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Production of Hybrid (Alok 6201) and HYV Rice: Who Pays More?

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ABSTRACT

A comparative scenario of growing Hybrid (Alok 6201) and two other modern HYVs is presented in this study. Attempt was taken to describe the nature of input use, costs structure and comparative profitability of BRRI varieties and Hybrid rice in two different locations of Bangladesh. The study was conducted during winter (Boro) season of 1999. Analysis showed that, costs of production of Hybrid rice was about 28% higher than BRRI Dhan 29 and 35% higher than BR14. Gross return was found higher for BRRI Dhan 29 (Tk 46014 ha^{-1}) leading to pay better economic return. The net return and benefit-cost ratio (BCR) were also substantially higher for BRRI Dhan 29 compared to that of other two varieties. Applying the partial budgeting technique, the study further confirmed that BRRI Dhan 29 is more profitable than Hybrid (Alok 6201) and BR14. In terms of consumers' choice also, Hybrid rice appeared to be a less preferred dietary item.

Key words: Hybrid rice, economic return and partial budget

INTRODUCTION

Bangladesh is a land scarce country and the possibility of horizontal expansion of the cropped area is absolutely impossible. So, the only way to achieve higher production is to obtain higher yield per unit area. The introduction and expansion of MV rice brought a dramatic change in annual rice production from 8.48 million metric tons (milled rice) in 1960-61 to 20.88 million metric tones in 1999-2000. Presently, MV covers 93% areas in Boro, 30% in Aus and 47% in T. Aman crop seasons. The overall adoption of MV rice in Bangladesh is 62% (BBS, 1999).

Adoption of Hybrid rice is now considered as the superior technology over the existing inbred modern rice varieties. Hybrid rice technology is successful in China that gives 15 to 20% higher yield than the conventional MV rice, but was facing lower price in the market because of its poor grain quality as compared to prevailing modern HYVs (He *et al.*, 1987). Hybrid rice was shown to be less profitable than the inbred varieties, although the former had about 15% yield advantages (Hussain *et al.*, 2001). However, with the advent of hybrid rice technology in China, rice production has reached to 220 million metric tons in 1992 (Hybrid Dhan, 1999). So, through the adoption of Hybrid rice, Bangladesh with her small land holdings, intensive agriculture and a large number of educated unemployed youths, can exploit the situation (Das, 2000). But massive diffusion in the available Hybrid rice might be risky at least to some degrees because of the enormous technical and socio-economic reasons.

Very recently, a number of hybrid rice varieties have been reportedly cultivated in various parts of the country creating lot of confusions among the farmers, researchers and extension workers. Success of Hybrid varieties depends on their yielding capacity in comparison with the endemic rice varieties, quality of rice and the economic benefit that would make headway to the farmers. It should be wise to take into account all of those issues before release of hybrid varieties for massive cultivation in the farmers field. Although the country needs a couple of hybrid rice varieties to keep pace with the increasing demand for food grains, such varieties would not be suitable unless those are developed on the basis of local agro-ecological and climatic situation. It is reported that in Bangladesh, hybrid gives 20-25% higher yield than the existing rice varieties (BRRI 1999) but it needs performance evaluation at the farmers' field. With this view, the present study was undertaken to explore the aforesaid issues in the context of irrigated rice cultivation in two areas of Bangladesh, which are considered a bit advanced in agriculture. Aims of the study were to: know the nature of inputs used and cost structure of BRRI varieties and Hybrid rice; estimate the productivity of BRRI varieties and Hybrid rice as winter crop and determine the comparative profitability of BRRI varieties and Hybrid rice varieties.

MATERIALS AND METHODS

The study used primary data generated through sample survey carried out in two purposively selected locations. A total of 162 sample farmers were randomly selected from Kishoregonj and Netrokona districts. Out of 162 samples, 40 for BR14, 40 for BRRI Dhan 29 and 82 for Hybrid rice (Alok 6201) farmers were interviewed using predesigned questionnaire. Data were collected through the entire period of winter (Boro) crop. Collected data were then summarized, tabulated and analyzed in accordance with the objectives of the study. In this regard, mainly the conventional descriptive statistics were used. Partial budgeting technique was also employed to diagnose the relative profitability of growing hybrid rice over the inbred HYVs at the farmers' level.

