



STUDY OF ENVIRONMENTAL AWARENESS IN THE USE OF PESTICIDES BY FARMERS IN GAERAA DISTRICT NINAWA GOVERNORATE, IRAQ

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Abstract

This article aimed to identify the level of environmental awareness of farmers in the use of pesticides in general and in each field of this research and identify the correlation between the level of environmental awareness and between the independent variables in this research. It depended on a questionnaire to obtain data of this research. The questionnaire consisted of two parts: The first part: included the personal, social and economic variables of farmers, which were connected with the level of awareness for farmers (age, educational level, number of years working in agriculture, size of agricultural land, the quality of cultivated tenure, the communication degree with the information sources). The second: included (5 fields) consist of (64 items - survey) distributed on the fields of research, as following: First field: Effect of pesticide use on soil. (15 items), the second field: Effect of pesticide use on humans and animals. (14 item), the third field: Effect of pesticide use on water. (14 item), the fourth field: Effect of pesticides on plants. (14 item), the fifth field: Effect of pesticide use on air. (7 items). The data collected from 1/4/2019 to 1/5/2019. The data measured environmental awareness for farmers by using scale consist of three levels, each level with alternatives always (3 degree), sometimes (2 degree), no (1 degree).

The results showed that the level of environmental awareness for farmers on the effect of pesticide use on environmental in general is medium tends to low and the level of environmental awareness for farmers in the effect of pesticide use on environmental in each field: The fields are (Effect of pesticide use on soil), (Effect of pesticide use on humans and animals), (Effect of pesticide use on water), (Effect of pesticides on plants), (Effect of pesticide use in the air) is medium tend to low. Also, the results showed that there is significant correlation between the level of environmental awareness of farmers in the use of pesticides and the age variable. The Author recommended that farmers need to raise their awareness in the issues of environmental awareness in the use of pesticides.

Key words: Environmental awareness, farmers, Pesticides and use.

Introduction

Agricultural development is one of the important pillars of economic and social development, Its importance is particularly important in the societies of developing countries, where agricultural sector is the main pillar of the national economy (Arab Organization for Agricultural Development, 2002). Agricultural development is also an urgent necessity in our time as it is aimed at achieving high levels of productivity. It is recognized that achievement of agricultural development requires existence of new agricultural techniques. Therefore, the State has contributed in the development of the agricultural sector and given it great importance through the

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introduction of modern agricultural techniques to production process in all fields of agricultural sector, as well as the provision of all agricultural inputs (Al-Ani, 2003, Al-Dosari 2003, Saleem and Al-Hafidh 2014). The studies of the Arab Organization for Agricultural Development in the agricultural production in the Arab region shown that there are losses by pest, whether during growth of the crop in the field or spraying it with pesticides. Pesticides are toxins and unfortunately, they can damage more than the pests that infect crops and pesticides can cause a number of human health effects. It is associated with a range of serious diseases ranging from respiratory problems to cancer (Pesticides Action Network United Kingdom, 2017, Al- Dosari, 2003). Exposure to pesticides can occur in many ways. Farmers and agricultural

workers can be exposed to pesticides in agriculture by processing crops, plants and grain stores. Rural people living next to the farms can be exposed to pesticide by diversion professional and local pest control through the treatment of preservatives, the treatment of fouling bodies on boat structures and the treatment of livestock with antiparasitic preparations (Pesticides Action Network United Kingdom, 2017). Success in using of pesticides led to the reduction of tropical diseases such as yellow fever. Due to the remarkable results achieved by pesticides at the beginning of their use and the lack of knowledge of their damage and negative effects, farmers in different countries around the world used them (Ghorab and Khalil 2016, Food and Agriculture Organization of the United Nations 2018). As the large use of pesticides in agriculture has been given poor returns on public health and lead to environmental pollution, as well as higher production costs resulting from a decrease in the return of chemical control operations (Arab Organization for Agricultural Development, 1994). All these effects and risks are generally due to the incorrect use of pesticides, some international organizations such as the World Food Program (FAO) have alerted to health risks that could result from the use of chemical pesticides (Food and agriculture Organization of the United Nations 2016, Food and Agriculture Organization of the United Nations (FAO) 2015). What the environment offers us and what we offer to the environment depends on our knowledge and understanding of the environment. The improper exploitation of the environment, the lack of ecological balance and the decline of vegetation cover all these conditions threaten humanity and affect it and causes for a reconsideration of human interaction with the environment (IVAN 2015). Environmental awareness: It is the knowledge of farmers with the necessary information for the elements studied in the field of environmental protection from pollution, Chemical pesticides are lethal organisms and damage the biological diversity and ecosystem (Arab Organization for Agricultural Development, 2002). According to US Department of Agriculture statistics, harmful agricultural pests cause losses estimated annually by more than (30%) of production if there is 50 thousand species of fungus causes more than 1500 disease of plants and pets as well as 10 Major damage to agricultural crops (Candiotti *et al.*, 2010).

