



## FARMERS' ATTITUDE TOWARDS INTEGRATED PEST MANAGEMENT (IPM) PRACTICES IN VEGETABLE CULTIVATION

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### ABSTRACT

Dissemination of Integrated Pest Management (IPM) practices among the farmers' especially vegetable farmers are imperative for both environment and human health. The main purpose of this study was to determine and describe farmers' attitude towards IPM practices in vegetable cultivation and to explore the relationship between farmers' attitude with their twelve selected characteristics. The study was conducted in two villages of Shombhag union under Dhamrai upazila of Dhaka district. Data were collected by using an interview schedule from the randomly selected 100 respondents during 2 May to 25 May, 2015. Pearson's Product-Moment Correlation Coefficient (r) was computed to explore the relationship between the selected characteristics of the farmers and their attitude towards IPM practices. The findings revealed that the highest proportion (79%) of the respondents had unfavorable attitude, while only 21 percent had favorable attitude towards IPM practices in vegetable cultivation. Among twelve selected characteristics, education, time spent in the vegetable field, organizational participation, knowledge on IPM practices in vegetable cultivation, contact with IPM club and FFS, communication media exposure and training exposure had a significant positive relationship with the attitude of the farmers towards IPM practices in vegetable cultivation. On the other hand, age had a negative but significant relationship. Farm size, land under vegetable cultivation, annual family income and annual income from vegetable cultivation had no significant relationship with the attitude of the farmers towards IPM practices in vegetable cultivation. Education, communication, motivational activities should be strengthened by the diffusion agencies to form the favourable attitude of the vegetable farmers towards IPM practices.

**Keywords:** IPM club, FFS, Selected characteristics and Diffusion agencies

### INTRODUCTION

Pest management is a major problem in vegetable production. The word 'pest' refers to organisms such as insects, pathogens, rodents etc. that cause damage or annoyance to man, his animals, crops or possessions. According to an estimate annual yield loss due to insect pest alone is 25% for vegetable production in Bangladesh (Ahmed et al., 2001). The farmers of Bangladesh are mostly dependent on chemical pesticides to control the insect pests. Pesticide consumption in Bangladesh was 0.7 kg/ha in 2000 which is increased to 9.8 kg/ha in 2009 and at present different kinds of pesticides with 211 trade names has been registered in Bangladesh (Abdullah, 2012). By the use of chemical pesticides, production is increasing but creating serious environmental and health problems. At present, it has been established that agriculture is a major polluter of the environment on a local, regional and global basis (Conway et al., 1991). On the other hand, it has been found that in different countries of the world in addition to beneficial effects the improved agricultural practices have a tremendous influence on environmental pollution and Bangladesh is not an exception to this (Sana, 2003). Vegetable is short duration crops, most of the chemical pesticides' residual effect remains on it even after marketing. Chemical pesticides also create a new problem of pest resistance and destroy the beneficial insects. Besides, it gradually decreases soil health. To avoid such consequences and to increase vegetable production on a biological basis, a viable alternative for pest management is needed. And IPM is the best alternative

strategy in reducing pest attack and at the same time producing healthy crops. In fact, IPM is a broad ecological approach to pest control using various pest control methods in a compatible manner that is why IPM is a holistic approach to pest control for keeping sound environment. In Bangladesh, vegetable IPM was started through the IPM-ICM project in 1996-1999. Since then different projects are being implemented to popularize IPM practices in vegetable cultivation. Most of them were extension-led projects. Many trainings were given to the farmers but a little study was conducted on the attitude of farmers towards IPM practices in vegetable cultivation. The present study was undertaken with the following objectives:

1. To determine and describe the selected characteristics of the vegetable farmers;
2. To determine and describe the farmers' attitude towards IPM practices in vegetable cultivation; and
3. To explore the relationships between farmers' attitude towards IPM practices in vegetable cultivation and their selected characteristics

