Journal of Agricultural Engineering and Food Technology
p-ISSN: 2350-0085, e-ISSN: 2350-0263; Volume-9, Issue-1; January-March, 2022; pp. 1-5

https://www.krishisanskriti.org

Adoption of selected Aman Rice Varieties by The Farmers under Mymensingh Sadar Upazila of Mymensingh District, Bangladesh

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Abstract—*Bangladesh is mainly an agro-based country, has made a notable progress in sustaining respectable growth in rice production, and this growth in production has originated mostly from the shift from low-yielding traditional to high-yielding modern varieties when irrigation facilities were developed. Rice cultivation plays a vital role towards guaranteeing food security in Bangladesh. The main purpose of the study was to determine the extent of adoption of Aman rice varieties by the farmers under Mymensingh sadar upazila in Mymensingh district and explore the relationship between the selected characteristics of farmers and their adoption of Aman rice varieties. The study was conducted in four villages of Paranganj Union under sadar upazila of Mymensingh District. Out of a list of 1000 farmers, 100 farmers were selected at random. Pearson's product moment correlation co-efficient(r) was used to explore the relationship between the selected characteristics of the farmers and their adoption of Aman rice varieties. Findings showed that highest proportion (67 percent) of the farmers were medium adopters while 19 percent low and 14 percent high adopters. The selected Aman rice varieties were BRRI dhan49 and BRRI dhan52. The findings also revealed that 73.5 percent of the area was covered by Aman rice varieties out of which BR-11, BRRI dhan-52, BRRI dhan-49, BRRI dhan-48, BRRI dhan-42 and BR-23 were notable where BRRI dhan52 was 17.6% and BRRI dhan49 was 15.5%. Out of ten independent variables, Pearson's product moment correlation co-efficient(r) revealed that farmers education, rice cultivation knowledge, innovativeness, attitude, extension media contact and input cost had significant positive relationship with their adoption of selected Aman ricecultivation.*

Keywords: *Adaptors, agro-based, HYV, attitude, BARRI.*

INTRODUCTION:

Bangladesh is mainly an agro-based country with an area of 1, 47, 570 sq. kilometers. Agriculture is the backbone of the economy. Rice is the staple food of Bangladesh. It grows in three seasons namely; Aus, Aman and Boro. Aus, Aman, and Boro rice were recently reported to account for 7%, 38%, and 55%, respectively, of the total rice production in Bangladesh (Risingbd, 2014). Rice (*Oryza sativa* L.) is the most important food for over two billion people in Asia and for hundreds million in Africa, America. To feed the ever-increasing population of these regionsthe world"s annual rice production must be increased from the present 560 to 750 million tons by 2020 (Saranraj *et al.,* 2013). Bangladesh is a farming depended nation. About 76 percent 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. Rice is grown throughout the country except in the southeastern hilly territories. The agro climatic states of the country are suitable for growing rice year-round. However, the national average rice yield is much lower (2.46 t/ha) than that of other rice-growing countries (BBS, 2018). Rice is the staple food for about 156 million people of the country. The success of any technology depends on its dissemination among the potential users, which ultimately is measured by the level of adoption of that technology. It is to be anticipated that certain sustainable development can take place in the agriculture of Bangladesh, if the technology can be transferred properly. Rice cultivation plays a vital role towards guaranteeing food security in Bangladesh. Presently impressive exertion is being made through research and extension delivery system to expand rice production. But the actual increase in production will depend on the activities of the rice cultivators and also the adoption of modern varieties in rice cultivation in our country. For that to enhance rice production efficiency, modern varieties play a great role. The concept and benefits of the rice cultivation should be disseminated to the farmers in a convincing and attractive manner, so that farmers" response quickly to adopt modern varieties of rice cultivation in Aman season. This is indisputably an educative process and it possible through Extension Education System, concerned mainly with increasing agricultural production and promoting living standards of the farmers. The productive efficiency in agricultural production is an vital issue from the standpoint of agricultural improvement in developing countries since it provides pertinent information which is useful for drawing sound management decisions in resource allocations for creating agricultural policies and institutional improvements.

Several adaptive exercises are regularly envisaged by the farmers in the local agriculture but the relative success to overcome these situation and primary variations gradually making them more vincible. In this condition, the adaptive/adjustments capacities of the targeted people need to be gradually improved to comprehend the probabilistic vulnerabilities and its consequences over the agriculture and agriculturally based livelihoods (CEGIS, 2005). Mymensingh district was considered as a suitable area to study the process of adoption of Aman variety by the rice cultivators. The focal point of the research work was to explore the trends of adoption of Aman rice variety by the farmers. The following objectives were structured out in order to provide an appropriate track to the research work are to determine and describe the characteristics of the farmers of Aman rice growers in Mymensingh district; to determine the extent of adoption of selected Aman rice varieties by the farmers and to explore the relationship between the selected characteristics of farmers and their adoption of selected Aman rice varieties.

