Modern irrigation in Iraq: the challenges and obstacles facing its implementation and use

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Abstract:

The search aims to identify Factors affecting farmers' reluctance to use modern irrigation systems in Iraq and the study used the descriptive analytical method, and the study relied on the questionnaire as a tool for the study. The number of the study sample was 100 farmers and the study found the medium level of the R Factors affecting farmers' reluctance to use modern irrigation systems in Iraq where the main reasons were Low level of awareness of farmers about the importance of modern technology While the least important reason was the spread of illiteracy and the low level of education and the lack of sufficient interest from agricultural authorities in educating farmers on how to properly use modern technology while the medium level of the Reasons due to technology reluctance to use modern irrigation systems in Iraq, Iraq where the main reasons were High prices of modern technology beyond the capacity of farmers and Modern technological methods may not be commensurate with the capabilities and capabilities of farmers in Iraq While the least important reason was Some technological methods require special experience in dealing and the medium level of the Reasons for the concerned authorities' reluctance to use modern irrigation systems in Iraq, where the main reasons were the high level of interest on loans provided to farmers While the least important reason was the state's failure to provide adequate support to farmers in the prices of production inputs.

The study recommends the need to work on raising farmers' awareness of the importance of using technology in agricultural operations through agricultural extension workers clarifying the importance of using technology through practical experiences and applications, Attention to providing technological methods that are compatible with the Iraqi agricultural environment and working to provide the best modern agricultural technological means and methods and Encouraging researchers and academics to conduct more studies and research related to the use of modern technological methods in agriculture and how to raise farmers' awareness of the importance of applying this.

***Keywords**: Modern technology, agricultural environment, practical experiences and applications.*

INTRODUCTION:

The scarcity of water resources in Iraq in general was not the result of the current stage. It is one of the problems diagnosed since the seventies of the twentieth century when the riparian countries with Iraq, Turkey, Iran and Syria began activities to store the waters of the upper. Tigris and Euphrates rivers by constructing dams, reservoirs and irrigation projects on the course of the two rivers in their lands without consultation, With the downstream country (Iraq) **[9]** . Over the course of the twenty years that preceded the American occupation of Iraq, repeatedly tried to negotiate with those countries to reach solutions and understandings through diplomatic means in order to preserve its water rights, but it failed to do so because of the intransigence of the Turkish side on the one hand and because of the circumstances **[11].**

The Iran-Iraq war, which was raging at the time, had priority in the interests of the Iraqi state at the expense of other matters, At the end of the eighties and early nineties, the Iraqi political scene became more complex after

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published in 1999, and the first phases of its implementation began at the beginning of 2000, and the tasks of implementing the project's phases were entrusted to the Ministry of Agriculture **[7].**

Mention this project was established after the imposition of the embargo on Iraq in 1991, and the Ministry of Agriculture adopted the tasks of implementing it in the year 2000, under the direct supervision of the country's top leadership at the time.

due to the conditions of the siege imposed on Iraq, Iraq was exposed to a severe shortage in the availability of foodstuffs, foremost of which is the wheat crop, which is the basis for the availability of a loaf of bread. Iraq has now had to increase the production of grain and wheat in particular through:

1- Increasing the area planted with grain crops

2- Increasing the productivity of the dunums of these crops

Since the water resources available for agriculture are limited, it has become necessary to think of using modern techniques in agriculture to increase the cultivated area and increase productivity with the same amount of water used by traditional irrigation methods, which is provided by sprinkler irrigation methods. Iraq, where there were opportunities to import sprinkler and drip irrigation systems after implementing this program **[1]**.

MATERIALS AND METHODS

Research problem

The farmers' lack of irrigation with modern systems and their adherence to flood irrigation may be due to the high cost that the farmer bears from purchasing the equipment and machinery needed to create modern irrigation checks, in addition to the fact that modern irrigation systems need special expertise, which causes farmers to fear everything that is new because of they are accustomed to immersion irrigation for its ease.

In addition to the small area of agricultural land owned by most farmers, which makes it

Iraq's occupation of Kuwait and the subsequent war between Iraq and the coalition forces,. which was one of the most important direct results of the demolition of structures The state's infrastructure, the imposition of a siege on its people, and the collapse of the basic pillars of the Iraqi economy, foremost of which is the cessation of pumping and exporting oil abroad **[4**].

