KNOWLEDGE WHEAT FARMERS WITH SCIENTIFIC RECOMMENDATIONS FOR CHEMICAL PESTICIDES USED IN CONTROL WEEDS IN AL-MHAWiL DISTRICT /BABYLON PROVINCE AND RELITED WITH SOME FACTORS

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Abstract

The efficiency of pesticide use depends on farmers' knowledge of scientific recommendations related to the use of pesticides. The study aims to identify the level of knowledge wheat farmers with scientific recommendations for using chemical pesticides used in control weeds in Al-Mhawil district/ Babylon province, for agricultural season (2022/2021) In addition to determine the relationship between farmers and some independent factors. To achieve the goal of the research, a scale was prepared consisting of 36 recommendations distributed on 6 axes. The data were collected from a random sample of 68 farmers in Al-Mhawil district by means of a questionnaire in the interview method. Result showed that 55.88% of respondents had medium and on average 62.07 degrees. There is a Significant relationship between farmers knowledge and area cultivated with wheat, Contribution of wheat growing to annual income, Educational level, experience in wheat cultivation. The study reached to conclusions such as: The level of knowledge of the farmers surveyed in the Al-Mahawil distract by agricultural scientific recommendations for using of chemical pesticides in control wheat weeds by medium, and it is considered a major reason for the decline in the productivity and production of the crop. The researcher recommended by several recommendations such as: Get up the general state for agricultural extension and Cooperation and all its formations in the agricultural directorates and agricultural departments by mission spread knowledge's and special experiences by correct scientific agricultural recommendations among farmers in the field of dealing with chemical pesticides in control wheat weeds.

Key words: Scientific recommendations, Chemical pesticides, control wheat weeds , Factors.

Introduction

Wheat is a plant widely cultivated for its seeds (wheat grains), which are considered a staple food all over the world. Wheat is grown on a larger land area than any other food crop, at more than 880 million Donum. There is no other grain more important than wheat in global nutrition, as bread wheat alone provides 20% of the calories consumed in the world. Global wheat trade is larger than all other crops combined, and in 2022 global wheat production reached 781 million tons, making it the second most produced grain after yellow corn (23).

Wheat is the first strategic crop in Iraq. The area cultivated with the crop is about 7,487,196 with a production rate of about 2,764,692 tons (6). Despite this, Iraq, especially since more than three decades ago, has faced a large deficit in crop production, which forces it annually to import millions of tons to cover the deficit in crop production, which costs millions of dollars annually. For example, but not limited to, according to the statistics of the Ministry of Agriculture for the year 2023. Iraq's annual consumption of wheat is estimated at between 5 - 5.5 million tons (29), of which it imports between 600 -

ISSN 2072-3857

million tons of wheat (30), equivalent to (12 - 18%) of its actual need, representing a heavy burden on the state's general budget (19 , 11). The insufficient national production of wheat represents the fragility of food security ،The aforementioned deficit is attributed to many reasons, most notably the low agricultural productivity. The Ministry of Agriculture considered the low agricultural productivity one of the most important challenges facing the agricultural sector in Iraq (20). The average wheat productivity in Iraq is 369 kg/donum (6), while its low compared to average Egypt1642 kg/donum, in Saudi Arabia 1594 kg/donum, in Kuwait 1700 kg/donum, and in Lebanon 854 kg/donum (18).

The low productivity is due to several reasons, including: the lack of ideal application of soil and crop service operations, (Al-Fahdawi 2016) (14) noted that the presence of jungles had a significant effect on plant characteristics, spike length, number of ears/m2, weight of 1000 grains, and grain yield. Numerous studies have agreed that the amount of losses caused by weeds in agricultural lands constitutes (34%) of the total losses that may occur in the agricultural sector in general, including soil losses, diseases, insects, and losses of livestock (5, 10). Therefore, researchers worked to combat various weeds in various ways, including the use of chemical pesticides due to their ease of use and rapid effect. They achieved impressive results in this regard, as productivity increased by more than 50% compared to those that did not use pesticides (9).

Chemical pesticides are one of the agricultural technologies. A pesticide is defined as any substance or mixture of substances whose purpose is to protect crops from infection by agricultural pests and to treat the injuries they cause (12). These pests cause significant losses in agricultural production, as one of the studies of the International Food and Agriculture Organization (FAO) estimated. Between (40-50)% of the total production in the Arab world, including Iraq (17).

