

Impact of food security project on crop production in Bangladesh

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ABSTRACT

The main purpose of the study was to determine the impact of Food Security program on crop production. Mithapukur and Sadar upazilas of the Rangpur district were the locality of the study. Sixty respondents were selected as the sample for the study by using simple random sampling technique. Data were collected with help of an interview schedule. The entire process of data collection took 30 days from June 25 to July 24, 2007. The impact of food security project was measured on the basis of extent of change occurred in use of optimum irrigation water, use of balanced fertilizer, credit received and utilization, crop production and annual income of the respondents. Most of the respondents were young aged having secondary and above level, possessed small farm, medium extension contact and partially positive attitude towards food security project. Majority of the respondents used optimum irrigation water and balanced fertilizer for rice, potato and maize cultivation after involvement in food security project as compared to their involvement before. Farmers also got greater credit facilities after involvement with food security project. Hence, after involvement in food security project, production of rice, potato and maize increased significantly which ultimately increased farmer's annual income, education, farm size, farming experience, training exposure, extension contact.

Keywords: Food security, crop production, Bangladesh.

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INTRODUCTION

Bangladesh is one of the most densely populated countries in the world. Its population exceeds 134 million with an average of more than 850 people per sq. km. About 22 million households of the country live in rural Bangladesh. The rural population is comprised of 22 percent landless, 34 percent with homesteads only, 12 percent marginal farmers having 0.2 to 0.4 ha of land, and 14 percent are small farmers having 0.4 to 0.8 ha of cultivated land (Anonymous, 2000).

Bangladesh has an overwhelmingly agricultural country. Agriculture accounts for 32 percent GDP of the country and absorbs 63 percent of its labour force. Rice is the staple food for Bangladeshis and rice production is the most important economic activity in rural Bangladesh. It is grown in all the

three growing seasons of the year and covers about 77% of the total cropped area of around 13.9 million hectares. At present, rice alone constitutes about 92% of the total food grains produced annually in the country. Rice offers the basic source of food security for the people.

The Government of Bangladesh has identified Food Security as an important factor contributing to its socio-economic stabilization and development. Bangladesh has made a steady progress in the expansion of food production. But because of increasing population pressure there has been an extensive use of land to meet the growing demand for food. Despite the growth in food production and its availability, food increasing is still a major problem mainly because of the lack of purchasing power and thus poor access to food, especially for the rural poor. The

average Bangladesh diet is deficit in energy by about 15 percent. It is seriously unbalanced with an inadequate intake of fat, oil, fish/animal protein, fruit and vegetable.

FAO works with a national government to identify the ways of removing barriers to food access and helps to facilitate access to donor resources that will fund the project. FAO also assists with the implementation and kick-off phase. The Food Security Project pilot phase was started in July 1996 in Bangladesh. The second, third, fourth and fifth year plans emphasized accelerated food production and the expansion of employment opportunities in rural areas. The policy emphasizes attainment of food self sufficiency maintaining steady supply, food price stability with less subsidy improving nutritional status of the vulnerable groups and implement action plan to attain food security. At present, the Food Security Project is extended to 21 Upazilas of 16 Districts covering more than 8 Agro-ecological zones and Japan is providing the total cost of the project.

The project is being implemented by the Department of Agricultural Extension (DAE) of the Ministry of Agriculture (MOA) with the aim to determine and describe the selected characteristics of the respondents, to determine the impact of Food Security Project on different crop production practices and to identify the constraints faced by the respondents under the Food Security Project areas.

MATERIALS AND METHODS

Study area and sample size

Two blocks namely, Askorpur of Mitapukur upazila and Abhirampur of Sadar upazila of Rangpur district were selected as locale of this study since the place was selected as one of the successful areas by FAO. All the project beneficiaries of two upazilas of Rangpur District who received the aids from food security project constituted the active population of this study. However, representative sample from the population were taken for collection of data following random sampling technique. Sixty respondents were selected based on 12-14% of active population from a list of 450 respondents.

Data collection

In order to collect reliable and valid information from the respondents, an interview schedule was prepared carefully keeping the objective of the study in mind. The interview schedule contained both open and closed form of questions. The questions were arranged systematically so that they could easily understand. The draft interview schedule was prepared and pre-tested. On the basis of pretest result and suggestions of advisory committee members, necessary correction, additions, alternations and rearrangement were made in the interview schedule. Data were collected through face to face interview by the researcher himself. To get valid and relevant information the researcher made all possible efforts to explain the purpose of the study to the respondents. Appointments with the interviewers were made in advanced. In case of failure-to collect information from the respondents due to their other business, revisit was made with prior appointments.

