

Affecting Factors on Adoption of Integrated Management of Eurygaster: Based on FFS Approach (Wheat Farmers of Kermanshah Province, Iran)

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Eurygaster is a one of the harmful pests of wheat considered non-compensatory damages; including yield loss to wheat farms. Integrated pest management based on Farmer Field School (FFS) is an appropriate approach to strengthen the ability of farmers to deal with problems related to pests of wheat. This study aimed to identify affecting factors on adoption of integrated management approach with emphasis on farmer field school in Kermanshah province, Iran. This is applied study and its research method is correlation. The main research tool is questionnaire. Statistical population included 3787 of Wheat farmers in Kermanshah that had participated in farmer field school courses, which 204 were based on Cochran formula by using proportional stratified random sampling. Statistical analysis of data was done by software SPSS 12. Findings showed that the attitude of majority respondents (81.9%) to effectiveness of farmer field school was favorable. Most farmers (51%) had partly adopted the integrated pest control. The results of regression analysis also indicated that extensional contacts and communication channels have determined 37% of adoption of integrated management of Eurygaster.

Key words: Integrated Pest Management (IPM), Eurygaster, Farmer Field School (FFS), Kermanshah province, Iran.

Agricultural production is depending on climatic conditions, unforeseen risks, primarily the function of specific management factors that has important impacts on sustainable agricultural production. Pest management plays an important role in the process of agricultural production, because pest damage to agricultural products have a long history and every year not only taking chemical insecticides cannot control pests but also farms pollution levels have increased (Sharifi-

Moghadam, 2004). In Iran, more than 70 species have been identified herbivores as the primary consumers of wheat and barley. About 15 species of harmful insects of wheat and barley that can be named as the first and second grade pests, which had significant economic losses to these products (Rezabeigi and Rajabi, n.d).

Damage caused by pests, diseases and weeds in our country has been estimated 35-30 percent, that 12-10 percent is devoted to the harmful insects. This means that management control of these factors can be increased 12-10 percent of real yield of wheat (Ibid).

In recent years, integrated pest management has been introduced in order to control plant pests and diseases as a useful way that is closest to nature of the other solutions. Integrated

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pest management is an effective and sensitive approach to environmental management of pests that relies on a combination of the conventional methods. Integrated pest management programs are used comprehensive information about the life cycle of pests and their interactions with environment (Ofuoku *et al.*, 2009). This approach is used for biological control agents and maximization of agronomic and chemical control only when necessary and with the minimal environmental damage (Rasoulli-Azar *et al.*, 2008). This approach has been designed to empowerment of farmers along the dissemination of information and technology and in some cases is named as a "school without walls" (Davis, 2006).

"Human capital" is one of the most important factors and using of participatory approaches is successfully factor of agricultural development programs such as integrated pest management.

Certainly all farmers in this area don't adopt this innovation simultaneously and process of adoption may be influenced by various factors including the attitude of farmers towards integrated pest management, characteristics of participatory approaches, coordinate their social and economic factors and etc., so identifying affecting factors on the adoption of this technology can be largely facilitate the innovation acceptance process among farmers.

Mariyono (2007) showed that in Jakarta the most important reasons for farmers' participation in integrated pest management courses are pest infestation, prevention incentive, motivation and high performance and neighbors effects.

Goff *et al.*, (2009) in the research in Trinidad and Tobago concluded that age and gender have effect on participation in the integrated pest management courses.

Samiee *et al.*, (2009) in the research showed that there is a significant relationship between adoption of integrated pest management with an annual farm income, using of information sources and channels of communication, and knowledge about integrated pest management methods.

Yaghoubi *et al.*, (2004) in their study showed there is a significant relationship between adoption of integrated pest management with

educational level, income source, application recommendations and advice individual extension agricultural experts.

Dinpanah (2007) showed that the variables of knowledge, history of rice cultivation, social participation, the number of contact extension agents, the use of information resources and mass adoption determined 75.9 % of Participants Farmer field school.

