KIRKUK UNIVERSITY JOURNAL
FOR AGRICULTURAL SCIENCES

The level of environmental knowledge among farmers during farming practice in the Sharazur Plain - Sulaymaniyah Governorate

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- Date of research received 28/02/2022 and accepted 13/03/2023
- Part of MSc. dissertation for the first author.

Abstract

This research was conducted to identify the level of environmental knowledge among farmers during farming practice in the Sharzour Plain, Sulaymaniyah governorate, to identify the correlation between the level of environmental knowledge and the independent variables. The research population included all farmers in the villages of Shahrzour district in the Sulaymaniyah governorate, whose number is (2735) farmers distributed in (47) villages, A simple random sample was taken from the villages at a rate of (51%) at the rate of (24) villages, and the number of farmers in these villages reached (1615) farmers, Then a simple random sample (20%) was taken from the research population, so research sample size was (323) farmers, The results showed that most of the respondents had a mid-level of knowledge tending to go down, also showed that there is a significant relationship between the level of environmental knowledge and each variable of the following (age, level of education, Sources of agricultural information, size of farm holding, Environmental training courses, participation in environmental activities), while no significant relationship appeared between the level of environmental knowledge and the variables (Years of experience in agriculture, type of farm holding, farmers' attitudes towards environmental protection). Therefore, the researcher suggests escalating training courses in the field of agricultural environment, for the agricultural extension body to disseminate knowledge and experience related to the development of the agricultural environment

Key words: Environmental, knowledge, farming practice, Sharazur.

Citation: Naxshawan Z. S. Shexani; Tahir M. Layeeq. "The level of environmental knowledge among farmers during farming practice in the Sharazur Plain - Sulaymaniyah Governorate". *Kirkuk University Journal For Agricultural Sciences*, 14, 1, 2023, 1-16. doi: 10.58928/ku23.14101

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Introduction

That distinguishes a developed society is its ability to unleash the energies of its members, develop their capabilities, and enable them to make optimal use of the available economic resources to achieve more production and development by providing them with modern scientific developments because of their great importance in human development [1]. This development came through specialization and intensive use of industrial production inputs such as chemical fertilizers, pesticides, and manufactured feed materials [2], However, the excessive use of multiple agricultural technologies to increase agricultural production and improve its quality led to the emergence of many agricultural problems, as well as specialization in cultivating a specific crop for consecutive years that contributed to the imbalance of the delicate balance of nutrients that the soil can provide to the plant, This led to a reduction in the percentage of resources in agricultural land and its inability to determine its resources [3], also, the phenomenon of desertification has become a threat to the land and the population as a result of the irrational exploitation of the natural pastures, which is represented in overgrazing, early grazing, and the uprooting of trees and shrubs for fuel. This has led to soil erosion and the formation of dunes. In addition to the problem of salinity that spreads in the soil and deposits on the surface of the soil. This is in addition to air pollution with carbon smoke from oil burning, acid rain, ionization, and radiation, which causes damage to plant growth and primary productivity. Also, rivers, lakes, and groundwater were not spared by throwing factory and hospital waste and fertilizers, which lead to water pollution [4], and other types of pollution in various areas of life, and accordingly, the concept of environmental awareness must be comprehensive, starting from the knowledge of environmental problems to the consolidation of values and beliefs that direct human behavior to be more environmentally friendly, and more rational in the consumption of its resources. Therefore, a person must have awareness of local and global environmental problems, and environmental problems that are agreed to be the most important challenges in the current millennium. [5].

There are several studies concerned with environmental risks in general, where the study [6] Emphasized the importance of the role played by agricultural producers in protecting the environment by bringing about a change in their knowledge, attitudes, and practices to apply sustainable development methods, and [7] Believes that Environmental knowledge and values among individuals have contributed to explaining 75% of behavior towards the elements of the environment in general, While [8] See in their study that the level of knowledge of farmers about the safe use of pesticides is very insufficient, and this lack of knowledge negatively affects the quality of life of workers in addition to occupational health and safety. While [9]. Indicated that there are agricultural practices that have negative effects on the environment, which are carried out by agricultural producers without having sufficient knowledge of their effects and possible alternatives to them, while [10]. Showed that environmental awareness of farmers is a major factor in Reducing the negative impact of agricultural production on the natural environment, [11]. indicated in his study that farmers in the Kurdistan Region not only had no knowledge of environmental problems but were also less aware of current environmental concepts and challenges, with the exacerbation

