Impact assessment of credit programme for the tenant farmers in Bangladesh: Evidences from the field experiment

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The project

- In last 25 years the number of tenant farmers increased from 44% to 58%, and the land operated under tenancy contracts has increased from 23 to 42% (Hossain and Bayes 2014). Thus, the demand for agricultural input increased which requires a large amount of ‘out of pocket’ expenses that most of the tenant farmers cannot bear with their own capital.
- Operational strategies and design of credit facilities provided by the conventional banks and MFIs are not compatible to the farm practices and livelihood styles of the tenant farmers that lead towards them to inefficient loan uses.
- Guided by this instance, BRAC, the largest non-government organization (NGO) in the world, introduced the ‘Tenant Farmers Development Project’ /*Borgachashi Unnayan Prakalpa (*BCUP) in Bangladesh using its grassroots level network to ease financial inclusion and provided a small range of complementary extension services for the small and marginal tenant farmers.

The project

•Launched in October 2009, the BCUP project already scaled up in 212 sub-districts through its 263 branches in 46 districts out of 64 districts and provided credit to about 291,000 borrowers.

•**Eligibility** is determined by several criteria.

• Offers **a wide array of credit products**:
- **Crop and livestock loans**: A minimum of BDT 5,000 to a maximum of BDT 50,000, depending on the size of the farm and the crop enterprise. **Loans for machineries** (upto a maximum of BDT 120,000) and **leasing lands** (upto a maximum of BDT 60,000).
-The **repayment period** of the credit is 1 year except for the credit for machineries and leasing which entails a repayment period of 1-3 years.
-The farmers are provided loans at **subsidized rate of interest of 10 percent** per year at flat rate, much lower than any other existing MFIs' credit.
• **Changes** have been taking place in the program since its inception (from male focus to female, enterprise and repayment system).

Literature, policy relevance, etc.

- Though **the provision of credit for the tenant farmers like BCUP one is new concept** not only in Bangladesh but also for other developing countries, **the provision of credits to the farmers is not a newly used concept around the worl**d.
- Numerous non-experimental/observational studies were carried out **regarding agricultural credit in different country contexts**. Most of these studies draw several important lessons:

-Firstly, the practice of providing credits to the farmers has the evidence of boosting up agricultural production, either directly or indirectly- positive relationship between farm productivity and agricultural credit.

-Secondly, lack of access to credits by the farmers has detrimental effects on agriculture and farmers' productivity and relaxing credit constraints improve the farmers' productivity.

- Recent **experimental evidences (following RCT methodology) of micro-credit programme mostly done by Banerjee, Dean Karlan and others did** not give any evidence supporting farmers' productivity by the conventional microcredit programme.

