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Farmers' Adoption of GO-NGO Support in Selected Char Areas of Sirajganj District

Md. Monirul Islam*
Md. Taj Uddin*

Abstract: *The study was carried out to identify the adoption of GO-NGO support on farmers' income generation and livelihood changes in selected char areas of Sirajganj district. A total of 60 farmers consisted 30 from non-supported and 30 from GO-NGO supported both in Belkuchi and Chauhali upazilas in Sirajganj district were selected. The primary data were collected from direct interview method using structured questionnaire. Collected data and information were analyzed with the combination of descriptive statistics (sum, average, percentages, etc.) and statistical analysis (Ravallion test and logit model with marginal effect). The average perceptions of the non-supported farmers about the statements on their improvement with GO-NGO support in agriculture and other services were relatively not worth mentioning situation than the GO-NGO supported one. The result of logit model showed that farm size, education level of the household heads, farm income and non-farm income had significant influence on adopting GO-NGO supports in farming practices. The estimated result of double difference (DID) method for total income in the year of 2012 and 2014 was statistically significant. The farmers in char areas mentioned lack of transportation facilities, low price of output, etc as problems; and also provided some probable suggestions to support them.*

Key words: Farmers' adoption, GO-NGO support and Char area

1. Introduction

About 5 percent populations of Bangladesh as well as about 10 million people live on the char areas narrowed as 7200 square kilometers (Kelly et al., 2002). The economy of the people of river basin areas is highly dependent on agriculture. Most of the char dwellers are involved in various kinds of farming systems and

* The authors are respectively lecturer, and Professor, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh

their farming practices are also different from the mainland. A number of social protection interventions such as social safety net programmes, various training facilities, awareness campaign, etc. have been providing by the government and non-government organizations (GO-NGOs) to the poorest households in char areas. These provide either long-term assistance to those unable to work or a 'step' for poor households to overcome the initial barriers to productive activities. The development of organizational facilities, agricultural product has been brought by bringing additional area under cultivation and better techniques evolved through adoption of GO-NGO support on agricultural production and their livelihood. However, the chronic increase of population, evolution of new socioeconomic as well as psychological problems, limitations of the state fund in social welfare, etc. made almost impossible for any long-term solution of all these problems by the government alone. Hence, the emergence of NGOs was considered with much importance in this regard.

Despite poor living conditions, households continue to live in the chars because they simply have no alternative, since land is so scarce in Bangladesh. As population, and thus future cereals demand grows, overcoming these constraints is becoming an increasingly pressing issue. Without the intervention of GO-NGOs, the situation would be more problematic and challenging for the char people. The employment opportunities of char dwellers are even less diversified than the others. Government and non-government organizations act as windows in char areas on applied knowledge in agricultural practices and provide links to sources of information and other facilities. Different GOs and NGOs are working in the char areas to reduce poverty and contribute to community development through various support and services. The Char Livelihood Programme (CLP) is one of the important programme run by different NGOs. The government is also implementing programmes to promote farmers for producing high-value crops, fruits and vegetables, potatoes, oilseeds, pulses and spices through appropriate packages of seed-fertilizer-irrigation technologies.

The present study is linked in some extent to other studies. Mahamud (2011) examined the livelihood of the people of Boyer char in Noakhali district under the intervention of Char Development and Settlement Project (CDSP) by the government of Bangladesh. Rahman et al. (2011) carried out a research on char formation process and livelihood characteristics of char dwellers of alluvial river in Bangladesh where the authors observed that the stability of char has positive relationship to the stability of livelihoods of char dwellers. Kashem et al. (2005) identified hunger, locations of ultra-poor, causes of food insecurity and put suggestions for reducing food insecurity in rural Bangladesh in line with social and religious cultural norms, lack of alternate income sources, limitation of training supports, supporting the integration of ultra-poor women into the development programmes for enhancing purchasing power. Uddin (2000) examined that Grameen Bank

credit program has positive impact on improving standard of living of participants and the author found that after joining the GB credit program, there was noteworthy progress in the living standard of the participants in Mymensingh district of Bangladesh. The above literature review indicates that, there are very few studies which endeavour to analyse the impact of adoption of GO-NGO supports on farmers' livelihood in char areas. This study provides a scope to identify the linkage between farmers' livelihood and GO-NGO support. The study will be helpful to scrutinize the farmers' adoption of GO-NGO supports on income generation on livelihood changes in the study areas. So, it is expected that present study would be able to add new information for the assessment and improvement of development activities in future.