of these problems, international and governmental bodies and others collided to confront the line that threatens the environment and work to solve it through approving global and regional agreements, enacting laws, and issuing declarations concerned with environmental protection, which prompted officials and those interested in environmental affairs at the global level for many centuries to hold conferences to discuss and study those risks that caused by pollution and finding appropriate solutions and recommendations, This is due to their knowledge of the damage caused by pollution at all levels, especially on human health. However, agreements, laws, and legislation are of no great benefit in solving current environmental problems and preventing their aggravation except with the presence of individuals who have sufficient environmental culture and strong motives to work hard to address them [12], This does not come without the existence of developmental systems that include sound environmental education that introduces individuals to environmental issues and contributes to addressing them, providing them with sufficient knowledge about the environment and the problems that threaten it, and the necessary skills to deal with it, developing their environmental attitudes, raising their level of awareness of them, and providing them with new environmental behavior patterns [13]. Several agencies are working to develop the human element, including the Agricultural Extension Agency, which directs its activities to the rural population [14], As the extension system works to transfer knowledge and information about environmental pollution and deliver it to farmers [15], by disseminating desirable environmental practices as an informal educational process aimed at serving farmers, their families, and their environments and helping them to properly exploit natural resources [16].

The agricultural extension can play an important role in preparing farmers to deal safely with the environment, preserve the environment from pollution, and confront destructive behavioral deviations towards the environment. Sound knowledge among farmers, results in desirable economic and social effects for farmers.[17], this requires farmers to have a high degree of environmental knowledge of environmental concepts and the relationship between the environment and agricultural activities. Therefore, it is necessary to identify their level of knowledge in the field of preserving the environment, and this prompted the researchers to carry out this study, which mainly aims to identify the level of environmental knowledge of farmers in agricultural practices in the Shahrzour Plain in Sulaymaniyah governorate. In general, the research tries to respond to these questions:

1. What is the level of environmental knowledge among farmers during farming practice in the Sharazur Plain - Sulaymaniyah governorate?
2. Is there a correlation between the level of environmental knowledge and each of the independent studied variables mentioned before?

Research Objectives:

1. Identifying the level of environmental knowledge among farmers during farming practice in the Sharazur Plain - Sulaymaniyah governorate
2. Identification of the level of environmental knowledge among farmers during farming practice, in each of the following axes (soil, water, air, and food).
3. Arrangement of the main axes of the level of environmental knowledge of farmers about agricultural practices in the Sharzour Plain in Sulaymaniyah governorate.
4. Determining the correlation between the level of environmental knowledge of farmers and each of the following independent

variables: (age, educational level, years of experience in agriculture, size of farm holding, type of agricultural holding Sources of agricultural information, Environmental training courses, farmers' attitudes towards environmental protection, and participation in environmental activities).

Research hypotheses:

There is no significant correlation between the level of environmental knowledge of the farmers and each variable of the study variables, represented in: (age, educational level, years of experience in agriculture, size of farm holding, type of agricultural holding, Sources of agricultural information, Environmental training courses, farmers' attitudes towards environmental protection, participation in environmental activities).

Research importance: The importance of the study lies in the following:

1. It is considered one of the recent studies that investigated the level of environmental knowledge among farmers at the level of the Kurdistan Region in general and the Sulaymaniyah governorate in particular.
2.Through knowledge of the level of knowledge of farmers in the governorate of Sulaymani, it is possible to diagnose the weaknesses in the knowledge of farmers, for which specialists in agricultural extension can build their activities and extension programs, especially training ones, in a good way.
3. It may help researchers and those interested in the environmental field to benefit from the results of this study.
4. Contribute to solving one of the important problems facing farmers, which is developing environmental knowledge and then developing awareness of protecting their farms.
5. The importance of the research is evident in that it deals with a new topic that has occupied the forefront in the lives of peoples and countries, which is environmental knowledge, which reflects the degree of development and progress of nations and represents an essential part of the development process.