The incorrect uses of chemical pesticides by farmers, as a result of their ignorance of their scientific recommendations, cause damage to these pesticides and thus cause pollution in the environment, which leads to a disruption of the environmental balance and the negative effects they have on non-target organisms, and their impact on human health, in the emergence of chronic and cancerous diseases, as well as Infertility and birth defects resulting from chemical pesticide residues in agricultural, plant or animal products that humans consume (24). It is the responsibility of the Agricultural Extension Service to spread and teach farmers the correct methods for using pesticides. Since pesticides are an agricultural technology, the Agricultural Extension Service must educate farmers about the dangers of using chemical pesticides on crops and vegetables. Farmers' knowledge of how to deal with pesticides leads to their proper and safe application. The desired goals are achieved by using it as a technology that contributes to protecting crops and helps increase productivity and agricultural production (21 , 22). It should be noted here that the work of the Agricultural Extension Service is not limited to informing and teaching farmers how to prevent the use of pesticides only, but it goes beyond it to include informing and teaching farmers about modern trends in the field of crop protection that confirm the use of new methods and methods in combating agricultural pests to reduce the use of pesticides as a management

ISSN 2072-3857

method. Integrated agricultural pests, interest in which has been increasing in many countries of the world since the 1960s and 1970s (24, 25). In order to raise the level of wheat farmers' knowledge of how to use chemical pesticides to combat weeds, we must know the areas of weakness in the field of dealing with these pesticides, so that we can address them, as well as the independent factors that have a direct correlation to their level of knowledge. The Al-Mahawil area is one of the agricultural areas in Babylon Governorate, where wheat cultivation is widespread, as the area cultivated with wheat is estimated at approximately 9,500 donum, and it faces problems of crop productivity, which is estimated at 700 kg/donum (27). Despite of has been highest from the agricultural productivity at the level of Iraq in general ,but this low productivity compering to other neighbor and Arab countries productivity such as Saudi , Syria ,Kuwait, and Egypt(18). The continued problems productivity of the wheat crop in the Al-Mahawil area raises many questions, including:

1.What is the level of wheat farmers' knowledge of scientific recommendations for chemical pesticides used to combat weeds in the Al-Mahawil area?

2.What is the correlation between the level of wheat farmers' knowledge of scientific recommendations for chemical pesticides used to combat weeds and some independent factors: (age, area cultivated with wheat, annual income, educational level, agricultural experience, participation in extension activities contact agricultural information sources)?

Research aims

1. Identify the level of wheat farmers' knowledge of scientific recommendations for chemical pesticides used to combat jungles in the Al-Mahawil area.

2. Determine the correlation between the level of wheat farmers' knowledge of scientific recommendations for chemical pesticides used to combat weeds and some independent factors: (age, area cultivated with wheat, annual income, educational level, agricultural experience, participation in extension activities contact agricultural information sources).

Materials and methods

The study was carried out in AL-Mahawil District in Babylon Province, Iraq. The population for this study consisted of 685 wheat farmers in the district. Of these materials and methods 6 10% (68) were randomly selected to respond to the questionnaire from 1/15 to 2/12/2022. The instrument used was a two-part questionnaire comprising socioeconomic characteristics and farmers knowledge. The socio-economic characteristics included age, area cultivated with wheat, annual income, educational level, agricultural experience, participation in extension activities contact agricultural information sources. The farmers knowledge identified six aspects, each aspects include sub-aspects, as follows: describing the appropriate pesticide for the bush(4 sub-aspects); preparing control supplies (3 sub-aspects); preventive measures before control(7 sub-aspects); preventive measures during control(5 sub-aspects); preventive measures after control(9 sub-aspects); and damages or risks of using pesticides(8 sub-aspects), table 1. Content validity of the questionnaire was established by a panel of experts in fields of agricultural extension and wheat weed control.