Therefore, there was a need to use pesticides resistant to agricultural pests to reduce their damage to agricultural crops as a weapon to regulate agricultural production (Holvoet, 2006). Pesticides are a general term that includes pesticides, rodenticides, herbicides and

fungicides. These materials are easily classified and highly effective against agricultural pests (Chorpa *et al.*, 2011). In terms of health, the statistics indicate the importance of pesticides in reducing the incidence of some diseases transmitted by insects but the widespread use of pesticides is usually accompanied by strong adverse effects on humans, animals, plants and fish (IVAN, 2015; Al-Dosari 2002). The agricultural extension also plays an active role in educating farmers about the safe use of pesticides and applying the guiding recommendations of not resorting to the use of chemical pesticides unless it is absolutely necessary and at certain levels of pests and also aware of safety precautions during the use and storage of pesticides (Ahemad and Mohammad Saghir Khan, 2012; Al-Darwish 1998; Altalb 2017). When agriculture began in the area of Qayyarah as well as other areas of the province of Nineveh, characterized by small holdings of agricultural and a few varieties of crops planted and the need to use pesticides at the beginning is simple due to the lack of pests that threatened crops. However, as a result of the agricultural renaissance that occurred in recent years because of the region's agricultural production components. The diversification and intensification of crops in the region has affected the diversity and multiplicity of pests and diseases that did not exist before. This led to the use of different types of pesticides with different concentrations (Benbrook, 1996; Ahemad and Mohammad Saghir Khan, 2011). The trend of many farmers in the research region to use different types and different concentrations of agricultural pesticides to control pests and diseases affecting their crops has been noted (Al-Otaibi, 2006). Relying on sources such as traders and sellers of agricultural inputs. The use of pesticides by farmers may be unaware of the harmful effects of pesticides on the environment which led the researcher to conduct this study in order to identify the environmental awareness of farmers in the use of pesticides. There are many studies and research that have been done in the subject of environmental awareness in the use of pesticides, such as: Aksornsri (2003), Mollah (2008), Sodavy, P.M.R. Nugent and H.M.(2000).

Research objectives

This research aims to achieve the following objectives:

1. Identify the level of environmental awareness for farmers in the use of pesticides in general.
2. Identify the same level of awareness for farmers in the field of pesticide use and effect on the soil.
3. Identify the same level for farmers in the field of pesticide use effect on humans and animals.
4. Identify environmental level of awareness for farmers

in the field of pesticide use and its effect on water.

5. Identify the awareness level for farmers in the field of pesticide use and its effect on the plant.
6. Identify awareness environmental for farmers in the field of pesticide use and its effect on air.
7. Identify the correlation between the level of environmental awareness of and between the independent variables in this research.

Materials and Methods

The region of research

This research was conducted in the Qayara region, which is considered an important region of Nineveh province because it is an important agricultural area in the province.

Sample size of research

The research community is 620 farmer. A random sample was taken from the total number of research community with (10%), the sample is 62 farmer.

The components of the questionnaire

The questionnaire used as a mean to collect data from the farmers. Questionnaire consisted of two part:

The first part: includes the personal, social and economic variables of farmers, believed to have a relation to the level of awareness of farmers of (age, educational level, number of years working in agriculture, size of agricultural land, the quality of cultivated tenure and the communication degree with the information sources).