Data processing and analysis

All the collected data were checked and cross checked before transplanting to the master sheets. The data were compiled, coded, tabulated for analysis and interpretation. Qualitative data were converted into quantitative form by means of suitable scoring. Data were presented mostly in the tabular form. The unit of analysis of the study was the project beneficiaries who were involved in development activities. Statistical measures like number, range, mean and standard deviation (SD) were calculated in describing the selected characteristics of the respondents and their total crop production after involvement with Food Security Project.

Variables of the study

The dependent variable of this study was the total crop production by the respondents after involvement with Food Security Project. The independent variables of this study included age, education, farming experience, family size, farm size, training exposure, extension contact and attitude.

Measurement of independent variables

Age

Age of a farmer was measured in terms of actual years on the basis of his statement. A score of one (1) was assigned for each years of age. Based on the available information cited by the respondents, they were classified into three categories according to Islam and Ahmad (2004). The categories were: young age (18 to 35 years), middle age (36 to 45 years) and old age (46 years and above)

Education

Education was measured on the basis of completed years of schooling by a respondent in the educational institutions. Score of one was given to a respondent for each year of schooling.

Farming experience

The farming experience of the respondent means the experience he/she gained directly by performing various farming activities and it was expressed in years i.e. score of one was given for each year of experience. Respondents were classified into three categories on the basis of their farming experience. Thus low experience was up to 5, medium experience was 6 to 16 and high experience was above 16 years.

Family size

The family size of a respondent was measured in terms of the number of member in family who used to eat and live together permanently. Respondents were classified into three categories on the basis of their family size according to Llossain (2005). The categories were: small family (up to 4), medium family (5 to 6) and large family (>6).

Farm size

Based on their total farm size, the respondents were classified into three categories according to Anonymous; (2002) as landless (<0.02), marginal farmer (0.02 to .20) and small farmer (0.21 to 1.00)

Training Exposure

The respondents were classified into following three categories according to their total duration of training received as short duration up to 3 days, medium duration 4 to 6 days and long >6 days.

Contact with extension media

Extension contact scores of the respondents were computed on the basis of their extension contact with different media like individual, group and mass. Respondents were asked to indicate their extent of contact with those extension media not at all, rarely, occasionally and frequently. Weights were assigned as 0 for not at all, 1 for rarely, 2 for occasionally and 3 for frequently. Respondents were classified into following three categories according to their contact with extension media as low contact (up to 12), medium contact (13 to 22) and high contact (above 22).

Attitude towards food security project

Attitude of the respondents towards food Security Project was measured by asking their opinion upon 8 attitudinal statements which were put in the interview schedule. Score 5 was assigned to strongly agree statements, while scores 4, 3, 2 and 1 was assigned for agree, undecided, disagree and strongly disagree statements respectively. In case of negative attitudinal statement reverse score was assigned to each response. Respondents were classified into following three categories according to their attitude towards food security project as partially positive attitude (up to 13), moderately positive attitude (14 to 28) and highly positive attitude (>28)

Measurement of impact of food security project

The impact of Food Security Project was measured on the basis of the extent of change occurred in five selected dimensions. These dimensions were irrigation, balanced Fertilizer, crops production, annual income and credit received and utilization.

Change in use of water for irrigation

The change in use of water for irrigation, three statements were asked individually to indicate the

number of irrigation over time from each of the practices after and before involvement with Food Security Project. Score of 3, 2 and 1 were assigned against yes, sometimes, and no respectively for each of the statement in respect of using water for irrigation on crop production according to Gofran (2006). Based on the available information, respondents were classified into three categories as low use (up to 2), medium use (3 to 5) and high use (6 and above).

Change in use of balanced fertilizer and organic manure

The respondents were asked to mention the name of fertilizer with doses applied in their crop cultivation. The change in use of balanced fertilizer and organic manure was determined by computing each of the practices by the respondents after and before involvement with food security project. Score of 3, 2 and 1 were assigned against correct, nearly correct and incorrect respectively for each of the statement following after and before situation with the involvement of Food Security Project. Based on the available information, respondents were classified into the following three categories as incorrect use (20% less than recommended doses)-1, nearly correct use (10% less than recommended doses)- 2 and correct use (recommended doses)- 3.