The overall goal of this study is to find out an overview of farmers' adoption of GO-NGO support on income generation and livelihood changes in char areas. The specific objectives of the study are:

i. to determine and describe the important socioeconomic characteristics of the char farmers;

ii. to identify the farmers' perception about the GO-NGO support on their improvement; and

iii. to investigate the key determinants of the adoption of different supports and services provided by the GO-NGO.

2. Study Method

Total 60 farmers in which 30 non-supported and 30 GO-NGO supported farmers were selected from Belkuchi and Chauhali upazila of Sirajganj district for primary data collection using purposive sampling technique where different GO-NGO organizations are working. All possible efforts were made to ensure the collection of reasonably accurate data from the selected farmers through direct interview method by the researcher himself. Moreover, focus group discussions (FGD) were conducted in each selected location. The primary data for one year farming operations (January to December, 2014) which covered ten different crops were collected. Secondary information sources were different books, handouts, publications, documents of Government of Bangladesh (GoB) and its different non-government organizations i.e., CLP.

Model specification

The primary data collected from direct interview method were analyzed with a combination of tabular and statistical techniques. Descriptive statistics (such as, sum, mean, percentages, etc.), impact analysis i.e., PPI, DID, Ravallion test, CFI, and econometric analysis using logit model with marginal effect were derived and calculated to present the results.

Percentage perception index

To determine the improvement of GO-NGO supports on agriculture and other services, percentage perception index was used by using the following simple percentage formula:

Percentage perception index = [No. of respondents' opinion about statements (increase, decrease or constant) × 100] / Total no. of respondent

Determinants of adopting GO-NGO supports in different farming operations

The logit regression model was used to determine the factors that have significant influence on the adoption of GO-NGO support in the study areas. The implicit form of the model was as follows:

$$Y = \ln\left(\frac{Pi}{1 - Pi}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon_i$$

Where,

P_i is the probability of adoption and non-adoption of GO-NGO support; and

$P_i = 0$ indicates non-adoption and $P_i = 1$ indicates adoption.

Dependent variable (i.e., binary variable):

Y = Probability of adoption of GO-NGO support.

Independent variables:

X_1 = Farm size (Ha); X_2 = Age of household head (Years); X_3 = Household size (Number);

X_4 = Educational level of household head (Years of schooling); X_5 = Farm income (Tk.);

X_6 = Non-farm income (Tk.); β_0 = Intercept; β_1 to β_6 = Regression coefficients of the independent variables; and ε = Disturbance term or error term.

Marginal effect

Marginal effects are computed differently for discrete (i.e., categorical) and continuous variables. Marginal effects measure discrete change i.e., how predicted probabilities change as the binary independent variable changes from 0 to 1. Marginal effects can be an informative means for summarizing how change in a response is related to change in a covariate. This can be quite useful, informative, and easy to understand.

According to Gujarati (1995), the marginal probabilities of the key determinants of adopting GO-NGO support to be estimated based on expressions derived from the marginal effect of the logit model which was estimated as:

$dp/ dx = \beta i \{ Pi (1-Pi)\}$

Where,

β_i = Estimated logit regression coefficient with respect to the ith factor; and

P_i = Estimated probability of a farm household adoption status.

Ravallion test

The impacts of GO-NGO support on farming systems were measured by using the non-supported and GO-NGO supported farmers' income generation comparison with the help of following formula:

$$I = \frac{1}{n}\sum_{i=1}^{n}(O_i^T - O_i^C)$$

Where,

I = Average impact; N = Sample size; I = Sample units;

0 = Value of the interpretable impact indicator;

T = Treatment group; and C = Control group.

The paired sample t-test was applied to test the significance of relevant parameters.

