

ADOPTION OF IMPROVED RICE CULTIVATION PRACTICES BY THE FARMERS OF CHAR-LAND OF GOMOTI RIVER

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ABSTRACT

The main purpose of the research work was to determine the extent of adoption of selected rice cultivation practices by the farmers of char-land of Gomoti River and to explore the relationships between selected characteristics namely, age, level of education, family size, farm size, annual income, organizational participation, extension media contact, innovativeness, attitude towards modern agricultural technology and agricultural knowledge of the farmers and their composite adoption of selected rice cultivation practices (dependent variable). Data were collected from randomly selected one hundred farmers of Luter-char union under Daudkandi upazilla of Comilla district with the help of an interview schedule. Appropriate scales were developed in order to measure the variables. Pearson Product Moment Coefficient of Correlation test was used to ascertain the relationships between the concerned focus and causal variables of the research work. Majority (53 percent) of the farmers had high adoption while 29 percent had medium adoption and 18 percent had low adoption of improved rice production practices. Among the selected characteristics, age, farm size, annual income, extension media contact, innovativeness, attitude towards modern agricultural technology, problems and agricultural knowledge showed significant and positive relationships with their adoption of selected rice production practices. The policy makers may consider these characteristics to increase the adoption of improved rice production practices.

Keywords: Adoption, rice production, char land, improved practices

INTRODUCTION

The total char land of Bangladesh is one million hectares. This land has been created through the formation of lands by accretion of sediments along the riverbanks and/ or riverbeds of four big rivers – Padma, Meghna, Jamuna and Brahmaputra and their more than 500 branch rivers and tributaries. People of char lands mainly depend on agriculture including fisheries and livestock-rearing (Roy, 2019). They cultivate various crops such as ground nut, mungbean, watermelon etc. However, beside these crops they also cultivate rice and vegetables in some areas.

The majority of the farmers of char-land of Bangladesh are illiterate. They have little communication facilities with developed areas. Reasonably they do not have well exposure with modern agricultural technologies except some HYV of rice varieties such as BR-3, BR-8, BR-28 and BR-29 (Karim, 2014). Indeed only the HYV of rice seeds can not ensure high production. Cultivation of HYV of rice consists of a package of technologies such as quality seeds, raising of seedling, balance dose of fertilizers, insect and disease control, etc. Unless the farmers of char-land adopt the entire package of rice production technologies the yield is supposed to be below the national average. The per hectare rice production in char-land is estimated to be below three tons per hectare against national average five ton per hectare (BBS, 2021). As the char people mostly depend on agriculture for their livelihood and the crop production is low, therefore, it is assume that they are very poor and live hand to mouth. There is an urgent need to adopt improved rice production technology along with HYV of rice by the people of char-land to improve their livelihood.

According to Rogers (2003), "Adoption is a decision to make full use of an innovation as the best course of action available". Ray (1995) also said that when an individual takes up a new idea as the best course of action and practices it, the phenomenon is known as adoption. The adoption of selected rice production practices by the farmers of char-land must be in the line of definition. The success of rice production technologies depends on its dissemination among the potential users, which ultimately

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is measured by the level of its adoption (Haque *et. al.*, 2016). It is assumed that notable improvements can take place in rice production system among the farmers of char- land if farmers adopt the package of technologies properly.

Generalization from studies conducted at home and abroad regarding the adoption of innovations may not be always applicable due to considerable variation in attributes of the innovations and for various other factors. It will be necessary to have a clear understanding of the present status of adoption of selected rice production practices by the farmers. Therefore, there is necessary to conduct a study on adoption among especial community such as farmers of char-land of Gomoti-river.

- i. To identify the rice production practices used by the farmers of char-land of Gomoti River.
- ii. To describe some selected socio-economic characteristics of the farmers.
- iii. To determine the extent of adoption of selected rice production practices used by the farmers.
- iv. To explore the relationships between the selected characteristics of the farmer's and their extent of adoption of selected rice production practices.

MATERIALS AND METHODS

Locale of the study

Luter-char a char-land of Gomoti River was purposely selected as locale of the study. The char-land is situated in Daudkandi upzilla under comilla district just five kilometers away from the upzilla head quarter.

