Iraqi Journal of Agricultural Sciences –2026:57(3):732-747
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/9cyt1b28

A PROPOSAL TO DEVELOP THE USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY IN AGRICULTURAL EXTENSION

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ABSTRACT

The research was aimed to develop a proposed vision to develop the effectiveness of the use of information and communications technology in agricultural extension work/Iraq, To achieve the research goal, the questionnaire was prepared as a tool for collecting information and included 109 items distributed over 8 axes, which are (formulating a strategic plan, providing infrastructure, disseminating culture, Security and safety of information extension, developing workers' capabilities, improving cooperation and coordination between the extension organization and relevant authorities, Improving the target population's access to information and extension knowledge, monitoring and evaluation. The research included the governorates of Iraq, except for the Kurdistan region, which number 15 governorates. A 50% random sample was drawn, with 8 governorates: Baghdad, Kirkuk, Babylon, Basra, Anbar, Dhi Qar, Najaf, and Karbala), and the research community included those working in agricultural extension, numbering 773 respondents. A proportional, stratified random sample was drawn with a proportion of 33.1% of the research community and 256 respondents. The data was collected, tabulated, and analyzed using statistical methods and the SPSS program to extract The results: It was concluded that all the paragraphs and axes of the proposed vision, in terms of importance and the opinions of the respondents, obtained weighted means higher than the hypothesized mean of 3 degrees, The researcher recommends the need for officials and specialists in the Ministry of Agriculture, the Agricultural Extension and Training Department, and the Agriculture Directorates to adopt the proposed vision to develop the effectiveness of agricultural extension and its use of information and communications technology.

Keywords: infrastructure, evaluation, Strategic plan and monitoring
*** Part of Ph.D. dissertation of the 1st author.**

Received: 12/8/2023, Accepted: 31/12/2023, Published: 31/3/2026

INTRODUCTION

Scientific progress and rapid developments that the world has witnessed today in the field of information and communications technology have brought about various changes at the economic, social, cultural and agricultural levels, which has been clearly reflected in the success of many developed countries (Ali, 2015). In an effort to achieve rural agricultural development, optimal investment of material, financial and human resources, effective response to the needs and requirements of the extension public and improving their standard of living (Hasan,2021). It showed its effects on many agricultural activities and practices that changed the lives of rural communities (Haneen,2018). The increasing demand for information and communications technology has led to the interest of many organizations, including the extension organization, in providing services, completing its work

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quickly, and implementing its activities accurately and efficiently (Hussein, & Nidal, 2020).And its contribution to conveying information, bringing about important changes, and achieving the organization's goals of survival, growth, and improving the performance and quality of its work (Al-Thabet, & Al-Jamili, 2017). This requires the presence of an effective and efficient agricultural extension system that transfers agricultural information and practices to rural residents with the aim of teaching and educating them, increasing their awareness, and helping them identify their problems and determine their priorities (Fathy, et al, 2023). And he must have the scientific ability as a link between the extension public on the one hand and the agricultural research stations on the other hand (Farah, & Al-Mashhadani,2022). And his participation in transferring scientific knowledge using modern means of information and communication technology and carrying out many extension activities and practices (Salman, 2019). Communication is the essence of extension work and its contribution to achieving economic, social and cultural development in rural communities through its programs and activities that are based on modern means of communication in transferring information, exchanging ideas, and satisfying the needs of the targets (Hassan, & Al-Qarqari., 2018). Modern means of communication are among the most important technological revolutions and have been widely applied in the field of agricultural extension (Abdullah.,.& Abdel Rahman, 2025). It is a good platform to communicate with targets in all rural areas with ease (Al-Janabi, & Al-Nuaimi, 2014). and thus, it eliminated the need for direct contact between the targets and the trend towards using networks and means of remote communication to reduce costs and reduce barriers between them (Nagham, & Heba, 2020). Adopting (ICT) and applying it in the field of extension work is not an easy process as others think, but rather a process surrounded by many problems that negatively or positively affect the development of extension work (Hamasalih, & Layeeq, 2023). Therefore, the use of information and communication technology has become an urgent necessity to confront the problems of applying traditional extension, which are represented by the small number of agricultural extension workers, weak qualification of cadres, weak coordination between agricultural extension and research stations, and other problems that have led to weak extension service (Zaid at al, 2019 .)What distinguishes the technological revolution is the emergence of the Internet and its rapid spread as an integrated information system to enable beneficiaries of agricultural extension to interact with each other through communication networks and participate in obtaining and exchanging it (Abdel –Menem, 2023). Social media is a cultural phenomenon that is prevalent in society and is very popular. Because it allows its beneficiaries to connect to the Internet, and enables them to exchange information and ideas without any geographical barrier (Abdel-Ghani, 2019). They are electronic platforms for interaction between farmers and the extension organization and facilitate their access to information, knowledge and modern agricultural technique (Elsaey, 2022). Accordingly, agricultural extension can benefit from commonly used social media and its applications spread on the Internet and mobile phones to disseminate agricultural innovations, transfer information, interact with the extension public without restriction, and communicate with agricultural researchers and extension workers to develop their performance and achieve extension goals (Chariset, 2014). This study aims to develop the effectiveness of the use of information and communication technology in agricultural extension work/Iraq.

