



BEEKEEPERS' PROBLEMS ASSOCIATED WITH THE AGRICULTURAL EXTENSION SYSTEM IN THE HOLY KARBALA GOVERNORATE

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ABSTRACT

The research aims to determine the existence of beekeepers' problems associated with the agricultural extension system in the Holy Karbala Governorate, Iraq, as well as to demonstrate their impact on the production work of beekeepers. A simple random sample of 100 beekeepers was taken, and a questionnaire was prepared that included 31 problems. The research results have shown that the vast majority of beekeepers have indicated the existence of these problems as well as their direct impact on their production work. This may reflect the realism and objectivity of the problems addressed in the research and reflects part of the extent of the suffering and difficulties experienced by beekeepers when doing their production work. Consequently, the research recommends the necessity of working to solve these problems by the decision makers in the Ministry of Agriculture and its affiliated government departments, in a way that contributes effectively and efficiently to treating these problems or reducing their negative effects and consequences on the beekeepers' production work in the present and future.

Keywords: Problems, Beekeepers, Agricultural Extension System.

مشكلات مُربي النحل المرتبطة بجهاز الإرشاد الزراعي في محافظة كربلاء المقدسة
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الخلاصة

يهدف البحث إلى تحديد تواجد مشكلات مُربي النحل المرتبطة بجهاز الإرشاد الزراعي في محافظة كربلاء المقدسة، العراق، فضلاً عن بيان تأثيرها على العمل الإنتاجي لمُربي النحل. تم أخذ عينة عشوائية بسيطة تتكون من 100 مُربي للنحل، وأعدت استبانة ضمت 31 مشكلة. وقد أظهرت نتائج البحث أن أغلب مُربي النحل قد أشاروا إلى تواجد هذه المشكلات فضلاً عن تأثيرها المباشر على عملهم الإنتاجي، وقد يعكس ذلك واقعية وموضوعية المشكلات التي تم تناولها في البحث، فضلاً عن أنه يعكس جانب من حجم المعاناة والصعوبات التي يمر بها مُربي النحل عند ممارسة عملهم الإنتاجي. وعليه يوصي البحث بضرورة العمل على حل هذه المشكلات من قبل الجهات المتخذة القرار في وزارة الزراعة والدوائر الحكومية التابعة للوزارة، وبالشكل الذي يساهم وبدرجة فاعلة وكفوة في معالجة هذه المشكلات أو الحد من آثارها وعواقبها السلبية على العمل الإنتاجي لمُربي النحل في الحاضر والمستقبل.

الكلمات المفتاحية: مشكلات، مُربي النحل، الجهاز الإرشاد الزراعي.

*This article is taken from the first researcher's master's thesis.



INTRODUCTION

The world is going through many contemporary challenges that agriculture and food systems are facing now and will face into the 21st century, which can be summarized as follows: climate change, water scarcity, environmental degradation, the spread of hunger and extreme poverty, deterioration of agricultural lands, and conflicts, crises and natural disasters **(FAO, 2016)**, in addition to the large increase in the world population which has reached 8 billion people in 2022, and it is expected to reach 9.7 billion people by the year 2050 which has also led to an increase in demand for food **(United Nations, 2023)**.

Therefore, confronting these challenges is a national task that requires using multiple modern aids and methods to facilitate farmers' access to knowledge sources, on the other hand, transferring modern technologies, and acquiring farmers the important skills to improve the efficiency and effectiveness of their production work **(Khalaf & Al-Mashhadani, 2023; Alazy & Al-Mashhadani, 2023)**.

One of the modern technologies or techniques that contribute in increasing the productivity of various crops, as well as reducing the decline of vegetation cover, is the expansion of beekeeping by farmers. Scientific experiments have proven that the existence of bees in agricultural areas leads to increase production of crops and fruit trees, as well as improving the quality of fruits and seeds by 25-30% **(Palestinian Center for Communication and Development Policies, 2011)**, also, bees are contributing by 90% to the pollination of wild plants **(Haddad, 2016)**. In many rural areas of the world, beekeeping is a widespread activity, with thousands of small-scale beekeepers depending on bees for their livelihoods as bees can provide humans with valuable hive products (honey, wax, propolis, pollen, royal jelly, queen bees and swarms) and services (pollination, apitherapy, apitourism and environmental monitoring) and play other important economic, cultural and social roles **(FAO et al., 2021)**.