Population and sample of the study

An update list of all farm family heads using only selected rice production practices of the selected village was prepared with the help of Sub-Assistant Agricultural Officer (SAAO). The list comprised a total of 496 farmers in the study area. These farmers constituted the population of this study. Twenty (20 percent) of the population of the village was randomly selected as sample of population by using a table of Random Numbers (Kerlinger, 1973). Thus, the total sample size of this study area was about one hundred (100) farmers.

Variables and their measurement

The respondents' selected 10 characteristics viz. age, education, family size, farm size, annual income, organizational participation, innovativeness, extension media contact, attitude towards technology, and agricultural knowledge are selected as causal variables. Adoption of selected rice production practices is selected as focus variable. It was calculated by asking farmers how many Boro rice technologies they adopted for how many years in how much land. The land area used for certain technology (mentioned in the first part of result and discussion) is considered to be the extent of adoption (e), whereas the area that could be used for the technology is considered to be potentiality of adoption (p). The extent of adoption (e) was divided by potentiality of adoption (p) against each of the technologies. This is called Adoption Quotient (AQ). Thus adoption of selected rice production practices score of a respondent could range from 0-100, while 0 indicating no adoption and 100 indicating highest adoption. A summary of measuring techniques of these variables are given below--

Table 1. Measurement techniques of focus variable and farmers characteristics

| IV and dv | Measuring techniques |
|------------------------------|---|
| Age | Actual years |
| Education | 0 for illiterate and 1 for each of schooling |
| Family size | Total number of members in the farmers family |
| Farm size | Total land possessed by the farmers (hectare) |
| Annual family income | Taka (Bangladeshi currency) |
| Organizational participation | 0 for not involved and 1 for each year of involvement |

| IV and dv | Measuring techniques |
|--------------------------------------|---|
| Innovativeness | Use a technology earlier (score) |
| Attitude towards improved technology | Five point Likert scale |
| Knowledge on rice technology | Score comes from question asking |
| Extension media contact | Five point scale from regularly to no contact (Score) |
| Adoption of improved practices | Adoption quotient formula (Score) |

Collection of data

For the purpose of data collection, an interview schedule was prepared. It was prepared keeping the objectives of the study in mind. The schedule contained both open and closed form questions. Direct simple questions were included in the schedule to collect data on the selected dependent and independent variables. Appropriate scales were developed to measure the selected factors of the respondents. The draft schedule was prepared in Bengali and pre-tested before using it for collection of data. For pre-test purpose, ten farmers taking from the selected village of the study area were interviewed by using the draft interview schedule. Based on the pre-test experience, necessary corrections, additions, alternations and rearrangements were made in the schedule. Thus, the schedule was prepared for final use.

Data were collected personally by the researcher himself through face to face visit to all the selected farmers of Luter-char village of Daudkandiupazilla to obtain valid and pertinent information. The researcher made all possible efforts to explain the purpose of the study to the farmers. Rapports were established with the farmers prior to interview and the objectives were clearly explained by using local language to the extent possible. At the time of data collection, the researcher was also aware of side talking and tried to avoid that problem tactfully. The researcher sought the help of the local supervisors for this purpose. Excellent co-operation and co-ordination were obtained from all the respondents.

Processing and analysis of data

The collected raw data were examined thoroughly. For this, the researcher made a scrutiny of the completed interview schedule to make sure that they were entered as complete as possible and well arranged to coding and tabulation. In case of qualitative data, appropriate scoring technique was followed to convert the data into quantitative forms. These were then tabulated according to the objectives of the study. For describing the various independent and dependent variables, the respondents were classified into various categories and arranged in simple table for description.

The collected data were compiled, coded tabulated and analyzed in accordance with the objectives of the study. The statistical measures such as range, mean, standard deviation, percentage distribution and rank order were used to describe both the dependent and independent variables. Tables were also used in presenting data for clarity of understanding. In order to explore the relationships of the selected characteristics of the farmers with their adoption of modern agricultural technologies, the Pearson's Products Moments Correlation Co-efficient was computed. Correlation matrix were also computed to determine the inter relationship among the variables.

RESULTS AND DISCUSSION

Identification and selection of rice cultivation practices

The term rice cultivation practices referred to the practices related to rice production, namely, cultivation of modern variety of rice, use of green manure, use of compost, use of granular urea, use of mixed fertilizer, use of power tiller, use of weedicide, methods used for controlling diseases and insects in rice field etc. In a broad sense, rice production practices refer to the production technologies of rice by judicious use of the resources of nature and different innovations.

