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Assessment of Small Scale Farmers' Skills Regarding Integrated Pest Management (IPM) in District Sargodha-Pakistan

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Abstract

A survey study was conducted to assess the knowledge /awareness level in IPM technology among farmers. Four villages were randomly selected from Sargodha district for data collection. Thirteen farmers from each village were selected randomly and sample size was 52 respondents. More than 92% of respondents have no advisory services either from public or private sector. The findings imply that respondents need knowledge for all levels of competence in IPM technology. They need to get high-level of competence for application of this technology in the field. In addition, they have little exposure to long-term training opportunities due to low education level for applications of this technology. More than 77% of respondents think that government agricultural policies and no access to information sources regarding integrated pest management at grass-root level are main constraints. The findings from correlation and regression analyses indicate that age and knowledge/awareness level are negatively correlated. It may be concluded that elder respondents have less adaptability to new ideas and techniques as compared to young respondents. However, training and information, education, and experience play a significant role in enhancing the knowledge/awareness level of respondents in IPM technology.

Keywords:
Pest Management, Training, Information, Knowledge, Awareness

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INTRODUCTION

Technologies are always being used as essential tool for development and so does Integrated Pest Management (IPM) in modern agriculture. This technology could be used as alternative for curtailing the use of pesticides in crop management. Morse *et al.*, (2000) described that IPM is constantly referred to as one of the main elements in the development of sustainable agriculture. They further described in their study that goals and philosophies of sustainable agriculture and those of IPM have significant similarities. The crisis of uncontrolled use of pesticides required urgent solution, and IPM is regarded as an alternative pest management and solution to the present problems of our growers. The variety of crop protection methods are being used such as crop rotation, biological, and limited use of chemicals.

The IPM technology is driven by many principles, which require careful application of effective pest management. Integrated pest management (IPM) is regarded as the future plant protection model for developing countries and ideal pest management approach (Altieri, 1993). It is expected that IPM has potential to sustain and improve yields, to lower the dependence on pesticides, to decrease the cost of production, and to reduce negative impacts on the environment and human population (Erbaugh *et al.*, 2001). Extensive research is going on in different parts of the world to examine the benefits of this technology, and to check the awareness and knowledge level of farmers for adaptation of IPM technology.

There is a dire need to implement this technology at grass root level for pesticides free crop yields. However, the question is how the goal of implementation could be achieved. The knowledge and awareness about the use of this technology among end users is significant for its application. Moreover, training and information may also play an important role in enhancing the knowledge level of growers in IPM technology.

Knausenberger *et al.*, (2001) pointed out that access to information on IPM practices and implementation can result in IPM becoming a sustainable crop protection method in Africa. Kyamanywa (2001) noted that in Uganda, extension agents recommend the use of chemicals and overlook cultural tactics due to limited information on its application. The role of extension workers is more important than any other factor in adoption of IPM technology at grass root level. Providing knowledge and information to growers are the core responsibilities of extension workers. The extension system could play a significant role in proper adoption of IPM approaches and for sustainable agricultural. Norris *et al.,* (2003) indicate that the economic reliability of IPM practices is particularly crucial, and to a great extent, determines adoption. IPM practices must reduce the risk of crop loss or encounter rejection by farmers.

The modern research tells that pest management is crucial for any farming system. Plants and animals must be protected from damage caused by insects, weeds, nematodes and other pathogens. Due to relaxed policies in pesticide use regulations in developing countries, farmers are continuously relying on chemical without considering their negative effects on human and animal health and also for environment. It is important to create awareness and boost up knowledge level of growers for using IPM technology as a solution to the prevailing problems in agriculture sector. IPM is regarded as a practical alternative in pest management for overcoming issues that arise from increased pesticide use (Afreh-Nuamah, 2001).

MATERIALS AND METHODS

A survey study was conducted to assess the knowledge /awareness level in IPM technology of small scale farmers. Erbaugh *et al*., (2001) conducted a similar study to evaluate farmers' knowledge and awareness regarding IPM in a collaborative research support project in Uganda. The present study was conducted in Sargodha district of Punjab province of Pakistan. The two stage random sampling procedure was used to collect data from respondents. Four villages were randomly selected from Sargodha district and then13 farmers from each village were selected randomly. Therefore, the sample size was 52 respondents. A survey questionnaire was

used as an instrument for this study. The instrument was pre-tested on 10 farmers and then finalized by a panel of experts after making number of corrections. In addition, instrument was also tested for reliability by calculating the Cronbach's alpha using the data obtained from pilot study and found reliable. The instrument consisted of four sections demographic profiles of respondents, constraints in using IPM, training and information, and knowledge/awareness level of respondents.

