Progress. Agric. 20(1 & 2) : 253 – 258, 2009 ISSN 1017-8139

COMPARATIVE PROFITABILITY OF *BORO* RICE AND POTATO PRODUCTION IN SOME SELECTED AREAS OF MYMENSINGH DISTRICT

S. Ahmed[1], M. H. A. Rashid[2] and N. Chowdhury[2]
Department of Agricultural Economics, Bangladesh Agricultural University
Mymensingh-2202, Bangladesh

ABSTRACT

This study was undertaken to determine and compare the profitability of *Boro* rice and potato production. In total 60 farmers of which 30 *Boro* rice growers and 30 potato growers were selected randomly from four villages of Gouripur Upazila in Mymensingh district. Descriptive as well as statistical analysis were done to achieve the objectives of the study. The Cobb-Douglas production function was used to determine the effects of individual inputs on *Boro* rice and potato production. The major findings of the study were that the cultivation of *Boro* rice and potato was profitable from the view point of farmers. The per hectare total return from *Boro* rice and potato were Tk. 83,320.00 and Tk. 2,62,625.22 respectively. The gross cost of *Boro* rice and potato production were Tk. 54,202.74 and 1,20,221.71 respectively. Again the net return from *Boro* rice and potato were Tk. 24,117.26 and 1,42,403.51 respectively. The Benefit Cost Ratio (BCR) was 1.41 and 2.18 respectively for *Boro* rice and potato production. The results indicated that potato production was more profitable than *Boro* rice production. It was also evident from the study that per hectare net returns were influenced by most of the factors included in model.

Key words : Profitability, *Boro* rice, Potato

INTRODUCTION

Bangladesh is a country dominated by agriculture. The combined contribution of all sub sectors of agriculture (crop, livestock, forestry and fisheries) to GDP is 21.77 per cent. The crop sub sector alone contributes 12.19 per cent to GDP (Bangladesh Economic Review, 2006). Rice is a staple food and potato is an important cash crop for farmers in the Sub-Tropical Eastern Indo-Genetic Plains of India and Bangladesh (Anon, 2004-2005). In Bangladesh, the rice area is about 10 million hectare and 75 per cent of the total area of agricultural crops and 93 per cent of the total area planted to cereals. The rice production is by far the most important provider of rural employment (HIES 2005 and BBS 2006).

[1] Post-graduate students, Department of Agricultural Economics, Bangladesh Agricultural University Mymensingh-2202, Bangladesh
[2] Professor and Lecturer, respectively, Department of Agricultural Economics, Bangladesh Agricultural University Mymensingh-2202, Bangladesh

Potato is one of the important cash crops in Bangladesh as its added value to agricultural sector is about Tk. 44016 million in 2007 – 08 (BBS, 2007). Potato is an important and leading staple crop of the world and occupied topmost position after rice and wheat in respect of production consumption (Akhter *et al.,* 1998)**.** It is an important vegetable crop for cash income. The production of vegetables including roots and tubers in our country is low so that per capita availability is about 13 per cent of the total requirements (Saha, 2005). Prominent argument for giving more attention to the production of non-rice crops are that these have the potentials to improve not only the nutritional status but also improve soil fertility that is being depleted due to mono-culture with rice (Biswas and Sarkar 1987; Bhuiyan 1989 and Mirnada 1989). The yield of irrigated HYV *Boro* rice has increased significantly over the past years (BBS 2006), but rice is one of the most costly crops, the return from HYV *Boro* rice has declined because of low market price and high cost of production. Therefore, the present study was designed to estimate relative costs and returns of producing *Boro* rice and potato.