Difference-in-differences (DID) method

A central feature of impact evaluations is the use of longitudinal data (repeat observations of the same individuals or households over time) to use difference-in-differences or double difference methods. These data were collected from the households receiving GO-NGO support and without receiving such support

The double-difference estimate is obtained by subtracting the preexisting differences between the groups, $(I_0 - C_0)$ from the difference after the intervention has been implemented, $(I_1 - C_1)$. The formula of double-difference estimates is given below:

$$DID = \{(I_1 - C_1) - (I_0 - C_0)\}$$

DID = Difference in difference; I_1 = Follow- up (Intervention group); C_1 = Follow- up (Control group); I_o = Baseline (Intervention group); C_o = Baseline (Control group)

Constraint facing index

There were so many constraints faced by the farmers in *char* areas. A constraint facing index (CFI) for each 10 selected constraints was computed by using the following formula:

$$CFI = (C_h \times 3) + (C_m \times 2) + (C_l \times 1) + (C_n \text{ X } 0)$$

Where,

C_h = Number of responses indicating high constraint;

C_m = Number of responses indicating medium constraint;

C_l = Number of responses indicating low constraint; and

C_o = Number of respondents having no constraints.

Constraint facing index (CFI) for any of the selected constraints could range from 0 to 90 for non-supported and GO-NGO supported farmers, where, 0 indicated no constraint facing index and 90 indicated highest constraint facing index.

3. Results and Discussion

Some Basic Socioeconomic Features of the Respondents

The average crop area was 0.21 ha for non-supported and for GO-NGO supported farmers, it was 0.25 ha. The average numbers of livestock and poultry birds were 3.83, 4.27 and 5.35, 7.65 for non-supported and GO-NGO supported farmers, respectively. Average number of wood tree was 5.15 and 5.48 for non-supported and GO-NGO supported farmers, respectively. Majority of the family members were in the working age group of 15.01 to 55 years and it was 51.6 and 61.9 percent, respectively for non-supported and GO-NGO supported farmers in char areas. The average family size of non-supported and GO-NGO supported farmers was 5.2 and 6.3 which is higher than the national average of 4.53 (HIES, 2010). The average literacy rate of GO-NGO supported farmers (64.3 percent) was higher than the non-supported (53.3 percent) farmers and it also exceeded the national average literacy rate (57.9 percent) (BER, 2013). On an average, 23.3 percent farmers were engaged in crop farming in case of non-supported farmers whereas it was 30.0 percent for GO-NGO supported farmers.

Table 1: Socioeconomic features of the respondents

Particulars		Non-supported farmers	GO-NGO supported farmers
Area and number of agricultural enterprises			
Crop area (ha)		0.21	0.25
Livestock (no.)		3.83	4.27
Poultry (no.)		5.35	7.65
Wood tree (no.)		5.15	5.48
Family size, age, education level, average literacy rate, occupational status, land type and dependency ratio of sample farmers			
Family size (no.)		5.2	6.3
Age (16-55 years) (%)		51.6	61.9
Average literacy rate (%)		53.3	64.3
Occupational status	Farming (%)	23.3	30.0
	Farming + handloom (%)	40.0	20.0
Rented/mortgaged/leased-in land (%)		55.2	60.5
Dependency ratio (no.)		2.25	2.52

Source: Authors' estimation based on field survey, 2015.

The dependency ratio expresses how many members of a family were dependent on economically working and earning person. In the study areas, economically working and earning persons were 2.25 and 2.52 for non-supported and GO-NGO supported farmers, respectively. It was noted that the socioeconomic characteristics of the sample farmers differ significantly between two groups i.e., non-supported and GO-NGO supported farmers in char areas.

Credit and Training Facilities Received by the Farmers

Credit can play a significant role in increasing farm productivity and income. The GO-NGO supported farmers have spent their loaned money broadly for the agricultural and non-agricultural purposes. From Table 2 it is apparent that percentage of total loaned money utilized for agricultural purposes was about 44.5 percent. The borrower farmers also used about 55.5 percent of their credit for non-agricultural purposes among which the highest amount of credit was utilized for the marriage of daughter and it was 29.9 percent of the total credit fund. As their economic condition was so poor, they used their credit money in some non-agricultural purposes such as small business, food consumption (during flood period), etc. There are different GO-NGOs working in char areas that provide loans to the farmers for various purposes. Farmers of char areas generally borrowed money from BRDB, ASA, MMS, GKS, CLP, CARITAS, NDP, BRAC, CARE Bangladesh, etc.

