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Study on the production and profitability of BRRI dhan50 cultivation in south-western region of Bangladesh

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ABSTRACT

Knowledge gap and lack of practical experience of farmers are the main impediments to cultivate BRRI dhan50 in south-western region of Bangladesh. BRRI dhan50 is of interest as a means of addressing the higher production cost and lower profitability of the existing Boro cultivars. Therefore the present study was conducted to estimate the production and profitability of BRRI dhan50 rice in selected areas of Bagerhat, Satkhira and Khulna districts. An interview schedule was prepared containing all relevant questions and farmers responded the questions from their regular practice and experience. Primary data were collected from the randomly selected farmers during the period from August to September, 2016. During calculation of total production costs, purchase costs of seed, manure, fertilizer, and insecticides as well as cost of power tiller rent, irrigation, and land rent were taken into account. Per hectare costs were calculated for all inputs including farmer's own labor and hired labor and all other materials costs for producing BRRI dhan50 rice. Collected data were analyzed using SPSS 16.0and MS Excel program which helped to address the main objectives of the study. Cost and return analysis showed that input cost (cash costs) incurred for producing BRRI dhan50 in Bagerhat, Khulna and Satkhira were 82,555.34±1460.15, 83,228.03±852.13 and 76,148.51±1423.35 BDT/ha, respectively. The estimated fixed costs for producing BRRI dhan50 in Bagerhat, Khulna and Satkhira were 22,151.81±60.84, 25,411.09±292.70 and 27,630.01±128.74 BDT/ha, respectively. In south-western region, average total cost for BRRI dhan50 production was 105,815.62±927.84 BDT/ha. Gross return from BRRI dhan50 cultivation in Bagerhat, Khulna and Satkhira were BDT 107,761.3±3582.10, 125,383.9±3073.08 and 135,415.5±3300.78/ha, respectively. Accordingly, per hectare net return from BRRI dhan50 cultivation showed highly significant differences (P<0.001) in three districts where the means were 3054.2±2062.72, 16,744.63±2080.21 and 31,636.97±3270.48 BDT/hafor Bagerhat, Khulna and Satkhira, respectively. Average yield of BRRI dhan50 in these regions was observed 5.73±0.08 t/ha. The findings of the present study indicate that net return of BRRI dhan50 rice cultivation was highest in Satkhira district compare to Bagerhat and Khulna. However, the profit margin was very low because farmers received lower prices of rice during harvesting time and over the year.

Key Words: *BRRI dhan50, Production, Profitability and Cultivation*

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I. Introduction

Rice (*Oryza sativa* L) is the most widely consumed staple food for more than half of the world's population. Bangladesh agriculture involves in food production for 163.65 million people from merely 8.75 million hectares of agricultural land (Salam et al. 2014). According to the estimate of World Bank, by 2030 the population will have risen to 230 million, with nearly half of the population living in towns and cities. In future, more food will be needed to feed people because of the growing population. Food security in Bangladesh has long been synonymous with achieving self-sufficiency in rice (Brolley 2015). Rice security is not only an economic issue but also a crucial parameter for determinant social and political stability (Nath 2015).

Bangladesh is the fourth-largest rice producer among the world. Since independence, rice production in Bangladesh has increased three-fold, from almost 11 million tons in 1971-72 to about 34.86 million tons in 2014-15 (AIS 2016). This indicates that rice production growth has been much faster than population growth.Rice production has increased by 0.34 million metric tons per year in recent years (2009-10 to 2013-14) (BBS 2014). This increased rice production has been attainable due to the selection of high yielding modern rice varieties on around 66% of the rice land that contributes to about 73% of the country's total rice production (BRRI 2015). Among the modern varieties, high yielding Boro varieties have the maximum share in total production which is more or less stable.

There are 261 Boro varieties in Bangladesh were identified by nationwide survey (Hossain et al. 2005) and 41 of them are high yielding varieties (BRKB 2019). Among them BRRI dhan50 is known as "Bangla Moti rice". It is aromatic rice which is cultivated in Boro season. As far as quality and size, this fine aromatic rice is better than "basmati rice". It is a water logging resistant variety and developed for long time water logged region (BRKB 2011). But lack of adequate knowledge and practical experience, our farmers are not interested to cultivate BRRI dhan50 than the other popular rice varieties. Therefore, on the approach of "Feed the Future Bangladesh Rice Value Chain Project" was the introduction of this variety among the farmers proving seeds free of cost along with encouragement to cultivate it. After cultivation, a survey was conducted to observe the production performance of this variety. There is need to observe how far people are oriented towards BRRI dhan50 cultivation in view of other personal and socio-economic characteristics. The experiment was conducted to evaluate the production performance of BRRI dhan50 in three different districts of south-western coastal region, and to determine the production cost and profitability of BRRI dhan50 cultivation.