## **METHODOLOGY**

The locale of the study was Shombhag and Goaldee Village of Shombhag union under Dhamrai upazila of Dhaka district. The total number of the vegetable growers (255) in the study area was considered as the population of the study. 39 percent vegetable growers were selected from the population randomly. Data were collected through face-to-face interview by using structured interview schedule from the selected respondents of the study area during 2 May to 25 May, 2015. The methodology followed for measuring the dependent and independent variables are described below:

### **Measurement of independent variables**

The selected characteristics of the farmers were age, education, farm size, land under vegetable cultivation, annual family income, annual income from vegetable cultivation, time spent in vegetable field, organizational participation, knowledge on IPM practices in vegetable cultivation, contact with IPM club and FFS, communication media exposure and training exposure which were considered independent variable of the study. Age of a farmer was measured in terms of actual years from his birth to the time of interview. The education of a farmer was measured in terms of formal years of schooling. The area possessed by the farmers under farm and homesteads were the basis for calculation of farm size. Respondent's land under vegetable cultivation was measured in percentage. Annual family income was measured considering last year's total earnings from agriculture, services, business, labor and other sources of the members of a respondent's family.

Time spent in vegetable field was measured in hours/day considering average time spent per day. Organizational participation of the respondents was measured on the basis of nature of involvement with eight organizations. Knowledge on Integrated Pest Management (IPM) practices of a respondent were measured by using 17 different kinds of questions in relation to various aspects of vegetable IPM practices. Contact with IPM club and FFS was measured on the basis of the extent of contact for ten purposes. Communication media exposure was measured on the basis of the extent of use of 16 selected communication media of different nature by using four points (0-3) rating scale. Training exposure was measured by the total number of days a respondent received training in his entire life under different agricultural training programs.

### **Measurement of dependent variable**

"Farmers' Attitude towards IPM Practices in Vegetable Cultivation" was the dependent variable of this study. For measuring the attitude of farmers, a 5 point Likert scale with 22 statements (11 positive and 11 negatives) were used. The statements were chosen from literatures, discussion with vegetable IPM experts and the concerned vegetable farmers. All the statements were arranged in a sequence of positive and negative basis to help to avoid subject bias in expressing their opinion. Each respondent was asked to indicate his extent of agreement or disagreement against each of the statements along with a 5 point scale: 'strongly agree', 'agree', 'no opinion', 'disagree' and 'strongly disagree'. The score assigned to these responses was 5, 4, 3, 2 and 1 respectively for positive statement and the reverse scoring was assigned for negative statements. The total score of a

respondent was determined by summing up the scores against all the 22 statements. The possible attitude towards IPM practices in vegetable cultivation scores of a farmer could range from 22 to 110.

## RESULTS AND DISCUSSION

### Selected characteristics of the farmers

In this section, the findings on the farmers' selected characteristics have been discussed and a summary profile of these characteristics is presented in Table 2, which indicates an overwhelming majority (75%) of the respondents belonged to middle and young aged categories except a few (25%), among which 58% had education ranged from primary to secondary, far below the national average.

Most of the respondents (79%) belonged to small to medium farm. More than two-thirds (67%) of the respondents had medium to large vegetable farm. This may because of profit from vegetable cultivation is higher than the other crops. The highest proportion (72%) of the farmers had low to medium annual income whereas only 28% farmers had high annual income. The average annual income from vegetable cultivation of the farmers of the study area was much higher. The reason might be more than two-thirds of the respondents (67%) had medium to large vegetable farms. The study reveals that an overwhelming majority (89%) of the respondents had medium to high income from vegetable cultivation. The majority (56%) of the respondents spent a long time in vegetable field due to the fact vegetable production requires intensive care. 35% of the respondents had very low organizational participation but rest of them maintained low to medium organizational participation. It was observed that three fourth of the vegetable farmers (75%) in the study area had low to medium knowledge on IPM practices. IPM club organizers are helpful, cooperative and innovative for that the findings of the study indicate that an overwhelming majority of the respondents (80%) had medium to high contact with the IPM club and FFS. Majority of the farmers (85%) had low to medium communication media exposure. Highest proportion (71%) of the respondents had no training, while 23 percent of them had low training and only 6 percent had medium training.