The impact study

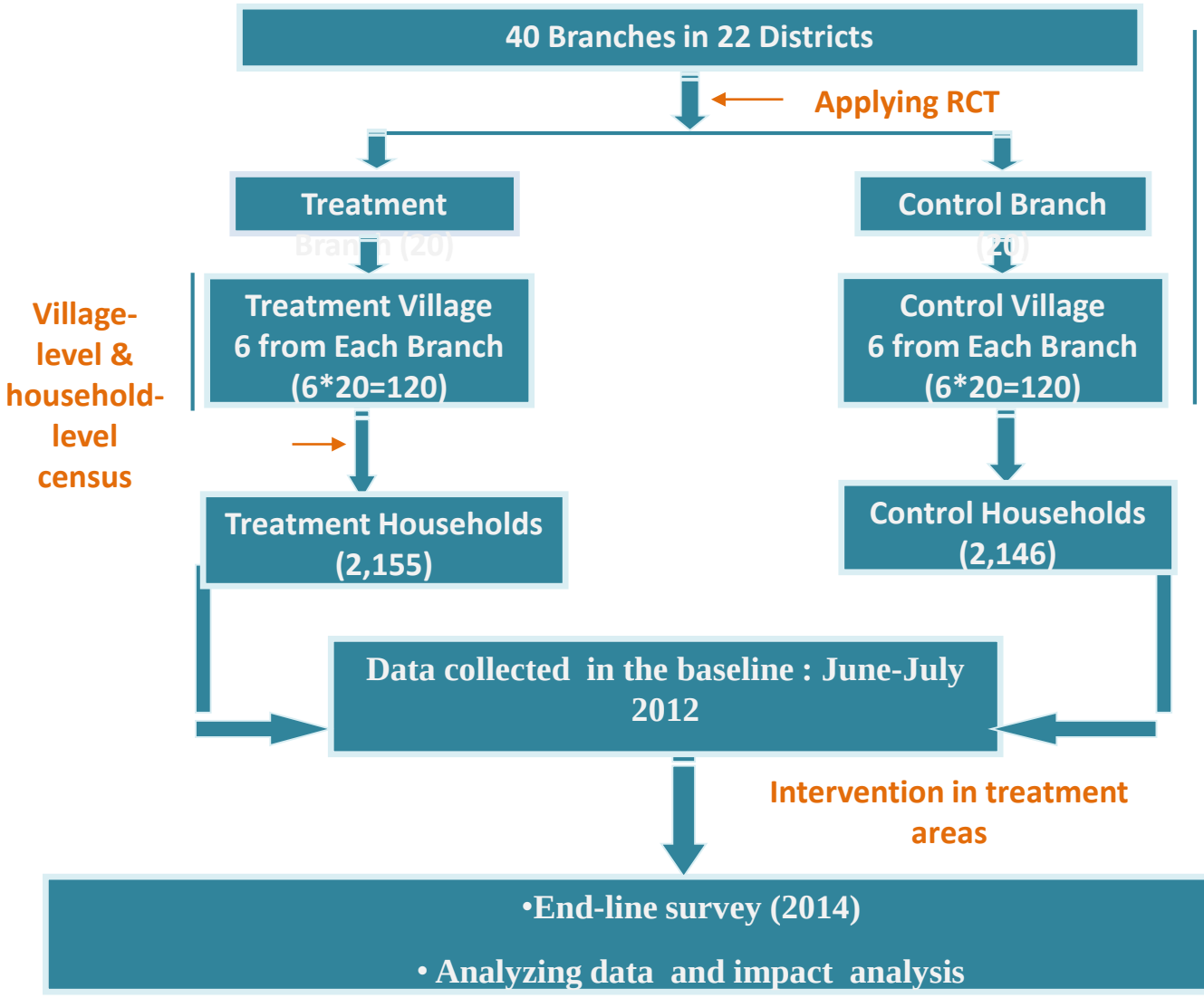
The objective of the study is to explore

1) whether BCUP program increases financial inclusion rate among the treatment households.

2) Whether the treatment households improve farm lives and livelihoods by technology adoption, increasing farm productivity, by diversifying their livelihood options/investments ranging from crop and non-crop farming to nonfarm activities, by enhancing women economic empowerment, and gaining higher farm and non-farm self-employment income.

3) finally whether these changes lead to their household welfare, food security and nutritional achievement.

Flow of Impact Assessment Study



Imposing eligibility Criteria

-Has National ID card
-Age: 18-60 years
-Education: SSC pass or below
-Permanent resident>3 years
-> 3 years of prior farming exp.
-Land holdings:<200 dec.
-Not an MFI member
-Willing to take credit