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Table 1. Aspects and sub-aspects of wheat farmers' knowledge of scientific recommendations for chemical pesticides used in combating jungles.

seq	Cognitive axes	Number of paragraphs	Limits of values
1.	Description of the pesticide Suitable for the bush	1. Use the appropriate pesticide	1-2
		2. The person describing the pesticide	1-3
		3. The quality of the pesticide used	1-3
		4. Efficiency of the pesticide used	1-3
2.	Preparing supplies Control	1. The person carrying out the control	1-3
		2. Use pest control supplies	1-2
		3. Use of control equipment (sprayer and puller)	1-2
3.	Preventive measures before control	1. Irrigation before control	1-2
		2. Soil condition	1-2
		3. Maintaining control equipment (sprayer and puller).	1-2
		4. Taking into account climatic conditions	1-2
		5. The amount of pesticide used	1-2
		6. Area of wheat control	1-3
		7. Severity (density) of bush infestation	1-3
4.	Preventive measures when combating	1. Type of pesticide used	1-3
		2. The dose of the pesticide used	1-3
		3. Control method	1-2
		4. The appropriate time for control	1-3
		5. Calibrating and adjusting control equipment (sprayer and puller)	1-2
5.	preventive measures After control	1. Wash hands, body and work clothes	1-2
		2. Wash the control spray holder	1-2
		3. Washing the used agricultural tug	1-2
		4. Disposal of empty containers	1-3
		5. Acting with paws and masks	1-3
		6. Protecting family members and neighboring families	1-2
		7. Protection of farm animals	1-2
		8. Protecting food and drinking water	1-2
		9. Irrigation after control	1-2
		1. Risks to control workers	1-2
		2. Risks to family members and	1-2

ISSN 2072-3857

6.	Damage or risks Use of pesticides	neighboring families	
		3. Risks to livestock and bees	1-2
		4. Risks to cultivated crops	1-2
		5. Risks to the environment (water, air and soil)	1-2
		6. Risks to the productive yield	1-2
		7. Risks to subsequent crops	1-2
		8. Risks to vital enemies	1-2
The total		36 paragraph	36-83

A pilot study was conducted on 10 wheat farmers out of the sample to establish reliability of the instrument. Cronbach's alpha (a reliability coefficient of 0.78) was established, indicating the instrument used was reliable and valid.

Scores were assigned to the respondent on each sub-aspect chosen in overall knowledge scale , each respondent had scores ranging from (36 to 83). Based on these scores, respondents were assigned to categories according to their level of knowledge , as follows: low (36 – 51), medium (52 – 67), and high (68 – 83). Data were analyzed using percentages, arithmetic means, frequency distributions, simple correlation coefficient, standard deviation, and t-test.

Results and discussion

Wheat farmers' knowledge of scientific recommendations for chemical pesticides used to combat weeds.

Result in table 2 showed that 30.88% of respondents had low knowledge level regarding agricultural scientific recommendations for chemical pesticides used to control wheat, 55.88% had medium knowledge, while 13.24% had high level of knowledge, with an average of 59.69 , and a standard deviation. 48.85, with an average of 59.69 degrees, and a standard deviation. 48.85.

Table 2. Distribution of respondents according to the level of knowledge of scientific recommendations for chemical pesticides used to control wheat weeds

Knowledge level	Limits of values	Average values	the number	%	Standard Deviation S.D = 48.85
low	36-51	49.28	21	30.88	Significance level = 0.01
medium	52-67	62.07	38	55.88	
High	68-83	73.88	9	13.24	
the total	39-83	59.69	68	100	

It can be concluded from Table 2. Most of the wheat farmers surveyed described their level of knowledge of agricultural scientific recommendations for the use of chemical pesticides in combating wheat weeds as medium, and this result may be attributed to many reasons, including:

1. Limited extension activities implemented for farmers in the research area on the subject of agricultural scientific recommendations for the use of chemical pesticides in combating wheat weeds. Although there is An agricultural extension unit in the Agricultural Division, and the presence of the extension

farm in Al-Mahawil, but the research area witnessed only one extension activity during the year 2022 on the subject of the research, and none of the respondents participated in this extension activity (26). Which indicates the weakness of the extension institutions concerned with this, and the weak level of farmers' communication with those institutions, and this is an important indicator of the weakness of extension activity.

2.The limited quantities of chemical pesticides prepared to combat weeds for wheat farmers by the Agricultural Protection Department of the Ministry of Agriculture, as the areas controlled in 2022 amounted to (4000) dunums with the pesticides Topic, Cranstar, Lanitor and Atlantis, which cover less than half of the area cultivated with wheat, which amounts to 9500 dunums (28), which was negatively reflected in the application of agricultural scientific recommendations for the use of chemical pesticides in combating wheat weeds, especially since the limited preparation is accompanied by weak application of scientific recommendations, which led to low productivity and production of the wheat crop in the research area.