II. Materials and Methods

Although rice is grown in allover Bangladesh, the present study area was in south-western region in Bangladesh, where the farmers cultivated BRRI dhan50 by the approach of "Feed the Future Bangladesh Rice Value Chain Project". Based on higher cultivation rate of BRRI dhan50 rice, Dumuria and Batiaghata upazila under Khulna district; Tala and Kalaroa upazila under Satkhira district; and Kochua upazila under Bagerhat district were purposively selected for the study. The main reason for selecting the study areas were accessibility of numerous respondents in the regions, the regions had practically comparable soil type and geographical condition, the language and financial qualities of the villagers was familiar to the researchers, easy accessibility and good communication facilities. According to Yang (1958), the area in which a farm business survey is to be made depends on the purpose of the survey and possible cooperation's from the farmers. At first, production training of BRRI dhan50 was provided by the trainers under this project, which helped to grow the motivation among farmers to cultivate this variety. Some trained and motivated farmers collected the seeds from local International Rice Research Institute (IRRI) workers. Forty farmers were randomly selected from the trainees as well as the cultivators of BRRI dhan50 for the survey.

In conformity with the objectives of the study, a preliminary interview schedule was developed for collecting relevant primary data from the farmers. A set of survey schedules was carefully constructed to collect information for the study in accordance with the study's objectives. Before preparing the final survey questionnaire, a draft schedule was developed. Survey schedule was pretested by interviewing some farmers who cultivated BRRI dhan50 rice and necessary modifications, additions and alternations were made and then draft interview schedule was finalized for carrying out the survey activities.

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The primary data were collected during Boro season of 2016 using detailed structured questionnaires by using face to face interview method. Generally, farmers of Bangladesh do not keep any records. The answers of the farmers were completed from their memory. Therefore, the best possible effort was made to ensure gathering information correctly and accurately. Data were collected in native units and so it absolutely was transformed into standard unit. The collected data included production and marketing information of BRRI dhan50 which includes inputs like fertilizer, land, seed, quality and quantity of input, labor and output/yield and marketing information like prices of inputs and output, area basis price of rice in the market. To minimize the level of error, a brief introduction on the study's objectives was conveyed before the respondents were interviewed so that they could respond freely. Then in a systemic manner, the questions were asked and the records were kept into the schedule to minimize error. In addition to the survey, observation method was also applied to collect information.

In calculating profit or loss of an enterprise or relative profitability of different crops costing of inputs is essential. Farmers in the study area used both purchased and home supplied inputs to produce of BRRI dhan50 rice, which were valued at the prevailing market rate during survey period or at the price paid by the farmers. The output was also valued at the prevailing market price. Purchased inputs such as seeds, fertilizers, irrigation, pesticides, hired labor etc. involved out of direct expenses and therefore, pricing of these inputs was easy. But, since no cash payment was made for the home supplied inputs, the costs of these inputs were estimated by using the opportunity of cost principle. Calculation process of per hectare production cost of BRRI dhan50 rice have been presented in the following sub-sections:

Operating capital cost such as human labor, animal labor, power tiller, seeds, manure, fertilizers, pesticides, irrigation etc. costs were considered as input cost in these study areas. For calculating input cost following formula was used:

Total input cost = Seed/seedling cost + Seedbed preparation cost + Cost from transplantation to harvesting + Harvesting, threshing and heaping cost

Interest on operating capital was determined based on opportunity cost of principle. The operating capital represented the average operating costs over the period because all costs were not incurred at throughout the whole production period. Interest on operating capital was charged for a period of five months at the rate of Tk. 10 percent per annum. It was assumed that if the farmers received loan from a commercial bank for the period, they would have provided interest on the money at this rate. For calculating, interest on operating capital, following formula was used:

$$\text{Interest on total input cost} = \frac{\text{Total input cost} \times \text{rate of interest} \times \text{Time considered}}{12 \times 100}$$

Fixed costs are which do not change over the short-term as the amount of output changes and are incurred even when production is not undertaken. The interest on input cost/operating capital and land use cost were considered as fixed cost rice production in this study. For calculating fixed cost following formula was used:

Fixed cost = Land rate of that area + 10% interest on total input cost

For calculating total/gross cost following formula was used:

Total cost = Total input cost + Fixed Cost

Gross return per hectare was estimated by multiplying the total amount of product and byproduct produced by their respective prevailing market prices.