Research hypothesis: There is a proposed vision for developing the effectiveness of the use of information and communication technology in agricultural extension work/Iraq.

MATERIALS AND METHODS

The descriptive approach was used because it is considered one of the most appropriate approaches to achieving the objectives of the current research, describing the phenomenon to be studied, predicting its occurrence and explaining it, and identifying and controlling

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problems (Al-Mahmoudi, 2019). Obtaining realistic facts and detailed data about the proposed vision for developing the effectiveness of the use of information and communications technology in agricultural extension work/Iraq.

Research population and sample

The research area included all the governorates of Iraq except the 15 governorates of the Kurdistan region. A 50% random sample was drawn from 8 governorates, namely (Babylon, Kirkuk, Basra, Anbar, Baghdad, Dhi Qar, Karbala, Najaf). The research community included agricultural extension workers within the directorate of agricultural extension and its affiliated extension centers and farms, and the agricultural extension departments and their affiliated units in the agricultural directorates of the governorates of the research sample, who numbered 773 respondents. A proportional, stratified random sample was drawn at a rate of 33.1% and 256 were researched, according to the equation (Steven, 2012) (Table 1).

Table 1. Distribution of agricultural extension workers in the research community and its sample according to the governorates of the research area

No.	Governorate	Agricultural extension workers in the research community	Percentage of the research sample
1	Baghdad (Baghdad Agriculture Directorate + directorate agricultural extension)	219	72
2	Basra	84	28
3	Dhi Qar	67	22
4	Najaf	65	22
5	Babylon	134	44
6	Karbala	47	16
7	Anbar	86	28
8	Kirkuk	71	24
	the total	773	256

Preparation of the research tool

After reviewing the literature, scientific research, previous studies, and the opinions of specialists and experts in the field of agricultural extension and information and communications technology, and using the international information network, the questionnaire was prepared in its initial form as a tool for collecting data and information from the respondents related to the research topic. Accordingly...the questionnaire consisted of 115 item distributed over 8 axes, namely: (formulating a strategic plan for applying information and communications technology in agricultural extension, 13 item, providing the infrastructure for using information and communication technology in agricultural extension, 24 item, spreading a culture of technology. Information and communication between workers in the extension organization, 14 item, security and safety of extension information, 15 item, developing the capabilities of workers in using information and communications technology in agricultural extension work, 14 item, improving cooperation and coordination between the agricultural extension organization and relevant parties, 10 item, Improving targets' access to information and extension knowledge 17 item, monitoring and evaluation 8 item).

Validity of the research tool

An important and necessary process to ensure that the scale achieves the goals that were set to measure it, and this is known as face validity (Kawafha, 2010). As for content validity, it means the extent to which the scale's items are clear and related to the

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measured aspect. To achieve the set goals (Bassiouni2010). Accordingly, the questionnaire was presented to measure the apparent validity and content of 21 experts in the field of agricultural extension, information and communications technology, media, management, and economics for the purpose to survey the opinions of the experts and ensure the integrity of the wording of the paragraphs, their clarity and ease of understanding, and that the questionnaire achieves the goals for which it was developed (Al-Jadri, & Yaqoub, A. 2009). In addition to submitting proposals to delete, reformulate, or add other paragraphs, according to a three-point scale (agree, agree with the amendment, disagree I determined the following weights: 2.1.0 and collected their opinions and recorded their answers for the period between (4/4/2023 - 5/5/2023).

Cut-off threshold

A cut-off threshold of 75% or more has been set regarding the validity of the questionnaire's items and axes, as the agreement of experts on the components of the questionnaire on a cut-off threshold of 75% or more gives an indication of feeling and satisfaction about the validity of the scale (Darwaza 2005). After collecting the opinions and recording the answers of the experts and specialists, the averages of their agreement with the components of the questionnaire in its initial form were calculated, as the cut-off threshold for the questionnaire reached 85%.

Preparing the questionnaire in its final form

In light of the opinions and suggestions of experts and specialists, the questionnaire was prepared in its final form. It included 109 item distributed over 8 axes, 12 item for the first axis, 23 item for the second axis, 13 item for the third axis, 12 item for the fourth axis, 13 item for the fifth axis, 10 item for the sixth axis, 16 item for the seventh axis, and 10 item for the seventh axis. For the eighth axis

Stability of the research tool

Stability is a basic condition for the validity of the tool and is defined as the stability of the scale in its scores achieved after some time and under the same conditions (Abboud, 2017). The initial test was conducted for agricultural extension workers in the Diwaniyah and units Agriculture Directorate affiliated with It and its extension centers and farms in May 2023, numbering 67 respondents, and a random sample of 40.3% was chosen, consisting of 27 respondents. To measure the reliability included in the questionnaire, the Cronbach's alpha coefficient equation was used, and its value was 0.90 degrees. The value is considered It is scientifically acceptable, and the scale indicates stability and reliability if it obtains a stability value higher than 0.80 degrees (Table 2).

