Agriculture College – Wasit University

Dijlah Journal of Agricultural Sciences

ISSN 2790 – 5985
eISSN 2790 – 5993

Dijlah J. Agric. Sci.، 5(2):66-76, 2026

Obstacles to Farmers Apply of Modern Irrigation Techniques in Jasan District, Wasit Province, Iraq

Ali Hashim Abdulrazzaq

College of Agriculture - Wasit University, Wasit, Iraq
Corresponding author: alihashim@uowasit.edu.iq

Abstract:

The research aimed to identify the personal characteristics of farmers in the study area, determine the obstacles that limit the use of modern irrigation techniques, and examine the correlational and regression relationships between the studied factors influencing farmers' adoption of modern irrigation technologies. The study targeted farmers affiliated with the Jassan Agricultural Division in Wasit Province. The research population consisted of approximately 1000 farms, from which a random sample representing about 10% was selected. Accordingly, the study sample included 100 farmers who represented the target group of the research. The results showed that the majority of the respondents were men (92%). Regarding the age variable, the highest proportion of respondents belonged to the middle-age group (53%). The findings also indicated that 58% of the respondents worked in agriculture as their main occupation, while most respondents had a high level of farming experience (75%). In addition, the annual non-agricultural income of the respondents was highest among the middle-income group (39%).The results further revealed a positive and statistically significant correlation at the 0.05 level between the dependent variable, represented by water scarcity obstacles, and several independent variables, including the level of education, the total number of family members, and annual non-agricultural income. Based on these findings, the study recommends attracting international agricultural companies specialized in modern irrigation technologies to the study area in order to support farmers and encourage them to adopt advanced water management practices.

Keywords: Irrigation techniques, modern irrigation, water, Wasit

Received:22/2/2026 **Accepted:13/25/2026** **Published:30/3/2026**

1. Introduction

Water and methods of use are considered one of the most important factor for the development, growth, and prosperity of the agricultural sector because water represents the most challenging factor for agricultural production. It is also one of the main pillars for achieving agricultural development and food security for society as a whole (Zaghloul et al., 2012). Modern irrigation techniques including sprinkler or drip irrigation are the modern and advanced irrigation methods that are widely used in many countries

of the world including developed and developing (Fouda: 2012; Allam,M.A. :2017). The goal is to provide water and economize on the quantities consumed to expand the agricultural area and increase productivity, meet the water needs of the agricultural sector, increase irrigation efficiency, and increase productivity and net income on the other hand (Dahash, 2016).

Iraq relies on two main rivers namely the Tigris and Euphrates. It is secure about 98% of its water needs, and despite Iraq's location at the bottom of the two river basins. It receives less water than before, about 30 billion m^3 in 1933 to about 9.5 billion m^3at the current time (Central Bureau of Statistics, 2021). It is expected that per person of water will reach (479) m^3 by 2030. This is considered a significant decrease in the per person, reaching below the water poverty point of (1111) m^3 per person annually (Malashkhia, 2003). This amount is far from the World Health Organization standard of 1,700 m^3 annually. This threatens food security, life and development (Musa, 2015). In order for agriculture to develop, all types of agricultural technological progress must be put into practical application, which is in line with the concept of agricultural extension in consciously influencing the minds of farmers by transferring information and knowledge to help them achieve that decision in using modern technology (Shehata, 2022).

It is necessary to change the current agricultural irrigation to rationalize the use of irrigation water as one of the strategies to preserve water resources, whether awareness or quantity (El-Hazek, 2016). To achieve the goals, the agricultural sector through its agricultural extension channels seeks to encourage farmers of all categories to apply modern technologies in agricultural fields, and to pay attention to advanced technologies that raise agricultural productivity (Abdulrazzaq, 2024). Therefore, the optimal use of water resources in the agricultural sector is considered one of the most important factors determining agricultural development in Iraq (Doss et al., 2023).

