proportion of this group would participate (or would have participated) in the programme (assuming that there would not be 100 per cent miss-targeting of the programme). Thus, programme impacts will be assessed by estimating intention to treat (ITT) effect.

Table 4.1 Distribution of study areas

Region	District	<i>Upazila</i>	Union	Village
South	7	15	44	90
East	2	5	14	30
West	3	5	18	30
North	4	4	12	24
Central	5	10	44	60
Coastal	1	1	2	6
Total	22	40	134	240

Note: The figures represent number of Districts, *Upazilas*, Unions and Villages.

4.2 Branch selection and addressing the issue of control area contamination

In order to implement and monitor the programme successfully, BCUP usually runs the programme within eight (8) kilometer radius of the branch office. After selecting treatment and control branches, the research team took care of the issue of the contamination of the control areas. Since randomization has been done at the branch office level, it is likely that there would be sufficient geographical distance between the control and treatment areas. To see actual difference between the control areas and nearby intervened areas, information on the distance between the peripheries of each control branch office and the nearby intervention branch offices were recorded. After the branches were mapped, it was found that most of

the control areas maintained sufficient distance from the treatment area except the branch areas in southern region (Figure 3). For the southern region branches, GIS mapping (Figure 4) was done and circulated to the programme people so that they could maintain expansion of the intervention branches within the areas and avoid extension to the control areas. From each of the branch offices, villages were randomly selected within an eight (8) km radius of the BRAC programme branch offices.

Figure 3. Study areas

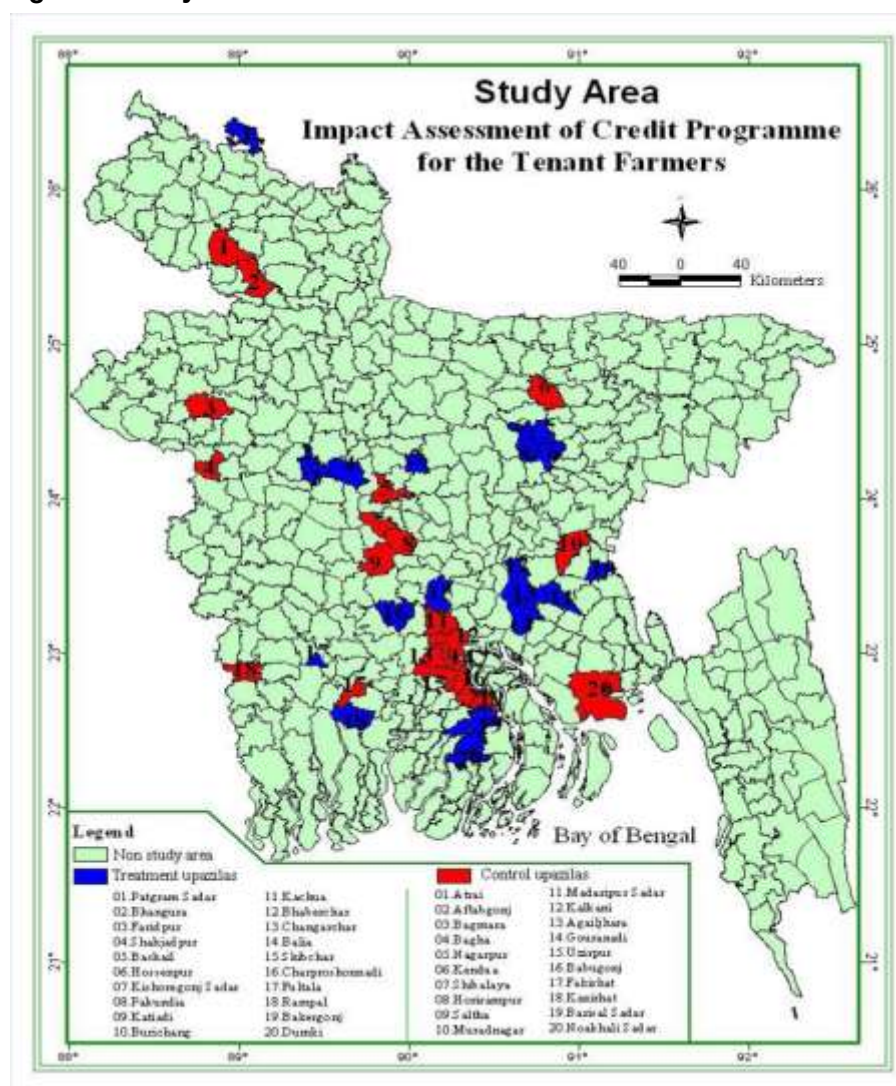
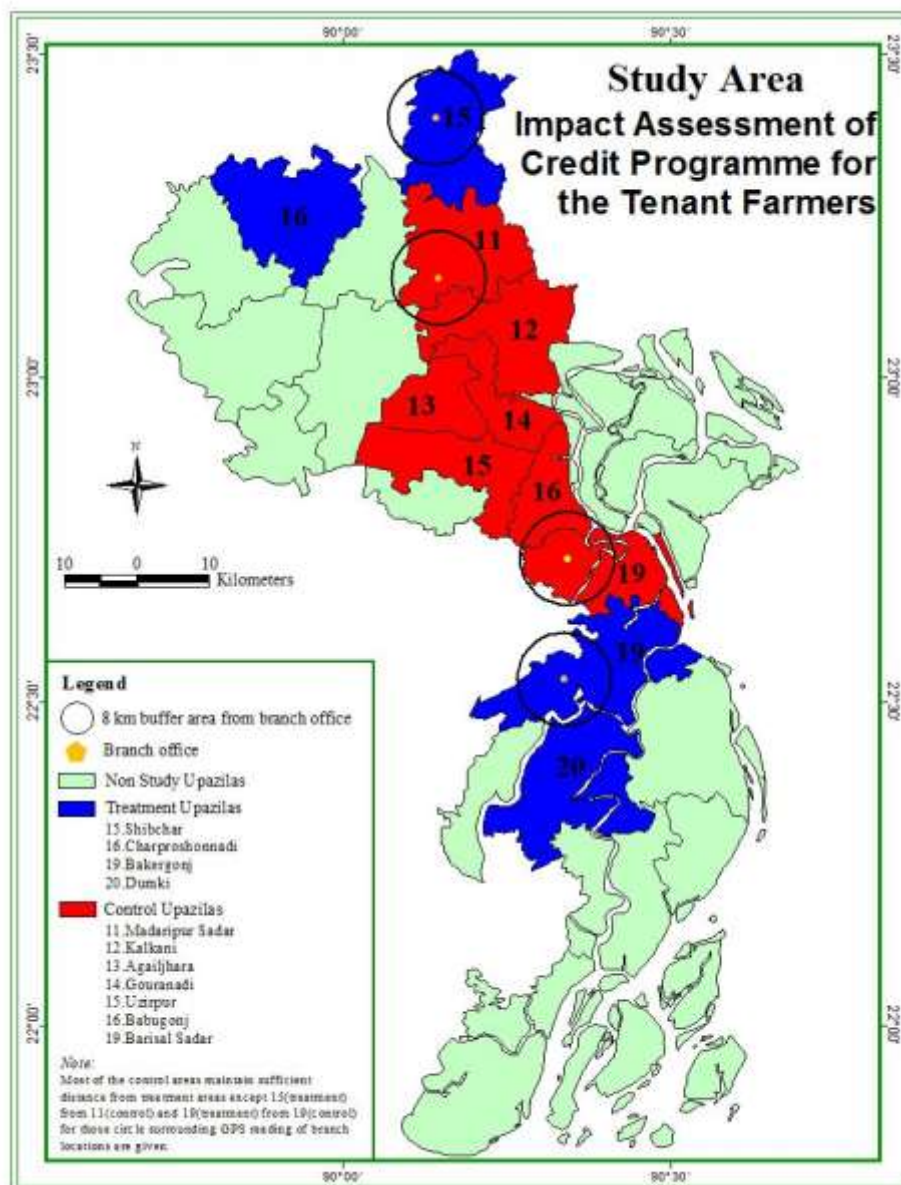


Figure 4. GIS mapping for southern region under study areas



4.3 Household selection

Following household level census for 61,322 households covering 240 villages of 40 Branch areas, the number of eligible households who met all the selection criteria (Table 4.2) including their willingness to participate in the programme was found to be 7,563.

Table 4.2 Eligibility criteria used for study sample selection

Criteria	Criteria Rationale
Has National ID card	This is to obtain evidence on the member's permanent address and origin.
Age of the farmer is between 18 and 60 years	In order to ensure that the members are physically able.
Education of the farmer is at the most SSC pass or below	In order to target farmers who have less opportunity in other income generating activities (IGAs) due to limited human capital
Permanent resident of the concerned area for at least 3 years	To ensure that the member is not a temporary resident who will not migrate out of the village during the period of programme implementation.
Has at least 3 years of prior experience in farming activities	To ensure that the credit is going to farmers who possess sufficient knowledge about the activity and will thus know the ways to effective credit utilization.
Maximum land holding limits 33 decimal- 200 decimal	Households with less than 50 decimals of land holding are usually termed functionally landless but the minimum level has been lowered to 33 decimal in order to emphasize poorer farmers.
Not an MFI member	To target households who could not benefit from credit obtained from another microfinance organization (MFI).
Willing to take credit from BCUP	

Source: BRAC, Agriculture and Food Security Program, 2012.

However, eligible households are not concentrated equally among the regions, branches and villages. A simple random sampling method was adopted based on the concentration of the eligible households; more weight was given (i.e. more households were selected) to areas that were more concentrated with eligible households. In the first stage, a total sample at the branch level was estimated by using a weighted average of the total eligible households in the particular branch and total sample needed for the group (treatment and control group). In the second stage, the total sample needed at the village level was estimated by taking weighted average of the total eligible households in the particular village and total sample needed in the branch (Table 4.3).

Table 4.3 Sample statistics

Region	Treatment			Control		
	Population	Eligible	Sample	Population	Eligible	Sample
South	10,175	1,240	635	14,146	1,285	837
East	5,731	605	312	2,025	245	159
West	3,293	417	214	2,422	328	213
North	1,015	159	81	3,738	693	449
Central	9,851	1,807	922	7,819	695	451
Coastal	0	0	0	1,107	89	58
Total	30,065	4,228	2,164	31,257	3,335	2,167

For qualitative study, twenty four tenant farmers from twelve villages and from six districts belonging to six BRAC operation divisions were selected for residential field work that is consistent with the quantitative study design and baseline quantitative structural questionnaire. Among the selected 12 villages, 6 received intervention (treatment); the remaining did not (control).

For anthropometric measurement all the households having at least one child under the age of five were selected. Among 4,301 households surveyed, 1,607 households satisfied this criterion for baseline survey who were the ultimate respondents for the anthropometric component of the study. Similarly 1,607 households' working aged members were selected for time budget survey.

4.4 Baseline survey

Keeping in mind the objectives of the survey, a standard questionnaire was developed. Before finalizing the questionnaire, the researchers made field visits in different villages for pre-testing the questionnaire. Table 4.4 shows the number of selected and surveyed households for the baseline survey.