Table 2. Cronbach's alpha coefficient values for the proposed perception scale for developing the effectiveness of using information and communication technology in agricultural extension work

No.	Axes	Stability coefficient
1	Formulating a strategic plan to apply information and communications technology in agricultural extension work	0.92
2	Providing the infrastructure for the use of information and communications technology in agricultural extension work	0.95
3	Spreading the culture of information and communications technology among workers in the extension organization	0.88
4	Security and safety of extension information	0.91
5	Developing the capabilities of workers in using information and communications technology in agricultural extension work	0.91
6	Improving cooperation and coordination between the Agricultural Extension Organization and relevant parties	0.87
7	Improving target access to information and extension knowledge	0.91
8	Monitoring and evaluation	0.87
	the total	0.90

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Data collection

Data was collected using the questionnaire in its final form, which is one of the most important tools of scientific research in achieving its goals (Linda, et al. 2019). from the research sample of 256 respondents, and their answers were recorded for the period between 28/6/2023- 28/8/2023

RESULTS AND DISCUSSION

The first objective: The respondents learned about the proposed vision for developing the effectiveness of the use of information and communication technology in agricultural extension work: The results of the research showed that the (8) axes of the proposed vision for developing the effectiveness of the use of information and communication technology in agricultural extension work obtained weighted averages that ranged between (3.93 - 4.13) degrees, which is higher than the hypothetical mean of 3 degrees, and with a percentage weight ranging between (78.6 - 82.7) %, (table 3).

Table 3. Weighted means and percentage weights are axes of a proposed vision for developing the effectiveness of the use of information and communication technology in agricultural extension

sort by questio - nnaire	order by import-ance	Axes	weighted mean	Percentag e weight
3	1	Spreading the culture of information and communications technology among workers in the extension organization	4.13	82.7%
2	2	Providing the infrastructure for the use of information and communications technology in agricultural extension work	4.06	81.2%
1	3	Formulating a strategic plan to apply information and communications technology in agricultural extension work	4.05	81%
5	4	Developing the capabilities of workers in using information and communications technology in agricultural extension work	4.03	80.6%
8	5	Monitoring and evaluation	4.02	80.4%
4	6	Security and safety of extension information	4.00	80%
7	7	Improving target access to information and extension knowledge	3.97	79.4%
6	8	Improving cooperation and coordination between the Agricultural Extension Organization and relevant parties	3.93	78.6%

Table (3). indicates that the weighted means of the proposed perception axes are almost close, and the axis of spreading the culture of information and communication technology among workers in the extension organization ranked first in terms of importance, with a weighted mean of 4.13 degrees, and with a percentage weight of 82.7%. The reason for this may be attributed to the lack of understanding of modern methods and methods imposed by the uses of information and communication technology in agricultural extension work, while the axis of improving cooperation and coordination between the Agricultural Extension Organization The relevant authorities ranked last, in terms of importance, with a weighted mean of 3.93 degrees, and a percentage weight of (78.6%). The reason for this may be attributed to the respondents' belief that there are complex respondents' belief that there are complex problems related to the technical, organizational, administrative and financial aspects that limit the linking and coordination mechanisms between the extension organization and the research and educational institutions, agricultural organizations and other relevant parties .Based on the above... paragraphs of each of the axes related to the proposed vision for developing the effectiveness of the use of information and communications technology in agricultural extension work will be discussed which are represented in the following. ====The first axis: Spreading the culture of information and communications technology among workers in the extension organization: The 13 item related to this axis obtained a weighted mean that falls between (4.06 - 4.23) degrees, and a percentage weight that falls between (81.2 - 84.6) % (Table 4)

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Table 4. Distribution of paragraphs on the theme of spreading the culture of information and communications technology among workers in the extension organization

sort by questio - nnaire	order by import- ance	Item	weighted mean	percenta ge weight
7	1	Preparing educational and training programs to familiarize workers with the need to apply information and communications technology in agricultural extension work	4.23	84.6%
11	2	The competent authorities and experts should be sought to develop plans to spread the culture of information technology among agricultural extension workers	4.21	84.2%
1	3	Developing cultural awareness among agricultural extension workers and farmers to use information and communications technology	4.20	84%
5	4	Announcing media programs to educate all workers about the benefits of using information and communications technology in agricultural extension work	4.16	83.2%
4	5	Preparing brochures to explain the details of information and communications technology in the field of agricultural extension work	4.15	83%
10	6	There should be an entity responsible for spreading technological culture among agricultural extension workers	4.14	82.8%
2	7	To encourage the extension organization to instill the concept of creativity and innovation among employees and motivate them to adopt a culture of information technology	4.13	82.6%
13	8	The extension organization should adopt a wide-ranging awareness campaign to inform workers of the proposed changes in the use of information and communications technology before starting it.	4.12	82.4%
12	9	The extension organization should contribute to disseminating the application of scientific research results and everything new through its website	4.11	82.2%
11	10	Developing the concept of electronic management among agricultural extension workers	4.09	81.8%
3	11.5	Changing the traditional ideas and methods of agricultural extension workers about dealing with data and information and focusing on what is new	4.08	81.6%
9	11.5	Providing a modern communications network capable of communicating and transferring information within the extension organization	4.08	81.6%
8	13	Strengthening the relationship and exchanging ideas and information between agricultural extension workers and targets via e-mail	4.06	81.2%