Rasouli-Azar *et al.*, (2008) found that there is a negative significant between age and agricultural experience and there is a positive and significant relationship between level of education, amount of connection with central services, income, and number of attendance in class during the past year.

Sharif-Zadeh *et al.*, (2008) research showed that there is a positive significant relationship between the application of integrated pest management by farmers with the variables: age, participation in extension courses, membership in cooperatives, contact with engineers and agricultural experts, income, and experience of planting and negative significant relationship with yield per hectare variable.

Osku *et al.*, (2007) showed that farmers' participation in farmer field schools has improved technical knowledge, attitude towards the biological fight, attitude toward the effectiveness of farmer field schools and sustainable development.

Sharifi *et al.*, (2007) concluded that there is a positive significant relationship between applications of integrated pest management by farmers with the variables: age, experience in planting and participation extension classes in the field of IPM.

Pezeshki-Rad *et al.*, (2006) in their study showed that adoption of integrated management against stem cream rice eater with variables of household members, agricultural experience, experience of rice cultivation and the amount of social participation has a negative significant relationship.

Parto-Azam (2004) showed there is a positive significant relationship between the effectiveness of the education courses, long familiar with the FFS and the number of extension classes that farmers have participated last year.

Increasing cost of conservation and

reducing the cost of economic efficiency in production resulting from repeated use of chemical pesticide is another reason to use IPM/FFS in any province, lack of scientific knowledge and practical skills in the field of fighting and pest control and diseases have forced agricultural sector officials to provide farmers through participatory approach. so identifying such affected factors on farmer adoption can mostly simplify this approach among farmers. In this regard, the main purpose of this research is identifying the affected factors on adoption of integrated pest management in Kermanshah province.

MATERIAL AND METHODS

This is applied study. The methodology of this research is non experimental (descriptive) and correlation. Statistical population included 3787 of Wheat farmers that had participated in school classes in the field. The required research sample size was calculated 204 people by using Cochran formula and the calculated sample was chosen by proportional stratified random sampling. The instrument that was used for data collection was a questionnaire. Content and face validity were established by a panel of experts consisting of faculty members and some specialists in the Ministry of Agriculture and Kermanshah province. Minor wording and structuring of the

instrument were made based on the recommendation of the panel of experts. A pilot study was conducted with 30 persons who had not been interviewed before the earlier exercise of determining the reliability of the questionnaire for the study. Computed Cronbach Alpha score was 85.0%, which indicated that the questionnaire was highly reliable. The dependent variable is adoption of integrated management of Eurygaster. In this study, descriptive statistics (mean, variance and standard deviation) and inferential statistics to determine relationship between variables (stepwise regression) were used. Statistical analysis of data was done by software SPSS 12.

RESULTS

Results showed that the average age of farmers was 37.45 years. The majority of farmers (8.33%) are in the age group of 44-34 years. least respondents' age is 23 and most is 78 years. Most farmers are men (97.1%). Most farmers (29.9%) have high school graduates and only about (5%) respondents are illiterate.

For measuring farmers extension contacts and also amount of using the communication channel by farmers for gaining agricultural information respectively 5 and 6 items were made, that were ranked from any time (1), once (2), two times (3), three times (4), to more than three times

Table 1. Attitude farmers to the effectiveness of the farmer field school (n=204)

Attitude	Frequency	Percent	Cumulative percent
Moderate	12	5.9	5.9
Favorable	166	81.9	87.7
Completely favorable	25	12.3	100

Mode: Favorable

Table 2. Adoption level of the farmer field school by farmers (n=204)

Attitude	Frequency	Percent	Cumulative percent
MoLow	6	2.9	2.9
Moderate	104	51	53.9
Much	90	44	98
Very much	4	2	100

Mode: Favorable

(5). Information shows that farmer's majority (56.9%) had three times extension contacts and they have used three times of communication channels in the last year (46.1%).