Change in total crop production

The change of crop production was determined by computing production after and before involvement with Food Security Project. Respondents were classified into the following three categories on basis of their crop production (Ton/ hec) as low production (up to 3.54), medium production (3.55 to 13) and high production (>13) ton/hectare.

Change in annual income

A respondent's annual income was measured on the basis of their total yearly income from agriculture, non agriculture and others sources. The change in income was determined by computing income score of the respondents after and before involvement with food security project. Based on their annual income, respondents were

classified into following three categories according to Shahenwaz (2007). The categories were low income (up to 35 thousand taka), medium income (36 to 50 thousand taka) and high income (>50 thousand taka).

Change in credit received

Credit received refers to the amount of money received or taken by respondents as loan from any source. The change of credit received by the respondents was determined by computing the amount of Taka received after and before involvement with food security project. Respondents were classified into three categories on the basis of their credit received according to Moonmoon (2003). The categories were small credit received (<6 thousand taka), medium credit received (6 to 10 thousand taka) and large credit received (>10 thousand taka).

Change in credit utilization

During interview each respondent was asked to indicate the amount of credit received and how much amount they used in assigned purposes. Credit utilization was expressed in terms of percentage of credit used in assigned purposes. According to percent of credit utilization, the respondents were classified into following three categories: small credit utilization (>54%), medium credit utilization (54 to 82%) and large credit utilization (<82%).

RESULT AND DISCUSSION

Age

As shown in Table 1, the highest proportion (61.70%) of the respondents was in young aged category as compared to 6.70 % who were old aged and 31.70% respondents were middle aged. Average age of the farmers was 34.52 years with SD being 8.12.

The young and middle aged people are more interested for participating in a learning contest compared to the old aged. The reasons behind the lesser participation of the older segment might be that their life is so burdened and they lose interest to take any type of venturesome activities.

Table 1
Distribution of the respondents according to their characteristics.

| | Categories | Frequency | Percent | Mean | SD |
|-------------------|--|-----------|---------|-------|-------|
| Age | Young age (18 to 35) | 37 | 61.7 | | |
| | Middle age (36 to 45) | 19 | 31.7 | 34.52 | 8.12 |
| | Old age (46 and above) | 4 | 6.7 | | |
| Education | Can sign only (.5) | 18 | 30 | | |
| | Primary education (1to 5) | 4 | 6.70 | 6.05 | 3.96 |
| | Secondary and above (>5) | 38 | 63.30 | | |
| Experience | Low experience (Up to 5) | 8 | 13.30 | | |
| | Medium experience (6 to16) | 46 | 76.70 | 8.93 | 4.35 |
| | High experience (>16) | 46 | 10.00 | | |
| Family size | Small Family (up to 4) | 32 | 53.30 | | |
| | Medium Family (5 to 6) | 20 | 33.30 | 4.57 | 1.51 |
| | Large Family (>6) | 8 | 13.30 | | |
| Farm Size | Marginal | 7 | 11.70 | | |
| | Small | 53 | 88.30 | 0.64 | 0.25 |
| Training | Short duration (Up to 3) | 12 | 20.00 | | |
| | Medium duration (4 to 6) | 42 | 70.00 | 4.58 | 2.18 |
| | Long duration (Above 7) | 6 | 10.00 | | |
| Extension contact | Low Contact (up to 12) | 2 | 3.30 | | |
| | Medium Contact (13 to 22) | 51 | 85.00 | 17.20 | 4.78 |
| | High Contact (>22) | 7 | 11.70 | | |
| Attitude | Partially Positive attitude (up to 13) | 1 | 1.70 | | |
| | Partially Positive attitude (14 to 28) | 53 | 88.30 | 20.38 | 6.67 |
| | Partially Positive attitude (>28) | 6 | 10.00 | | |
| Income | Low income (Up to 35) | 33 | 55.00 | 11 | 18.30 |
| | Medium income (36 to 50) | 15 | 25.00 | 19 | 31.70 |
| | High income (>50) | 12 | 20.00 | 30 | 50.00 |

Education

Educational scores of the respondents ranged from 0.5 to 12 with an average of 6.05 and SD being 3.96 (Table 1). Table 1 showed that 30 of the respondents could sign only, 6.70 % of the respondents were primary level of education followed by 63.30% respondents had secondary and above secondary level of education. It indicates that maximum of the respondents were secondary and above secondary level of education. The result of the Table 2 also indicated that there was a portion (30%) of respondents who could sign only. This situation should be change by involving them in different educational activities.