Second part: includes 5 fields, it consist of 64 items-question as follows: These fields are: First field: (Effect of pesticide use on soil): This field consists of 15 item-question. The second field: (Effect of pesticide use on humans and animals). This field consists of 14 item. The third field: (Effect of pesticide use on water): This field consists of 14 item. The Forth field: (Effect of pesticides on plants): This field consists of 14 item. The fifth field: (Effect of pesticide use in the air). This field consists of (7 item).

Three alternatives were put for each item (always, sometimes and no), each level was given a numerical degrees ranging from (1-3). The number (3) means (always), the number (2) means (sometimes) where the number (1) means (not).

Validity of research items

In order to find validity of the questions, it has been presented to specialists in agricultural extension to verify items validity scientifically speaking.

Reliability

The measurement of reliability of scale items was

found by using (split half method) to finding the correlation between individual and marital items, which can be represented in half reliability of scale and then corrected by using (Spearman - Brown) to find the full reliability of the scale.

Collect data

After completing questionnaire, data collection process was carried out. The data were collected from the farmers in Qayyara district using the interview and helpless some extension workers. The data collection process took place from 1/4/2019 to 1/5/2019.

Statistical means

For the purpose of analysis, many statistical methods were used, including: Percentage, repetitions, person correlation and spearman-Brown equation.

Results and Discussion

Identify the awareness level of environmental for farmers regarding the use of pesticides in general:

The results showed that the highest value of respondents on the awareness level of environmental about the use of pesticides in general is 136 and the lowest value is 81 and a mean of 105 and responses were divided into three categories according to the awareness level of environmental of using of pesticides in general table 1. Show that:

Table 1 explains that the highest percentage of farmers fall in the middle category (100 - 117) reaching

Table 1: Distribution of responses to three categories according to awareness level of environmental of using of pesticides in general.

Percentage(%)	The number	Categories
25.81	16	Low category(81- 99)
59.68	37	Meddle category(100 -117)
14.51	9	High category(118 -135)
100	62	Sum

(59.68%), The low category (81- 99) is (25.81%) and the high category (118 – 135) is (14.51%). This mean that the level of environmental awareness for farmers about the effect of pesticide use on environment in general is medium that tends to low.

Identify the awareness level of environmental for farmers in the field pesticide use's effect on the soil:

The results showed that the highest value of the responses for the level of environmental awareness in the use of pesticides on the soil is 38 and the lowest value is 21, the mean is 30 and the respondents were divided into three categories according to the level of environmental awareness of the farmers in the use of

pesticides in this field, table 2. explain that:

Table 2 shows that the highest percentage of

Table 2: Distribution of respondents to three categories according to environmental awareness in this field.

Percentage (%)	The number	Categories
37.09	23	Low category (21-26)
46.78	29	Meddle category (27-32)
16.13	10	High category (33-38)
100	62	Sum

responses is the middle category (27-32) reaching (46.78 %), while the low category (21-26) is (37.09 %) and the high category (33-38) is (16.13 %). This shows that the level of environmental awareness for farmers in the impact of pesticide use on soil is medium and tends to low.

Identify the awareness level of environmental for farmers in the field of pesticide use effect on humans and animals:

The results showed that the highest value of the respondents expressed the level of environmental awareness in the use of pesticides on humans and animals is 32, the lowest value is 19 and the mean is 24. The responses were divided into three categories according to the level of environmental awareness of the farmers in the use of pesticides on humans and animals, as show in table 3.

Table 3 shows that the highest numerical value of **Table 3:** Distribution of respondents to three categories according to the environmental awareness in this field.

Percentage (%)	The number	Categories
24.20	15	Low category (19-23)
56.45	35	Meddle category (24-28)
19.35	12	High category (29-33)
100	62	Sum

the respondents in the middle category (24-28) where the percentage (56.45%), the low category (19-23) with percentage (24.20%), while the highest category (29-33) was (19.35%). This means that the level of environmental awareness in the use of pesticides on human and animal is medium tends to low.

