Farmers' attitude towards the use of USG in rice cultivation in three selected villages of Netrakona district

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Abstract

The study was conducted to determine the attitude of farmers towards the use of urea super granule (USG) in rice cultivation and explore relationship between the selected characteristics of the farmers. Data were collected through personal interview from 84 randomly selected USG users in rice cultivation of the three villages under Sadar Upazila of Netrakona district during October to December 2008. A five point Likert scale was used to determine the attitude of farmers. The majority (73.81%) of the farmers had moderately favourable, 21.43% slightly favourable and 4.76% highly favourable attitude towards use of USG in rice cultivation. Level of education, farm size, annual income, farming information, agricultural training exposure and rice farming knowledge of the farmers' had significant positive relationship but family subsistence pressure had significant negative relationship with their attitude towards the use of USG.

Keywords: Rice, Urea super granule (USG), Attitude, Farmers

Introduction

Nitrogen is a very important nutrient element for crop production. In Bangladesh, rice is the main staple food crop. It covers about 80% of the total cropped area of the country (AIS, 2008). Farmers of Bangladesh use mainly urea in rice field as the most available source of nitrogen. Annual requirement of urea of the country is about 28 lakh ton of which 50% is met by the domestic production. The rest amount of urea needs to be imported by spending a large amount of foreign currency (BBS, 2008). Farmers apply urea in rice field mainly on the soil surface. As urea is a highly water-soluble and quick release fertilizer, its application to the soil surface may result in a significant loss in various ways (as ammonia volatilization, denitrification, surface run-off and leaching) thus, reducing its efficiency. It is reported that the efficiency of urea nitrogen in wetland rice is only about 30% of the applied urea and even less in many cases (Prasad and De Datta, 1979). However, the nature and magnitude of nitrogen loss largely depends upon the sources of nitrogenous fertilizer and its methods of application. Rymar *et al.* (1989) reported that slow release fertilizers i.e., nitrogen as encapsulated urea, granular oxamide and oxamide powder are more effective than the conventional fertilizers as ammonium sulphate or urea. Urea super granule (USG), a slow releasing nitrogenous fertilizer is being marketed in Bangladesh as a source of nitrogen. Deep placement of USG in rice field instead of broadcasting conventional prilled urea can increase the efficiency of applied nitrogen by improving absorption to a certain extent. Thus, the total requirement of urea of the country can be reduced which will ultimately save our foreign currency needed to import urea. On the other hand, USG is now easily available to the farmers. So, the use of USG in rice cultivation may offer a considerable opportunity to minimize the production cost of rice. Moreover, use of USG is environment friendly and it has the potential to influence our national economy positively through increased rice production. The Department of Agriculture Extension, some other government and non-government organizations have been working among the farmers in different areas of the country including Netrakona district to popularize the use of USG in crop production.

Attitude of an individual on certain aspect serves as a driving force for constant efforts on certain perceived action. So, to motivate farmers for wide adoption of USG technology in rice cultivation is necessary to assess their attitude in this regard. However, very few research studies have so far been reported in Bangladesh in this context. Under the above circumstances, the present study was undertaken to achieve the following objectives; i) to describe selected characteristics of the farmers, ii) to determine farmers' attitude towards the use of USG in rice cultivation and iii) to explore the relationship between the farmers' selected characteristics and their attitude towards the use of USG in rice cultivation.

Materials and Methods

The study was conducted in three villages, namely Panchashipara, Laight and Rajendrapur under Sadar Upazila of Netrakona district. The villages were selected purposively. The basis of the selection was availability of USG users. Total number of USG user in three villages was 280, which constituted the population of the study. Out of which 84 (30% of the total population) USG users were selected randomly and proportionately from each of the three villages to constitute the sample. Data were collected from the respondents through direct interviewing method using a pre-tested structured interview schedule during October to December 2008.