Table 4.4 Estimated samples and actually surveyed samples for the baseline 2012

Region	District	Treatment			Region	District	Control		
		Selected samples	Actually surveyed	Success (%)			Selected samples	Actually surveyed	Success (%)
South	Bagerhat	74	74	100	South	Bagerhat	124	124	100
	Barisal	87	85	98		Barisal	401	400	100
	Gopalganj	33	32	97		Faridpur	85	84	99
	Khulna	61	61	100		Madaripur	227	224	99
	Madaripur	154	151	98					
	Patuakhali	226	224	99					
East	Chandpur	138	136	99	East	Comilla	173	169	98
	Comilla	175	175	100					
West	Pabna	110	109	99	West	Rajshahi	213	213	100
	Sirajganj	104	104	100					
North	Lalmonirhat	81	81	100	North	Dinajpur	88	88	100
						Naogaon	225	225	100
						Satkhira	136	135	99
Central	Kishoreganj	772	772	100	Central	Manikganj	86	83	97
	Munshigonj	63	63	100		Netrakona	155	154	99
	Tangail	87	87	100		Tangail	196	196	100
Coastal					Coastal	Noakhali	58	50	86
All		2,164	2,155	99.6			2,167	2,146	99.0

Residential training of the field enumerators were held from 3-8 June, 2012. Then the baseline survey was conducted during June to August, 2012. During survey, some respondents of the selected households were not available, as such dropped

from the survey. As a result, the baseline survey covered 4,301 households out of a total of 4,331 selected households (Table 4.4).

For qualitative survey an innovative five-day workshop (June 11-15, 2012) was conducted for field investigators so that they could get acquaintance with necessary information on research subject and checklist for interviews, focus groups and observation, trained on qualitative longitudinal research and taught on the Sustainable Livelihood Framework (SLF) as a conceptual framework to approach the data. Immediately after completion of the innovative workshop, all Field Investigators started field work for collecting data. Four weeks were allocated for them to cover two villages and interview four tenant farmers (2+2).

For anthropometric survey out of 1,607 selected households' data collection from 1,559 households (799 from treatment and 760 from control area) were successfully completed. There were some non-respondent households due to their absence during interview. After the necessary data cleaning, anthropometric data of 1,524 children aged below five and 1,388 mothers were analysed.

4.5 Analytical technique used in this report

This baseline report is descriptive in nature. However, since randomization control trial evaluation design was followed, the findings were presented separately for treatment and control area. The purpose was to see occurrence of (statistically) significant difference between treatment and control areas, if any.

As Randomized Control Trial (RCT) evaluation design was adopted, it was expected, at least theoretically, that there would be no significant difference between treatment and control areas for the outcome variable of interests. To see any significant difference, the difference between treatment and control areas for the key variables of interests were estimated and performed t-test. Since randomization was clustered at the branch office level, ideally the standard error should be estimated at the branch office level. However, it is of worth mentioning that the geographical coverage of a single BRAC branch office reflects BRAC's capacity rather than any underlying feature of the economic environment common to all communities in the area. Hence, standard error at the village level was estimated but a robustness check of the results was performed by estimating standard error at the branch office level as well.

To check for the balancing, normalized difference between treatment and control was also estimated. Normalized difference was computed as the difference of means in treatment and control areas divided by the square root of the sum of the variances following Imbens and Wooldridge (2009). According to Imbens and Wooldridge (2009) if normalized differences are below 0.25, linear regression methods are not likely to be sensitive to specification changes.

4.6 Power calculation

In a study comparing two groups, power calculation shows the probability of rejecting the null hypothesis that two groups share same population mean and claiming that there is a difference between population mean when in fact a difference exist (Spybrook *et al.* 2011). In the research proposal prior to implementing this study, specific effect size based on findings from existing literature on microfinance and other related programs was assumed. Based on available information on the mean and standard deviation of the outcome variables of interests, the power was calculated and the sample size determined. The actual information on the outcome variables of interests and their standard deviations from the baseline survey was detailed. So, the power using mean, standard deviations, and intra-cluster correlations obtained from the baseline survey data was re-calculated. The baseline survey was conducted in 40 BRAC branch offices, which were equally and randomly divided between treatment and control. From each branch office 6 villages were randomly selected, and from each village 18 households were surveyed. So, this was a three stage RCT design. A participation rate of 65 per cent among these households and an attrition rate of 10 per cent in the follow up survey is expected, thereby, indicating a cluster size of around 10 households (no of households per village). Based on this information the power calculations were performed. Optimal design software to estimate the power for three stage cluster randomization was used in this study. Information used in the power calculation is shown in Table 4.5.

Table 4.5 Intra-cluster correlation and effect size

	Mean	SD	Expected increase	Effect size ¹	Intra-cluster correlation ²	
					Branch level	Village level
Per capita income (Per Capita Yearly)	20969	15041	3145(15% increase)	0.209	0.008	0.029
Food expenditure (Per Capita Daily)	32.15	9.24	3.22(10% increase)	0.348	0.067	0.092
Yield rate (M. Ton per Hectare)	5.47	1.02	0.547 (10% increase)	0.536	0.222	0.247
Yield rate (M. Ton per Hectare)	5.47	1.02	0.437 (8% increase)	0.429	0.222	0.247
Yield rate (M. Ton per Hectare)	5.47	1.02	0.327 (6% increase)	0.322	0.222	0.247
WHZ	-0.80	1.93	0.40 (0.4Z increase)	0.207	0.017	0.008

Using the above mentioned information on effect size, intra-cluster correlation and cluster size, the following power against each of the outcome variables was obtained (Table 4.6).

¹ Effect size is standardized difference between treatment and control households.

² It is the between-cluster variability divided by the sum of the within-cluster and between-cluster variability (Shersten Killip *et al.*, 2004).

Table 4.6 Power for key outcome variables

Outcome variable	Power at 5% level of significance
Per capita income (Per Capita Yearly)	0.97
Food expenditure (Per Capita Daily)	0.93
Yield rate (M. Ton per Hectare)	0.88
Yield rate (M. Ton per Hectare)	0.73
Yield rate (M. Ton per Hectare)	0.44
WHZ	0.99

0.8 was considered as high level of power. Hence, the power calculation reveals that for main outcome variable of interests, significantly high level of power was obtained; however, 10% increase in the yield rate may not be realistic. Thus, the sample size adopted in this study may not detect the effect size.

Results and discussion 5

5.1 Socio-demographic profile

The study on socio-demographic profile of targeted populations provides valuable information on the composition of households and their characteristics like; age, sex, and educational status, etc. Table 5.1 summarizes the key demographic characteristics of the surveyed households. The average age of the head of treatment households was about 45 years, and it did not differ significantly ($p>0.05$) with that of the control households. The average years of schooling of the household heads of both the group were found to be about three years. The female headed household was 8% and 5%, respectively, and the difference was statistically significant ($p<0.05$).

Table 5.1 Demographic characteristics of the household

Particulars	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Age of household head (years)	45.30 (11.37)	44.40 (11.82)	0.90 (0.67)	0.90 (0.45)	0.05
Female headed household (%)	8.0 (27.7)	5.0 (22.7)	3.0 (0.018)	3.0** (0.010)	0.084
Years of education of household head	2.9 (3.27)	3.0 (3.34)	-0.1 (0.302)	-0.1 (0.193)	-0.02
Members (aged above 5 years) never attended school (%)	22.1 (41.5)	22.1 (41.5)	-0.02 (0.026)	-0.02 (0.015)	0.000
Primary school drop-outs (%)	13.0 (33.7)	14.7 (35.4)	-1.70 (0.014)	-1.70 (0.008)	-0.035
Secondary school drop-outs (%)	19.7 (39.8)	19.4 (39.5)	0.36 (0.015)	0.36 (0.011)	0.006
Secondary passed (%)	6.7 (30.3)	7.0 (30.4)	-0.33 (0.014)	-0.33 (0.009)	-0.008
Year of schooling					
Adult male (15+)	4.63 (4.01)	4.57 (3.96)	0.054 (0.327)	0.054 (0.194)	0.01
Adult female (15+)	4.20 (3.83)	4.04 (3.81)	0.162 (0.268)	0.162 (0.167)	0.03

Notes.

i) *denote significant at 5% level.

ii) Normalized differences computed as the difference in means between the treatment and control households divided by the square root of the sum of the variances.

It was found that the household members had low levels of education, and a similar per cent (22%) of the household members of both the treatment and control groups never had any schooling (Table 5.1). The average dropouts from the primary school was 13% and 14.7%; and that from the secondary school was 19.7% and 19.4% of the household members of the two groups, respectively; and the differences were not significant ($p>0.0$). The average years of schooling of the adult (15+) female and male member of the treatment households were 4.20 and 4.63, respectively, and that of the control households were 4.04 and 4.57%, respectively (Table 5.1).

5.1.1 Distribution of households based on household size and age

The average number of person (household size) and their age compositions of the treatment and the control households are presented in Table 5.2. Both the group had a higher household size (5.1 and 4.7, respectively) and a lower sex ratio (95 and 93 female per 100 male, respectively) than that of the rural household size (4.5) or the sex ratio of the country (96).

The economically active member aged between 16 to 64 years of age of the control households (61.3%) was similar to that of the national average (61.4%), but their share was 58.1% in the treatment villages resulting in a higher per cent of the children (37.8%) than the control (34.7%) or the national average (34.6%). Thus, the dependency ratio or the ratio of dependent population (people aged 0 to 15 years and 65+) to economically active population was higher (0.7) in the treatment villages than the control (0.6) or the national average (0.6). The percentage of the women aged between 16 to 49 years in the treatment and the control households was about 24.5% and 25.4%, respectively. A child to women ratio, a measure of the current fertility rate, of the treatment and the control households was lower (34 and 31 respectively) than that of the national average level of 37.0% (Table 5.2).

Table 5.2 Household size and age composition of the population

	Treatment	Control	National
Household size	5.1	4.7	4.5
Sex ratio (female per 100 male)	95	93	96
Children- 0 to 15 years (%)	37.8	34.7	34.6
Adults- 16 to 64 years (%)	58.1	61.3	61.4
Old- 65 years and more (%)	4.1	4.0	4.0
Dependency ratio	0.7	0.6	0.6
Children 0 to 4 years (%)	8.4	8.0	-
Women 16 to 49 years (%)	24.5	25.4	-
Child-Women ratio	34	31	37

5.1.2 School participation of children

Table 5.3 shows that the primary school attendance rate was higher for girls compared to boys both in the treatment and control groups. However, no

significant ($p > 0.05$) variation was found in the primary school attendance between male and female students of both the control and the treatment groups. Similar results were also observed in the case of secondary school attendance. It was found that the dropout rate of the girl at secondary school level was significantly ($p < 0.05$) lower (5.2%) than that of the boys of the treatment (14.8%) or the control households (14.1%).

Table 5.3 School participation (per cent of the relevant age group) of children

	Treatment Area (SD)	Control Area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Primary school participation (6-10 age)					
Boys	94.8 (22.1)	93.9 (23.9)	0.9 (1.7)	0.9 (1.4)	0.028
Girls	96.7 (18.0)	95.2 (21.3)	1.4 (1.3)	1.4 (1.2)	0.052
Secondary school participation (11-15 age)					
Boys	82.7 (37.9)	82.7 (37.9)	0.0 (2.7)	0.0 (2.4)	0.000
Girls	92.7 (26.0)	91.1 (28.5)	1.6 (1.9)	1.6 (1.5)	0.042
Secondary school drop-out					
Boys	14.8 (35.5)	14.1 (34.8)	0.6 (2.6)	0.6 (2.2)	0.013
Girls	5.2 (22.3)	8.2 (27.4)	-2.9 (1.8)	-2.9** (1.4)	-0.083

Notes.

i) ** significant at 5 per cent level.

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

5.2 Health profile

More than 50.0% of the population interviewed were hardly found ever sick indicating that the health status of the interviewed people was quite good (Table 5.4), and the difference in per cent people found hardly sick between the treatment (54.4%) and the control group (61.4%) was significant ($p < 0.05$). About 2.6% of the people of the treatment households remained almost always sick and it differed with that of the people of the control houses (3.9%, Table 5.4) significantly ($p < 0.01$) at village level, and also at branch level ($p < 0.10$). Some of the people of the former households (42.6%) remained sick sometimes, and their number was significantly ($p < 0.01$) higher than the people of the latter households (34.1%, Table 5.4) at village level.

