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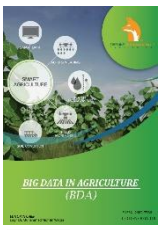

RESEARCH ARTICLE

FARMERS' ATTITUDES TO CHEMICAL PESTICIDE USE IN NORTHWEST REGION OF BANGLADESH

Mujibur Rahman Khan[a*], Dipenkar Chandra Barman[b], Md. Mahbub Alam[b], Rifat Alam[c]

[a]Department of Horticulture, EXIM Bank Agricultural University Bangladesh, Bangladesh
[b]Faculty of Agriculture, EXIM Bank Agricultural University Bangladesh, Bangladesh
[c]Department of Entomology, EXIM Bank Agricultural University Bangladesh, Bangladesh
[*]Corresponding Author Email: mujiburkhan.bd@gmail.com

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ABSTRACT

Although it is obvious that chemical pesticides may have adverse effects on health and the environment, farmers in our nation frequently use chemical pesticides in crop fields to manage pests. This research work focuses on analyzing farmers' attitudes towards chemical pesticide application. Using a prepared questionnaire, the study was carried out in several Chapainawabganj sites, and information was gathered from 50 randomly chosen farmers. Appropriate scales were developed to measure the variables. Descriptive statistics, such as mean, standard deviation, range, and percentage, were used to characterize the variables. According to the findings, the bulk of the respondents in the research area was old aged 46%. The findings also reveal that 54% of the respondents do not have a primary school education, 62% of the respondents have a medium-sized farm, 52% of the respondents have high annual income, 90% of the respondents do not have organizational training and 84% of the total respondents have high farming experience of crop cultivation. The study indicates that 76% of respondents had medium knowledge of pesticide application and the use of pesticides was viewed with a moderate attitude by 76% of the respondents. In this study, we find a positive significant relationship between farmers' knowledge about chemical pesticides and the use of pesticides. Besides, there is also another positive significant relationship between extension media contact and the use of pesticides. Farmers in the research region were found to be more likely to use chemical pesticides to increase productivity by controlling pest attacks. Therefore, the current study could subsidize improving better guidelines aim at applying fewer pesticides in the crop field and improving farmers' knowledge of the balanced use of pesticides. The extension service providers might educate farmers on the responsible use of chemical pesticides, raise their level of knowledge on the control of insects, and provide alternative ways for insect pest management in the research area.

KEYWORDS

Attitude, Chemical pesticides, Insect pests

1. INTRODUCTION

Pesticides were developed in response to the need for higher agricultural production through pest and disease control. Pesticides are by far the most common of all the chemicals used for this purpose. The widespread use of insecticides was first encouraged after the Second World War. Due to the partial loss of government subsidies for pesticides from 1973 to 1974, insecticide use fell precipitously to roughly 1500 tons from 1974 to 1975, and the trend persisted from 1978 to 1979. The interaction between agriculture and the environment is such that agricultural development is dependent upon the environmental system's proper operation, just as environmental soundness is dependent upon agriculture (Amin, 2006). As a result, agriculture contributes to ecological destruction while also becoming a victim of it (Hossain et al., 1994). Pesticides and fertilizer waste were additional factors in the deterioration of the soil environment (Garg et al., 2014). One of the human labor activities with a very high risk is agriculture. There are several connections between agricultural practices and products and hazards to the environment's health, according to evidence from throughout the world (Sarkar et al., 2012). The use of pesticides is seen to be a cost-effective, labor-saving, and effective method for controlling pests and boosting crop output (Damalas and Eleftherohorinos, 2011). Pesticides are used indiscriminately, resulting in the most destructive ecological imbalance. Pesticides have an impact on fish that live in river tanks, ponds, and other bodies of water. It has been established those toxic chemicals remain existing at an intolerable level in the fish of the Bay of Bengal, posing a significant risk to human health. To feed the growing global population, pesticides can assist reduce yield losses brought on by pests (such as insect pests, diseases, and weeds) (Verger and Boobis, 2013). On the other hand, using inappropriate pesticide doses renders insect pests resistant, necessitating the use of even higher chemical doses. As a result, farmers' crops are laden with pesticides, resulting in severe and fatal consequences for consumers. In order to reduce the use of agrochemicals, it is crucial to understand how farmers perceive agri-environmental harm. Farmers are the pesticides' primary consumers. Due to the influence of many causes, the level of awareness may differ from one farmer to the next. Because an individual's entire set of qualities has a significant impact on his behavior. It is crucial to comprehend how much farmers are aware of the harmful pesticide use does to the ecosystem. As a result, pesticide use might harm crop productivity on a large scale. The North-West region of Bangladesh is endowed with natural resources such as fertile soils, water, and other favorable climatic and agroecological features. According to half of the