Procedural Definitions:

- Environmental knowledge: the extent to which farmers in Shahrzour Plain in Sulaymani governorate are aware of the environmental information and concepts available to them in how to deal with and preserve the environment, represented by correct positive behaviors towards the environment.
- Knowledge level: It is an indicator that expresses the information, knowledge, and experience that farmers possess in the Shahrzour Plain in Sulaymani Governorate in the field of preserving the agricultural environment (soil, water, air, food), according to the test items in the second part of the research questionnaire.
- Environment: the place where a living organism lives and finds its needs of water, air, and food, and where it performs its daily activities.
- Agricultural Practices: It is the practical application of scientific recommendations (agricultural guidelines in the field of agricultural environment management) to achieve high (targeted) productivity and sustainability and the safety of the product and its workers.
- Shahrzour Plain: It is a plain located in the middle of the Shahrzor district of the Sulaymaniyah Governorate in Iraqi Kurdistan. The population of the district is more than 100 thousand people, 35 km southeast of the center of Sulaymaniyah Governorate. It is located at an altitude of 1770 feet above sea level on the path of a line Height and width of 45 x 35.

Materials and methods:

6.1 Research methodology: In conducting this research, the descriptive approach was adopted, using the method of the survey study [18],

because it is commensurate with the nature of the phenomenon to be studied, which is to Identify the level of environmental knowledge of farmers about agricultural practices in the Sharzour Plain, Sulaymaniyah governorate.

6.2 Research zone: Shahrzor district of Sulaymaniyah governorate was chosen as an area to conduct the research because the district is one of the important agricultural areas that is characterized by the diversity of agricultural activity. The district of Shahrzour is located at a distance of (40) km northeast of the city of Sulaymaniyah. The total area of the district is (114094.5) dunums, of which (46839) dunums are unsuitable for cultivation, as for the arable area, it amounts to (67255.5) dunums, of which (52277) dunums are demi, while the irrigated area amounts to (14978.5) dunums[1]

6.3 The research population and sample: The research population included all farmers in villages of Shahrzour district in the Sulaymaniyah governorate, whose number is (2735) farmers distributed in (47) villages, A simple random sample was taken from the villages at a rate of (51%) at the rate of (24) villages, and the number of farmers in these villages reached (1615) farmers, then a simple random sample was taken from farmers at a rate of (20%) at the rate of (323) farmers subject to the research.

6.4 Data collection tool: A questionnaire was prepared consisting of two parts, the first part of which included the personal variables of the respondents ,the second part included a measure to test the knowledge level of farmers which consists of four axes: the first axis consists of determining the level of environmental knowledge in the field of soil, which consisted of (14) items, the second axis Determining intensity of environmental knowledge in the field of water, which consisted of (12) items,

the third axis is in the field of air, which consisted of (10) items, the fourth axis is in the field of food, which consisted of (12) items, and after completing the identification of the axes, they were presented to the specialists in the field of environmental pollution to know the relative importance by distributing one hundred (100) degrees to the four axes according to their experience in the field of environmental pollution, based on the weight of each axes compared to the rest of the fields about its importance to the farmers surveyed, and the amount of focus on it and the provision of sufficient information to farmers in this field compared to other axes, after taking the average scores indicated by the experts, the relative importance of the domain units was determined as follows: The axes of soil (31.5%), The axes of water (27%), The axes of air (22.5%), The axes of food (19%),Its apparent fact validity and content validity were verified by presenting it to a number of experts specialized in agricultural extension and environmental pollution, The stability and validity were calculated using Cronbach's alpha method then, the degree of difficulty and distinction of the test paragraphs included in the questionnaire was extracted. The data collection process was carried out through a personal interview, and after unpacking and classifying the data, the Spss program and several statistical methods were used to analyze the data, such as (range, percentage, arithmetic mean, correlation weight, simple correlation, ordinal correlation, Cronbach's alpha equation, multi-stage regression analysis).

Results and Discussion:

1. Identifying the level of environmental knowledge among farmers during farming practice in the Sharazur Plain - Sulaymaniyah Governorate:

[1] Agricultural areas were obtained by the Directorate of Agriculture in the Shahrzour district

The results declared that the largest numerical value obtained by the farmers in the environmental knowledge axis is (89), and the lowest numerical value (12), on a level scale whose scores ranged between (0-100), with an average of (43.21) numerical values and a standard deviation of (16.037), The farmers were distributed into three categories of knowledge level, as shown in Table 1:

Table 1: Distribution of farmers based on their environmental knowledge

Level of Knowledge	Frequency	%	Average of Knowledge	$\bar{x}$	Std. Deviation
(12 – 37) Low	130	40.25	28.00	43.21	16.037
(38 – 63) Medium	149	46.13	48.11		
(64 – 89) High	44	13.62	71.54		
Total	323	100			

Table (1) indicates that the largest percentage is (46.13%), with a knowledge average of (48.11) with a numeric value in the middle category (38-63), while the lowest percentage of the respondents was (13.62%), with knowledge average of (71.54) and a numeric value in the high category (64-89), It is clear from the results that most of the farmers have average knowledge and tend to decline toward environmental knowledge of agricultural practices and that the medium and low categories constituted (86.38%) of the total number of respondents, Perhaps this is caused by the weakness of extension activities in the field of environment or the dependence of farmers on local and traditional experiences from non-scientific sources.

