



# JUSTIFICATIONS FOR ELECTRONIC AGRICULTURAL EXTENSION AND ITS INGREDIENTS FOR SUCCESS FROM THE POINT OF VIEW OF AGRICULTURAL EXTENSION WORKERS IN KIRKUK GOVERNORATE/IRAQ

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<p><b>Received:</b> 7<sup>th</sup> August 2023 <b>Accepted:</b> 7<sup>th</sup> September 2023 <b>Published:</b> 10<sup>th</sup> October 2023</p>	<p>The current research aims to identify the most important justifications for electronic agricultural extension and its ingredients for success, as well as to identify the obstacles to its application from the point of view of agricultural extension workers in Kirkuk Governorate, and also to identify some of the personal and functional characteristics of the respondents.</p> <p>The research population included all agricultural extension workers which they working in Kirkuk Governorate, in both of the Agricultural Extension Department in the Kirkuk Agriculture Directorate and the Extension Training Center in the governorate, they number (52) workers.</p> <p>The data was collected through a questionnaire consisting of four parts. The first part includes a number of questions to identify some of the personal and functional characteristics of the respondents, while the second part includes questions related to the justifications for electronic agricultural extension, while the third part includes questions about the ingredients for success of electronic agricultural extension, while the questions related to The fourth part includes the most important obstacles to using electronic agricultural extension, then ensuring the validity and reliability of the measures used in the questionnaire using the Cronbach's alpha coefficient, after which the data was collected and analyzed using some appropriate statistical methods and using the statistical analysis program (SPSS V.20).</p> <p>The results showed that most of the agricultural extension workers are young, the majority of them are not specialists in agricultural extension and they have smart phones and computers, more than half of them hold postgraduate degrees. The results also showed that the agricultural extension workers are satisfied with their work in agricultural extension. But they have little experience in agricultural extension.</p> <p>The results also showed that there are many justifications for electronic agricultural extension, most notably the small number of agricultural extension workers and the difficulty of reaching some rural areas. It was also shown that there are ingredients for success of electronic agricultural extension, the most important of which is that electronic agricultural extension contributes to saving time, effort and money. It was found that the most important obstacles to its use is that electronic agricultural extension limits or reduces field visits by the agricultural extension worker.</p> <p>The researchers recommended the necessity of using the mobile phone at work, especially its modern applications in agricultural extension work, reducing the costs of subscribing to the Internet, and open agricultural extension departments in agricultural colleges in Iraqi universities to provide extension departments and centers with specialists in the field of agricultural extension.</p>
<p><b>Keywords:</b> Electronic agricultural extension, justifications, ingredients for success, obstacles</p>	

## INTRODUCTION

Our current era is considered an era of technological revolution and rapid change. The technological revolution, which is one of the most important characteristics of the century in which we live, is a revolution that depends on advanced scientific knowledge and the optimal use of information flowing at rapid rates (Al-Issawi, 2004). The greatest achievement achieved by the technological revolution in the field of communication and information is that Distances are no longer an obstacle to the exchange of news and information, whether at the local, regional or international levels (Abu Zaid, 2007), and the most prominent results are that we live in an era in which knowledge has become the backbone of development and production and since modern technology has provided rapid development in our lives Agricultural extension must inevitably keep pace with this development in order to keep pace with modernity and speed in order to catch up with technology and achieve the greatest desired benefit from it in improving the agricultural extension system and sustaining its services (Istita, 2021: 31). Agricultural extension is one of the communication devices in the countryside, and is concerned with developing the sector. agricultural extension to achieve rural development, by transferring new agricultural innovations and technology to farmers and persuading them to adopt them and continue applying them (Omar, 1992: 46). The agricultural extension worker is also considered the main driver of the extension process as a whole because of the extension tasks that fall upon him, which are to provide the public of farmers with information and expertise. Renewable technology, so the guide must be familiar with matters related to dealing with farmers and technical matters in terms of being able to deliver information to them (Akioya & Ikoyo-Eweto, 2018).

