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Farmers' Knowledge on Arsenic Related Problems of Environment

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Abstract

The purpose of the study was to determine farmers' knowledge on arsenic related problems of environment and to explore the relationships between the selected characteristics of the farmers and their knowledge on arsenic related problems of environment. Data were collected from randomly selected 105 farmers of three selected villages of Gouripur upazila under Mymensingh district during September to October 2004. Knowledge on arsenic related problems of environment was the dependent variable and its score could range from 0 to 100 while the observed range 41 to 73. The average knowledge score of the farmers was 53.64. More than two-thirds (67 percent) of the respondents had medium knowledge while 28 and 5 percent of them possessed high and low knowledge on arsenic related problems of environment. Out of ten selected characteristics of the farmers, education, annual income, cosmopoliteness, organizational participation, number of training received, duration of training received and communication exposure had significant positive relationships with their knowledge on arsenic related problems of environment whereas age showed significant negative relationship with the same.

Keywords: *Arsenic related problems of environment, farmers' knowledge*

Introduction

Though agriculture constitutes the largest sector of the economy in Bangladesh, she has been facing food shortage since the early 1950s with a large and rapidly growing population. But efforts to increase agricultural production without considering the environmental problems of rural people could not able to bring about their real welfare and happiness. Because, human health along with their agricultural production is important. Arsenic in the recent years has been a serious environmental issue in Bangladesh. Groundwater contamination by arsenic is a severe problem in Bangladesh. Presently, 59 districts out of 64 and about 60 percent land of this country affected by arsenic contamination (Joarder *et al*., 2002). This element contamination poses a serious threat to man and agricultural sustainability in this country.

Arsenic in Bangladesh came in attention at the beginning of 1995, but the awareness started in 1993, when arsenic induced pigmentation keratosis was detected in some areas of south western parts of Bangladesh.

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Consequently, 80 million people are now exposed to arsenic poisoning and 10 thousand people have shown the symptoms of arsenicosis (Chowdhury, 2001).

Arsenic is mostly found in high concentration in the depth between 9 and 30 meters and ground water from depth of more than 150 to 200 meters might be free from arsenic (BGS, 1999). Groundwater containing arsenic is randomly used in Bangladesh for irrigation purposes, which in turn enhance the levels of soil arsenic, in many cases above the allowable limits (>20 mg As kg^{-1} soil). This arsenic enters into food chain through agricultural crops and affect human health. Besides, it also exerts phytotoxicity. Thus, arsenic contamination has become a serious problem in many parts of the world including Bangladesh. Both human health and agricultural production of Bangladesh are affected in a very undesirable way. In this connection, the present study has been carried out to fulfill the following objectives:

- To determine and describe the extent of knowledge on arsenic related problems of environment and
- To explore the relationships between farmers' selected characteristics and their knowledge on arsenic related problems of environment.

Methodology

The study was confined to three villages (Achintapur, Chorakona and Krishnapur) in Gouripur upazila of Mymensingh district. Population of the study was constituted by 697 male farm family heads of the selected villages. From the population 15 percent was randomly selected to obtain a sample containing 105 respondents. Data were collected using pre-tested interview schedule during September to October 2004 through personal interview.

To measure the farmers' knowledge on arsenic related problems of environment, 25 questions on various aspects of arsenic related problems of environment were asked to each of the respondent farmers. Four probable answers were set under each question item. Scores were assigned as 1, 2, 3 and 4 for the least appropriate to the most appropriate answer under each question item. Thus, the possible total scores of the farmers could range from 25 to 100, where 25 indicated very low knowledge and 100 indicated very high knowledge on arsenic related problems of environment. The independent variables *viz.* age, education, family size, farm size, annual income, cosmopoliteness, organizational participation, number of training received, duration of training received and communication exposure were measured by the prevailing standard methodology. Correlation between dependent and independent variables was calculated through computing 'r' values.

Findings and Discussion

Farmers' knowledge on arsenic related problems of environment

The observed scores of the farmers' knowledge on arsenic related problems of environment ranged from 41 to 73 against a possible range of 25 to 100. The mean and standard deviation were 53.64 and 7.46 respectively. Among the farmers, more than two-thirds (67 percent) had medium level of knowledge while 28 percent them had high level of knowledge and only 5 percent possessed low level of knowledge on arsenic related problems of environment (Table 1).

Table 1. Distribution of the farmers according to their knowledge

Farmers			Mean score	Standard deviation
Categories (score)	Number	Percent		
Low knowledge (up to 42)	5	5		
Medium knowledge (43 to 58)	70	67	53.64	7.46
High knowledge (above 58)	30	28		
Total	105	100		

It is evident from Table 1 that a great majority (95 percent) of the farmers had medium to high knowledge on arsenic related problems of environment. This might be due to the reason that the non-formal education, media campaign etc. regarding arsenic helped them to gain knowledge on this issue. However, as the average knowledge level was 53.64, there still remains ample scope to improve the knowledge level of farmers regarding arsenic related problems of environment.

Characteristics profile of the farmers

Distribution of the farmers according to their selected characteristics has been shown in Table 1. About half (48 percent) of the farmers were middle-aged and substantial proportion (40 percent) was young. Average literacy was above primary level (5.93). Majority (86 percent) of the respondents had medium family size. More than half (56 percent) of the farmers had 1 to 2 hectare of land and their average farm size was 1.24 hectare. Three-fourth (75 percent) of the respondents had medium annual income. The higher proportion (82 percent) of them had medium level of cosmopoliteness. Organization participation was very low (average score 11.81) and 69 percent of the respondents was in very low category. Among the farmers 20 percent never attended any training and 75 percent of them attended very low to medium number of training. Their duration of training received was on an average short (13.36). Their average communication exposure was also medium and most (78 percent) of them had medium level of communication exposure.