Gross return= (Total rice yield × Market price) + (Total byproduct × Market price)

Farmers usually didn't sell the rice straw. They use it for the feeding purpose for their livestock. But to calculate appropriate gross return, cost of rice straw was estimated as 2.0 BDT per kg. Therefore, the price per ton of rice straw was estimated 2,000 BDT.

Net return was calculated by deducting total cost from the gross return, i.e.,

Net return = Gross return – Total cost

Benefit cost ratio (undiscounted) is a measure to determine the efficiency of resource use which was applied in the present study based on total cost and cash cost. The BCR estimated as a ratio of gross returns and gross costs. The formula of calculating BCR (undiscounted) is given below:

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$$\text{Benefit cost ratio} = \frac{\text{Total gross return}}{\text{Total cost}}$$

Data were collected from 21st August to 25th September, 2016. After collection of data, they were edited and coded carefully to eliminate all sorts of possible errors and inconsistency. Local units were converted into standard units. Data analysis is done by using computer with SPSS Version 16.0 and MS Excel. In the analysis, 5 percent (0.05) level of probability was used as the basis for rejection of any null hypothesis whenever necessary.

III. Results and Discussion

Cultivable land and land used for BRRI dhan50 cultivation in three districts

A farmer cultivated BRRI dhan50, on an average 63.50±11.35 decimal of land, though he owned 346.50±60.32 decimal cultivable lands in Bagerhat. In Khulna a farmer had an average 306.91±89.06 decimal of cultivable land but he cultivated BRRI dhan50 only in 80.19±11.74 decimal land. In Satkhira, a farmer owned 154.25±25.11 decimal of cultivable land but he cultivated BRRI dhan50 in 84.08±13.42 decimal land. Average cultivable lands per farmer were 234.54±39.63 decimal where BRRI dhan50 cultivated in 76.46±8.18 decimal lands in three districts (Figure 01). The land area under BRRI dhan50 cultivation and total cultivable land area did not differ significantly (P>0.05) among the districts.

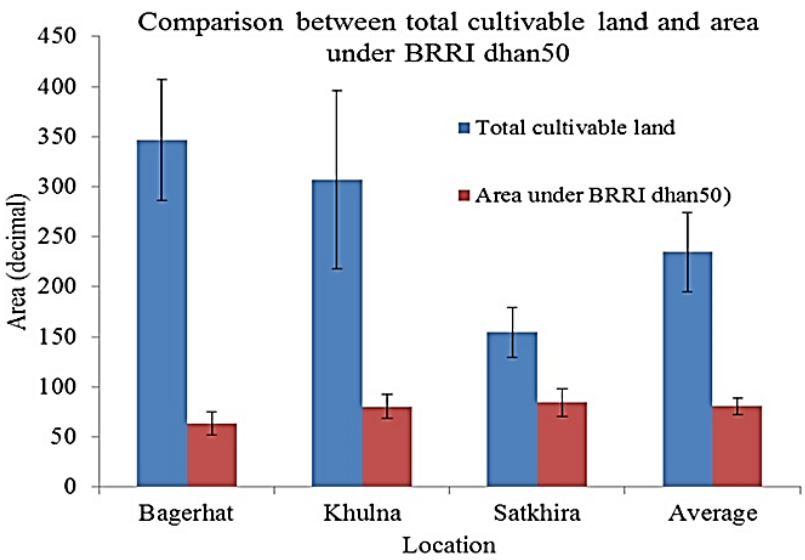

Figure 01. Comparison between area under BRRI dhan50 cultivation and total cultivable land.

Total input cost for BRRI dhan50 cultivation in three districts.

Average input cost of BRRI dhan50 under these three districts are shown in Table 01. Data of the Table showed that, seedbed preparation cost had highly significant differences (P<0.001) in three districts. The highest seedbed preparation cost was observed in Bagerhat (4,736.01±422.51 BDT/ha) and lowest in Satkhira district (2,722.00±82.64 BDT/ha). According to the statement of the farmers, due to low fertility of the land, fertilizer was used more for seedbed preparation in Bagerhat district which increased the seedbed preparation cost in this area compared to other study areas. The overall seedbed preparation cost for south-western region was 3,136.97±116.49 BDT/ha.

The seed cost among the farmers of the three districts were almost similar and it was 1,706.50±65.05, 1,615.25±46.26 and 1683.30±40.09 BDT/ha for Bagerhat, Khulna and Satkhira, respectively and didn't differ significantly as the farmers collected seeds from local IRRI field workers. In previous study on Boro rice production Islam (2012) found that the cost of seeds per ha was BDT 2,080 and 2,040 for BRRI dhan29 and BRRI dhan28 cultivation, respectively in Faridpur district which is higher than that of present study area.