Agricultural extension represents one of the tributaries of rural development in the field of agriculture through dealing with working rural people. With agriculture in direct and indirect contact, as well as interest in activities related to agriculture in local rural communities (Qashta, 2013: 99), the extension communication process is a means and an end at the same time, as agricultural extension is concerned with using all means and outlets to deliver extension messages to the agricultural audience (Aqeela, 2018: 1), agricultural extension uses multiple extension methods and methods in conducting the communication process with farmers in order to provide them with modern agricultural ideas and technologies that contribute to the development and development of the countryside (Saleh et al., 2004: 250)(Othman et al., 2015: 563), despite the multiplicity and diversity of communication methods. used in agricultural extension to transfer agricultural techniques, but it has become insufficient to transfer the huge and renewable amount of agricultural information and techniques as a result of the small number of agricultural extension workers and the traditionality of the methods used (Shaer, 2013: 175) (Arab Organization for Agricultural Development, 2011: 67) (Ghadib, 2011: 75).

There are many problems that stand in the way of agricultural extension work, such as the lack of financial allocations, the difficulty of accessing farmers' fields, etc. (Muhammad, 2017: 299). This pushes towards finding a new method or method in agricultural extension that is compatible with developments in means of communication. Among these methods is the trend towards employing information and communication technology in agricultural extension (Hussein and Khattab, 2023: 1158), which is called electronic agricultural extension, as it was found that this method of extension is important in extension work as it is consistent with developments in means of communication. They call for its use in extension work (jassam, H., & al-jumaily, 2012: 42-53). It has also been shown that the use of social networking sites such as WhatsApp, Facebook, and YouTube in extension work has become necessary because most farmers have accounts on it and work to follow websites. Agricultural and they are interested in the agricultural information that is published there (Gad & Samar, 2021: 2331), and since Kirkuk Governorate is of agricultural importance in Iraq due to the presence of large agricultural areas in it and the presence of water sources (rivers and groundwater), therefore the optimal exploitation of these sources is one of the goals of Agricultural extension to reach comprehensive agricultural development, and modern agricultural information and techniques are delivered to farmers to identify them and their problems are conveyed to scientific research centers to solve them through multiple methods and means, but they have become insufficient for that, so the current research seeks to study the justifications and components of the success of electronic agricultural extension as an alternative method or It complements the traditional extension methods used from the point of view of those working in agricultural extension and identifies its most important obstacles in order to overcome them.

From the above, the current research attempts to answer the following research questions:

- 1- What are the distinctive personal and functional characteristics of agricultural extension workers in Kirkuk Governorate?
- 2- What are the justifications for using electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate?
- 3- What are the ingredients for success of electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate?
- 4- What are the obstacles to implementing electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate?

## RESEARCH OBJECTIVES:

1. Identify the distinctive personal and functional characteristics of agricultural extension workers in Kirkuk Governorate such as (Age, gender, educational attainment, duration of job service, Scientific specialization, owning a smart phone, satisfaction with work in agricultural extension, attitude towards electronic agricultural extension).

2. Identify the justifications for electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate.
3. Identifying the ingredients for success of electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate.
4. Identifying the obstacles to using electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate.

### OPERATIONAL DEFINITIONS:

- 1- Justifications for electronic agricultural extension: In this research, what is meant is the reasons for using electronic agricultural extension in Kirkuk Governorate from the point of view of agricultural extension workers.
- 2- Ingredients for success of electronic agricultural extension: In this research, what is meant is the advantages provided by electronic agricultural extension that push agricultural extension workers towards adopting it and employing it in extension work.
- 3- Obstacles to electronic agricultural extension: In this research, what is meant is the difficulties faced by agricultural extension workers that prevent the use of electronic agricultural extension or reduce its use.

### RESEARCH METHODOLOGY:

The researcher used the descriptive method, as it is the most appropriate method of scientific research to conduct the current research, as it is used when the researcher wants to describe a phenomenon and study it after collecting accurate information about it (Al-Asadi, 2008), then it can be classified and described accurately after analyzing the data and arriving at facts and generalizations that contribute to reaching To results on the research topic (Al-Rashidi, 2002).

### RESEARCH POPULATION AND SAMPLE:

The research included all agricultural extension workers in the Kirkuk Governorate Agriculture Directorate/Agricultural Extension Department and the Agricultural Training Center, who numbered (52) extension workers. (10) extension workers who were among the pre - test sample were excluded, and thus the totality of the respondents reached (42) extension workers, from whom research data was collected on through a personal interview using a special questionnaire designed to achieve the research objectives, as in Table (1).

