Reasons for summer vegetable farmers' reluctance to protected agriculture from the perspective of agricultural Employees in Anbar Governorate

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Abstract

This research aimed to study the reasons for the reluctance of summer vegetable farmers to protected agriculture from the perspective of agricultural employees in Anbar Governorate in general, as well as to identify the differences in the respondents' viewpoints regarding the reasons for this reluctance, according to the independent factors represented by (Origin , number of years of employment, training in the field of protected agriculture, and sources of information about protected agriculture).were selected 93 agricultural employees were randomly , and a questionnaire consisting of (47) items distributed across five domains was prepared. The data was collected and analyzed using Excel and the SPSS statistical program, along with some statistical formulas. The results showed that the reasons for this reluctance were generally of high importance. The researchers concluded that summer vegetable farmers in greenhouses suffer from real problems that led to their reluctance to continue adopting this technology. The results also showed a discrepancy in the respondents' views regarding the reasons for reluctance to adopt greenhouse farming and the independent factors (years of service, training , and sources of information). The researchers concluded that these factors are important for agricultural extension agents in their extension work and communication with farmers. The results also showed no discrepancy in the respondents' views regarding the reasons for reluctance and the independent factor (origin). The researchers concluded that agricultural extension agents in Anbar Governorate, whether from rural or urban areas, communicate with farmers and are aware of their circumstances; therefore, their views on the reasons for reluctance do not differ significantly. The researchers recommend that relevant authorities consider the reasons that led to farmers' reluctance to adopt greenhouse farming in Anbar Governorate and address the problems and obstacles to ensure farmers continue cultivating vegetables in greenhouses.

Keywords: Food security , protected agriculture, agricultural employees .

Introduction and research problem :

The agricultural sector is among vulnerable sectors to risks, especially climatic ones such as wind, rain, temperature fluctuations, droughts, desertification, and agricultural pests (1). Modern agricultural technologies are considered an important means of increasing agricultural production, requires the transfer and dissemination of these technologies among farmers to encourage their adoption and use in agricultural operations (15from the modern agricultural technologies that agricultural extension services have sought to promote is protected agriculture, which allows for the production of high-quality agricultural products year-round, surpassing the quality of products from open fields (6). Therefore, protected agriculture is a pivotal element in modern agriculture, and this technology has achieved advance technological advancements. It is characterized by the use of protective structures and ventilation systems. The adoption of protected agriculture has facilitated maximizing the quantity and quality of agricultural products for vegetable crops, rationalizing the efficient use of water

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and soil resources, and ensuring a year-round food supply (10). The adoption of new agricultural ideas and methods depends on the nature and type of expertise being sought. Several characteristics of new innovations accelerate their adoption, such as comparative advantage, degree of complexity, and testability (14) Despite the importance of protected agriculture in providing crops out of season, as this technique creates a suitable climatic environment for plants, protecting them from weather conditions, especially very low or very high temperatures, storms, and heavy rainfall, and also protecting plants from birds, animals, and other threats (21), several limitations discourage farmers from adopting this technique. These include the need for the initial infrastructure, a shortage of skilled labor in protected agriculture, and the requirement for meticulous supervision and continuous monitoring (20). The agricultural policy adopted by the state also has a huge impact on determining agricultural production patterns through numerous programs, plans, and a range of operations, such as agricultural lending and granting low-interest loans to farmers to finance agricultural operations and provide production inputs such as machinery, seeds, fertilizers, pesticides, greenhouse supplies like structures and covering materials, and labor costs (4) Protected agriculture in the country generally suffers from a lack of or complete absence of modern agricultural technologies (19). A large part of the in agricultural production in Iraq is attributed to the continued use of traditional production methods and the limited adoption of modern technology (12). Despite advancements and modern technologies in agriculture, skilled labor remains a fundamental element in agricultural production, especially in the field of protected agriculture (7). The agricultural extension service is one of the most important bodies responsible for transferring information and technology to farmers. Therefore, an extension service capable of effectively conveying information to beneficiaries is essential (11). Agricultural extension agents act as key agents of change by translating complex scientific research into practical advice that farmers can adopt and apply in the field. They educate farmers on diverse issues, such as pest control, irrigation techniques, and methods for improving soil fertility (16). Agricultural extension services involve providing farmers with the necessary information to solve agricultural problems and training them in innovative agricultural practices for adoption and implementation in the field to increase production. Agricultural extension is considered an important agricultural and policy strategy used by governments to encourage the growth of agricultural production(8). Vegetable crops are among the most important food sources needed by members of society on a daily basis (17). They are plants that are greatly affected by environmental factors. Greenhouses (plastic or glass greenhouses) are the most important structures for protected agriculture, as they provide an ideal and controlled environment for plant growth (9). Therefore, Anbar Governorate witnessed the launch of greenhouse technology through loans from the agricultural initiative launched by the government in 2008 to support the agricultural sector and address water scarcity and environmental conditions. Despite the spread of protected agriculture in the governorate, many greenhouse vegetable farmers have retreated and refrained from continuing to adopt this technology. According to statistics from the Anbar Agriculture Directorate, there has been a significant decline in the number of greenhouses and farmers, with the number decreasing from (1484) greenhouses in 2022 to (914) greenhouses in 2024 (5). To understand the reasons for the reluctance of many farmers to continue adopting this technology, the current study was conceived to answer the following research questions.