For identifying rice production practices by the farmers, the researcher asked farmers about their use of production practices in rice cultivation. Later, their responses were cross checked by the DAE personnel (SAAO) and model farmers. After thorough discussion with these stakeholders, the following practices were identified. These practices were followed by the farmers of the study area.

1. HYV Boro rice varieties (BR3/ BR8/ BRR1 dhan 28/ BRR1 dhan 29)
2. Integrated Pest Management
3. Recommended Doses of Fertilizers.

Socio-economic profile of the farmers

Ten characteristics of the farmers were selected to find out their relationship with the adoption of selected rice production practices. The selected characteristics included their age, level of education, family size, farm size, annual income, organizational participation, extension media contact, innovativeness, attitude towards modern agricultural technology and agricultural knowledge. The summary of these characteristics of the farmers have been Table 2.

Table 2. Summary profile of the farmers selected socio-economic characteristics

| Item | Possible range | Observed range | Mean | SD |
|--|----------------|----------------|--------|-------|
| Age (years) | -- | 17-80 | 50.46 | 14.24 |
| Education (score) | -- | 0-11 | 1.80 | 3.07 |
| Family size (number of person) | -- | 2-18 | 6.66 | 2.67 |
| Farm size (ha) | --- | 0.13-2.83 | 0.87 | 0.56 |
| Annual family income (BDT) | -- | 12000-724360 | 109647 | 87810 |
| Organizational participation (score) | 0-11 | 0-5 | 3.90 | 1.01 |
| Innovativeness (score) | 0-50 | 1-15 | 6.19 | 4.06 |
| Attitude towards improved technology (score) | 0-32 | 18-30 | 23.86 | 2.92 |
| Knowledge on rice technology (score) | 0-50 | 4-30 | 16.82 | 6.12 |
| Extension media contact (score) | 0-72 | 0-17 | 7.62 | 3.25 |

Adoption of selected rice production practices

In this study only three important dimensions were taken into consideration for determining adoption of Boro rice production practices. The three dimensions were: 1. Area of selected Boro rice varieties. 2. Use of IPM practices for controlling pests & disease of Boro rice and 3. Recommended doses of fertilizers.

According to the measurement procedure of adoption of selected Boro rice production practices mentioned in methodology chapter. The adoption score of these three technologies ranged from 22-89 against the possible range of 0-100. The average adoption was 58.54 with a standard deviation of 18.02. Based on the adoption score, the farmers were classified into three categories: "low adopters" (up to 40), "medium adopters" (41-60) and "high adopters" (61 and above). Majority (53 percent) of the farmers fell under the high adopter's category, while 29 percent had medium adopters and only 18 percent had low adopters. Thus, an overwhelming majority of the farmers had medium to high adoption. For clarity of understanding, a bar diagram has been presented in Fig. 1.

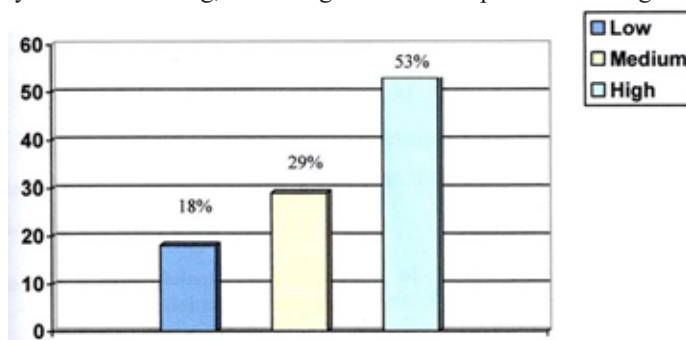


Fig. 1. Bar-graph showing adopter categories of selected rice production practices

Relationships between farmers' characteristics and adoption of selected rice production practices

Here the relationships with ten selected characteristics of the farmers and their adoption of selected rice production practices were presented. The selected characteristics constituted underlying variables and the adoption of selected rice production practices by the farmers considered as focus variable. Pearson's product moment correlation co-efficient "r" has been used to test the hypothesis concerning the relationship between two variables. The analysis showed that out of 10 selected characteristics seven characteristics such as age, farm size, annual income, extension media contact, innovativeness, attitude towards technology and knowledge on agriculture had significant relationship with the adoption of selected rice production technologies. The summary of the results of the correlations co-efficient relationships between the selected characteristics of the respondents and their adoption of selected rice production practices is shown in Table 3.