Training activities can give people more effective social connections and bonds so that they can apply their knowledge and skill to get more benefit in their daily lives, thus making their lives more happier. In recent years, BRDB, DAE and MMS, CLP, GKS, Tomtom project (NGOs), etc. has been providing training and technical assistance in agricultural activities such as rice plantation, vegetable cultivation, cattle and goat rearing, poultry production, etc. for both men and women in the study areas. They are also working with the farmers to promote safe drinking water, sanitation and hygiene, and getting people involved with various income-generating activities (IGAs). BRDB offered training on 'one house one farm' project to the char farmers with a duration of three (03) days. Department of Agricultural Extension (DAE) also provided training on various issues that helped to improve their standard of living. Different NGOs also provided a number of training programmes to the char farmers on livestock rearing, flood protection activities and some social awareness related issues like early marriage, sanitation, dowry system, etc.

Table 2: Uses, sources, training and distribution of sampled farmers of GO-NGO support and services

Particulars	Amount (Tk.)		Percentage of credit used
Uses			
Agricultural activities	8835		44.5
Non-agricultural activities	11065		55.5
Grand Total	20000		100.0
Sources	BRDB, ASA, MMS, GKS, CLP, CARITAS, BRAC, CARE Bangladesh		
Training and field visit organization	Duration (days)	Year	Purpose(s)
	Training offered by Government organization(s)		
BRDB, DAE	3 and 2	2013	One House One Farm (OHOF)
	Training offered by NGO(s)		
MMS, CLP, GKS, *Tomtom* project	5, 3, 2 and 5	2014 and 2013	Crops, livestock, poultry, flood protection
	Title of field visit		
MMS Expert team, DAE	1	2013	After flood period
GO-NGO support			
Types of NGO intervention			No. Percentage (%)
Credit facilities			30 100.0
Training			14 46.7
Free agricultural inputs, Monitoring, Product selling and credit facilities			16 53.3

Source: Field survey, 2015.

Table 2 showed that 100 percent farmers have access to get loan from both GO and local NGOs in the study areas. 14 out of 30 farmers have training facilities on various agricultural and social related issues. A marginal number of farmers have the accessibility to get free agricultural inputs, monitoring service, product selling and all of the above within the same time.

Farmers Perception about their Improvement on Agricultural and Other Services

Improvement in agricultural activities

The percentage of the farmers' improvement at GO-NGO support in agriculture has been shown in Table 3. It exhibits that most of the non-supported farmers have constant opinion about the statements while for GO-NGO supported farmers, the statements were in the favour of their increase in productivity (83.3%), production of crops (86.7%), use of fallow land (90.0%), number of crops produced in a year (93.3%), poverty situation (86.7%), better marketing facilities (83.3%) and income generation (86.7%). In case of pesticide and fertilizer application, both non-supported and GO-NGO supported farmers have constant opinion and it was 86.7 and 90.0 percent, respectively. The table also shows that the average perceptions of the farmers about the statements on their improvement due to GO-NGO support in agriculture were 38, 7 and 55 percent for increase, decrease and constant circumstances, correspondingly for non-supported farmers while for GO-NGO supported farmers, these were 77, 5 and 18 percent, respectively in char areas.

Table 3: Farmers' perception regarding their improvement in agriculture through GO-NGO support (in %)

Statements	Non-supported farmers			GO-NGO supported farmers		
	Increase	Decrease	Constant	Increase	Decrease	Constant
Productivity	30.0	3.3	66.7	83.3	6.7	10.0
Production of crops	40.0	3.3	56.7	86.7	3.3	10.0
Use of fallow land	46.7	6.7	46.7	90.0	6.7	3.3
No. of crops	43.3	3.3	53.3	93.3	3.3	3.3
Poverty status	40.0	6.7	53.3	86.7	6.7	10.0
Marketing facilities	46.7	10.0	43.3	83.3	3.3	13.3
Pesticide and fertilizer application	3.3	10.0	86.7	6.7	3.3	90.0
Employment creation	46.7	13.3	40.0	76.7	6.7	16.7
Income generation	43.3	6.7	50.0	86.7	6.7	6.7
Average perceptions	38.0	7.0	55.0	77.0	5.0	18.0

Source: Authors' estimation, 2015.