1-What are the reasons for the reluctance of summer vegetable farmers in Anbar

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Governorate to protected agriculture, from the perspective of agricultural employees in general?

2-What is the descending order of the study fields according to the perspective of agricultural employees in Anbar Governorate?

3-Are there differences in the perspectives of agricultural employees regarding the reasons for the reluctance of summer vegetable farmers in Anbar Governorate to protected agriculture, based on personal variables such as (Origin , years of job service, Training in the field of protected agriculture, and Sources of information)

-Study Objectives:

1-To identify the reasons for the reluctance of summer vegetable farmers in Anbar Governorate to protected agriculture, from the perspective of agricultural employees.

2-To rank the study field in descending order according to the perspective of agricultural employees in Anbar Governorate.

3-To identify the differences in the perspectives of agricultural employees regarding the reasons for summer vegetable farmers' reluctance to protected agriculture in Anbar Governorate, according to personal variables such as (Origin , years of job service, Training in the field of protected agriculture, and Sources of information about protected agriculture

-Statistical Hypotheses:

1-There are no significant differences in the reasons for summer vegetable farmers' reluctance to protected agriculture, according to the perspective of agricultural employees in Anbar Governorate By origin category

2-There are no significant differences in the reasons for summer vegetable farmers' reluctance to protected agriculture, according to the perspective of agricultural employees in Anbar by years of job service

3-There are no significant differences in the reasons for summer vegetable farmers' reluctance to protected agriculture, according to the perspective of agricultural employees in Anbar Governorate by Training in the field of protected agriculture.

4-There are no significant differences in the reasons for summer vegetable farmers' reluctance to protected agriculture, according to the perspective of agricultural employees in Anbar Governorate by Sources of information .

procedural of definitions

1-Reasons for Reluctance: The obstacles that prevent or hinder summer vegetable farmers from continuing to adopt protected agriculture within greenhouses.

2- . Summer vegetable farmers: These are farmers who adopted the cultivation of summer vegetables (tomatoes, cucumbers, eggplants, peppers) in protected agriculture (greenhouses) and then withdrew and refrained from cultivating them for several reasons in Anbar Governorate..

3-Protected Agriculture: An agricultural technology that provides a suitable environment for the cultivation and production of summer vegetable crops in specific facilities known as greenhouses, with the aim of providing crop products outside their normal growing seasons by providing suitable environmental conditions for their cultivation, growth, and production **4-Agricultural employees**: All employees with a scientific qualification in the field of agriculture working in the Anbar Governorate Agriculture Directorate and its affiliated agricultural divisions.

Materials and Methods

Study Methodology-

The descriptive approach was adopted to achieve the research objectives. This approach relies on studying the phenomenon and providing a precise description of it. It is expressed qualitatively by describing the phenomenon, its characteristics, and the

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surrounding factors, and then quantitatively by giving the phenomenon a numerical description that clarifies its magnitude, size, and degree of correlation with other phenomena (3)

-Study Area

Anbar Governorate was chosen as the study area because it is famous for its cultivation of summer vegetables using greenhouse farming methods. Furthermore, a large number of farmers have abandoned greenhouse farming for summer vegetable production.]