Table 5.4 Health status (per cent)

	Treatment Area (SD)	Control Area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Disabled	4 (6)	0.7 (8.1)	-0.3** (0.00)	-0.3** (0.00)	-0.010
Almost always sick	2.6 (15.9)	3.9 (19.3)	-1.3* (90.6)	-1.3*** (52.6)	-0.020
Sometimes sick	42.6 (49.5)	34.1 (47.4)	8.6 (43.4)	8.6*** (26.6)	0.500
Hardly ever sick	54.4 (49.8)	61.4 (48.7)	-7 (1.3)	-7*** (1.3)	0.130

Notes.

i) ***, **, * significant at 1%, 5% and 10% level respectively.

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

A major part of the people of both the treatment (63.0%) and the control (57.9%) households sought treatment from quacks or pharmacies (Table 5.5). About 18.8% and 19.6%, respectively of the people of the two household groups had been in the hospital for treatment, and only 10.8% and 13.9% of the people met professional medical doctors engaged in private practice. Moreover, some of the sick people of the two households (3.7% and 3.5%, respectively) trusted on self treatments instead of seeking treatment from others.

Table 5.5 Treatment practice (per cent)

	Full Sample	Treatment	Control
Medical practitioners without formal degree (Quack)	60.5	63.0	57.9
<i>Kobiraz, Hakim, Pir, Fokir</i>	2.0	1.8	2.2
Homeopathic Doctor	1.0	0.9	1.0
Self Treatment	3.6	3.7	3.5
Hospital	19.1	18.8	19.6
Doctors with medical degree	12.4	10.8	13.9
Others	0.3	0.1	0.4
No treatment	1.2	0.9	1.6

5.3 Nutritional status of children and mothers

Anthropometry is the measurement of body dimensions, e.g., weight and height that reflects the nutritional status of an individual or a population group (Cogill 2001). It is non-invasive, relatively inexpensive, simple, safe, and easy to perform method of assessing the status of nutrition. Three indices are commonly used in assessing the nutritional status of under-5 children. These are length-for-age or height-for-age (stunted), weight-for-length or weight-for-height (wasted) and weight-for-age (under-weight). Length-for-age (<2 years) or height-for-age (more than 2 years) indicates the status of linear growth. If the z score of length-for-age or height-for-age of a child is below -2 standard deviations (-2SD) of the median, according to the WHO growth standard, then a child is considered as stunted. It

measures both past under nutrition and chronic malnutrition. The second one, weight-for-length or weight-for-height is used to identify the status of current or acute malnutrition or wasting. If the z score of weight-for-length or weight-for-height is below -2 standard deviations (-2SD) of the median, according to the WHO growth standard, then a child is considered to be wasted one. It may be resulted from short-term effects such as, seasonal changes in food supply or from short-term nutritional stress. The third one, weight for age, indicates the status of both short term and long term malnutrition. If the z score of weight-for-ages below -2 standard deviations (-2SD) of the median, according to the WHO growth standard, then a child is considered to be underweight. For the adult ones, body mass index (BMI) is used for measuring the nutritional status. It is calculated based on a weight to height ratio.

Anthropometric (weight and height) indices of the children were calculated using WHO anthrop software. Mothers' BMI were calculated using the standard formula weight (in kilograms) divided by the height (in meters) squared. The cut-off points for the anthropometric indices used in this analyses are given below:

Cut-off points	Stunting (HAZ)	Wasting (WHZ)	Underweight (WAZ)
<-3SD	Severe	Severe	Severe
<-2SD	Moderate and severe	Moderate and severe	Moderate and severe

Cut-off points for BMI	Classification
<18.5	Underweight/Thin
18.5 to 24.99	Normal
≥25	Overweight or obese

The results showed that the mean age, weight and height of the children less than 5 years were 34 months, 11.1 kg, and 86 cm, respectively in all areas (Table 5.6). The mean HAZ, WHZ and WAZ were -1.79, -.76, and -1.56, respectively. No significant differences were observed between the treatment and control households. The sex ratio between the male and female children was 51:49 in all the areas.

The data on the prevalence of stunting, wasting and underweight of the children of treatment and control households under different study areas are presented in Table 5.7. About 54.9% and 56.0% of the under-5 children of the two household group, respectively had normal growth, and the rest (45.1% and 44.0%, respectively) had moderate and severe (<-2SD) stunted growth including severely stunted growth (Table 5.7). About 15.8% to 16.0% of the children of the same age group of the two household group, respectively had moderate and severe wasting including severely wasting of 5.3% and 5.0%, respectively. The rest 84.2% and 84.0% of the children under-5, respectively were normal. The two group households had 63.8% and 66.2% of their children under-5, respectively of normal weight, and the rest 36.1% and 33.7%, respectively had moderate and severe underweight including severe underweight of 10.6% and 10.3%, respectively. No significant ($p > 0.10$) differences were found between the two group of households.

Table 5.6 Children under 5 by anthropometric indices, age and sex in different areas

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Age (months)	33.32 (16.2)	34.37 (16.1)	-1.05 (0.8)	-1.05 (0.729)	-0.046
Weight(kg)	11.06 (2.9)	11.31 (2.7)	-0.25 (0.182)	-0.25 (0.148)	-0.061
Height (cm)	85.53 (12.8)	86.5 (12.9)	-0.97 (0.766)	-0.97 (0.653)	-0.053
HAZ	-1.81 (2.018)	-1.77 (1.829)	-0.04 (0.138)	-0.04 (0.116)	-0.015
WHZ	-0.8 (1.92)	-0.71 (1.7)	-0.09 (0.139)	-0.09 (0.113)	-0.034
WAZ	-1.6 (1.37)	-1.52 (1.21)	-0.08 (0.079)	-0.08 (0.071)	-0.044

Notes.

i) none of the differences is statistically significant.

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

Table 5.7 Percentage of under-5 Children by Anthropometric indices (HAZ, WHZ and WAZ)

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Severely stunted (<-3SD)	20.7 (1.4)	18.5 (1.4)	2.2 (3.2)	2.2 (2.5)	1.082
Moderate and severe (<-2SD)	45.1 (1.5)	44 (1.6)	1.1 (2.2)	1.1 (2.3)	0.495
Normal ($\geq$ -2SD)	54.9 (1.8)	56 (1.8)	-1.1 (3.4)	-1.1 (2.8)	-0.431
Severe wasting (<-3SD)	5.3 (0.8)	5 (0.8)	0.3 (1.4)	0.3 (1.2)	0.266
Moderate and severe (<-2SD)	15.8 (1.1)	16 (1.2)	-0.2 (1.6)	-0.2 (1.8)	-0.126
Normal ($\geq$ -2SD)	84.2 (1.3)	84 (1.4)	0.2 (2.1)	0.2 (2.1)	0.107
Severe underweight (<-3SD)	10.6 (1.1)	10.3 (1.1)	0.3 (1.9)	0.3 (1.5)	0.191
Moderate and severe (<-2SD)	36.1 (1.5)	33.7 (1.6)	2.4 (2.4)	2.4 (2.4)	1.088
Normal ($\geq$ -2SD)	63.8 (1.7)	66.2 (1.8)	-2.4 (2.7)	-2.4 (2.6)	-0.981

Notes.

i) none of the differences is statistically significant at 10% level.

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

The average age of the mother of the two groups was 28.25 years, and no significant ($p>0.10$) difference was found between the group (Table 5.8). The table shows that the average weight, height and BMI of the mothers irrespective of the treatment and control households were 47.12 kg, 150.39 cm and 20.83, respectively in all areas. However, the weight and BMI were found to be significantly ($p<0.05$) lower in the intervention areas than that of the control areas.

Table 5.8 Characteristics of the mother by age, weight, height and BMI in different areas

Indicator	Treatment (n= 673)		Control (n=715)		All (n=1388)	
	Mean	SD	Mean	SD	Mean	SD
Age	28.23	6.12	28.27	6.59	28.25	6.35
Weight (kg)	46.39	8.06	47.89	8.49	47.12	8.30
Height (cm)	150.11	5.34	150.69	6.63	150.39	6.01
BMI	20.57	3.30	21.11	3.75	20.83	3.53

One way analysis of variance, $p<0.05$

Table 5.9 shows that the BMI of 61% and 64.3% of the mothers of the treatment and the control households was normal (18.5 to 24.9), 30.1% and 23.3%, respectively had BMI of <18.5 ; and 9.0% and 12.3%, respectively of the two households had mothers of overweight. A significant difference in the per cent of mothers having <18.5 BMI ($p<0.10$) or having obese ($p<0.05$) between the two groups was found.

Table 5.9 Percentage of mothers by BMI in intervention and control areas

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Thin (<18.5)	30.1 (45.9)	23.3 (42.3)	6.8** (2.8)	6.8*** (2.4)	0.024
Normal (18.5-24.9)	61.0 (48.8)	64.3 (47.9)	-3.3 (2.6)	-3.3 (2.5)	0.025
Overweight or Obese (≥ 25)	9 (28.6)	12.3 (32.9)	-3.3* (1.9)	-3.3* (1.8)	0.024

Notes.

i) ***, **, * significant at 5% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

5.4 Land ownership

The growing trend in landlessness and disparity in land ownership, that implicate increasing trend in rural income inequality, have been an issue of concern to the government and civil society (Hossain and Bayes 2009). Therefore, it is worth overlooking the emerging pattern of land ownership.

The average size of the total owned land of the treatment and the control households was 61.5 and 63.0 decimals, respectively, and the difference was not significant ($p < 0.10$). The average size of cultivable land owned by the two household groups was 47.3 and 45.6 decimals, respectively, and that of the homestead area was 9.9 and 10.3 decimals, respectively. The difference in the holding of all types of land between the treatment and the control group was not statistically significant ($p < 0.10$, Table 5.10).

Table 5.10 Land ownership of the households (in decimal per household)

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Cultivable land	47.30 (59.80)	45.60 (59.21)	1.70 (3.53)	1.70 (2.61)	0.020
Homestead	9.90 (8.52)	10.30 (10.06)	-0.40 (0.90)	-0.40 (0.52)	-0.030
Pond	2.00 (5.68)	2.30 (8.66)	-0.30 (0.43)	-0.30 (0.26)	-0.029
Cottage enterprise	0.01 (0.15)	0.02 (0.58)	-0.01 (0.013)	-0.01 (0.013)	-0.016
Fallow land	0.50 (5.02)	0.60 (4.94)	-0.10 (0.17)	-0.10 (0.16)	-0.014
Others	1.80 (3.95)	4.18 (2.13)	-2.38 (0.10)	-2.38 (0.11)	-0.531
Total owned land	61.500 (68.48)	63.000 (69.53)	-1.500 (4.09)	-1.500 (2.91)	-0.015

Notes.

i) none of the differences is statistically significant at 10 per cent.

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

About 55.0% of the total households of both the groups in the study area was functionally landless (own up to 50 decimals), followed by 43% of small farmers (own 51 to 250 decimals), and only about two per cent of the total households owned more than 250 decimals of land (Table 5.11).

Table 5.11 The pattern of distribution of land ownership (per cent)

Size of land (Decimal)	Treatment	Control	Sample
Up to 10	23.1	22.2	22.7
11 to 50	32.1	32.6	32.4
51-100	23.9	24	23.9
100-250	19.4	19.1	19.2
250-above	1.5	2.1	1.8

As can be seen from Table 5.12, the bottom 40 per cent of the households owned only 7.8%, and the top 10% owned about 34% of the total land. The degree of inequality in the distribution of land ownership was high, as reflected by the Gini coefficient (0.52). But, no significant difference was found in the degree of inequality between the treatment and the control groups (Table 5.12).