Variables of the study

The independent variables of the study were 13 selected characteristics of the farmers. These were age, education, family size, farm size, annual income, family subsistence pressure, farming experience, farming information exposure, agricultural training exposure, rice farming knowledge, cosmopoliteness, innovativeness and organizational participation.

Measurement of independent variables:

Age: Age was measured in terms of actual years at the time of interviewing on the basis of respondents' response.

Education: It was the total number of academic years that a respondent received by getting formal education in the educational institution. A score of 1 was assigned for each class passed by the respondent, 0 was assigned for no education.

Family size: Family size of a respondent was measured in terms of actual number (all dependents) of members in his family (including himself) during the interview period.

Farm size: The area of land possessed by the respondent and his family members in hectare was the farm size.

Annual income: Annual income of a respondent was measured in terms of Taka. It was determined from the earnings of agriculture and other source (if any) including him and other family member(s). Earnings of previous one year from the date of interview were computed.

Family subsistence pressure: It is the total number of family member per unit area (ha) of arable land owned by the family. This reflects pressure of family size on arable land owned by the family. It was measured by the following formula:

$$Sp = \frac{Fs}{L}$$

Where,

        Sp = Family subsistence pressure
        Fs = Family size (no.)
        L = Farm size (ha)

Farming experience: Farming experience score of a respondent was determined on the basis of his involvement in agricultural activities. For every year of involvement score was 1, for two years of involvement score 2 and so on.

Farming information exposure: Farming information exposure score of a respondent was computed on the basis of his contact with 14 sources of farming information. Respondent was asked whether he contacted with those farming information sources/activities by indication never, rarely, occasionally or frequently. Weights were assigned as 0 for never, 1 for rarely, 2 for occasionally and 3 for frequently. A respondent's farming information exposure score was obtained adding the weights for his responses to all the 14 sources listed in the interview schedule. Farming information exposure of a respondent could range from 0-42, where 0 means no farming information exposure and 42 means very high farming information contact.

Agricultural training exposure: Training exposure was measured by the total number of days a respondent received different agricultural training during previous one year from the date of interview.

Rice farming knowledge: To measure the rice farming knowledge of respondents 40 questions related to rice farming were incorporated in the interview schedule, every respondent was asked to answer all the 40 questions. Score 1 was assigned for each correct answer to the question. The summation of obtained scores against 40 questions represented the rice farming knowledge of a respondent.

Cosmopoliteness: Cosmopoliteness score of a respondent was computed on the basis of respondent's visit to 6 different places outside his own village. The respondent indicated whether they visited those places frequently, occasionally, rarely or never. Weights assigned to these visits were 3, 2, 1 and 0, respectively. A respondent's cosmopoliteness score was obtained by adding the weights for his visit to all the 6 places listed in the instrument. Cosmopoliteness score could range from 0 to 18; 0 indicated no visit and 18 indicated very high cosmopoliteness.

Innovativeness: Innovativeness of a respondent was measured by computing an innovativeness score on the basis of his extent of use of selected 10 modern agricultural practices. Every respondent was asked whether he used each of the 10 modern agricultural practices by expressing 'do not use' or used for 1 year or for 2 years and so on. Scores were assigned on the basis of time dimension. Score 0 was assigned for 'do not use' and score 1 for each year used of every item. Innovativeness score of a respondent was obtained by adding his scores for all 10 items.

Organizational participation: Organizational participation score of a respondent was measured on the basis of the nature of participation in different organizations in previous one year from the date of interview. A score of 0 was assigned for no participation, 1 for ordinary participation, 2 for executive committee member and 3 for officer (president, vice-president, secretary etc.). Organizational participation score of a respondent was determined by summing the participation scores for all the organization he participated.