Table 2. Characteristics profile of the farmers

Characteristics (units)	Range		Farmers		Mean	SD
	Possible	Observed	Categories	Percent		
Age (year)	-	27-55	Young (≤35) Middle-aged (36-50) Old (>50)	40 48 12	39.07	7.37
Education (year of schooling)	-	1-12	Can sign only (0.5) Primary (1-5) Secondary (6-10) Above secondary (>10)	7 49 38 6	5.93	3.38
Family size (number)	-	4-9	Small (<5) Medium (5-7) Large (>7)	2 86 12	6.31	1.17
Farm size (hectare)	-	0.58-2.48	Small (<1) Medium (1-2) Large (>2)	35 56 9	1.24	0.48
Annual income ('000' Tk.)	-	38.52-134.96	Low (<50) Medium (50-100) High (>100)	11 75 14	75.40	21.75
Cosmopoliteness (score)	0-24	12-22	Medium (8-16) High (>16)	82 18	14.92	1.87
Organizational participation (score)	0-72	7-22	Very low (≤12) Low (>12)	69 31	11.81	3.10
Number of training received (number)	-	1-3	Not at all (0) Very low (1) Low (2) Medium (3)	20 36 39 5	1.28	0.84
Duration of training received (day)	-	0-44	Very short (≤7) Short (8-30) Medium (>30)	47 43 10	13.36	12.39
Communication exposure (score)	0-80	28-52	Low (<31) Medium (31-45) High (>45)	19 78 3	34.67	4.58

Relationships between selected characteristics and knowledge

The relationships between the selected characteristics of the farmers and their knowledge on arsenic related problems of environment have been presented in Table 3. Findings reveal that age of the farmers significantly influenced their knowledge level regarding arsenic related problems of environment. Younger farmers possessed

more knowledge compared to their older counterpart. Educational qualification had significant positive relationship with knowledge i.e. increased level of education of the farmers increased their level of knowledge regarding arsenic related problems of environment. Hamid (1995) and Wahab (1975) also found such relationships in their respective studies.

Table 3. Relationships between dependent and independent variables

Independent variables	r values
Age	-0.328**
Education	0.438**
Family size	-0.043
Farm size	-0.049
Annual income	0.204*
Cosmopoliteness	0.232*
Organizational participation	0.357**
Number of training received	0.468**
Duration of training received	0.436**
Communication exposure	0.639**

Dependent variable: Farmers' knowledge on arsenic related problems of environment
** Significant at 5% level of probability*
*** Significant at 1% level of probability*

Family size and farm size did not show any significant relationships with the farmers' knowledge of arsenic related problems of environment. However, annual income, cosmopoliteness, organizational participation, number of training received, duration of training received and communication exposure of the farmers had significant positive relationships with their knowledge of arsenic related problems of environment.

Income of an individual usually creates upliftment of economic, social and cultural knowledge level. In the present study, the farmers having higher income were likely to have increased knowledge regarding arsenic related problems. The respondents having more cosmopolite nature maintained more contact with places outside their social system, exchanging opinion and sharing ideas regarding different environmental issues regarding arsenic problems. Organizational participation was a crucial factor to increase farmers' knowledge regarding arsenic. Farmers who had more participation in different social organizations, could expose themselves to different development issues and gain knowledge on different issues including arsenic. Hamid (1995) also found similar findings in his study.

The respondents having higher number and duration of training received were likely to have contact with different people and places concerned with different environmental issues that might enhance their knowledge regarding arsenic. Sana (2003) also found that training received of the farmers had a positive significant relationship with their knowledge on shrimp culture. Similarly, communication exposure of the farmers also had advantageous effect on their knowledge regarding arsenic related problems of environment.

Conclusions

Farmers' knowledge related to arsenic related problems of environment was above average, but there is still ample scope to improve their knowledge level. The vital characteristics of the farmers namely age, education, annual income, cosmopoliteness, organizational

participation, number of training received, duration of training received and communication exposure which had significant relationships with their knowledge on arsenic related problems must be kept in favor of knowledge improvement. For this, extension workers should give special attention to younger farmers. Effective training program related to environmental issues by government and non-government organizations should be arranged in organizational framework for increasing organizational participation as well as knowledge level. Adult education and mass literacy program might be strengthened including environmental issues in general and arsenic in particular in the teaching curricula.

References

BGS. 1999. *Groundwater Studies of Arsenic Contamination in Bangladesh.* British Geological Survey (BGS) and Mott MacDonald (UK) for the Government of Bangladesh. Ministry of Local Government, Rural Development and Cooperatives, Department of Public Health Engineering and Department for International Development (DFID).

Chowdhury, Q.I. 2001. *Bangladesh: State of Arsenic.* Forum of Environmental Journalists of Bangladesh (FEJB), Dhaka.

Hamid, M.A. 1995. Farmers' Awareness on Environmental Pollution Caused by the Use of Agrochemicals in Two Selected Villages of BAU Extension Centre. *M.S. (Ag. Ext. Ed.) Thesis,* Dept. of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Joarder, A.I., M. Rahman, M.A. Shahjahan and K.A. Salam. 2002. Arsenic Contamination of Groundwater in Bangladesh: Cause, Effect and Remedy. *Paper Presented in 4th International Conference,* January 12-13, Dhaka.

Sana, M.C. 2003. Farmers' Knowledge of Shrimp Cultivation in Assassin Upazila under Satkhira District. *M.S. (Ag. Ext. Ed.) Thesis,* Dept. of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Wahab, A.M.F. 1975. Attitude of Farmers towards the Use of Fertilizers. *M.Sc. (Ag. Ext. Ed.) Thesis,* Dept. of Agricultural Extension and Teachers' Training, Bangladesh Agricultural University, Mymensingh.