Table 5.12 Inequality in the land ownership in the treatment and control villages

Quintile	Full sample		Treatment		Control	
	Share	Cumulative share	Share	Cumulative share	Share	Cumulative share
1	1.4	1.4	1.3	1.3	1.7	1.7
2	6.4	7.8	6.4	7.7	6.2	7.9
3	13.7	21.5	14.1	21.8	14.1	22.0
4	25.2	46.7	24.3	46.1	24.6	46.6
5	53.3	100	53.9	100	53.4	100
Top 10 Per cent	34.2		34		34.2	
Gini Coefficient	0.52		0.52		0.52	

5.5 Distribution of cultivated land

The average size of cultivated land of the sampled household was about 93 decimal (0.38ha), and no significant ($p>0.10$) difference in land size between the treatment and the control groups was found. The average size of the cultivated land of the treatment and the control group was 96 and 90 decimals, respectively (Table 5.13).

Table 5.13 Land tenure arrangement

Land type (decimal)	Treatment Area (SD)	Control Area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Own cultivated	40.00 (51.58)	38.60 (49.23)	1.40 (3.58)	1.40 (2.37)	0.020
Share cropped-out	2.60 (17.41)	2.60 (16.44)	0.00 (0.62)	0.00 (0.54)	0.000
Share cropped-in	27.90 (51.21)	34.70 (61.87)	-6.80 (5.35)	-6.80* (3.70)	-0.085
Mortgaged-out	4.00 (16.13)	3.80 (15.06)	0.20 (0.89)	0.20 (0.61)	0.009
Mortgaged-in	10.60 (29.45)	9.30 (25.99)	1.30 (1.94)	1.30 (1.22)	0.033
Leased –out	0.90 (9.58)	1.20 (12.58)	-0.30 (0.59)	-0.30 (0.48)	-0.019
Leased-in	17.40 (119.68)	7.60 (44.13)	9.80 (8.72)	9.80* (5.13)	0.077
Rented-out in other arrangement	0.02 (0.59)	0.07 (2.66)	-0.05 (0.06)	-0.05 (0.06)	-0.020
Rented-in in other arrangements	0.55 (8.12)	0.26 (5.275)	0.29 (0.29)	0.29 (0.23)	0.030
Farm size	96.40 (153.57)	90.50 (86.66)	5.90 (11.56)	5.90 (6.90)	0.033
% of farm rented in land	0.633 (0.482)	0.653 (0.476)	-0.020 (0.032)	-0.020 (0.02)	-0.030

Notes.

i) *significant at 10% level. ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

The average size of the cultivated land taken under sharecropping was about 31 decimals by the treatment group and 35 decimals by the control group. Almost 63 per cent of the sample households rented in some land under different tenorial arrangements. Sharecropping was the dominant tenancy arrangement. Sharecropping arrangement was found in 58% and 65% cases of the total rented in land by the treatment and the control group, respectively (Table 5.13). None of the variables, except leased in land, differed significantly ($p < 0.10$) between the treatment and the control groups (Table 5.14). At the village level the difference in leased-in land was significant ($p < 0.10$).

The proportion of marginal farms in the study area was 34% compared to 39% of the country. The share of the small farmers (owning 51 to 250 decimals of land) in the study area (62%) was higher than the national average of 50%. Compared to 11.4% medium and large farm households (owned more than 250 decimal of land) in the country the study area had only 3.9%. The eligibility criterion of maximum 200 decimal land for selecting a household kept the share of the latter category low.

Table 5.14 The pattern of distribution of landholding in the treatment and control groups

Land size (decimal)	Treatment	Control	Sample	Bangladesh (All Holdings)	Bangladesh (Farm Holdings)
Non-farm household	0.32	2.0	1.2	46.4	-
Up to 50	34.3	33.8	34.1	20.7	38.6
51-100	34.1	34.9	34.5	26.7	49.9
101-250	27.5	25.3	26.4		
251-above	3.8	4.0	3.9	6.2	11.4

N=4301

5.6 Tenancy market

It was found that 64% of the total sampled households were tenant households, and the percentages of pure tenant and mixed tenant households were 31.0 and 33.0, respectively. Of the 33 per cent mixed tenant households, the owner-tenant, tenant- owner and equal-share were 10%, 20% and 3%, respectively. The study shows that the percentage of mixed tenant households in the treatment and in the control villages was 32% and 34%, respectively. The difference was statistically insignificant ($p > 0.10$). However, no difference in the percentage of pure tenant households was found between the groups (Table 5.15).

Historically, the small and marginal farmers of Bangladesh have been cultivating owned as well as rented-in land under different tenorial arrangements for supporting their livelihood. Almost all categories of farms had rented-in land, but, it was higher for the marginal and small landowners (Table 5.16). They took rent land from others to make their holdings more viable, and to economize the use of fixed farm establishment (Hossain and Bayes 2009). Almost 95% of the landless households were engaged in cultivation by means of rented-in land; the corresponding figure for the functionally landless households was 81% (Table 5.16).

Table 5.15 Tenure status of the households (per cent)

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Owner farm	37 (48.2)	35 (47.4)	2 (3.06)	2 (2.2)	0.030
Mixed tenant	32 (46.5)	34 (47.3)	-2 (3.95)	-2 (2.3)	-0.030
Owner-tenant	9 (27.7)	11 (31.3)	-2 (1.58)	-2 (1.1)	-0.048
Equal share	3 (17.7)	02 (19.9)	1 (1.79)	1 (1.1)	0.037
Tenant-owner	20 (40.1)	21 (40.3)	-1 (2.81)	-1 (1.8)	-0.018
Pure Absolute Tenant	31 (46.5)	31 (46.0)	0.000 (3.48)	0.000 (2.4)	0.000

Notes.

i) Owner-tenant refers to major portion of land owned by tenants with less proportion under tenancy. The opposite land ownership pattern is for tenant-owner while equal share refers to equal proportion of owned and rented/leased-in land.

ii) none of the differences is statistically significant

iii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

Table 5.16 Distribution of owned land and the incidence of renting in (per cent of households)

Land owned (in decimal)	Share cropping in	Mortgage in	Lease in	Other rented in	Total rented in
Nil	56	22	22	7	95
Up to 50	56	22	12	1	81
50 to 100	30	15	10	1	50
100 to 200	23	10	7	1	37
200 and more	17	6	8	1	30
Total	42	18	10	1	63

The share of the rented-in land in the total cultivated land of the functionally landless households of the treatment and the control groups was 86% and 87%, respectively, and it was about 47% in case of the farmers owning 50 to 100 decimals of land (Table 5.17).

Another point worth noting is the co-existence of different types of rented-in system. Historically, sharecropping had been the dominant system in the tenancy market. But, the gradual expansion of high yielding varieties (HYVs) of rice and wheat cultivation having the support of groundwater irrigation, technologies and market linkages multiplied the cropping intensity in Bangladesh. In the context of

adoption of high yielding modern rice varieties (HYVs), the cash oriented fixed rental tenancy like, mortgage or lease increased progressively.

The present study showed that 42% of the total households took rented-in land under sharecropping arrangement, 18% and 10% of the total households took mortgaging and lease, respectively (Table 5.17). The total rented-in land under sharecropping and other tenancy system was 30% and 28% of the total cultivated land, respectively in the treatment group, and 38% and 19%, respectively in the control group (Table 5.17).

Table 5.17 Importance of tenure arrangement for different land ownership group (per cent)

Land owned (in Decimal)	Treatment			Control		
	Owned Land	Rented in		Owned Land	Rented in	
		Share- cropping	Other arrangement		Share- cropping	Other arrangement
Nil	0	41	59	0	49	51
Up to 50	14	50	36	13	60	27
50 to 100	53	22	25	53	29	18
100 to 200	70	11	19	70	22	8
200 and more	66	5	29	78	7	15
All	42	30	28	43	38	19

It was revealed that tenants preferred leasing contract over crop sharing arrangement, mainly because they had more space for exercising agency in leasing contracts, as landlords '*do not boss all the time*,' says Abdul Malek from Barisal. Farmers think that under sharecropping arrangement, not much is left for them after sharing the produce with the owner. However, a significant number of marginal tenant farmers lack the working capital for paying rent altogether in advance. The study reveals that cash rent for leasing land has been gradually increasing over a period of time. The transition from sharecropping to cash leasing contract and the cultivation of input intensive modern variety (MV) crops created an urgency for credit support to tenants.

Box 1. Tenancy through a combination of diverse and co-existing forms

It was seen in most of the study areas that the agricultural tenurial relations in land and other kinds of property are maintained through a combination of diverse and co-existing of cash and kind sharing arrangements. *Goru borga*, a popular local form of livestock tenancy, may be the best example of it. In this system, usually a rich farmer lease out a heifer to a relatively poor farmer for rearing, once it becomes matured and started producing milk, the owner receives a portion of milk for free and the rest of the milk may be sold or consumed by the tenant, the first calf goes to the original owner but, the next one belongs to the tenant. *Goru borga* is also applied to lease beef cattle. The tenant farmer rears and fattens the cattle. After some time when the cattle is sold at the market, usually prior to the Eidul-Ajha festival of the Muslim community, the money is shared at a ratio of 1:1 between the two parties. Unlike the crop tenancy, women act as key players in negotiating and running livestock tenancy.

5.7 Land utilization

The utilization of land and the cropping pattern of the sample households are worth discussing to know how farmers use their land in the context of land management in rural Bangladesh. The overall cropping intensity of the sampled households was 165%, and it was lower than that of the national average of 178%. This study shows a significant difference in cropping intensity between the treatment and the control groups. But, the normalized differences are all less than 0.25. The cropping intensity of the treatment group was 170%, and it was 154% in the control group. It was also found that there were significant differences in the single, double and triple cropped areas between the treatment and the control villages (Table 5.18).

Table 5.18 Intensity of land use and cropping intensity (per cent)

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Single cropped	34.7 (47.6)	47.3 (49.9)	-12.6 (8.8)	-12.6* (4.8)	-0.183
Double cropped	60.5 (48.9)	51.7 (50.0)	8.8 (8.6)	8.8* (4.8)	0.126
Triple cropped	04.8 (21.5)	1 (9.9)	3.8** (1.6)	3.8*** (4.8)	0.162
Cropping Intensity	170.2 (55.3)	153.7 (51.8)	016.5* (9.2)	16.5*** (0.01.0)	0.217

Notes.

i) ***, **, * significant at 1%, 5% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

It is also important to look at the topography that dictates the decision on selecting crops to be grown on different lands. The proportion of high land and medium land of the total cultivated land were 15% and 41%, respectively in the treatment group, and they were 19% and 38%, respectively in the control group. The difference between the treatment and the control group was found to be statistically insignificant. The distribution of low land and very low land were quite similar in the treatment and the control group. The proportion of low land and very low land of the total cultivated land were 30% and 14%, respectively. The difference between the treatment and the control group was not statistically significant in this regard (Table 5.19).