To determine Farmers attitudes toward the effectiveness of the farmer field school approach 15 items in format of Likert five-point (Completely unfavorable (1), Unfavorable (2), Moderate (3), Favorable (4) and Completely Favorable (5) was used. The finding indicated that the attitude of majority respondents (81.9%) to effectiveness of farmer field school is favorable (Table 1).

For determination the adoption of integrated management of Eurygaster, eight items in the format of Likert five points were used that were ranked from Very low (1), Low (2), Somewhat (3), Much (4) and Very much (5). Findings indicated

that the level of adoption of majority farmers is moderate (Table 2).

To determine the affecting key factors on the adoption of integrated management of Eurygaster, stepwise regression was used. After entering all independent variables with significant correlation, only extension contacts and communication channels remained in the equation. These variables could explain 37% of the dependent variable variance. Extension contacts with the amount of $R^2=0.22$ is the most important affective variable on adoption level of integrated management of Eurygaster, so that this variable lonely has explained, about 22% of level of adoption integrated management of Eurygaster (Table 3).

Table 3. Stepwise regression analysis on adoption of integrated management of Eurygaster

Variables	R square Adjusted	R Square	B	Beta	t	sig
Constant	-	-	7.840	-	4.426	0/000
Extension contacts (X1)	0.227	0.223	0.429	0.451	8.045	0/000
Communication channels(X2)	0.370	0.364	0.418	0.379	6.760	0/000

Based on values of B in Table (3), predict regression equation can be written as follows:

$$Y = 7/840 + 0.429 (X1) + 0.418 (X2)$$

To identify the effects of independent variables on adoption, the regression equation according to β can be written as follows:

$$Y = 0.451(X1) + 0.379(X2)$$

DISCUSSION

This study aimed to identify influencing factors on on adoption of integrated management of Eurygaster showed that the attitude of majority respondents to effectiveness of farmer field school is favorable. Also Findings indicated that the level of adoption of majority farmers is in moderate level.

According to results, variables of contacts extension and communication channels determined 37% of dependent variable variance. Extension contacts are the most influential variable on the adoption of integrated management of Eurygaster, so that this variable lonely, approximately explained 22% of dependent variable changes. Results of multiple regression is consistent with Dinpanah (2007) Rasouli Azar *et*

al., (2008), Parto- Azam (2004), Sharifi *et al.*, (2007), Sharif-Zadeh *et al.*, (2008), Mariyono (2007) and Yaghoubi *et al.*, (2004).

Findings show that after extensional contacts, the communication channels have the most influence on adoption of integrated control against among wheat farmers in Kermanshah province, so identifying the proper communication systems in society in order to promote and transferring technology seems to be necessary. It seems the local resources such as leading farmers and neighbor ones to promote innovation more quickly than other channels like computers and internet. Rasouli Azar *et al.*, (2008), Dinpanah I (2007), Parto- Azam (2004), Sharifi *et al.*, (2007), Sharif-Zadeh *et al.*, (2008) were confirmed mentioned hypotheses.

According to the results of research, the following suggestions are provided to overcome weaknesses and enhance strengths in this study.

CONCLUSION

According to the results, using communication channels is effective in increasing adoption of integrated management of Eurygaster, also the progressive farmers and the local farmers and their neighbors are the best sources for increasing adoption integrated management of Eurygaster by farmers. Farmers motivation to increase production and increase their income trying to get in touch with the progressive farmers, thus these farmers are as a communication channel in a growing adoption of innovation in society. This issue about local farmers and neighbors as a communication channel will also apply.

Considering the role of extension contacts in increasing adoption of integrated management of Eurygaster, increase extension agents meeting with farmers, extension - educational classes and promotional publications, workshops and visiting farms and etc. to increase farmers awareness of the benefits of integrated pest management, identify wheat pests and diseases and awareness of appropriate methods to combat with them were suggested.

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