Measurement of dependent variable:
Farmers' attitude towards the use of USG in rice cultivation was considered as the dependent variable. A five point Likert-type scale was used to ascertain the farmers' attitude towards the use of USG in rice cultivation. The farmers were asked to respond if they strongly agreed, agreed, no opinion, disagreed and strongly disagreed against 10 selected items of which 5 were positive and 5 negative. The scoring order for the above five types of responses were 5, 4, 3, 2 and 1, respectively for positive statements and scoring order was reverse in case of the negative statements. Thus, the possible attitude score for a respondent could range from 10 to 50, where 10 indicating highly unfavourable attitude and 50 indicating highly favourable attitude of the farmers towards the use of USG. On the basis of observed score respondents' attitude was categorized as highly unfavourable, unfavourable, favourable and highly favourable.

In order to explore the relationship between the selected characteristics of the farmers and their attitude towards the use of USG in rice cultivation Pearson's Product Moment Co-efficient of Correlation (r) was computed.

Results and Discussion

Selected characteristics of the farmers

The selected characteristics of the farmers are presented in Table 1. Data revealed that the highest portion (45.23%) of the farmers were young. A substantial portion (38.10%) of the farmers was middle aged followed by old aged (16.67%) with an average of 41 years. The highest portion of the respondents (45.24%) had primary level of education followed by secondary level (38.10%). A few (11.90%) of them were illiterate. However, average literacy of the respondents was above primary level (5.62). Majority of the respondents (54.76%) had medium sized family. Equal portion (21.43%) of the respondents had small and large family while only 2.38% respondents had very large family size. However, the average family size was 5.95.

Table 1. Distribution of the respondents according to their selected characteristics

Characteristics	Scoring method	Possible score	Observed score	Categories	Respondents N= 84		Mean	SD
					Number	Percent		
Age	No of years	-	22-90	Young age (up to 35) Middle age (36-50) Old age (>50)	38 32 14	45.23 38.10 16.67	41	14.50
Level of education	Years of schooling	-	0-13	Illiterate (0) Primary level (1-5) Secondary level (6-10) Higher secondary level and above (> 10)	10 38 32 4	11.90 45.24 38.10 4.76	5.62	3.48
Family size	No of members	-	2-12	Small (up to 4) Medium (5-7) Large (8-10) Very Large (>10)	18 46 18 2	21.43 54.76 21.43 2.38	5.95	1.97
Farm size	Size in hectares	-	0.20-4.86	Marginal (0.021-0.2) Small (0.21-1.0) Medium (1.01-3.0) Large (> 3.0)	2 52 28 2	2.38 61.91 33.33 2.38	1.04	0.85
Annual income	'000' Tk	-	29-290	Low income (up to 45) Medium income (45.1-135) High income (>135)	14 54 16	16.67 64.29 19.04	95.52	62.36
Family subsistence pressure	Score	-	1.42-26.67	Low (<5) Medium (5-10) High (>10)	28 30 26	33.33 35.72 30.95	8.33	5.19
Farming experience	No of years	-	2-70	Low (up to 10) Medium (11-25) High (>25)	20 30 34	23.81 35.71 40.48	23.67	15.41
Farming information exposure	Score	0-42	2-29	Low (up to 10) Medium (11-20) High (>20)	44 26 14	52.38 30.95 16.67	11.60	7.60
Agricultural training exposure	Score	-	0-31	No (0) Low (1- 10) Medium (11-20) High (>20)	42 38 2 2	50.00 45.24 2.38 2.38	2.31	5.40
Rice farming knowledge	Score	0-40	14-38	Low (up to 20) Medium (21.30) High (>30)	16 40 28	19.05 47.62 33.33	26.79	6.74
Cosmo-politeness	Score	0-18	4-16	Low (up to 7) Medium (8-14) High (>14)	34 44 6	40.48 52.38 7.14	9.05	3.81
Innovativeness	Score	-	0-33	No (0) Low (1- 10) Medium (11-20) High (>20)	2 48 26 8	2.38 57.15 30.95 9.52	10.50	8.05
Organizational participation	Score	-	0-12	No (0) Low (1-5) Medium (6-10) High (>10)	30 40 12 2	35.71 47.62 14.29 2.38	2.76	3.19

As regard to farm size, about two-third (61.91%) of the respondents were small farmers and one-third were medium farmer (33.33%). Average farm size of the respondents was 1.04 hectare.