### Farmers' attitude towards IPM practices in vegetable cultivation

The observed scores of farmers' attitude towards IPM practices in vegetable cultivation ranged from 38 to 82 against the possible range of 22 to 110 with an average of 54.77 and standard deviation of 13.57. On the basis of attitude towards IPM practices in vegetable cultivation scores, the respondents were classified into three categories as shown in Table 1.

**Table 1. Distribution of the vegetable farmers according to their attitude towards IPM practices in vegetable cultivation**

| Categories                 | Respondents |         | Mean  | Standard deviation |
|----------------------------|-------------|---------|-------|--------------------|
|                            | Number      | Percent |       |                    |
| Unfavorable attitude (<66) | 79          | 79      | 54.77 | 13.57              |
| Neutral attitude (66)      | 0           | 0       |       |                    |
| Favorable attitude (>66)   | 21          | 21      |       |                    |
| Total                      | 100         | 100     |       |                    |

Data in Table 2 show that the highest proportion (79%) of the respondents had unfavorable attitude towards IPM practices in vegetable cultivation, 21 percent respondents had favorable attitude and none of them had neutral attitude towards IPM practices in vegetable cultivation. The findings indicate that majority of the respondents had unfavorable attitude towards IPM practices in vegetable cultivation. The reason may be IPM practices require higher level of skills, formal education, frequent contact with extension personnel's, season long training. Most of the farmers in the study are lacking in most of all those motivating factors resulting to the formation of a positive attitude towards IPM practices in vegetable cultivation.