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respondents applied insecticides during the initial stages of an insect infestation in vegetable cultivation in this region (Alam et al., 2022). However, maximum farmers do not use pesticides sparingly, posing a major threat to the ecosystem. Consequently, research is required to evaluate farmers' views on the use of chemical pesticides. Determining and describing the relationship between some of the respondents' chosen characteristics and their attitude toward the application of chemical pesticides was one of the main goals of the current study, which also aimed to describe the socio-demographic profile of the study area's farmers and gauge the extent of farmers' attitudes toward the use of chemical pesticides.

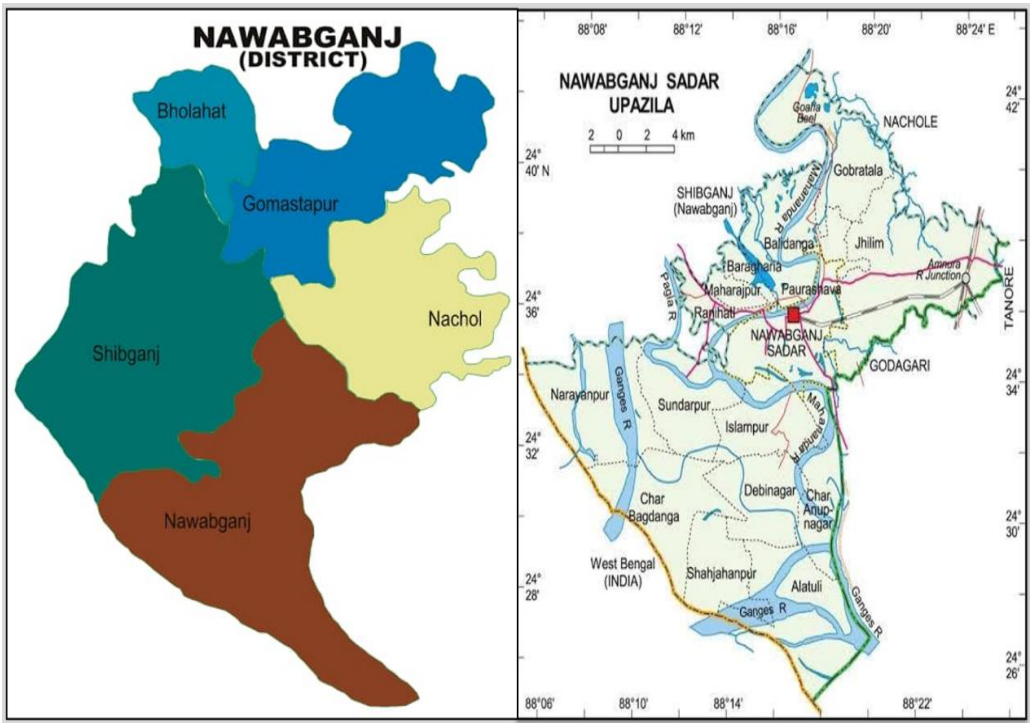
2. Materials and Methods

2.1 Location of the Study

The research took place in the northwest of Bangladesh, in the Sadar Upazila of the Chapainawabganj district. Chapainawabganj is located between latitude 24⁰22' to 24⁰57' and longitude 87⁰23' to 88⁰23'. Figure 1 below shows the study area

2.2 Collection Procedure and Analysis Data

Among five upazilas of Chapainawabganj district sadar upazila was purposively selected. Five unions and two different villages from each union were selected purposively for the study. Each hamlet had five participants who were chosen at random. Thus, a total of fifty respondents constitute the sample of the study from ten villages. The in-person interview was done to gather data using a pre-structured questionnaire. SPSS (Statistical Package for Social Science) was used to conduct the analysis. To classify the data necessary tables and categories were used considering their nature and distribution. To assess and interoperate the data following the objectives, statistical tests such as frequency counts, means, percentages, and standard deviation were applied. To study the link between the variables, the coefficient of correlation was employed for hypothesis testing, with 0.5 and 0.01 level significance being taken into account.