-1607 households: anthropometric and time use survey

Table : Baseline Characteristics

		Control Group		Treatment-control		
	Obs	Mean	S D	Diff	p-value	Norm. Diff.
Household Composition						
No of members	4141	4.76	1.69	0.18	0.33	0.07
Male head	4141	0.95	0.22	-0.03	0.08	-0.08
Head's age (yrs)	4141	44.5	11.81	0.74	0.3	0.05
Head with no education (%)	4141	0.39	0.49	-0.02	0.69	-0.03
Access to credit (%)						
Loan from Banks/co-operative	4141	0.05	0.21	-0.01	0.2	-0.04
Loan from Grameen Bank	4141	0.03	0.16	-0.01	0.33	-0.05
Loan from BRAC programs	4141	0.02	0.12	0	0.86	0.00
Loan from other NGOs	4141	0.03	0.18	-0.02	0.03	-0.09
Informal Loan	4141	0.04	0.19	-0.02	0.16	-0.08
Any type of loan	4141	0.14	0.35	-0.04	0.05	-0.09
Amount of Land (Decimal)						
Owned land	4141	38.71	51.82	-1.25	0.7	-0.02
Rented in land	4141	51.24	78.6	0.29	0.97	0.00
Rented out land	4141	7.65	26.19	0.59	0.62	0.01
Total cultivated land	4141	89.95	88.92	-0.96	0.92	-0.01
Tenancy Status (%)						
Pure Owner	4031	0.35	0.48	0	0.95	0.00
Owner-cum-tenant	4031	0.34	0.47	-0.03	0.5	-0.05
Pure Tenant	4031	0.31	0.46	0.02	0.44	0.03
Food Security						
Per day per capita calorie Intake	4141	2189.57	671.76	-44.79	0.46	-0.05
Suffered food insecurity in last one year (%)	4141	0.2	0.4	0.02	0.73	0.03

brac

Notes: 1) Unit of observation: household. 2) Standard errors of the differences are calculated at Branch level. 3) Sample includes all households surveyed at baseline.

Panel A: End line 1 attrition in treatment vs. control	
Found in endline 1, in control	0.964
Found in endline 1, in treatment	0.961
p-value of difference	0.648

Panel B: End line 1 attrition, by household characteristics

	(1)	(2)
VARIABLES	Not found at endline	Not found at endline
Treatment	0.00263	0.00195
	(0.00640)	(0.00643)
Female head		0.0524**
		(0.0206)
Head illiterate		-0.00748
		(0.00674)
Head separated		-0.0104
		(0.0221)
HH has electricity connection		0.00346
		(0.00566)
land		1.75e-06
		(7.43e-05)
Brick-built wall		0.00527
		(0.00891)
Condition worsened in last year		-0.00761
		(0.00974)
HH receives remittance		-0.0150
		(0.00917)
NGO member		-0.000723
		(0.0142)
Constant	0.0359***	0.0340***
	(0.00465)	(0.00685)
Observations	4,303	4,321
R-squared	0.000	0.005

Analytical technique for impact assessment

- We estimated the combined effect on both treated and non-treated participant (spill-over) namely *Intention-to-treat (ITT) effect* of the programme by following equation:

$$outcome_{it} = \beta_1 + \beta_2 program_i + \beta_3 year_t + \beta_4 (program * year)_{it} + \varepsilon_{it}$$

Where

$outcome_{it}$ = Outcome of interest

$program_i$ = a dummy variable taking the value of 1 if the observation is from 2014 and 0 otherwise. This variable captures possible differences between the treatment and control groups prior to the intervention.

$year_t$ = dummy variable taking the value of 1 if the observation is in the treatment group and 0 otherwise. This variable captures aggregate factors that would cause changes in the outcome even in the absence of intervention.

$(program * year)$ = The coefficient of interest, which is the same as a dummy variable equal to one for those observations in the treatment group in the second period.

-To check robustness of the analyses, we also used multivariate regression analysis which allowed to control baseline characteristics.

Results Access to credit

- On an average about 19.8% eligible households from the treatment group took BCUP credit .