Average land preparation costs were 7,791.12±426.30 BDT/ha for three districts and land preparation cost showed non-significant difference (P>0.05). For transplanting purpose, 32-35 laborers/ha were

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employed in Satkhira where 25-27 laborers/ha were involved in Khulna and Bagerhat. For this reason, highest transplanting cost was observed in Satkhira district (10,612±168.04 BDT/ha) and lowest in Khulna district (8,183.98±284.12 BDT/ha). Labor cost for transplanting purpose showed highly significant difference (P<0.001) and overall transplanting cost was 9,411.34±238.71 BDT/ha for BRRI dhan50 cultivation in three districts.

Land under Bagerhat district was less fertile and farmers applied highest rates of fertilizer than recommended doses, for these reason fertilizer costs was highest in Bagerhat (10,870.61±592.77 BDT/ha). Average fertilizer cost for BRRI dhan50 in the study areas were observed 8,354.38±365.71 BDT/ha and fertilizer costs showed significant difference (P<0.05) among three districts.

The farmers of Bagerhat did not applied manures in their land; they only used high doses of fertilizers. The average manure cost in these study areas was 667.00±38.90 BDT/ha, where highest manure cost was 769.37±34.50 BDT/ha in Khulna district and lowest manure cost was 718.50±13.96 BDT/ha in Satkhira district. Manure cost in three districts showed highly significant mean differences (P<0.001). From previous finding of Islam (2012) on Boro rice production, it was observed that manure cost showed highly significant differences in selected areas of Faridpur district. The cost of manure was estimated 690 and 903 BDT/ha for BRRIdhan28 and BRRIdhan29 cultivation, respectively.

Irrigation is an important factor for Boro rice cultivation, and it requires more water because it cultivated in dry season. Average irrigation cost in these study areas was observed 19,915.57±204.33 BDT/ha. Irrigation cost showed significant differences (P<0.01) in these three districts. Highest irrigation cost was observed in Khulna, (20,650.91±345.53 BDT/ha) and lowest in Bagerhat (18,513.77±166.93 BDT/ha). Islam (2012) observed that the average irrigation costs were 23,200 and 22,500 BDT/hafor BRRIdhan28 and BRRIdhan29, respectively in selected areas of Faridpur district.

Average pesticide cost in south-western region was 2,353.01±167.55 BDT/ha for BRRI dhan50 production. The highest cost was observed in Khulna (2,836.58±318.74 BDT/ha) and lowest in Satkhira(1,969.35±162.58 BDT/ha) (Table 01). This finding was in agreement with the previous finding of Islam (2012) for Boro rice cultivation. In Faridpur, the average cost of pesticides and herbicide was 2,925 and 2,890 BDT/ha for the production of BRRI dhan28 and BRRI dhan29, respectively (Islam, 2012).

The differences of means for labor cost in three districts were highly significant (P<0.001). More laborers were used in Satkhira, which made highest labor costs (2,391.5±59.28 BDT/ha) for fertilizing and pesticide application in Satkhira than those in Khulna and Bagerhat (Table 01).

Weeding cost for BRRI dhan50 production in these three districts showed significant mean differences (P<0.01), where highest weeding cost was in Bagerhat (5,854.99±488.19 BDT/ha) and lowest in Satkhira (3,640.72±242.63BDT/ha). Women were chosen for weeding operation in Khulna and Satkhira, who charged 100-150 BDT/day; but in Bagerhat, 400 BDT/day was the cost for labor for weeding. So, weeding cost in Bagerhat was observed highest than that of Khulna and Satkhira. However, average weeding cost of these study areas were observed 4,251.68±227.70 BDT/ha.

Harvesting and carrying costs showed significant differences (P<0.01) among three districts. Harvesting cost was highest in Khulna (15,835.69±432.03 BDT/ha) due to high labor cost and lower in Satkhira (11,816.17±416.49 BDT/ha), among three districts. Average harvesting cost of BRRI dhan50 in south-western region was observed as13,695.36±406.83 BDT/ha (Figure 02).

Highest threshing, cleaning and heaping cost per hector were observed in Khulna (7,255.34±355.88 BDT/ha) and lowest in Bagerhat (5,222.00±762.73 BDT/ha). Average threshing, cleaning and heaping cost in south-western region were observed 6,197.92±250.12 BDT/ha which showed highly significant variation among three districts (P<0.001) (Figure 02).