Table 5.19 Land elevation status (per cent)

	Treatment area (SD)	Control area(SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
High land (Not flooded)	15 (36.2)	19 (39.0)	-4 (5.4)	-4 (2.9)	-0.075
Medium land (Flooded up to knee level)	41 (49.2)	38 (48.5)	3 (6.1)	3 (3.7)	0.043
Low land (Flooded up to chest level)	30 (45.6)	30 (45.8)	0.000 (5.2)	0.000 (3.3)	0.000
Very low land (Flooded over chest)	14 (34.7)	14 (34.2)	0.000 (4.7)	0.000 (2.6)	0.000

Notes.

i) none of the differences is statistically significant

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

5.7.1 Cropping pattern

It can be seen from Table 5.20 that *Boro* paddy (fully irrigated dry season rice) occupied almost two third of the total cultivated land. The second major crop was *Aman* paddy which occupied about half of the total cultivated area. *Aus*, the pre-monsoon rice crop was a major crop under rain fed condition, and the land under the *Aus* crop is gradually occupied by *Boro* rice with the availability of irrigation facility. The benchmark survey showed that only 7% of the total cultivated land was occupied by *Aus*. Crop diversification was very low and it was only 42% of total cropped area under non-rice crops. Among the non-rice crops, pulses turn out to be the most important one occupying 8% of the total cultivated land, followed by jute and oilseeds occupying 7% and 5%, respectively.

Table 5.20 Area under different crops

Crop	Area under different crops (as a percentage of total cropped area)		
	Treatment	Control	Full sample
<i>Aus</i>	12	1	7
<i>Aman</i>	59	48	53
<i>Boro</i>	58	69	64
Wheat	1	2	1
Maize	2	3	2
Potato	1	3	2
Pulses	11	5	8
Oilseeds	5	5	5
Jute	4	9	7
Sugarcane	0.07	0.25	0.16
Tobacco	0.57	0.01	0.29
Others	17	15	16
Total	170	160	165

5.7.2 Adoption of modern varieties

One of the indicators for technological progress is the adoption of Modern Varieties (MVs). It is now widely accepted that the productivity of MVs is much higher than the Traditional Varieties (TV). Bangladesh has made a remarkable progress in the

adoption of modern varieties in recent years. The survey results showed that 90% of the rice area was covered by the modern varieties of rice, especially in *Boro* season. But, the cultivation of MVs in *Boro* season differed significantly between the treatment and the control group. The MV cultivation was 99% of the *Boro* rice area (this is quite similar to the national statistics) in the treatment group compared to 79% in the control group. The MV coverage was lower in the *Aus* and *Aman* season, and it was about 50% and 60%, respectively (Table 5.21).

Table 5.21 Adoption of modern varieties in rice farming (per cent)

Season	Treatment Villages		Control Villages	
	Rice area as a percentage of total cultivated area	MV coverage(as a percentage of total rice area)	Rice area as a percentage of total cultivated area	MV coverage(as a percentage of total rice area)
<i>Aus</i>	12	55	1	47
<i>Aman</i>	59	60	48	61
<i>Boro</i>	58	99	69	79
All seasons	128	77	118	71

5.7.3 Rice yield

The yield (production per unit of land) per hectare (land productivity) of crops is an indicator of the efficiency of farming. No significant difference was found in *Aus* and *Aman* crops between the treatment and the control group (Table 5.22). However, at the village level the *Boro* cultivation differed significantly ($p < 0.10$).

Table 5.22 Yield of different rice varieties (m. ton per hectare)

Rice	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
<i>Aus</i>	3.29 (1.18)	3.73 (1.38)	-0.44 (0.60)	-0.44 (0.38)	-0.243
<i>Aman</i>	3.37 (1.15)	3.50 (1.39)	-0.13 (0.31)	-0.13 (0.16)	-0.071
<i>Boro</i>	5.47 (1.02)	5.22 (1.34)	0.26 (0.25)	0.26* (0.14)	0.151

Notes.

i) * significant at 10% level.

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

5.8 Asset holdings of the households

The average value of the asset of the treatment group was Tk. 1.51 million compared to Tk. 1.38 million of the control group. But, the difference was statistically insignificant ($p > 0.10$). Land is the most important form of asset to both the groups comprising almost 85% of total asset value. However, there is no statistically significant ($p > 0.10$) difference between the treatment and the control

group. The value of household durables of the treatment group was Tk. 97 thousand, and it was Tk. 103 thousand in the control group. The average value of the agricultural assets was Tk. 42 thousand in the treatment group and Tk. 39 thousand in the control group. Livestock and poultry were the most important type of agricultural assets comprising almost two-third of the total agricultural assets. A significant difference in livestock and poultry holding was found between the treatment and the control group.. The average value of non-farm assets was Tk. 800 in the treatment group and Tk. 500 in the control group. The average value of business assets of the treatment group was Tk. 22.3 thousand, and that of the control group was Tk. 67 thousand. The difference between the two groups was almost 67%. There was also no significant difference in financial assets between the two groups. The average value was about Tk. 15 thousand in the treatment group and about Tk. 12 thousand in the control group (Table 5.23).

Table 5.23 Average Value of assets at current replacement cost ('000 Tk.)

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Land	1332 (1980.07)	1157 (1788.64)	176 (173.64)	176 (96.04)	0.066
Agricultural asset	43 (55.51)	39 (53.97)	3 (3.70)	3 (2.33)	0.043
Livestock and Poultry	28 (43.28)	23 (38.39)	5* (2.59)	5*** (1.63)	0.092
Other agricultural asset	15 (28.72)	17 (35.93)	-2 (2.87)	-2 (1.64)	-0.043
Non-farm assets	1 (18.046)	1 (2.58)	0 (0.54)	0 (0.40)	0.016
Business asset	22 (191.92)	67 (404.28)	-45 (44.56)	-45 (25.35)	-0.000
Household durables	97 (103.57)	103 (119.68)	-6 (9.23)	-6 (5.18)	-0.037
Financial asset	15 (143.93)	12 (57.69)	3 (4.07)	3 (3.38)	0.019
Total asset	1511 (2098.56)	1379 (1993.88)	132 (196.41)	132 (109.663)	0.019

Notes.

i) ***, * significant at 1% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

Non-land assets included poultry and livestock, agricultural tools or machines, other industrial assets and vehicles; some of which increased the productivity of land like, agricultural equipments and livestock, while the others may generate supplementary income. The distribution of non-land asset shares mostly by poultry and livestock (Table 5.24). The households kept poultry birds had the highest share of 73% of the Non-land asset in the treatment group, and it was 75% in the control

group. The difference between the groups was not statistically significant. Among other agricultural assets, a significantly higher percentage of the control households group owned irrigation pump. The ownership of power tiller, thresher or sprayer was limited to a very small percentage of households. There was significantly higher percentage of households involved in pottery as an occupation in the control group. In case of transport vehicles, bicycle was the most commonly found asset possessed by the households. We also observe significant difference in the treatment and the control group in regard to rickshaw/van, motor cycle and cattle holding. But, for all these cases, the normalized differences were found to be very low.

Table 5.24 Household owning different kind of assets (per cent of all farms)

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Poultry and livestock assets					
Cattle (Cow-Bull)	65.0 (47.7)	58.0 (49.4)	7.0* (4.02)	7.0*** (2.6)	0.102
Goats/Sheep	22.1 (41.5)	25.7 (43.7)	-3.6 (5.29)	-3.6 (2.9)	-0.060
Poultry birds	72.7 (44.6)	75.2 (43.2)	-2.5 (3.84)	-2.5 (2.7)	-0.040
Other agricultural assets					
Irrigation pump	5.4 (22.6)	9.9 (29.9)	-4.5* (2.44)	-4.5*** (1.4)	-0.120
Power tiller/ Tractor	1.5 (12.1)	2.4 (15.4)	-0.9 (0.67)	-0.9 (0.5)	-0.046
Thresher	2.3 (14.9)	1.8 (13.4)	0.5 (0.82)	0.5 (0.6)	0.025
Sprayer	2.6 (15.9)	4.6 (20.9)	-2.0 (1.61)	-02.0 (1.0)	-0.076
Industrial assets					
Hand loom	0.4 (6.5)	0.2 (0.04.8)	0.2 (0.19)	0.2 (0.2)	0.025
Potter's wheel	0.2 (4.8)	2.8 (16.6)	-2.6** (1.15)	-2.6*** (0.7)	-0.150
Transport					
Boat	3.4 (18.2)	4.1 (19.8)	-0.7 (1.97)	-0.7 (1.5)	-0.026
Motor cycle	1.1 (10.3)	2.2 (14.8)	-1.1** (0.55)	-1.1*** (0.4)	-0.061
Bicycle	26.6 (44.2)	33.0 (47.0)	-6.4 (7.44)	-6.4* (3.7)	-0.099
Rickshaw/Van	2.2 (14.6)	5.2 (22.2)	-3.0*** (1.07)	-3.0*** (0.8)	-0.113

Notes.

i) ***, **, * significant at 1% ,5% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

Table 5.25 Average size of assets (per 100 households)

	Treatment (SD)	Control (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Poultry and livestock assets					
Cattle (Cow-Bull)	151 (158.6)	132 (173.0)	18 (14.54)	18** (8.627)	0.10
Goats/Sheep	55 (138.6)	65 (142.0)	-10 (14.46)	-10 (8.25)	0.087
Poultry birds	535 (759.9)	602 (761.7)	-67 (57.67)	-67* (38.24)	0.262
Other agricultural assets					
Irrigation pump	7 (59.0)	16 (116.6)	-9 (6.42)	-9** (3.81)	0.059
Power tiller/ Tractor	2 (12.7)	3 (16.9)	-1 (0.69)	-1* (0.56)	0.021
Thresher	2 (14.9)	2 (13.4)	0 (0.82)	0 (0.60)	0.0121
Sprayer	3 (16.3)	5 (21.5)	-2 (1.64)	-2** (1.04)	0.0287
Industrial assets					
Hand loom	2 (55.3)	1 (31.1)	1 (1.61)	1 (1.44)	0.007
Potter's wheel	1 (12.0)	9 (61.5)	-8** (3.90)	-8*** (2.44)	0.125
Transport					
Boat	3 (18.6)	4 (22.3)	-1 (2.07)	-1 (1.68)	0.024
Motor cycle	1 (10.3)	2 (15.7)	-1** (0.55)	-1*** (0.44)	0.0226
Bicycle	29 (50.2)	35 (52.9)	-7 (8.06)	-7* (4.11)	0.066
Rickshaw/Van	2 (16.2)	5 (22.8)	-3** (1.10)	-3*** (0.84)	0.035

Notes.

i) ***, **, * significant at 1% ,5% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

The treatment and the control groups also significantly differed in their average asset holdings (Table 5.25). On average there were 5 to 6 poultry birds in a household. The ownership of large agricultural equipment was found to be small both in the control and the treatment households. The average asset size was significantly lower in the treatment group. The normalized difference was found to be very low for all the variables except for poultry birds.

5.9 Credit market

In Bangladesh, a greater extent of transformations has taken place in rural credit market over a period of time, especially, in terms of growing tenancy market and

the emergence of NGOs as the suppliers of credits to rural poor household. It is said that a short-term credit are usually given by the NGOs, and it demands, a higher interest rate and weekly repayments. It is suitable mostly for running non-farm activities that generate regular income. The small and marginal sharecroppers remain outside the orbit of opportunities opened up by the formal credit channels, especially, of the Banks and the NGOs. Sarker (2006) reported that the farmers had access to credit facility were facilitated to increase their income and to accumulate the capital at a faster rate compared to the farmers had no access to credit facility. Heady and Jensen (1958) stated that the short term credit facility increased farming efficiency by ensuring adequate input supply in time. The present study reveals the significant role played by the credit in supporting the livelihood strategies and the trajectories of various people. However, in reality *'the effectiveness of credit ultimately lies in the capacity of the borrowers to make use of the cash wisely'* as stated by Nasir, a tenant farmer.