2.3 Measurement of the Dependent Variable

In this study farmer's attitude towards chemical pesticide application was considered as the dependent variable. 11 attitudinal statements on the chemical pesticide application were used to measure the farmer's attitude by asking his/her opinion on chemical pesticide application. To bring a convenient result a Likert scale was used with 5 points. Score 5-points was assigned to strongly agree with statements, while 4- points were assigned for agreeing, 3-points for neutral, 2-points for disagreeing and 1-point for strongly disagreeing statements. Each response received a reverse score if the attitude statement was negative. Based on the scale score, the respondents were categorized into three groups i.e., slightly favorable attitude (up to 27 scores), moderately favorable attitude (27-38 scores), and highly favorable attitude (above 38 scores).

2.4 Measurement of Independent Variables

The independent variables in this study are the farmer's age, education, total farm size, annual revenue, farming experience, training exposure, and knowledge of pesticide application. The age of the respondents was measured in terms of actual years from their birth to the time of the interview and expressed in years. The duration of schooling was used to determine the level of education. The farmer's farm size was calculated based on the amount of land he owned and the unit of measurement was hectares for the total farm size. The farmers' annual income is counted as the sum of his/her different sources of income. The length of a farmer's experience performing agricultural tasks was measured, and the unit used was years. The total number of days a responder received farming training from various organizations over the course of his or her whole life was used to calculate training exposure. The interview schedule included ten open-ended questions to gauge farmers' understanding of pesticide use. There were two scores assigned to each question. A respondent's pesticide knowledge score can vary from 0 to 20, while 1 indicates low pesticide knowledge, 2 suggests medium pesticide knowledge, and 3 indicates high pesticide knowledge. A respondent's overall score was used to determine his/her pesticide application knowledge.

3. Results and Discussion

3.1 Selected Characteristics of the Respondents

The data presented in table 1 indicates that farmers in the old age group accounted for 46% of the total, while the middle and younger age groups accounted for 44% and 10% of the total sample. The highest percentage of people had no education and they are 54% of the total respondents. Only 28% and 6% of farmers, respectively, had completed secondary and upper secondary education. The respondents' farms ranged in size from 0.13 to 2.14 hectares where 62% of respondents said they had a medium farm, compared to 10% who said they had a large farm and 28% who said they had a small farm size. The respondents' yearly income varied from Tk. 50000 to Tk. 1000000, with a mean of Tk. 249000. The majority, 90% of the population had no training exposure, whereas we found only 6% had high training exposure and 4% had medium training exposure category. The respondents' pesticide knowledge varied from 8.50 to 19, with a mean of 12.99 where 76% of respondents had medium knowledge, while 18% had high knowledge and 6% had medium knowledge respectively. The reported similar socio-demographic features among the area's vegetable farmers (Khan et al., 2022).

Table 1: Categories of the Selected Characteristics of the Farmers

Characteristics	Scoring Method	Categories	Respondents		Mean	SD
			Frequency	%		
Age	No. of Year	Young (16-30)	5	10	51.04	13.43
		Middle-aged (31-50)	22	44		
		Old (above 50)	23	46		
Educational Qualification	Year of Schooling	No education (0)	27	54	3.96	4.64
		Primary level (0.5-5)	6	12		
		Secondary level (6-10)	14	28		
		Upper secondary level (11-12)	3	6		
Farm Size	Hectare	Small (0.20-0.40)	14	14	0.7379	0.50445
		Medium (0.41-1.59)	31	31		
		Large (1.6-4)	5	5		
Annual Income	BDT	Low (20-30 thousand)	5	10	249000	229908.94
		Medium (31-100 thousand)	19	38		
		High (101-200 thousand)	26	52		
Farming Experience	Years	Low	3	6	33.42	16.18
		Medium	38	76		
		High	9	18		
Training Exposure	Score	No training (0)	45	90	0.26	0.8
		Medium	2	4		
		training	3	6		
Knowledge	Score	Low (7-12)	3	6	12.99	2.31
		Medium (13-19)	38	76		
		High (above 19)	9	18		
Extension media contact	Score	Low Contact (0-3)	15	30	5.98	3.25