2. Identifying the level of environmental knowledge among farmers during farming practice in the Sharazur Plain - Sulaymaniyah governorate, in each of the following axes (soil, water, air, food).

2.1 Identifying the level of environmental knowledge among farmers during farming practice in the soil axes:

The results declared that the largest value procured by the participants in the axis of environmental knowledge in the area of soil is (31.5), and the lowest is (2.25), on a knowledge level scale whose degrees ranged between (0 - 31.5), with an average of (14.23) numeric value and a standard deviation of (10.327), The farmers were distributed into three categories of knowledge level, as shown in Table 2:

Table 2: **:** Distribution of farmers based on their environmental knowledge in the soil axes

Level of Knowledge	Frequency	%	Average of Knowledge	$\bar{x}$	Std. Deviation
(2.25 – 11.99) Low	165	51.1	5.70	14.23	10.327
(12 – 21.74) Medium	64	19.8	14.94		
(21.75 – 31.5) High	94	29.1	28.74		
Total	323	100			

Table (2) indicates that the highest percentage of farmers is (51.1%), with a knowledge average of (5.70) in the low category (2.25 – 11.99),while the lowest percentage of the respondents was (19.8%), with a knowledge average of (14.94) numeric value in the middle category (12–21.74), and the medium and low categories constituted (70.9%) of the total number of respondents, Perhaps the reason for this is due to the lack of interest of the

respondents in the issue of preserving the soil environment and constantly following what is new in this field.

2.2 Identifying the level of environmental knowledge among farmers during farming practice in the water axes:

The largest numerical value obtained by the respondents in the axis of environmental knowledge in the area of water is (27), and the lowest numeric value is (0) degrees, on a scale whose degrees ranged from (0 – 27), with an average of (12.54) numeric value and a standard deviation of (8.996), The farmers were distributed into three categories of knowledge level, as shown in Table 3.

Table 3: **:** Distribution of farmers based on their environmental knowledge in the water axes

Level of Knowledge	Frequency	%	Average of Knowledge	$\bar{x}$	Std. Deviation
(0 – 8) Low	131	40.5	3.86	12.54	8.996
(9 – 17) Medium	92	28.5	11.88		
(17 and More) High	100	31.0	24.52		
Total	323	100			

Table (3) indicates that the largest percentage of respondents is (40.5%), with a knowledge average of (3.86) in the low category (0-8),while the lowest percentage of the respondents was (28.5%), with a knowledge average of (11.88) numeric value in the middle category (9-17),The results show that most of the farmers have low knowledge, and that the medium and low categories constituted (69.0%) of the total, Perhaps the reason for this is due to the respondents' lack of awareness of the importance of water in agricultural practices and their lack of information in this axes.

2.3 Identifying the level of environmental knowledge among farmers during farming practice in the air axes:

The largest numerical value obtained by the farmers in the axis of environmental knowledge in the area of air is (22.5), and the lowest numeric value is (0), on a knowledge level scale whose degrees ranged between (0-22.5), with an average of (8.94) numerical value and a standard deviation of (6.762), The farmers were distributed into three categories of knowledge level, as shown in Table 4:

Table 4: Distribution of farmers based on their environmental knowledge in the air axes

Level of Knowledge	Frequency	%	Average of Knowledge	$\bar{x}$	Std. Deviation
(0 – 7) Low	164	50.8	2.97	8.94	6.762
(8 – 15) Medium	108	33.4	11.08		
(15and more) High	51	15.8	20.42		
Total	323	100			

Table (4) indicates that the highest percentage of farmers is (50.8%), with a knowledge average of (2.97) degrees in the low category (0 - 7), while the lowest percentage of the respondents was (15.8%), with a knowledge average of (20.42) the numerical value in the high category More than (15), The medium and low categories constituted (84.2%) of the total,

which means that more than Three-quarters of the respondents have low knowledge tending to the average, Perhaps the reason for this is due to the lack of information the respondents about the dangers of breathing polluted air with fumes and toxic gases and their impact on agricultural production.