MATERIALS AND METHODS

The study was conducted at Gouripur upazila of Mymensingh district in 2009. Data for the present study were collected from the selected farmers of four villages namely: Bhagnabari, Chorkalibari, Chornilaikha, Rupnakandi under Gouripur upazila in Mymensingh district. In total 60 farmers of which 30 *Boro* rice growers and 30 potato growers were selected randomly. The following algebric equation was developed to asses the costs and returns of *Boro* rice and potato production.

$$GRi = \sum_{i=1}^{n} Q_{mi} P_{mi} + \sum_{i=1}^{n} Q_{bi} P_{bi}$$

Where,

GR_i = Gross return from i^{th} product (Tk/ha)
Q_{mi} = Quantity of the i^{th} main product (kg/ha)
P_{mi} = Average price of the i^{th} main product (Tk/kg)
Q_{bi} = Quantity of the i^{th} by product (kg/ha)
P_{bi} = Average price of the i^{th} by product (Tk/kg)
i = 1,2,3, … n

Net return was calculated by deducting all costs (variable and fixed) from gross return. To determine the net return of *Boro* rice and potato production the following equation was used in the present study:

$$\pi = PyY - \sum_{i=1}^{n} (P_{xi} X_i) - TFC$$

Where,

π = Net return (Tk/ha)
P_y = Per unit price of the product (Tk/kg)

Y = Quantity of the product per hectare (kg)
P_{xi} = Per unit price of i^{th} inputs (Tk)
Xi = Quantity of the i^{th} inputs per hectare (Kg)
TFC = Total fixed cost (Tk)
i = 1,2,3, …, n (number of inputs).

To determine the contribution of variable inputs to the production of *Boro* rice and potato, Cobb-Douglas form of regression equation was employed:

$$Y = aX_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} X_5^{b_5} X_6^{b_6} X_7^{b_7} X_8^{b_8} X_9^{b_9} e^{u_i}$$

By taking log on both sides the Cobb-Douglas production function was transferred to the following logarithmic form because it could be solved by the ordinary least squares (OLS) method.

$$\ln Y = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + b_7 \ln X_7 + + b_8 \ln X_8 + b_9 \ln X_9 + U_i$$

Where,
Y = gross return (Tk/ha)
X_1 = costs of seed (Tk/ha)
X_2 = costs of human labour (Tk/ha)
X_3 = costs of animal power (Tk/ha)
X_4 = costs of power tiller (Tk/ha)
X_5 = costs of Urea (Tk/ha)
X_6 = costs of TSP (Tk/ha)
X_7 = costs of MP (Tk/ha)
X_8 = costs of insecticides (Tk/ha)
X_9 = costs of irrigation (Tk/ha)
a = constant/intercept (Tk/ha)
$b_1, b_2, \ldots b_9$ = coefficients of respective variables
U_i = Error term
In = Natural logarithm

RESULTS AND DISCUSSION

Relative profitability of *Boro* rice and potato production is presented in Table 1. It is observed that per hectare total value of *Boro* rice and potato production were Tk. 82,320.00 and Tk. 2,62,625.22 respectively. Gross cost of *Boro* rice and potato production were Tk. 58,202.74 and Tk. 1,20,221.71 respectively. Net returns of *Boro* rice and potato production were Tk. 24,117.26 and Tk. 1,42,403.51 respectively. The undiscounted benefit cost ratios of *Boro* rice and potato were 1.41 and 2.18 respectively. It is evident from the Table 1 that potato production was more profitable than *Boro* rice production in the study area.

Table 1. Per hectare yield, costs and returns *Boro* rice and potato production

Particulars	*Boro* rice	Potato
Yield (kg)	6,000	16,302
Price (Tk/kg)	13.50	16.11
Value of product (Tk)	81,000	2,62,625.22
Value of by product (Tk)	1,320	-
Gross return (Tk)	82,320	2,62,625.22
Variable cost (Tk)	42,917.8	1,07,188.99
Fixed cost (Tk)	15,284.94	13,032.72
Gross cost (Tk)	58,202.74	1,20,221.71
Gross margin (Tk)	39,402.2	1,55,436.23
Net margin (Tk)	24,117.26	1,42,403.51
BCR (undiscounted)	1.41	2.18

Source : Ahmed (2009)

Table 2. Estimated values of the coefficients and related statistics of Cobb-Douglas production function of *Boro* rice and potato