Farming experience

Farming experience scores of the respondents ranged from 5 to 30. The Mean was 8.93 with SD being 4.35. Table 1 indicated that the highest proportion (76.60%) of the respondents had medium farming experience followed by 13.30% low and 10.00% high experience of the study area.

Family size

The numbers of family member of the respondents of the study area ranged from 2 to 12, with an average of 4.57 and SD being 1.51. Data in table 1 indicated that most of the respondents were in small family (53.30%) category followed by

medium (33.30%) and large (13.30%) family category. The average family size of Bangladesh is 5.6 (Anonnyous, 2002) while average family size of the study area were lower than the national figure shows a good sign of population control.

Farm Size

Data concerning the farm size of the respondents were shown in the Table 1. The average farm size of the respondents was 0.64 and SD being 0.25. Most of the respondents of the study area had small (88.30%) farm size followed by marginal (11.70 %) farm size respectively. Therefore, from these results it might be concluded that most of the respondents of the study area were under the group of small farmers.

Training Exposure

The total duration of training received by the respondents ranged from 1 to 11(days) with an average 4.58 and SD 2.18. Table 1 indicated that the highest proportion (70.00%) of the respondents had received medium duration training, 20.00% respondents had received short duration training and 10.00% respondents had received long duration training. This was due to fact that Food Security Project mostly provided medium duration training.

Extension contact

Data presented in Table 1 indicated that the highest proportion (85.00%) of the respondents had medium extension contact as compared to 11.70 percent having high extension contact and 3.30 percent low extension contact. From this Table, it might be concluded that majority of the respondents' extension contact was medium. Extension contact pertains to one's contact with multifarious sources of knowledge and information. This results in cognitive change of the users with an eventual change in behavior and also in skill. For this specific study, the respondents of that area gained considerable amount of knowledge on food security project.

Attitude towards Food Security Project

From data it was clear that most of the respondents (88.30%) had moderately positive attitude compared to 10 percent having highly positive attitude and 1.70 percent having partially positive attitude towards food security project. It was found from Table 1 that 88.30% respondent maintained moderately positive attitude towards Food Security Project. The respondents maintained moderately positive attitude indicated a positive effect towards food security project.

Impact of Food Security Project

Food security project has supposed to play some positive role in changing use or irrigation, balanced fertilizer, crop production, annual income and credit received and utilization. The impact of Food Security Project was measured on the basis of extent of change occurred in use of optimum irrigation water, use of balanced fertilizer, credit received and utilization, crop production and annual income of the respondent. This chapter attempts to discuss about these changes.

Impact on irrigation

Table 2 revealed that the highest proportion (71.70%) of the respondents used optimum irrigation water after involvement with Food Security Project compared to 68.30% medium use of irrigation water before involvement. This indicated that the percentage of respondents was increased in optimum use of irrigation water after involvement with Food Security Project.

Impact on irrigation on rice production

Table 2 revealed that the highest proportion (76.70%) of the respondents used optimum irrigation water for rice production after involvement compared to 8.30 % optimum use before involvement with Food Security Project. This outcome indicated that the percentage of respondent was increased who used optimum irrigation water on rice cultivation after involvement with Food Security Project.

Impact on irrigation on potato production

The findings in Table 2, it was observed that 78.79 % of the respondents were in the optimum use

category after involvement with Food Security Project but 75.76 % of the respondents were in the medium use category before involvement with Food Security Project. These findings indicated

that the percentage of the respondent was increased in relation to optimum use of irrigation water on potato cultivation due to Food Security Project activities

Table 2

Extent of cumulative use of irrigation and crop production by the respondents after and before involvement with food security project.

| Categories | | Before involvement | | After involvement | |
|--|-------------------|--------------------|--------|-------------------|--------|
| | | N | % | N | % |
| Irrigation | Low use | 12 | 20.00 | 4 | 6.70 |
| | Medium use | 41 | 68.30 | 13 | 21.70 |
| | Optimum use | 7 | 11.70 | 43 | 71.70 |
| Irrigation on rice production | Low | 16 | 26.7 | 4 | 6.70 |
| | Medium | 39 | 65.0 | 10 | 16.70 |
| | Optimum | 5 | 8.30 | 46 | 76.70 |
| Irrigation water for potato production | Low use | 8 | 24.24 | 00 | 0.00 |
| | Medium use | 25 | 75.76 | 7 | 21.21 |
| | Optimum use | 0 | 0.00 | 26 | 78.79 |
| Irrigation water for maize production | Low use | 29 | 76.32 | 00 | 0.00 |
| | Medium use | 9 | 23.68 | 4 | 10.53 |
| | Optimum use | 0 | 0.00 | 14 | 89.47 |
| Crop production | Low production | 7 | 11.7 | 5 | 8.30 |
| | Medium production | 42 | 70.00 | 37 | 61.70 |
| | High production | 11 | 100.00 | 60 | 100.00 |