Table (4) indicates that the paragraph "Preparing educational and training programs to familiarize workers with the extent of the need to apply information and communications technology in agricultural extension work" came in first place in terms of importance, with a weighted mean of 4.23 degrees, and with a percentage weight of 84.6 %, and the reason for this is due to the awareness of the majority of agricultural extension workers of the urgent need to prepare integrated and comprehensive educational and training programs to learn about the importance and benefits of information and communications technology, spread its culture among users, and set up workshops to apply modern means of information technology in work. Agricultural extension as an attempt to change from the traditional extension concept to digital transformation in delivering extension services to farmers, while the paragraph "Strengthening the relationship and exchanging ideas and information between agricultural extension workers and the targets via e-mail" ranked last in terms of importance with a weighted mean of 4.06. degree, with a percentage weight of 81.2%, and the reason for this is attributed to the extension organization benefiting from the application and employment of information

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and communication technology in extension work to extension farmers in agricultural operations that lead to increasing agricultural production and providing farmers' needs and requirements for modern information and ideas. The second axis: Providing infrastructure for the use of information and communications technology in agricultural extension work: The 23 item related to this axis obtained a weighted mean that falls between (3.90-4.21) degrees, and a percentage weight that falls between (78-84.2) %, (Table 5).

Table 5. Distribution of paragraphs of the axis of providing infrastructure for the use of information and communications technology in agricultural extension work

sort by questio - nnaire	order by import- ance	Item	weighte d mean	percentage weight
19	1	Working to provide agricultural extension websites with up-to-date information on an ongoing basis	4.21	84.2%
6	2	The information technology devices in the extension organization should be characterized by accuracy, efficiency, and speed in obtaining and disseminating information, and ease of connecting to the Internet and communicating with the targets.	4.18	83.6%
2	3	There should be a comprehensive database management system in the extension organization that enables it to store, retrieve and modify its data and provide a suitable environment for the targets.	4.17	83.4%
4	4	Building websites that provide a quick extension service for targets	4.14	82.8%
20	5	Extending communication network links with extension, research and educational institutions, and farmers through social media channels	4.13	82.6%
23	6	Supporting and developing policies, strategies and legislation for information and communications technology by providing technical assistance and establishing a network between the extension organization and relevant parties.	4.12	82,4%
1	7	\The extension organization has an infrastructure prepared for the use of information and communications technology	4.11	82.2%
15	8	There must be conviction and support from the senior management in the extension organization of the importance of using information and communications technology	4.10	82%
14	9.5	Broadband Internet networks should be available, including all extension units in remote areas	4.09	81.8%
7	9.5	Providing high-quality devices and equipment to support communication networks for all levels and extension units	4.09	81.8%
12	11	The extension organization must have secure procedures to preserve information and communication technologies, including Internet networks	4.07	81.4%
18	12.5	Ensuring the delivery of communication networks to all targets in the extension organization without interruption	4.05	81%
3	12.5	Information and communications technology devices and equipment must be provided in a manner commensurate with the number of targets, the nature of the work, and the tasks of the extension organization.	4.05	%81
11	14	Activating the role of senior management in the extension organization to support its database and information system	4.04	80.8%
13	15	The extension organization should be concerned with constantly updating its databases in accordance with recent developments	4.03	80.6%
9	16.5	The extension organization should seek to develop easy, diverse and constantly updated software that suits the needs and nature of extension activities and contributes to processing extension data in a timely manner.	4.02	80.4%
8	16.5	Encouraging the targets to learn about and use many information hardware programs and applications to develop extension work and improve their performance	4.02	80.4%
5	18	The extension organization must have sufficient diverse media to store and retrieve data and information, such as flexible, hard, and compact magnetic disks (CD/DVD)...etc.	4.01	80.2%
10	19	Determine organizational procedures for the mechanism of operating programs, applications and communication networks in the extension organization	4.00	80%
19	20	Strengthening and improving communication networks to facilitate social communication between targets with speed, accuracy and high efficiency	3.97	79.4%
16	21	The extension organization should adopt information technology communication systems to predict natural disasters and monitor environmental impacts	3.96	79.2%
21	22	Providing a specialized team in the field of developing extension programs and networks	3.95	79%
22	23	ICT should be mobilized to meet the needs of rural society	3.90	78%

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Table (5) indicates that the item "Working to provide agricultural extension websites with up-to-date information on an ongoing basis" came in first place in terms of importance, with a weighted mean of 4.21 degrees, and a percentage weight of 84.2%, The reason is attributed to attracting the interest and trust of users, agricultural extension workers and farmers, in the extension content published on extension websites, which is constantly changing over time, in addition to amending errors in the extension content, upgrading it, improving its efficiency to ensure it is free of defects, and re-publishing it through social media. Social networking, while the paragraph Mobilizing information technology came "Communications to meet the needs of the rural community" ranked last in terms of importance, with a weighted mean of 3.90, and a percentage weight of 78%. The reason for this may be attributed to the belief of agricultural extension workers that the extension organization needs requirements for employing information and communications technology in extension work. Infrastructure to meet the needs of farmers. The third axis: Formulating a strategic plan for applying information and communication technology in agricultural extension: The 12 item related to this axis obtained a weighted mean that falls between (3.89-4.14) degrees, and a percentage weight that falls between (77.8-82.8)% (Table 6).