3.2 Attitude Towards the Application of Chemical Pesticides

The study's primary focus was on farmers' attitudes toward the use of pesticides. The attitude scores of the respondents were 23 to 48. The mean score of farmers' attitudes towards chemical pesticide application is 32.60 with a standard deviation of 4.38. Figure 2 displays the distribution of the respondents based on their attitudes toward the use of pesticides.

Figure 2 shows that just 4% of respondents had a slightly favorable attitude regarding the use of chemical pesticides, while 76% percent had a moderately favorable attitude and only 20% had a highly favorable opinion. To maintain the ecological balance of the environment, a favorable attitude toward the use of pesticides issue of the farmers is necessary. Most farmers

are interested in the use of chemical pesticides because the use of chemical pesticides is easy and available in the market. The study found that pesticides work quickly against pests and yields are high. Farmers say it is not possible to control the disease in any other methods after being infected without chemical pesticides

By calculating opinion scores, a rank order was created to show how farmers felt about each specific statement on the usage of chemical pesticides in crop cultivation table 2. Findings indicate that the maximum farmers think that chemical pesticides do not reduce soil fertility (mean score = 3.84). As a result, they frequently use pesticides in the crop field but the populations of beneficial soil microorganisms may drop as a result of intensive pesticide application to soil (Aktar et al., 2009). Table- 2 also showed that the farmers also tend to use chemical pesticides on the crop for getting market value (mean score = 3.7) which was in the second position followed by the use of a chemical pesticide may increases crop yield (mean score = 3.5). These statements indicate that the majority of research participants were unaware of the negative effects pesticides have on the environment and crop quality.

3.3 Relationship Between Selected Characteristics of the Farmers and Their Attitude Towards Chemical Pesticide Application

Karl Pearson's Product Moment Correlation coefficient (r) was utilized to analyze the correlations between the focus issue and the chosen characteristics. The information in Table 3 demonstrates the connections between a number of the farmers' traits and their attitudes on the usage of chemical pesticides.

The results demonstrate that, out of seven independent factors, two variables knowledge of pesticides and contact with extension media were significantly related to farmers' attitudes about the use of chemical pesticides (r = 0.313* and 0.4878**, respectively). It suggests that even though a farmer has a medium level of understanding about applying pesticides, they are likely to have a favorable attitude toward doing so. In his study, (Hanif, 2000) discovered a substantial positive correlation between respondents' knowledge and awareness of environmental contamination. Also, the extension media has the same result as knowledge.

The conclusion drawn from taking contact with extension media into account indicates that farmers who often interact with extension media are more likely to use chemical pesticides. Farmers with high extension media contact can make decisions and carry out other activities related to farming operations, but farmers with low extension media contact were unable to do so. In their individual investigations, all discovered a substantial positive correlation between the extension media interaction and the farmers' attitudes (Rana et al. 2017; Adebayo and Oladele, 2013; Khan, 2012; Zakir, 2010).