Statistics indicate that more than 100 crops depend on honey bees to pollinate their flowers, which saves at least 200 billion US dollars worldwide **(Hristov et al., 2020)**. Therefore, the value of crop pollination and honey production services provided by honeybees, for example in 2020, amounted to 182-577 billion US dollars annually **(Marcelino et al., 2022)**.

Bees are considered the only insect species that produces food for humans or produces a raw material (such as propolis beeswax and royal jelly) that is used for medical and cosmetic purposes **(Abu- Almaaly, 2021; Ullah et al., 2021)**. Honey is also ranked 676th among the most traded products in the world for the year 2020. The total trade reached \$2.29 billion between the years 2019 to 2020, honey trade represents 0.014% of the total global trade **(Nile Preneurs, 2024)**, and the honey market is expected to grow globally between the years 2022 to 2030, by 5.2%, reaching \$13.5 billion **(Beekeepers Cooperative Society in Qassim, 2024)**.

Hence, bees play an important role in achieving food security and economic growth because of their role in pollinating the flowers of various plants, in addition to the benefits of their products.

Iraq considers suitable habitat for beekeeping. This is due to the geographical diversity (mountains, plains, and plateaus) as well as the diversity of plant production, which made it a good habitat for bee hives **(Alazy & Al-Mashhadani, 2023; Awad et al., 2020)**. The number of licensed and unlicensed beekeepers and government apiaries throughout Iraq (except the



Kurdistan region) have reached 6,505 beekeepers, and the number of their hives have reached 181,735 beehives, while their honey production has reached 855 tons (Al-Zuhair, 2023), compared to the year 2018, when the number of licensed and unlicensed beekeepers throughout Iraq (except for the Kurdistan region) reached 5758 beekeepers, while the number of their hives reached 149,184 beehives, while their honey production reached 738 tons (Except the Kurdistan region), (Al-Hasnawi & Al-Samie, 2020).

This undoubtedly helps in achieving self-sufficiency at the local level, and it is a step to limit the import of honey products from abroad, which leads to significant losses in hard currency in addition to its negative impact on the production work of local beekeepers. As the amount of imported bees' products reached in 2022 of natural honey is 4000 kg, at a financial cost estimated at \$17,750, beeswax imported 13,000 kg, at a financial cost estimated at \$19,500, the artificial honey imported 11,605 kg, at a financial cost estimated at \$47,174, the natural honey rich in royal honey 6,000 kg, at a financial cost estimated at \$60,000 (Jaafar *et al.*, 2023).

Despite the aforementioned agricultural, health, and economic importance of beekeeping in Iraq, there is a noticeable decline in the amount of honey produced, in addition to the scarcity of other products of bees in the local market (such as royal jelly and pollen). The reason for this may be due to many problems, including those related to the agricultural extension system, such as: the weak or absence of cooperation and coordination between the beekeeper and the agricultural extension system, lack of implementation of specialized extension activities in beekeeping, weak or absent coordination and cooperation between the agricultural extension system and the private sector, etc.

Hence, as a result of the lack of Iraqi research that shows the extent of existence of beekeepers' problems associated with the agricultural extension system in the Holy Karbala Governorate, as well as determining the extent of their impact on the production work of beekeepers, this research has come to answer the following research questions:

- What is the extent of existence of beekeepers' problems associated with the agricultural extension system? And what is their impact on beekeepers' production work?

RESEARCH AIMS:

- Determine the extent of existence of beekeepers' problems associated with the agricultural extension system, as well as clarify the extent of its impact on the beekeepers' production work.

