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Communication Behaviour of Vegetable Growers Regarding Eco-Friendly Management of Pesticides

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Abstract

The main purpose of the study was to determine the extent of communication behaviour of vegetable growers regarding eco-friendly management of pesticides. Data were collected from 100 randomly selected vegetable growers of the two villages of Hossainpur upazila under Kishoreganj district during 1-30 September, 2017 by using a pre-tested structured interview schedule. Communication behaviour of the vegetable growers was measured in terms of their opinion on three dimensions, namely information input behaviour, information processing behaviour and information output behaviour. A number of communication related aspects were selected for each dimension, while communication behaviour of the farmers was measured by seeking their opinion in a four-point rated scale for the selected statements. Eleven characteristics of the vegetable growers were selected for exploring the relationship with the vegetable growers' extent of communication behaviour. Correlation test was used to ascertain the relationships between the concerned variables. Results showed that 74% of the vegetable growers had medium level communication behaviour, followed by 26% of the vegetable growers had high level of communication behaviour, while none was found having low communication behaviour. Four characteristics of the vegetable growers, namely level of education, farm size, knowledge on eco-friendly management of pesticides, and perception on eco-friendly management of pesticides showed significantly positive relationship with their communication behaviour, while only farming experience showed a significantly negative relationship.

Keywords: Information input behaviour, information processing behaviour, information output behaviour

Introduction

Vegetable production is a promising and economically important branch of agriculture. In Bangladesh, green revolution has witnessed a quantum jump in vegetable production with the introduction of high yielding varieties of various vegetables and by following intensive cultivation practices with the use of fertilizers, pesticides and other inorganic inputs (Jebapreetha et al., 2017). Pesticides were an essential part of the Green Revolution, which occurred between the 1940s and 1970, greatly promoted agricultural productivity and is credited with saving over a billion people from starvation. During the last century, a noticeable increase in production of vegetable is evident due to the increased use of various pesticides (Alexandratos and Bruinsma, 2012). According to Dey (2010), vegetable growers used a huge amount of pesticides with a wide number of commercial names that included Sumithion, Malathion, Theovit, Agromethion, Diazinon, Dimecron etc. for producing brinjal, bitter gourd, cauliflower, tomato and okra etc. Despite the contribution of pesticides to vegetable production, many pesticides are not biodegradable and due to their bioaccumulation can enter into food chain and detrimental to human and the ecosystem (Banjo et al., 2010; Adeola, 2012).

The exposure of farmers increases in the case of not paying attention to the instructions on how to

use the pesticides and particularly when they ignore basic safety guidelines on the use of personal protective equipments (Ajayi and Akinnifesi, 2008; Damalas and Ilias, 2011). In addition, agricultural farm workers and pesticide factory workers have high risk to pesticide direct exposures (Pimentel, 2005; Verger and Boobis, 2013). According to Shashidhara (2012), majority of the vegetable growers were in medium level adoption of eco-friendly technologies. The maximum vegetable growers had low extent of adoption of the eco-friendly pest management practices followed by medium and high extent of adoption (Patel et al., 2013). Studies showed that farmers who were not provided with, or shown how to use, personal protective equipment, suffered from higher rates of occupational accidents, injuries and diseases (Lekei et al., 2014).Communication channels are the life-line of an effective extension system. However, it is seen that some vegetable growers adopt recommended technology, but they are not getting adequate information related to eco-friendly use of these technologies (Kumar, 2015). Only few studies are available that are related to communication behaviour of vegetable growers regarding eco-friendly use of pesticides. The perception, knowledge and attitude of vegetable growers towards effects of pesticides are numerous.

However, it seems that farmers don't use much useful information on pesticide management mainly due to their non-use communication media or lack of appropriate feedback to the received information. These management related information include dose of pesticides, time of application and other precautionary issues. On the other hand only limited literatures are available on the issues of communication behaviour of farmers. In order to develop a sustainable and environment-friendly agricultural production system, it is important to have proper understanding on communication behaviour of vegetable growers. Presently, development and strengthening the communication network to ensure sustainable vegetable production via eco-friendly management of pesticide is the primary concern of the government. So, it is of utmost important to know about communication behaviour of vegetable growers regarding eco-friendly management of pesticides. In this connection, this study has been carried out with the following specific objectives: (i) to determine the extent of communication behaviour of vegetable growers regarding eco-friendly management of pesticides; (ii) to describe the socio-economic characteristics related to communication behaviour of vegetable growers regarding eco-friendly management of pesticides; and (iii) to determine the relationship between vegetable growers' communication behaviour and their socio-economic characteristics.