2.4 Identifying the level of environmental knowledge among farmers during farming practice in the food axes:

the results of the research showed the largest numerical value of the environmental knowledge level of farmers in food axis is (11.9), and the lowest numerical value is (1.58), on a knowledge level scale whose degrees ranged between (0-19), with an average of (6.87) numeric value and a standard deviation of (1.963), The farmers were distributed into three categories of knowledge level, as shown in Table 5:

Table 5: Distribution of farmers based on their environmental knowledge in the food axes

Level of Knowledge	Frequency	%	Average of Knowledge	$\bar{x}$	Std. Deviation
(1.58 – 5.01) Low	50	15.5	3.58	6.87	1.963
(5.02 – 8.46) Medium	213	65.9	6.80		
(8.46 and more) High	60	18.6	9.85		
Total	323	100			

Table (5) indicates that the highest percentage of farmers is (65.9%), with a knowledge average of (6.80), in the middle category (5.02 – 8.46), while the lowest percentage of the respondents was (15.5%), with a knowledge average of (3.58) a numeric value in the low category (1.58 – 5.01), This means that the majority of farmers have an average knowledge that tends to rise, perhaps due to the presence of some degree of awareness by the respondents of the dangers and harms of contaminated food when eaten by humans.

3 Arrangement of the main axis for the level of environmental knowledge among farmers during farming practice in the Sharzour Plain, Sulaymani governorate.

The results declared that there is a discrepancy in the knowledge of the farmers from each area of the environmental knowledge of farmers about agricultural practices, as shown in Table 6:

Table 6:Tthe level of knowledge of farmers in each axes of environmental knowledge of agricultural practices

Axes	maximum degree of the axes	Average of Knowledge	Weight %	Std. Deviation	Rank
Soil	31.5	14.23	45.17	10.32	2
Water	27	12.54	46.44	8.99	1
Air	22.5	8.94	39.73	6.76	3
Food	19	6.81	35.84	2.17	4

It is clear from Table (6) that the axes of water ranked first for the level of knowledge of the farmers, as the weight percentile reached (46.44) degrees. This result may be attributed to the importance of water and its greater use in the field of agricultural practices compared to other fields. The field that won the last rank is the axes of food, as the percentage weight reached (35.84) degrees. It may be less

important to the respondents compared to other axes.

4. Determining the correlation between the level of environmental knowledge and the studied independent variables of the respondents:

1. Age: It appeared that the oldest age of the farmers was (83) years, and the youngest age was (20) years, with an average of (43.39) years. The farmers were distributed into four categories depending on the extent and length of the category, as shown in Table 7:

Table (7) indicates that the highest percentage of farmers falls within the age group (20-35) with a percentage of (34.4) and an average of (46.06) degrees, and the lowest percentage of farmers falls within the age group (68-83) with a percentage of (13.0) and an average of (38.47) degrees.

To find out whether there is a correlation between environmental knowledge and age, use the correlation coefficient (Pearson), whose value is (-0.123), and this indicates a significant relationship between the two variables. Therefore, the research hypothesis is rejected, and young farmers may be more aware, open, and use mass media compared to older people in the field of environmental knowledge, this result is consistent with what was reached by [17]; [19]; [15].

2. Educational level: The results declared that the educational level of the farmers ranged between (illiterate – Bachelor), and the farmers were distributed into seven categories, as shown in Table (7):

Table (7) indicates that the largest percentages of farmers are from the elementary category with (29.4%), with knowledge average of (39.24) degrees, and the lowest percentages of farmers (4%) are from the bachelor's category, with average of (43.53) degrees. To find out whether there is a correlation between the environmental knowledge level and the educational level, the Spearman-Brown correlation was used, whose value was (0.134) degrees and this indicates that there is a positive correlation between the two variables at the level of (0.05). Accordingly, the research hypothesis is rejected, The reason for this relationship may be attributed to the fact that the higher the educational level of the respondents, the greater their knowledge, This result is consistent with what was reached by [20];[21].

3. Years of experience in agriculture: The results declared that the largest numeric value for the number of years of experience in agriculture is (53) years, and the lowest numeric value is (2) years, with an average of (20.53) years and a standard deviation of (12.23). The farmers were divided into four categories, as shown in Table (7).