3.2 Improvement in other services

The percentage of farmers' perception on their improvement at GO-NGO support in other services has been shown in Table 4.

Table 4: Farmers' perception on their improvement in other services (in %)

Statements	Non-supported farmers			GO-NGO supported farmers		
	Yes	No	Indifferent	Yes	No	Indifferent
Credit facilities	3.3	83.3	13.3	79.9	13.3	6.7
Training facilities	13.3	79.9	6.7	79.9	6.7	13.3
Health care facilities	6.7	79.9	13.3	83.3	3.3	13.3
Sanitary latrine	13.3	83.3	3.3	86.6	6.7	6.7
Pure drinking water	6.7	79.9	13.3	79.9	6.7	13.3
Selection of occupation with season	6.7	10.0	83.3	83.3	3.3	13.3
Selection of time of cultivation	13.3	73.3	13.3	13.3	3.3	83.3
Crop pattern change	13.3	79.9	6.7	79.9	13.3	6.7
Market distance	79.9	13.3	6.7	20.0	6.7	73.3
Extension services	13.3	13.3	73.3	73.3	13.3	13.3
Transportation problem	13.3	20.0	66.6	20.0	59.9	20.0
Average perceptions	17.0	56.0	27.0	64.0	12.0	24.0

Source: Authors' calculation, 2015.

The table reveals that most of the non-supported farmers have adverse opinion about the statements while for GO-NGO supported farmers, the statements were in the favour of their increase in credit facilities (79.9%), training facilities (79.9%), health care facilities (83.3%), sanitary latrine (86.6%), pure drinking water facilities (79.9%), selection of occupation with season (83.3%), change in cropping pattern (79.9%) and extension services (73.3%). The table also shows that the average perception of the farmers about the statements on their improvement at GO-NGO support in other services were 17, 56 and 27 percent for yes, no and indifferent situations, correspondingly for non-supported farmers while for GO-NGO supported farmers these were 64, 12 and 24 percent, respectively.

Determinants of Adopting GO-NGO Support

Empirical results of factors influencing the adoption of GO-NGO support

The result of logit regression was presented in Table 5. The results showed that the model was accurate in explaining the determinants of adopting GO-NGO support in different farming practices. Four out of six variables included in the model were significant in explaining the variation in adopting GO-NGO support in farming practices; which were: farm size, education level of the household heads, farm income and non-farm income of the sample farm households in char areas.

Farm size

The empirical result shows that the farm size of the farmers has negative coefficient and it was 3.08, which was significant at 10% level. One unit increase in the farm size will decrease the probability of adopting GO-NGO support in farming practices by 3.08 unit, keeping other factors held constant.

Household size

Household size has also positive coefficient and it was 0.31, which was also statistically significant at 10% level. One unit increase in the household size will increase the probability of adopting GO-NGO support in farming practices by 0.31 unit, keeping other factors remaining constant.

Education level of household head

The parameter estimates of education level carry a positive result which is 1.174 and is statistically significant at 5% level. One unit increase in the level of education of the household head will increase the probability of adopting GO-NGO support in farming practices by 1.174 unit, keeping other factors remaining constant.

Table 5: Estimates of the logistic regression of determinants of adopting GO-NGO supports in farming practices

Variables	Coefficient (Y)	Std. Err.	z	P>z	[95% Confidence Interval]
Constant	-3.642	1.781	-2.05	0.041	-7.131
Farm size (X_1)	-3.084*	1.651	-1.87	0.062	- 6.321
Age of household head (X_2)	0.046	0.041	1.11	0.266	- 0.035
Household size (X_3)	0.313*	0.188	1.67	0.095	- 0.054
Education level of household head (X_4)	1.175**	0.620	1.90	0.048	- 0.040
Farm income (X_5)	1.141*	0.746	1.53	0.101	- 0.321
Non-farm income (X_6)	0.046	0.490	0.10	0.926	- 0.915

Source: Authors' estimation based on field survey, 2015.