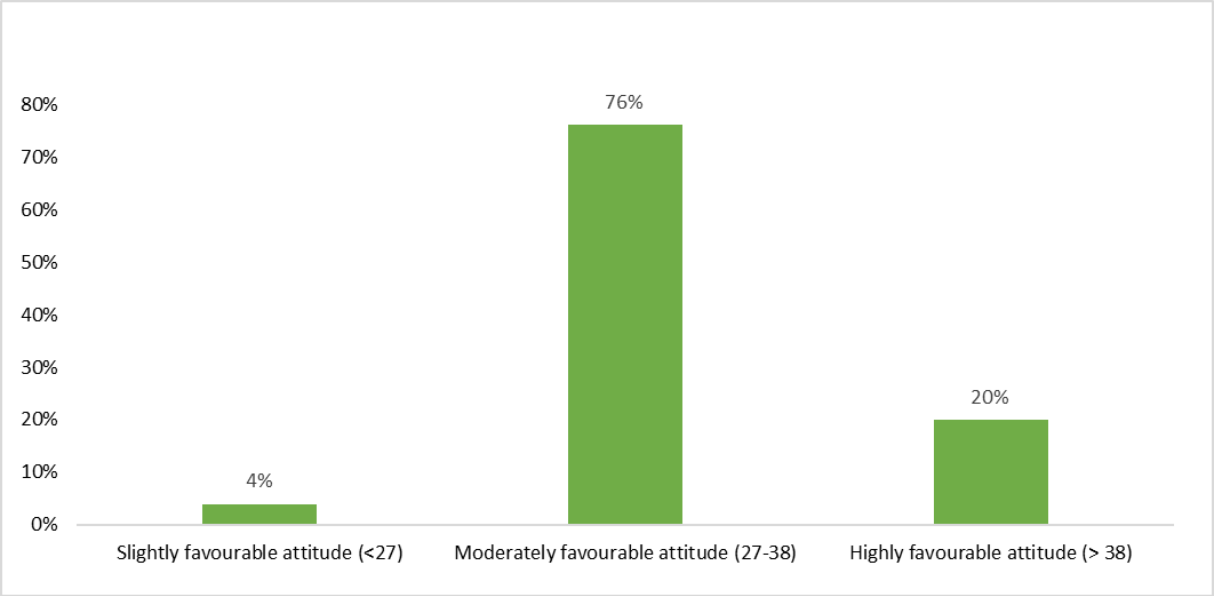


Figure 2: Attitude Toward the Application of Pesticides

Table 2: Extent of Attitude Towards Individual Statement Regarding Chemical Pesticide Use

Statements	Mean score	Rank order
(-) Chemical pesticides do not reduce soil fertility.	3.84	1
(+) Chemical pesticides pollute the environment.	3.70	2
(-) Using chemical pesticides on the crop will get market value.	3.70	3
(-) The use of chemical pesticides increases crop yield.	3.52	4
(+) Chemical pesticides decrease fruit tests and quality.	3.22	5
(-) Chemical pesticides should apply immediately just after the infection of the pest.	2.78	6
(+) Chemical pesticides is the cause of death of aquatic living beings & poultry.	2.54	7
(-) There is no way to use chemical pesticides when pest attack injuriously.	2.30	8
(+) Chemical pesticides cause death of aquatic living beings & poultry.	2.20	9
(+) The use of chemical pesticides is more harmful than useful.	2.00	10
(+) Chemical pesticides increase human disease	2.08	11

Table 3: Relationship Between Selected Characteristics of the Farmers and Their Attitude Toward Chemical Pesticide Application

Focus issue	Selected Characteristics	Computed Values of r
Attitude towards pesticide use	Age	0.002
	Level of Education	0.036
	Farm Size	-0.021
	Annual Income	-0.019
	Farming Experience	0.019
	Knowledge	0.313*
	Extension Media contacts	0.4878**

*Correlation is significant at the 0.05 level; ** Correlation is significant at the 0.01 level

4. Conclusion

The majority of the farmers in the research area were middle-aged and elderly, owned medium-sized farms, had no formal education, and had between medium and high yearly incomes as well as medium levels of farming experience. Most of them had low to medium extension contact, and medium knowledge about chemical pesticide application. Among the respondents, about 76% of the respondents had a moderate attitude towards pesticide application compared to 22 % who had a high attitude and only 4% had a slight attitude toward chemical pesticide application. The findings exposed that farmers had a moderate attitude toward chemical pesticide application. Education is an important factor in acquiring knowledge and competence, as well as in developing appropriate attitudes toward appropriate things. The majority of farmers, according to the report, lack formal education and have a negative attitude toward pesticides. They think it is difficult to grow crops in this generation without pesticides. Farmers are more tending to use pesticides as they do not have a good idea about pesticides. They have adopted such an attitude due to their lack of training. The above finding led to the conclusion that farmers should provide more attention to training so that they become more aware of the use of pesticides.

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