**Table 2. The characteristics profile of the sample farmers**

| Characteristics                                      | Measuring unit     | Range    |               | Categories                             | Respondents    |             |        |       |
|------------------------------------------------------|--------------------|----------|---------------|----------------------------------------|----------------|-------------|--------|-------|
|                                                      |                    | Possible | Observed      |                                        | Number (N=100) | Percent (%) | Mean   | SD    |
| Age                                                  | Actual Years       | Unknown  | 22-68         | Young aged ( $\leq 35$ )               | 30             | 30          | 42.44  | 10.92 |
|                                                      |                    |          |               | Middle aged (36-50)                    | 45             | 45          |        |       |
|                                                      |                    |          |               | Old aged ( $> 50$ )                    | 25             | 25          |        |       |
| Education                                            | Years of schooling | Unknown  | 0-16          | Illiterate (0-0.5)                     | 40             | 40          | 4.33   | 4.13  |
|                                                      |                    |          |               | Primary education (1-5)                | 30             | 30          |        |       |
|                                                      |                    |          |               | Secondary education (6-10)             | 28             | 28          |        |       |
| Farm size                                            | Actual in (ha)     | Unknown  | 0.07-1.69     | Above secondary education ( $>10$ )    | 2              | 2           | 0.41   | 0.34  |
|                                                      |                    |          |               | Marginal ( $< 0.2$ ha)                 | 21             | 21          |        |       |
|                                                      |                    |          |               | Small (0.2- $<1.0$ ha)                 | 72             | 72          |        |       |
| Land under vegetable cultivation                     | Percent            | 0-100    | 5.17%-69.57%  | Medium (1- 3ha)                        | 7              | 7           | 39.14  | 13.46 |
|                                                      |                    |          |               | Small vegetable farm ( $<33\%$ )       | 33             | 33          |        |       |
|                                                      |                    |          |               | Medium vegetable farm (33%- 45%)       | 34             | 34          |        |       |
| Annual family Income                                 | Thousand taka/year | Unknown  | 55.80- 501.50 | Large vegetable farm ( $>45\%$ )       | 33             | 33          | 143.66 | 76.95 |
|                                                      |                    |          |               | Low annual income ( $<120.00$ )        | 63             | 63          |        |       |
|                                                      |                    |          |               | Medium annual income (120.00- 165.00)  | 9              | 9           |        |       |
| Annual income from vegetable cultivation (Last year) | Taka/year          | Unknown  | 10.30- 69.80  | High annual income ( $>165.00$ )       | 28             | 28          | 41.38  | 14.65 |
|                                                      |                    |          |               | Low vegetable income ( $<25.00$ )      | 11             | 11          |        |       |
|                                                      |                    |          |               | Medium vegetable income (25.00- 55.00) | 71             | 71          |        |       |
| Time spent in vegetable field                        | hrs/day            | 0-24     | 3-7           | High vegetable income ( $>55.00$ )     | 18             | 18          | 5.37   | 1.11  |
|                                                      |                    |          |               | Short time spent ( $<4$ hrs)           | 10             | 10          |        |       |
|                                                      |                    |          |               | Moderate time spent (4hrs-5 hrs)       | 34             | 34          |        |       |
| Organizational Participation                         | Scores             | 0-24     | 1-14          | Long time spent ( $>5$ hrs)            | 56             | 56          | 6.69   | 3.79  |
|                                                      |                    |          |               | Very low participation ( $<5.00$ )     | 35             | 35          |        |       |
|                                                      |                    |          |               | Low participation (5.00-8.00)          | 42             | 42          |        |       |
| Knowledge on IPM practice in vegetable cultivation   | Scores             | 0-34     | 8-30          | Medium participation ( $>8.00$ )       | 23             | 23          | 17.19  | 6.91  |
|                                                      |                    |          |               | Low knowledge ( $<11$ )                | 31             | 31          |        |       |
|                                                      |                    |          |               | Medium knowledge (11-23)               | 44             | 44          |        |       |
| Contact with IPM club and FFS                        | Scores             | 0-30     | 9-21          | High knowledge ( $>23$ )               | 25             | 25          | 15.69  | 3.91  |
|                                                      |                    |          |               | Low contact ( $<12$ )                  | 20             | 20          |        |       |
|                                                      |                    |          |               | Medium contact (12- $<19$ )            | 57             | 57          |        |       |
| Communication media exposure                         | Scores             | 0-48     | 12-34         | High contact ( $\geq 19$ )             | 23             | 23          | 23.87  | 6.43  |
|                                                      |                    |          |               | Low media exposure ( $<18$ )           | 20             | 20          |        |       |
|                                                      |                    |          |               | Medium media exposure (18-30)          | 65             | 65          |        |       |
| Training exposure                                    | Days obtained      | Unknown  | 0-7           | High media exposure ( $>30$ )          | 15             | 15          | 0.65   | 1.58  |
|                                                      |                    |          |               | No training (0.00 days)                | 71             | 71          |        |       |
|                                                      |                    |          |               | Low training (1-2 days)                | 23             | 23          |        |       |
|                                                      |                    |          |               | Medium training ( $>2$ days)           | 6              | 6           |        |       |

### Relationship between selected characteristics of the farmers and their attitude towards IPM practices in vegetable cultivation

An attempt was made to find out the relationship between the selected characteristics of the respondents with their attitude towards IPM Practices in vegetable cultivation which is shown Table 3.

**Table 3. Co-efficient of correlation between selected characteristics of the farmers with their Attitude towards IPM Practices in Vegetable Cultivation**

| Dependent variable                                      | Independent variables                               | Computed value of $r$ and value at 98 df |            |            |
|---------------------------------------------------------|-----------------------------------------------------|------------------------------------------|------------|------------|
|                                                         |                                                     | co-efficient of correlation ' $r$ '      | 0.05 level | 0.01 level |
| Attitude towards IPM practices in vegetable cultivation | Age                                                 | -0.877**                                 |            |            |
|                                                         | Education                                           | 0.936**                                  |            |            |
|                                                         | Farm size                                           | -0.080 NS                                |            |            |
|                                                         | Land under vegetable cultivation                    | -0.176 NS                                |            |            |
|                                                         | Annual family income                                | -0.122 NS                                |            |            |
|                                                         | Annual income from vegetable cultivation            | -0.144 NS                                |            |            |
|                                                         | Time spent in vegetable field                       | 0.690**                                  |            |            |
|                                                         | Organizational participation                        | 0.898**                                  | 0.196      | 0.256      |
|                                                         | Knowledge on IPM practices in vegetable cultivation | 0.884**                                  |            |            |
|                                                         | Contact with IPM club and FFS                       | 0.833**                                  |            |            |
|                                                         | Communication media exposure                        | 0.820**                                  |            |            |
|                                                         | Training exposure                                   | 0.390**                                  |            |            |