3.Wheat farmers rely on the knowledge and know-how they have through accumulated experience in wheat cultivation, which is currently insufficient in managing and raising the wheat crop in accordance with scientific trends in modern agriculture, which require the application of scientific recommendations through integrated management in combating agricultural pests.

4.Weakness or absence of follow-up from the relevant extension unit in the agricultural division in particular and the extension farm in the research area in general for farmers' fields and for farmers while they are carrying out agricultural operations due to the lack of adequate means of transportation, limited field work requirements, lack of specialized agricultural staff, etc., and thus not meeting the needs of farmers. Among the knowledge are the skills necessary to improve their field practices, and the lack of knowledge of the problems that farmers suffer from in the field in order to find solutions or address them immediately.

Correlation between wheat farmers knowledge and socioeconomic characteristics

1.Age

Wheat farmers in AL- Mahawil district are distributed according to their age as follow: 25% (30 - 41 years), 26.47% (42-53 years), 30.89(54- 65 years), and 17.64%(66- 78 years), with an average of 52.75 and a standard deviation of 13.65, table 3.

Table 3. Distribution of respondents according to level of knowledge of scientific recommendations for chemical pesticides in combating wheat weeds and age.

Categories	No	Average Knowledge	%	Correlation Coefficient	Standard Deviation S.D	Calculated (t) value
30-41	17	34.88	25	0.64	13.65	6.88
42-53	18	48.33	26.47	X = 52.72 N = 68 Significance level = 0.01		
54-65	21	59.90	30.89			
66-78	12	72.90	17.64			
The total	68	52.75	100			

ISSN 2072-3857

It can be concluded from Table 3. The highest percentage of respondents falls within the age group 54-65, with an average knowledge of 59.90, and the lowest percentage of respondents falls within the age group 66-78 ,with an average of 72.16. This means The knowledge level of the respondents regarding the use of chemical pesticides to combat wheat weeds increases with increasing age .The simple Pearson correlation coefficient was 0.64.

This result is consistent with the findings of Salem and Al-Khazraji (8), Al-Bayati and Al-Jumaili (1), Al-Jubouri (3) and Hassan and Al-Badri (7) in their study of the agricultural cognitive level, as they found that there is a correlation between age and the cognitive level of the respondents. This result may be attributed to the fact that increasing age leads to increased farmers' knowledge in this field as a result of the use of modern agricultural technologies.

2. Area cultivated with wheat

According area cultivated with wheat, farmers in AL- Mahawil district are distributed as follow: 61.77% (1–15 donum), 27.49% (16-30 donum), 5.88(31– 45 donum), and 4.41%(46- 60 donum), with an average of 16.63 and a standard deviation of 16.63, table 4.

Table 4. Distribution of respondents according to the level of knowledge of scientific recommendations for chemical pesticides in combating wheat weeds and the area planted with wheat

Categories	No	Average Knowledge	%	Correlation Coefficient	Standard Deviation S.D	Calculated (t) value
1 – 15	42	8.45	61.77	0.60	13.61	6.18
16 – 30	19	23.47	27.94	X = 16.63 N = 68 Significance level = 0.01		
31– 45	4	37.5	5.88			
46 – 60	3	60	4.41			
the total	68	16.5	100			
Significance level = 0.01						

It can be concluded from Table 6. the knowledge level of the respondents in the use of chemical pesticides in combating wheat weeds increases with the increase in the cultivated area. The simple Pearson correlation coefficient was 0.60.

And this result is consistent with what was reached by Salem and Al-Khazraji (8) Al-Bayati and Al-Jumaili (1) Al-Jubouri (3) Hassan and Al-Badri (7) in their study of the agricultural cognitive level. This result may be attributed to the fact that cultivating and exploiting large areas using modern technologies brings a high economic return to farmers and their families, which encourages farmers to acquire modern technologies in order to apply them in their agricultural fields, which leads to increasing their level of knowledge.

3. Annual income of farmers from wheat cultivation

Result in table 5 indicate that 41.18% of wheat farmers in AL-Mahawil district had low annual income from wheat cultivation , 45.59% had medium income, and 13.23% had high annual income. with an arithmetic mean of 51 and a standard deviation of 13.44.