Objectives of the Study

The study was conducted to achieve the following objectives.

1- To describe the demographic profiles of the respondents

2- To identify the knowledge/awareness level of respondents in specific concepts of IPM technology.

3- To identify the opportunities of training and information in IPM technology for respondents.

4- To describe constraints those limit the applications of IPM technology.

5- To identify the relationship among the variables such as training/ information for IPM technology, demographic profiles, and knowledge/awareness level of respondents in specific concepts of IPM technology.

Data Analysis

The collected data was coded and entered into computer for further analysis. The Statistical Package for Social Sciences (SPSS) 15.0 was used for analysis. The descriptive statistics such as mean, standard deviation, frequency distribution and percentages were computed for general description of the data. The multiple regression analysis was also used to predict how much of variance in dependent variable of knowledge / awareness level accounted for by independent variables of training/information and demographic profiles of the respondents. Multiple regression procedures also make it possible to observe the relationships between each of independent variable and dependent variable while controlling for other variables in the model (Urdan, 2001). Inter-correlations also computed to show strength of mutual relationships between the variables.

RESULTS, DISCUSSIONS, AND CONLUSIONS

The demographic profiles were age, education, years of experience in farming, and advisory services. Average age of the respondents was

Table 1: Means, standard deviations, and ranks of knowledge/awareness level in specific Concepts of IPM technology as perceived by the respondents

Knowledge / Awareness level in IPM Technology	N	Mean*	SD	Rank
Harmful effects of Pesticides use	52	3.58	0.99	1.0
Prevention is better than cure	52	3.27	1.43	2.0
Important Insect/Pests Knowledge	52	2.77	0.73	3.5
Pruning and Thinning can minimize pest population	52	2.77	1.00	3.5
Resistant varieties against different Insect/Pests	52	2.56	0.61	5.0
Timely sowing can reduce Insect/Pests population	52	2.52	0.80	6.0
Damage Symptoms of Insect/Pests	52	2.48	0.80	7.0
Insect/Pest/Control	52	2.38	0.77	8.0
Susceptible Stages for Insect/Pests attack on plant	52	2.17	0.90	9.0
Use of light traps Or Pheromone traps	52	2.12	1.04	10.0
Inter-cropping and crop rotation is essential for pest control	52	2.04	0.93	11.0
Techniques of Control Insect/Pests	52	1.96	0.79	12.0
Other methods to control attack of Insect/Pests	52	1.75	0.84	13.0
Pesticides as a last option to control attack of Insect/Pests	52	1.67	0.78	14.0
Alternative use of pest control measures are effective	52	1.63	0.82	15.0
Use of Fertilizers to control Insect/Pests population	52	1.62	0.57	16.5
Options available to control Insect/Pests other than pesticides	52	1.62	0.72	16.5
Selective use of Pesticides to control attack	52	1.58	0.80	18.0
Inter-cultural Practices to control attack of Insect/Pests	52	1.37	0.56	19.0

*Mean: 1= None, 2=Low, 3=Moderate, 4=High, 5=Very high

46 years. More than 67% of the respondents were of the age from 40 to 59 years. Of the 52 respondents, almost 35% were educated between grade eight (Middle) to grade ten (Metric) and only 10% were above metric. These results indicate that respondents belong to mature age group with low education level. Approximately 46% of respondents have farming experience from 21 to 30 years. Almost 19% of respondents have 31 to 40 years farming experience Unfortunately more than 92% of respondents have no advisory services either from public or private sector.

The results indicated that respondents have moderate knowledge/awareness level in two concepts of IPM technology such as "Harmful effects of Pesticides use (3.58) and Prevention is better than cure (3.27)". The respondents have low level of knowledge and awareness in "Important Insect/Pests (2.77) and Pruning and Thinning can minimize pest population with mean of (2.77)". Of the 19 specific concepts of IPM technology, the respondents were considered having "No" knowledge/awareness in 8 specific concepts of IPM technology as shown in the following table.