RESEARCH HYPOTHESIS

The process of determining the beekeepers' problems associated with the agricultural extension system in the Holy Karbala Governorate would result in the existence of many problems that have a direct impact on the production work of beekeepers.

RESEARCH IMPORTANCE

1. The current research is considered a qualitative addition to the field of scientific research, as it is one of the research projects that deals with determining the existence of beekeepers' problems associated with the agricultural extension system, as well as



explaining their impact on the beekeepers' production work in the Holy Karbala Governorate.

2. The importance of the research is related to the economic importance of beekeeping projects, which require little capital and generate a quick and good profit return. Thus, it is possible to invest in them and expand their spread, especially among young rural people.
3. The contribution of this sector to achieving an important aspect of local food security. This is due to the nutritional value provided by honey products, in addition to the vital role of bees in completing the pollination process and increasing its effectiveness for many agricultural and horticultural crops.

MATERIALS AND METHODS

Research Methodology:

The descriptive approach is used for conducting the current research as it is considered the most suitable research approach. The diagnostic-analytical method which is considered the most appropriate research technique within the descriptive approach has been adopted to achieve the research aims. This type of research approach has proven effective in various fields, including political, economic, and social domains, among others. The technique involves using data collection methods and interpreting information through a questionnaire (Al-Mahmoudi, 2019).

Population And Sample:

The research population included all beekeepers in the Holy Karbala Governorate, totalling 593 beekeepers, distributed across eight agricultural divisions¹ within Holy Karbala Governorate. A simple random sample was taken, representing 42.86%, of the agricultural divisions in the governorate, to represent the research population. Consequently, the sample included: Al-Husseiniyah, Al-Jadawal Al-Garbi, and Al-Hurr and Al-Markaz, as they represent the largest number of beekeepers, and the beekeepers within these agricultural divisions (the sample) reached 391 beekeepers. Therefore, a simple random sample of beekeepers within the sample of agricultural divisions was taken, representing approximately 25%, resulting in a final research sample of 100 beekeepers, as shown in the following table:

Table (1): Distribution of the research population and sample.

N o.	Agri. Division	Total of beekeepers	Beekeepers within the sample of Agri. Division	%	Sample of Beekeepers	Sample and Pre-Test
1	Al-Husseiniyah	208	208	53.20	53	Sample
2	Aoun	41	-	-	-	-
3	Al-Hurr + Al-Markaz	76	76	19.44	20	Sample
4	Al-Jadawal Al-Garbi	107	107	27.37	27	Sample
5	Al-Hindia	57	-	-	-	Pre-Test

¹. The Agriculture Divisions of Al-Hurr and Al-Markaz are located in one place in Holy Karbala Governorate, and contain common (not separate) data on beekeepers, so the two divisions were included in the table (1) of population and sample with the same number.



6	Al-Kharat	80	-	-	-	-
7	Ean Tamer	24	-	-	-	-
Total		593	391	100%	100	

Research Tool:

In order to develop a scale for determining the extent of existence of beekeepers' problems associated with the agricultural extension system, as well as clarifying the extent of their impact on the beekeepers' production work, a set of scientific resources in the field of agricultural extension, and beekeeping were adopted, as well as the opinions of a group of experts specialized in agricultural extension and economic entomology, were considered. The research area was determined:

_ Beekeepers' problems associated with the agricultural extension system (31 problems).

The existence of these problems was measured using a dichotomy scale (Yes, No), and the extent of impact (in case a problem exists) was measured using a three-level Likert scale (High Impact, Medium Impact, Low Impact), with scores of 3, 2, and 1 assigned to the scale items, respectively: Accordingly, the total scale score for the extent of impact ranged between 31-93 points.