Table (1) Research population and sample

Workplace	Research population	Pre-test sample	Research sample
Extension Department in Kirkuk Agriculture Directorate	12	0	12
Extension training center	40	10	30
<b>Total</b>	<b>52</b>	<b>10</b>	<b>42</b>

### PREPARING THE QUESTIONNAIRE FORM:

For collecting the required research data, a questionnaire was designed consisting of four parts. The first part included some personal and functional characteristics of employees working in agricultural extension in the Extension Department of the Kirkuk Agriculture Directorate and the Extension Training Center, which are represented by (age, gender, educational attainment, duration of job service, scientific specialty, workplace, owning a computer, owning a smart phone, satisfaction with work in agricultural extension, attitude towards electronic agricultural extension), while the second part included a scale consisting of (14) items to measure the justifications for using electronic agricultural extension, while the third part included a scale consisting of (16) items to measure the ingredients for success of electronic agricultural extension, and the fourth part included the obstacles that prevent the use of electronic agricultural extension. The items of scales were formulated after reviewing books and research in the field of agricultural extension, and the questionnaire form was presented to agricultural extension experts at the College of Agriculture and the College of Agriculture - Hawija at the University of Kirkuk.

### RELIABILITY AND VALIDITY

Reliability is an expression of the extent to which the scale gives the same grades to the same individuals when it is applied to them a second time. The fixed scale is the scale that, if applied to individuals and then re-applied to the same individuals after a period of time, gives approximately the grade it gave the previous time (Ismail Al-Feki, 2005: 31).

In order to ensure the reliability and validity of the scales used in the questionnaire, a pre-test was conducted on a sample consisting of (10) employees working in agricultural extension, chosen randomly from extension training center, data was collected from them during the period (10-12/09/2023) and the reliability coefficient of the scales was calculated using Cronbach's alpha equation and then the validity coefficient was found by the square root of reliability coefficient, so the reliability and validity coefficient values were as shown in Table (2).

Table (2) Reliability and validity coefficient values for the scales used in the questionnaire

Scale	Number of items	Reliability coefficient values	validity coefficient values
Attitude	10	0.846	0.919
Justifications	14	0.754	0.868
Ingredients for success	16	0.896	0.946
Obstacles	13	0.761	0.872

**MEASURING RESEARCH VARIABLES:**

**First the independent variables:**

1. Age: It was measured by the number of years the respondent lived until the date of collecting the research data.
2. Gender: It was measured through the two alternatives (male, female), and numerical values (2, 1) were given to them, respectively.
3. Academic achievement: It was measured through the levels: agricultural preparatory school, institute, college, master’s, and doctorate. Numerical values (1, 2, 3, 4, 5) were given to each of them, respectively.
4. Duration of service: It was measured by number of years that the respondent served in his job from the time he was first appointed until the date of data collection.
5. Scientific specialization: It was measured through the two levels (agricultural extension, other agricultural specialization), and numerical values (2, 1) were given to them, respectively.
6. Owning a computer: It was measured through the two alternatives (yes, no) and values (1, 0) were given to them, respectively.
7. Owning a smartphone: It was measured through the two alternatives (yes, no) and given values (1, 0) respectively.
8. Satisfaction with work in agricultural extension: It was measured through the levels (satisfied, somewhat, dissatisfied), and numerical values (3, 2, 1) were given to them respectively.
9. Attitude towards electronic agricultural extension: It was measured through (10) items, including five negative items and five positive items in front of which alternatives were placed (agree, neutral, disagree), and numerical values (3, 2, 1) were given to them for the positive items and (1, 2, 3) for negative paragraphs, so the theoretical range of direction degrees is (10-30) degrees.

**Second: Justifications for electronic agricultural extension:**

It was measured through a scale consisting of (14) items in front of which alternatives were placed (agree, somewhat agree, disagree), and numerical values (3, 2, 1) were given to them respectively, and thus the theoretical range for the degrees of justifications is (14-52). degree.

**Third: Ingredients for success of electronic agricultural extension:**

It was measured through a scale consisting of (16) items in front of which alternatives were placed (agree, somewhat agree, disagree), and numerical values (3, 2, 1) were given to them respectively, and thus the theoretical range for the component scores is (16-58). degree.