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	**BCUP**	**Bank/Co-operative**	**Grameen Bank**	**Other BRAC Programme**	**Other NGOs**	**Informal**	**Others**
program*year	0.198***	0.014	0.011	-0.015	0.000	0.011	0.005
	(0.027)	(0.013)	(0.015)	(0.009)	(0.009)	(0.012)	(0.016)
program	0.000	-0.015	-0.007	-0.001	-0.015**	-0.015	-0.010
	(0.000)	(0.011)	(0.007)	(0.005)	(0.007)	(0.010)	(0.009)
year	0.002	-0.011	0.026***	0.034***	0.026***	0.002	0.033**
	(0.002)	(0.010)	(0.007)	(0.007)	(0.006)	(0.006)	(0.013)
Constant	0.000	0.046***	0.025***	0.015***	0.032***	0.036***	0.033***
	(.)	(0.009)	(0.005)	(0.003)	(0.006)	(0.008)	(0.007)
Observations	8,282	8,282	8,282	8,282	8,282	8,282	8,282
R-squared	0.155	0.001	0.007	0.008	0.006	0.001	0.008

Cluster-Robust (at the Branch level) standard errors in parentheses

(1) *** p<0.01, ** p<0.05, * p<0.1

(2) The variable *program*year* shows the difference-in-difference estimate. The variable *Constant* shows the mean of the control group in the baseline. The variable *program* captures possible differences between the treatment and control groups prior to the intervention. The variable *year* captures aggregate factors that would cause changes in the outcome even in the absence of intervention.

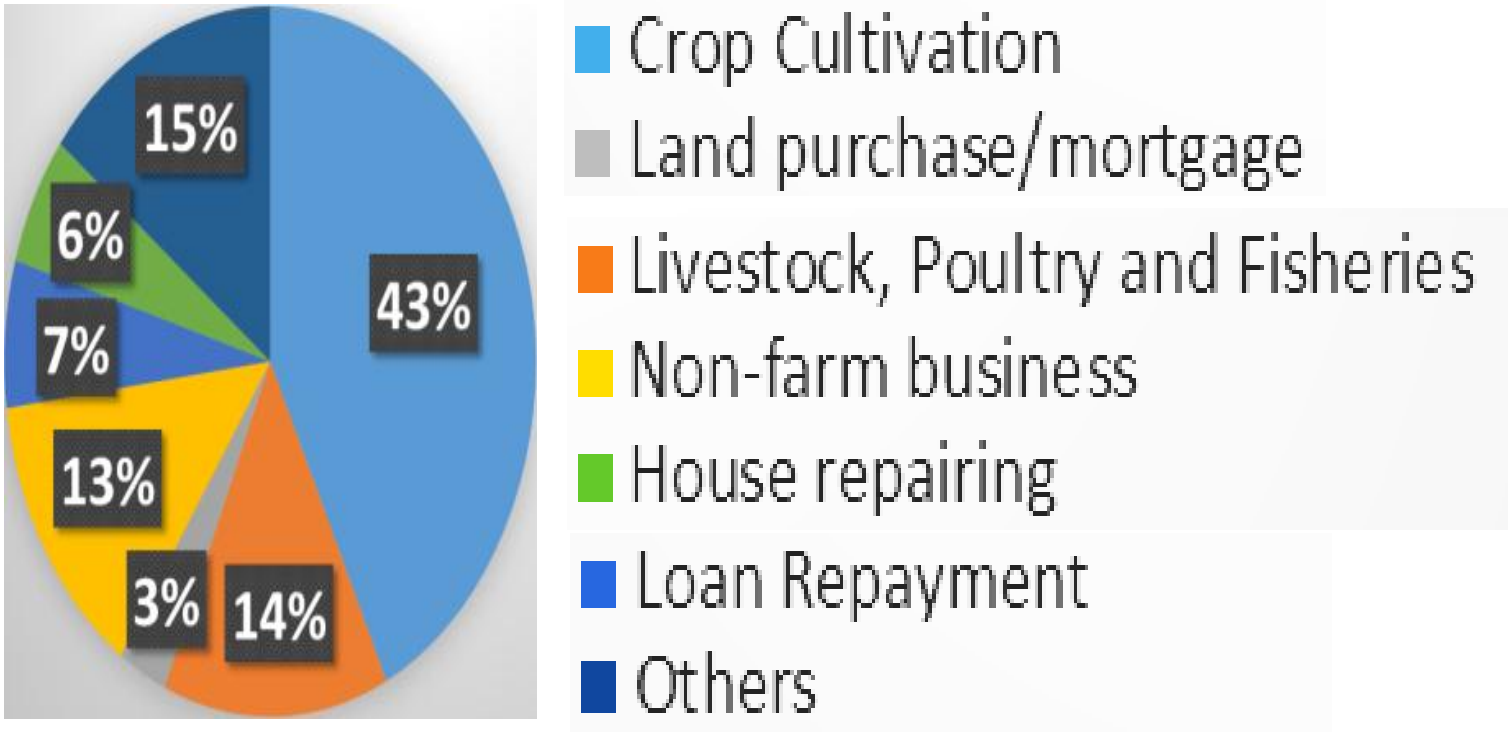
Amount of Loan (in BDT)

