International Journal of Science and Business

Adoption of BRRI DHAN29 Production Technologies by the Farmers in Shariakandi, Bogra

Fatema-Tuz-Zohra, Md. Abul Bashar & Mohammad Zamshed Alam

Abstract:

The study examined the status of adoption of BRRI dhan29 production technologies and estimated the contribution of the selected characteristics of the farmers to the adoption of production technologies. The methodology of this study is an integration of quantitative and qualitative data collected in Sonatala and Dohopara villages of Sariakandi upazila in Bogra district. Data were collected from 117 BRRI dhan29 growers from January 06 to February 05, 2017. Descriptive statistics, multiple regression were used for data analysis. Most of the farmers (67.5 percent) belong to medium adoption followed by high adoption (18.8 percent) BRRI dhan29 production technologies. Among the variables- age, level of education, farming experience, attitude towards rice cultivation, usage of ICT in agriculture, organizational participation and knowledge on rice production were the significant contributor and provided 59.3 percent contribution on adoption of BRRI dhan29 production technologies. It was also found that 4.2%, 15.3%, 41.1%, 31.5% and 6.9% farmers were innovators, early adopters, early majority, late majority, and laggards respectively regarding BRRI dhan29 adoption. It is concluded that the composite adoption of BRRI dhan29 production technologies is moderate and needs further advancement. Based on the findings, it is recommended that respective authorities should implement and popularize farmers based projects on a massive scale for the adoption of BRRI dhan29 production technologies.

Key words: BRRI Dhan29, Technologies, rice cultivation, adopters, adoption.

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INTRODUCTION

Bangladesh has an agrarian economy, about 89% of total farm holdings are below 2.49 acres in size (Islam, 2007). Socioeconomic factors, such as the predominance of small and marginal farmers and tenancy cultivation in agrarian structure, did not impede the adoption of modern rice varieties in Bangladesh (Amin, 2015; Haque, 2003; Aurangozeb, 2002; Hossain, 2003). Moreover, the major constraints to the adoption of modern rice varieties were in fact logistic factors (Hossain, 2006). According to Feder *et al.* (1985), adoption is "the degree of use of new innovation in long run equilibrium when a farmer has full information about the new technology and its potential". Bangladesh is an agrarian country. About 76% of the people live in rural areas, and 47.5% of the total manpower is involved in agriculture. In Bangladesh, agriculture contributes 18.82% of the gross domestic product (GDP) of the country in the year of 2014-2015 (BEC, 2016). Bangladesh has a long history of rice cultivation. The agro climatic conditions of the country are suitable for growing rice year-round. However, the national average rice yield is much lower (2.94 t/ha) than that of other rice-growing countries (BBS, 2014). Rice is the staple food for about 156 million people of the country. The population growth rate is 2 million per year, and if the population increases at this rate, the total population will reach 238 million by 2050. An increase in total rice production is required to feed this ever-increasing population. At the same time, the total cultivable land is decreasing more than 1% per year owing to the construction of industries, factories, houses, and highways. On the other hand, due to urbanization, food habits tend to change, demanding the cultivation of new crops that must share land used for rice cultivation. Therefore, the modern varieties of rice have given its contribution to increase the yield per unit area of rice.

Among the modern varieties, BRRI dhan29, avail to increase rice production in a sustainable manner for the food and nutritional security of this highly populated country. There are three rice-growing seasons in Bangladesh: Aus, Aman, and Boro. BRRI dhan29 is a Boro rice. Boro is now the major contributor to total rice production in the country. Bangladesh has made notable progress in sustaining respectable growth in rice production. Factor contributing to the increase in total rice production by irrigation and

modern rice varieties such as BRRI dhan29 is the key to change in the rural economy. Bogra locale is considered as surplus rice generation zone of the nation, where BRRI dhan29 was a noteworthy endeavor. Shariakandi upazila range, in this manner, considered a most reasonable area to concentrate the marvels of selection of BRRI dhan29 innovations by the rice cultivators. Contemplates on individual, gathering and society uncovered that acknowledgment of modem innovations is restrictive upon many variables. Some of these are social, individual, practical and situational components. While directing any review on the reception of modem advancements, these elements should be considered. The research work was conducted under the objectives of (i) To assess the extent of adoption of BRRI dhan29 production technologies by the farmers; (ii) To describe the selected socio-economic characteristics of farmers; (iii) To estimate the level of contribution of the selected characteristics of farmers in adoption of BRRI dhan29 production technologies and (iv) To categorize the adopters of BRRI dhan29.