Respondents' annual income ranged from Tk. 29 to 290 thousand. Most of the respondents (64.29%) were in medium income category. Family subsistence pressure score ranged from 1.42 to 26.67 with a mean of 8.33. Only one third of the respondents (33.33%) had low family subsistence pressure and the rests had medium (35.72%) to high (30.95%) subsistence pressure. The average farming experience

scores was 23.67 years with a range of 2-70 years. Major portion of the respondents (about 40%) was highly experienced compared to medium (35.71%) and low (23.81%) farming experienced groups. More than half of the respondents (52.38%) had low farming information exposure. About one-third (30.95%) had medium and only 16.67% had high farming information exposure. About 45% of the respondents had low exposure to different agricultural trainings and only 4.76% had medium to high training exposure. However, half of the respondents (50%) had no training exposure. Rice farming knowledge score of the respondents ranged from 14-38 with an average of 26.79. About 48% of the respondents had medium level of rice farming knowledge compared to 33.33% (high) and 19.05% (low) levels of knowledge about rice farming.

More than one-half of the respondents (52.38%) had medium level of cosmopoliteness compared to 40.48% low and 7.14% had high level of cosmopoliteness. Majority of the respondents (57.14%) had low innovativeness followed by 30.95% medium and only 9.52% had high innovativeness. Results also indicated that the highest portion of the respondents (83.33%) had low organizational participation and the rest had medium (14.29%) to high (2.38%) organizational participation.

Farmers' attitude towards the use of USG

It is revealed that farmers' attitude scores towards the use of USG ranged from 27 to 45 against possible range of 10 to 50 (Table 2). The mean score was 39.33 with standard deviation of 3.68. On the basis of observed scores, respondents were classified into four categories as outlined in Table 2. The major portion of the respondents (57.14%) had favourable attitude followed by highly favourable (40.48%) attitude towards the use of USG in rice cultivation. However, only a few (2.38%) of them had unfavourable attitude. It is revealed that almost all the respondents had favourable to highly favourable attitude towards use of USG. Most likely it was due to the presence of more young farmers among the respondents. Results indicated that more than 80% of the respondents of the study area were young to middle aged. Furthermore, high rice farming knowledge and frequent visit to other places may be the other reasons that helped the farmers to form favourable attitude towards the use of USG in rice cultivation. On the other hand, a few of the respondents showed unfavourable attitude. This might be due to their low innovativeness, low farming information exposure, low cosmopoliteness and low training participation.

Table 2. Distribution of farmers on the basis of their attitude score towards use of USG

Possible score	Observed score	Category	Farmers' (N =84)		Mean	SD
			Number	Percent		
10 to 50	27-45	Highly unfavourable (up to 20)	0	0	39.33	3.68
		Unfavourable (21-30)	2	2.38		
		Favourable (31-40)	48	57.14		
		Highly favourable (>41)	34	40.48		

Relationship of the farmers' selected characteristics with their attitude towards the use of USG in rice cultivation

To find out the relationships between the selected characteristics of the farmers and their attitude towards the use of USG, coefficients of correlation were computed which are presented in Table 3. Results revealed that level of education of the farmers had significant positive correlation (0.313**) with their attitude towards the use of USG in rice cultivation. It indicated that educated farmers had more access to print media relating to USG and can understand the beneficial effects of using USG in rice cultivation compared to prilled urea. As a result educated farmers had a positive attitude towards the use of USG. Similar relationship was also observed by Hoque *et al.* (2001) between the farmers' attitude towards the use of organic matter and level of education. Farm size of the respondents showed significant positive relationship (r=0.235*) with their attitude towards the use of USG in rice cultivation. It revealed that large farm holders had more favourable condition towards the use of USG than the small farm holders. Pandit (2007) reported that the small farm holders had tendency to use traditional and proven technology to their farms because they usually do not like to take any risk of new technology. But the large farm holders had

a tendency to do something new and they had also the capability to take risk of new technology. Similar relationship was also observed by Islam and Kashem (2001) between farm size and farmers attitude towards judicious use of agro-chemicals in crop production.