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Table 01. Different input costs for BRRI dhan50 cultivation in three districts

Different costs (BDT/ha)	Area of study				F-value	Level of significance
	Bagerhat	Khulna	Satkhira	Mean		
Seedbed preparation cost	4736.01± 422.51	3255.91± 102.73	2722.00± 82.64	3136.97 ±116.49	35.37	***
Total purchase cost of seeds or seedlings	1706.5± 65.05	1615.25 ±46.26	1683.30± 40.09	1658.40 ±28.04	0.81	NS
Cost for land preparation	8266.90± 307.77	7869.40 ±523.69	7633.35± 752.27	7791.12 ±426.30	0.10	NS
Labor cost for transplanting	8317.5± 297.86	8183.98± 284.12	10612± 168.04	9411.34 ±238.71	34.26	***
Cost for fertilizer application	10870.61± 592.77	8409.81± 549.68	7806.79± 514.36	8354.38 ±365.71	3.27	*
Cost for manure application	0	769.38± 34.50	718.5± 13.96	667±38.90	102.87	***
Cost for irrigation	18513.77± 166.93	20650.91± 345.53	19607.66± 216.07	19915.57 ±204.33	7.29	**
Pesticide and herbicides cost	2337.06± 472.61	2836.58± 318.74	1969.35± 162.58	2353.01 ±167.55	3.33	*
Labor cost for fertilizer and pesticide application	2200± 40.82	1931.25± 57.53	2391.5± 59.28	2188.25 ±50.85	16.21	***
Weeding cost	5854.99± 488.19	4614.54± 386.19	3640.72± 242.63	4251.68 ±227.70	6.02	**
Harvesting and carrying cost	14530± 254.04	15835.69± 432.03	11816.17± 416.49	13695.36 ±406.83	24.35	***
Reaping, threshing and heaping cost	5222.00± 762.73	7255.34± 355.88	5547.17± 281.19	6197.92± 250.12	8.28	***
Total input cost	82555.34±1460.15	83228.03± 852.13	76148.51± 1423.35	79621± 965.26	9.23	***

NS= Non significant (P>0.05), ***= Significant (P<0.001), ** = Significant (P<0.01), * = Significant (P<0.05).

Fixed and total costs for BRRI dhan50 production in three districts

Interest on total input cost showed highly significant differences (P<0.001). Astotal input cost was highest in Khulna (Figure 03) that's why interest on total input cost was highest in Khulna region and lowest in Satkhira region. Average interest on total input cost was observed 3,317.54±40.22 BDT/ha (Table 02).

Land rent was highest in Satkhira (24,457.15±102.850 BDT/ha) and lowest in Bagerhat (18,712.00±00 BDT/ha). Average land rent was observed 22,877.08±316.643 BDT/ha in study areas. Land rent showed highly significant differences among three districts (P<0.001). The sum of interest on total input cost and land rent cost was considered as total fixed cost which was highest in Satkhira (24,457.15±102.85 BDT/ha), due to high land rent cost in that area. Average fixed cost was observed 26,194.62±303.09

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BDT/ha in study areas. Total fixed costs in three different districts showed highly significant differences (P<0.001) (Table 02).

Total costs were observed BDT 104,707.14±1520.99, 108,639.12±993.38, and 103,778.52±1506.93 per ha for Bagerhat, Khulna and Satkhira, respectively which showed significant differences (P<0.05). Average total cost for BRRI dhan50 production in south-western region was observed 105,815.62±927.839 BDT/ha. Earlier, Islam (2012) found that average costs for Boro rice cultivation were 86,557 and 85,123 BDT/ha for BRRIdhan28 and BRRIdhan29, respectively in selected areas of Faridpur district. The lower production cost observed by Islam (2012) was due to the fact that the operating expenses were lower in 2012 than now. Cash cost gradually increased over time which means that farmers now need more cash to meet operating expenses (Jahan and Jaim, 2002).