The first attempt to introduce modern irrigation techniques in Iraq was in the mid-seventies, when Iraq imported a limited number of drip irrigation systems to irrigate desert oases trees in Anbar Governorate from well water. Followed by the import of fixed sprinkler irrigation systems in addition to drip for use in agricultural research stations in different regions of Iraq **[7].**

The leadership of the state in Iraq began to think seriously about the use of modern irrigation techniques after the imposition of the embargo on Iraq in 1991 and the subsequent severe shortage in the availability of foodstuffs, especially grain crops. However, Iraq was not able at that time to import these technologies until 1996, after the implementation of oil in exchange for food and medicine in that year **[3].**

Since then, the state's effort has focused on adopting a national irrigation project aimed at increasing the yield of a dunum of grain and at the same time increasing the cultivated area of these crops without affecting the annual water quota for agriculture, which is provided by modern irrigation techniques represented by sprinkler and drip irrigation devices **[6].**

In light of the foregoing, the establishment of the "National Project for the Development of Irrigation Technologies" was approved, as the founding document of the project was

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The study population consists of farmers in the governorates of central Iraq. Because of the difficulty of conducting a comprehensive inventory of all members of the study population, the study used the sampling method by selecting a simple random sample of these farmers. The research conducted interviews with these farmers, and the study sample numbered 100 farmers.

Types of field irrigation systems in Iraq:

Crops are watered in several ways: flooding the entire field, directing water between rows of plants, spraying water through large sprinklers, or letting waterfall on plants through holes in pipes. The most common types of irrigation are **[5]** :

First - Tourist irrigation:

It is considered one of the simplest and most widespread irrigation methods known. It is considered the prevailing system for irrigating agricultural lands in Iraq, relying on the waters of the Tigris and Euphrates rivers. The average area of agricultural land relying on this irrigation system in Iraq is about 8.517 million dunums **[9].**

Second: Sprinkler irrigation**:**

This type of irrigation is used in Iraq on limited agricultural areas. Field experiments have proven the success of this type of irrigation by increasing the productivity of some crops grown in small areas such as (wheat, yellow corn, jet, eggplant), and work is underway to expand its use in the coming years. By focusing on cultivating the wheat crop primarily, the goal is to increase the area of land cultivated with wheat using the sprinkler irrigation method to about 3 million dunums, with an average productivity of about 840 kilograms per dunum in 2021 **[2].**

Third- Drip irrigation:

It is considered one of the most modern and efficient irrigation methods (Moursy, & Wasfy 2021) .This system was used narrowly and on very limited areas in Iraq, where it proved successful in field experiments for cotton and olive crops. This system led to an increase in productivity, the provision of irrigation water, a difficult to establish modern irrigation networks for them, and it is not economically feasible.

From the above, the research problem can be determined by what are the reasons for the reluctance of farmers in Iraq to use modern irrigation methods**.**

Research objective

The research seeks to achieve the following objectives:

1. Describe and diagnose the research variables represented in of Factors affecting farmers' reluctance to use modern irrigation systems in Iraq
2. Providing a theoretical and field framework for Factors affecting farmers' reluctance to use modern irrigation systems in Iraq
3. Testing the correlation and influence between the research variables.
4. Identify the Factors affecting farmers' reluctance to use modern irrigation systems in Iraq in the field of work
5. Presenting a set of recommendations to the surveyed retiling regarding the interest in Reasons for farmers' reluctance to use modern irrigation systems

Research Methodology

The current study used the analytical method, through which statistical methods used in analyzing the research data of questionnaire study achieve the objectives of the research.

Data Analysis

The research will use the SPSS to analyze the data of questionnaire using Alpha coefficient, Frequencies, percentages, mean, standard deviation, relative weight, Pearson correlation coefficient

Study population and sample

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previous studies related to the subject of the study. The five-degree Likert scale was used in answering the questions of the study tool and the questionnaire contained 21 phrases.

- Validate the study tool

The validity of the questionnaire's statements was calculated by calculating the Pearson correlation coefficients between each statement and the total score of the axis to which the statement belongs, in order to determine the level of internal homogeneity of the study tool.

reduction in water losses, and an increase in irrigation efficiency of up to about 85-95% compared to the efficiency of both sprinkler irrigation 60-80% and surface irrigation 40-60% **[2].**

RESULTS AND DISCUSSION:

The research will use the questionnaire form as a tool for the field study by preparing the questionnaire and its axes and phrases by using the theoretical framework of the study,

Table 1. Correlation coefficients between the score for each phrase and dimension