MATERIALS AND METHODS:

The study was conducted in Mymensingh Sadar upzila under Mymensingh district. From this upazila four villages were selected purposively where Aman rice varities are cultivated every year. Therefore, considering all the above traits, Charhashadia, Chokshamrampur, Charashadia, Charsirta villages of Mymensingh Sadar upzila under Mymensingh district were selected purposively for this study. In this way, farmers of these villages constituted the population for the study. From this population, 10% farmers from each village were selected randomly as the sample for the study. The numbers of randomly selected farmers of the four villages were 100 which constituted the sample for the study. Data were collected personally by the researcher himself through face to face interview. For conducting a study, every research method has its own instrument of data collection. Data need to be consciously identified, carefully selected, methodologically collected and accuracy and precision are obviously important quality in research measurement. In this study face to face interview method was used. This method is probably the best method in social research as it is easy to collect empirical data with limited time and money. Interview method was used for collection of data. Interview is one of the major methods of data collection. It was defined as two-way systematic conversation between an investigator and an informant, initiated for obtaining information relevant to as a specific issues and recording the answer of the respondent in the instrument prepared earlier. It was involved not only conversation, but also learning from the respondents' gestures, facial expressions and their environment. In a descriptive social research, selection and measurement of the variable is an important task. An organized research usually contains at least two identical elements viz. independent and dependent variable. An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the experimenter introduces, removes or varies the dependent variables (Townsend, 1953). According to the relevant research area, the researcher selected characteristics of the farmers as the independent variables and adoption of Aman rice cultivation as the dependent variable. This section contains procedures of measurement of the dependent and all independent variables of the study. The independent variables of the study were age, level of education, family size, farm size, annual house hold income, access to agricultural training, communication exposure and attitude towards Aman rice cultivation. To facilitate tabulation, the collected data were properly coded and transferred from interview schedule to a master sheet. Qualitative data were converted in to quantitative forms by means of suitable scoring whenever necessary. Tabulation was done on the basis of different categorization developed by the researcher and transferred into SPSS (Statistical Package for Social Science) software package (20.0 Version). For analysis of data, different descriptive and inferential statistical tests will be used. Among the inferential statistics Person's Product Moment Correlation Coefficient (r) would be computed to explore the relationships between socio-economic characteristics of farmers and their adoption of Aman rice varieties. In order to test the formulated hypotheses of the study, Pearson's product Moment Correlation Co-efficient (r) was used. Through this statistical treatment, nature of relationship between the dependent and independent variables was determined. Pearson's correlation is used when we have two quantitative variables and the research hypothesis predicts whether there is a linear bivariate relationship between these two quantitative variables. It was performed to explore the relationship between farmers' socio-economic characteristics and their adoption of Aman rice varieties.

RESULTS AND DISCUSSION

Data presented in the above Table 1 indicates that the highest proportion (52 percent) of the respondent farmers felt into middle aged category compared to 27 percent young and 21 percent old aged category. Data also presented that 26 percent of the respondents were illiterate, 1 percent can sign only, 39 percent had primary education, 31 percent had secondary education and 3 percent had higher secondary education. From the above table it is also shows that medium family size constituted the highest proportion 69 percent and the lowest 24 percent in small family size and 7 percent were large family size. The highest proportion (61 percent) of the farmers had medium farm compared to 28 percent had small farm and 11 percent having large farm. More than half (63 percent) of the respondents in the study area belongs to medium income category compared to 22 percent in the low income category and 15 percent in the high income category. The observed data showed that most of the farmers (78 percent) had a moderately favorable attitude towards Aman rice cultivation while 11 percent of them had poorly favorable attitude. Data also showed that the highest proportion (69 percent) of the farmers

had medium extension contact as compared to 15 percent of them having low extension contact and 16 percent fell in high extension media contact. It might be concluded that majority of the farmers had medium extension contact. It is reveals that 62 percent of the farmers had medium rice cultivation knowledge, 25 percent had low knowledge and 13 percent had high rice cultivation knowledge. Thus, an overwhelming majority (62) of the farmers had medium knowledge. Most of the farmers (78 percent) had a medium attitude towards Aman rice cultivation while 11 percent of them had low attitude. 11 percent was also found in high attitude category. Data contained in table indicate that more than half (70 present) of the farmers in the study area were medium innovative as compared to 14 percent low innovative and 16 percent high innovative. The highest proportion (67 percent) of farmers felt under medium adoption category, while 19 percent had low adoption and 14 percent had high adoption.