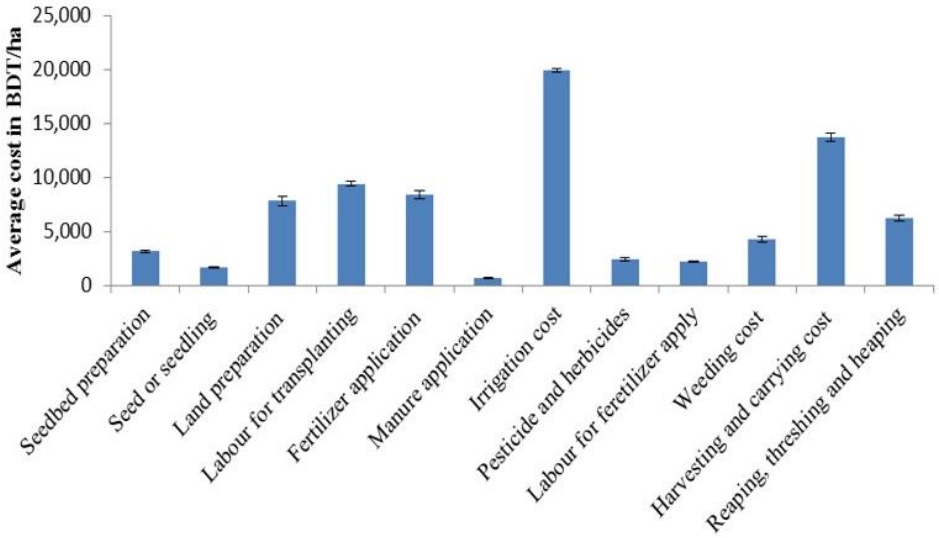

Figure 02. Average of different input cost for BRRI dhan50 cultivation in three selected districts.

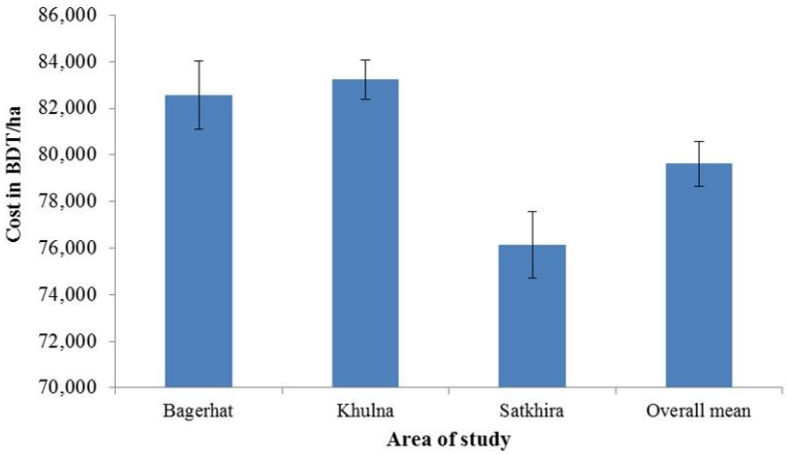

Figure 03. Average input cost for BRRI dhan50 cultivation in south-western region.

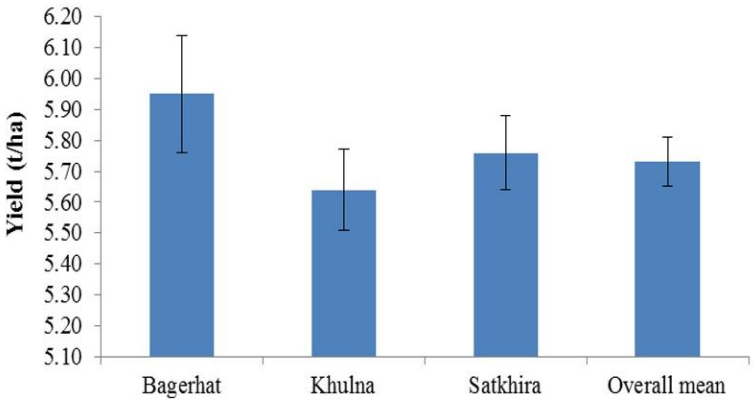

Figure 04. Average yield of BRRI dhan50 in three districts.

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Table 02. Total cost of BRRI dhan50 production in three districts

Items (BDT/ha)	Areas of study				F-value	Level of significance
	Bagerhat	Khulna	Satkhira	Mean		
Interest on total input cost @10%	3439.81 ±60.84	3467.84 ±35.51	3172.86 ±59.31	3317.54 ±40.22	9.23	***
Lease rate of the land	18712±0	21943.26 ±282.20	24457.15 ±102.85	22877.08 ±316.64	106.58	***
Total fixed cost (BDT/ha)	22151.81 ±60.84	25411.09 ±292.70	27630.01 ±128.74	26194.62 ±303.09	80.05	***
Total cost	104707.14 ±1520.99	108639.12 ±993.38	103778.52 ±1506.93	105815.62 ±927.84	3.54	*