Table (13) indicates that the highest percentage of farmers falls within the category (15-27) with an amount of (41.5%), with an average (of 20.00) degrees, and the lowest percentage of farmers falls within the category (41-53), with an amount of (8.4%), with an average of (46.37) degrees, To find out whether there is a correlation between environmental knowledge and years of experience, the correlation coefficient (Pearson) was used, whose value was (-0.067), and this indicates that there is no correlation between the two variables, Therefore, the research hypothesis is accepted, and this may be attributed to the fact that the years of experience of the farmers are in the field of agriculture and not in the field of environment, and this result does not agree with what was reached [22].

4. The size of the farm holding: The results declared that the largest holding size among the farmers is 74 dunums, and the lowest holding size is 4 dunums, with an arithmetic mean of 13.42 dunums and a standard deviation of 13.26. The holding size was classified into five categories depending on the extent and length of the category, as shown in Table 7:

Table (7) indicates that the largest percentage of farmers (66.6%) falls within the category of agricultural holding (1-14) with an average amount of (6.08) and the lowest percentage of farmers (1.9%) falls within the category (60-74) dunums with an average amount of (63.33), To find out if there is a correlation between environmental knowledge and farm holding size, the correlation equation (Pearson) was used, whose value was (0.125), This indicates that there is a positive relationship between the two variables at the level of (0.05), Therefore, the research hypothesis is rejected, and the reason for this may be attributed to the fact that large holdings have more economic returns, which motivates farmers to be exposed to new sources of information about the agricultural environment to increase their knowledge and experience about agricultural practices. This result agrees with [23], and does not agree with what he reached [24]; [25].

5. Type of agricultural land tenure: According to this variable, farmers were distributed into four categories, as shown in Table 7. Table (7) indicates that the largest percentage of farmers (60.4%) falls within the ownership category with an average of (44.07) degrees, and the lowest percentage of farmers (11.1%) falls within the Agricultural contracts category with an average of (43.08) degrees, To determine the correlation between the level of environmental knowledge and the type of land tenure, the Spearman-Brown coefficient was used, with a value of (-0.045), which indicates that there is no correlation between the two variables, Therefore, the research hypothesis is accepted. This result does not agree with [26]; [27].

6. Sources of agricultural information: The results declared that the largest numeric value for the degree of contact with agricultural information sources for the farmers is (63) degrees and the lowest numerical value is (16) degrees according to a scale whose degrees ranged between (16-64) with an average of (27.70) degrees and a standard deviation of (12.66). The farmers were divided into three categories, as shown in Table (7). Table (7) indicates that the largest percentage of farmers (68.1%) falls within the low category, with average of (20.28) degrees, and the lowest percentage of respondents (9.9%) falls within the high category, with an average of (55.18), to determine the correlation between communications with information sources and the environmental knowledge, the correlation coefficient (Pearson) was used, with a value of (0.112), which indicates the existence of a positive apparent relationship between the two variables at the level of (0.05). Therefore, the research hypothesis is rejected, and the reason may be that the more the respondents are exposed to information sources in the field of preserving the agricultural environment, the higher their level of knowledge, and this result is consistent with what was reached [15]; [28].

7. Environmental training courses: Farmers were distributed into two categories according to their participation in environmental training courses, as shown in Table (7):

Table (7) shows that (80.2%) of the farmers did not participate in training courses, with a knowledge average of (42.16), and that (19.8%) participated, with a knowledge average of (48.40) degrees, to find the correlation between the level of environmental knowledge and training courses, the Spearman correlation coefficient was used, whose value was (0.148), and this indicates a significant relationship between the two variables at the level of (0.01), Therefore, the research hypothesis is rejected, This result is consistent with the study of [29]; [15].

