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## Impact Assessment of Integrated Farming Systems at FSRD Site, Goyeshpur, Pabna, Bangladesh

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**Abstract:** The average family size 5.10 and effective family member of all farm category 2.33 was found in project farmers (PF). While the average family size 4.87 and effective family member 2.67 was recorded in non-project farmers (NPF). Average 42.33 and 53.33% in project farm and 64.33 and 18% farmers in non-project farm were found in between education level I-V and VI -X. Average 17.67% farmers were reported illiterates in non-project farm. About 62% farmers in project farm replied that agriculture+business was their main occupation while 72% replied only agriculture was main occupation. A total 27 different modern technologies were used by project farmers whereas non-project farmers used only 8 both traditional and improved technologies in agriculture production. Marginal farmers used highest numbers of technologies in homestead area compared to small and medium farmers. Yield was found 217% higher by the PF of medium group than non-project farmers due to use of new technologies at different production units by the project farmers. The results indicated that higher yield was possible to the project farmers by adopting or using new technologies and resources. Farm income was higher (Tk. 44095/farm/year) with the project farmers than that of non-farm project (Tk. 37770/farm/year). Cash balance of the project farmers was also found higher than that of non-project farmers.

**Key words:** Impact, homestead, resource use, productivity, technology, integrated farming and adoption

### Introduction

Poverty is the common feature in rural areas of Bangladesh. The causes of rural poverty are not independent rather they are integrated and holistic in nature. In the context of faster development, an effective mechanism has been developed by the Bangladesh Agricultural Research Institute (BARI) through Farming Systems Research and Development (FSRD) activities. This mechanism creates opportunities for participation of the farmers and researchers in developing and transfer of technologies.

The component approach in farming systems research and development fail to create interaction effects among the components. But a whole farm research approach, evaluates research and development activities in whole farm systems for the interest of the society (Harwood, 1979).

Impact studies of different FSRD activities indicated that traditional research systems failed to show any significant improvement in poverty level of the resource poor farmers (Khan *et al.*, 1990; Islam *et al.*, 1990).

In Bangladesh, there are increasing demands for evidence and documentation of adoption of technologies and the impact of farming systems research and development (FSRD) activities. In the past investigation made on only

the rate of adoption of technologies and factors contributing to adoption by the farmers. But none of them attempted to determine the consequence of adoption in terms of increases or decreases in yield, income and farmers expenditure pattern. Therefore, the present study has been taken to determine the extend of adoption of FSRD activities and its impact on different farm families. The study was therefore, aimed to determine the extend of adoption of intervened technologies and to evaluate the impact of FSRD activities on resources use, productivity and socioeconomic development.

### Materials and Methods

The survey was planned and conducted during January to March, 2002 at FSRD site, Goyeshpur, for project farmers (PF) and at the village Baloghata, Pabna which was 8 km far from the project area for non project farmers (NPF). The stratified random sampling technique was applied in selecting the sample farmers from the three farm categories. All together, 15 farmers were selected and interviewed taking 5 farmers from each farm category. The selected farmers were categorized in marginal (0.21-0.50 ha) small (0.51-1.0 ha) and medium (1.01-2.0 ha) farm groups (Anonymous, 1999). The major interventions were done on crop, livestock, homestead, fisheries and

household fisheries and household fuel management. In the crop sector, interventions were made on cropping patterns. In homesteads, interventions were on vegetable production in open sunny places, utilization of shady area by growing spices and introduction of multipurpose plant species for fruits. In the fisheries sector, backyard ditches were utilized for growing seasonal fishes. In the livestock sector, interventions were made on poultry, duck, pigeon and apiculture. In household fuel management modification of the existing oven was made to save fuel. The changes occurred in different aspects were determined through monitoring and survey of both the group of farmers.

Necessary information was collected through face to face interview methods with pre-tested survey schedule. The collected data were then edited, summarized and analyzed to fulfil the objectives of the study. Tabular methods of analysis like mean, average, percentage, ratio etc., were followed to explain the result.