Note: ** Significant at 5 percent level; and * Significant at 10 percent level.

Farm income

This result implies that households' annual average farm income was positive which was 1.14 and significant at 10% level. If other things being equal, one unit increase in the level of farm income will increase the probability of household to be adopted GO-NGO support in farming systems by 1.14 unit.

Marginal effect subsequent to logit model

The results of marginal effects subsequent to logit model are shown below:

$$Y = Pr \text{ (type of farmers) (predict)}$$

$$= 0.492$$

The result of marginal effect shows that the farm size of the farmers has a negative value of dy/dx and it was 0.771 unit, which was significant at 10% level.

Table 6: Estimates of the marginal effect for adopting GO-NGO support in farming practices

Variables	dy/dx	Std. Err.	z	P>z	[95% Confidence Interval]	X
Farm size (X_1)	-0.771*	0.412	-1.87	0.061	-1.579	0.037
Age of household head (X_2)	0.012	0.010	1.11	0.265	-0.009	0.032
Household size (X_3)	0.078*	0.047	1.67	0.095	-0.014	0.170
Education level of household head (X_4)	0.285**	0.141	2.02	0.044	0.008	0.562
Farm income (X_5)	0.285*	0.186	1.53	0.101	-0.080	0.650
Non-farm income (X_6)	0.012	0.123	0.09	0.925	-0.023	0.252

Source: Authors' calculation based on field survey, 2015.

Note: ** Significant at 5 percent level and; * Significant at 10 percent level.

It indicated that the predicted probability of adoption is 0.771 unit lower for the individual in higher farm size than for one who is smaller one all other variables equal their means. The marginal effect on the probability of adopting GO-NGO supports in different farming practices is 0.078 unit greater for large household size than the smaller one, keeping all other factors constant. The results of marginal effect showed that the predicted probability of adoption is 0.285 unit higher for the individual in better education level than for one who is less educated held all other factors remain equal. The results of marginal effect confirmed that, the predicted probability of adoption is 0.285 unit higher for the individual in higher farm income than for one who is smaller farm income earner, other things being equal.

Impact on Income Generation

An analysis of income sources adds further insight into the income generation process. There are two sources of income for both non-supported and GO-NGO supported farmers. These sources are farm and non-farm income. After the intervention, the income of the GO-NGO supported farmers was increased because of

credit facilities, extension services, supervision and monitoring of the field worker. Table 7 depicts that average annual income of non-supported and GO-NGO supported farmers in the year 2014 were Tk. 102672.1 and Tk. 128076.1, respectively. Table 7 also illustrates that average yearly income of non-supported and GO-NGO supported farmers in the year 2012 were Tk. 89200.0 and Tk. 103700.0, respectively.

Table 7: Average annual income of the farmers

Sources of income	Non-supported farmers		GO-NGO supported farmers	
	Amount (Tk.)	Percentage (%)	Amount (Tk.)	Percentage (%)
In the year 2014				
A. Total farm income	71605.4	69.74	89326.1	69.74
B. Total non-farm income	31066.7	30.26	38750.0	30.26
C. Total income (A+B)	102672.1	100.00	128076.1	100.00
In the year 2012				
A. Total farm income	60800.0	68.16	68100.0	65.67
B. Total non-farm income	28400.0	31.84	35600.0	34.33
C. Total income (A+B)	89200.0	100.00	103700.0	100.00

Source: Authors' calculation based on field survey, 2015.

Table 8: Double difference estimates for income generation

Outcome variables	Non-supported farmers	GO-NGO supported farmers	Difference	t-statistic	p-value
Total farm income in 2012	60800.0	68100.0	7300.0	15.12	0.0000
Total farm income in 2014	71605.4	89326.1	17720.7	11.93	0.0532
Difference in total farm income (2014-2012)	10805.4	21226.1	10420.7	11.30	0.1945
Total non-farm income in 2012	28400.0	35600.0	7200.0	11.50	0.1341
Total non-farm income in 2014	31066.7	38750.0	7683.3	16.36	0.0000
Difference in total non-farm income (2014-2012)	2666.7	3150.0	483.3	14.78	0.0000
Total income in 2012	89200.0	103700.0	14500.0	17.93	0.0000
Total income in 2014	102672.1	128076.1	25404.0	53.22	0.0000
Difference in total income (2014-2012)	13472.1	24376.1	10904.0	58.94	0.0000

Source: Authors' calculation based on field survey, 2015.
Note: Total farm incomes in 2012 and in 2014 are considered as before-after situation.