Technological progress leads to the introduction of modern improvements and the invention of new machines and equipment. This technology would save the time needed for the agricultural production process, which leads to increasing agricultural income for the farmer and society and achieving agricultural development in all fields (Abdulrazzaq, 2012). The problem of the research focused on the fact that water resources in Iraq face problems, the most important of which are drought, scarcity of rain, lack of water releases from the Tigris and Euphrates rivers, and indiscriminate consumption of cultivated areas to provide the demand for food. For that reason, the importance of implementing this research emerged to reach appropriate and effective solutions that limit the shortage of water resources and ensure efficient investment at the present time and provision for future generations.

1.1. Research Question:

This research seeks to examine the personal characteristics of farmers in the study area, identify the obstacles that prevent them from using modern irrigation techniques, and determine the relationship between farmers' characteristics and their adoption of modern irrigation technologies.

1.2. Research Objectives:

1- To identify the personal characteristics of the respondents.
2- To identify the obstacles that limit the use of modern irrigation techniques among farmers in the research area.
3- To determine the correlation and regression relationships between the studied factors affecting the use of modern irrigation techniques.

2. Research Methods

2.1. Justification for Choosing the Study Area (Jassan City)

The city of Jassan in Wasit Province was selected as the study area because it is considered one of the important agricultural regions in the province. The area is well known for cultivating strategic crops such as wheat and barley, in addition to various types of date palms. Agriculture represents a primary source of livelihood for many farmers in this region, and irrigation practices play a crucial role in sustaining agricultural production. Moreover, the area faces challenges related to water scarcity and the efficient use of water resources, which makes it an appropriate location to study the obstacles to adopting modern irrigation techniques. Therefore, Jassan provides a suitable environment for examining farmers' adoption of modern irrigation technologies and the factors influencing their use.

2.2. Data Collection

This study was conducted in the Jassan district of Wasit Province, which is located approximately 57 km east of the city of Kut. The research adopted the descriptive analytical method to address the research topic, as it is considered appropriate for studying social phenomena. The researcher used the survey method as one of the descriptive approaches to achieve the research objectives.

Data were collected using a questionnaire through personal interviews with farmers. After preparing the questionnaire, a pretest was conducted on ten farmers to ensure the clarity of the questions and the respondents' understanding of them. Based on the results of the pretest, several modifications were made, including deleting, adding, or rephrasing some questions and adjusting the order of others.

To ensure the reliability of the questionnaire, the Cronbach's Alpha coefficient was calculated to measure the internal consistency of the questionnaire items. The value of Cronbach's Alpha reached (0.82), which indicates a high level of reliability and confirms the suitability of the questionnaire for data collection.

The study population included all farmers affiliated with the Jassan Agricultural Division, which consisted of approximately 1000 farms. A random sample representing about 10% of the total farmers was selected. Accordingly, the final sample included 100 farmers who participated in the study.

2.3. Statistical Analysis

The study adopted the descriptive statistical method, and the collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). A number of statistical techniques were applied to achieve the objectives of the study. Descriptive statistics, including frequencies, percentages, and arithmetic means, were used to describe the characteristics of the respondents and to summarize the data. In addition, inferential statistical methods were employed to examine the relationships between the study variables. Simple linear regression analysis was also used to determine the effect of the independent variables on the dependent variable related to farmers' adoption of modern irrigation technologies.

3. Results and Discussion

3.1. Identifying the personal characteristics of the respondents

The results showed that the social and economic personal characteristics of the respondents, which included the following variables: gender, age of the respondents, level of education of the respondents, profession, number of years of experience, total number of family members, number of family members who work the land, who cultivate the land, income, annual income from agriculture, annual income from non-agriculture.