VARIABLES	(1) Bank/Co-operative	(2) Grameen Bank	(3) BCUP	(4) Other BRAC Program	(5) Other NGO	(6) Informal	(7) Others	(8) Any credit other than BCUP	(9) Any Credit
Program*year	**386.7**	**391.7**	**6,194*** **	**-434.7**	**42.73**	**1,516**	**630.0**	**1,016**	**6,438*** **
	(772.8)	**(393.1)**	**(692.4)**	**(716.7)**	**(205.9)**	**(1,483)**	**(532.2)**	**(1,375)**	**(1,493)**
Observations	8,282	8,282	8,282	8,282	8,282	8,282	8,282	8,282	8,282
R-squared	0.020	0.001	0.070	0.010	0.020	0.040	0.001	0.020	0.060

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results (cont.)

Utilization of BCUP credit



The nature of utilization tells us that BCUP credit added up household financial capital that might be immediately translated into household assets, livelihood improvement and farm productivity.

Results (cont.): More investment on productive assets

VARIABLES	(1) cow	(2) goat	(5) Power tiller	(8) handloom	(1) Potter wheel	(4) boat	(5) bicycle	(5) bicycle	(7) Value of total assets	(8) Total Purchase in last two years
program*year	0.04*	0.04*	0.01	0.00	0.03**	0.03	0.03	0.03	19,076.19	2,549.17
	(0.02)	(0.02)	(0.00)	(0.00)	(0.01)	(0.02)	(0.03)	(0.03)	(31,523.05)	(5,726.88)
program	0.00	-0.08	-0.01**	-0.00	-0.03**	-0.01	-0.08	-0.08	-5,880.51	-0.00
	(0.04)	(0.05)	(0.01)	(0.00)	(0.01)	(0.02)	(0.07)	(0.07)	(11,020.62)	(0.00)
year	0.04***	-0.04**	-0.00	-0.00	-0.03**	-0.01	0.01	0.01	45,374.19***	16,871.60***
	(0.01)	(0.02)	(0.00)	(0.00)	(0.01)	(0.01)	(0.02)	(0.02)	(11,826.74)	(3,014.16)
Constant	0.59***	0.26***	0.02***	0.00***	0.03**	0.04***	0.33***	0.33***	144,121.33***	0.00
	(0.03)	(0.05)	(0.01)	(0.00)	(0.01)	(0.01)	(0.05)	(0.05)	(8,033.47)	(0.00)
Observations	8,282	8,282	8,282	8,282	8,282	8,282	8,282	8,282	8,282	8,282
R-squared	0.00	0.01	0.00	0.00	0.02	0.00	0.01	0.01	0.01	0.02

Source: BRAC sample survey (2012 and 2014) in Bangladesh

Notes: Cluster-Robust (at the Branch level) standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Results (cont.)