METHODOLOGY

The study was conducted in Sariakandi upazila under Bogra district. Two villages namely Sonatala and Dohopara villages were selected purposively for the study. Data were collected from 117 BRRI dhan29 growers from January 06 to February 05, 2017. The total number of rice cultivators in these villages was 525. According to Yamane's formula, the respondents comprised of 117 rice cultivators. A well-structured interview schedule was developed based on objectives of the study for collecting information with containing direct and simple questions in open form and close form keeping in view the dependent and independent variables. Appropriate scales were developed to measure both independent and dependent variables. Data was collected from face to face interview of BRRI dhan29 cultivators. The dependent variable is adoption of BRRI dhan29 production technologies by the farmers. While the independent variables are age, level of education, family size, family income, farming experiences, farmers' attitude, training exposure and adoption, usage of ICT in agriculture, extension media contact, organizational participation and farmers' knowledge. Various statistical measures such as frequency counts, percentage distribution, average, and standard deviation were used in describing data. In order to estimate the contribution of the selected characteristics of farmers to the adoption of BRRI dhan29 production technologies multiple regression analysis was used. Throughout the

study, five (0.05) percent and one (0.01) percent level of significance were used as the basis for rejecting any null hypothesis.

RESULTS AND DISCUSSION

Adoption of BRRI dhan29 production technologies

Adoption of BRRI dhan29 production technologies by the rice cultivators was measured by computing scores according to extent of adoption with each of 12 selected technologies. Adoption of rice cultivation technologies by the rice cultivators scored varied from 65.00 to 87.38 with the mean and standard deviation of 76.42 and 3.51 respectively. On the basis of adoption scores, the rice cultivators were classified into three categories given in Table 1:

Table 1. Distribution of the rice cultivators according to their adoption of BRRI dhan29 production technologies

Category	Range		Farmers		Mean	Standard deviation
	Score	Observed	Number	Percent		
Low adoption	≤ 72	65-87.38	16	13.7	76.42	3.51
Medium adoption	73-80		79	67.5		
High adoption	≥ 81		22	18.8		
			117	100.0		

Table 1 indicates that among the respondents, the highest 67.5 percent rice cultivators belongs to the group of medium adoption and the lowest percentage 13.7 percent in low adoption followed by high adoption (18.8 percent) by the rice cultivators in adoption of BRRI dhan29 production technologies. Among the cultivators most of the rice cultivators (86.3 percent) have medium to high adoption in BRRI dhan29 production technologies.

Characteristics of the farmers

In this study, twelve characteristics of the farmers were selected as independent variables which are shown in Table 2. The data revealed that the middle-aged rice cultivators comprised the highest proportion (42.7%). Secondary education constituted the highest proportion (43.6%). The small farm holder constituted the highest proportion (57.3%). The medium size family constituted the highest proportion (66.7%). Medium annual income constituted the highest proportion (70.1%). The majority (70.1%) fell in medium farming experience category. 17.9 percent of them had highly favorable attitude towards rice cultivation. The highest proportion (54.7%) had medium training exposure. Most of the farmers (66.7%) had medium usage of ICT in agriculture. The highest proportion (65.0%) of the farmers had medium agricultural extension contact. The highest proportion (67.5%) of the respondents had medium organizational participation. The majority (58.1%) of the rice cultivators fell in medium knowledge category.

Table 2. Distribution of the farmers according to the selective characteristics

Factors	Categories	Number	Percentage	Mean	S.D.
Age	Young aged	42	35.9	41.83	11.57
	Middle aged	50	42.7		
	Old aged	25	21.4		
Level of education	Can't read and sign	9	7.7	6.37	3.88
	Can sign only	12	10.3		
	Primary education	28	23.9		
	Secondary education	51	43.6		
	Above secondary	17	14.5		
Effective farm size	Landless	-	-	0.91	0.56
	Marginal	5	4.3		
	Small	67	57.3		
	Medium	45	38.5		
	Large	-	-		
Family size	Small family	29	24.8	4.75	1.61

	Medium family	78	66.7		
	Large family	10	8.5		
Annual income	Low income	17	14.5	108.69	37.25
	Medium income	82	70.1		
	High income	18	15.4		
Farming experiences	Low	16	13.7	22.19	11.96
	Medium	82	70.1		
	High	19	16.2		
Attitude towards rice cultivation	Poorly favorable	29	24.8	8.58	2.49
	Moderately favorable	67	57.3		
	Highly favorable	21	17.9		
Training exposure	No	8	6.8	10.96	5.62
	Low	19	16.2		
	Medium	64	54.7		
	High	26	22.2		
Usage of ICT in agriculture	Low usages	30	25.6	8.14	2.31
	Medium usages	78	66.7		
	High usages	9	7.7		
Extension media contact	Low contact	27	23.0	15.24	2.99
	Medium contact	76	65.0		
	High contact	14	12.0		
Organizational participation	Less	17	14.5	13.95	3.39
	Medium	79	67.5		
	High	21	18.0		
Knowledge on rice production	Low knowledge	23	19.7	16.76	3.94
	Medium knowledge	68	58.1		
	High knowledge	26	22.2		

Contribution of the selected characteristics on the adoption of BRRI dhan29 production technologies

In order to estimate the contribution of the selected characteristics on the adoption of BRRI dhan29 production technologies by the rice cultivators, multiple regression analysis were used which is shown in the Table 3.