Table (1) The personal social and economic characteristics (n=100)

Variable	Class	Frequency	%	Mean	Rang	S.D

Gender	Male	92	92			273.0
	Female	8	8			
Age of the respondent/year	28-45	16	16	55.26	51	12.267
	45-62	53	53			
	62-79	31	31			
Education level	Not Edu.	24	24	3.43	6	2.016
	Reads and writes	8	8			
	Primary	31	31			
	Secondary	8	8			
	High	10	10			
	diploma	5	5			
	University	14	14			
Main job	agriculture	58	58	0.65	1	0.479
	Non-agriculture	42	42			
Number of experience/year	Less than 10	3	3	33.97	60	14.402
	10-20	22	22			
	More than 20	75	75			
Total number of family members	Less than 5	18	18	7.07	18	3.049
	5-10	63	63			
	More than 5	19	19			
Number of family members working on the land	non	5	5	2.80	5	1.263
	1-5	87	87			
	More than 5	8	8			
Who cultivates the land	The farmer himself	24	24	3.06	3	1.293
	A family member	8	8			
	worker	6	6			
	All above	62	62			
Home ownership	The farmer himself	55	55	1.65	2	0.686
	For Gov.	34	34			
	Other person	11	11			
Annual income from agriculture	Low	71	71	1.27	2	0.446
	Middle	27	27			
	High	2	2			
Annual income from non-agriculture	Non	1	1	1.09	3	0.797
	Low	26	26			
	Middle	39	39			
	High	33	33			

Source: calculated from the data of the research sample

The study examined the personal characteristics of the respondents in the research area. The sample included 100 farmers from the Jassan Agricultural Division. Results showed that the majority of respondents were male (92%), while females accounted for 8%, with a standard deviation of 0.273. This gender distribution reflects local social customs, which allow men greater freedom to access modern irrigation resources and participate in relevant training programs.

Regarding age, respondents were classified into three groups: youth (16%), middle-aged (53%), and elderly (31%), with a standard deviation of 12.267. The predominance of middle-aged farmers, many of whom serve as local leaders and early adopters, suggests that guidance programs could effectively encourage the spread of modern irrigation techniques.

The education level of respondents was diverse: illiterate (24%), able to read and write (8%), primary certificate (31%), secondary certificate (8%), high school (10%), diploma (5%), and university degree (14%), with a standard deviation of 2.016. The results indicate that most respondents had relatively low education levels, emphasizing the need for agricultural extension programs tailored to facilitate learning and adoption of modern technologies.

In terms of occupation, 58% of respondents practiced agriculture as their primary profession, while 42% considered it a secondary occupation (standard deviation 0.479). Experience in agriculture was categorized as low (3%), medium (22%), and high (75%), with a standard deviation of 14.402, indicating that most respondents are highly experienced, which positively influences the adoption of modern techniques.

Family characteristics showed that 18% of respondents had fewer than five members, 63% had 5–10 members, and 19% had more than 10 members (standard deviation 3.049). Regarding labor on agricultural land, 5% of families did not contribute labor, 87% had 1–5 members working, and 8% had more than five members engaged, with a standard deviation of 1.263. Land cultivation was carried out by the farmer alone (24%), family members (8%), hired labor (6%), or a combination of these (62%), with a standard deviation of 1.293. These findings highlight the need for farm management programs, as the adoption of modern irrigation techniques may initially raise production costs.

Home ownership was distributed as follows: 55% owned their homes, 34% lived in state-owned homes, and 11% in homes owned by others (standard deviation 0.686). The majority owning their homes may positively influence their perception of modern irrigation investments.

Annual agricultural income was categorized as low (71%), medium (27%), and high (2%), with a standard deviation of 0.446, indicating that most respondents are low-income earners, which could negatively affect their willingness to adopt costly irrigation technologies. In contrast, non-agricultural income showed that 1% had no other income, 26% had low income, 39% had medium income, and 33% had high income, with a standard deviation of 0.797. This suggests that most respondents rely on a combination of agricultural and non-agricultural income, which could support investment in modern irrigation practices.

3.2. The simple correlation between the independent variables studied and the obstacles to using modern irrigation techniques represented by the three dependent variables.