Table 3. Co-efficient of correlation of the selected characteristics of the farmers and their adoption of selected rice production practices

| Focus variable | Causal variables | Computed value of 'r' | Table value of 'r' at 98 degree of freedom | |
|--|------------------------------|-----------------------|--|-------|
| | | | 0.05% | 0.01% |
| Adoption of selected rice production practices | Age | 0.202* | 0.196 | 0.257 |
| | Level of education | 0.009 ^{NS} | | |
| | Family size | -0.034 ^{NS} | | |
| | Farm size | 0.220* | | |
| | Annual income | 0.204* | | |
| | Organizational participation | -0.092 ^{NS} | | |
| | Extension media contact | 0.225* | | |
| | Innovativeness | 0.197* | | |
| | Attitude towards technology | 0.202* | | |
| | Agricultural knowledge | 0.227* | | |

^{NS}Not significant, * significant at 0.05 level

The relationship between the age and adoption was positive direction and a low relationship was found between the two variables. The co-efficient of correlation between the concerned variable was significant at 0.05 level of probability. Based on the above findings, the researcher concluded that age of the farmers had a significant and positive relationship with their adoption of selected rice production practices. This meant the higher age of the farmers the higher was their adoption in respect of selected rice production practices. Singh and Rajendra (1990) and Hossain *et al.* (1992) observed the similar findings in their studies.

From the above observations, it might be concluded that there was significant positive relationship between farm size of the farmers and their adoption of selected rice production practices. The finding is quite rational because adoption of selected rice production practices is relatively costly. Hence, large farmers get more scope than the small farmers as they can invest money for adoption of selected rice production practices. Many researchers (Pal, 1995; Islam, 2002; Islam, 2003) observed the similar significant and positive relationship between these two variables.

On the basis of the observations, the researcher concluded that the annual income of the farmers had a positive significant relationship with their adoption of selected rice production practices. This means that the farmers having higher annual income were likely to have more adoption of selected rice production practices. Khan (1993), Aurangozeb (2002) and Islam (2003) found the similar results.

Table 3 explored that extension media contact of the farmers had significant and positive relationship with their adoption of selected rice production practices. It means that higher extension media contact of the farmers was more likely to have more adoption of selected rice production practices. Hussen (2002), Rahman ((2001) and Aurangozeb (2002) observed the similar significant and positive relationship between these two variables.

Considering the findings, the researcher concluded that innovativeness of the farmers had a significant and positive relationship with their adoption of selected rice production practices. Innovative farmers have more tendencies to adopt technology than the laggards. The finding is consistent with the studies conducted by Podder (1999) and Islam (2002).

The researcher also concluded that the attitude towards modern agricultural technology of the farmers had significant and positive relationship with their adoption of selected rice production practices. Favorable attitude helps to form a positive mind for adopting an innovation. In this aspect, the finding is realistic.

From the above observations, it might be concluded that there was significant positive relationship between agricultural knowledge of the farmers and their adoption of selected rice production practices. The finding is quite rational, because adoption of selected rice production practices is relatively intellectual. Hence, an intelligent farmer can accept technology earlier than the non-intelligent farmers. Many researchers (Bashar, 1993, Islam, 2002) observed the similar significant and positive relationship between these two variables.

CONCLUSION

The adoption of selected rice production practices of the farmers was remarkable, as nearly 82 percent of the farmers had medium to high adoption. However, to meet the ever-growing demand of food, economic facts, and environmental problems, there is a need to further enhance the rate and extent of adoption of selected rice production practices among the farmers. Particularly, both the Government Organization (GO) and Non-Government Organization (NGO) workers should provide appropriate technical and field management information to all farmers through continued extension education and support services. The study found a significant and positive relationship between farmers' seven characteristics such as age, farm size, annual income, extension media contact, innovativeness, attitude towards technology and knowledge on agriculture with the adoption of selected rice production technologies. The policy makers may consider these characteristics to increase the adoption of improved rice production practices. Department of Agricultural Extension (DAE) should take initiative to motivate farmers with younger age, having lower media contact, lower agricultural knowledge, unfavorable attitude towards technology adoption to accept improved rice production practices.

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