Table 3. Multiple regression coefficients of contributing factors related to the adoption of BRRI dhan29 production technologies

Dependent variable	Independent variables	B	*p*	R^2	Adj. R^2	F	*p*
Farmers' adoption of BRRI dhan29 production technologies	Age	-0.17	0.020*	0.593	0.571	27.460	0.000**
	Level of Education	0.280	0.000**				
	Effective farm Size	0.300	0.514				
	Family size	0.151	0.333				
	Annual family Income	1.024	0.163				
	Farming experience	0.149	0.039*				
	Attitude towards rice cultivation	0.097	0.001**				
	Training Exposure	0.094	0.059				
	Usage of ICT in agriculture	0.945	0.013*				
	Extension media contact	0.054	0.083				
	Organizational participation	0.164	0.021*				
	knowledge on rice production	0.285	0.005**				

** Significant at $p < 0.01$;

* Significant at $p < 0.05$

The result in **Table 3** shows that there is a significant contribution of respondents' age, level of education, farming experience, attitude towards rice cultivation, usage of ICT in agriculture, organizational participation and knowledge on rice production. Of these, level of education, attitude towards rice cultivation, knowledge on rice production were the most important contributing factors (significant at the 1% level of significance). Age, farming experience, usage of ICT in agriculture, organizational participation (significant at the 5% level of significance) while coefficients of other selected variables don't have any contribution on adoption of BRRI dhan29 production technologies. The value of R^2 is a measure of how the variability in the dependent variable is accounted for by the independent variables. So, the value R^2 0.593 means that independent variables accounts for 59% of the variation in adoption of BRRI dhan29 production technologies. The adjusted R^2 indicates the loss of predictive power or shrinkage. Therefore, the adjusted value (0.571) tells us how much variance in Y (adoption of BRRI dhan29 production technologies) would be accounted if the model has been deprived from the populations from which the sample was taken. The F ratio is 27.46 which is highly significance (p<.001). This ratio indicates that the regression model significantly improved the ability to predict the outcome variable. The b-values indicate the individual contribution of each predictor to the model. Almost all predictors have positive b-values indicates if score/values of predictors (e.g level of education) increases so do the extent of adoption of BRI dhan29 production technologies. Usages of ICT in agriculture (b=.945), this value indicates that as usages of ICT in agriculture increase by one units adoption of BRRI dhan29 production technologies increase by 0.945 units. This interpretation is true if the effects of all other predictors are held constant. However, each predictor may explain some of the variance in respondents' adoption of BRRI dhan29 production technologies conditions simply by chance.

Categorization of BRRI dhan29 adopters

The BRRI dhan29, as measured by the time at which an individual adopt BRRI dhan29, is continuous. Based on their adoption score, the adopters were classified into five categories following the categorization according to Roger (1995). The distribution of the adopters according to adoption is presented in following Table 4.

Table 4. Distribution of the BRRI dhan29 adopters according to adoption

Categories	Basis of Categories	Frequency of adopters	Mean of adoption period($\bar{X}$)	Standard Deviation (σ)
Innovator	(x - 2σ)	5		
Early adopter	(x -2σ) to (x -σ)	18		
Early majority	(x - σ) to (x)	48	3.22	.938
Late majority	(x) to (x + σ)	38		
Laggards	(x + σ) to (x +2σ)	8		
Total		117		

Data presented in Table 4 shows that largest respondent farmers were early majority which is 48% and lowest proportion only 5% belongs to innovator category.

CONCLUSIONS

It is observed in this study that there is a significant contribution of respondents' age, level of education, farming experience, attitude towards rice cultivation, usage of ICT in agriculture, knowledge on rice production and organizational participation on the adoption of BRRI dhan29. Of these, level of education, attitude towards rice cultivation, knowledge on rice production were the most important contributing factors. This means that high literacy and educational level among the farmers might have influenced high BRRI dhan29 production technologies. Conclusion could be drowned that these farmers could be more ameliorated in all aspects of socio- economic life if government takes more educational project to make the farmers' more educated. In addition that extension workers should vocation adequately with the farm people through various teaching methods and correctly envisaging those characteristics of the farmers which have some bearing on these activities.

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Cite this article:

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