**Fourth: Obstacles to electronic agricultural extension:**

It was measured through a scale consisting of (13) obstacles, in front of which alternatives (yes, no) were placed, and numerical values (1, 0) were given to them respectively. Thus, the theoretical range for the degrees of obstacles is (0-13) degrees.

**Data collection and analysis:**

After completing the questionnaire form in its final form, data was collected through personal interviews from agricultural extension workers in the Extension Department and the extension training center in Kirkuk Governorate for the period (09/17/2023 until 09/24/2023) and analyzed using some statistical methods, including ratios, frequencies, arithmetic mean, Standard deviation and Cronbach's coefficient.

**RESULTS AND DISCUSSION**

**First: Identify the distinctive personal and functional characteristics of agricultural extension workers in Kirkuk Governorate.**

**1- Age:**

The results showed that the youngest of the respondents was (27) years old, while the oldest was (64) years old. The respondents were divided into three categories according to the laws of range and category length, as shown in Table (3)

It is clear from Table (3) that the general average age of agricultural extension workers in Kirkuk Governorate reached (38.7) years, with a standard deviation of (9.7) degrees, and that most of the respondents fall into the first category, which is those with young ages ranging between (27-39) years. Their number was (28) respondents,

representing (66.6%) of the number of respondents, and their average age was (33.3) years, while the percentage of respondents in the middle and old categories, which are those of middle and upper ages, was (16.7%) for each.

This means that the majority of agricultural extension workers in Kirkuk Governorate are young people, who may have a great role and drive to use information and communications technology in extension work.

Table (3) Distribution of agricultural extension workers in Kirkuk Governorate according to their age

Age categories	Frequency	%	Mean
Young (27-37)	28	66.6	33.3
Medium (38-48)	7	16.7	47
Old (49-60)	7	16.7	57.5
<b>Total</b>	<b>42</b>	<b>100</b>	

General Mean = 38.7

standard deviation =9.7

## 2- The Gender:

The results in Table (4) showed that the percentage of males working in agricultural extension was (57.1%) of the total number of agricultural extension workers, while the percentage of females was (42.9%) of the total respondents.

The results, as shown in Table (4), showed that the percentage of males whose working in agricultural extension was (57.1%) of the total number of workers in agricultural extension, while the percentage of females was (42.9%) of the total respondents.

This high percentage of female agricultural extension workers can be benefited by encouraging them to use electronic agricultural extension to deliver agricultural information to rural women, especially since agricultural extension workers' communication is limited to male farmers due to the customs and traditions prevailing in rural society, in addition to that electronic extension helps to overcoming many of the difficulties that women face in extension work.

Table (4) Distribution of agricultural extension workers in Kirkuk Governorate according to their gender

Gender categories	Frequency	%
Male	24	57.1
Female	18	42.9
<b>Total</b>	<b>42</b>	<b>100</b>

## 3- Academic achievement:

The results in Table (5) showed that (9.5%) of agricultural extension workers hold an agricultural preparatory certificate, while the percentage of agricultural extension workers who have an agricultural diploma was (12%), while it was found that (26.1%) of them They have a bachelor's degree in agriculture, while those who have a master's degree in agricultural sciences reached (45.3%) of the total employees, which is the highest percentage, and (7.1%) have a doctorate degree in agricultural sciences.

From the above, it is clear that more than half of the respondents (52.4%) of the agricultural extension workers in Kirkuk governorate have a postgraduate degree in agricultural sciences (PhD + Master), and that this means the presence of a high level of knowledge that encourages the use of modern technologies in extension work as modern communication platforms and the use of computers, smart phones, etc. by them.

Table (5) Distribution of agricultural extension workers in Kirkuk Governorate according to their Academic achievement

Academic achievement categories	Frequency	%
Agriculture preparatory school	4	9.5
Institute	5	12
Bachelor	11	26.1
Master	19	45.3
Doctorate	3	7.1
<b>Total.</b>	<b>42</b>	<b>100</b>

## 4- Duration of service:

The results showed that the least duration of service among the respondents was (1) year, while the longest duration service was (34) years in extension work. The respondents were divided into three categories according to the laws of range and length of the category, and according as shown Table (6).