The simple correlation coefficient was used to calculate the correlation between the independent variables: gender, age of the respondent, level of education, main occupation, number of years of experience, total number of family members, number of family members working on the land, who cultivates the land, household ownership, annual income from agriculture, annual non-agricultural income, and the three dependent variables, which were indicative constraints, economic constraints, and water scarcity constraints. The relationship of each independent variable was calculated separately with each of the dependent variables as follows:

Table (2) The simple correlation between the independent variables studied and the three dependent variables, which were indicative, economic, and water scarcity obstacles

Independent variables	**simple correlation coefficient**		
	Indicative	**economic**	**water scarcity**

Gender	0.083	0.012 -	0.194 -
Age of the respondent/year	* 242.0 -	0.196 -	* 0.243 -
education	** 0.492	* 0.248	** 0.272
Agriculture is the main job	* 0.226 -	** 0.309 -	* 0.205 -
No. experience/year	** 0.306 -	** 0.433 -	* 0.244 -
Total number of family members	0.055	** 0.271 -	** 0.338
No. members working on the land	0.116 -	** 0.479 -	0.116 -
cultivates the land	** 0.286 -	0.141 -	0.179 -
Home ownership	** 0.262	0.093 -	0.070 -
Annual income from agriculture	** 0.438-	0.136	0.102
Annual income from non-agriculture	** 0.460 -	0.094 -	** 0.421

** Significant at (0.01), * Significant at (0.05)

3.3. Detailed Correlation Analysis Between Independent Variables and Obstacles to Modern Irrigation Techniques

3.3.1. Age of Respondents

The correlation analysis showed an inverse significant relationship at the 0.05 level between the age of respondents and both guidance (indicative) and water scarcity obstacles, with correlation coefficients of -0.242 and -0.243, respectively. This indicates that as farmers' age increases, they report fewer indicative and water scarcity obstacles. This may be because older farmers tend to rely on traditional irrigation methods, have established routines, and are less likely to seek modern irrigation solutions. However, no significant correlation was found between age and economic obstacles, suggesting that financial challenges are experienced similarly across age groups. The research hypothesis is thus supported, and the null hypothesis rejected.

3.3.2. Level of Education

Education level exhibited a positive significant correlation with guidance and water scarcity obstacles at 0.05 ($r = 0.492$ and 0.272), and with economic obstacles at 0.01 ($r = 0.248$). This indicates that more educated farmers are more likely to encounter guidance-related tasks, manage economic considerations effectively, and address water scarcity issues. Education enhances farmers' ability to understand extension advice, adopt innovative practices, and plan resource management. Therefore, higher education levels positively influence engagement with modern irrigation methods. The research hypothesis is accepted, and the null hypothesis is rejected.

3.3.3. Main Profession

Farmers whose main profession is agriculture showed an inverse significant correlation with guidance obstacles at 0.05 ($r = -0.309$) and with economic and water scarcity obstacles at 0.01 ($r = -0.226$ and -0.205). This suggests that full-time farmers are less affected by these obstacles than those who practice agriculture as a secondary occupation. The practical interpretation is that continuous engagement in farming increases familiarity with techniques and resources, reducing the perceived difficulties in accessing guidance, managing economic constraints, and handling water scarcity challenges.

3.3.4. Years of Agricultural Experience

Experience in farming had an inverse significant correlation with guidance (r = -0.306) and economic obstacles (r = -0.433) at 0.01, and with water scarcity obstacles (r = -0.244) at 0.05. This means that farmers with more years of experience perceive fewer obstacles overall. Experienced farmers tend to rely on prior knowledge and skills, enabling them to overcome practical challenges more efficiently. Thus, the null hypothesis is rejected, confirming the hypothesis that experience plays a mitigating role in facing irrigation obstacles.

3.3.5. Total Number of Family Members

The total number of family members was inversely correlated with economic obstacles at 0.01 (r = -0.271), indicating that larger families reduce economic burdens through cooperative labor. Conversely, a positive correlation with water scarcity obstacles at 0.05 (r = 0.338) shows that larger families are more affected by water scarcity, possibly due to higher water demand for both domestic and agricultural needs. This highlights the dual effect of family size: it reduces labor costs but increases exposure to resource limitations.

