

Adoption of selected Modern Wheat Varieties by The Farmers under Sundarganj Upazila in Gaibandha District, Bangladesh

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Abstract—Wheat (*Triticumaestivum* L.) is the world's most widely cultivated cereal crop which ranks first followed by rice. The total production of rice in Bangladesh is not sufficient to feed her people. Wheat can be a good supplement of rice and can play the most vital role to feed the teeming millions of the people. It is preferable to rice for its higher seed protein content. The purpose of the study was to determine the extent of adoption of modern wheat varieties by the farmers and explore the relationships between selected characteristics of farmers and their adoption of modern wheat varieties. Data were collected from randomly selected 100 farmers by using interview schedule. The finding revealed that about three-fourth (75 percent) of the growers had medium adoption, 13 percent had low and 12 percent had high adoption of modern wheat varieties. The selected varieties were BARI gom-19 (Sourav), BARI gom-20 (Gourab) and BARI gom-30. The area covered by BARI gom-19, BARI gom-20, BARI gom-30 and other varieties were 28.23%, 22.69%, 14.28% and 34.80% respectively. 'r' value depicts that selected characteristics of the farmers, namely, education, extension media contact, knowledge about wheat cultivation, attitude towards wheat cultivation and innovativeness had significant positive relationships with the adoption of modern wheat varieties. Age and family size had significant negative relationships with the adoption of modern wheat varieties. About two - thirds (64 percent) of the growers faced medium problems, 17 percent faced low and 19 percent faced high problem regarding adoption of modern wheat varieties. The most confronted problems were; (1) inadequate irrigation facilities (2) low price of produce (3) poor contact with SAAO (4) Scarcity of quality seed and fertilizers (5) poor marketing facility.

Keywords: Adoption, high value crops, BARI, attitude, production

Introduction:

Wheat is the second most important cereal crop in Bangladesh next to rice. The policy makers of agricultural extension programs recognized the importance of increasing the cultivation of this crop. As a high value crop, wheat has much potentiality for widespread cultivation. But unfortunately the adoption rate of wheat cultivation is decreasing from past few

years which were previously at increasing trend. Before undertaking any massive program for its increased cultivation in Bangladesh, it is first necessary to know the existing situation of adoption status of the wheat growers in the most potential areas of Bangladesh. The Gaibandha region is mostly well known for cultivation of wheat in this country. To expand the cultivation of this crop in other parts of the country, the knowledge on the present situation of wheat cultivation in this region will be significantly contributory to design appropriate programs for its widespread cultivation. Production of wheat may be increased with the care of wheat cultivation by the farmers. The concept and benefits of the wheat cultivation should be disseminated to the farmers in a convincing and attractive manner, so that farmers response quickly to adopt wheat cultivation. The annual requirement of wheat is increasing day by day in our country as the food products of wheat viz.; bread, bakery items and fast food items are becoming popular. The amount of wheat import is also increasing which were 5.4 million tons in the year of 2016 -17 and 5.5 million tons in the year of 2017-18 (BBS, 2017-18). So, a huge amount of local currency has to spend for importing wheat. This could be minimized by increasing the rate of adoption of wheat and rate of its production as well. On an average about 2.4 to 2.8 million hectares of land remain uncultivated during winter season. A substantial portion of that, wheat cultivation need less water, faces less problem due to weed and insect. There is an assurance of next crop after harvesting of wheat for its short duration and obtain self-sufficiency in food, it can play a great role along with rice. To increase wheat production, transfer of modern technology is essential and to get necessary information related to wheat production would be the key factor for the farmers in adoption of wheat cultivation (Islam, 1996). Now considerable efforts are being made through research and extension delivery system to increase wheat production in our country. But the actual increase in production will depend on the adoption of wheat by the growers. So, one has to know the adoption behaviour of the growers. In this judgment this piece of

research work has under taken. Sundarganj upazila under Gaibandha district, considered as one of the most suitable locations to study the phenomenon of adoption of wheat cultivation by the wheat growers with the objectives to determine and describe some selected characteristics of the wheat growers; to determine the extent of adoption of wheat cultivation by the wheat growers; and to explore the relationships between adoption of wheat cultivation and selected characteristics of the farmers.