Table 7: Distribution of farmers according to the independent variables and their impact on environmental knowledge

Variables	frequency	%	Average of Knowledge	Correlation Coefficients (r)	Sig.
Age/Year					
20 – 35	111	34.4	46.06	- 0.123 *	**S**
36 – 51	108	33.4	41.84		
52 – 67	62	19.2	44.72		
68 – 83	42	13.0	38.47		
Level of education					
Illiterate	31	9.6	46.12	0.134*	S
Reads and writes	59	18.3	41.25		
Primary	95	29.4	39.24		
Intermediate	83	25.7	45.96		
High school	21	6.50	47.00		
Diploma	21	6.50	50.38		
Bachelor	13	4.00	43.53		
Years of experience in agricultural work					
2 – 14	111	34.4	8.47	- 0.067	N.S
15 – 27	134	41.5	20.00		
28 – 40	51	15.8	34.51		
41 – 53	27	8.4	46.37		
Size of the farm holding					
1 – 14	215	66.6	6.08	0.125*	S
15 – 29	68	21.1	19.66		
30 – 44	25	7.7	33.84		
45 – 59	9	2.7	51.66		
60 – 74	6	1.9	63.33		
Types of Agricultural land tenure					
Ownership	195	60.4	44.07	- 0.045	N.S
Agricultural contracts	36	11.1	43.08		
Lease	48	14.9	39.58		
Participation	44	13.6	44.81		
Sources of agricultural information					
Low (16 – 31)	220	68.1	20.28	0.112*	S
Medium (32 – 47)	71	22.0	38.31		
High (48 – 63)	32	9.9	55.18		
Environmental training courses					
participation	64	19.8	48.40	0.148**	S
not participate	259	80.2	42.16		
Attitudes of farmers toward environmental protection					
Negative (15 – 21)	15	4.6	45.73	0.050	N.S
Neutral (22 – 28)	166	51.4	42.57		
Positive (29 – 35)	142	44.0	44.12		
Participation in environmental activities					
Low (7 – 10)	63	19.5	41.63	0.119*	S
Medium (11 – 14)	186	57.6	41.97		
High (15 – 18)	74	22.9	48.48		
Total	323	100			

***Significant at the level of 0.05 ** Significant at the level of 0.01**

8. Attitudes of farmers towards environmental protection: The results declared that the lowest numerical value expresses the farmers' attitude towards protecting the agricultural environment (15) and the largest value (35). The farmers were divided into three categories, as shown in Table (7).

Table (7) indicates that the highest percentage of farmers (51.4%) falls within the category (22-28), with a cognitive average of (42.57), and the lowest percentage of respondents (4.6%) falls within the category (15-21) with a cognitive average of (45.73), to find the correlation between the knowledge level and the trend towards environmental protection, the correlation coefficient (Pearson) was used, whose value was (0.050). It indicates that there is no correlation between the two variables, therefore, the research hypothesis is accepted, and this result does not agree with the findings of [15].

9. Participation in environmental activities: The results declared the lowest numerical value expressing participation in environmental activities (7) and the largest value (18). The farmers were divided into three categories, as shown in Table (7):

Table (19) indicates that the largest percentage of respondents (57.6%) falls within the medium category, with a cognitive average of (41.97) degrees, and the lowest percentage of respondents (19.5%) falls within the low category, with a cognitive average of (41.63), To determine the correlation between participation in environmental activities and the cognitive level, the correlation coefficient (Pearson) was used, with a value of (0.119), which indicates a significant relationship between the two variables at the level of (0.05), Therefore, the research hypothesis is rejected, Participation may prepare the respondents to confront environmental problems, find positive solutions, and provide farmers with basic environmental knowledge, skills, and desirable environmental trends.

Conclusions:

1. The general nature of the level of environmental knowledge of agricultural practices is described as an average that tends to decline, and we conclude from that the strong need of farmers to develop their knowledge, information, and skills in this field.
2. The level of environmental knowledge in the area of (water) ranked first compared to other fields, and we conclude that there is more awareness among the respondents about this field compared to other fields because of the greater use of water in the field of agricultural practices has become one of the most important problems facing the work of the agricultural sector at present, due to the stability and limitations of these resources on the one hand and the other hand the increase in demand for them in light of the continuous population increase, as the intensive and irrational use and large losses in Its quantities lead to failure to achieve the goals of economic development.
3. The independent factors (age, level of education, size of farm ownership, contact with information sources, training courses in the field of environment, participation in environmental activities) are among the factors that have a high impact on the level of environmental knowledge of the agricultural practices of farmers in the Shahrzor Plain is the following:

- Young farmers are more aware and open-minded and use the media extensively compared to the elderly in the field of environmental knowledge.
- The higher the educational level of the respondents, the greater their knowledge, and the desire to search for new things in the field of environmental knowledge, it has an effective role in the cognitive level due to the expansion of the learners' perceptions and information,

which was positively reflected with the good use and protection of the agricultural environment.