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Table 5. Distribution of respondents according to the level of knowledge of scientific recommendations for chemical pesticides in combating wheat weeds and annual income from wheat cultivation

Annual income categories	No	Average Knowledge	%	Correlation coefficient	standard deviation	calculatd t value	tabular t value
low	28	40	41.18	0.80	13.44	10.91	1.99
medium	31	56	45.59	X =51 N = 68 Significance level 0.01			
high	9	72	13.23				
the total	68	51	100				

It can be concluded from Table 5. that the knowledge level of the respondents in the field of using chemical pesticides to control wheat bushes increases with the increase in the annual income from wheat cultivation. The simple Pearson correlation coefficient was 0.80.

This result is consistent with what Hassan and Al-Badri (7) and Al-Jubouri (3) reached in their study of the agricultural knowledge level. This result may be attributed to the economic return. The high yield resulting from wheat cultivation encourages farmers to be equipped with modern information and technologies related to agricultural scientific recommendations for the use of chemical pesticides to combat wheat weeds in order to apply them in their agricultural fields, which leads to increasing their level of knowledge.

4. Educational level of farmers

According to educational level, wheat farmers in AL- Mahawil district are distributed as follow: 14.71% (illiterate), 19.12% (primary), 22.6%(medium), 25%(preparatory), 10.29% (technical), and 8.82% college, table 6.

Table 6. Distribution of respondents according to level of knowledge of scientific recommendations for chemical pesticides in combating wheat weeds and educational level

Educational level	No	Average knowledge	%	Correlation coefficient	standard deviation ,S.D	calculated t value
illiterate	10	42.80	14.71	0.54	17.54	5.29
Primary	13	55.38	19.12	X = 67.79 N = 68 Significance level = 0.01		
Medium	15	66.33	22.06			
Preparatory school	17	77.52	25			
technical	7	84.14	10.29			
college	6	93.33	8.82			
the total	68	67.79	100			
Significance level 0.01						

ISSN 2072-3857

It can be concluded from Table 8. that the knowledge level of the respondents in the field of using chemical pesticides in... Combating wheat weeds increases with the increase in educational level. The simple Pearson correlation coefficient was 0.54. This result is consistent with what was reached by Karmasha, Al-Khazraji (16), Jabara, Salman (13), Qasim (15), and Al-Jubouri (2) in their study of the agricultural cognitive level. The reason for this may be attributed to the fact that the more Educational opportunities: The level of knowledge of farmers has increased with scientific recommendations for the use of agricultural chemical pesticides in combating wheat weeds, in a manner commensurate with their mental abilities and scientific levels regarding agricultural operations. Agriculture, from their point of view, is not only crop management, but rather the application of modern scientific methods to these operations.

5. Agricultural experience in practicing wheat cultivation

The results (table 7) showed that 32.35% of respondents had (1-17 years) of experience in wheat cultivation, 30.88% had (18- 34 years), and 36.77% had (35-51 years), with an average experience of 26.91 years, and a standard deviation of 6.96.

Table 7. Distribution of respondents according to level of knowledge of scientific recommendations for chemical pesticides in combating wheat weeds and agricultural experience

Agricultural experience	No	Average knowledge	%	Correlation coefficient	standard deviation S.D.	calculated t value
1-17	22	10.72	32.35	0.36	6.96	3.16
18-34	21	25.47	30.88	X=26.91 N =68 Significance level = 0.01		
35-51	25	42.40	36.77			
The total	68	26.91	100			
Significance level = 0.01						

It can be concluded from Table7. that the level of knowledge of the respondents in the field of using chemical pesticides in combating . wheat weeds increases with the increase in agricultural experience. The simple Pearson correlation coefficient was 0.36. This result is consistent with what was reached by Al-Jubouri (3) Salem and Al-Khazraji (8) Al-Bayati and Al-Jumaili (1) In their study of the agricultural knowledge level, this result may be explained by the fact that using modern technologies and keeping pace with agricultural scientific development works to increase farmers' information and generate experience for them in this field.

6. Participation in extension activities

According to their Participation in extension activities , wheat farmers in AL–Mahawil district are distributed as follow: 47.06% (low), 30.88% (medium), and 22.06%(high), with an arithmetic average of 6.23 years and a standard deviation of 5.61, table 8.