Materials and Methods:

The study was conducted in two villages namely, Monmoth and Katgora at Bamandanga union of Sundarganj upazila of Gaibandha district. Sundarganj upazila is area 426.52sq km area. It was designed to describe the relationship between selected characteristics of the farmers and their extent of adoption of wheat cultivation practice. Efforts were also made to assess the problems of the wheat growers in adopting the wheat cultivation. Simple random sampling method was used to select the villages under the study. Out of 15 Unions, one union Bamandanga was selected randomly. From these union two villages- Monmoth and Katgora were selected using simple random sampling method. Then a list of wheat growers of these two villages was made by the help of the Sub-Assistant Agricultural Officer (SAAO). The number of wheat growers of these two villages was 200. Only heads of these 200 wheat growers constituted the population. Fifty percent of the wheat growers were selected from each village by using proportionately systemic random sampling methods. As a result 100 farmers constituted the sample size. In order to collect relevant data from the respondents an interview schedule was prepared keeping the objectives of the study in mind. Both open and closed form questions were used in collecting data. Simple and direct questions were included in the schedule to ascertain dependent and independent variables. The interview schedule was pre-tested with 12 wheat growers of the study area. On the test experiences, necessary additions, corrections and modifications of the schedule were done. Valuable suggestions and comments were received from the research supervisor and co-supervisor. Appropriate scales were developed to operationalize some characteristics of the wheat growers. The interview schedule was prepared in Bangla. The researcher himself collected data with the help of an interview schedule from the sample respondents through face to face interview using the pre-scheduled leisure period of respondent. The researcher selected 11 characteristics of the respondents as the independent variables. These were: Age, Education, Farm size, Family size, Annual family income, Input cost, Extension media contact, Knowledge on wheat cultivation, Attitude towards wheat cultivation, problems of wheat cultivation and Innovativeness. Adoption of wheat cultivation by wheat farmers was the main focus of this study and so it was considered as the dependent variables. In order to conduct the study in accordance with the objectives, it was necessary to measure the selected variables. This section contains procedures for measurement of both independent as

well as dependent variables of the study. Wheat cultivation knowledge of a respondent was measured by asking him 15 questions related to different aspects of wheat cultivation e.g. pests, pesticides, fertilizer etc. It was measured assigning weight age 2 for each question. So, the total assigned scores for all the questions became 30. The score was given according to response at the time of interview. Attitude towards wheat cultivation was measured through a four point Likert scale. Ten statements on various aspects of wheat cultivation were asked to the farmers. The number of positive and negative questions was equal. Growers in the study area might have faced various types of problems in the way of adopting wheat cultivation. But the investigator gained an experience through personal contact regarding common problems faced by the respondents before collection of data. Innovativeness is the degree to which an individual adopts an innovation relatively earlier than other members in a social system (Rogers, 1983). Here, innovativeness of a respondent was measured on the basis of the adoption of eight agricultural technologies by the respondents. A six point scale was used to compute the innovativeness. The score was assigned on the basis of time dimension which means how earlier a respondent used the technology continuously. The computer software SPSS (Statistical Package for Social Sciences, version 21) was used to analyze the data. The following statistical treatments were used to describe, represent and explanation of the relationships and contributions of the variables included in the study. Data were presented mostly in the tabular form. Various statistical measures like number, percentage distribution, range, mean, standard deviation, correlation coefficient etc. were used to describe and interpret the data. In order to explore the relationships between adoption of wheat cultivation and the selected characteristics of the wheat farmers, the Pearson Product Moment Correlation was computed. Correlation matrix was also computed to determine the interrelationships among the variables.