- The large holdings have more economic incomes, which motivates farmers to be exposed to new sources of information about the agricultural environment to increase their knowledge and experience about agricultural practices.

- The more the respondents were exposed to the sources of information in the field of preserving the agricultural environment, the higher their level of knowledge.

- The more they participate in the training courses, the greater will be its positive impact on their level of knowledge, so that the participants in the training courses receive a lot of scientific recommendations on the important agricultural environment that has an impact on increasing the level of environmental knowledge.

- The more they participate in environmental activities, the greater their knowledge, experience, and skills about the agricultural environment, and thus lead to an increase in their production.

4. The absence of a significant relationship between the level of environmental knowledge and each (number of years of experience in agriculture, type of land holding, farmers' attitudes towards environmental protection), indicates that these factors do not affect the environmental knowledge of farmers.

Recommendations:

1. The need to intensify training programs for farmers in the field of agricultural environmental protection by the competent authorities to raise the level of their knowledge, skills, and attitudes in everything related to this field.

2. the Agricultural Extension Service needs to disseminate knowledge and experience related to the protection of the agricultural environment, conduct field visits, hold seminars, meetings and learn about farmers' conditions to find out the most important problems that farmers suffer from, especially the obstacles related to the agricultural environment, diagnose the imbalance and develop what is positive in it their work.

3. Taking into account the independent moral factors when planning and implementing extension programs while protecting the agricultural environment from pollution.

4. The necessity of adopting the results of the research by the Directorate of Agricultural Extension and the Directorate of Agriculture in the governorate.

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مستوى المعرفة البيئية للمزارعين بالممارسات الزراعية في سهل شرزور بمحافظة السليمانية

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- تاريخ استلام البحث 28/2/2023 وتاريخ قبوله 13/3/2023
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المستخلص

يهدف هذا البحث في الأساسالتعرف على مستوى المعرفة البيئية للمزارعين بالممارسات الزراعية في سهل شرزور بمحافظة السليمانية بشكل عام وترتيب مجالات مستوى المعرفة البيئية تنازليا حسب الاهمية وتحديد العلاقة الارتباطية بين مستوى المعرفة البيئية وفقاً لبعض الصفات الشخصية والوظيفية المتمثلة في :(العمر، المستوى التعليمي، عدد سنوات الخبرة في الزراعة ، حجم الحيازة المزرعية ، نوع الحيازة الزراعية ، الاتصال بمصادر المعلومات ، المشاركة في دورات التدريبية في مجال البيئة، ،اتجاهات المزارعين نحو حماية البيئة، المشاركة في النشاطات البيئية) ، وقد شمل مجتمع البحث جميع المزارعين في قرى قضاء شهرزور في محافظة السليمانية والبالغ عددهم (2735) مزارعاً موزعين على (47) قرية، وتم أخذ عينة عشوائية بسيطة من القرى بنسبة (51%) وبواقع (24) قرية وقد بلغ عدد المزارعين في هذه القرى (1615) مزارعاً ثم اخذت عينة عشوائية بسيطة من زراع بنسبة (20%) وبواقع (323) مزارعاً الخاضعين للبحث. واثبتت النتائج ان غالبية المبحوثين ذوي مستوى معرفي متوسط يميل الى الانخفاض، كما اوضحت النتائج بان هناك علاقة معنوية بين مستوى المعرفي البيئي و المتغيرات المستقلة (العمر مستوى التعليمي، الاتصال بمصادر المعلومات، حجم الحيازة المزرعية ، المشاركة في دورات التدريبية، المشاركة في النشاطات البيئية)، في حين لم تظهر علاقة معنوية بين مستوى المعرفي البيئي والمتغيرات (عدد سنوات الخبرة في الزراعة، نوع الحيازة المزرعية ، اتجاهات المزارعين نحو حماية البيئة). لذا توصى الباحثة بتكثيف الدورات التدريبية المتخصصة في مجال البيئة الزراعية ،و قيام جهاز الأرشاد الزراعي في نشر المعارف والخبرات المتعلقة في تطوير البيئة الزراعية والاخذ بنظر الاعتبار العوامل المعنوية المستقلة المدروسة عند تخطيط وتنفيذ البرامج الارشادية في حماية البيئة الزراعية من التلوث في منطقة البحث.

الكلمات المفتاحية: البيئة ، المعرفة ، الممارسات الزراعية ، شهرزور