Methodology

Study Locale, Population and Sample

The study was conducted in the Hossainpur upazila of Kishoreganj district. Shahedol union (an administrative unit consists of a number of villages, whereby an upazila comprised of several unions) was purposively selected because of the fact that vegetable production is very popular and a major agricultural practice of the locality. Kurimara and Basurchar villages were also purposively selected from Shahedol union due to the highest production of vegetables. Updated lists of all the vegetable growers were collected from the Office of the Upazila Agriculture Officer (UAO) of Hossainpur upazila. All the listed vegetable growers constituted the population of the study. From the listed 667vegetable growers, 100 were selected (15% of the population) as sample of the study by using a table of random numbers.

Variables and their Measurement

Communication behaviour of vegetable growers regarding eco-friendly management of pesticides was the focus variable of the study. The variable was conceptualized in terms of three important dimensions of communication behaviour such as information input behaviour, information processing behaviour and information output behaviour as used by Kavaskar and Gobinda (2014) and Kumar (2015). Vegetable growers'

opinion for each dimension was measured on a 4-point rated scale under 31 related aspects (13 for information input, 10 for information processing and 8 for information output dimensions) as identified by the researchers. For each aspect, a respondent was asked to indicate his/her opinion by selecting one of the four options related to extent of communication, namely 'regularly', 'occasionally', 'rarely' and 'not at all', while scores were assigned as 3, 2, 1 and 0, respectively. The respondents' obtained scores of all aspects were added to compute his/her total score in a single dimension. In the same way the overall communication behaviour score was obtained by adding one's obtained scores in all three dimensions. Thus, the overall communication behaviour score could range from 0 to 93; '0' indicating no communication and '90' indicating high extent of communication.

In order to explore relationship between the vegetable growers' communication behaviour and their selected characteristics, eleven characteristics were considered for the study. They were: age, level of education, household size, farm size, farming experience, annual family income, organizational participation, innovativeness, training received, knowledge on eco-friendly management of pesticides, and perception on eco-friendly management of pesticides. Standard procedures of measurement were used to operationalize the characteristics as shown in Table 1.

Data Collection and Analysis

A structured interview schedule was prepared for data collection, where all the variables and necessary scales were incorporated. The questionnaire was pre-tested among 20 farmers in the study area followed by necessary modifications based on the pre-test experience. Data were collected through face-to-face interview by using the prepared questionnaire from the selected vegetable growers during 1-30 September, 2017. The collected data were analysed by using SPSS statistical package. Descriptive statistics such as range, percentage, rank order, mean and standard deviation were used for describing the variables. Pearson's Product Moment Correlation Co-efficient was used to determine the relationship between the characteristics of the vegetable growers and their extent of communication behaviour regarding eco-friendly management of pesticides.

Findings and Discussion

Selected Characteristics of the Vegetable Growers

Thirteen characteristics of the vegetable growers were selected for the study. The salient features of the characteristics of the respondents are presented in Table 1.

Data presented in the Table 1 show that the majority of the vegetable growers (57%) were middle-aged followed by 26% being old. While about 25% of the respondents were illiterate, 27%, and 36% of them had primary and secondary level education, respectively. An overwhelming majority of the farmers (70%) had medium sized household, followed by 22% having large households. Majority of the vegetable growers (62%) had small farm size, where 34% had medium sized farms, while was no landless farmers among the respondents. The highest proportion of the vegetable growers (59%) had medium farming experience. On the other hand, income distribution seems normal among the vegetable growers. It was interesting to note that majority of the respondent did not have any organizational affiliation. However, their innovativeness seems low to medium – a situation quite expected from the socio economic considerations. Majority of the respondents (66%) had no training experience on pesticide or pest management, while the other received some sorts of training from the extension agencies working in the study area. The other socio-economic and psychological characteristics of the respondents reflected the ground realties of the farming communities of Bangladesh. Farmers' knowledge on eco-friendly management of pesticide was interesting – 23% having high knowledge and 77% having medium knowledge. On the other hand, their perception of the eco-friendly management of pesticides was almost similar to that of knowledge variable.