Reliability And Validity of The Questionnaire:

The method of content validity and face validity (Bhattacharjee, 2012) was used to measure the validity of the questionnaire by presenting the questionnaire (in its initial form) to ten arbitrators and experts from the College of Agricultural Engineering Sciences \ University of Baghdad, as well as Faculty of Agricultural \ University of Kufa. The necessary adjustments were made to the questionnaire, and after completing the questionnaire in its final form, the preliminary test (Pre-test) was conducted (from the first to the sixth of January (2024)) using the final questionnaire on a random sample consisting of 30 beekeepers in the agricultural area of Al-Hindia, which was excluded from the final data collection process. The aim of conducting the pre-test was to verify the reliability and consistency of the results, as well as to reveal the sincerity of the content and the extent of clarity and distinction of the statements in the questionnaire.

The Cronbach's Alpha (α) equation was used to examine the reliability of the results, as it is suitable for obtaining reliability coefficients from the special data set for a graded scale of statements, as this method is characterized by its shortening of effort, avoiding the transfer effect of training or avoiding the effect of remembering, and all of these are features that are invalid in the re-test method (Arifij *et al.*, 1999).

The results have shown that the reliability coefficient was high, which was 0.950, and these have indicated that the questionnaire has a high degree of reliability and can be relied upon in field application to achieve the aim of the research. This is according to Nunnally & Bernstein scale, which adopted 0.7 as the minimum reliability limit (Nunnally & Bernstein, 1994).

Pearson Linear Correlation Coefficient was used to examine the validity of the internal consistency between each statement of the axis (area) and the total score of the axis (area) itself. The results showed that all correlation coefficients were statistically significant, at a



significant level of 0.01 and 0.05. The minimum of the correlation coefficients was 0.403 while the maximum was 0.819. Accordingly, all the statements of axis (area) are internally consistent with the axis to which they belong, which has proved the validity of the internal consistency of the axis and statements that belong to it.

Data Collection:

The data for the research was collected by the final questionnaire, which was distributed to the beekeepers within the agricultural divisions representing the research sample.

Accordingly, the process of collecting data took approximately one month, from 7/1/2023 to 1/2/2024, noting that all questionnaire forms were obtained from the beekeepers.

Statistical Methods:

Appropriate statistical methods were used to achieve the research aim, including the arithmetic mean, counts and percentages, as well as a weighted average in analyzing and presenting the research results.

RESULTS AND DISCUSSION:

-Determine the extent of existence of beekeepers' problems associated with the agricultural extension system, as well as clarify the extent of its impact on the beekeepers' production work:

Foremost, the extent of the problem's existence or non-existence has been determined, and the research results have shown that the vast majority of beekeepers have indicated the existence of all problems in their production work, which were referred to them in Table (3).

Then the general level of the impact of the beekeepers' problems associated with the agricultural extension system has been determined. The research results have shown that the maximum value of the impact level of the problems is 93 degrees, and the minimum value is 36 degrees, with an average and a standard deviation of 66.73 and 12.063 degrees, respectively. As shown in the following table.

Table (2): Distribution of beekeepers' answers according to the impact level of problems associated with the agricultural extension system.

No.	Problems impact level	Categories	Number	%	Average	Notes	
1	Low Impact	31 – 51	8	8%	44.50	Max=	93
2	Medium Impact	52 – 72	66	66%	62.98	Min=	36
3	High Impact	73 – 93	26	26%	83.08	S.D=	12.063
Total			100	100%	Total Average=	66.73	

It can be concluded from the table above that the problems' impact of the agricultural extension system on the beekeepers' production work is described as medium by approximately two-thirds of beekeepers and described as high by approximately one-quarter of beekeepers. Hence, the problems' impact can be described as medium by the majority of beekeepers in the Holy Karbala Governorate.



This may reflect the realism and objectivity of the problems that were addressed in the research, as well as reflect the extent of suffering and difficulties that beekeepers go through when doing their production work.

Therefore, working to overcome these problems by improving the work of the agricultural extension system by the decision-makers in the Ministry of Agriculture and its affiliated government departments will contribute, effectively and efficiently, to solving or reducing the existence and impact of these problems on beekeepers. Hence, these problems will be clarified in some detail when presenting the results of it, with an explanation of the possible reasons behind the rank of these problems.