Table 1: Salient features of the selected socio-economic characteristics of the farmers

S.L. No.	Characteristics	Unit of measurement	Observed range	Mean	Standard deviation
1.	Age	Year	23 – 70	43.33	11.26
2.	Level of education	Year of schooling	0 – 12	4.30	3.32
3.	Family size	Number of persons	3 – 10	5.66	1.42
4.	Farm size	Hectare	0.26 - 4.61	1.60	0.95
5.	Annual family income	Taka	28000 – 300000	66930	57094.68
6.	Extension media contact	Score	10 – 27	19.59	4.32
7.	Input cost	score	9 – 16	12.94	2.22
8.	Knowledge about Aman rice cultivation	Score	15 – 28	22.07	3.50
9.	Attitude towards Aman rice cultivation	Score	17 – 30	21.47	3.11
10.	Innovativeness		13 – 33	23.69	3.63

Correlation co-efficient between the selected characteristics of the respondents and their adoption of selected Aman rice varieties

Relationship between Age of the Farmers and their Adoption of selected Aman rice varieties

The relationship between age of the farmers and their adoption of selected Aman rice variety was measured by testing the null hypothesis "There is no relationship between age of the farmers and their adoption of Aman rice variety". The calculated value of ('r'= -.369**) was found smaller than the tabulated value ('r' = 0.197) at 0.01 level of probability as shown in Table 2. It was concluded that there was negatively significant relationship between age of the farmers and their adoption of Aman rice variety. That means that farmers extent of adoption is somewhat affected by their age. Young age farmers are more aware than the old age farmers. Because young age of the farmers use different modern technologies, such as mobile phone, computer, internet e.t.c. that's why those farmers can take decision easily to adopt modern technologies.

Relationship between level of education of the Farmers and their Adoption of selected Aman rice varieties

The relationship between education level of the farmers and their Adoption of selected Aman rice variety was measured by testing the null hypothesis "There is no relationship between education level of the farmers and their Adoption of selected Aman rice variety". The calculated value of ('r'= .676**) was found greater than the tabulated value ('r' = 0.196) at 0.01 level of probability as shown in Table 2. Hence, the null hypothesis was rejected and it was concluded that a positive significant relationship between farmer's education and their Adoption of selected Aman rice variety. It seemed to be the educated farmers had more knowledge, a greater ability to understand and have greater access to information and opportunities than others, which might increase adoption.

Relationship between family size of the Farmers and their Adoption of selected Aman rice varieties

Data in the table indicate that the computed Correlation co-efficient value of ('r'= -.201*) was found smaller than the tabulated value ('r'= 0.257) at 0.05 level of probability was statistically negatively significant. Hence, the null hypothesis was rejected and it was concluded that family size had negatively significant relationship. If family size small then most of the family member found the most of the facilities for lead the life. Most of the family member found education and communication facilities. For this reason family member are more educated and acquire more knowledge form different source. Finally those families are more adapted on adoption of Aman rice variety.

Table 2: Correlation co-efficient between the selected characteristics of the respondents and their adoption of selected Aman rice varieties

Dependent variable	Independent variables	Correlation co-efficient 'r' values with 98 df	Tabulated value of 'r'	
			0.05 level	0.01 level
Adoption of selected Aman rice varieties	Age	-.369**	0.197	0.257
	Level of education	0.676**		
	Family size	-.201*		
	Farm size	0.093		
	Annual family income	0.134		
	Communication media contact	0.613**		
	Input cost	0.632**		
	Knowledge about Aman rice	0.724**		

cultivation	
Attitude towards Aman rice cultivation	0.698**
Innovativeness	0.591**

** Significant at the 0.01 level. * Significant at the 0.05 level.

Relationship between farm size of the Farmers and their Adoption of selected Aman rice varieties

The calculated value of r'= 0.093 (table 2) was found to be smaller than the tabulated value of 'r' (0.197) at 5 percent level of significance with 98 degrees of freedom. So the concerned null hypothesis in this aspect could not be rejected. The findings imply that the farm size of the farmers had no relationship with their adoption of' selected Aman rice variety.

Relationship between annual family income of the Farmers and their Adoption of selected Aman rice varieties

The calculated value of r = 0.134 (Table 2) was found to be smaller than the tabulated value of 'r' (0.197) at 5 percent level of significance with 98 degrees of freedom. So, no significant relationship was found between the annual income of' the farmers and the adoption of selected Aman rice variety. Therefore the concerned null hypothesis in this aspect was accepted. That means annual income of the farmers had no influence on the adoption of selected Aman rice variety

Relationship between extension media contact of the Farmers and their Adoption of selected Aman rice varieties

Data in the table 2, indicate that the computed Correlation co-efficient value of ('r'= .613**) was found greater than the tabulated value ('r'= 0.196) at 0.01 level of probability statistically significant. Hence, the null hypothesis was rejected and it was concluded that the farmer's adoption of Aman rice variety could vary significantly with the variation of communication exposure. So uses of communication exposure have significant relationship with their adoption. Communication exposure helps the farmers in gathering more knowledge about various farming practices. It might be that, communication with extension media enhances farmers' knowledge, attitudes which increase the adoption level of farmers. So, it could be said that, more agricultural extension contact of farmers were enhanced their adoption. Based on the above finding, it can be said that extension media contact increases cultivators" willingness which helps him/her to extension media contact influenced on adoption selected Aman rice variety.