Table 5.26 Credit market participation

	Treatment (SD)	Control (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Access to credit market					
Non-borrowing household (%)	87.42 (33.16)	82.76 (37.78)	4.67** (2.08)	4.67*** (1.46)	0.885
Borrowing household (%)	12.58 (33.16)	17.24 (37.78)	-4.67** (2.08)	-4.67*** (1.46)	0.486
Sources of loan (%)					
Banks and cooperative	3.43 (18.21)	3.22 (17.64)	0.22 (1.03)	0.22 (0.71)	0.174
NGOs	6.96 (25.45)	9.65 (29.53)	-2.69* (1.41)	-2.69** (1.09)	0.366
Informal market	2.37 (15.20)	4.52 (20.78)	-2.15* (1.14)	-2.15*** (0.75)	0.294

Notes.

i) ***, **, * significant at 1% ,5% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

In this section, we will try to explore the prevailing credit market system in the study areas of BCUP and various aspects of financial market participation by the rural marginal farmers. Table 5.26 shows that, the credit market participation was quite low in both the treatment and the control group. This was due to the fact that the household having membership of an NGO would remain excluded. A large segment of the borrowing households was excluded from the sample since membership is required to have access to NGO loans and the latter covers a significant number of rural households in the study area. Only 12.8% of the households in the treatment villages was current borrowers, and it was significantly lower than that of the control villages (17.24%).

Table 5.26 shows that compared to other sources, a large number of the participants took loan from NGOs in both the areas, and it proved that NGOs are the major credit sources for the rural poor households, in spite of having the BCUP eligibility criterion that limits their participation in NGOs. Only 3.4% of the households received credit from the bank and the cooperatives.

Although a small number of households got credit from the Banks, the farmers in the study areas considered the Banks as a source of low-cost loans, and they wanted to have their access to bank credits. However, it is difficult for the small and marginal tenant farmers, lack collaterals, to get loans from the public and the private banks. During the field survey they were found to be well aware on their eligibility for special loans at a minimum interest rate offered by the Bangladesh Agricultural Bank. *'But in reality it's not the poor but the rich businessmen, who do not have anything to do with the agriculture, have been grabbing the Bank loans allocated for agriculture,* Jalil Mia, a farmer, stated pointing the practice of gross corruption in the distribution of institutional loans.

The influence of traditional money-lenders and informal lending institutions impacts the inability of banks to meet with farmers' demand of credit. Nevertheless, it was found that a significant change has already been taken place in the use of non-institutional and informal credits. Today, the informal credit market is no longer dominated by traditional money-lenders. Instead, it was found that a wider range of actors of varying economic and social status has been sources of credits.. They often do this by forming a new kind of informal credit institution. The 'cooperative lending organization' is one of the informal credit institutions. It collects its working capital from the investment of cooperative members, who are not always exclusively local elites. Interestingly, as in the microcredit system the strength of a cooperative lending organization is derived from its group mechanism. However, in the case of the former, the group is composed of creditors rather than borrowers. Creditors are typically, although not always drastically, better off than microcredit borrowers.

Table 5.27 shows the sources of credit to the borrowers of different farm sizes. It was found that NGOs were the major sources of loan to the marginal farmers (less than 50 decimal) and the farmers own 50 to 100 decimals of land.. The primary loan sources of the farmers own 100 to 200 decimals of land were banks (around 52% in the treatment villages and 375 in the control villages). It supports the allegation that banks seem to cater to the needs of larger farms and business interests in the rural areas. Poor farmers with limited access to formal credit face the inequality prevailed in the market system.

Table 5.27 Sources of credit by farm size and tenure status (per cent of borrower)

	Treatment villages				Control villages			
	Banks	Govt. Dev agencies	NGOs	Non-formal	Banks	Govt. Dev agencies	NGOs	Non-formal
Up to 50	12.5	5.3	60.5	21.7	5.9	1.6	72.0	20.4
51 to 100	21.1	4.4	60.0	14.4	19.1	3.1	59.5	18.3
101 to 200	52.6	2.6	36.8	7.9	37.4	3.6	39.8	19.3
200 and above	50.0	-	37.5	12.5	23.8	9.5	47.6	19.1

N=720

Table 5.28 shows that average non-formal and bank loans were larger in size than that of NGOs and government development agencies in both the treatment and the control villages. As expected, the interest rate of banks and other government organizations was lower than that of NGO and non-formal sources. The informal sources charge the highest interest rate of 26% annually. It may be due to the fact that formal institutions are usually reluctant and find it risky to give a huge amount of loan. The NGOs are mainly target small farmers and they also provide short term credit with repayment in instalment. This leads farmers to seek help from the money-lenders, relatives or other informal sources, when they need a large amount or urgent loan. The rate charged by the informal sources could be even higher if friends and relatives failed to support credit. It is a common practice among the small holders and tenant farmers to take short term and interest free loans from well-wishers, kins, friends or neighbours. Tenant farmers often look for small loans prior to cultivating capital intensive *Boro* rice. However, the likelihood of getting this kind of loan very much depends on the quality of social capital that the prospective borrower has in his/her possession. Mr. Nasir, a tenant farmer stated that one needs to be reliable and well related with people in order to have access to such handy loans.'

Box 2. Lending relationship between owners and tenants

Mr. Nasir cultivated *Boro* rice through sharecropping arrangement during 2002 to 2004. As he lacked sufficient working capital, prior to cultivation, he sought a cash loan from the land owner to cover the expenses. Mr. Nasir wanted to pay back the loan in cash after selling his produces. In addition, he had to provide him with extra 2 – 3 *Monds* (80 to 120 kg) of rice as interest. The owner-tenant relationship within the sharecropping arrangement is often characterized by this kind of intra lending relationship. Although this kind of lending is categorized as informal, its terms and conditions are quite precisely defined in different areas. The loans are sometimes paid back in cash, sometimes in kinds and sometimes in a mix of cash and kind. Mr. Nasir stated that *after giving all these to the owner, not much is left for the tenants.*

Table 5.28 Size of loan (Tk.) and the interest charged by sources

	Treatment villages		Control villages	
	Size of loan	Interest rate per year	Size of loan	Interest rate per year
Banks	47,933	10.0	36,083	10.0
BRDB	10,154	10.0	21,250	11.0
NGOs	17,889	15.4	19,321	15.4
Non-formal	57,039	26.0	46,398	21.2

N=720

Box 3. The intersection of rural credit and tenancy markets

An interesting form of tenure system, locally called as *Kotor bondhoki* in most places, has been becoming prominent in the tenure market. This form of tenure contract maybe found as an intersectional system of rural credit and tenancy markets. The *Kot*, in short, system allows a tenant to keep an arable land as a mortgage in providing a decent amount of loan to the land owner, and the tenant cultivate the land until the total money is paid back. A landowner needs a large amount of credit but reluctant to sell his/her land is found to opt for the *Kot tenure* to have access to credit. It is often found that the landowner families usually take loan to support overseas employment of a family member, and pay it back after getting remittances and take control of their land.

Table 5.29 Pattern of credit utilization

Sources of utilization	Treatment villages		Control villages	
	Amount of loan	Share of total loan (%)	Amount of loan	Share of total loan (%)
Agricultural investment	184	54.0	241	46.4
Non-agricultural investment	28	8.2	48	9.2
Food consumption	31	9.1	55	10.6
Educational expense	6	1.8	15	2.9
Medical expense	6	1.8	18	3.5
Housing repair	16	4.7	23	4.4
To buy/mortgage of land	7	2.1	9	1.7
Loan repayment	17	5.0	35	6.7
Migration	11	3.2	23	4.4
Social festivals	9	2.6	11	2.1
Others	26	7.6	41	7.9
Total	341	100	519	100

N=860

Table 5.29 summarizes the pattern of credit utilization in the study area. In both the areas, most of the loans were taken for the purpose of agricultural investment (54% in treatment villages and 46% in the control villages). A large share of loan is taken for non-crop investment like fishing, forestry and/or for small and medium business. The other important purposes of loan utilizations were to support household consumption, loan repayment, etc.

Box 4. The significance of credit in livelihood strategies and trajectories

Md. Nasir, in his late 20s, achieved a great success through farming, entrepreneurship and on experimenting with new ideas. From a mere landless tenant farmer he becomes an owner of a brick built house within ten years period. Moreover, he has established himself as an emerging leader in his village community. His life history analysis reveals a significant role of credit played in his livelihood development, and fixing strategies and trajectories. In the absence of own land, every year Nasir gained access to land through tenancy arrangement. During the last one decade he collected the much needed working capital for leasing land through a variety of avenues and ways including selling labour, profit from farming, livestock rearing, agro-businesses with multiple institutional and non-institutional credit flows. Although, he had a steady growth in the business, he never abandoned practicing farming. He was one of the first few farmers in Modhusudonpur village cultivated betel leaf plants through an innovative method, he learnt during his visit to Dinajpur district. He made good profits from cultivating potatoes and betel leaves. He had also access to loan from Bangladesh Agricultural Bank with the help of bribing! As he said, *"we are actually supposed to get agricultural loan with minimum interest rate but the Bank prefers the elites. So, many things are needed to have access to loan from them including legal documents of land, the signature of the UP chairman, national ID card, birth certificate etc. Then a series of hustle waits at different levels if the bribe is not paid to the Bank employees and the manager. In order to get a loan of Tk. 500000 I had to spend Tk. 70,000 as bribe."* In 2010, he utilized a significant part of it to build a brick house, that increased his social status. Nasir already developed a dynamic system of relations between borrowing and making money through different avenues. He is very confident that he will repay the loan taken from the Agricultural Bank. He claimed to be unlike the elites, who take loan from government banks with the intention of not paying it back.



Md. Nasir is working in his field. He has never been reluctant to take risk and neither had shortage of enterprising ideas.

5.10 Access to agricultural extension service

The transformational agricultural context of rural Bangladesh is dominated by the widespread use of Modern Varieties (MV) of crops and input supports such as, use of irrigation, chemical fertilizers and pesticides. This situation has created a growing

need of agricultural extension services to farmers who are, most often, found illiterate. Unfortunately, access of rural farm households to extension service was limited. The study reveals that only about 34% and 39% of the households in the treatment and the control group were familiar with a number of agricultural extension services (Table 5.30). Although a very small number of farmers reported that they received training.

Table 5.30 Exposure to agricultural extension service (per cent of households)

	Treatment (SD)	Control (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Do you know extension officials?	34.3 (47.48)	39.1 (48.82)	-4.8 (0.08)	-4.8 (0.04)	-0.008
Have you received training?	3 (16.98)	5.2 (22.25)	-2.2** (0.01)	-2.2*** (0.01)	-0.013

Notes.

i) **, *** significant at 5% and 1% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

Among the agricultural extension service personnels Sub-Assistant Agricultural Officer (formerly known as Block Supervisor) was the most familiar with the households (Table 5.31), and 24% and 23% of the household of the treatment and the control group, respectively contacted with them. About 13% of the treatment households were familiar with the *Upazila* Agricultural Officers and the *Upazilla* Livestock Officers whereas, this share in the control group was only 15%.

About 34% of the households were familiar with the agricultural personnel. However, the percentage of households received extension services like training or suggestions was even lower. Because the familiarity of the households with the agricultural personnel does not necessarily mean that the family members would seek suggestion or receive training from them. A very few people of the surveyed households received training from the agricultural extension providers. The household received training was about 3% in the treatment group and 5.2% in the control group.

One of the reasons behind a lower familiarity with the agricultural personnel may be found from the statement of one of the farmers of Netrokona district. He stated that 'the Block Supervisors hardly visit the field, even if they do, they do for the big farms, but not for the small farms run by ordinary farmers, like us.'