Results and Discussion:

The results indicated that the middle aged wheat farmers comprised the highest proportion (57 percent) followed by young aged category (31 percent) and the lowest proportion were made by the old aged category (12 percent). Data also indicates that the young and middle aged wheat farmers constituted about 88 percent of the respondents. In education categories 'primary education category constituted the highest proportion (41 percent) compared to 38 percent secondary level, 14 percent illiterate level category, 05 percent can sign only category,. On the other hand the lowest 02 percent belonged to above secondary level category. Data also revealed that 48 percent of the wheat growers had "medium family" of 6 to 7 members compared to more different than 32 percent of them having "large family" of above 7 members. The proportion of "small family" was 20 percent only. The medium land holder constituted the highest proportion (77 percent) of the farmers followed by 13 percent with large land holder, 10 percent with small land holder. The farmers having

low annual family income constitute the highest proportion (64 percent) followed by medium income (21 percent) and high annual family income (15 percent). The farmers having medium input cost constitute the highest proportion (47 percent) followed by low input cost (39 percent) and high input cost (14 percent). The majority (76 percent) of the farmers had medium extension media contact, while 12 percent of them had low contact. The proportion of the farmers having high extension media contact was only 11.2 percent. The highest proportion (69 percent) of the farmers had medium agricultural knowledge compared to about 19 percent of them having low agricultural knowledge, and only 12 percent high agricultural knowledge. The highest proportion (67 percent) of the wheat growers belonged to medium favourable attitude towards wheat cultivation as compared to 23 percent had low favourable attitude and 10 percent had highly favourable attitude. This indicates that 90 percent of the respondent growers had low to medium favourable attitudes towards wheat cultivation. Data presented indicate that the majority (64 percent) of the farmers faced medium problems compared to 19 percent of them faced high problem and 17 percent of the farmers faced low problems. Results also indicate that highest proportion (63 percent) of the growers had medium innovativeness as compared to 19 percent high innovativeness and only 18 percent low innovativeness. Data also revealed that majority (82 percent) of the respondent growers of the study area had medium to high level of innovativeness. Data contained in table indicate that highest proportion (75 percent) of the growers had medium adoption as compared to 13 percent low adoption and only 12 percent high adoption. Data also revealed that majority (88 percent) of the respondent growers of the study area had low to medium level of adoption of wheat cultivation practice. Results also shows that most of the area covered by BARI gom-19, BARI gom-20 and BARI gom-30 (65.2%) in where BARI gom-19 covered 28.23%, BARI gom-20 covered 22.69 percent and BARI gom-30 covered 14.28 percent of land.

Relationship between the Selected Characteristics of the Farmers and Their Adoption Practices of Wheat Cultivation

Relationship between adoption of wheat cultivation and their age

The coefficient of correlation between age and adoption of wheat cultivation was presented in Table 1. The coefficient of correlation between the concerned variables was found to be -0.266**.

Relationship between adoption of wheat cultivation and their education

The coefficient of correlation between education and adoption of wheat cultivation was presented in Table 1. The coefficient of correlation between the concerned variables was found to be 0.797**.

Relationship between family size of the farmers and their adoption of wheat cultivation

The co-efficient of correlation between the concerned variables was found to be -0.219* to the following observations regarding the relationship between the two variables.

Relationship between adoption of wheat cultivation and their farm size

The coefficient of correlation between farm size and adoption of wheat cultivation was presented in Table. The coefficient of correlation between the concerned variables was found to be -0.061.

Relationship between adoption of wheat cultivation and their annual family income

The coefficient of correlation between annual family income and adoption of wheat cultivation was presented. The coefficient of correlation between the concerned variables was found to be -0.051.

Relationship between adoption of wheat cultivation and their input cost

The coefficient of correlation between input cost and adoption of wheat cultivation was presented. The coefficient of correlation between the concerned variables was found to be 0.030.

Table 1 Co-efficient of correlation of the selected characteristics of the respondents and their adoption of wheat cultivation

| Independent variable | Computed value of 'r' | Dependent variable | Table value of 'r' of 100 degrees of freedom | |
|------------------------------------|-----------------------|-------------------------------|--|-------|
| | | | 0.05% | 0.01% |
| Age | -0.266** | Adoption of wheat cultivation | 0.197 | 0.257 |
| Education | 0.797** | | | |
| Family size | -0.219* | | | |
| Farm size | -0.061NS | | | |
| Annual income | -0.051NS | | | |
| Input cost | 0.030NS | | | |
| Extension media contact | 0.695** | | | |
| Agricultural knowledge | 0.698** | | | |
| Attitude towards wheat cultivation | 0.619** | | | |
| problems | -0.030NS | | | |
| Innovativeness | 0.569** | | | |

NS = Non significant, * = Significant at 0.05 level of probability, ** = Significant at 0.01 level of probability

Relationship between adoption of wheat cultivation and their extension media contact

The coefficient of correlation between extension media contact and adoption of wheat cultivation was presented. The

coefficient of correlation between the concerned variables was found to be 0.695**.