Table 1: Salient features of the selected characteristics of the vegetable growers

Characteristics and scoring unit/system	Score range		Respondent categories (n=100)	Percent	Mean	SD*
	Possible	Observed				
Age (years)	Unknown	26-62	Young (up to 35)	17	43.95	8.50
			Middle aged (36-50)	57		
			Old (above 50)	26		
Level of education (years of schooling)	Unknown	0-12	Illiterate (0)	25	4.26	3.54
			Can sign only (0.5)	10		
			Primary (1-5)	27		
			Secondary (6-10)	36		
			Above secondary (>10)	2		
Household size (member number)	Unknown	4-12	Small (up to 4)	8	7.07	1.91
			Medium (5-6)	70		
			Large (above 6)	22		
Farm size (hectare)	Unknown	0.165-7.14	Landless (<0.02 ha)	0	1.06	0.90
			Marginal(0.02-0.2 ha)	2		
			Small (0.21-0.99 ha)	62		
			Medium (1.0-2.99 ha)	34		
			Large (>3.0 ha)	2		
Farming experience (years)	Unknown	2-45	Low (up to 5)	14	25.80	8.77
			Medium (6-15)	59		
			High (above 15)	27		
Annual family income ('000 Taka)	Unknown	130-775	Low (up to 200)	29	378	139
			Medium (201-400)	52		
			High (above 400)	19		
Organizational participation (scale score)	Unknown	0-6	No (0)	69	1.59	1.48
			Low (1-5)	31		
			Moderate (above 6)	0		
Innovativeness (scale score)	0-36	6-20	Low (up to 12)	55	12.12	3.14
			Medium (13-24)	45		
			High (above 24)	0		
Training on pesticide management (days)	Unknown	0-7	No training (0)	66	0.63	1.06
			Low (up to 7)	34		
Knowledge on eco-friendly pesticide management (scale score)	0-38	14-36	Low (up to 13)	0	24.02	4.36
			Medium (14-26)	77		
			High (above 26)	23		
Perception on eco-friendly management of pesticide (scale score)	0-36	18-35	Low (up to 12)	0	26.91	4.32
			Medium (13-24)	30		
			High (above 24)	70		

* SD stands for Standard Deviation

Communication Behaviour of Vegetable Growers Regarding Eco-friendly Management of Pesticides

Vegetable growers' communication behaviour regarding eco-friendly management of pesticide was understood through three dimensions, namely information input behaviour, information processing behaviour and information output behaviour. As the items under the three dimensions were different, a standardized mean score was also computed in order to make a comparison among those The standardized mean score was computed by converting the actual mean value into percentage. The results on these three dimensions have been presented in Table 2.

Table 2: Distribution of vegetable growers according to their dimensions of communication behaviour regarding eco-friendly management of pesticides

Dimensions of communication behaviour	Possible and observed score range*	Respondent Categories (n=100)	Percent	Mean and standardized mean**	Standard deviation
Information input behaviour (13 items)	0-39 (11-28)	Irregular (up to 13)	3	21.35 (54.74)	3.69
		Occasional (14-26)	90		
		Regular (above 26)	7		
Information processing behaviour (10 items)	0-30 (11-27)	Low (up to 10)	0	19.31 (64.37)	3.12
		Medium (11-20)	67		
		High (above 20)	33		
Information output behaviour (8 items)	0-24 (10-22)	Low (up to 8)	0	14.37 (59.87)	2.75
		Medium (9-16)	80		
		High (above 16)	20		

* Observed score range presented in the parentheses.

**Standardized mean scores presented in the parentheses.

Data presented in Table 2 indicate that majority of the vegetable growers were under occasional use category in each dimension of communication behaviour. That might be happen due to the low level use or action regarding different information sources, information processing and output behaviour aspects by the vegetable growers. In other words, a vegetable grower might use one or two items or active on these, while passive or inactive in other items. The standardized mean value indicate that information processing behaviour of the vegetable grower is higher than the other two dimensions. Kumar (2015) also found that tribal vegetable growers had occasional information input behaviour, information processing behaviour and information output behaviour. On the other hand, their low score in information input behaviour indicates that farmers are not much active in using information sources for receiving information on eco-friendly management of pesticides.

Information input behaviour

Information input behaviour of the respondents was operationalized through eleven sources of information as the vegetable growers might used for receiving information. The result regarding the dimension has been presented in Table 3.

The findings of Table 3 prompted to conclude that vegetable growers in the study area mostly used channels like input dealers/traders, company representatives, Sub-Assistant Agriculture Officer (SAAO) and progressive farmers as their major sources of information regarding pest management of vegetable cultivation. They had relatively low exposure of usage of mass media, internet and even field extension events. That means the vegetable growers in the study area were not much involved with the extension activities of the DAE, the mainstream public sector extension agency of the country. These findings have many similarities to the observations of Kavaskar and Gobinda (2014) and Kumar (2015) in their respective studies.