Phrase	Correlation coefficient	P-value
Reasons for farmers		
The spread of illiteracy and the low level of education	0.908**	0.000
The inability of farmers to deal with modern technology properly	0.872**	0.000
The small size of the areas that the farmer cultivates	0.783**	0.000
Low level of awareness of farmers about the importance of modern technology	0.808**	0.000
The low level of farmers' income and their inability to purchase modern technology in agriculture	0.764**	0.000
The lack of sufficient interest from agricultural authorities in educating farmers on how to properly use modern technology	0.908**	0.000
Decreased net profit that farmers get from the crops they grow	0.872**	0.000
Reasons due to technology		
Most of the technology used is that its operating systems are in foreign languages and not in Arabic	0.885**	0.000
High prices of modern technology beyond the capacity of farmers	0.830**	0.000
The methods of operating and using modern technology are difficult and complex	0.694**	0.000
Some technological methods require special experience	0.825**	0.000

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in dealing		
The inadequacy of some technological methods and systems for application in the Iraqi agricultural environment	0.731**	0.000
Technological methods contribute to reducing the workforce, which contributes to increasing agricultural unemployment	0.885**	0.000
Modern technological methods may not be commensurate with the capabilities and capabilities of farmers in Iraq	0.830**	0.000
Reasons for the concerned authorities		
The lack of sufficient interest from agricultural authorities in educating farmers on how to properly use modern technology	0.876**	0.000
The agricultural authorities' lack of interest in explaining the impact of the use of modern technology on the level of productivity and quality of crops	0.934**	0.000
The state's failure to provide adequate support to farmers in the prices of production inputs	0.883**	0.000
The high level of interest on loans provided to farmers	0.805**	0.000
Lack of interest from agricultural authorities to help farmers in marketing their crops	0.772**	0.000
The lack of sufficient interest from agricultural authorities to bring in modern technology suitable for the agricultural environment in Iraq	0.876**	0.000
The failure of the agricultural authorities to follow up and evaluate how to use modern technology	0.934**	0.000

** significance ($\alpha = 0.01$)

- Stability study tool

All correlation for questionnaire items was statistically significant in 0.01 and the tool has structural validity.

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Table 2. Stability questionnaire

Dimension	Alpha Cronbach	number of elements
Reasons for farmers	0.926	7
Reasons due to technology	0.904	7
Reasons for the concerned authorities	0.945	7
Total questionnaire	0.954	21

statements of the questionnaire axes and the stability of the tool used in the study.

Stability coefficient Alpha is greater than 0.6 for all dimension of the questionnaire, which confirms the validity and correlation of the

First: Personal data

Table 3. Sample according to Personal data

	Categories	**N**	**%**
Gender	Male	89	84.0
	female	17	16.0
Age	Less than 30 years	37	34.9
	From 30 to less than 40 years	58	54.7
	From 40 to less than 50 years	9	8.5
	50 years or more	5	4.7
Educational level	Doesn't know how to read and write	29	27.4
	below average	53	50.0
	Average	21	19.8
	above average	3	2.8
Years of experience	Less than 5 years	17	16.0
	From 5 years to less than 10 years	27	25.5
	From 10 years to less than 15 years	53	50.0
	15 years and over	9	8.5

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- The first dimension: Reasons for farmers **Second: the dimension of study**

Table 4. Phrases of the first dimension

N.	Phrase	Mean	S. D	Relative weight	Degree	Arrangement
1	The spread of illiteracy and the low level of education	2.566	1.179	0.513	Medium	5
2	The inability of farmers to deal with modern technology properly	2.717	1.128	0.543	Medium	4
3	The small size of the areas that the farmer cultivates	2.792	1.169	0.558	Medium	3
4	Low level of awareness of farmers about the importance of modern technology	2.953	1.174	0.591	Medium	1
5	The low level of farmers' income and their inability to purchase modern technology in agriculture	2.934	1.132	0.587	Medium	2
6	The lack of sufficient interest from agricultural authorities in educating farmers on how to properly use modern technology	2.566	1.179	0.513	Medium	5
7	Decreased net profit that farmers get from the crops they grow	2.717	1.128	0.543	Medium	4

Iraq, Iraq from the viewpoint of the study sample; where the mean of the dimension 2.749 and S.D 1.156

The all expressions of the Reasons for farmers dimension were in the medium plane and it shows the medium level of the Reasons for farmers' reluctance to use modern irrigation systems in

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farmers on how to properly use modern technology.