It is clear from Table (6) that the general mean of duration of service of agricultural extension workers in Kirkuk Governorate reached (11.2) years, with a standard deviation of (9.9) degrees, and that most of the respondents fall into the first category, which is those with little experience ranging between (1-12) years. Their number reached (29) respondents, representing (69%) of the number of respondents. Their mean experience in extension work was (5.8) years, while the percentage of respondents in the middle and large categories, which are those with medium and high experience, was (16.7%) and (14.3%) for each of them, respectively.

This may mean that the majority of agricultural extension workers in Kirkuk Governorate are those who have been recently appointed to the job and have little experience in the field of extension work, and therefore they need training courses to develop their skills in agricultural extension work, whether traditional agricultural extension or electronic agricultural extension..

Table (6) Distribution of agricultural extension workers in Kirkuk Governorate according to the number of years of their duration service

Duration of service categories	Frequency	%	Mean
Little (1-11)	29	69	5.8
Medium (12-22)	7	16.7	20.8
Great (23-34)	6	14.3	30.8
<b>Total</b>	<b>42</b>	<b>100</b>	

General Mean = 11.02

standard deviation =9.9

### 5- Scientific specialization:

The results in Table (7) showed that the percentage of specialists in agricultural extension reached (10%) of the total number of workers in agricultural extension in Kirkuk Governorate, while the percentage of specialists in other agricultural sciences who work in agricultural extension reached (90%) of the total respondents.

This means that the majority of the respondents are not specialists in agricultural extension, the reason for this may be due to the presence of only three agricultural extension departments in all agriculture colleges in Iraq, which means a lack of availability of agricultural extension specialization, and the failure of these colleges to cover the requirements of agricultural extension departments in the agricultural directorates in the governorates, as well as extension training centers.

Table (7) Distribution of agricultural extension workers in Kirkuk Governorate according to their Scientific specialization

Scientific specialization categories	Frequency	%
Specialization in Agricultural Extension	4	10
Not specialized in Agricultural Extension	38	90
<b>Total</b>	<b>42</b>	<b>100</b>

### 6- Owning a computer:

The results showed as in Table (8) that the percentage of agricultural extension workers whose own computers was (83.3%), while the percentage of whose did not have a computer was (16.7%) of the total respondents.

Since the majority of respondents have computer devices, this encourages the trend towards using electronic agricultural extension in extension work, and it facilitates its application process.

Table (8) Distribution of agricultural extension workers in Kirkuk Governorate according to their owning a computer

Owning a computer categories	Frequency	%
Owns	35	83.3
Does not have	7	16.7
<b>Total</b>	<b>42</b>	<b>100</b>

### 7- Owning a smartphone:

The results in Table (9) indicate that the percentage of agricultural extension workers whose own a mobile phone was (95.2%), while the percentage of whoes did not have mobile phones was (4.8%) of the total respondents.

This means the possibility of applying modern technology in extension work by agricultural extension workers in Kirkuk Governorate, because possession of a smartphone is one of the most important requirements for moving towards using electronic agricultural extension.

Table (9) Distribution of agricultural extension workers in Kirkuk Governorate according to their owning a smartphone

Owning a smartphone categories	Frequency	%
Owns	40	95.2
Does not have	2	4.8
<b>Total</b>	<b>42</b>	<b>100</b>

### 8- Satisfaction with work in agricultural extension:

The results showed as in Table (10) that (52.3%) of agricultural extension workers are satisfied with their work in agricultural extension, while (31%) of them were somewhat satisfied, and (16.7%) are not satisfied with their work in agricultural extension. The reason for this may be due to the fact that the majority of agricultural extension workers in Kirkuk Governorate are not from the agricultural extension specialty, but rather from other specializations. This may negatively effect on the use of electronic agricultural extension by respondents, and this point must be taken into consideration

Table (10) Distribution of agricultural extension workers in Kirkuk Governorate according to their satisfaction with work in agricultural extension

Satisfaction categories	Frequency	%
Satisfied	22	52.3
Somewhat satisfied	13	31
Not satisfied	7	16.7
<b>Total</b>	<b>40</b>	<b>100</b>

**9-The attitude towards electronic agricultural extension:**

The results showed as in Table (11) that (38%) of the respondents had a negative attitude towards electronic agricultural extension, and that (50%) of the respondents had a neutral attitude, while the percentage of agricultural extension workers whose attitude was positive towards electronic agricultural extension (12%) only.