\*\*Significant at the 0.01 level, \*Significant at the 0.05 level, <sup>NS</sup>Not significant

**Age and attitude towards IPM practices:** The result shown in Table 3 indicates that there was a negative significant relationship between age of the farmers and their attitude towards IPM practices. This implies that younger the respondents more the favourable attitude towards IPM practices. The young farmers have a higher level of formal education, ability to take risk, ambition, the inspiration for change, readiness and ability to understand new technologies than the old aged farmers, which might have played a role to have more favorable attitude towards IPM practices among young aged farmers than old aged farmers. Islam et al., 2016 and also found similar findings in their study.

**Education and attitude towards IPM practices:** The result shown in Table 3 indicates that there was education of the farmers had significant and positive relationship with the attitude of the farmers towards IPM practices in vegetable cultivation. Thus, it can be said that as the education increase, attitude towards IPM practices in vegetable cultivation is also increased. A Higher level of education provides better ability to an individual to understand modern scientific technologies. IPM is such a technology which encompasses many complex scientific methods. To understand this, formal education provides more capability to apprehend it. Hence attitude towards IPM practices in vegetable cultivation was observed better among those farmers who had a higher level of formal education. Patel et al. (2007), Rahman (2010), Farhad and Kashem (2004) also found similar findings in their studies.

**Time spent in the vegetable field and attitude towards IPM practices:** The result shown in Table 3 indicates that time spent in the vegetable field had a significant positive relationship with the attitude of the farmers towards IPM practices in vegetable cultivation. This statistical analysis indicates that with the increase of time spent in the vegetable field the favourable attitude towards IPM practices by the farmers is also increased. IPM practices are multiple approach of pest control which require regular monitoring and frequent actions of implementation

different pest management tools and techniques. This is why the farmers who spent more time in vegetable field had more favorable attitude towards IPM practices.

**Organizational participation and attitude towards IPM practices:** The result shown in Table 3 indicates that organizational participation had a significant positive relationship with the attitude of the farmers towards IPM practices in vegetable cultivation. Rahman (2010) also found a similar relationship between formal group affiliation and attitude towards IPM practices in his study.

**Contact with IPM club and FFS and attitude towards IPM practices:** Based on the result shown in Table 3 indicates that nature of contact with IPM club and FFS had a significant positive relationship with the attitude of farmers towards IPM practices in vegetable cultivation. It means that the farmers with more extent of contact with IPM club and FFS had more favourable attitude towards IPM practices than the farmers with low extent of contact. The farmers with frequent contact with IPM club and FFS getting more knowledge about IPM practices. This might be the reason to have more favorable attitude among those farmers who had more contact with IPM club and FFS.

**Communication media exposure and attitude towards IPM practices:** Based on the result shown in Table 3 indicates that communication media exposure had a significant positive relationship with the attitude of the farmers towards IPM practices in vegetable cultivation. The statistical analysis implies that with the increase of communication media exposure of the farmers, the favorable attitude towards IPM practices in vegetable cultivation is also increased. Farmers with more exposure with communication media have more opportunity to gain a clear understanding about latest technologies which might have influenced to form favorable attitude towards IPM practices in vegetable cultivation. Sadat (2002), Siddique (2002) and Rahman (2010) also found a similar significant positive relationship between communication media exposure and attitude of the farmer in their studies.