Impact on irrigation on rice production

Table 2 revealed that the highest proportion (76.70%) of the respondents used optimum irrigation water for rice production after involvement compared to 8.30 % optimum use before involvement with Food Security Project. This outcome indicated that the percentage of respondent was increased who used optimum irrigation water on rice cultivation after involvement with Food Security Project.

Impact on irrigation on potato production

The findings in Table 2, it was observed that 78.79 % of the respondents were in the optimum use category after involvement with Food Security Project but 75.76 % of the respondents were in the medium use category before involvement with Food Security Project. These findings indicated that the percentage of the respondent was increased in relation to optimum use of irrigation water on potato cultivation due to Food Security Project activities.

Impact on irrigation on maize production

In Table 2, it was observed that 89.47% % of the respondents were in the optimum use category after involvement with Food Security Project but 76.32% of the respondents were in the low use category before involvement with Food Security Project. These findings indicated that the percentage of the respondent was increased in relation to optimum use of irrigation water in maize cultivation due to Food Security Project activities.

Impact on fertilizer use

Food security project has supposed to take part in some positive role in changing apply of balanced fertilizer and organic manure.

Impact on fertilizer use on rice production

From the Table 2 it was observed that 46.7 % and 36.7% respondents were involved in use of urea correctly on rice production after and before involvement with the project respectively. Hence,

the percentage of respondents was increased in use of balanced fertilizer and organic manure on rice cultivation after involvement with food security project.

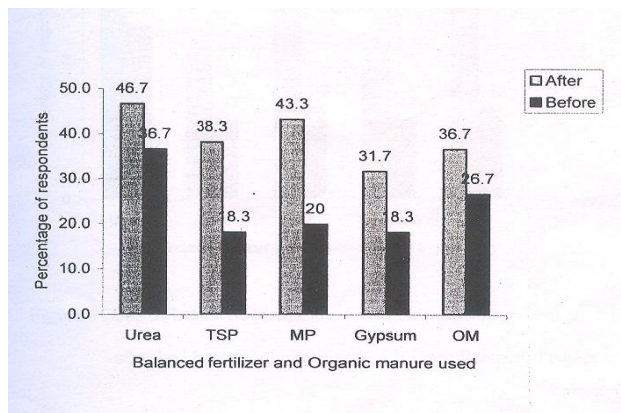


Figure 1
Use of balanced fertilizer and organic manure on rice production after and before involvement with food security project.

Impact on fertilizer use on wheat production

From the figure 2, it was found that 3.33 % and 2.5 % respondents were involved in use of urea correctly on wheat production after and before involvement with the project respectively. Hence, the percentage of respondents was increased in use of balanced fertilizer and organic manure on wheat cultivation after involvement with food security project.

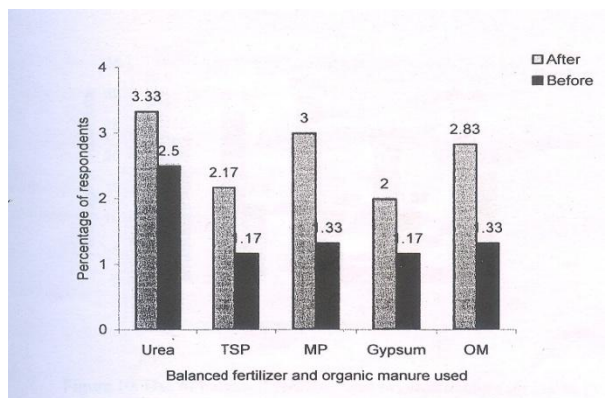


Figure 2
Use of balanced fertilizer and organic manure wheat production after and before involvement with food security project

Impact on fertilizer use on maize production

Data presented in figure 2 showed that 30.50 % and 23.00 % respondents were involved in use of urea correctly on maize production after and before involvement with the project respectively. From the study it was revealed that the percentage of respondents was increased after involvement with Food Security Project.