In order to spread the idea of electronic agricultural extension among agricultural extension workers in Kirkuk Governorate, their attitudes must be transformed from negative to positive, in addition to the need to crystallize neutral attitudes into positive ones.

Table (11) Distribution of agricultural extension workers in Kirkuk Governorate according to their attitude towards electronic agricultural extension

The attitude categories	Frequency	%	Mean
negative (14-18)	16	38	16.4
neutral (19-23)	21	50	21.6
Positive (24-28)	5	12	25.1
<b>Total</b>	<b>42</b>	<b>100</b>	

General Mean =20.87

standard deviation =3.87

**Second: Identify the justifications for electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate.**

The results showed as in Table (12) that the lowest numerical value for the importance of justifications for using electronic agricultural extension was (28) degrees, while the highest justification in terms of importance was (42) degrees, with an general mean of (35.5). score and standard deviation of (3.72) degrees. The

The respondents were divided according to their point of view on the importance of justifications into three categories. (21.5%) of them saw that the justifications are of little importance, while it was found that (45.2%) of them saw that the justifications are moderately important, while (33.3%) of them found that the justifications are high importance.

From the above results, it is clear that (78.5%) of agricultural extension workers believe that there are important justifications for the using of electronic agricultural extension.

Table (12)the justifications for electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate.

The justifications categories	Frequency.	%	Mean
little (28-32)	9	21.5	30.22222
Medium (33-37)	19	45.2	35.21053
High (38-42)	14	33.3	39.69231
<b>Total</b>	<b>42</b>	<b>100</b>	

General Mean = 35.5

standard deviation =3.72

**- Arranging the justifications for electronic agricultural extension according to their importance.**

The justifications were arranged according to their importance it was found that the justification (the small number of agricultural extension workers) came in first rank in terms of importance, and this is a very important justification for using electronic agricultural extension, because it compensates for the small number of agricultural extension workers, while The justification (the difficulty of agricultural extension workers reaching some rural areas due to the lack of transportation) came in second rank in terms of importance. This may be due to the large area of Kirkuk Governorate and the agricultural extension workers are need transportation for the purpose of reaching the areas targeted by the extension process. While the justification (some traditional extension methods require high costs) came in third rank, which prompts agricultural extension workers to think about using electronic agricultural extension to reduce costs, while the justification (the agricultural extension may not be aware of the aspects of the problem because he is far from it as a result of his use of one of the extension methods. Traditional) came in last rank, while the rest of the justifications were distributed according to their importance, as in Table (13)

Table (13) Arranging the justifications for electronic agricultural extension according to their importance

The justifications	Weighted average	The rank
The limited number of agricultural extension workers	2.69	1
Difficulty of access to some rural areas by agricultural extension workers due to the lack of transportation.	2.61	2
Some traditional extension methods require high costs.	2.59	3
It may not be possible to provide a suitable place in terms of availability of material and health requirements to meet with farmers.	2.57	4
Easily exchange agricultural information through electronic agricultural extension applications.	2.56	5
The deteriorating security situation prevents agricultural guides from reaching some rural areas.	2.53	6
The distance between the villages and the locations of agricultural extension workers.	2.52	7
Some traditional extension methods require a long time to implement	2.5	8
The lack of suitable time for farmers prevents agricultural extension workers from using traditional extension methods.	2.45	9
The difficulty of gathering farmers in one place when using one of the collective agricultural extension methods, for example	2.41	10
Weak feedback on some agricultural extension methods.	2.31	11
Farmers' preoccupation with agricultural and household work makes it difficult to use collective extension methods.	2.30	12
The application of some extension methods requires farmer awareness of the importance and benefit of agricultural extension, such as office visits, for example.	2.23	13
The agricultural extension worker may not be familiar with the aspects of the problem because he is far from it as a result of his use of one of the traditional extension methods	2.21	14

**Third: Identifying the ingredients for success of electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate.**

It is clear from Table (14) that the ingredients for success of electronic agricultural extension, according to what workers in agricultural extension in Kirkuk Governorate see, their values ranged between (33 - 48) degrees on a scale whose theoretical range ranges between (16 - 48) degrees. The general mean reached (41.9) degrees. With a standard deviation of (4.61) degrees, the respondents were distributed into three categories based on the laws of range and category length, as shown in Table (14).