-Study Population and Sample

The research population represents the sum of the statistical units to be studied that share the basic characteristic to be analyzed. A statistical population must be well-defined (18). The study population included all agricultural employees in the agricultural divisions affiliated with the Anbar Governorate Agriculture Directorate, totaling 22 divisions. A 50% sample was randomly selected, resulting in 11 divisions included in the study, employing 232 agricultural staff. A pilot sample of 30 agricultural employees was selected to conduct the initial test of the questionnaire. The final research sample size was determined to be 40%, resulting in a final number of 93 respondents, as shown inTable(1)

Table (1) Study population and sample

No	Agricultural Division	Research community	exploratory sample	Research sample
1	Al-Jazeera	13	1	5
2	Anah	18	2	7
3	Al-Amiriya	26	5	10
4	Al-Habaniya	39	6	16
5	Al-Furat	6	1	2
6	Al-Muhammadi	7	1	3
7	Al-Baghdadi	20	2	8
8	Al-Rumana	12	1	5
9	Rawah	10	1	4
10	Al-Fallujah	77	10	31
11	Al-Rutba	4	-	2
	Total	**232**	**30**	**93**

Preparing the Questionnaire Form:

The questionnaire form was initially prepared by reviewing scientific sources and previous studies, consulting with experts and specialists, and formulating it according to the research problem, its objectives, and the type of data it would receive. The questionnaire consisted of two main parts, as follows

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Part One: It included a set of questions concerning the personal and social aspects of the respondents, which included(**origin , years of job service, training in the field of protected agriculture, and sources of information).**

Part Two: This included a scale consisting of (47) items to be answered using a five-point Likert scale, distributed across five main fields related to the reasons for farmers' reluctance to protected agriculture, as shown in Table

Table (2) of the fields and items included in the questionnaire in its final form

No	Field	Number of paragraphs
1	Reasons related to farmers First field	10
2	Economic reasons Second field	12
3	Reasons related to the agriculture extension Third field	11
4	Fourth field Environmental factors	7
5	Fifth field Reasons related to government policy and support	7
	Total paragraphs in the fields	47 paragraphs

Measuring Reliability and Validity:
Reliability refers to the ability of a test instrument to produce the same results if the test is repeated under similar conditions (2). After collecting and processing the data from the pilot sample, the scale's reliability coefficient was calculated using Cronbach's alpha, yielding a value of 0.91. To determine the scale's validity, the square root of the reliability coefficient was taken, resulting in a value of 0.95. This indicates the scale's suitability for collecting the final research data

Measuring Study Variables:
Measurement is defined as the process of quantitatively describing information using numbers to describe, arrange, and organize data in an easy-to-understand and objective format (13).

Measuring Independent Variables:

1-Origin: This variable was measured using the two alternatives (rural, urban), and the following weights were assigned: (2, 1) respectively.

2-years of job service: This was measured by the number of years of service of the respondent at the time of data collection.

3-Training in Protected Agriculture: This was measured using the alternatives (trainee, non-trainee), and the values (1, 0) were assigned, respectively.

4- Sources of information: This variable was measured by identifying (6) sources of information and placing the following alternatives in front of 'each of them (often, sometimes, rarely, I do not get them). The values (3, 2, 1, 0) were given respectively, and thus the level of communication ranges between (0 - 18) degrees.

Measuring the Dependent Factor:

The reasons for summer vegetable growers' reluctance to use protected agriculture were measured using (47) items distributed across five domains. Each item was presented with five

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alternatives: ((Very important, Important, Moderately important, Little important, Not important)). The values assigned were (5, 4, 3, 2, and 1) respectively. Thus, the values representing the reasons for the farmers' reluctance ranged between (47 and 235) points, as shown in Table -3-

Table (3) Distribution of scale scores by field of study

No	Field	Number of paragraphs	Field scale
1	Reasons related to farmers	10	50 – 10
2	Reasons related to Economic reasons	12	60 – 12
3	Reasons related to the extension aspect	11	55 – 11
4	Environmental factors	7	35 – 7
5	Reasons related to government policy and support	7	35 – 7
	Total	47	235 – 47

Statistical methods:

To achieve the research objectives, data must be categorized, analyzed, and the results presented in their final form. The following statistical methods were used:

)Range, arithmetic mean, standard deviation, Cronbach's alpha coefficient, t-test, and one-way ANOVA)

Results and Discussion

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

First Objective: To identify the reasons for summer vegetable farmers' reluctance to protected agriculture from the perspective of agricultural employees in Anbar Governorate in general.

The values indicating the reasons for summer vegetable farmers' reluctance to protected agriculture from the perspective of agricultural employees in Anbar Governorate in general ranged between (151-223) points, with an overall mean of (196.96) and a standard deviation of (18.55). The respondents were divided into three categories according to the range law, as shown in Table (4)

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Table (4) Distribution of respondents according to the reasons for reluctance in Anbar Governorate in general

Categories	Number	Percentage	arithmetic mean
Low (151-174)(	14	15.05	164.42
Medium (175 – 198)	26	27.96	187.15
High (199 and above)(	53	56.99	210.37
Total	93	100	

Table (4) shows that the high category constituted the highest percentage at (56.99%), followed by the medium category at (27.96%), while the low category was (15.05%). Therefore, the reasons for farmers' reluctance to engage in protected agriculture, from the perspective of agricultural employees in Anbar Governorate, are described as moderate to high. This may be because the agricultural employees were in Continued with the farmers and knew what problems and obstacles the farmers were actually suffering from, which led to their reluctance to cultivate summer vegetables in greenhouses in Anbar Governorate.