Relationship between agricultural knowledge of wheat cultivation and their adoption of wheat cultivation

The coefficient of correlation between knowledge about wheat cultivation and adoption of wheat cultivation was presented in Table 1. The coefficient of correlation between the concerned variables was found to be 0.698**.

Relationships between adoption of wheat cultivation and their attitude towards wheat cultivation

The coefficient of correlation between attitude towards wheat cultivation and adoption of wheat cultivation was presented in the above Table. The coefficient of correlation between the concerned variables was found to be 0.619**.

Relationship between adoption of wheat cultivation and their problems

The coefficient of correlation between problems of wheat cultivation and adoption of wheat cultivation was presented in Table 1. The coefficient of correlation between the concerned variables was found to be - 0.030.

Relationship between the innovativeness of the wheat growers and their adoption of wheat cultivation

The coefficient of correlation between innovativeness and adoption of wheat cultivation was presented in the above Table. The coefficient of correlation between the concerned variables was found to be 0.569**.

Ranked order of the problems faced by the wheat growers in adopting wheat cultivation

Table 2: Ranked order of the problems faced by the wheat growers in adopting wheat cultivation

| Sl. No | Problem | Growers N=125 | | | | Problem Facing Index | Rank order |
|--------|--|---------------|------------|---------|----------------|----------------------|------------------|
| | | High (3) | Medium (2) | Low (1) | Not at all (0) | | |
| 01 | Lack of sufficient machineries and tools for wheat cultivation | 48 | 48 | 2 | 2 | 242 | 7 th |
| 02 | Inadequate knowledge about wheat production | 40 | 41 | 6 | 13 | 208 | 9 th |
| 03 | Inadequate irrigation facilities. | 80 | 19 | 1 | 0 | 278 | 1 st |
| 04 | Low price of produce | 80 | 16 | 4 | 0 | 276 | 2 nd |
| 05 | High cost involvement for Adoption of modern technologies | 23 | 57 | 12 | 8 | 195 | 10 th |
| 06 | Poor contact with SAAO | 65 | 32 | 2 | 1 | 261 | 3 rd |
| 07 | Lack of cash money | 65 | 14 | 8 | 13 | 231 | 8 th |
| 08 | Scarcity of quality seed and fertilizers | 59 | 35 | 5 | 1 | 252 | 4 th |
| 09 | Lack of subsidy | 49 | 45 | 6 | 0 | 243 | 6 th |
| 10 | Poor marketing facility | 54 | 42 | 4 | 0 | 250 | 5 th |