The research results have shown that the answers of beekeepers (Table 3) have been approximately similar in determining the existence of problems that are associated with the agricultural extension system. That means the problems have received approval from the vast majority of beekeepers (Table 3). Also, the results have shown that the overall average of weighted averages is 2.161 degrees. Thus, these problems have a medium impact in general on the beekeepers' production work.

Table (3): Distribution of beekeepers' answers related to the problems of the agricultural extension system.

NO.	Problems Related to the Agricultural Extension System	Freq. and %	Its Existence		Problem's Impact			Weighted average	Rank
			No	Yes	Low	Medium	High		
1	Beekeepers are not involved in developing plans for extension activities related to beekeeping.	F	1	99	7	46	46	2.394	1
		%	1	99	7	46	46		
2	Lack coordination with local or foreign researchers, when implement agricultural exhibitions.	F	0	100	13	38	49	2.36	2
		%	0	100	13	38	49		
3	International agricultural companies specialized in the bee sector are not present at agricultural exhibitions implemented by Agricultural Extension.	F	0	100	10	48	42	2.32	3
		%	0	100	10	48	42		
4	The scarcity of specialized exhibitions held by the Agriculture Extension Directorate or Centre related to beekeeping at the level of agricultural suburbs	F	1	99	13	42	44	2.313	4
		%	1	99	13	42	44		
5	The scarcity of periodic field visits in times of epidemic infections such as the spread of Varroa disease or Nosema Ceranae, etc.	F	0	100	15	40	45	2.3	5
		%	0	100	15	40	45		
6	Absence of training courses on development topics and modern technologies in the field of beekeeping	F	0	100	14	46	40	2.26	6
		%	0	100	14	46	40		



NO.	Problems Related to the Agricultural Extension System	Freq. and %	Its Existence		Problem's Impact			Weighted average	Rank
			No	Yes	Low	Medium	High		
7	Most field visits are limited to distinguished beekeepers, who have close contact with extension workers	F	0	100	14	48	38	2.24	7.5
		%	0	100	14	48	38		
8	Weak promotion of agricultural exhibitions, as they are limited to a small number of beekeepers, and therefore smallholder beekeepers are unable to prepare and participate in them.	F	0	100	15	46	39	2.24	7.5
		%	0	100	15	46	39		
9	Limited training courses conducted by agricultural extension workers in the field of beekeeping in general	F	1	100	9	58	32	2.232	9
		%	1	100	9	58	32		
10	Scarcity of extension field days held in the field of beekeeping.	F	0	100	12	53	35	2.23	10
		%	0	100	12	53	35		
11	Most training courses are limited to basic and intuitive information, such as how to identify colony members, inspection or test tools, and how to conduct an inspection.	F	0	100	15	49	36	2.21	12
		%	0	100	15	49	36		
12	The absence of conferences that address modern challenges in the bee sector, especially with the spread of new pests such as Nosema Ceranae disease.	F	0	100	14	51	35	2.21	12
		%	0	100	14	51	35		
13	The available leaflets do not address modern technologies and how to use them in beekeeping	F	0	100	12	55	33	2.21	12
		%	0	100	12	55	33		
14	Weak focus on topics that address improving the skills of beekeepers when implementing field visits	F	0	100	13	54	33	2.2	14
		%	0	100	13	54	33		
15	The scarcity of field visits in general by extension workers to beekeepers	F	2	98	19	41	38	2.194	15
		%	2	98	19	41	38		
16	Most agricultural exhibitions only display the products of local beekeepers.	F	0	100	14	53	33	2.19	16
		%	0	100	14	53	33		
17	Absence of workshops specific to the beekeeping sector.	F	0	100	15	52	33	2.18	17
		%	0	100	15	52	33		
18	Weak preparations to holding the agricultural extension field day, such as: submitting invitations to the concerned participants, identifying the participants, explain the goal of the field day, etc.	F	0	100	22	44	34	2.12	19
		%	0	100	22	44	34		
19	Limited use of visual and audio aids in symposiums	F	0	100	18	52	30	2.12	19
		%	0	100	18	52	30		
20	Limited distribution of specialized leaflets to	F	0	100	19	50	31	2.12	19