### **Results and Discussion**

The average family size was 5.10 for project farmers (PF) and 4.87 for non project farmers (NPF) considering all farm category, which was lower than national average (5.60) in Bangladesh (Anonymous, 1999). Effective family members of all farm categories were 2.33 and 2.67 for project and non-project farmer respectively. In the project area about 42.33 and 53.33% farmers were between I-V and VI-X education level respectively. About 64.33 and 18% farmers were between I-V and VI-X education level respectively and 17.67% farmers were reported illiterates in non-project farm. Agriculture was the main occupation of the majority (71%) in non-project area. The marginal farmers of the project area and non-project area attained in 6 and 1 training program to increase the knowledge of production technology respectively. Considering all farm categories the sample farmers of project area received more loan or credit (Tk. 7661) than non project farmers from bank/NGOs for purchasing crop land and repairing of irrigation equipment (Table 1).

**Technology adopted by the sample farmers:** The resource poor farmer (land less and marginal) who represent 65% of the farmers community (Khan *et al.*, 1998) generally have very little risk bearing capacity and they lack enough confidence in new technologies until it is successfully tried in his own situation. High cost technology with liberal use of inputs have resulted in dramatic increase in productivity. It was revealed that farmers of the non-

project area used 8 technologies with traditional method considering all farm categories (Table 2). Farmers of the project area were able to use 27 different technologies i.e., 6 for crop sector, 18 for homestead, 2 for livestock and one for fisheries sector. By using new technology they increased their productivity, income and standard of livings. Marginal farmers, were used highest number of technologies in homestead area compare to small and medium farm category.

**Impact on resource use and productivity:** The study took into ten resources or production units by which project farmers grow vegetables round the year while non-project farmers grew four to five resources widely for producing vegetables. The resources were open land of homestead, house roof, fence, trelli, partially shady area, marshy land, tree support, waste land, house boundary, pond bank and road site etc which can be as a means of production unit for vegetable cultivation. Farmers of the non-project area were found to use three to four production unit or resources with traditional method. Farmers of project area were able to use each and every possible production units efficiently for own consumption and surplus to sale for more cash income. It was found that the marginal farmers in project area got the highest yield 25, 152, 15, 120 and 111 kg from the production unit of fence, trelli, marshy land, backyard land and controlling of mango hopper (Table 3). On the other hand marginal, small and medium farmers of non-project area got the highest yield from the production unit of back yard land, open land of homestead and house roof respectively. Yield was found 217% higher from medium farm category in project farm (PF) than non-project farmers (NPF) due to improved management and new technologies were used in different production units by the project farmers. The result indicated that higher yield was possible to the project farmers by adopting or using new technologies and effective use of resources.

**Impact on farm income and expenditure:** Comparisons of income and expenditures were made on whole farm basis (Table 4). Farm income was found 42, 83 and 68% of total income for marginal, small and medium farms respectively of project farms and whole the farm income was 28, 49 and 57% of total income for marginal, small and medium farmers for non project farms. Farm income was the dominant source for small and medium farmers of project farm and non-farm income was dominant of non-project farms for marginal and small farmers. The marginal farmers

Table 1: Socio-economic characteristics of sample farmers by farm category at FSRD site, Goyeshpur, Pabna 2001-2002

Parameters	Project farms				Non-project farms			
	Marginal	Small	Medium	All	Marginal	Small	Medium	All
<b>Educational level (%)</b>								
Illiterate	-	-	-	-	20.0	13.0	20.0	17.67
I-V	80.0	33.0	14.0	42.33	60.0	80.0	53.0	64.33
VI-X	20.0	67.0	73.0	53.3	20.0	7.0	27.0	18.00
Above X	-	-	13.0	-	-	7.0	-	-
Family size (No.)	5.3	5.0	5.0	5.1	5.2	4.2	5.2	4.87
<b>Source of income (%)</b>								
Agriculture	100.0	33.0	80.0	37.67	87.0	73.0	53.0	71.00
Agri+Business	-	67.0	20.0	62.33	13.0	27.0	33.0	24.33
Agri+Service	-	-	-	-	-	-	130.0	4.33
Effective family member (No.)	2.0	2.0	3.0	2.33	3.0	2.0	3.0	2.67
<b>Farm size (decimal)</b>								
Own land	50.33	145.33	340.0	178.56	99.9	156.8	355.5	204.07
Homestead	27.60	24.3	36.5	29.47	14.0	18.6	17.0	16.53
Pond/ditch	8.67	23.9	15.0	15.86	18.0	11.2	12.8	14.00
Training received	5.20	4.6	3.3	4.37	1.0	-	-	0.33
Credit received (Tk.)	2750.00	6900.0	13333.0	7661.0	4200.0	9800.0	3250.0	5750.00