Second Objective: Ranking the Study fields in Descending Order from the Perspective of Agricultural Employees:g The study **fields** were ranked in descending order according to the reasons for reluctance to participate, using the arithmetic mean. The results are shown in Table.(5)

Table (5) shows the ranking of the study fields in descending order using the arithmetic mean.

No	Field	Number of paragraphs	average	Rank
1	Economic field	12	49.96	1
2	extension field	11	45.45	2
3	Farmers' field	10	41.37	3
4	Government policy and support field	7	30.89	4
5	Environmental field	7	29.29	5

Table (5) shows that the economic field came in first place according to the reasons for reluctance from the point of view of the respondents, with an average of (49.96). This may be due to the high cost of establishing and maintaining greenhouses, due to the high prices of production inputs, plastic coverings, labor wages, and electricity. The extension field came in second place according to the point of view of the respondents, with an average of (45.45), and the field related to farmers came in third place with an average of (41.37). The field of government policy and support came in fourth place with an average of (30.89), while the environmental field came in last place with an average of (29.29). This is due to the fact that the reasons related to the environmental aspect have less of an impact on farmers' reluctance if the requirements for protected agriculture and

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suitable conditions for plant growth were available.

Third Objective: To identify the variation in agricultural employees' viewpoints regarding the reasons for summer vegetable farmers' reluctance to protected agriculture in Anbar Governorate, according to the following personal variables:

1-Origin:

The respondents were divided into two categories based on origin, as shown in Table (6). It was found that urban residents scored higher than rural residents. To test the significance of the differences between the average scores of the urban and rural categories, a t-test was used. The results are shown in Table(6)

Table (6) Results of the t-test according to origin categories

Category	number	Percentage	arithmetic mean	value of t	Probability value	Statistical significance
Urban	52	55.91	199.77	1.435	0.1550	Not significant
Rural	41	44.09	193.27			
Total	93	%100				

Table (6) shows that the value of

(p.v > 0.05) indicates that there are no significant differences between the averages of the origin categories. Therefore, we accept the statistical hypothesis that states: (There are no significant differences in the reasons for summer vegetable farmers' reluctance to protected agriculture from the perspective of agricultural employees in Anbar Governorate according to origin categories).

2- years of job service:

The values representing the number of years of service for employees ranged from (3-20) years. They were distributed according to this range into three categories, with the long service category obtaining the highest arithmetic mean. To determine the significance of the differences in the means of these categories, one-way analysis of variance was used, and the results are shown in Table (7)

Table (7): Results of Analysis of Variance by Category of years of job service

Category	number	Percentage	arithmetic mean	value of f	Probability value	Statistical significance
few (3-8)	40	43.01	186.98	9.232	.000 0	significant
Medium (9 - 14)	34	36.56	201.59			
long(15 - 20)	19	20.43	209.42			
Total	93	**%100**				

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Table (7) shows that the value of

(0.05 > p.v) reached (0.000). Therefore, we reject the statistical hypothesis stating that (there are no significant differences in the reasons for summer vegetable farmers' reluctance to protected agriculture from the perspective of agricultural employees in Anbar Governorate according to their years of job service). To determine the source of the variance, the LSD test was used, and the results are as shown in Table -8 -

Table (8) shows the results of the LSD test according years of job service.

Category	Differences in averages	Probability value	Significant
few: Medium	14.61*	0.0030	Significant
long: few	22.44*	0.0000	Significant
long : Medium	7.83	0.1830	Not significant

Table (8) shows that the source of the variance between the categories (short: medium) and the category (short: long) is in favor of the long service, and the reason may be that employees with a long service are more aware of the conditions of the region than others, which makes them aware of the problems facing greenhouse farmers and caused them to refrain from continuing to adopt that technology.