Table 6. Distribution of paragraphs on the topic of formulating a strategic plan for applying information and communications technology in agricultural extension work

sort by questio-nnaire	order by import-ance	Item	weighted mean	percentage weight
9	1	The introduction of the Agricultural Extension Information and Communication Technology Department within the organizational structure contributes to providing extension services to the targets	4.14	82.8%
2	2	Involving various administrative levels in developing the plan and setting goals and programs related to the application of information and communications technology in the extension organization	4.13	82.6%
1	3	Assigning a team of experts and specialists to develop a strategic plan to adopt the application of information and communications technology as a basic management style in the extension organization.	4.12	82.4%
3	4	Determine the role of the participants in the strategic plan and what is expected of them to implement information and communications technology in the extension organization	4.10	82%
6	5	The existence of a plan supported by decision makers in the extension organization	4.09	81.8%
4	6	Conduct a comprehensive analysis of the internal and external environment for agricultural extension work	4,07	81.4%
7	7.5	To develop strategies for using information technology that suit the needs and circumstances of the rural community	4.05	81%
5	7.5	Formulating a strategic plan that includes what is necessary to build human capabilities according to the available information	4.05	81%
12	9	Formulating a roadmap to enable the extension organization to perform its primary role as a provider of content to the targeted audiences	4.03	%80.6
10	10	Design and implement programs to increase awareness of extension managers and train them to formulate guidance plans to develop electronic strategies in the field of agricultural extension.	4	80%
11	11	Develop a plan to follow up and evaluate the application of information and communications technology to identify deviations and make the necessary corrections	3.94	78.8%
8	12	To improve the networking between the extension organization and relevant parties	3.89	77.8%

Table (6) indicates that the item "Creating the Agricultural Extension Information Technology and Communication Department within the organizational structure contributes to providing extension services to the targets" ranked first in terms of importance, with a weighted average score of 4.14, with a percentage weight of 82.8 %, and the reason for this may be attributed to the extension organization's need to create a unit or department for information and communication technology within the

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agricultural extension structure to implement extension activities and disseminate all new knowledge, extension information and agricultural innovations via communication platforms. Social, while the paragraph "Improving networking between the extension organization and relevant parties" ranked last in terms of importance, with a weighted average score of 3.89, and a percentage weight of 77.8%. This may be due to improving connectivity with communication networks and its diversity. There is an inevitable necessity between the extension, research and educational organization and rural community organizations in exchanging ideas, information, knowledge, good practices and shared experiences to develop the capabilities of workers, improve institutional performance, strengthen relationships, cooperation and joint work. The fourth axis: Developing the capabilities of workers in using information and communication technology in agricultural extension work: The 13 item related to this axis obtained a weighted mean that falls between (3.92 - 4.09) degrees, and a percentage weight that falls between (78.4 - 81.8)% (Table 7).

Table 7. Distribution of paragraphs on the topic of developing the capabilities of workers in using information and communications technology in agricultural extension work

sort by questio - nnaire	order by import- ance	Item	weighted mean	percentage weight
2	1	Developing training programs to develop the capabilities of the extension organization's employees to qualify them to apply information and communications technology that is compatible with	4.09	81.8%
13	2	Preparing a study conducted by a team composed of specialists, one from the field of information and communications technology and the other from the field of training, to determine activities and prepare a	4.08	81.6%
1	3	The extension organization will attract workers who have diverse experiences, extensive knowledge, and an advanced level in dealing with information and communications technology	4.07	81.4%
7	4	Developing the capabilities of guidance workers to design animation programs and use them as an easy means to deliver the extension message to the targets	4.06	81.2%
12	5.5	There should be courses to develop the capabilities of workers in the field of e-learning related to agriculture, rural development and	4.05	81%
6	5.5	To identify specific activities in extension work through which agricultural extension workers can widely apply modern information and communications technology	4.05	81%
3	7	Selecting workers with a desire and interest in the field of information and communication technology to participate in training courses that increase their competence in this field	4.04	80.8%
9	8.5	The extension organization contributes to involving workers in training courses in the agricultural field through electronic links	4.02	80.4%
4	8.5	Providing technical personnel with skills and experience in maintaining and operating the system, software, and information and communications technology devices in the extension organization.	4.02	80.4%
8	10	Developing the use of the necessary electronic devices and tools that workers need to provide the extension service effectively	4.01	80.2%
11	11	Developing the capabilities of workers in creating websites for qualified people that provide video clips and visual presentations	4	80%
5	12	The extension organization should gain the confidence of workers in information and communications technology through education and effective communication	3.97	79.4%
10	13	Workers should be able to access modern agricultural information electronically	3.92	78.4%

Table (7) indicates that the item "Developing " training programs to develop the capabilities of the extension organization's employees to qualify them to apply information and communications technology commensurate with modern developments" came in first place in terms of importance, with a weighted mean of 4.09 degrees, , and with a weight Percentage: 81.8%. The reason for this may be due to the extension organization's need for

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training programs to qualify and develop the expertise and skills of workers and acquire new knowledge to raise their competencies and improve their performance in applying information and communications technology in agricultural extension work, while The paragraph stated: "Workers should be able to access"...Modern agricultural information electronically" ranked last in terms of importance, with a weighted mean of 3.92 degrees, and a percentage weight of 78.4%. The reason for this may be attributed to the fact that most of the workers in the extension organization have experience and skills in browsing Arab and foreign agricultural websites via communication networks. To learn about all the new agricultural developments and innovations that suit the conditions and capabilities of farmers. Fifth Axis: Monitoring and Evaluation: The 10 item related to this axis received a weighted mean falling between (3.88-4.16) degrees, and a percentage weight falling between (77.6-83.2)% (Table 8).

Table 8. Distribution of the paragraphs of the monitoring and evaluation axis of the use of information and communications technology in the extension organization

sort by questio - nnaire	order by import- ance	Item	weighted mean	percentag e weight
1	1	Develop a mechanism to create digital platforms to monitor and evaluate the extension service provided to the targeted people	4.16	83.2%
3	2	Information and communications technology should allow targets to request extension services learn about their satisfaction with them and suggest improvements to develop them	4.15	83%
6	3	The extension organization uses monitoring devices to collect data on the results of agricultural extension services based on data provided by extension service providers.	4.14	82.8%
10	4	The existence of an entity whose mission is to provide data and information to decision makers regarding the use of information and communications technology in extension work	4.06	81.2%
2	5	The extension organization has tremendous potential to facilitate data collection and increase evidence at the farm level to provide decision-makers	4.05	81%
7	6	Digital forums and platforms play a major role in establishing monitoring systems and constantly adapting them to agricultural advisory services systems.	4	80%
4	7	The extension organization should use information and communications technology to monitor the quantity and quality of advisory services provided to the targets and receive their comments.	3.95	79%
8	8	Conduct continuous and periodic follow-up on all operations, practices, activities and extension projects, and review plans implementation reports.	3.94	78.8%
9	9	Providing applications for quick evaluations of extension activities	3.90	78%
5	10	To enable the extension organization to use information and communications technology to identify gaps in providing extension services to the targeted people	3.88	77.6%

Table (8). indicates that the item "Developing a mechanism to create digital platforms to monitor and evaluate the extension service provided to the targeted people" came in first place in terms of importance, with a weighted mean of 4.16 degrees, which is higher than the value of the other weighted means, and with a percentage weight of 83.2%, and the reason may be attributed to This is due to the extension organization's need for digital platforms that allow the targets to present their opinions, discussions, and comments and

Iraqi Journal of Agricultural Sciences –2026:57(3):732-747
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/9cyt1b28

benefit from them as information to monitor and evaluate the extension services they receive in order to improve the quality of services and enhance communication between the parties benefiting from the extension system, while the paragraph stated, "to enable the organization extension on the use of information and communications technology to identify gaps in providing "extension services to the targeted people" ranked last in terms of importance, with a weighted mean of 3.88 degrees, and a percentage weight of 77.6%. The reason for this may be attributed to the extension organization's need for an information and communications technology infrastructure and to benefit from the reactions of the targets of the provided extension service and record their observations and comments. Sixth Axis: Security and Safety of extension Information: The 12 item related to this axis received a weighted mean that falls between (3.93-4.09) degrees, and a percentage weight that falls between (78.6-81.8)% (Table 9).

Table 9. Distribution of paragraphs of the security and safety axis of extension information

sort by questio - nnaire	order by import- ance	Item	weighted mean	percentage weight
1	1	There should be a variety of extension information available on computers, stored and protected from hacking, so that it can be obtained when needed.	4.09	81.8%
9	2	The persons concerned with feeding the electronic extension system with agricultural information must be reliable	4.06	81.2%
4	3	Extension information should be stored in additional copies on magnetic, laser, flexible or hard disks in a safe and appropriate place and under the supervision of competent and honest people in anticipation of a hack occurring in the operating system.	4.05	81%
3	4	The method of auditing the extension data entering the computers of the extension organization should be adopted using advanced anti-virus and anti-penetration programs to preserve the authenticity and safety of the information.	4.04	81.8%
10	5	The extension organization must have specialized experts interested in the security and safety of information	4.02	80.4%
12	6	Laws, regulations, and security penalties should be put in place to limit penetration of Internet communications networks and violations of the privacy of information extension.	4.01	80.2%
2	7	The necessary measures must be taken to confront the ongoing power outages, the risks of technical piracy, and other emergency circumstances that lead to the loss of much extension information.	3.98	79.6%
6	8.5	Basic computer security guarantees must be put in place for all stakeholders to use to protect data and information from piracy and viruses	3.96	79.2%
11	8.5	Providing specific and clear procedures to protect the privacy of published information and increasing confidence in electronic transactions among the targets.	3.96	79.2%
8	10	Activating the monitoring and inspection system and the movement of extension data entering and leaving communication networks through various applications to detect intrusion and determine its location.	3.95	79%
5	11	A robust system must be put in place for the safety of extension data, and its storage and retrieval when needed, in a way that provides a service to those who are authorized to use it and prevent unauthorized use.	3.94	78.8%
7	12	Creating special mechanisms to encourage the agricultural sector to develop safe and reliable applications that facilitate transactions via the Internet	3.93	78.6%

Table (9). indicates that the item "that there should be diverse extension information stored in computers and protected from hacking that can be obtained when needed" came in first place in terms of importance, with a weighted mean of 4.09 degrees, The other, with a percentage weight of 81.8%, and the reason for this may be attributed to the extension organization resorting to safe applications and programs that combat viruses and other intrusions to reduce the risks to which information devices, communication networks,

Iraqi Journal of Agricultural Sciences –2026:57(3):732-747
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
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systems and databases are exposed, in When the paragraph "Finding special mechanisms to encourage the agricultural sector to develop safe and reliable applications that facilitate dealing via the Internet" came in last place in terms of importance, with a weighted mean of (3.93) degrees, and a percentage weight of 78.6%, the reason for this may be attributed to the fact that The extension organization realized the importance of having barriers to protect its information, ensure its confidentiality from hacking, its availability, and ensure its credibility . Seventh axis: Improving the targets' access to information and extension knowledge: The 16 item related to this axis obtained a weighted mean that falls between (3.88 - 4.08) degrees, and a percentage weight that falls between (77.6 - 81.6)%, (table 10).

Table 10. Distributing the paragraphs of the theme of improving the target's access to information and extension knowledge

sort by questio - nnaire	order by import- ance	Item	weighte d mean	percentage weight
16	1	Creating electronic interaction platforms through which the targeted people can easily obtain the extension service	4.08	81.6%
1	2	The extension organization should provide freedom of access to agricultural extension information via the Internet and facilitate its use	4.05	81%
7	3	Information and communications technology helps provide extension services in a manner consistent with the needs and requirements of rural community groups	4.03	80.6%
2	4	Creating a mechanism to coordinate extension procedures and activities carried out by the extension organization to facilitate enhancing access to agricultural extension knowledge and information through the Internet.	4.02	80.4%
9	5	Establishing multi-purpose access points to provide a wide range of electronic services and applications targeting rural community groups.	4.01	80.2%
5	6	Designing extension programs that focus on employing information and communications technology to empower rural women economically and socially	4.00	80%
3	7	The extension organization should facilitate obtaining extension information via mobile phone	3.99	79.8%
8	8	Enhancing target access to agricultural information through coordination of extension policies directed towards the use of information and communications technology	3.98	79.6%
6	9	Using information and communications technology to provide market-oriented advisory services in a timely manner	3.96	79.2%
14	10.5	There should be effective oversight to ensure the credibility of agricultural extension ideas via the Internet	3.95	79%
10	10.5	Creating databases of extension services and activities available to rural community groups	3.95	79%
13	12	Reducing Internet subscription prices in rural areas where this service is available	3.94	78.8%
11	13	The agricultural extension worker shall hold periodic meetings among farmers to discuss the published agricultural extension information	3.93	78.6%
4	14	Involving local leaders by providing extension information through mobile phones and modern technologies	3.92	78.4%
12	15	Establishing specialized centers in rural areas to maintain information and communications technology devices such as mobile phones and the Internet	3.89	77.8%
15	16	Finding teams that provide free Internet service to disseminate extension information	3.88	77.6%

Table (10). indicates that the item "Creating platforms for electronic interaction through which the targeted people can easily obtain the extension service" ranked first in terms of importance, with a weighted mean of 4.08 degrees, and with a percentage weight of 81.6%, Which may be attributed to the reason for this being the extension institution's need to create electronic extension platforms for social communication, to interact with the

Iraqi Journal of Agricultural Sciences –2026:57(3):732-747
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
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beneficiaries of the extension system and specialists to discuss important issues and problems related to them, which increases their awareness and enhances their self-confidence, while the paragraph "Creating teams that provide service" came. "Free Internet to disseminate extension information" ranked last in terms of importance, with a weighted mean of 3.88, and a percentage weight of 77.6%. The reason for this may be attributed to the extension organization realizing the necessity of having teams that provide free Internet services to beneficiaries to access extension services at the lowest costs. And at the right time.= The eighth axis: Improving cooperation and coordination between the Agricultural Extension Organization and relevant authorities: The 10 item related to this axis received a weighted mean that falls between (3.80 - 4.02) degrees, and a percentage weight that falls between (76 - 80.4)% (Table 11).

Table 11. Distribution of paragraphs on the axis of improving cooperation and coordination between the Agricultural Extension Organization and relevant authorities

sort by questio - nnaire	order by import- ance	Item	weighted mean	percentage weight
1	1	Developing regulatory mechanisms to consolidate the relationship between agricultural extension, educational and research institutions, and relevant parties to exchange information, ideas, and agricultural innovations through information and communications technology.	4.02	80.4%
3	2	Involving specialized researchers and university professors in extension training activities to familiarize the targets with how to use information technology in extension work.	4.01	80.2%
2	3	Integrating activities and events between agricultural extension and related institutions within a unified work mechanism for using information technology	3.99	79.8%
5	4	Interactive electronic links should be formed between the extension organization and relevant parties to facilitate the operational relationship between them	3.97	79.4%
4	5	Involving the private sector and civil society organizations in providing extension services to the targeted people, publishing everything new, and exchanging experiences and scientific ideas.	3.95	79%
8	6	Developing distance training through regional and global cooperation programs, including pooling available resources	3.92	78.4%
6	7	Establishing new extension centers in areas not usually covered by agricultural extension workers, in cooperation with the relevant authorities	3.91	78.2%
7	8	Strengthening cooperation between extension policy makers and relevant authorities to provide agricultural extension workers with the necessary methods to combat potential risks in the use of information technology.	3.89	77.6%
10	9	Creating cooperation and coordination mechanisms at the national, regional and international levels to combat potential risks in using the Internet in the agricultural field.	3.86	77.2%
9	10	The existence of a joint policy between the extension organization and the private sector in which laws and legislation related to information and communications technology are established	3.80	76%

Table (11) indicates that the item "Establishing regulatory mechanisms to consolidate the relationship between agricultural extension, educational and research institutions, and relevant parties to exchange information, ideas, and agricultural innovations through information and communications technology" ranked first in terms of importance, with a weighted mean of 4.02 degrees, and with a percentage weight of 80.4%, and the reason for this may be attributed to the weakness or absence of cooperation and coordination between agricultural extension, educational and research institutions, and local agricultural communities, while the paragraph stated: "The existence of a joint policy between the extension organization and the private sector in which laws and legislation related to information technology are established." "And communications" ranked last in terms of importance, with a weighted mean of 3.80, and a percentage weight of 76%. The reason for this may be attributed to the necessity of adopting supportive policies and measures at

Iraqi Journal of Agricultural Sciences –2026:57(3):732-747
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/9cyt1b28

high levels from government parties to activate the role of the private sector in agricultural extension to learn about modern technologies and their applications in the field of technology Information and communication in agricultural extension work.=====In light of the previous results, we conclude... that there is agreement among the sample members on the importance of the axes and paragraphs of the proposed vision for developing the effectiveness of the use of information and communication technology, which expresses the awareness of those working in the field of agricultural extension of the importance of its use and application in extension work. The researcher recommends:

1- The need for officials and specialists in the Ministry of Agriculture, the Department of Agricultural Extension and Agricultural Training, and the agricultural directorates in the governorates to adopt the proposed vision for developing the use of information and communications technology in agricultural extension.

2- The necessity of preparing and implementing comprehensive indicative training programs on the importance of the axes and paragraphs of the proposed vision and working to implement them in the field.

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Iraqi Journal of Agricultural Sciences –2026:57(3):732-747
P-ISSN: 0075- 0530 /E-ISSN: 2410-0862
DOI: https://doi.org/10.36103/9cyt1b28

مقترح لتطوير استخدام تكنولوجيا المعلومات والاتصالات في الإرشاد الزراعي

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المستخلص

أستهدف البحث وضع تصور مقترح لتطوير فعالية استخدام تكنولوجيا المعلومات والاتصالات في عمل الإرشاد الزراعي/ العراق، ولتحقيق هدف البحث تم أعداد الاستبانة كأداة لجمع المعلومات تضمنت من 109 فقرة موزعة على 8 محاور وهي (صياغة خطة استراتيجية، توفير البنية التحتية، نشر الثقافة، امن وسلامة المعلومات الإرشادية، تنمية قدرات العاملين، تحسين التعاون والتنسيق بين المنظمة الإرشادية والجهات ذات العلاقة، تحسين وصول المستهدفين الى المعلومات والمعرفة الإرشادية، الرصد والتقييم)، وقد شمل البحث محافظات العراق عدا إقليم كردستان والبالغ عددها 15 محافظة، سحبت عينة عشوائية بنسبة 50%، وبواقع 8 محافظات وهي: (بغداد، كركوك، بابل، البصرة، الأنبار، ذي قار، النجف، كربلاء)، وأشتمل مجتمع البحث العاملين في الإرشاد الزراعي البالغ عددهم 773 مبحوثاً، سحبت عينة عشوائية طبقية تناسبية بنسبة 33.1% من مجتمع البحث وبواقع 256 مبحوث، وقد جمعت البيانات وتم تبويبها وتحليلها باستخدام الوسائل الإحصائية وبرنامج SPSS لاستخلاص النتائج، وقد تم التوصل الى أن جميع فقرات ومحاور التصور المقترح من حيث الأهمية وأراء المبحوثين قد حصلت على أوساط مرجحة أعلى من الوسط الفرضي البالغ 3 درجات، ويوصي الباحث بضرورة تبني المسؤولين والمختصين في وزارة الزراعة ودائرة الإرشاد والتدريب الزراعي ومديريات الزراعة بالتصور المقترح لتطوير فاعلية الإرشاد الزراعي واستخدامه لتكنولوجيا المعلومات والاتصالات.

كلمات مفتاحية: بنية تحتية، تقييم، خطة استراتيجية ورصد.

*** جزء من أطروحة دكتوراه للباحث الأول.**