***= Significant (P<0.001), * = Significant (P<0.05)

Table 03. Yield and returns from BRRI dhan50 in three districts

Items	Area of study				F-value	Level of significance
	Bagerhat	Khulna	Satkhira	Mean		
Rice yield (t/ha)	5.95 ±0.19	5.64 ±0.13	5.76±0.12	5.73±0.08	0.67	NS
Price of rice (BDT./t)	16,125.00 ±125.00	20,234.38 ±125.97	21,513.75 ±306.60	20,463.13 ±297.33	45.74	***
Total price of rice (BDT./ha)	95,871.25 ±3215.87	114,110.2 ±2824.71	123,899.5 ±3108.95	117,180.9 ±2345.49	9.29	***
Total cost of byproduct (BDT./ha)	11,890 ±375.01	11,273.75 ±256.12	11,516 ±231.32	11,456.5 ±158.36	0.67	NS
Gross return (BDT./ha)	107,761.3 ±3582.10	125,383.9 ±3073.08	135,415.5 ±3300.78	122,837.4 ±2453.69	7.99	***

***= Significant (P<0.001), NS= Non significant (P>0.05)

Yield and return from BRRI dhan50 in three districts

Highest yield of BRRI dhan50 was observed in Bagerhat (Figure 04), but having poor communication, marketing and milling facilities, farmers of this district did not get preferable market price of this aromatic rice. They didn't know the actual market price of this variety, which clarified the price difference between Satkhira (21,513.75±306.60 BDT/ton) and Bagerhat (16,125±125BDT/ton(. Milling facility of BRRI dhan50 was not available everywhere. In south-western region only the millers of Satkhira have access to grind BRRI dhan50. That's why farmers got the highest price in Satkhira, 123,899.5±3108.95 BDT/ha for 5.76±0.12 t/ha yield (Table 03). Average rice yield of these study areas was 5.73±0.08 t/ha which is close to the reported yield of this variety of6.0t/ha (BRKB 2011). Yields of rice in three different districts showed non-significant differences (P>0.05), but price per ton of rice yield in these study areas showed highly significant differences (P<0.001). Prices of the byproducts showed non-significant differences (P>0.05) and average byproduct price was assumed 11,456.5±158.36 BDT/ha for three districts. Islam (2012) conducted a study in Faridpur district and found the yields of BRRIdhan28 and BRRIdhan29 were 5.57 and 5.90 t/ha and prices per ton of rice were BDT 16,000 and BDT 15,000, respectively, which was lower than the market price of BRRI dhan50, because BRRI dhan50 is aromatic rice variety. Sarker

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et al. (2010) found that the yields of Boro rice per hectare were 5.26 ton and 4.18 ton for the borrower and non-borrower farmers, respectively.

Gross return of BRRI dhan50 in three different districts of south-western region showed highly significant differences (P<0.001) and it was highest in Satkhira (135,415.5±3,300.78 BDT/ha) and lowest in Bagerhat (107,761.3±3582.10 BDT/ha). Average gross return of BRRI dhan50 cultivation was 122,837.4±2453.69 BDT/ha. Islam (2012) found in Faridpur district that per hectare average production cost of BR-28 and BR-29 rice were BDT 89,104 and 88,440, respectively. Sarkar (2010) found that the gross returns for Boro rice cultivation were BDT 41,699.03 and 51,589.53 for non-borrower and borrower farmers, respectively.

Net income and cost benefit ratio from BRRI dhan50 cultivation

Net income and cost benefit ratio from BRRI dhan50 cultivation in the studied areas showed highly significant differences (P<0.001), and average net income was observed 17,192.68±2472.83 BDT/ha (Table 04). Highest net income and cost benefit ratio was observed in Satkhira (31,636.97±3270.48 BDT/ha and 1.31±0.03). Lowest net income and cost benefit ratio was observed in Bagerhat (3054.2±2062.72 BDT/ha and 1.03±0.05). The average cost benefit ration for BRRI dhan50 in south-western region was observed 1.16±0.03 (Table 04). Islam (2012) found that, per hectare net return for producing BRRI dhan28 and BRRI dhan29 rice were BDT 9,417 and 10,727, respectively. She also found the BCR for BRRIdhan28 and BRRI dhan29 production as 1.10 and 1.12, respectively on total cost basis. Sarker et al. (2010) found that net returns from Boro rice cultivation were BDT/ha 4,475.64 and 8,821.68 for non-borrower and borrower farmers respectively. The BCRs were 1.12 in case of non-borrower farmers and 1.21 for the borrower ones. Hanifa (2009) found that the average returns per hectare were BDT 26,104.39 from Boro rice (BRRIdhan29) production.