Exploratory variables	*Boro* rice		Potato	
	Values of coefficients	t-value	Values of coefficients	t-value
Intercepts	19029.133	1.588	50874.894	
Seeds (X_1)	1.898*	4.165	1.218**	2.426
Human labour (X_2)	-0.780**	-2.382	0.010	0.026
Animal power (X_3)	-	-	0.047	-0.163
Power tiller (X_4)	-0.145	-0.238	-0.525	-4.026
Urea (X_5)	0.192	0.565	-0.042	-0.417
TSP (X_6)	0.356***	1.820	-0.789**	-2.895
MP (X_7)	-0.082	-0.547	-0.525*	-4.026
Insecticides (X_8)	-0.078	-0.654	0.824***	2.053
Irrigation (X_9)	-0.676	-0.1357	-	-
R^2	0.787		0.851	
Adjusted R^2	0.706		0.794	
F-value	9.702		14.994	
Sample size	30		30	

Source : Field survey 2009, * Significant at 1 per cent level, ** Significant at 5 per cent level, *** Significant at 10 per cent level

It is evident from Table 2 that the value of the coefficients of multiple determination (R^2) were 0.787 and 0.851 for *Boro* rice and potato respectively which means that the explanatory variables included in the model explained 78.7 and 85.1 per cent of total variation in *Boro* rice and potato production respectively.

The measure of the overall fit of the estimated regression, F-value of all the cases were highly significant at 1 per cent level, implying that the variables significantly explained the variation in returns of *Boro* rice and potato production.

The explanatory variables were human labour, seed, power tiller, fertilizer, insecticides and irrigation for *Boro* rice production and human labour, seed, animal power, power tiller, fertilizer and insecticides for potato production. In case of *Boro* rice, estimated values of the relevant coefficient revealed that among the included variables, seed and TSP showed positive and significant effect, human labour showed negative but significant effect. For potato production, estimated values of the relevant coefficient revealed that among the included variables, seed, pesticides showed positive and significant effect, TSP and MP showed significant but negative effect on gross return.

CONCLUSION

It is evident from the results of the present study that both *Boro* rice and Potato production in the study areas were profitable. Potato production is more profitable than *Boro* rice. It revels that there has been an ample scope for the farmers to increase their income by practicing this sort of non-rice crops.

REFERENCES

Ahmed, S. 2009. *A Comparative Economic Study of Boro rice and Potato Production in Some Selected Areas of Mymensingh District*. Unpublished, M. S. Thesis, submitted to the Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Akhter, M. E. M. S., Ali, Z. N., Huq, A. K. M. A., Habib, M. A. and Hossain, A. B. S. 1998. Granula, Cleopatra and Binella New Potato Varieties in Bangladesh, *Prog. Sci*., 24(1): 133-143.

Anonymous. 2004-2005. Agricultural Statistics at a Glance. Ministry of Agriculture, Government of India.

Bangladesh Economic Review 2006. Economic Advisors Wing Finance Division, Ministry of Finance, Government of the People's Republic of Bangladesh.

BBS 2006. *Statistical Yearbook of Bangladesh*. Bangladesh Bureau of Statistical Division. Ministry of Planning. Government of the People's Republic of Bangladesh.

BBS 2007. *Statistical Yearbook of Bangladesh*. Bangladesh Bureau of Statistics, Statistical Division. Ministry of Planning. Government of the People's Republic of Bangladesh.

Bhuyian, S. I. 1989. Irrigation and Water Management for Diversified Cropping in Rice Irrigation Management Network Paper, 89/1C.

Biswas, M. R. and Sarkar, R. I. 1987. Crop Diversication with Existing Irrigation Management : A Challenge in Bangladesh. Irrigation Management for Diversified Cropping.

HIES, 2005. Reports on Household Income and Expenditure Survey, Ministry of Planning, Dhaka, Bangladesh.

Mirnada, S. M. 1989. Irrigation Management for Crop Diversification in Indonesia, Philippines and Sri Lanka. A Synthesis of IIMI Research Technology, Colombo, Sri Lanka.

Saha, P. K. 2005. *A Comparative Economic Study of Wheat, Potato and Groundnut Production in Rowmari Thana of Kurigram District*. Unpublished, M. S. Thesis, submitted to the Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.