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Table 8. Distribution of respondents according to level of knowledge and participation in extension activities

Participation in extension activities	No	Average knowledge	%	Standardized drift	correlation coefficient (S.D.)	Calculated (t) value
low(1 - 5)	32	2.75	47.06	0.58	5.61	6.10
Medium (6 -10)	21	7.38	30.88	X =6.23 N =68 Significance level = 0.01		
High (11-15)	15	12.07	22.06			
the total	68	6.23	100			
Significance level = 0.01						

It can be concluded from Table 8. That the knowledge level of the respondents is in the scope of using chemical pesticides to control wheat weeds increases with increasing participation in extension activities. The Spearman correlation coefficient was 0.58.The high participation rate within the weak participation category, with a high number of participants amounting to 32 respondents, indicates the weak activity of extension institutions in urging and guiding farmers to participate in meetings, extension meetings, seminars, courses, field days, demonstration fields, and the lack of distribution of extension bulletins...etc. This requires extension agencies to exert more effort in planning extension and training programs for farmers and to continue convincing farmers to participate in them and address the reasons for reluctance to do so. This result is consistent with the findings of Al-Jubouri (3), Salem, Al-Khazraji (8), Al-Bayati and Al-Jumaili (1) in their study of the agricultural knowledge level. Perhaps the reason is that increasing participation in extension activities increases farmers' exposure New knowledge and concepts in agriculture, and then increasing the use of modern agricultural technologies and achieving scientific development in agriculture.

7. Contact agricultural information sources

Results (table 9) showed that 50% of respondents had low contact with agricultural information, 29.41% had medium contact , and 20.59% had high contact, with an arithmetic mean of 9.29 degrees and a standard deviation of 2.47.

Table 9. Distribution of respondents according to level of knowledge and contact with agricultural information sources

Contact information sources	No	Average knowledge	%	Standardized drift	correlation coefficient (S.D.)	Calculated (t) value
low (2 - 8)	34	4.76	50	0.247	2.40	2.093
Medium(9 –15)	20	11.30	29.41	X = 9.29 N =68 Significance level = 0.01		
High (16-22)	14	17.42	20.59			
the total	68	9.29	100			
Significance level = 0.01						

ISSN 2072-3857

It can be concluded from Table 9. That the level of knowledge of the respondents in the field of The use of chemical pesticides to control wheat weeds increases with increasing contact with agricultural information sources. The Spearman correlation coefficient was 0.247. This result is consistent with the findings of Al-Jubouri (3), Salem, Al-Khazraji (8), Al-Bayati and Al-Jumaili (1) in their study of the agricultural knowledge level. Perhaps the reason is due to the increased exposure of the respondents to private agricultural information sources. Using chemical pesticides to combat wheat bushes provides them with many skills and knowledge, which leads to increasing their knowledge due to continuous contact with various sources of agricultural information.

Conclusions

1.The level knowledge of wheat farmers in Al-Mahawil district regarding agricultural scientific recommendations for the use of agricultural chemical pesticides in combating wheat weeds is at medium level, and this has a negative impact on the application of scientific recommendations for the use of these pesticides, because dealing with pesticides requires farmers with a high level of knowledge.

2. The independent factors (age, area cultivated with wheat, contribution of wheat to annual income, educational level of farmers, agricultural experience, participation in extension activities, contact with information sources) had an effect on farmers knowledge.

Recommendations

1.The General Authority for Agricultural extension and Cooperation and all its formations in the agricultural directorates and agricultural divisions undertake the task of disseminating knowledge and expertise regarding correct scientific recommendations among farmers in the field of dealing with chemical pesticides in combating wheat bushes.

2. Intensifying the efforts of the Agricultural Extension Service in the Babylon Agriculture Directorate in order to involve farmers in training courses on agricultural scientific recommendations for the use of agricultural chemical pesticides in combating wheat weeds.

3.The Agricultural Extension Service prepares efficient extension plans and programs to ensure the dissemination of modern technologies among farmers, including the use of biological control instead of chemical control, as it is one of the contemporary global trends that contribute to maintaining a clean environment, eliminating the negative effects of chemical pesticides, and reducing the damage of agricultural pests. To a great extent.

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