Diversifying income sources ranges from crop-based to non-crop based agriculture

VARIABLES	(1) Rice Income	(2) Non-rice Income	(3) Livestock, Poultry and Fisheries	**(4) Total Agricultural Income**	(5) Agricultural Wage
*program*year*	3,478**	250.0	2,215	**6,000***	-5,788**
	(1,594)	(2,418)	(2,723)	**(3,507)**	(2,606)
program	-133.9	-3,949	-2,523	**-6,590****	-1,443
	(1,501)	(2,893)	(2,186)	**(3,155)**	(2,378)
year	3,565***	1,365	-3,030	**1,989**	6,903***
	(1,175)	(1,719)	(2,137)	**(2,084)**	(1,919)
Constant	10,110***	8,979***	11,276***	**30,780*****	15,371***
	(1,236)	(2,418)	(1,748)	**(2,308)**	(1,722)
Obs	8,282	8,282	8,282	**8,282**	8,282
R-squared	0.032	0.006	0.002	**0.005**	0.006

Source: BRAC sample survey (2012 and 2014) in Bangladesh

- Rice income increased significantly
- Positive (but not significant) trend in non-rice and non-crop based agriculture
- Decreased agricultural wage earnings

Results (cont.)

Shifting labor supply from wage earning to self-employment activities e.g. small business

VARIABLES	(1) Household has a self-employment activity	(2) No of Self-employment activity	(3) No of family labor	(4) No of hired labor	(5) Has started a new business in last two years	(6) Net Profit (BDT)
program*year	0.0652*	0.0706	0.0835	0.0483	0.0135*	2,585
	(0.0328)	(0.0431)	(0.0614)	(0.0725)	(0.00674)	(2,808)
Program	-0.000321	0.00301	0.0407	-0.0373	-0.00388	4,256
	(0.0343)	(0.0448)	(0.0574)	(0.0651)	(0.00285)	(2,729)
Year	-0.0498**	-0.0614*	-0.0367	-0.0483	0.0319***	1,999
	(0.0232)	(0.0306)	(0.0407)	(0.0680)	(0.00463)	(1,824)
Constant	0.222***	0.254***	0.257***	0.120*	0.0116***	11,890***
	(0.0262)	(0.0332)	(0.0416)	(0.0635)	(0.00237)	(1,914)
Observations	8,282	8,282	8,282	8,282	8,282	8,282
R-squared	0.004	0.003	0.005	0.000	0.014	0.004

Source: BRAC sample survey (2012 and 2014) in Bangladesh

Results (cont.)

Increased women's decision making power and time allocation for IGAs

- Increased decision making power in land sell/purchase, crop cultivation, livestock rearing and children education (but statistically insignificant)

- Women extended their role not only in credit repayment but also in credit investment. Women time allocation for IGAs increased.

- The control of women over the way loans are invested challenges the assumption in earlier literatures on microcredit that **women borrow but men control** (e.g. Goetz and Gupta 1996).

Results (cont.)

Impact on tenurial arrangement and land use

VARIABLES	(1) Own Cultivation	(2) Share-in	(3) Mortgage-in	(5) Leased-in	(6) others	(7) Total rented-in	(8) Total rented-out	(9) Total cultivated land
program*year	0.517	0.917	0.251	4.838*	-0.172	5.835	-0.277	6.352
	(2.518)	(2.417)	(1.535)	(2.857)	(0.293)	(3.868)	(1.041)	(5.077)
Program	-1.251	-5.372	-0.0532	5.490	0.223	0.288	0.593	-0.963
	(3.221)	(5.298)	(1.726)	(6.631)	(0.224)	(7.279)	(1.182)	(9.159)
Year	-4.565**	7.556***	1.053	-0.264	0.0619	-6.705**	3.478***	-11.27***
	(1.911)	(1.983)	(0.967)	(1.625)	(0.142)	(2.827)	(0.861)	(3.828)
Constant	38.71***	34.36***	9.057***	7.638**	0.196*	51.25***	7.657***	89.95***
	(2.345)	(4.639)	(1.226)	(2.907)	(0.102)	(5.124)	(0.951)	(6.261)
Observations	8,282	8,282	8,282	8,282	8,282	8,282	8,282	8,282
R-squared	0.002	0.006	0.000	0.003	0.000	0.001	0.003	0.002