3.3.6. Number of Family Members Working on Agricultural Land

The number of family members actively working on agricultural land showed an inverse significant correlation with economic obstacles at 0.01 (r = -0.479). This suggests that greater family labor reduces reliance on external hired labor, lowering costs and mitigating economic challenges in adopting modern irrigation methods. Cooperative family labor directly supports efficient farm management.

3.3.7. Land Cultivator

When the farmer cultivates the land personally, there is an inverse correlation with guidance obstacles at 0.01 (r = -0.286). This implies that farmers who manage their own land are more proactive in following extension programs, seeking guidance, and adopting modern irrigation practices, as opposed to land managed by others. Personal involvement in cultivation motivates engagement with technical and educational resources.

3.3.8. Household Ownership

Homeownership showed a positive correlation with guidance obstacles at 0.05 (r = 0.262). This suggests that farmers owning their homes may feel secure and less pressured by risk, encouraging them to participate in guidance programs and agricultural innovation. Conversely, those living in state-owned or rented homes may prioritize stability over experimental adoption of new techniques.

3.3.9. Annual Agricultural Income

Annual income from agriculture was inversely correlated with guidance obstacles at 0.01 (r = -0.438), indicating that higher agricultural income reduces perceived difficulties in accessing guidance and implementing modern irrigation. Farmers with more agricultural income have more resources to invest in training, equipment, and efficient irrigation methods.

3.3.10. Annual Non-Agricultural Income

Non-agricultural income showed an inverse correlation with guidance obstacles at 0.01 (r = -0.460) and a positive correlation with water scarcity obstacles at 0.05 (r = 0.421). Higher non-agricultural income enables farmers to participate in extension programs and adopt modern irrigation technologies. However, it also exposes them more to water scarcity challenges, likely due to increased agricultural activity supported by additional income.

Overall, the correlation analysis demonstrates that most independent variables—age, education, profession, experience, family composition, land cultivation, and income—have significant effects on one or more obstacles to modern irrigation techniques. The null hypothesis of no correlation is largely rejected, supporting the research hypothesis that these factors influence farmers' engagement with guidance, economic, and water scarcity challenges.

Table (3) the relative importance of the independent variables in their impact on the dependent variable using modern irrigation techniques by the respondents

Independent variables	regression coefficient	t value	Standard regression coefficient	Order
education	0 .192	3.418	0.216	first
Agriculture is the main job	0.193	1.865	0.290	second
cultivates the land	0.252	3.530	0.251	third
Annual income from agriculture	1.221	2.174	0.167	fourth
Annual income from non-agriculture	0 .166	2.767	0.147	Fifth
Number of family members working on the land	0 .054	0.775	0.155	Sixth
Years of Experience	0.135	1.622	0.133	Seventh

Source: Collected and calculated from the study sample data using SPSS

The results showed that the factor of the level of education of the respondents is of great importance in influencing the variable of obstacles to the use of modern irrigation techniques by the respondents. Followed by the one who cultivates the land, followed by the annual income from agriculture, followed by the annual income from non-agriculture, followed by the number Family members working on the land. Finally, the influence on the obstacles to the use of modern irrigation techniques by the respondents varies according to the number of years of experience (Table 3). It became clear that these variables were not significant, and this is due to the lack of familiarity with modern irrigation techniques by the respondents, the lack of familiarity with their importance, and the lack of an official website for the study area that contains extension services in the field of modern irrigation techniques that are appropriate to the capabilities of farmers and thus overcoming the obstacles that It prevents the use of modern agricultural techniques, including modern irrigation techniques.