Table 5.31 Familiarity with agricultural extension service providers (per cent of households)

	Treatment (SD)	Control (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Upazilla Agricultural Officer	6.1 (23.98)	10.7 (30.88)	-4.6** (0.02)	-4.6*** (0.01)	-0.019
Block Supervisor	24.3 (42.91)	23.1 (42.17)	1.2 (0.07)	1.2 (0.04)	-0.010
Model Farmer	3.8 (25.61)	3.9 (37.58)	-0.1** (0.05)	-0.1*** (0.02)	-0.025
Upazila Livestock Officer	6.9 (25.30)	5.1 (22.06)	1.8 (0.02)	1.8 (0.01)	-0.018
Rural Development Officer	0.6 (7.75)	1.2 (10.73)	-0.6 (0.00)	-0.6* (0.00)	-0.062

Notes.

i) ***, **, * significant at 1% ,5% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

Box 5. The need of extension

Md. Saiful Islam is an old tenant farmer from Lalmonirhat district explained the situation as *'the traditional wisdom that I received from my ancestors is not always enough to meet the knowledge required for modern cultivation. For the use of fertilizers one must know the right combination and proportion of various fertilizers for a particular crop and the soil health. It is also important to know the right timing of pesticide usage. Last year I cultivated tobacco for the first time in my life. However, in the absence of proper information the production suffered a huge loss.'*

Nevertheless, small farmers try to contact extension practitioners in their offices. They sometimes seek information from the fertilizer dealers and commercial agro-shops in the market. The farmers exchange and cooperate among themselves for sharing knowledge and information on seed and agricultural practices. The small farmers in Bangladesh are found to be highly dependent on the rural system of communal learning in facing the challenge of modern cultivation.

Farmers also collect information on the improved crop cultivation and management practices from the media. Mobile phone and television were the two mostly reported sources of information on various aspects by the households (Table 5.32). About 23% to 24% of the households thought that the television was important for getting required information, while 35% to 39% of the households gave some importance to mobile phones.

Table 5.32 Sources of information for improved crop management practice (per cent of households who reported access to media)

Sources of information	Treatment			Control		
	Highly important	Important	Less important	Highly important	Important	Less important
Radio	0.6	0.4	0.1	0.8	1.0	0.4
Television	7.7	7.0	8.5	8.2	8.6	7.9
News paper	0.8	0.5	0.7	1.3	0.8	1.1
Mobile phone	9.3	5.3	24.2	8.0	7.7	19.8
Internet	0.0	0.1	0.2	0.0	0.0	0.1
Street theater	0.0	0.0	0.0	0.1	0.0	0.1

Note: The percentages relate to those households which possess or have access to the sources as mentioned in the table.

Box 6. The long lasting impact of agricultural extension

Nasim and Roma, living in Modhushudonpur village in Rajshahi district, got married. The hardworking couple depends entirely on tenancy farming for their income. In 1998, they had the privilege to receive benefits from an agricultural development project led by a non-government organization (NGO). This would have long-lasting impact on their lives and livelihoods for years to come. Under the project framework, Nasim and Roma received intensive agricultural training and practical classes given by the agricultural specialists for a period of six months. *'It was an eye opening experience for me. I learned about a range of modern cropping technologies, crop selection process and effective methods of using chemical fertilizers and pesticides. They also taught me to produce organic fertilizers and pesticides. There, I knew that green chili and cabbage cultivation could be profitable activities,'* said Mr. Nasim. Interestingly, the technological know how and encouragement that Roma received from the project paved the way for her direct engaged in the cultivation process.

She works in the field with her husband, an uncommon practice in rural Bangladesh. In 1999, upon applying this newly gained knowledge and skill, the farmer couple made a decent profit on cultivating cabbage and potato. At that time most of farmers in Modhusudonpur rely on traditional crops and a few cultivates diversified crops. Since 2000, the couple slowly but steadily increased cultivable land under leasing arrangement from more than one source and, importantly, chose to cultivate diversified crops in an efficient manner. As Roma states, *'we cultivate rice mainly to meet our yearly consumption. We look to make some profit through cultivating vegetables, maize and spices.'*



Roma plucks okra through using gloves made by her through recycling pesticide sacks. She is one of the very few women in rural Bangladesh who directly work in the field.

5.10.1 Expectations from BCUP's extension service

The popularity of some of the BRAC brand rice, maize, vegetable and potato seeds is already earned amongst the rural farming community. During the fieldwork, the farmers showed a keen interest and their high expectations about BCUP's extension programme. *'BRAC may revolutionize the agriculture sector supporting us with the right information and good seed varieties,'* said Tarun Biswas, a young farmer from Fakirhat Upazila. He thought that the impact of 'effective extension service' on farm yield and poverty reduction may be more intensive and long lasting than that of agricultural loans., *'The scope of the extension service has to be broaden to include issues like providing information on marketing of produces, motivating the farmers towards entrepreneurship, distributing them seeds etc.'*—stated by Tarun. Nasim and Roma had never taken institutional credit throughout their long tenure lives. The monthly extension service of BRAC's BCUP programme attracted them to participate in a credit programme. Roma said, *'shickhitto lokra (educated people) do not usually tend to come to the field to talk to farmers! But we have so many queries! We will feel more confident doing agriculture, if we find somebody knowledgeable about it next to us.'* Nasim also thought that the membership meetings and gathering may benefit the farmers on getting new information and effective advices.

5.11 Household income

The average income of the sample household was Tk. 102,831 (USD1260); the difference between treatment and control was found to be significant (5 per cent at branch office level and 1 per cent at the village level). But, the normalized difference is also very low. The average size of sample household was 5 members per household and an average per capita income of Tk. 21,933 (USD 269) was found. The share of agriculture and non-agriculture in total income was almost similar in the area. However, in the treatment group the share of non-agricultural income was greater (53% of the total income) whereas, in the control group the share of agricultural income was greater (52% of the total income). In the case of non-agricultural income, there was a significant difference between the treatment and the control group. But, normalized difference was found to be low. The average agricultural income of the sample was Tk. 50,902 with no significant differences between the two groups. Furthermore, the agriculture sector is found to have been heavily dominated by crop farming. Around 53% of the agricultural income was from crop farming where as, the remaining 47% was from non-crop agriculture (i.e. livestock, poultry, fishery and forestry) and agricultural labour wages. On the other hand, the main source of non-agricultural income turns out to be remittance. This is followed by service, non-agricultural wage labour and business. The contribution of social safety net was negligible across the sample, and similar results were found for both of the groups (Table 5.33).

Table 5.33 Level and structure of household income (BDT/household)

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Agriculture	51972 (88789)	49827 (61998)	2145 (5321)	2145 (3263)	0.020
Crop farming	27312 (75046)	26532 (34718)	780 (3930)	780 (2460)	0.009
Non-crop agriculture	12138 (41137)	11127 (49220)	1011 (2521)	1011 (1654)	0.016
Agricultural wage	12523 (22809)	12168 (20848)	355 (1809)	355 (1095)	0.011
Non-agriculture	57874 (84041)	45960 (90249)	11914* (6986)	11914*** (4201)	0.097
Business	9152 (35084)	9352 (27209)	-200 (1495)	-200 (1150)	-0.005
Service	14236 (41229)	12511 (41497)	1725 (2751)	1725 (1761)	0.029
Remittance	20545 (65357)	12507 (67444)	8038 (5652)	8038 (3325)	0.086
Cottage industry/industry /processing	590 (6328)	1075 (7862)	-485** (222)	-485** (234)	-0.048
Non-agricultural wage	13328 (29771)	10462 (27049)	2866 (2211)	2866** (1376)	0.071
Transfer (SNP)	25 (561)	53 (913)	-28 (24)	-28 (25)	-0.026
Household income	109846 (116374)	95786 (105056)	14060** (5514)	14060*** (3927)	0.090
Per capita income	22854 (25222)	21009 (21643)	1845* (996)	1845** (799)	0.056

Notes.

i) ***, **, * significant at 1%, 5% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

To measure the degree of inequality in the distribution of income over the sample, Gini-coefficient was used. To do this, sample households were arranged by per capita income scale. Since welfare effect of an individual is better reflected by per capita income, and not by household income, the total income was presented along with the per capita income. From Table 5.34 it appears that the bottom 40% of the treatment household received only 16.1% of the total income whereas, the share of the control group was 19.3%. On the contrary, the share of the top 10% of the households in the treatment and in the control group was 28.6% and 27.3%, respectively. This reflects severe inequality in the distribution of income. In this case, the income inequality reflected by gini concentration ratio was 0.407 with no significant difference between the two groups (- 0.405 in the treatment group and 0.408 in the control group, Table 5.34).

Table 5.34 Distribution of household income, 2011-12

Per capita income scale	Treatment		Control	
	Household Average	Per capita Share (%)	Household Average	Per capita Share (%)
Highest quantile	233,354	44.6	214139	42.5
2nd quantile	120,675	23.8	114562	21.9
3rd quantile	85,272	15.5	77903	16.3
4th quantile	61,406	10.7	57579	12.5
Lowest quantile	32,590	5.4	29766	6.8
Top 10%	294,534	28.6	280902	27.3
Gini- coefficient		0.366		0.405

5.12 Expenditure and consumption

Expenditure and consumption are crucial in determining the level of welfare of households. Examination of various categories of household expenditure reveals that food, non-food or total expenditure of the control and the treatment groups were fairly similar (Table 5.35). The average annual expenditure on food was about 60% in both the groups. Among the non-food category spending on clothing was higher in the treatment area and the difference with the control at the village level

Table 5.35 Level of household expenditure (TK. per household)

	Treatment Area (SD)	Control Area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Food	58713 (25754)	57512 (27301)	1201 (2990)	1201 (1607)	0.032
	35972 (23071)	37004 (24332)	-1032 (2386)	-1032 (1325)	-0.031
Housing	8684 (5972)	8356 (5892)	328 (629)	328 (342)	0.039
Clothing	5546 (3638)	5180 (4245)	366 (390)	366* (216)	0.065
Non food	4715 (8674)	4823 (8468)	-108 (695)	-108 (414)	-0.009
Education	3640 (8712)	3662 (6765)	-22 (343)	-22 (263)	-0.002
Healthcare	13406 (10273)	14982 (13006)	-1576 (952)	-1576 (557)	-0.095
Others					
Household durables	800 (3079)	1591 (5344)	-791*** (198)	-791*** (146)	-0.128
Total expenditure (Food and Non-food)	94703 (43140)	94542 (45328)	161 (5052)	161 (1325)	0.003

Notes.

i) ***, * significant at 1% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

was statistically significant at 10 per cent. However, for household durables, the treatment group spent almost 50% less than that of the control group and the difference was highly significant.

The per capita daily total food consumption was found to be higher in the control group; and the difference is statistically significant at 5 per cent level at village level (Table 5.36). For rice, vegetables, pulses, fish and meat consumption there was no statistically significant difference between the treatment and the control groups. The consumption of potato and fruit in the control group was significantly higher than that of the treatment group. The normalized difference is less (in absolute term) than 0.25 for potato, but it is higher in the case of amount of fruit consumption (Table 5.36).