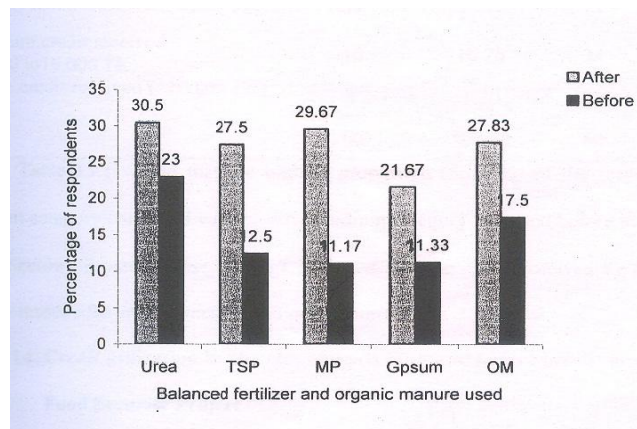


Figure 3
Use of balanced fertilizer and organic manure on maize production after and before involvement with food security project.

Impact on credit facilities

Table 3 revealed that the highest proportion (56.70%) of the respondents was in medium category compared with 16.70% medium category after and before involvement with food Security Project. These findings indicated that the credit received by the respondents was increased after involvement with Food Security Project.

It is shown that the highest proportion (95%) of the respondents was large credit utilization category compared with 25% large credit utilization category after and before involvement with Food Security Project respectively. These Findings indicated that the percentage of the respondents in relation to credit utilization was increased after involvement with Food Security Project.

Table 3
Credit received by the respondents after and before involvement with food security project.

| Categories | Before involvement | | After involvement | |
|---------------------------------------|--------------------|-------|-------------------|-------|
| | N | % | N | % |
| Credit received | | | | |
| Small credit received | 49 | 81.70 | 14 | 23.30 |
| Medium credit received | 10 | 16.70 | 34 | 56.70 |
| Large credit received | 1 | 1.70 | 12 | 20.00 |
| Credit utilize | | | | |
| Small credit utilization (<54%) | 6 | 20.00 | 0 | 00 |
| Medium credit utilization (54%to 82%) | 39 | 65.00 | 3 | 5.00 |
| Large credit utilization (>82%) | 15 | 25.00 | 57 | 95.00 |

Table 4
Differences between means of crop production of the farmers after and before involvement with food security project.

| Name of crops | Crop production(t/ha) | | | | | |
|-----------------------|-----------------------|------|-------------------|-------|--------------------|-------------|
| | Before Involvement | | After Involvement | | T-value | Probability |
| | Mean | SD | Mean | SD | | |
| Rice | 4.46 | 2.13 | 5.46 | 2.41 | 16.96** | 0.000 |
| Wheat | 0.035 | 0.15 | 0.048 | 0.017 | 1.69 ^{ns} | 0.096 |
| Mustard | 0.004 | 0.01 | 0.025 | 0.012 | 1.44" | 0.155 |
| Potato | 1.95 | 1.85 | 2.47 | 2.40 | 5.81** | 0.000 |
| Maize | 1.99 | 1.72 | 2.72 | 2.36 | 7.85** | 0.00 |
| Total crop production | 8.43 | 4.90 | 10.71 | 6.10 | 12.62** | 0.000 |

**= Significant at 0.01 level of probability NS= Non Significant

Impact on annual income

Table 1 indicated that before joining with Food Security Project 20 % respondents were in high income category but after joining with Food Security Project 50% respondents were in the above mentioning category. So observed result indicated that the extent of the respondents in relation to in high income category were increased after the involvement with Food Security Project activities.

Impact on total crop production

Table 2 revealed that before joining with Food Security Project 18.30 % respondents would get high level of crop production but after joining with

Food Security Project 30% of respondents were being benefited by high level of crop production. So observed result indicated that the extent of the respondents in relation to high level of crop production were increased after tile involvement with food security project activities.

Table 4 showed the differences between means of crop production of the farmers after and before involvement with Food Security Project were tested by computing t-value. As shown in Table 4, mean production of rice, potato and maize and total crop production increased significantly after involvement. The corresponding t-values were 19.96, 5.81, 7.85 and 12.62 respectively. Therefore it might be concluded that production of rice,

potato and maize increased significantly due to hood Security Project activities.

CONCLUSION

After involvement by the respondents with Food Security Project, the production of rice, potato and maize were significantly increased except wheat and mustard. The wheat and mustard cultivation were shifted by other profitable crops like boro, potato and maize.

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