Data contained in Table 2 indicate that “Inadequate irrigation in dry season” ranked the 1st with the PFI of 278. They need adequate water supply specially in dry season. For scarcity at irrigation, growers could not produce better yield. There were also not sufficient deep tube wells, water pumps and available water in the river during dry season in the study area for supply of irrigation water to the field. Probably that is why growers perceived this problem as topmost one. The 2nd cited problem of the growers was "Lack of accurate" with the PFI of 276. Now a day the improved seed are costly. The irrigation cost is high because the fuel oil cost is high. During peak time of using in wheat field the market price of fertilizer is usually increased rapidly. They invest high but feedback is very low. They do not get accurate price from selling wheat. Probably due to this reason growers faced problem in this respect. The 3rd cited problem of the growers was “Inadequate help from SAAO” with the PFI of 261. It is the crucial problem of the growers. SAAO were not so frequent and dutiful to contact the farmers. As a result, they did not get proper advice from the Block Supervisors for wheat cultivation. . SAAO did not help the growers to realize economic benefit from wheat cultivation. They also could not give the growers a clear-cut understanding of the innovations. Probably due to this reason growers faced problem in this respect. The 4th cited problem was "Scarcity of modern wheat variety of seed, fertilizer and pesticides when they are needed " with the PFI of 252. The growers do not get modern wheat variety of seed, fertilizer and pesticides in time when they go for cultivation of wheat. Modern wheat variety of seed, fertilizer and pesticides were not available at the village market due to lack of transport facilities. Probably due to this reason farmers faced problem in this respect. The 5th problem of the growers was “Lack of market” with the PFI 250. The growers of the study area do not get well market and market price during peak period of time. Probably due to this reason growers faced problem in this respect. The 6th problem of the growers was “Lack of subsidy” with PFI value of 243. Cultivation at wheat requires government grant. Most of the farmers are poor. They need government grant for wheat cultivation. The 7th problem of the growers was "Lack of sufficient agricultural machineries and tools for wheat cultivation" with the PFI of 242. The growers of the study area did not get agricultural machineries and tools timely. Probably due to this reason growers faced problem in this respect. The 8th problem of the growers was “Lack of cash money” with PFI of 231. The socio-economic conditions of the wheat growers were not good. Wheat cultivation demands large amount of money. They require incentives in adopting wheat cultivation practice. But for lack of cash money they could not provide adequate inputs (fertilizers, pesticides, insecticides etc.) at proper time in their fields. As a consequence they often fail to obtain a good harvest. In absence of cash money, the growers face difficulties in adopting wheat cultivation practice. The 9th problem of the growers was "Inadequate knowledge about wheat production" with the PFI of 208. Extension worker and others development workers do not provide technical support

or advice to the growers. Probably due to this reason growers faced problem in this respect. The 10th cited problem of the growers was “High cost involvement for adoption of modern technologies” with the PFI at 195. Tractor, seed drill, irrigation, modern wheat variety of seed, fertilizer and pesticides are the modern technologies. The irrigation cost is high because the fuel oil cost is high. In addition management of DTW and STW is also high. So, it is a problem for the growers hindering the adoption of modern wheat cultivation technologies. Furthermore, the growers in selling their goods do not get reasonable price. Probably due to this reason growers faced problem in this respect.

Conclusion:

In the study area farmers have been adopting wheat in various extents. There were 75% medium adopters, 13% low adopters and 12% high adopters. Therefore, it may be concluded that farmers of the study area all were adopters in variety of degrees. Only 14 percent of the farmers were illiterate and the remainder could sign their names or school educated. This result has achieved because of different NGOs’ activities and many educational institutes in the study area. There existed a positively significant relationship between farmers’ education and their adoption of wheat cultivation. Therefore, it may be concluded that, high educated farmers adopted more wheat cultivation. A great majority (88 percent) of the farmers had low to medium extension media contact, while there had a very strong positive significant relationship between extension media contact and adoption of wheat cultivation. Therefore, it may be concluded that, low extension media contact farmers adopted less wheat cultivation and with the increase of extension media contact of the farmers tends to increase their extent of adoption. The majority (83 percent) of the farmers had faced medium to high problems towards wheat cultivation. Therefore, it may be concluded that, if the problems are less, adoption will be more for wheat cultivation. A great majority (88 percent) of the farmers had low to medium knowledge about wheat cultivation, while there had a very strong positive significant relationship between knowledge about wheat cultivation of the farmers and their adoption of wheat cultivation. Therefore, it may be concluded that, farmers had higher knowledge about wheat cultivation were adopted more wheat cultivation in the study area. The majority (90 percent) of the farmers had low to medium attitude towards wheat cultivation, while there had a very strong positive significant relationship between attitude towards wheat cultivation and their adoption of wheat cultivation. Therefore, it may be concluded that, with the increase in attitude towards wheat cultivation of the farmers tends to increase their rate of adoption. A great majority (81 percent) of the farmers had low to medium innovativeness, and there was a positive significant relationship between farmers’ innovativeness and their adoption of wheat cultivation. Therefore, it may be concluded that, with the increase in innovativeness of the farmers tends to increase their extent of adoption.

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