Source: BRAC sample survey (2012 and 2014) in Bangladesh

Notes:

(1) Cluster-Robust (at the Branch level) standard errors in parentheses

(2) *** p<0.01, ** p<0.05, * p<0.1

(3) Column 1 shows the amount of owned cultivated land. Column 2 -5 show the amount of land rented-in under different tenancy These include both share-cropping arrangement (Colum 2) and fixed-rental arrangement (column 3-5). Column 6 shows total a land under any type of tenancy arrangement. Column 7 shows total amount of land rented-out by different tenancy arrangeme

(4) Total cultivated land is the summation of owned cultivated land and rented-in land.

Results (cont.)

Impact on cropping intensity, diversification and adoption of modern verities

- Increased cropping intensity and cropping diversity

- Treatment hhs cultivated comparatively more vegetables and spices in *Rabi* (winter) season and more cash crops in Aus season

- Treatment hhs substituted HYV rice with Traditional varieties.

-Treatment households are 13.8 percentage points more likely to adopt HYVs in *Aman* season and a 6.92 percentage points in the likelihood of adopting Hybrid rice in *Aman* season.

- A10 percentage point reduction in the likelihood of adopting HYVs in *Boro* Season but 8.9 percentage points more likely to adopt hybrid varieties.

Results (cont.) Impact on rice yield

- No impact on rice yield during Aus season.

- Significant rise in yield in *Aman (monsoon)* season: an increase of almost 18 percent over the control mean of 3.2 Ton per Hectare- attributed by two factors- adoption of modern varieties and reducing crop loss in Aman (monsoon) season.

- Higher yield of *boro (irrigated)* rice-an increase of 7.5 percent over the control mean of 5.17 Ton per hectare- mainly attributed by shifting from HYV to Hybrid varieties

Results (cont.)

Impact on farm income, household income, etc.

VARIABLES	(1) Rice Income	(2) Non-rice Income	(3) Livestock, Poultry and Fisheries	**(4) Total Agricultural Income**	(5) Agricultural Wage	(6) Non-agricultural Wage	(8) Remittance	(9) **Non-farm Business**	**(10) Non-agricultural Income**	**(11) Total Income**
*program*year*	3,478**	250.0	2,215	**6,000***	-5,788**	-2,463	-587.7	**2,720**	**-7,646**	**-1,157**
	(1,594)	(2,418)	(2,723)	**(3,507)**	(2,606)	(2,458)	(3,465)	**(2,781)**	**(6,392)**	**(7,386)**
program	-133.9	-3,949	-2,523	**-6,590****	-1,443	5,942*	7,400	**4,258**	**22,079*****	**15,488****
	(1,501)	(2,893)	(2,186)	**(3,155)**	(2,378)	(3,162)	(5,037)	**(2,722)**	**(6,931)**	**(7,084)**
year	3,565***	1,365	-3,030	**1,989**	6,903***	5,357**	8,066***	**1,692**	**32,438*****	**41,104*****
	(1,175)	(1,719)	(2,137)	**(2,084)**	(1,919)	(2,097)	(2,474)	**(1,815)**	**(4,351)**	**(5,038)**
Constant	10,110***	8,979***	11,276**	**30,780*****	15,371***	11,775***	12,148***	**12,011*****	**67,457*****	**98,236*****
	(1,236)	(2,418)	(1,748)	**(2,308)**	(1,722)	(1,760)	(2,680)	**(1,917)**	**(5,270)**	**(4,540)**
Obs	8,282	8,282	8,282	**8,282**	8,282	8,282	8,282	**8,282**	**8,282**	**8,282**
R-squared	0.032	0.006	0.002	**0.005**	0.006	0.004	0.005	**0.004**	**0.018**	**0.024**

Results (cont.)

Impact on household income and expenditure

- Day laboring wage income-both agricultural and non-agricultural, was significantly higher for the control group compared to the treatment households. Service income was also higher for the control group, although the difference is not statistically significant.