The results showed that (50%) of the respondents indicated that the ingredients for success of electronic agricultural extension are largely available, while (33.3%) of the respondents indicated that the ingredients for success are available to a moderate degree, while (16.7%) of the respondents stated that the ingredients for the success of electronic agricultural extension are available to a small degree. .

From the above results, we find that (83.3%) of the respondents working in electronic agricultural extension believe that there are great ingredients for success of applying electronic agricultural extension in extension work.

Table (14) the ingredients for success of electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate.

The ingredients for success categories	Frequency	%	Mean
Little (33-37)	7	16.7	35.28571
Medium (38-42)	14	33.3	39.35714
High (43-48)	21	50	46.31579
<b>Total</b>	<b>42</b>	<b>100</b>	

General Mean = 41.9

standard deviation = 4.61

**- Arranging the ingredients for electronic agricultural extension according to their importance.**

The ingredients for success of electronic agricultural extension were arranged as in table (15), where it came first rank: (Electronic agricultural extension contributes to saving time, effort, and money), as the respondents believe that the application of electronic agricultural extension contributes to reducing the time required to complete agricultural extension activities, and it also works to reduce the effort required to carry out those activities. Activities at the lowest costs. In second place, the respondents believe that (the start of the use of the fourth generation 4G Internet by mobile phone companies) is also an important condition for the success of electronic agricultural extension because this means speed of the Internet and the ability to view clear images and high-resolution video clips related to



agricultural information. While the respondents believe that (the possibility of the extension agent communicating with the guides at all times, regardless of official working hours) is one of the most important components of the success of electronic agricultural extension, as it came in third rank. Where by using electronic agricultural extension, both parties of the extension process (the agricultural extension worker and the farmer) are able to communicate with each other. At any time.

In the last rank, agricultural extension workers believe that (some farmers owning laptop computers) is the least important ingredient for the success of electronic agricultural extension, and this may be due to the lack of availability among farmers or that smart phones are the most widely used by them and they use them continuously due to their ease of carrying and using them in various aspects of their lives.

Table (15) Arranging the ingredients for success of electronic agricultural extension according to their importance

The ingredients for success	Weighted average	The rank
It contributes to saving time, effort and money.	2.80	1
The widespread use of smart phones that contain modern applications	2.78	2
The possibility of the guide to communicate with the mentors at all times, regardless of official working hours.	2.74	3
Some mobile phone companies provide subscription services for calling cards and the Internet at reasonable prices.	2.73	4
The proliferation of applications and social media on mobile devices.	2.66	5
The possibility of using more than one method to deliver the extension material to the guides.	2.62	6
Interconnection and integration between social media applications, which facilitates navigation and file sharing between them.	2.61	7
The presence of drawings that facilitate the expression of the feelings and circumstances of farmers and extension workers.	2.59	8
The possibility of non-governmental bodies participating in the extension service	2.57	9
Using the arm, modern agricultural techniques, sprinkler and drip irrigation methods, for example, saved time for browsing the Internet	2.56	10
The start of the use of the fourth generation 4G Internet by mobile phone companies.	2.54	11
Some types of phones save energy and extend their operating time during the day.	2.45	12
Ease of downloading and using applications and social media by farmers.	2.42	13
Agricultural extension workers and farmers have the skills to use modern phone applications in agriculture.	2.40	14
They provide portable batteries that provide power to phones when the power goes out.	2.38	15
Farmers own laptops.	2.04	16

**Fourth: Identifying the obstacles to using electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate.**

The results showed as in table (16) that (19%) of the respondents see the size of the obstacles as small, while (31%) of them see the size of the obstacles as medium, while it was found that (50%) They find that the obstacles to applying electronic agricultural extension are large.

Which means that the majority of respondents believe that there are major to moderate obstacles to the application of electronic agricultural extension, and must work to overcome them in order to be able to use electronic agricultural extension.

Table (16) the obstacles for electronic agricultural extension from the point of view of agricultural extension workers in Kirkuk Governorate.