Table 04. Net income and cost benefit ratio from BRRI dhan50

Item	Area of study				F-value	Level of significance
	Bagerhat	Khulna	Satkhira	Total		
Total cost (BDT./ha)	104,707.1 ±1520.99	108,639.1 ±993.38	103,778.5 ±1506.93	105,815.6 ±927.84	3.54	*
Gross return (BDT./ha)	107,761.3 ±3582.10	125,383.9 ±3073.08	135,415.5 ±3300.78	122,837.4 ±2453.69	7.99	***
Net income (BDT./ha)	3054.2 ±2062.72	16,744.63 ±2080.21	31,636.97 ±3270.48	17,192.68 ±2472.83	9.50	***
Cost-benefit ratio	1.03±0.05	1.16±0.03	1.31±0.03	1.16±0.03	10.24	***

IV. Conclusion

The findings of the present study indicate that net return from BRRI dhan50 rice production was higher in Satkhira among three districts. But the profit margin was very low because farmers received lower price during harvesting time and over the year. Furthermore, BRRI dhan50 is labor intensive aromatic rice that boost up farmer income as well as it creates employment opportunities for the farm household. Among various variables, fertilizer and manure, human labor, power tiller and irrigation have had significant effect on BRRI dhan50 production. However, uses of these inputs might be increased to improve yield and economic returns from BRRI dhan50 variety of rice.

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References

[1] AIS (Agricultural Information Service) (2016). Krishi Diary 2016. Khamarbari, Farmgate, Dhaka-1215, Bangladesh.

[2] BBS (Bangladesh Bureau of Statistics) (2014). Statistical Year Book of Bangladesh. Statistics and Information Division (SID), Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka.

[3] BRKB (Bangladesh Rice Knowledge Bank, Rice Statistics) (2011). Rice in Bangladesh. Retrieved 26 December 2016 from http://www.knowledgebank-brri.org/riceinban.php.

[4] BRKB (Bangladesh Rice Knowledge Bank, Rice Statistics) (2019). Bangladesh Rice Knowledge Bank, Rice Varieties. Retrieved 13 February 2019 form http://knowledgebank-brri.org/brri-rice-varieties/boro-rice-varieties.

[5] Brolley, M. (2015). Rice security is food security for much of the world. Rice Today. International Rice Research Institute (IRRI), DAPO Box 7777, Metro Manila, Philippines, pp. 30-32.

[6] BRRI (Bangladesh Rice Research Institute) (2015). Adhunik Dhaner Chash (Modern Rice Cultivation), 19th Edition. Bangladesh Rice Research Institute, Gazipur-1701, Bangladesh (in Bangla).

[7] Hanifa, M. A. (2009). A Comparative Economic Analysis of BR-29 and Hybrid Hira Rice Production in Some Selected Areas of Netrokona District. M.S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

[8] Hossain, M., Jaim, W. M. H., Alam, S. and Chowdhury, A. K. M. J. (2005). Diversity, Spatial Distribution and the Process of Adoption of Improved Varieties in Bangladesh. Paper presented at the international workshop on "Rice Variety Diversityin Eastern India and Bangladesh organized by the International Rice Research Institute, Joydebpur, Gazipur.

[9] Islam, T. (2012). A comparative economic study of BRRI dhan28 and BRRI dhan29 rice production in selected areas of Faridpur district. M.S Thesis. Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

[10] Jahan and Jaim, W. M. H. (2002). Dimensions of structural Change in cost and Return of HYV Boro paddy over Time in Bangladesh and Determinations of the change. The Bangladesh Journal of Agricultural Economics, 25 (1), 35-62.

[11] Nath, N C. (2015). Food security in Bangladesh: Status, challenges and strategic policy options. Paper presented at 19th Biennial Conference of the Bangladesh Economic Association (BAE), held on 8-10 January, 2015, Dhaka, Bangladesh.

[12] Salam, M U., Hossain, S. M. A., Biswas J. K. and Mridha. A. J. (2014). Managing the unmanageable: rice variety technology for future challenging food security in Bangladesh. Extended abstract in the "Agronomic visions in challenging future", the proceedings of the 13thconference of the Bangladesh Society of Agronomy, 20 September 2014, Bangladesh Rice Research Institute (BRRI), Gazipur, Bangladesh.

[13] Sarker, M. S. K., Hasan, M. R. and Ferdous, M. A. (2010). Comparative Economic Analysis of Borrower and Non-borrower Boro rice Farmers in some Selected Sites of Mymensingh District. Bangladesh Journal of Agricultural Research, 35 (1), 65-76. https://doi.org/10.3329/bjar.v35i1.5867

[14] Yang, W. Y. (1958). Methods of farm management investigations for improving farm productivity. FAO Development Paper, Agriculture, (64).

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