Table 2: Number of technologies adopted by the project and non project farmers by farm category at FSRD site, Pabna 2001-2002

Name of the technology	Technology adapted							
	Project farm				Non project farm			
	Marginal	Small	Medium	All	Marginal	Small	Medium	All
Crop sector	2	8	7	6	2	7	6	5
Homestead sector	20	19	15	18	4	3	4	3
Livestock sector	2	2	2	2	1	0	0	-
Fisheries sector	1	1	2	1	0	0	0	-
Total	27	30	26	27	7	10	10	8

Table 3: Average yield from different resources of project and non-project farmers by farm category at FSRD site, Goyeshpur, Pabna 2001-2002

Resources	Project farm (kg/farm/year)				Non-project farm (kg/farm/year)			
	Marginal	Small	Medium	All	Marginal	Small	Medium	All
<b>Homestead garden</b>								
By using bed		149	144	161	151.33	-	-	-
By using open land (radish, stem amaranth, Indian spinach, cabbage, brinjal, tomato, okra etc.)		-	-	-	-	47	105	32
61.33								
<b>House roof</b>								
(Pumkin, ash gourd etc.)		111	258	67	145.33	46	103	71
73.33								
<b>Fence</b>								
(Bitter gourd, yard long bean etc.)		25	18	11	18.00	-	-	-
-								
<b>Trials</b>								
(bitter gourd snake. gourd etc.)		152	107	69	109.33	55	84	60
66.33								
<b>Shady area</b>								
(elephant. foot yam, leaf aroid, chili etc.)		72	86	117	-91.67	-	20	18
12.67								
<b>Marshy land</b>								
(Water taro etc.)		15	13	8	12.20	-	-	-
-								
<b>Tree support</b>								
(Country bean, sponge gourd, ribbed gourd, potato yam)		12	38	22	24.00	-	-	-
15								
<b>Waste land/back yard</b>								
(Banana, drum stick etc.)		120	65	12	65.67	65	-	-
21.67								
<b>House boundary</b>								
(Papaya, guava etc.)		93	242	296	210.33	25	57	61
47.67								
<b>Pond bank</b>								
(Bottle gourd, country bean, sponge gourd etc.)		-	211	108	106.33	28	-	-
9.33								
<b>Control of mango hopper by using</b>								
Modern method		111	83	79	91.00	-	-	-
-								
Traditional method		-	-	-	-	43	91	58
64.00								
<b>Total</b>		860	1265	950	1025	309	505	300
371.33		(178%)	(150%)	(217%)	(176%)			

Table 4: Whole farm cash flow of project and non project farmers by farm category at FSRD site, Goyeshpur, Pabna 2001-2002

Income/expenses (Tk./farm/year)	Project farm			Non project farm		
	Marginal	Small	Medium	Marginal	Small	Medium
Total income	70049	62046	74143	30376	46876	131645
Farm income	29671(42%)	51770(83%)	50843(68%)	8698(28%)	23226(44%)	75385(57%)
Non farm income	40378	10276	23300	22178	23650	56260
Total expenses	33351	31841	51859	30010	32964	93948
Farm expenses	15601	27845	38885	11395	10112	56207
House hold expenses	17750	3996	12974	18615	22852	37741
Cash balance	36698	30205	22284	866	13912	37697

Farm income includes: Income from crop livestock and fisheries sector, Non farm income includes -income from business, service, gift etc., Household expense includes - food, cloth, education, medical, cosmetics etc., Farm expense includes-purchase of inputs.

of both project and non-project farms spent their cash to meet up farm expenses. The result indicated that for small and medium farmers, farm income increased with the appropriate use of resource and adoption of high yielding modern technologies.

It was observed that small and medium farmers earned higher income from farm income in project farms and non-project farms. Therefore, step should be taken for wider adoption of modern technology in agriculture and ensure efficient use of resources through extension services to the resource poor farmers of project and non project farmers.

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