Table 3: Rank order of the items under information input behaviour

Sl. No.	Source of information (communication channels)	Frequency and percentage of use (n=100)				Total	Rank
		Regularly	Occasionally	Rarely	Not at all		
i	Relatives and neighbours (Weekly)	27	52	12	9	197	7
ii	Progressive farmers (Weekly)	60	17	18	5	232	5
iii	Opinion leader (Weekly)	0	0	0	100	100	10
iv	Sub-Assistant Agriculture Officer (SAAO) (Monthly)	76	13	3	8	257	3
v	Agricultural Extension Officer (AEO) / Upazila Agriculture Officer (UAO) (Monthly)	44	10	19	27	171	8
vi	Input dealers/ traders (Weekly)	86	5	9	0	277	1
vii	Company representatives (Monthly)	81	6	7	6	262	2
viii	Leaflets/folder/printed materials (Yearly)	3	8	5	84	30	12
ix	Radio (Weekly)	0	0	0	100	100	9
x	Television (Weekly)	71	9	13	7	244	4
xi	Cell phone for personal communication (Weekly)	61	12	6	21	213	6
xii	Internet (smart phone/ computer) (Monthly)	0	0	2	98	2	13
xiii	Demonstration, field day and other extension events (Yearly)	5	7	15	73	44	11

Information processing behaviour

This dimension was measured under ten parameters. The result of information processing behaviour has been presented in Table 4.

It is evident from Table 4 that the respondent vegetable growers seek more information to the socially available individuals including neighbours and other farmers as well as SAAOs. However, they had low sharing of information with opinion leaders. They had less effort to look for print materials and internet. The results are similar to a considerable extent with that of Kavaskar and Gobinda (2014), who found that banana growers processed information by discussion with family members, friends, fellow farmers, progressive farmers, input agents, neighbours, judgement on the basis of economic and technical feasibility etc. Kumar (2015) also showed that tribal vegetable growers also processed information by discussion with neighbours, discussion with relatives, discussion with leaders, discussion with extension officers, judgment in the light of climate condition etc. It is also interesting to know that farmers usually don't accept information in the way they receive it (item of rank 8).

Information output behaviour

Information output behaviour of the respondents was computed under eight parameters. The results on this dimension have been presented in Table 5.

Data presented in the Table 5 shows that the vegetable grower disseminate and apply information mostly with persons in regular contact – mainly the neighbouring farmers and persons in regular contacts. In other cases, they also disseminate the information to sharecroppers and family members as well as relatives. But their dissemination through demonstration or other formal extension events were found low. It is an indication that extension agencies had low contact or less events for the vegetable growers and less discussion on eco-friendly management of pesticides. These findings have similarities with those of Kavaskar and Gobinda (2014) and Kumar (2015).

Communication behaviour of vegetable growers

Table 4: Rank order of the items under information processing behaviour (n=100)

Sl. No.	Aspects of information processing behaviour	Frequency and percentage of use				Total	Rank
		Regularly	Occasionally	Rarely	Never		
i	Discussion with extension officers (UAO/ AEO) (Monthly)	39	12	25	24	166	6
ii	Discussion with SAAO (Monthly)	70	14	3	13	241	2
iii	Discussion with neighbours(Weekly)	23	49	16	12	183	5
iv	Discussion with relatives (Weekly)	16	26	49	9	149	7
v	Discussion with progressive farmers (Weekly)	53	19	14	14	211	4
vi	Discussion with opinion leaders (Weekly)	0	0	2	98	2	10
vii	By conveying to family person and asking them to remembers (Weekly)	82	5	8	5	264	1
viii	Preserving the printed literatures like leaflets, bulletins, booklets, newspaper cutting etc. (Yearly)	26	4	7	63	93	9
ix	Seeking information about the present climatic condition (Yearly)	67	10	5	18	226	3
x	Accepted as such (Weekly)	25	8	10	57	101	8

Table 5: Rank order of the items under information output behaviour (n=100)