NO.	Problems Related to the Agricultural Extension System	Freq. and %	Its Existence		Problem's Impact			Weighted average	Rank
			No	Yes	Low	Medium	High		
	beekeepers during the implementation of agricultural extension activities	%	0	100	19	50	31		
21	The lack of training courses conducted by agricultural extension workers for rural young people or those interested to enter the field of beekeeping.	F	0	100	20	49	31	2.11	21
		%	0	100	20	49	31		
22	Symposiums' topics consider routine and intuitive to beekeepers.	F	0	100	27	36	37	2.1	22
		%	0	100	27	36	37		
23	Limited specialized symposiums on beekeeping.	F	0	100	23	45	32	2.09	23
		%	0	100	23	45	32		
24	Failure to take into account the timing of bee service operations when selecting or determining the symposiums' topics.	F	0	100	20	52	28	2.08	24.5
		%	0	100	20	52	28		
25	Neglecting women working in beekeeping when carrying out field visits.	F	0	100	20	52	28	2.08	24.5
		%	0	100	20	52	28		
26	Absence of specialized female technical workers in the field of beekeeping.	F	0	100	29	35	36	2.07	26
		%	0	100	29	35	36		
27	Scarcity of specialized male technical workers in the field of beekeeping in general, and those responsible for carrying out field visits.	F	0	100	26	43	31	2.05	27
		%	0	100	26	43	31		
28	Failure to achieve the desired goals (real benefit) from the symposiums.	F	1	99	30	39	30	2	28
		%	1	99	30	39	30		
29	Few beekeepers attending agricultural extension activities as they are outside their interests	F	0	100	29	47	24	1.95	29
		%	0	100	29	47	24		
30	Weak preparation for symposiums, such as: the beekeeper not knowing the date of the symposium, or not announcing and promoting the symposium and its objectives.	F	1	99	33	40	26	1.929	30
		%	1	99	33	40	26		
31	Lack of beekeepers' enthusiasm and interaction with the agricultural extension workers during the implementation of agricultural extension activities.	F	5	95	36	35	24	1.874	31
		%	5	95	36	35	24		
Overall Average of Weighted Averages = 2.161 1 – 1.66 = (Low Impact), 1.67 – 2.33 = (Medium Impact), 2.34 – 3 = (High Impact)									

Also, the results in Table (3) have shown that the problem ranked first had a weighted average value of 2.394, which is higher than the overall average of the weighted averages for this area. It falls into the high impact category. This can be attributed to the importance of the participation of representatives of beekeepers in the planning process for agricultural extension activities, as they are the main and direct source of the field needs and problems facing



beekeepers. In addition, the participation of beekeepers is very important as it increases their acceptance, enthusiasm, and interaction with the agricultural extension activities that are being implemented in their agricultural areas or that will be implemented in the future.

Furthermore, by reviewing the research results in Table (3), we have observed that the problems ranked second, third, and fourth had weighted average values of 2.36, 2.32 and 2.313, respectively, which are higher than the overall average of the weighted averages for this area. One of them falls into the high impact category, and the rest are very close to it.

This may be attributed to the absence of researchers' databases, whether local or foreign, which facilitates the process of contacting and coordinating with them when implementing agricultural exhibitions. At the same time, these problems reflect good awareness among beekeepers about the importance of the presence of specialized researchers to benefit from their experiences and skills. It also shows the desire of beekeepers to hold agricultural exhibitions specializing in bees' products and modern technologies in beekeeping. To benefit from it in developing and improving their existing production work, and on the other hand, the possibility of finding a mechanism for communication and coordination with the international agricultural companies, which contributes to opening international cooperation skylines and moving towards global markets.