These findings imply that respondents have none to moderate knowledge and awareness in all specific concepts of for IPM technology which does not provide enough competence for applications of this technology in the field. The respondents need to get high-level of competence for applications of this technology. Ashraf (2007) reported similar findings in his doctoral study while assessing in-service educational needs of agricultural officers for adaptation of remote sensing technology for precision agriculture in the province of Balochistan-Pakistan.

The respondents were asked to rate the accessibility of training and information opportunities on a 5-point Likert scale ranging from none to very high (1-5). The means ranged from 1.21 (none) for "ETL/EIL knowledge" to 3.13 (moderate) for "other farmers as source of information" shown in the table given below.

The respondents described that they have "none" to "moderate" access to the training/information opportunities for IPM and its applications in agriculture. These findings indicate that respondents have limited access to training/information opportunities. The results further confirm that extension system in Pakistan does not provide enough training and information to clients for applications of IPM technology in the field. One of the reasons is, the extension officers themselves have limited options of training for this technology. It also implies that respondents have limited interaction with other professionals/researchers for applications of IPM technology. Consequently, they have little exposure to the long-term training opportunities due to low educational level.

The respondents also pointed out the constraints in applications of IPM technology. Few of them feel that inputs and finance are major constraints However, 77% respondents think that government agricultural policies and no access to information sources regarding integrated pest management

Table 2: Means, standard deviations, and ranks for training and information opportunities for IPM technology

Sources of Training/Information for IPM	N	Mean*	SD	Rank
Other farmers	52	3.13	0.79	1
Electronic Media	52	2.50	0.64	2
Print Media	52	1.88	0.78	3
Interactions with researchers	52	1.65	0.81	4
Extension worker	52	1.50	0.61	5
Training Sessions	52	1.48	0.77	6
Bulletins	52	1.46	0.58	7
Seminars	52	1.44	0.70	8
Publications	52	1.36	0.60	9
Short Courses	52	1.28	0.54	10
ETL/EIL Knowledge	52	1.21	0.41	11

*Mean: 1=None, 2=Low, 3=Moderate, 4=High, 5=Very high

Table 3: Regression analysis for Knowledge/awareness (DV)

Variable	Coefficients	S.E.	t	Sig.
Training and Information	1.044	0.190	5.482*	<0.001
Experience	0.804	0.142	5.663*	<0.001
Education	3.680	0.795	4.628*	<0.001
Age	-0.614	0.162	-3.779*	<0.001
Constant	18.570	6.025	3.081*	0.003

R^2 =.783; Adj. R^2 =.765; df= 4, 47; F= 42.505 *Significant at .05 level

at grass-root level are main constraints.

A regression model was used with independent variables of training/information, experience, education, and age of respondents. The model was statistically significant $p < 0.0001$ and explained 78.34% of the variance for knowledge/awareness level. The results indicated that independent variables such as training and information, experience, education, and age played a significant role in knowledge /awareness level among respondents in specific concepts of IPM technology. In addition all demographic variables were statistically significant.

The findings from correlation and regression analyses also indicate that age and knowledge/awareness level are negatively correlated. It may be concluded that elder respondents have less adaptability to new ideas and techniques as compared to young respondents. However, training and information, experience, education, and age play major role in enhancing knowledge/awareness level of respondents in IPM technology. Hussain *et al.,* (2011) concluded similar findings in their study that in Pakistan education plays an effective role in the adoption of IPM technology. They further recommended that government may take actions to upgrade the education as well as training programs in IPM for cotton producers.

RECOMMENDATIONS

The following are few recommendations for implementation and dissemination of this technology at grass-root level in Pakistan.

1- Continuous training programs are required for propagation of this technology among small scale farmers.

2- Refresher courses are the keys for success

3- Doing IPM practices onsite on farmers land.

4- Permanent coordination among farmers and researchers is required for the solution of the problems.

5- Educational institutions of higher learning need to include courses and offer training programs for Extension staff for up-gradation of their skills in IPM technology.

6- The Government should be responsible for implementing agricultural policies on priority bases.

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