Sl. No.	Aspects of information output behaviour	Frequency and percentage of use				Total	Rank
		Regularly	Occasionally	Rarely	Never		
i	To my family (weekly)	63	22	15	0	248	4
ii	To my relatives (weekly)	26	18	26	30	140	5
iii	To the person contact me (weekly)	92	4	3	1	287	1
iv	To farmers of my neighbourhood (weekly)	89	5	4	2	281	2
v	Sharecroppers (weekly)	84	8	7	1	275	3
vi	Distribution of preserved leaflets (monthly)	21	4	2	73	73	7
vii	Dissemination by demonstration (yearly)	12	3	0	85	42	8
viii	Discussion in local meetings (monthly)	24	0	5	71	77	6

Categories of Vegetable Growers based on Communication Behaviour

The score of overall communication behaviour of the vegetable growers ranged from 36 to 74 against a possible range of 0-93 with an average of 56.10 and standard deviation of 7.64. Based on their scores, respondents were classified into three categories as shown in Table 6.

Data presented in Table 6 shows that 74% of the vegetable growers had medium level of communication regarding eco-friendly management of pesticides, while 26% had high communication. On the other hand, none of the vegetable growers under the study had low communication in regards with eco-friendly use of pesticides. The results give an indication that

although the extension agencies had many interventions and field level programmes on eco-friendly pest management like IPM and ICM, farmers' actual communication on those are not satisfactory. The medium communication score was obtained mainly for personal level communication. Therefore, there remains ample scope and necessity for the extension agencies like DAE to undertake need based and community owned extension programmes on eco-friendly pest management. Moreover, the findings are in line with the findings of Hossain et al. (2011) and Kumar (2015). Kumar (2015) found that a major portion (55%) of tribal vegetable growers had medium level of communication, where 25% of them had low level of communication and 20% of them had high level of communication.

Table 6: Distribution of the vegetable growers according to their communication behaviour regarding eco-friendly management of pesticides

Communication behaviour categories (scores)	Percentage of respondents (n=100)	Mean	Standard deviation
Low communication (up to 31)	0	56.10	7.64
Medium communication (31-62)	74		
High communication (above 62)	26		
Total	100		

Relationship between Communication Behaviour of Vegetable Growers and their Selected Characteristics

A total of selected characteristics of the vegetable growers were considered for understanding relationships between those characteristics and their opinion on communication behaviour regarding eco-friendly management of pesticides. To test the relationship, Pearson's correlation coefficients were computed as the results have been presented in Table 7.

It is found from the Table 7 that out of eleven null hypotheses tested five were rejected and eight were accepted such as age, household size, annual family income, organizational participation, innovativeness, training received, social mobility, ownership of pesticide applicators etc.

Table 7: Relationship between communication behaviour of the vegetable growers and their selected characteristics

Selected characteristics of the vegetable growers	Value of coefficient of correlation (r) with 98 d.f.
Age	-.164
Education	.320**
Household size	-.180
Farm size	.230*
Farming experience	-.229*
Annual family income	.105
Organizational participation	.050
Innovativeness	.133
Training received	.145
Knowledge on eco-friendly management of pesticides	.587**
Perception on eco-friendly management of pesticides	.493**

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Data presented in the Table 7 show that education, farm size, knowledge on eco-friendly management of pesticides and perception on eco-friendly management of pesticides of the farmers had positive and significant relationship with their communication behavior on eco-friendly management of pesticides. On the other hand, farming experience of the vegetable growers had significantly negative correlation with their communication behaviour. The findings indicate that Kumar (2015) also found that relationship between communication behaviour and independent variables like age, education, land holding, annual income, material possession, farming experience, training exposure, knowledge of vegetable farming, farm decision making, innovativeness and risk orientation were significant with communication behaviour of the tribal vegetable growers.

Conclusion

Major proportion of the vegetable growers (74%) possessed medium level of communication regarding eco-friendly management of pesticides. Besides, maximum respondents had medium level of information input, information processing and information output behaviour. Therefore, there is an ample scope to increase the communication behaviour of vegetable growers regarding eco-friendly management of pesticides. The study also implied that level of education, farm size, farming experience, knowledge on eco-friendly management of pesticides, perception on eco-friendly management of pesticides had significant relationships with vegetable growers' communication behaviour regarding eco-friendly management of pesticides. Thus, these variables should be considered for improving communication behaviour of the vegetable growers regarding eco-friendly management of pesticides. These findings would be helpful for the extension agencies for the formulation of suitable strategies to increase their frequency of contact with different information sources and then process and share with respective sources. Besides, policy makers may consider them while launching extension programmes especially for vegetable cultivation through eco-friendly management of pesticides.

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