The obstacles categories	Frequency	%	Mean
Small (5-7)	8	19	6.43
Medium (8-10)	13	31	9.53
Large (11-13)	21	50	12.04
<b>Total</b>	<b>42</b>	<b>100</b>	

General Mean = 10.46

standard deviation = 1.94

**- Arranging the obstacles that hinder electronic agricultural extension according to their importance.**

Table (17) shows the ranking of the obstacles facing the application of electronic agricultural extension according to their size. In first place, the respondents mentioned that electronic agricultural extension (limits or reduces the conduct of field visits by the agricultural extension), as relying on electronic agricultural extension means that not visiting farmer' fields to detect the condition of the field, determine its requirements and farmer' recommendation to work on it. while the obstacle which came in second rank (the lack of familiarity of some farmers with using social media means) is one of the most important obstacles to the application of electronic agricultural extension, as employing social media networks in extension work has become a reality and is being used.

As for (The difficulty of communicating with rural women by the agricultural extension worker due to customs and traditions) came in third rank, as customs and traditions in rural areas impose some restrictions on rural women on their use of the Internet, specifically social media networks. These restrictions are also more stringent and limit their use of phones portable.

While it was found that (lack of experience among agricultural extension workers using electronic agricultural extension) was the least influential in reducing the use of electronic agricultural extension, as it came in last rank.

Table (17)Arranging the obstacles that obstruct electronic agricultural extension according to their importance

The obstacles	Weighted average	The rank
Electronic agricultural extension limits or reduces field visits by the agricultural extension worker.	0.95	1
Some farmers do not know how to use social media	0.92	2
Difficulty in communicating with rural women by the agricultural extension worker due to customs and traditions.	0.90	3
Internet disconnection or slow speed.	0.88	4
High prices for Internet subscription.	0.85	5
Lack of financial allocations necessary to prepare electronic agricultural extension requirements.	0.80	6
The negative attitudes of some farmers towards using social media.	0.78	7
The presence of illiteracy among farmers prevents the possibility of applying electronic agricultural extension.	0.76	8
In using electronic extension, there is a need for a high level of education for the agricultural extension worker.	0.73	9
Continuous power cuts.	0.66	10
The possibility of hacking the agricultural extension account and broadcasting non-agricultural information.	0.59	11
Inaccuracy of agricultural information circulated through electronic agricultural extension means.	0.57	12
Lack of experience among agricultural extension workers using electronic agricultural extension.	0.54	13

**CONCLUSIONS:**

From the above we can conclude the following:

1. Young people are more likely to use electronic agricultural extension because they have the motivation to use it as well as knowledge, and the presence of the majority of young agricultural extension workers contributes to employing modern applications in extension work.
2. The lack of agricultural extension departments in agricultural colleges in Iraqi universities has resulted in a small number of agricultural extension workers, and prompted official authorities to employ specialists in non-extension agricultural fields to work in agricultural extension.
3. There are strong justifications for establishing electronic agricultural extension in Kirkuk Governorate, including the availability of infrastructure such as smart phones, the Internet, and work experience.
4. Electronic agricultural extension contributes to compensating the shortfall in the number of agricultural extension workers in Kirkuk Governorate.
5. The need to use means of transportation decreases when relying on electronic agricultural extension.
6. Electronic agricultural extension allows for the use of time, so the agricultural guide can communicate with farmers at any time, and the costs and effort required to carry out extension activities are reduced.
7. The use of electronic agricultural extension may face the ignorance of some farmers in the use of modern technology.
8. Direct face-to-face communication between the agricultural extension worker and the farmer is reduced when using electronic agricultural extension, and field, office and home visits are reduced.

### RECOMMENDATIONS:

Based on the conclusions reached, the researchers recommend the following:

- 1- The necessity of using the mobile phone in extension work and using telephone calls and text messages to spread agricultural knowledge
- 2- Working to employ modern applications available on phone devices in agricultural extension work.
- 3- Reducing Internet subscription costs and coordinating with mobile phone companies to provide Internet packages at low prices to farmers through agricultural directorates or extension centers.
- 4- The need to open agricultural extension departments in agricultural colleges in Iraqi universities that meet the requirements for creating such departments.
- 5- Establishing awareness programs on how farmers can optimally use smart phones to search for agricultural information on websites.
- 6- Establishing virtual groups on social media that include agricultural extension workers and farmers and are specialized in each agricultural field to spread knowledge in it, answer farmers' questions, and solve their problems.

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