**Training exposure and attitude towards IPM practices:** Based on the result shown in Table 3 indicates that training exposure had a significant positive relationship with the attitude of the farmers towards IPM practices in vegetable cultivation. It implies that the farmers with more training exposure had more favorable attitude towards IPM practices than the farmers with low training exposure. Training increases knowledge and skills of the individual. Trained farmers are more capable of using complex practices. These might be the reasons to have more favorable attitude among those farmers who had more training exposure. Sarker (2002) and Rahman (2010) also found a similar significant positive relationship in their studies.

On the other hand, farm size, land under vegetable cultivation, annual family income, annual income from vegetable cultivation had no relationship with their attitude towards IPM practices in vegetable cultivation.

## CONCLUSION

The findings indicate that majority (79%) of the respondents had unfavorable attitude towards IPM practices in vegetable cultivation. There is huge scope for changing unfavourable attitude of the farmer to favorable attitude towards IPM practices in vegetable cultivation. Under the existing circumstances, it may be concluded that DAE and other rural advisory service providers should take effective steps for strengthening extension services in order to change unfavourable attitude of the farmers towards IPM practices in vegetable cultivation. Any arrangement made to increase the knowledge, contact with IPM club and FFS, communication media exposure, training exposure, organizational participation of the farmers would ultimately increase their favorable attitude towards IPM practices in vegetable cultivation. Therefore, it may be recommended that, DAE and different NGOs should form more farmers' association, offer various types of extension teaching methods on IPM practices, open more IPM clubs and FFSSs, maximize individual, group and mass contact methods like farm and home visit, results and method demonstrations and TV programs on IPM and conduct more training programs on IPM

practices that would make the farmers more skilled to change their attitude towards IPM practices in vegetable cultivation.

## REFERENCES

- Abdullah, M. 2012. Statistical Data Book for Agricultural Research and Development in SAARC countries. SAARC agriculture centre, BARC Campus, Farmgate, Dhaka 1215, Bangladesh. Vol. 7: 47.
- Ahmed, T., M. S. Islam, Haque., T. and M. Abusyed. 2001. The Effect of Manufacturing Methods and Different Shapes on the Release Pattern of Diclofenac Sodium Matrix Tablet. S. J. Pharm. Sci. 2(2): 76-80.
- Conway, O.R. and J.N. Pretty. 1991. Unwelcome Harvest: Agriculture and Pollution, London, Earthscan.
- Farhad AKM 2003. Knowledge, Attitude and Practices of Rural Women in Using IPM in Vegetable Cultivation. M.S. Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Farhad, A.K.M and Kashem, M.A. 2004. Attitude of Rural Women towards Using IPM Practices in vegetable Cultivation. Bangladesh Journal of Extension Education, 16(2):75-83.
- Islam, MR. Kundu S and Uddin, MM 2016. Involvement of Rural Women in Home Gardening Practices in Shariatpur District of Bangladesh. J. Innov. Dev. Strategy 10(3):1-5.
- Rahman MM. 2010. Variables Contribution to Farmers' Attitude Towards Ipm Practices in Rice Cultivation in Godagari, Rajshahi. Journal of Life Earth Sci., Vol. 5: 11-15.
- Sadat MA 2002. Farmer's Attitude towards Proshika: A comparative study between Proshika Beneficiaries and Non-Beneficiaries. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agril. University, Mymensingh.
- Sana MC 2003. Farmers' Knowledge of Shrimp Cultivation in Assasuni Upazila Under Satkhira District. M.S. (Ag.Ext.Ed.) Thesis. Department of Agricultural Extension Education. Bangladesh Agricultural University. Mymensingh.
- Sarker B 2002. Attitude of Rice Growers towards the Use of DAP on Rice Cultivation in Some Selected Areas of Rajbari District. M.S. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Siddique AB 2002. Attitude of the Farmers towards improved winter vegetable production in a Selected Area of Goforgaon Upazila under Mymensingh District. M.S. (Ag. Ext. Ed.) Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh