Research article

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The role of internet in disseminating modern agricultural technologies related to yellow corn crops from the perspective of agricultural employees in Al-Alam District / Salahaddin Province in Iraq

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ABSTRACT

INTRODUCTION. The internet has become an important tool for disseminating agricultural information and modern technologies, contributing to the improvement of agricultural extension services and farmers' access to knowledge.

AIM. To determine the role of the internet in disseminating modern agricultural technologies for yellow corn from the perspective of agricultural employees in Al-Alam District, Salah al-Din Governorate. It also sought to identify variations in the perceived role of the internet according to age, gender, years of service, participation, and attitude.

MATERIALS AND METHODS. The research population consisted of all 31 agricultural employees working in the Al-Alam Agriculture Division, Hamrin Agriculture Division, and Agricultural Research Station. A questionnaire was developed comprising two parts: personal characteristics of respondents and 19 agricultural practices related to yellow corn cultivation. A three-point scale (high, medium, low) was used to assess the role of the internet in disseminating agricultural technologies. Data were analyzed using Microsoft Excel and SPSS through descriptive statistics and one-way analysis of variance (ANOVA).

RESULTS. The findings revealed that the role of the internet in disseminating agricultural technologies for yellow corn was perceived as moderate. Among the internet platforms, YouTube ranked first in disseminating modern agricultural technologies.

CONCLUSION. The study concluded that agricultural employees in Al-Alam District require additional training in the use of e-extension tools to enhance the dissemination of agricultural technologies for yellow corn. Encouraging agricultural staff to follow official YouTube channels of governmental and agricultural extension institutions may further improve access to reliable agricultural information.

KEYWORDS: Internet, Agricultural Extension, E-extension, Yellow Corn, Agricultural Technologies, YouTube, Agricultural Employees

Исследовательская статья

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Роль интернета в распространении современных сельскохозяйственных технологий, связанных с посевами желтой кукурузы, с точки зрения работников сельского хозяйства в районе Аль-Алам / провинция Салах-эд-Дин в Ираке

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Роль интернета в распространении современных сельскохозяйственных технологий, связанных с посевами желтой кукурузы, с точки зрения работников сельского хозяйства в районе Аль-Алам / провинция Салах-эд-Дин в Ираке. *Аграрный вестник Северного Кавказа.* 2026;16(3). https://doi.org/10.31279/ABNC-2026-16-3-119 EDN TUWATL

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КОНФЛИКТ ИНТЕРЕСОВ:
авторы сообщают об отсутствии конфликта интересов.

БЛАГОДАРНОСТИ
Авторы выражают искреннюю признательность факультету базового образования – Эш-Ширкат и сельскохозяйственному факультету Университета Тикрита за предоставленную материально-техническую базу и поддержку, необходимые для выполнения данного исследования.

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АННОТАЦИЯ

ВВЕДЕНИЕ. Интернет стал важным инструментом распространения информации и современных технологий в сфере сельского хозяйства, способствуя улучшению услуг агроконсультирования и доступа фермеров к знаниям.

ЦЕЛЬ ИССЛЕДОВАНИЯ – определить роль интернета в распространении современных агротехнологий для желтой кукурузы с точки зрения работников сельского хозяйства в районе Аль-Алам провинции Салах-эд-Дин, а также выявить различия в восприятии данной роли в зависимости от возраста, пола, стажа работы, степени участия и личного отношения.

МАТЕРИАЛЫ И МЕТОДЫ. В исследовании участвовал 31 работник сельского хозяйства, занятый в Отделе сельского хозяйства Аль-Алама, Отделе сельского хозяйства Хамрина и на Сельскохозяйственной опытной станции. Был разработан опросный лист, включающий две части: личные характеристики респондентов и 19 агротехнических приемов, связанных с возделыванием желтой кукурузы. Для оценки роли интернета в распространении сельскохозяйственных технологий использовалась трехбалльная шкала (высокая, средняя, низкая). Данные анализировались с помощью Microsoft Excel и SPSS с применением описательной статистики и однофакторного дисперсионного анализа (ANOVA).

РЕЗУЛЬТАТЫ. Полученные данные показали, что роль интернета в распространении агротехнологий для желтой кукурузы оценивается как средняя. Среди интернет-платформ YouTube занял первое место по распространению современных сельскохозяйственных технологий.

ЗАКЛЮЧЕНИЕ. Исследование показало, что работники сельского хозяйства в районе Аль-Алам нуждаются в дополнительном обучении по использованию инструментов электронного агроконсультирования для повышения эффективности распространения сельскохозяйственных технологий для желтой кукурузы. Поощрение работников сельского хозяйства к подписке на официальные YouTube-каналы государственных учреждений и организаций агроконсультирования может дополнительно улучшить доступ к достоверной информации.

КЛЮЧЕВЫЕ СЛОВА: интернет, агроконсультирование, электронное консультирование, желтая кукуруза, сельскохозяйственные технологии, YouTube, работники сельского хозяйства

INTRODUCTION

Agriculture represents a major source for many industries associated with the national economy, including food and textile industries. It also constitutes a vital component in achieving food security for the population and serves as a broad demographic system that significantly influences social and economic life [1]. Furthermore, the development of the agricultural sector has become an urgent necessity for achieving sustainable development, as this sector represents one of the fundamental pillars of economic and social development processes. Its importance is even greater in developing countries, where agriculture forms the backbone of the national economy. Achieving agricultural development requires the availability and adoption of new agricultural technologies and innovations [2]. Given the importance of the agricultural sector, numerous organizations concerned with agriculture and rural communities have emerged, among which agricultural extension is considered one of the most significant institutions contributing to agricultural advancement and the improvement of rural livelihoods [3]. Agricultural extension is regarded as the cornerstone of the agricultural development process, as farmers cannot effectively benefit from modern agricultural technologies without extension support. Agricultural extension services are responsible for disseminating these technologies, persuading farmers to adopt them, and linking them with agricultural research centers to facilitate the transfer of modern agricultural innovations and provide training on their practical application [4]. Modern technologies have proven to be essential tools for addressing agricultural problems, indicating that the availability of such technologies forms the basis for solving agricultural challenges. Nevertheless, despite the apparent simplicity of this process, practical implementation remains difficult because some technologies may not be suitable for certain agricultural regions or may not be easily transferable [5].

Among the strategic agricultural crops for which agricultural extension seeks to disseminate modern technologies is maize (yellow corn), which ranks second after wheat in importance. Maize is used in bread production in rural areas at a rate of approximately 20% when mixed with wheat flour. It is also extensively utilized in the production of livestock and poultry feed, accounting for nearly 70% of feed components. In addition, maize is used in the production of starch and corn oil, while its green vegetative parts serve as animal fodder [6]. Owing to its strategic importance for food security, livestock production, and agro-industrial uses, increasing yellow maize productivity has become a priority that requires the effective dissemination of modern agricultural technologies. Consequently, understanding the communication channels through which these technologies can be transferred to farmers is of considerable importance.

In this context, agricultural extension plays a crucial role in transferring modern agricultural technologies and encouraging farmers to adopt advanced practices that surpass the traditional methods currently implemented in their fields [7]. Despite its substantial contribution to rural development, agricultural extension faces several challenges, including the declining number of extension agents relative to the growing number of farmers, as well as limitations in effectively delivering technical information to agricultural producers. With the rapid advancement of information technology, the concept of "electronic agricultural extension" (E-Extension) has emerged to support the work of agricultural extension agents through internet-based communication. Social media platforms such as Facebook *, WhatsApp *, and YouTube have become effective tools for disseminating agricultural technologies and exchanging agricultural information [8]. These platforms are increasingly considered preferred channels for receiving and sharing agricultural knowledge and innovations [9]. Despite the growing interest in the use of social media and internet-based technologies in agricultural extension, previous studies have mainly focused on farmers as end users of these technologies. Comparatively, limited attention has been given to assessing the role of social media platforms in disseminating agricultural technologies from the perspective of agricultural workers, who are directly responsible for planning and implementing extension activities. Furthermore, empirical evidence on the use of Facebook, YouTube, and WhatsApp in agricultural extension remains limited in the Iraqi context, indicating the need for further investigation.

* Facebook и WhatsApp, упоминаемые в статье, принадлежат компании Meta, признанной экстремистской организацией и запрещенной на территории Российской Федерации.
Facebook and WhatsApp, referenced in the article, are owned by Meta, a company designated as an extremist organization and banned in the Russian Federation.

Facebook, for example, is widely used to establish communication groups between farmers and extension agents for knowledge exchange and immediate consultation, in addition to facilitating the sharing of written, audio, and visual materials [10; 11]. YouTube is utilized to publish educational videos demonstrating the use of agricultural machinery and technologies, including irrigation techniques, fertilization methods, and pest management practices, while providing detailed visual explanations [12]. Similarly, WhatsApp enables the creation of instant communication groups between farmers and extension personnel, thereby facilitating the rapid exchange of technical recommendations and practical solutions to agricultural problems [13]. Consequently, agricultural extension agents must possess adequate knowledge and skills related to modern communication technologies and effectively employ them in transforming extension services into educational programs that enhance farmers' technical awareness regarding important crops such as maize. These technologies also contribute to transferring agricultural research findings to farmers in ways that suit their conditions and encourage the adoption of sound agricultural practices [14]. Agricultural workers constitute a key component of the agricultural extension system because they act as intermediaries between agricultural research institutions and farmers. Their perceptions of the effectiveness of social media platforms can provide valuable insights into the opportunities and challenges associated with the dissemination of agricultural technologies through digital extension approaches. One of the most significant achievements of the technological revolution in communication and information systems is that geographical distance is no longer an obstacle to the exchange of information at local, regional, or international levels. The integration of mobile phone technologies with satellite communication technologies has enabled the rapid transfer of news, information, and technological updates, making it increasingly difficult for any authority to conceal information from the public [15]. Social media platforms have become effective means for disseminating agricultural information and technologies, evolving continuously alongside technological developments and modern innovations [16]. These platforms facilitate the rapid delivery and dissemination of information and technologies to large numbers of people and have become dominant communication tools that penetrate nearly all sectors of society [17].

Basically, Social media platforms are characterized by their rapid dissemination capabilities, as a single piece of information can spread globally and be shared among millions of users within minutes. These technologies provide substantial opportunities for agricultural extension personnel to improve their professional performance, enhance interaction with farmers, and facilitate access to extension materials at relatively low costs. Moreover, social media applications have become widely accessible through mobile phone networks, allowing communication and information dissemination in almost any location while simultaneously providing educational and extension materials directly through mobile devices [18]. These platforms serve as important tools for transferring and exchanging information worldwide and have become highly influential in the field of agricultural extension [19]. Platforms such as WhatsApp, Facebook, and YouTube have become integral parts of daily life for communication and entertainment, and both public and private sectors increasingly employ them in various fields, including marketing and agricultural awareness activities [20].

In light of the widespread availability of modern communication technologies, particularly the internet, and their accessibility to all individuals regardless of specialization or orientation, the researcher was motivated to investigate the role of these communication technologies in disseminating agricultural technologies related to maize cultivation from the perspective of agricultural employees in Al-Alam District. Accordingly, this study was designed to answer the following research questions:

1 – What is the role of the internet in disseminating modern agricultural technologies for yellow corn cultivation from the perspective of agricultural employees in Al-Alam district in general?
2 – What is the role of the internet in disseminating agricultural technologies for yellow corn cultivation from the perspective of agricultural employees in Al-Alam district, according to the platforms represented by... (Facebook, YouTube, WhatsApp)?
3 – What is the ranking of the platforms (Facebook, YouTube, WhatsApp) in descending order for disseminating agricultural technologies related to yellow corn cultivation, from the perspective of agricultural employees in Al-Alam District?
4 – Is there a variation in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation, from the perspective of agricultural employees in Al-Alam District, according to personal factors such as (age, gender, years of service, participation, and orientation)?

Al-Alam District was selected as the study area because of its agricultural importance and the increasing need to employ modern communication technologies to support agricultural extension activities and facilitate the dissemination of agricultural innovations among farming communities.

This study contributes to the agricultural extension literature by providing empirical evidence on the role of Facebook, YouTube, and WhatsApp in disseminating modern agricultural technologies related to yellow maize production from the perspective of agricultural workers. The findings are expected to support the development of more effective e-extension programs and enhance the utilization of digital communication platforms in agricultural technology transfer.

Research Objectives:

1 – To identify the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam District in general.

2 – To identify the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam District, according to the platforms represented by Facebook, YouTube, and WhatsApp.

3 – To rank the platforms represented by Facebook, YouTube, and WhatsApp in descending order according to their role in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam District.

4 – To determine the variation in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam District, according to personal factors represented by age, gender, years of service, participation, and attitude. Statistical Hypotheses:

The statistical hypotheses were formulated based on the studied independent factors, as follows:

1 – There are no statistically significant differences in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation, according to the age groups of agricultural employees in Al-Alam District.

2 – There are no statistically significant differences in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation, according to the gender groups of agricultural employees in Al-Alam District.

3 – There are no statistically significant differences in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation, according to the years of service of agricultural employees in Al-Alam District.

4 – There are no statistically significant differences in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation, according to the participation in extension activities related to yellow corn, according to the participation of agricultural employees in Al-Alam District.

5 – There are no statistically significant differences in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam District, according to their attitudes towards using the internet to obtain information about modern agricultural technologies.

Operational Definitions:

1 – Internet: A communication network between individuals, whether via mobile phone or computer, for obtaining agricultural information, communicating with experts and relevant authorities, and following developments in yellow corn cultivation through websites.

2 – Dissemination of Modern Agricultural Technologies: This refers to delivering information and modern agricultural innovations related to yellow corn cultivation to farmers through agricultural employees in the agricultural division of Al-Alam District, using social media platforms.

3 – Agricultural Employees: Employees working in agricultural departments in Al-Alam District who hold agricultural qualifications.

4 – Participation: The participation of agricultural employees in extension activities related to yellow corn cultivation in Al-Alam District.

MATERIALS AND METHODS

Relevance and Subject Area

The research problem is formulated in a generally understandable manner. The study examines the role of the internet, and particularly digital platforms like

Facebook, YouTube, and WhatsApp, in the dissemination of modern agricultural technologies related to yellow maize production, from the perspective of agricultural workers. In this respect, the topic corresponds to a current and relevant research area in terms of the increasing importance of digitalization and e-extension applications in agricultural extension.

Although previous studies have examined the use of information and communication technologies in agriculture, limited attention has been given to the role of the internet in disseminating modern agricultural technologies among agricultural employees in Iraq. This study addresses this gap by focusing on Al-Alam District, where yellow maize is an important crop requiring continuous technological updates. Agricultural employees play a central role in transferring agricultural knowledge and innovations to farmers; therefore, understanding their perceptions of the internet's role can provide valuable insights for strengthening digital extension services. The study contributes empirical evidence from a local context that remains insufficiently represented in the literature.

Research Population

The research population comprised all agricultural employees in Al-Alam District, totaling (31) employees distributed across three agricultural departments, as shown in Table 1.

Table 1
Distribution of Agricultural Employees in the Research Population Across Agricultural Departments in Al-Alam District

No.	Agriculture Directory	Number
1	Al-Alam Division	16
2	Hamrin Agriculture Division	5
3	Agricultural Research Station	10
—	SUM	31

Questionnaire Design: After reviewing previous studies, literature, and conducting interviews with specialists, a questionnaire was designed consisting of two parts. The first part included independent variables related to agricultural employees, namely age, gender, years of service, participation, and attitude. The second part included 19 items, each representing a technique in the cultivation and management of yellow corn. Three alternatives were provided for each item: high, medium, and low.

Measurement of Independent Variables

1. Age: Measured by the number of years the respondent was old at the time of data collection.
2. Gender: Measured using the alternatives (male and female), with values of 1 and 2 assigned, respectively.
3. Years of Service: Measured by asking the respondent about their years of service in agricultural departments.
4. Position: Measured using the alternatives (employee, unit head, and division head), with values of 1, 2, and 3 assigned, respectively.
5. Participation: This was measured using two alternatives (participant, non-participant), which were assigned values of 1 and 2, respectively.
6. Attitude: This was measured using six statements, three positive and three negative. The alternatives (agree, neutral, disagree) were provided for each statement. The positive statements were assigned values of 1, 2, and 3, respectively, and the negative statements were assigned values of 1, 2, and 3, respectively. Thus, the values representing attitude ranged from 6 to 18.

Measuring the Dependent Variable

The role of the internet in disseminating agricultural technologies related to yellow corn was measured from the perspective of agricultural employees in Al-Alam district. This was done using nineteen items representing modern agricultural technologies for cultivating the crop. The alternatives (great, medium, small) were provided for each item, and the values representing the role of each platform ranged from 19 to 57 numerical values. The values representing the role of the internet in general ranged from 57 to 171.

Statistical Methods and Tools

To achieve the research objectives, Microsoft Excel and SPSS were used, along with several statistical tools, including:

1 – Range: Used to distribute the independent variables into categories according to the following formula [21]:

$$\text{Range} = \text{Highest value} - \text{Lowest value}.$$

Class width = (Variable range) / Number of classes (results rounded to the nearest whole number).

2 – Arithmetic Mean: Used to describe the research variables and to calculate the mean of the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees, according to the following formula [22]:

$$\overline{X} = \frac{\Sigma xi}{h}.$$

3 – Standard Deviation: Used to describe the deviations of values from their arithmetic means for the variables included in the research [23] according to the following law:

$$S.d = \sqrt{\frac{\sum xi^2 - \frac{\left(\sum xi\right)^2}{n}}{n-1}}.$$

4 – T-test: Used to determine the significance of differences in the reasons for reluctance with the two-category independent factors [24]

$$T = \frac{\left(x^{-}1 - x^{-}2\right)}{sp\sqrt{sp\left(\frac{1}{n1} + \frac{1}{n2}\right)}}.$$

5 – One-Way Analysis of Variance (ANOVA).

Used to determine the significance of differences between the arithmetic means of variables divided into three or more categories, according to the following formula [25]:

$$F = \frac{S^2 B}{S^2 W}.$$

RESULTS AND DISCUSSION

The results were presented and discussed according to the following research objectives:

The first objective: To identify the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam district in general.

The values representing the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the respondents' perspective in general ranged between (107–148), with a mean of (128.71) and a standard deviation of (9.18). The respondents were divided into three groups based on range and group length, and the results are shown in Table 2.

Table 2
Distribution of Respondents by Level of Perceived Internet Role in Disseminating Yellow Corn Technologies

Categories	Number	Percentage	Average
Low (107–120)	7	22.58	117.71
Average (121–134)	18	58.06	128.39
High (135–148)	6	19.36	142.51
SUM	31	100%	—

Table 2 shows that more than half of the respondents fall into the middle category, with a percentage of (58.06) and an arithmetic mean of (128.39). This is followed by the low category, with a percentage of (22.58) and an arithmetic mean of (117.71). Thus, the role of the internet in disseminating agricultural technologies related to yellow corn is moderate. This may be due to the lack of training courses for agricultural staff in using the internet and how to record and send extension messages via internet platforms.

The second objective: To identify the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam district, using the following platforms:

1. Facebook: The values representing the role of Facebook in disseminating agricultural technologies related to yellow corn, from the respondents' perspective, ranged between (27–49), with a mean of (39.00) and a standard deviation of (5.98). The respondents were divided into three categories based on the range and length of the category, as shown in Table 3.

Table 3
Levels of Facebook's Role in Disseminating Modern Yellow Corn Cultivation Technologies as Perceived by Respondents

Categories	Number	Percentage	Average
Low (27–34)	8	25.81	31.00
Average (35–42)	15	48.38	39.33
High (43–50)	8	25.81	46.37
SUM	31	100%	—

Table 3 shows that the highest percentage was in the middle category, with a percentage of 48.38 and a mean of 39.33. Therefore, the role of Facebook in disseminating agricultural techniques related to yellow corn, from the respondents' perspective, is considered moderate. This may be due to the use of Facebook for personal and social purposes, rather than exchanging agricultural information on the platform for dissemination among farmers.

2. YouTube: The values representing the role of YouTube in disseminating agricultural techniques related to yellow corn, from the respondents' perspective, ranged between 35 and 59, with a mean of 47.35 and a standard deviation of 5.75. The respondents were divided into three categories based on range and category length, and the results are shown in Table 4.

Table 4
Distribution of Respondents According to Their Perceived Role of YouTube in Disseminating Modern Yellow Corn Cultivation Technologies

Categories	Number	Percentage	Average
Low (35–42)	6	19.36	40.16
Average (43–50)	15	48.38	45.86
High (51– over)	10	32.26	53.90
SUM	31	100%	—

Table 4 shows that the highest percentage was in the middle category, with a percentage of (48.38) and a mean of (45.86), followed by the high category, with a percentage of (32.26) and a mean of (53.90). Thus, the role of YouTube in disseminating agricultural techniques for yellow corn, from the respondents' perspective, is moderate to high. This may be because YouTube is considered an effective and essential platform for widely disseminating modern agricultural techniques for yellow corn due to its simplified, easy-to-understand visual content.

3. WhatsApp: The values representing the role of WhatsApp in disseminating agricultural techniques for yellow corn, from the respondents' perspective, ranged between (35–53), with a mean of (42.36) and a standard deviation of (4.34). The respondents were divided into three categories based on range and category length, and the results are shown in Table 5.

Table 5
Distribution of Respondents According to Their Perceived Role of WhatsApp in Disseminating Modern Yellow Corn Cultivation Technologies

Categories	Number	Percentage	Average
Low (35–40)	10	32.26	37.90
Average (46–41)	16	51.61	42.81
High (47– over)	5	16.13	49.81
SUM	31	100%	—

Table 5 shows that the highest percentage is in the middle category (51.61%) with an average of 42.81%, followed by the low category (32.26%) with an average of 37.90%. Thus, the role of WhatsApp in disseminating agricultural techniques related to yellow corn, from the respondents' perspective, is average and tends towards low. This may be because WhatsApp uses only text messages for information exchange and lacks the ability to clearly explain the guidance message and its application.

The third objective was to rank the internet platforms (Facebook, YouTube, and WhatsApp) in descending order based on their role in disseminating agricultural techniques related to yellow corn cultivation, from the perspective of agricultural employees in Al-Alam district.

The internet platforms were ranked in descending order according to the arithmetic mean, and the results are shown in Table 6.

Table 6
Ranking of Internet Platforms by Their Role in Disseminating Modern Yellow Corn Cultivation Technologies

No.	Social Media	Mean	Order
1	YouTube	47.35	1
2	WhatsApp	42.36	2
3	Facebook	39.00	3

Table 6 shows that YouTube ranked first among the platforms. This may be due to its ability to effectively disseminate and clarify guidance messages through audio and video, and the ease with which internet users can access its educational content.

The fourth objective: To determine the variation in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam District, according to the following personal factors:

1. Age: The ages of the respondents ranged from 22 to 51 years. They were divided into three age groups according to the range law to determine their views on the role of the internet in disseminating modern agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam District, Salah al-Din Governorate. The highest percentage of employees was found to be in the younger age group. To determine the significance of the differences between the mean scores of the age groups, one-way ANOVA was used, and the results are shown in Table 7.

Table 7 shows that P > 0.05, where it reached 0.000. Therefore, we reject the statistical hypothesis stating that there are no statistically significant differences in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam district, according to age groups. To determine the source of the variance, the LSD test was used, and the results are shown in Table 8.

Table 8 shows that the difference between the (young: elderly) and (middle: elderly) categories favors the elderly. This may be because older employees are more aware of the rapid spread of modern agricultural technologies via the internet compared to the traditional extension methods they relied on.

2. Gender: The respondents were divided into two gender groups. Males scored lower than females. To test the significance of the differences between the male and female groups, a t-test was used, and the results are shown in Table 9.

Table 9 shows that the P > 0.05 value supports the statistical hypothesis that there are no statistically significant differences in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation, from the perspective of agricultural employees in Al-Alam district, based on gender.

Table 7
Results of One-Way ANOVA for Differences in Respondents' Perceptions According to Age Group

T	Categories	Number	Percentage	Average Size of Determinants	Value F	Level Probability	Significance Statistics
1	Young adults (23–33) years	11	35.48	124.91	11.308	0,000	Significantly
2	Middle age (34–42) years	13	41.94	125.92			
3	Elderly people (43 and 54)	7	22.58	139.86			
	SUM	31	%100	128.71			

Table 8
Results of the LSD Post Hoc Test for Differences According to Years of Service

Categories	Mean Difference	Probability Level	Significance Statistical
Young: elderly	1.01	.7290	Non-significant
Middle: elderly	14.95*	.0000	Significant
Elderly people	13.94*	0.000	Significant

Table 9
Results of the Independent-Samples t-Test for Differences According to Gender

Gender	Number	Percentage	Mean	Value t	Probability Level	Significance Statistics
Males	24	77.42	127.46	1.422	0.1860	Non-significant
Females	7	22.58	133.00			
SUM	31	100%	—			

3. Years of Service: The values representing the number of years of service for employees ranged from 1 to 21 years. These employees were distributed into three categories according to this range. To determine the significance of the differences in the means of these categories, one-way ANOVA was used, and the results are shown in Table 10.

Table 10
One-Way ANOVA Results by Years of Service Category

T	Categories	Number	Percentage	Mean	Value F	Level Probability	Significance Statistics
1	Young adults (23–35) years	16	51,61	126.38	5.297	0.011	Significantly
2	Middle age (36–48) years	6	19,35	126.17			
3	Elderly people (49 and over)	9	29,04	136.11			
—	SUM	31	%100				

Table 10 shows that P > 0.05, where it reached 0.011. Therefore, we reject the statistical hypothesis stating that there are no statistically significant differences in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation from the perspective of agricultural employees in Al-Alam district, according to their years of service. To determine the source of the variance, the LSD test was used, and the results are shown in Table 11.

Table 11
LSD Test Results by Years of Service Category

Categories	Mean Difference	Probability Level	Significance Statistical
Short: Middle	.0.21	.9550	Non-significant
Short: Long	9.73*	.0050	Significant
Middle: Long	9.94*	.0190	Significant

Table 11 shows that the source of the discrepancy between the (short: long) and (medium: long) service categories favors the long service category. This may be because employees with long service are aware of the importance and speed of using modern methods in disseminating agricultural technologies, in addition to saving time and effort. This makes them appreciate the role of the internet in spreading modern agricultural technologies, particularly those related to yellow corn.

4. Participation: The respondents were divided into two participation categories. It was found that the participating category had a higher average score than the non-participating category. To test the significance of the differences between the averages of the two categories, a t-test was used. The results are shown in Table 12.

Table 12
T-Test Results by Participation Category

Categories	Number	Percentage	Mean	Value t	Probability Level	Significance Statistics
Participant	22	70,97	131.95	3.657	0.001	Significant
Non- Participant	9	29,03	120.78			
SUM	31	%100				

Table 12 shows that the p-value is > 0.05. Therefore, we reject the statistical hypothesis stating that there are no statistically significant differences in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation, from the perspective of agricultural employees in Al-Alam district, based on their participation in yellow corn extension activities. This may be because agricultural employees participating in yellow corn extension activities tend to follow online publications about cultivation technologies and attempt to share them with farmers.

Table 12 shows that the p-value is > 0.05. Therefore, we reject the statistical hypothesis stating that there are no statistically significant differences in the role of the internet in disseminating agricultural technologies related to yellow corn cultivation, from the perspective of agricultural employees in Al-Alam district, based on their participation in yellow corn extension activities.

5. Attitude: The values expressing the respondents' attitude towards using the internet to obtain modern agricultural information ranged between (8–16). They were divided into three categories to determine their viewpoint on the role of the internet in disseminating technologies related to yellow corn crops in Al-Alam district. It was found that the third category (positive) obtained the highest average among the categories. To test the significance of the differences between the averages of the categories, one-way analysis of variance was used, and the results were shown in Table 13.

Table 13
ANOVA Results by Attitude Category Toward Internet Use for Agricultural Information

Categories	Number	Percentage	Mean	Value F	Probability Level	Significance Statistical
Negative (8–11)	4	22.58	123.00	1.450	0.252	Non-significant
Neutral (11–13)	16	48.39	128.06			
Positive (14–16)	11	29.03	131.73			
SUM	31	100%				

Table 13 shows that (P > 0.05) where it reached (0.252). Therefore, we accept the statistical hypothesis that states (there are no statistically significant differences in the role of the Internet in disseminating agricultural technologies related to the cultivation of yellow corn from the point of view of agricultural employees in Al-Alam district according to the categories of attitude towards using the Internet to obtain information about modern agricultural technologies).

CONCLUSIONS

In light of the research findings, we can conclude the following:

1 – Urgent Need for Digital Training and E-Extension: Based on the finding that the majority of respondents perceive the internet's current role as moderate, it is concluded that agricultural staff in Al-Alam District (Salah al-Din Governorate) urgently require specialized training programs. These programs should focus on leveraging e-extension methods to effectively formulate and disseminate modern agricultural technologies related to yellow corn crops.

2 – The Superiority of Interactive Visual Content (YouTube): Since YouTube ranked first among the evaluated social media platforms, it is concluded that agricultural extension employees strongly prefer video-based, explanatory content. Visual demonstrations are highly effective because they engage multiple senses simultaneously, thereby simplifying complex agricultural processes and management practices for yellow corn cultivation.

3 – Significance of Demographic and Professional Factors: The existence of statistically significant variations in the perceived role of the internet based on age, years of job service, and prior participation in extension activities leads to a crucial conclusion. Policymakers and extension administrators must strategically consider these personal and professional factors when assigning, training, and distributing tasks to employees tasked with spreading modern agricultural technologies.

4 – Bridging the Gap from Neutrality to Active Digital Adoption: Because nearly half of the surveyed agricultural employees maintained a "neutral" attitude toward using the internet for modern agricultural information, it is concluded that there is a critical need to enhance their awareness. Developing their cognitive understanding of the internet's value will motivate them to fully embrace it as a vital mass communication tool capable of effectively transferring agricultural innovations to farmers.

Recommendations:

1. To provide training courses for agricultural staff in the study area on how to create and publish extension messages via the internet.
2. To guide respondents to use YouTube as a platform for disseminating extension messages and urgent recommendations related to weather fluctuations and the spread of certain diseases, in order to reach the largest possible number of farmers quickly.
3. To encourage agricultural staff to follow the official YouTube channel of the Ministry of Agriculture, which publishes educational videos on modern agricultural technologies.

4. To encourage agricultural staff to produce field videos and document successful local experiences in cultivating yellow corn and other crops, and publish them via the internet. 5. To develop the attitudes of agricultural staff in the Al-Alam district towards using the Internet in extension work as an interactive tool that helps spread modern agricultural technologies and work on creating special groups for farmers.
5. Future research should consider larger and more geographically diverse samples, include farmers as primary beneficiaries of extension services, utilize actual social media usage data, and examine the effects of digital extension and e-publishing applications on farmers' knowledge, attitudes, and adoption of modern agricultural technologies.

Contributions

A. H. Al-Dokhi: conceptualization, project administration, writing-original draft.

K. J. Al-Harawi: investigation, methodology, data curation.

S. A. Khalaf: formal analysis, data analysis, writing-review & editing.

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А. Х. Аль-Дохи: разработка концепции, административное руководство исследовательским проектом, написание черновика рукописи.

Х. Д. Аль-Харави: проведение исследования, разработка методологии, курирование данных.

С. А. Халаф: формальный анализ, написание рукописи – рецензирование и редактирование.

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