Table 5.36 Per capita food intake (gram/day)

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Rice	439 (118.77)	429 (128.95)	10 (10.30)	10 (6.14)	0.057
Vegetables	134 (76.86)	137 (84.94)	-3 (10.35)	-3 (5.69)	-0.026
Potato	84 (43.17)	98 (57.04)	-14*** (4.89)	-14*** (2.91)	-0.196
Pulses	18 (16.32)	18 (17.94)	0 (1.91)	0 (1.03)	0.000
Oil	19 (8.521)	21 (10.371)	-2 (1.196)	-2*** (0.635)	-0.149
Fruits	77 (117.06)	139 (190.65)	-62*** (17.54)	-62*** (10.40)	-0.277
Fish	54 (40.78)	57 (42.66)	-3 (3.96)	-3 (2.19)	-0.051
Meat	20 (43.2)	20 (47.9)	0 (2.8)	0 (1.9)	0.000
Egg	3 (6.47)	4 (7.89)	-1* (0.55)	-1** (0.34)	-0.098
Milk	30 (59.2)	31 (63.9)	-1 (4.83)	-1 (3.02)	-0.011
Total intake	995 (1061.1)	1058 (444.1)	-63 (55.3)	-63** (31.6)	-0.055

Notes.

i) ***, **, * significant at 1%, 5% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

Table 5.37 shows that the data on the consumption of quality foods like, foods enriched with protein and vitamin. A significantly higher proportion of treatment households did not consume fruits, but had a higher consumption of pulses. In the case of egg consumption, the treatment households had a higher level of

consumption. The difference was significant at 5 per cent level, if standard error is clustered at the village level. The normalized difference was found to be 0.08.

Table 5.37 Household lacking quality food in the diet (per cent)

	Treatment Area (SD)	Control Area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Pulses	20.4 (40.3)	30.0 (45.8)	-9.6 (5.8)	-9.6*** (3.0)	-0.158
Fruits	45.7 (49.8)	29.7 (45.7)	16.0*** (4.1)	16.0*** (2.4)	0.237
Fish	16.0 (36.7)	19.5 (39.6)	-3.5 (2.7)	-3.5** (1.8)	-0.065
Meat	77.1 (42.0)	78.1 (41.3)	-1.1 (2.7)	-1.1 (1.9)	-0.018
Egg	74.8 (43.4)	69.6 (46.0)	5.2 (3.9)	5.2** (2.4)	0.083
Milk	71.2 (45.3)	71.3 (45.2)	-0.2 (3.8)	-0.2 (2.4)	-0.002

Notes.

i) ***, **, * significant at 1%, 5% and 10% level respectively

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

5.13 Incidence of poverty

The incidence of poverty was measured based on the Cost of Basic Needs (CBN) method. The Head Count Index showed that about 60.7% of the households were poor in the treatment group and 54.8% in the control group (Table 5.38). The difference was found to be significant at 5%. Poverty incidence was about 10% higher in the treatment households, and this was found to be significant. The Poverty Gap Index across the groups was not found to be significantly different. The households needed on average a 13% increase in expenditure to reach at the upper poverty line and 6% increase to reach at the lower poverty line. There was also no significant difference in the Squared Poverty Gap Index by the upper poverty line between the treatment and the control groups.

Table 5.38 Measure of incidence of poverty

	Treatment area (SD)	Control area (SD)	Difference (standard error at the branch level)	Difference (standard error at the village level)	Normalized difference
Head count index (%)	60.7 (48.9)	54.8 (49.8)	5.8 (0.04.9)	5.8** (2.7)	0.084
Moderate poor	24.7 (43.2)	23.1 (42.1)	1.7 (1.5)	1.7 (1.4)	0.028
Extreme poor	36.0 (48.0)	31.8 (46.6)	4.2 (5.0)	4.2 (2.7)	0.063
Poverty gap index (%)	13.9 (15.5)	13.3 (16.8)	0.6 (2.0)	0.6 (1.1)	0.025
Upper	6.0 (11.0)	6.5 (12.4)	-0.5 (1.4)	-0.5 (0.8)	-0.031
Lower	4.3 (6.9)	4.6 (8.0)	-0.2 (0.9)	-0.2 (0.5)	-0.023
Squared poverty gap index (%)	1.6 (4.0)	2.0 (5.0)	-0.4 (0.5)	-0.4 (0.3)	-0.061
Lower					

Notes.

i) ** significant at 5% level.

ii) Normalized differences computed as the difference in means in treatment and control areas divided by the square root of the sum of the variances.

5.14 Food security

The seasonal pattern of food insufficiency was calculated and showed in the percentage of the households faced food insufficiency in different months of a year (Table 5.39). The occurrence of food insecurity became acute in the Bengali months of *Kartik* and *Chaitra*.

Table 5.39 Occurrence of food insecurity in different months

Months	Treatment	Control
May-June (<i>Jaisthya</i>)	0.8	0.7
June-July (<i>Asharh</i>)	3.4	2.7
July-August (<i>Shrabar</i>)	4.1	2.7
August-September (<i>Bhadra</i>)	3.1	2.6
September-October (<i>Ashwin</i>)	5.8	4.6
October-November (<i>Kartik</i>)	9.1	7.5
November-December (<i>Agrahayan</i>)	0.5	0.8
December-January (<i>Poush</i>)	0.1	0.7
January-February (<i>Magh</i>)	0.5	0.5
February-March (<i>Falgun</i>)	1.6	4.2
March-April (<i>Chaitra</i>)	9.0	13.6
April-May (<i>Baishakh</i>)	1.1	1.8

5.14.1 Coping strategy adopted by households

The households adopted various types of coping strategies in order to face food insecurity are shown in Table 5.40. The strategies were reducing meals, reducing meal size, borrowing from relatives, purchasing food on credit and disinvestment on asset generations (Table 5.40). Reducing meal or meal size got priority in daily or weekly strategy. Borrowing or purchasing on credit used once or twice in a week by 2% to 3% of the surveyed households. Disinvestment on productive assets was less frequent, like once in a month (Table 5.40).

Table 5.40 Coping mechanism for addressing food-insecurity (per cent of households)

Coping mechanisms	Treatment			Control		
	Every day	Once or twice in a week	Once in last 30 days	Every day	Once or twice in a week	Once in last 30 days
Reducing meals	0.3	0.7	0.6	0.4	1.4	0.7
Reducing meal size	1.1	1.6	0.5	0.7	2.3	0.8
Borrowing from relatives	0.2	2.5	3.3	0.2	3.3	2.9
Purchasing food on credit	0.4	3.4	1.0	0.3	4.6	1.5
Disinvestment of assets	0.1	0.3	1.3	0.1	0.7	2.0

Box 7. The significance of village shop for food security

Sometimes, in the mid rainy season or in the gap time between the harvests, the poor farmers face limitations on employment opportunities, and a shortage of food and cash. During these off seasons the poor, especially agricultural and non-agricultural day labourers and small scale tenant farmers, rely heavily on village grocery shop credit to meet their basic food needs such as rice, lentil, oil, salts etc. Md. Mirza, the grocery shop owner in Modhusudonpur village, maintains the credit catalogue of more than 200 customers in his village. In most cases, credits are repaid on the first date of the Bengali New Year. The repayment dates of grocery shop loans are also found to be linked to the harvest time in some areas. Our research reveals the crucial role of village shop loans played on the poorest of the poor to support household food security in the most difficult periods of time. However, the rate of interest is found to be quite high when goods are bought on credit from these kinds of grocery shops. The data shows that the rural shop owners like Mirza were acting as key players in the local informal lending market.

5.15 Labour force participation**5.15.1 Labour force participation in economic activities**

A worker or labour was defined as a person who is engaged at least an hour in a day in activities that increases or saves income for the household. Labour force participation rate for the male members was about 84% whereas, the share of the female members was about 51%. The durations of work or domestic and economic activities together for the male member in the control group and in the treatment group was 7.95 hours and 7.50 hours respectively, whereas, the duration of work of the female member in the two groups was 8.52 hours and 8.28 hours, respectively (Table 5.41). It may also be observed that the economic activities were mainly for full-time in case of male and part-time for the female.

Table 5.41 Labor force participation in economic activities by gender

	Treatment		Control	
	Male	Female	Male	Female
Working members per household (No)	1.24	1.33	1.21	1.35
Members participating in economic activity (No.)	1.05	0.76	1.02	0.61
Labour force participation rate (% of workers)	84.64	56.4	84.63	44.7
Participation in domestic work (% of workers)	38.07	93.73	34.46	94.04
Duration of work (hours/day)	7.5	8.28	7.95	8.52
Economic activities (hours/day)	6.62	1.37	7.04	1.15
Domestic activities (hours/day)	0.88	6.9	0.91	7.37

Table 5.42 shows the data on the types of economic activities generally undertaken by the male. Although traditionally, farming has been the major economic activity, only 31% of the total labour force participated in farming activities. The survey was conducted in October which is a lean season for crop farming (the growing period of *Aman* Rice). Only a few household members reported that they were participating in farming activities. The next important economic activities were livestock and poultry. Among the non-agricultural activities, business and industry attracted more male labours followed by the construction works and service.

Table 5.42 Employment of male workers by economic activities

Economic activities	Workers employed (%)		Durations of employment (hours/day)	
	Treatment	Control	Treatment	Control
Agriculture				
Farming	31	35	4.45	4.1
Livestock	39	46	2.36	2.46
Fisheries	8	8	6.02	3.91
Forestry	4	5	2.08	1.6
Non-agriculture				
Industry	11	12	7.26	6.92
Transport	8	5	7.45	7.38
Construction	9	10	5.19	3.93
Business	12	11	8.91	9.27
Service	8	7	6.85	6.3

5.15.2 Female labour force participation

The main economic activities of the women were found to be poultry and livestock rearing. Almost 33% of the women was working members and they participated in this activity and in the forestry (Table 5.43). Only a few female members participated in non-agricultural activities. Among the non-agricultural activities, industry and services attracted more female labour followed by the construction works and business. However, the hours spent on these activities were much lower than that of the male members, implying that these economic activities were mainly a part time pursuit for the female members.

Table 5.43 Female participation in different economic activities

Economic activities	Workers employed (%)		Durations of employment(hours/day)	
	Treatment	Control	Treatment	Control
Agriculture				
Farming	2%	4%	2.47	3.01
Livestock	38%	33%	1.58	1.77
Fisheries	1%	1%	1.37	0.89
Forestry	16%	8%	1.18	1.04
Non-agriculture				
Industry	10%	5%	3.23	2.97
Transport	0%	0%	1.44	0.33
Construction	4%	1%	1.28	1.73
Business	-	-	-	-
Service	3%	3%	1.95	2.73

Conclusions 6

The purpose of this report was to describe the baseline data and information on tenant farmers in Bangladesh. Since randomized control evaluation design (cluster randomization at the BRAC branch office level) was adopted, the report specifically highlights the similarities and dissimilarities between the treatment and the control areas. Standard error of the difference between the treatment area and the control areas was estimated at village level. Despite the fact that randomization was done at the BRAC branch office level., The idea of estimating standard error at the village level was to unearth underlying features of the economic environment common to all communities in the area, instead of reflecting only BRAC's capacity. But, the results were checked by estimating standard error at the branch office and the village level as well. We also estimated normalized difference (defined as difference between treatment and control divided square root of the sum of the variances) between the treatment and the control following Imbens and Wooldridge (2009). Imbens and Wooldridge (2009) suggests that if the normalized difference is less than 0.25, linear regression methods are not likely to be sensitive to specification changes. The baseline data provide extensive information on the various aspects of tenancy and tenant farmers.

The results indicate similarities among the most of the outcome indicators of the treatment and the control groups. We find statistically significant (often weakly significant) difference in the treatment and the control areas mainly on household income (although per capita income is not strongly significant), access to credit, asset holding, health indicators and cropping intensity. But, normalized difference was found to be less than 0.25 for most of the variables. Moreover, there is no systematic pattern in the difference between the treatment and the control areas. In some cases, the treatment areas were better than the control or *vice versa*.

In conclusion, the BCUP was designed with the idea that there is a lack of formal credit and extension services to meet the demand of the tenant farmers in the country the share of whom in the agriculture sector has been on the rise. In accordance with the initial objectives of the programme development, the baseline survey results show that there is, indeed, a huge demand for credit and extension services, particularly offered by the tenant farmers in rural Bangladesh.

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