Relationship between input cost of the Farmers and their Adoption of selected Aman rice variety

Data in the table 2, indicate that the computed Correlation co-efficient value of ('r'= .632**) was found greater than the tabulated value ('r'= 0.196) at 0.01 level of probability statistically significant. Hence, the null hypothesis was rejected and it was concluded that the farmer's adoption of Aman rice variety could vary significantly with the variation of input cost.

Relationship between knowledge about Aman rice cultivation of the Farmers and their Adoption of selected Aman rice varieties

The calculated value of r = 0.724 (Table 2) was found to be greater than the tabulated value of r' (0.197) at 1 percent level of significance with 98 degrees of freedom. So the concerned null hypothesis in this aspect has been rejected. It was therefore suggested that the rice cultivation knowledge of the farmers had a positive and significant relationship with their adoption of selected Aman rice variety.

Relationship between attitude towards Aman rice cultivation of the Farmers and their Adoption of selected Aman rice varieties

The relationship between the attitude of the farmers towards selected Aman rice variety and their adoption of selected Aman rice variety was examined by testing the null hypothesis "There is no relationship between attitude of the farmers towards selected Aman rice variety and adoption of selected Aman rice variety". The calculated value of 'r' = 0.698 (Table 2) was found to be greater than the tabulated value r =.257 at 1 percent level of significance with 98 degrees of freedom. It was therefore concluded that the attitude of the farmers towards selected Aman rice variety had a positive and significant relationship with their adoption of selected Aman rice variety. So, the concerned null hypothesis in this aspect has been rejected. In the study area attitude of the respondent farmers towards selected Aman rice variety wasadoption increases.

Relationship between innovativeness of the Farmers and their Adoption of selected Aman rice varieties

Computed value of the co-efficient of correlation between innovativeness of the farmers and their adoption of selected Aman rice variety was found to be r = (.591*)) as shown in Table 2. The relationship showed a positive trend. The computed value of r = (.591*) was found to be greater than the table value (r = 0.197) with 98 degrees of freedom at 0.05 level of probability. Hence, the concerned null hypothesis was rejected. The researcher thus concluded that the innovativeness of the farmers had a significant relationship with their adoption of selected Aman rice variety. It could influence directly to adopt new technologies. Hence, extension workers who are strongly contributed to be created need awareness, consciousness and activeness of them to adopt selected Aman rice variety.

Conclusion:

It may be concluded that the adoption of selected Aman rice varieties is adequate however needs further advancement for maintaining. Level of education of the farmers showed the most important contributing factor in adoption Aman rice varieties. This means that high literacy and educational level among the farmers might influence the adoption of Aman rice

cultivation. 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 them more educated. Farm size of the farmers had no significant relationship with their adoption of selected Aman rice cultivation. The average farm size of the farmers in the study area belonged to medium size category. Most of the farmers had small to medium farm size. Large farmers can take risk than small and medium farmers. Annual family income of the farmers had a negatively significant contribution in adoption of selected Aman rice cultivation. The above facts lead to conclude that necessary arrangements (business, job etc) should be made to increase the annual family income of farmers which would ultimately increase the adoption of selected rice cultivation. Extension media contact of the farmers had a significant contribution in adoption of selected Aman rice cultivation. Through extension media contact an individual farmer became facilitated of the information on the various aspect of selected rice cultivation. The above facts lead to conclude that necessary arrangements (field day, result demonstration) should be made to increase the extension media contact of farmers which would ultimately increase the adoption of selected rice cultivation. Rice cultivation knowledge of the farmer had a significant contribution in adoption of Aman rice cultivation. The above facts lead to the conclusion that necessary arrangements (training, meeting etc) should be made to increase the knowledge of farmers which would ultimately increase the adoption of selected Aman rice cultivation. Farmer‟s attitude towards Aman rice cultivation had a significant contribution in adoption of Aman varieties. It is important to realize about the temperament of human behavior which is very complex. It is, therefore, concluded 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 changes on their attitude towards the adoption of selected Aman rice cultivation. Innovativeness had significant and positive correlation to the adoption of Aman rice cultivation. Innovativeness is very important to adopt any technology. Innovative persons can take immediate decision to adopt innovation. So. it is necessary to keep monitoring the innovativeness of the farmers so that innovativeness increase and adoption rate of Aman rice cultivation.

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