RESULTS AND DISCUSSION

Inputs used

Total human labor needed for Hybrid rice (Alok-6201) was higher (190.77 day days ha^{-1}) than BRRI Dhan 29 (164.09 days ha^{-1}) and BR14 (158.99 days ha^{-1}) (Table 1). The application of fertilizer in BRRI Dhan 29 was higher (302 kg ha^{-1}) than BR14 (225 kg ha^{-1}) and fertilizer use for the hybrid (Alok-6201) rice were much higher (432 kg ha^{-1}) than BRRI Dhan 29. Farmers used manure only for hybrid rice varieties. The seed rate of BRRI varieties ranged from 55 to 60 kg ha^{-1} while, for Hybrid (Alok) rice, it was about 10 kg ha^{-1}.

Costs of production

Human labor cost for BR14, BRRI Dhan 29 and Hybrid rice were Tk. 12719, Tk. 13128 and Tk. 15257 ha^{-1}, respectively (Table 2). The cost of fertilizer was found higher for Hybrid rice than the other two varieties because of higher amount of fertilizer needed for the former one. Though the quantity of seed used for Hybrid rice was substantially lower than inbred varieties, cost of seed was much higher for Hybrid rice (Tk. 2050 ha^{-1}). However, costs of production of Hybrid rice was Tk. 23660 ha^{-1} and it was higher than BRRI Dhan 29 (Tk. 18230 ha^{-1}) and BR14 (Tk. 17424 ha^{-1}).

Returns

Average yield of BR14, BRRI Dhan 29 and Hybrid rice were 5530, 5800 and 5430 kg ha^{-1}, respectively (Table 3). Gross return was found higher for BRRI Dhan 29 (Tk.46014 ha^{-1}) followed by Hybrid rice (Tk.41611 ha^{-1}) and BR14 (Tk. 41147 ha^{-1}). The net return was also found higher in case of BRRI Dhan 29 (Tk. 27784 ha^{-1}) followed by BR14 (Tk. 23723 ha^{-1}). The lead in obtaining higher net return by BRRI Dhan29 eventually enabled it to achieve higher benefit cost ratio (2.52) compared to that of Hybrid rice (1.76).

Partial budget analysis

Partial budget analysis was also employed to assess the break down of economic advantage of Hybrid rice over the prevailing inbred variety. It was found that Hybrid rice cultivation was not profitable rather the adoption of Hybrid led to a loss of Tk. 5772 ha^{-1} while compared with BR14 (Table 4). Similar analysis between Hybrid versus BRRI Dhan 29 also revealed that Hybrid rice incurred a loss of Tk. 9833 ha^{-1} (Table 5). Farmers growing BRRI Dhan 29 and BR14 achieved profit of Tk. 9833 and Tk. 5772 ha^{-1}, respectively, instead of growing Hybrid rice. Partial budgeting analysis between BRRI Dhan 29 versus BR14 is given in Table 6 where it appears that, BRRI Dhan 29 is more profitable (Tk. 4061 ha^{-1}) than BR14 (Table 6).

Farmers' perceptions on hybrid rice

The perceptions of the sample farmers were obtained on their preferences to Hybrid rice grain for consumption. Majority (86%) of the respondents mentioned that cooked rice from Hybrid rice (Alok 6201) becomes more sticky to which the consumers are not accustomed to take. Many respondents (57%) raised the problem that cooked Hybrid rice can not be kept for long time i.e., the quality deteriorates within short time after cooking implying that the variety Alok 6201 has poor keeping quality compared to that of modern HYVs. Among other reasons, 45% reported that the tastes of Hybrid rice is not up to the mark, while 17% mentioned about inconvenience of cooking.