- Overall BCUP credit has very little impact on total household expenditure, especially on food and non-food expenditure, for example, housing, clothing and education. That means, BCUP credit was not used to increase their current consumption except medical expenditure.

Results (cont.)

Food security and nutritional outcomes – Subjective measures

VARIABLES	(1) Calorie Intake	(2) Protein Intake
program*year	63.85	1.020
	(68.27)	(2.621)
program	-44.79	-0.576
	(59.49)	(1.708)
year	217.3***	11.33***
	(61.46)	(2.052)
Constant	2,190***	56.27***
	(46.36)	(1.308)
Observations	8,281	8,281
R-squared	0.035	0.077

Source: BRAC sample survey (2012 and 2014) in Bangladesh

Notes:

(1) Cluster-Robust (at the Branch level) standard errors in parentheses

(1) *** p<0.01, ** p<0.05, * p<0.1

(2) Column 1 shows the amount of calorie intake. Colum 2 shows the amount of protein intake.

Food insecurity and nutritional outcomes (Objective measures)

VARIABLES	(1) Suffered food insecurity in last 12 months	(2) Relied on cheap foods	(3) Reduced meal size	(4) Reduced number of meals	(5) Borrowed food	(6) Bough food in credit from local shopkeeper	(7) Sold chicken/duck
program*year	-0.0542	-0.0742	-0.0548	-0.0372	-0.0163	-0.0119	-0.0179
	(0.0907)	(0.0905)	(0.0455)	(0.0315)	(0.0728)	(0.0760)	(0.0179)
program	0.0228	0.0162	0.0274	0.00474	0.0128	-0.00795	-0.0145
	(0.0643)	(0.0621)	(0.0287)	(0.0146)	(0.0534)	(0.0583)	(0.0126)
year	0.297***	0.274***	0.155***	0.0517*	0.233***	0.207***	0.0290*
	(0.0749)	(0.0781)	(0.0382)	(0.0286)	(0.0619)	(0.0619)	(0.0148)
Constant	0.197***	0.167***	0.101***	0.0619***	0.146***	0.158***	0.0449***
	(0.0531)	(0.0514)	(0.0135)	(0.00929)	(0.0456)	(0.0505)	(0.0112)
Observations	8,280	8,282	8,282	8,282	8,282	8,282	8,282
R-squared	0.081	0.070	0.029	0.006	0.065	0.054	0.006

Source: BRAC sample survey (2012 and 2014) in Bangladesh

1. Cluster-Robust (at the Branch level) standard errors in parentheses
2. *** p<0.01, ** p<0.05, * p<0.1
3. Column 1shows the likelihood of suffering from food insecurity in last one year. Colum 2-7 show the likelihood of adopting different types of coping mechanism once suffered from food insecurity

Conclusion

- In contrast to the claims sometimes made by MFIs and others, demand for microloans is “far from universal”(Banerjee et al, 2014)
- By the end of our two year study period, only 20% of the treatment households took BCUP loan, and this is among households selected based on their relatively high propensity to take up credit.
- This does not appear to be an anomaly: several other randomized interventions (in India, Morocco and in Mexico) also find relatively low take-up.
- Most households either do not have a project with a rate of return of at least 10%, the flat rate on a BCUP loan, or simply prefer to borrow from friends, relatives, or moneylenders.
- Rabbani, Malek and Hossain (2016) found the net return from agriculture to be zero to negative when accounted for opportunity cost.

Summary(continued)

- BCUP credit helped the beneficiaries to move from share-cropping contract to fixed-rent contract .
- BCUP credit helped some households to start new-self employment activities.
- BCUP credit affected labor supply choices as well: The result of our *Time Use Survey* suggests that households that have access to loans seem to work harder on their self-employment activities.
- We also found it increased the participation of women in decision making about different spheres of economic and social life.
- It expands households' abilities to make different inter-temporal choices, including investment. Treatment household restricted their current consumption and invested in home durable goods or productive assets that may generate future income stream and household welfare.

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Questions

&

Answers