3.4. suggested solutions from the respondents' point of view to solve the problems associated with modern irrigation techniques

The researcher asked the respondents a direct question to identify the most important proposed solutions to the problems they face while carrying out various agricultural works, especially those related to modern irrigation techniques. They are part of the solution and also have an active role in the success of agricultural extension programs. The results resulted in six proposed solutions, which were repeatedly mentioned among the respondents. The respondents were arranged in descending order as in the following table:

Table (4) suggested solutions from the respondents' related to modern irrigation techniques

suggested solutions from the perspective of the farmers	frequency	%
pay attention to providing modern and advanced irrigation equipment and techniques	93.8	93.8

having private companies with modern and advanced irrigation techniques that equip and rehabilitate irrigation systems	91.5	91.5
provide specialized agricultural extension staff with high training in the field of water management	88.6	88.6
hold courses for farmers in the use of modern irrigation techniques	82.3	82.3
increase government support to provide loans to purchase modern irrigation systems	76	76
provide a government center specialized in water and soil management in the research area	69	69

N=100 Source: Collected and calculated from the study sample data using SPSS

The results showed through the table above that the most important solutions suggested from the point of view of the respondents to overcome the problems they face related to modern irrigation techniques. The suggested of the necessity of paying attention to providing modern and advanced irrigation devices and techniques ranked first with a rate of (93.8%), as the respondents mentioned that, This was followed by the necessity of having private companies with modern and advanced irrigation techniques that equip and rehabilitate irrigation systems in second place, with a percentage of (91.5%) of the respondents. This was followed by the proposal of the necessity of providing specialized agricultural extension cadres with high training in the field of water management, in third place, with a percentage of (88.6%) of the respondents. The respondents then suggested the need to hold courses for farmers in the use of modern irrigation techniques, ranked fourth, with a percentage of (82.3%) of the respondents, then suggested the necessity of increasing government support to provide loans to purchase modern irrigation systems, ranked fifth, with a percentage of (76%) of the respondents. Finally, the respondents reported the proposal of the necessity of providing a government center specialized in water and soil management in the research area, ranked sixth and last, with a percentage of (69%) (Table 4).

4. Conclusions

Based on the findings of the study, the following conclusions can be drawn:

1. Demographic Characteristics of Farmers: The results revealed that the majority of farmers in the study area are male, middle-aged, possess relatively low educational levels, rely primarily on agriculture as their main occupation, and have substantial farming experience. These characteristics directly influence farmers' ability to adopt modern irrigation techniques. While extensive experience helps reduce perceived obstacles, educational level affects farmers' capacity to benefit from guidance, manage economic challenges, and address water scarcity issues effectively.
2. Obstacles to Adopting Modern Irrigation Techniques: Correlation analysis indicated significant relationships between several independent variables (age, education, profession, farming experience, family size, number of family members working on the farm, land cultivation practices, homeownership, and agricultural/non-agricultural income) and the dependent variables representing guidance, economic, and water scarcity obstacles. For instance, higher non-agricultural income increases engagement with modern irrigation methods but also heightens exposure to water scarcity challenges, whereas greater farming experience reduces guidance and economic obstacles. This highlights the importance of leveraging practical experience while providing technical and educational support.
3. Importance of Infrastructure and Institutional Support: Respondents emphasized the need for advanced irrigation devices and systems, specialized private companies, trained extension personnel, and continuous training programs. This underscores the critical need to develop agricultural infrastructure and provide farmers with both technical and financial support.
4. Role of Family and Cooperative Labor: Family size and the number of family members working on agricultural land play a dual role. While cooperative family labor reduces economic obstacles by

decreasing reliance on external workers, larger families may face greater water scarcity due to higher demand for water resources.