Table 1: Inputs used per hectare for BR14, BRRI Dhan 29 and Hybrid (Alok) in Boro Season, 1998

Items	BR14	BRRI Dhan 29	Hybrid (Alok)
Human labour (man-days ha^{-1}):			
Family	72.18	67.07	83.91
Hired	86.18	97.02	106.86
Total	158.99	164.09	190.77
Animal labour (pair-days):			
Family	19.78	21.18	19.38
Hired	5.24	4.52	12.48
Total	25.02	25.70	31.86
Fertilizer (kg ha^{-1}):			
Urea	139.00	163.00	240.00
TSP	86.00	94.00	102.00
MP	-	45.00	90.00
Manure (t ha^{-1})	-	-	0.45
Seed (kg ha^{-1})	55.00	60.00	10.00

Table 2: Costs and return of BRRI varieties versus Hybrid rice in Boro season, 1998

Items	BR14	BRRI Dhan 29	Hybrid (Alok 6201)
Human labour (Tk ha^{-1})	12719	13128	15257
Animal labour (Tk ha^{-1})	1501	1542	1976
Fertilizer (Tk ha^{-1})	2434	2720	3777
Manure (t ha^{-1})	-	-	600
Seed cost (Tk ha^{-1})	770	840	2050
Total costs of production (Tk ha^{-1})	17424	18230	23660

Table 3: Costs and return of BRRI varieties versus Hybrid rice in Boro season, 1998

Items	BR14	BRRI Dhan 29	Hybrid (Alok 6201)
Paddy yield (kg ha^{-1})	5530.00	5800.00	5430.00
Gross return (Tk ha^{-1})	41147.00	46014.00	41611.00
Paddy price (Tk/mt)	7208.00	7690.00	7395.00
Total costs of production (Tk ha^{-1})	17424.00	18230.00	23660.00
Net return (Tk ha^{-1})	23723.00	27784.00	17951.00
Benefit cost ratio	2.36	2.52	1.76
Production cost (Tk/kg)	3.15	3.14	4.36
Number of observation	40.00	40.00	82.00

Table 4: Partial budget analysis, Hybrid rice VS BR14, 1998

Items	Debit (Tk ha^{-1})	Items	Debit (Tk ha^{-1})
Costs of Hybrid rice production	23660	Return from Hybrid rice production	41611
Revenue forgone for not practicing BR14	41147	Costs saved for not growing BR14	17424
Profit/loss	-5772		
	59035		59035

Table 5: Partial budget analysis, Hybrid rice VS BRRI Dhan 29, 1998

Items	Debit (Tk ha^{-1})	Items	Debit (Tk ha^{-1})
Costs of Hybrid rice production	23660	Return from Hybrid rice production	41611
Revenue forgone for not practicing BR14	46014	Costs saved for not growing BR14	18230
Profit/loss	-9833		
	59841		59841

Table 6: Partial budget analysis, BRRI Dhan 29 VS BR14, Boro, 1998

Items	Debit (Tk ha^{-1})	Items	Debit (Tk ha^{-1})
Costs of BRRI Dhan 29 production	18230	Return from BRRI Dhan 29 production	46014
Revenue forgone for not practicing BR14	41147	Costs saved for not growing BR14	17424
Profit/loss	-4061		
	63438		63438

Table 7: Reasons stated by the respondents for non-suitability of Hybrid rice grain consumption, Boro,1998

	Frequency of Response	
Reasons	Alok 6201 (n=82)	Percent
Stickiness of cooked rice	71	86
Taste not so good	37	45
Quality deteriorates after cooking	47	57
Inferior quality	22	26
Inconvenience in cooking	14	17
Unfavorable odor	6	7
Others	5	6

Note: Multiple choice responses considered

Based on the early experiences of the adoption of hybrid rice in Bangladesh, it can be tentatively concluded that, costs involvement for hybrid rice production was higher (Tk 23660 ha^{-1}) than BRRI Dhan 29 (Tk 18230 ha^{-1}) and BR14 (Tk. 17424 ha^{-1}). Gross margin was found higher for BRRI Dhan 29 (Tk 46014 ha^{-1}) followed by hybrid rice (Tk 41611 ha^{-1}) and BR14 (Tk 41147 ha^{-1}). The net return and BCR were also found greater for BRRI Dhan 29 compared to other two varieties. Analysis of partial budgeting shows that BRRI Dhan 29 is more profitable in comparison with Hybrid rice and BR14. Therefore, efforts should be given more for the extended diffusion of BRRI Dhan 29 along with the associated technological management practices.

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