Table 3. Relationship between respondents' selected characteristics and their attitude towards use of USG

Dependent variable	Characteristics of the respondents	Calculated value of 'r'
Farmers' attitude towards use of USG	Age	-0.174
	Level of education	0.313**
	Family size	0.049
	Farm size	0.235*
	Annual income	0.248*
	Family subsistence pressure	-0.229*
	Farming experience	0.194
	Farming information exposure	0.243*
	Agricultural Training exposure	0.226*
	Rice farming knowledge	0.591**
	Cosmo politeness	0.151
	Innovativeness	0.144
	Organizational participation	0.179

* Significant at 0.05 level and ** significant at 0.01 level.

The correlation coefficient (r= 0.248*) of the farmers attitude towards the use of USG and their annual income was significantly positive. It indicated that the higher was the annual income, higher was the farmers' attitude score towards the use of USG in rice production. Annual income plays an important role in adoption of a new technology by the farmers. So, farmers having higher annual income possessed positive attitude towards the use of USG in rice production. A similar relationship was observed by Karim *et al.* (1987) in case of farmers' attitude towards the use of urea in jute cultivation.

Family subsistence pressure was one of the selected characteristics which had only significant negative relationship (-0.229*) with farmers attitude towards the use of USG in rice production. It means that higher was the value of family subsistence pressure, lower was the attitude scores of the farmers regarding USG use, that is lower family subsistence pressure is well for formation of farmers favourable attitude towards a new technology like use of USG. The result is agreed with the findings of Hoque *et al.* (2001).

The relationship between farming information exposure of the farmers' and their attitude towards the use of USG was found to be significantly positive (0.243*). It is almost generalized that farmers contact to various information media broaden their knowledge and views about a technology which help to form better attitude towards the technology. Haque (2007) also found that extension media had a positive and significant relationship with their attitude towards organic farming.

Agricultural training exposure of the farmers had significant positive relationship (0.226*) with their attitude towards the use of USG. Better knowledge and motivation from the training on fertilizer management and other areas of agriculture might help them to form favourable attitude towards the use of USG in rice cultivation. Similar observation was also reported by Habib (2000).

The relationship between rice farming knowledge and their attitude towards the use of USG was positively significant (0.591**). Knowledge is an integral part of attitude. Probably farmers using USG acquired better agricultural knowledge and thus got their mental faculty broadened. This may be the reason of positive significant relationship between rice farming knowledge and attitude of farmers in using USG. Nurzaman (2000) observed that agricultural knowledge of the FFS and non-FFS farmers were positively related with their attitude on IPM.

Problems mentioned by the farmers in using USG

There are some constraints of using USG such as its availability in the local market, skilled labour for its application, optimum size of USG and practice of alternate wetting and drying (AWD) method of irrigation. When USG is applied the practice of AWD method of irrigation in boro rice field is not possible. Because when USG is applied the soil should not be cracked so that urea is not lost through the cracks in the form of gases. For this reason the soil should always be kept saturated by ensuring irrigation. However, regarding problems in using USG, almost all of the respondent farmers mentioned that application of USG took more time and more labour. Sometimes broken USG balls are found in the bags which causes loss to the farmers.

Conclusion and Recommendation

From the findings of the study it can be concluded that most of the farmers had favourable to highly favourable attitude towards the use of USG in rice cultivation. So, wide scale motivational programmes should be undertaken by the government or any other agency to popularize the USG for rice cultivation taking into consideration the constraints facing by the farmers.

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