In addition to assessing the impact of GO-NGO support and services on income generation in the study areas, authors' estimate the change in total farm income, total non-farm income as well as total income behavior of the GO-NGO supported and non-supported farmers over the 2012 to 2014 period. The results of impact estimates presented in Table 8 suggest that for non-supported farmers, total income difference was Tk. 13472.1 and for GO-NGO supported farmers, it was Tk. 24376.1 The estimated result of double-difference (DID) method was Tk. 10904 in the year 2012 and 2014 which is statistically significant.

Table 9: Ravallion test result (in Tk./farm)

Sources of income	Non-supported farmers	GO-NGO supported farmers
Total farm income	71605.4	89326.1
Total non-farm income	31066.7	38750
Total income	102672.1	128076.1
Change in total income	25404.0 (2.02*)	

Source: Authors' estimation, 2015.
Note: *Significant at 10 percent level.

Table 9 shows that, because of the GO-NGO support, the annual average income per farm increases from Tk. 102672.1 to Tk. 128076.1. The Ravallion test results shows that the income was increased by the amount of Tk. 25404.0 due to the support obtained from different GO and NGO organizations working in the study areas which is statistically significant at 10% level and it was verified by the value of t-statistic.

Computation of constraint facing index (CFI)

The computed CFI of 10 constraints ranged from 74 to 55 for non-supported and 73 to 53 (against a possible range from 0 to 90) for GO-NGO supported farmers which are arranged in rank order according to their CFI as shown in Table 10. Majority of the farmers point out that lack of transportation problem was the main problem in the study areas. A good number of the farmers point out that low price of output was an important problem due to lack of transportation facilities. High prices of different inputs are also problem in both for non-supported and GO-NGO supported farmers. Lack of education and training facilities was also a foremost difficulty for GO-NGO supported farmers compared to the non-supported farmers. Due to lack of knowledge about the best production practices, farmers do not know about the scientific methods of cultivation that ultimately results in lower output. Non-farm employment opportunity has been created to a large extent and laborers in the study areas migrated from farm activities to non-farm activities especially as a handloom worker for better income.

Table 10: Ten selected constraints along with constraint facing index and rank order

Name of the constraints	Non-supported farmers		GO-NGO supported farmers	
	CFI (A)	Rank order	CFI (B)	Rank order
Lack of transportation problem	74	1	73	1
Low price of outputs	72	2	69	2
High price of different inputs	71	4	70	3
Lack of education and training facilities	68	5	65	4
Scarcity of concentrate feed and fodder	63	3	61	7
Lack of adequate extension services	61	6	60	8
Outbreak of diseases	60	9	58	9
Lack of knowledge about best production practices	58	10	57	10
Scarcity of labor	56	11	55	11
High price of irrigation	55	12	53	12

Source: Authors' estimation, 2015.

Therefore, the scarcity of human labour along with their higher wage rate is found in different cropping seasons that ultimately hamper the whole process of cultivation.

Conclusions and Policy Implications

Different crop farming was much more profitable under GO-NGO supported farmers than the non-supported farmers. Income generation was increased due to the

intervention of GO-NGO support for GO-NGO supported farmers than the non-supported farmers. Increase in farm size, household size, level of education and farm income enable farmers to renovate their production system through GO-NGO supports that would be more helpful to increase the production level of char farmers. Farmers in char areas expressed their opinion about lack of transportation facilities, low price of output, high price of different inputs, etc. which was identified as major problems in the study areas. For policy implications, the sample farmers suggested that government and non-government organizations should allocate more soft loan for agricultural activities. As, education has positive influence on adopting GO-NGO support, compulsory primary education programme for both male and female should be implemented with the cooperation of proper authority.

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