-The second dimension: Reasons due to technology

It turned out that the main reasons were Low level of awareness of farmers about the importance of modern technology while the least important reason was the spread of illiteracy and the low level of education and the lack of sufficient interest from agricultural authorities in educating

Table 5. Phrases of the second dimension

N.	Phrase	Mean	S. D	Relative weight	Degree	Arrangement
1	Most of the technology used is that its operating systems are in foreign languages and not in Arabic	3.371	0.993	0.674	Medium	2
2	High prices of modern technology beyond the capacity of farmers	3.491	0.949	0.698	Medium	1
3	The methods of operating and using modern technology are difficult and complex	2.991	1.397	0.598	Medium	4
4	Some technological methods require special experience in dealing	2.830	1.100	0.566	Medium	5
5	The inadequacy of some technological methods and systems for application in the Iraqi agricultural environment	3.255	1.273	0.651	Medium	3
6	Technological methods contribute to reducing the workforce, which contributes to increasing agricultural unemployment	3.371	0.993	0.674	Medium	2

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7	Modern technological methods may not be commensurate with the capabilities and capabilities of farmers in Iraq	3.491	0.949	0.698	Medium	1

It turned out that the main reasons were High prices of modern technology beyond the capacity of farmers and Modern technological methods may not be commensurate .with the capabilities and capabilities of farmers in Iraq While the least important reason was some technological methods require special experience in dealing.

The all expressions of the Reasons due to technology dimension were in the medium plane and it shows the medium level of the Reasons due to technology reluctance to use modern irrigation systems in Iraq, Iraq from the viewpoint of the study sample; where the mean of the dimension 3.257 and S.D 1.093.

-The third dimension: Reasons for the concerned authorities

Table 6. Phrases of the third dimension

N.	Phrase	Mean	S. D	Relative weight	Degree	Arrangement
1	The lack of sufficient interest from agricultural authorities in educating farmers on how to properly use modern technology	3.321	1.223	0.664	Medium	2
2	The agricultural authorities' lack of interest in explaining the impact of the use of modern technology on the level of productivity and quality of crops	3.226	1.368	0.645	Medium	4
3	The state's failure to provide adequate support to farmers in the prices of production inputs	2.896	1.585	0.579	Medium	5
4	The high level of interest on loans provided to	3.552	1.323	0.710	Medium	1

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	farmers					
5	Lack of interest from agricultural authorities to help farmers in marketing their crops	3.238	1.418	0.648	Medium	3
6	The lack of sufficient interest from agricultural authorities to bring in modern technology suitable for the agricultural environment in Iraq	3.321	1.223	0.664	Medium	2
7	The failure of the agricultural authorities to follow up and evaluate how to use modern technology	3.226	1.368	0.645	Medium	4

The all expressions of the Reasons for the concerned authorities' dimension were in the medium plane and it shows the medium level of the Reasons for the concerned authorities' reluctance to use modern irrigation systems in Iraq, Iraq from the viewpoint of the study sample; where the mean of the dimension 3.254 and S.D 1.358.

It turned out that the main reasons were the high level of interest on loans provided to farmers while the least important reason was the state's failure to provide adequate support to farmers in the prices of production inputs.

CONCLUSION:

1- The medium level of the Reasons for farmers' reluctance to use modern irrigation systems in Iraq, from the viewpoint of the study sample; where mean of the dimension 2.749 and S.D 1.156 .and the main reasons were Low level of awareness of farmers about the importance of modern technology. While the least important reason was the spread of illiteracy and the low level of education and the lack of sufficient interest from agricultural authorities in educating farmers on how to properly use modern technology.

2- The medium level of the Reasons due to technology reluctance to use modern irrigation systems in Iraq, from the viewpoint of the study sample; where the mean of the dimension 3.257 and S.D 1.093. and the main reasons were high prices of modern technology beyond the capacity of farmers and Modern technological methods may not be commensurate with the capabilities and capabilities of farmers in Iraq. While the least important reason was Some technological methods require special experience in dealing.

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3- The medium level of the Reasons for the concerned authorities' reluctance to use modern irrigation systems in Iraq from the viewpoint of the study sample; where the mean of the dimension 3.254 and S.D 1.358. and the main reasons were the high level of interest on loans provided to farmers .While the least important reason was the state's failure to provide adequate support to farmers in the prices of production inputs.

RECOMMENDATION:

1- The need to work on raising farmers' awareness of the importance of using technology in agricultural operations through agricultural extension workers clarifying the importance of using technology through practical experiences and applications.
2- Attention to providing technological methods that are compatible with the Iraqi agricultural environment and working to provide the best modern agricultural technological means and methods.
3- Encouraging researchers and academics to conduct more studies and research related to the use of modern technological methods in agriculture and how to raise farmers' awareness of the importance of applying this.

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