3-Training in Protected Agriculture:

The participants were divided into two groups based on their protected agriculture training. It was found that the trained Category achieved a higher average score than the non-trained Category

. To test the significance of the differences between the average scores of the two groups, a t-test was used. The results are shown in Table(9

Table (9) T-test Results by Protected Agriculture Training Categories

Category	Number	Percentage	arithmetic mean	value of t	Probability value	Statistical significance
Untrained	53	56.99	184.06	9.104	0.000	Significant
Trainee	40	43.01	213.93			
Total	**93**	**%100**				

Table (9) shows that the value of

(0.05 >p .v) therefore we reject the statistical hypothesis that states (there are no significant differences in the reasons for summer vegetable farmers' reluctance to protected agriculture from the point of view of agricultural employees in Anbar Governorate according to the training categories in the field of protected agriculture) and the reason may be that employees trained in the field of protected agriculture know the requirements for providing suitable conditions for the plant and the difficulty of providing them by farmers, which makes them know the reasons for farmers' reluctance to continue adopting protected agriculture.

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4-Sources of Information on Protected Agriculture:

The values representing the respondents' level of access to information sources ranged from 3 to 18. They were divided into three categories to determine their perspective on the reasons for farmers' reluctance to protected agriculture in Anbar Governorate. The "High" category had the highest average score among the categories. To test the significance of the differences between the averages of the categories, one-way ANOVA was used. (The results are shown in Table(10

Table (10) Results of ANOVA by Category of Information Sources

Category	number	Percentage	arithmetic mean	value of f	Probability value	Statistical significance
low (3-7)	19	20.43	181.58			
Medium(8-12)	43	46.24	196.60			
and above(13) high	31	33.33	206.71	8.915	0.000	significant
Total	93	**%100**				

Table (10) shows that the value of

(0.05> p .v). Therefore, we reject the statistical hypothesis that states (there are no significant differences in the reasons for summer vegetable farmers' reluctance to protected agriculture from the perspective of agricultural employees in Anbar Governorate according to the categories of sources of information on protected agriculture). To determine the source of the variation, the LSD test was used, and the results were as shown in Table - -.

Table (11) LSD test results by Category of Information Sources

Category	Differences in averages	Probability value	Significant
Low: Medium	15.02*	0.009	Significant
Low: High	25.13*	0.000	Significant
Medium: High	*10.1	0.039	Significant

Table (11) shows that the source of the variation is the difference in the averages of the communication category (low: medium), the category (low: high), and the category (medium: high). The reason mayg be that the respondents who are exposed to more sources about protected agriculture have more knowledge about the problems that farmers face in applying the technology, which makes them feel the reasons for farmers' reluctance to continue adopting this technology

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Conclusions:

1-The results showed that the reasons for summer vegetable farmers' reluctance to protected agriculture farming in Anbar Governorate are generally high, according to the respondents. We conclude from this that summer vegetable farmers in greenhouses suffer from real problems that have led them to abandon this technology.

2-Economic reasons were the most important among the reasons for summer vegetable farmers' reluctance to greenhouse farming in Anbar Governorate. We conclude from this that farmers need government support in providing production inputs.

3-The results showed a discrepancy in the respondents' views regarding the reasons for reluctance and the independent factors represented by (years of job service, Training in Protected Agriculture**,** sources of information). We conclude from this the importance of these factors for agricultural extension agents in their extension work and communication with farmers.

4-The results showed no difference in the views of the respondents regarding the reasons for reluctance and the independent factors (Origin). We conclude from this that the agricultural extension agents in Anbar Governorate, whether they are from the rural or urban, communicate with the farmers and know their circumstances, so their viewpoint does not differ much regarding the reasons for the farmers' reluctance to engage in protected agriculture.

Recommendations:

1- . The relevant authorities, namely the Directorate of Agriculture in Anbar Governorate and the Ministry of Agriculture, should consider the reasons that led to the reluctance of summer vegetable farmers to adopt protected agriculture, and address the problems and obstacles to ensure the continuation of protected vegetable farming by farmers.

2-Provide accessible loans and government support to protected vegetable farmers for production inputs, ensure fair prices for their produce, include protected vegetables in the agricultural plan, provide appropriate marketing, and activate the law protecting local produce to regulate vegetable imports during protected vegetable production seasons.

3-Intensify extension efforts and activities in the field of protected agriculture through extension programs, seminars, demonstration plots, and training courses to enhance farmers' knowledge and skills in their work.

4-Improve the efficiency of agricultural personnel in the field of protected agriculture by involving them in specialized courses and exposing them to scientific experiments and modern technologies in this field. 5- Conducting broader studies and research in this field to identify the causes and provide the necessary solutions and treatments to ensure the continuation of greenhouse vegetable cultivation, given the agricultural products it provides in light of climate change

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