Identify the awareness level of environmental for farmers in the field of pesticide use effect on water:

The results showed that the highest value of the responses in the level of environmental awareness in the effect of pesticides use on water is 30 and the lowest value is 15 and the mean is 23. The responses were divided into three categories according to the level of

environmental awareness of the farmers in the use of pesticides on water. Table 4 show that:

Table 4 show that the highest percentage of **Table 4:** Distribution of respondents into three categories according to environmental awareness in this field.

Percentage (%)	The number	Categories
24.20	15	Low category (15-20)
54.83	34	Meddle category (21-26)
20.97	13	High category (27-32)
100	62	sum

respondents is in the middle category (21-26) reaching (54.83 %) and the low category (15-20) was (24.20%), while the highest category (27-32) is (20.79%), it means that the level of environmental awareness of the farmers in the use of pesticides on water is medium tends to low.

Identify the awareness level of environmental for farmers in the field of pesticide use effect on the plant:

The results showed that the highest value of the respondents regarding the level of environmental awareness about the effect of pesticide use on the plant is 28 and the lowest value is 17 and the mean 21. Respondents were divided into three categories according to the field of effect of pesticide use on plants, as shown in table 5.

Table 5 explain the highest percentage of respondents **Table 5:** Distribution of respondents to three categories according to this field.

Percentage (%)	The number	Categories
19.35	12	Low category (17-20)
66.13	41	Meddle category (21-24)
14.52	9	High category (25-28)
100	62	sum

in middle category (21-24) with (66.13%), while the low category (17-20) is (19.25%). The highest category (25-28) reached (14.52%). This shows that the level of environmental awareness of farmers in the effect of pesticides using on plants is medium tends to low.

Identify the awareness level of environmental for farmers in the field of pesticide use effect on air:

The results showed that the highest value of the respondents is 15, the lowest value is 8 and mean is 12, then the distribution of the respondents into three categories according to the field of effect the use of pesticides on air, is shown in table 6.

Table 6 shows that the highest percentage of respondents is the middle category (11-13), which amounted to (59.68%), while the low category (8-10) reached (20.97%) and the high category (14-16)

Table 6: Distribution of respondents to three categories according to the field of use of pesticides on air.

Percentage (%)	The number	Categories
20.97	13	Low category (8-10)
59.68	37	Meddle category (11-13)
19.35	12	High category (14-16)
100	62	Sum

accounted for (19.35%). This shows that the level of environmental awareness of the farmer in the effect for the use of pesticides on air is medium tends to low.

Identify the correlation between the awareness level of environmental and between the independent variables in this research

Table 7: The correlation between awareness level of environmental awareness and the independent variables in this research.

The variables dependent: (the awareness level of environmental for farmers in the effect of pesticide use)		The variables independent	No.
Value of Spearman correlation (rs)	Value of person correlation (r)		
	0.362**	Age	1
0,119		educational level	2
	-0.053	Number of years working in agriculture	3
	-0.003	size of agricultural land	4
-0.55		The quality of cultivated tenure	5
	0.198	The communication degree with the information sources	6

Table 7 shows that there was a significant correlation coefficient between the level of environmental awareness of farmers in effect of the pesticides use and the age. The correlation coefficient of Pearson is (0.362 **) significant at the probability level (0.05). This indicates that the age of farmers affects the level of environmental awareness about the use of pesticides as a result of the experience gained during his long years.

Acknowledgments

I would like to thank the ministry of High Education and Scientific Research and University of Mosul, College of Agriculture and Forestry and Department of Agricultural Extension and technology transfer in Iraq for giving me permission to complete this manuscript and

publish this it in the journal.

Conclusions

The level of environmental awareness of farmers in the fields of pesticide use in general in medium tends to below.

We conclude from this that farmers have poor knowledge information and environmental awareness in the use of pesticides and they need to enhance their knowledge in the fields of pesticide use.

The results showed that there is significant correlation between the level of environmental awareness of the farmers in the use of pesticides and age variable. We conclude that the age factor has an effect in raising the environmental awareness of the farmer in the use of pesticides.

Recommendation

The Author recommends a need to raise awareness among farmers in the issues of environmental awareness in the use of pesticides, as well as in the issue of the impact of negative use of pesticides on water, air, human and animal in general by encouraging farmers to enter in intensive training courses and practical lectures in these subjects.

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