Likewise, it can be concluded from the problems in Table (3) that the field visits and training courses do not contribute efficiently and effectively to achieving the desired goals in beekeeping. Either because of the limited training courses and visits that are carried out as a result of the limited number of specialists in beekeeping, or weak organization and preparation, or failure to address modern technologies or new development methods in the field of beekeeping.

Moreover, the results have revealed that the problems ranked last had weighted average values of 1.195, 1.929, and 1.874 respectively, which are lower than the overall average of the weighted averages for this area. But it is still in the medium impact category.

This may demonstrate the need for good preparation of agricultural extension activities in general (including the symposiums). Starting by determining its objectives in light of an urgent need or problem among beekeepers, then announcing and promoting it, and inviting beekeepers in the region to participate in it. Thus, ensuring their presence and active participation by presenting opinions and inquiries and discussing suggestions that would improve their current and future production work.

CONCLUSIONS

Based on the research results, we conclude the following:

1. The vast majority of beekeepers have indicated the existence of all problems in their production work, which were referred to them in the research.
2. The problems' impact of the agricultural extension system on the beekeepers' production work has been described as medium by the majority of beekeepers in the Holy Karbala Governorate.



3. The absence of beekeeper participation in the planning process for agricultural extension activities related to beekeeping was one of the problems that had a high impact on beekeepers.
4. Lack coordination and cooperation with researchers and the International agricultural companies specialized in the bee sector, when implement agricultural exhibitions.
5. The field visits, training courses, symposiums, and field days, do not contribute efficiently and effectively to achieving the desired goals in beekeeping.
6. The absence of specialized females and the scarcity of specialized male technical workers in the field of beekeeping who are responsible for communicating with beekeepers (men, women, and rural young people) and providing them with the required assistance.
7. Based on the above conclusions (from point 1-6), we can accept the research hypothesis, which states that the process of determining the beekeepers' problems associated with the agricultural extension system in the Holy Karbala Governorate would result in the existence of many problems that have a direct impact on the production work of beekeepers.

RECOMMENDATIONS

In order to overcome the beekeepers' problems associated with the agricultural extension system, it is necessary for the executive authorities in the Ministry of Agriculture and its affiliated government departments to review all the problems that have been determined by the current research, and then work to find effective and ideal solutions for them according to a system of priorities. Foremost of those solutions are the following:

1. The necessity for workers in the agricultural extension in divisions and farms to invite representatives of beekeepers to participate in the planning process for agricultural extension activities related to beekeeping. To ensure that the priority needs or problems of beekeepers are addressed through the agricultural extension activities that will be implemented.
2. The necessity for the Ministry of Agriculture to provide sufficient numbers of agricultural extension workers from male and female who specialized in economic entomology in general and beekeeping in particular to work at the executive administrative levels. This is done by using job rotation or transferring agricultural extension workers from places with large numbers (crowded with employees) to places with urgent need, or addressing the Federal Public Service Council to increase the number of appointments exclusively for rare specialties, especially economic entomology. This is to ensure periodic and continuous follow-up of beekeepers, and to diagnose and solve the problems.
3. The necessity for workers in the agricultural extension in divisions and farms to prepare well for all agricultural extension activities related to beekeeping, which include announcing and promoting the objectives of the activity, inviting researchers specializing in beekeeping, owners of agricultural companies and investors to participate in the activity, distributing specialized leaflets in beekeeping when implementing the activity, transferring and disseminating modern technologies and development methods related to beekeeping and moving away from topics that are intuitive or known by beekeepers, etc.



4. Holding agricultural exhibitions specialized in beekeeping and various bee products at the level of the agricultural extension center of the governorate, to market the products, introduce and honor distinguished beekeepers, as well as to transfer modern technology in the field of beekeeping.
5. The necessity for workers in the agricultural extension in divisions and farms to establish regular schedules for periodic follow-up of beekeepers to provide them with the necessary assistance, and encourage rural young people to work in beekeeping, as well as spread awareness of the economic, agricultural, health and environmental importance of this vital sector.

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