5. Recommendations

Based on the conclusions, the study offers the following recommendations to enhance the adoption of modern irrigation techniques in the study area:

1. Strengthen Agricultural Extension Programs: Establish specialized agricultural extension centers within each agricultural division, focusing on providing advisory services related to modern irrigation techniques and water management, supervised by trained and qualified extension personnel.
2. Provision of Modern Irrigation Technologies: Ensure the availability of advanced irrigation devices and systems that meet farmers' needs and local climatic and soil conditions, while facilitating access through affordable financing or loans.
3. Encourage Private Sector Participation: Support the establishment of private companies specializing in the installation, maintenance, and rehabilitation of modern irrigation systems, leveraging their expertise to enhance local adoption.
4. Farmer Training and Capacity Building: Conduct continuous training programs and workshops for farmers on the use of modern irrigation techniques, water management practices, and agricultural productivity improvement, with consideration of the farmers' educational levels.
5. Promote Research and Local Development: Support applied research and studies on modern irrigation technologies and disseminate findings among farmers to facilitate adoption and expand usage across Wasit Province.
6. Attract International Expertise: Engage international agricultural companies and organizations experienced in modern irrigation technologies under climates and soil conditions similar to Iraq to enhance local expertise and provide practical guidance to farmers.
7. Water Resource Management Strategies: Develop comprehensive strategies for managing water scarcity, including awareness campaigns on optimal water usage and waste reduction, integrated into extension and training programs.

References

1- Central Bureau of Statistics, Water (2020). Directorate of Agricultural Statistics, June, 2021, Ministry of Planning, Republic of Iraq, p. 3.

2- Abdulrazzaq, A. H. (2012). Factors affecting the utilization of information and communication technologies (ICTs) by agricultural extension workers in the Republic of Iraq (Doctoral dissertation, Cairo University). Pp 56-78

3- Abdulrazzaq, A. H., & Al-Rubaee, M. A. M. J. (2024). Extension Study of The Desires of Local and Imported Chicken Consumers in The City of Kut in Iraq دراسة ارشادية لرغبات مستهلكي الدجاج المحلي والمستورد في مدينة الكوت بالعراق. *Journal of the Advances in Agricultural Researches*, *29*(3), 417-427.

4- Allam,M.A. and Allam, G.A. (2017). Water Resources In Egypt : Future Challenges and Opportunities, IWRA, Water International, Vol(32),No(2).

5- Dahash F. J. (2016). Analysis of the impact of the use of modern irrigation techniques in water resources investment and the development of agricultural production in Iraq, Economics And Adminstration Studies Journal (EASJ), Vol. 1, No 8.

6- Doss ,Muhammad Muhammad Yahya, Taha Yassin Al-Adimi , Ali Kasim Ismael, (2023). The Level ofTomato Growers' Adoption ofModern Irrigation Techniques andTheir Impact onImproving Production andReducing Losses inIrrigation Water, African Journal of Advanced Pure and Applied Sciences (AJAPAS) Volume 2, Issue 4, October -December 2023, Page No: 156-165.

7- El-Hazek A. N. (2016). Challenges for Optimum Design of Surface Irrigation Systems, Journal of Scientific Research and Reports, Vol. 11, No. 6.

8- Fouda, Housna M. I. and M. I. A. El-Kholy (2012). Analytical Study Of The Factors Affecting Farmers Knowledge Of The Practices Of Rational Use Of Irrigation Water In Sharkia Governorate J. Agric. Econom. and Social Sci., Mansoura Univ., Vol.3 (12): 1759 - 1774, 2012.
9- Malashkhia, N. (2003). Social and environment constraints to the irrigation water conservation measures in Egypt, Malmo University, Sweden.
10- Musa, Haider Talib, (2015). The reality of human development in Iraq and ways of treatment with an indication of service of reality environmental and Muthanna Journal of Administrative and Economic Sciences, p.51.
11- Shehata, Gaber Ahmed Bassyouni, Abo Zaid M. El-Habal, Souzan I. El-Sharbatly, Ali H. Abdulrazzaq (2022). Impact of Farmers' Use of Information Technology to Improve Agricultural Marketing Extension Services in Wasit Governorate, Iraq. Advances in Social Sciences Research Journal. Vol. 9 No. p.p 300-314.
12- Zaghloul, E.A. (2012). Egyptian Needs and the Water Resources Under the Agreements Among the Nile River Basin Countries, Australian Journal of Basic and Applied Sciences, Vol.6,No.(4).