International Journal of Multidisciplinary Research and Growth Evaluation.

Wheat and Rice Production, Water Crisis and Drought in Iraq (Al-Rifai District / Dhi Qar Governorate as A Model)

Dr. Rashid Bani Shannan
Asst. Professor, Department of Oil and Gas Economics, Imam Al-Sadiq University, Dhi Qar Governorate, Iraq

* Corresponding Author: **Dr. Rashid Bani Shannan**

Article Info

ISSN (Online): 2582-7138
Impact Factor (RSIF): 8.04
Volume: 07
Issue: 03
May-June 2026
Received: 13-03-2026
Accepted: 11-04-2026
Published: 09-05-2026
Page No: 494-499

Keywords: Wheat, water crisis, rice

Abstract
Humanity is presently facing a substantial water scarcity dilemma, intensified by drought and population growth, as indicated by data from extrapolating reality and international organisations, including those associated with the United Nations. This dilemma endangers global food security and poses a threat to humanity's survival across social, economic, and cultural dimensions. The water crisis incites conflict and jeopardises regional and global peace, requiring cooperation to pursue equitable and legal resolutions to this urgent problem. The water crisis and drought, along with their direct impact on food security, provided a compelling impetus for addressing the issue, especially in light of the current Iraqi climate and the study's approach.

Introduction

The water problem has profoundly affected global agriculture, especially in Iraq, resulting in migration and the desertion of vast areas of arable land. Adverse climatic changes and severe droughts facilitate the proliferation of desertification, soil erosion, and environmental damage. The deficiency of agricultural product imports exacerbates hunger and poverty. The water issue has emerged as a source of conflict at local, regional, and global levels due to its increasing influence on food and national security, which is directly associated with political pressures and the coercion of vulnerable nations.

The environmental drought and water problem have profoundly impacted Iraq. Iraq faces a water crisis due to its reliance on external water sources, compounded by drought and desertification, jeopardising food security and agricultural productivity amid growing populations and volatile political and social circumstances.

A significant structural problem facing sustainable development in Iraq is the reconciliation of food security requirements with water limitations. Iraq ranks among the five nations most impacted by climate change, imposing dual pressures on its agricultural sector: the necessity to provide vital crops like wheat and rice for a population exceeding 43 million, and the diminishing historical water availability from the Tigris and Euphrates rivers, attributable to upstream nations' water management strategies and persistent drought conditions.

This paper examines the paradox of grain production in Iraq, highlighting the contrast between recent productivity improvements and the reduction of arable area caused by water limitations. In response to climate forecasts indicating sustained low precipitation and escalating desertification, the text examines the economic and environmental consequences of the nation's shift to groundwater and modern technologies as substitutes for conventional surface irrigation, evaluating the effects on national food security.

Problem Search

The problem lies in the fact that Al-Rifai district, which is one of the most important food baskets in Dhi Qar, has been exposed to a sharp decline in the areas cultivated with wheat and rice crops as a result of its location at the ends of rivers, which made it

the most affected by water scarcity. This deterioration has led to a disruption of local food security, and farmers have lost their sources of income, amid the inability of traditional technologies to adapt to the continuous decrease in water levels and the deterioration of its quality (high salinity).

Hypothesis Search

There is a statistically and spatially significant direct relationship between the decline in water inflows in the Shatt al-Gharraf and the shrinkage of areas cultivated with wheat and rice in the Al-Rifai district, where the water deficit has led to the district's transformation from a production surplus area to an area suffering from a gap in .local food security

Importance of the research

This study derives its value from the fact that it highlights a critical geographical area located at the ends of waterways, making it a real laboratory for measuring the efficiency of water policies in light of climate crises. It highlights the urgent need to provide an accurate diagnosis of the reality of agricultural deterioration that has affected wheat and rice crops in Al-Rifai district, as it represents a basic pillar for the economic and social stability of the region's inhabitants. The research also provides a modern scientific database that serves planning departments in drawing up a realistic roadmap for the fair distribution of water shares and ensuring the continuity of agricultural activity by adopting sustainable technical and water alternatives that contribute to reducing the phenomenon of rural migration and protect the lands from .the danger of desertification and productive extinction

Object Research

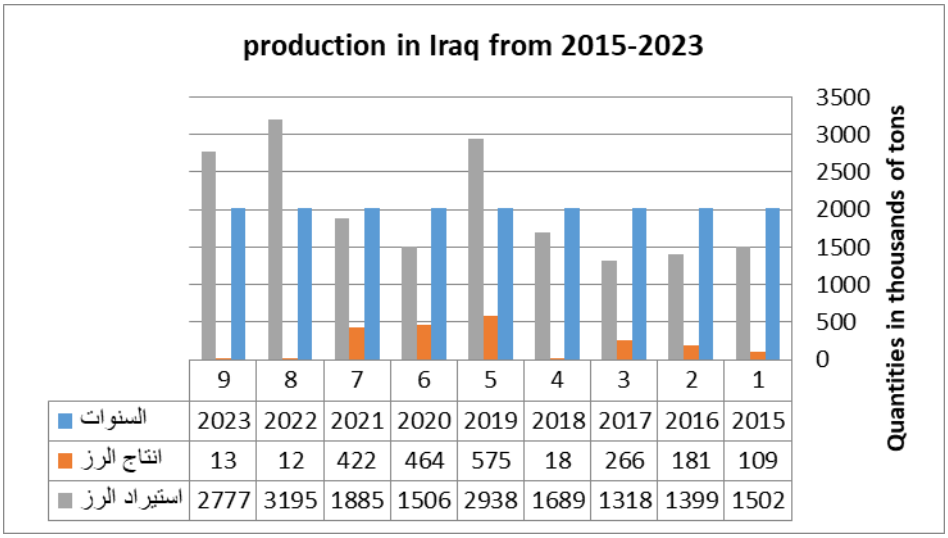
This research seeks to analyze and measure the impact of the continuous decrease in water resources on the reality of strategic crop production such as wheat and rice in Al-Rifai district, while attempting to reveal the nature of the spatial relationship between the decline in the flow of the Al-Gharraf River and the shrinking of the areas actually cultivated, and to determine the size of the production gap left by successive years of drought. The research also aims to evaluate the efficiency of the available alternatives for using groundwater and modern irrigation techniques compensating for the water shortage and to develop a scientific vision that contributes to providing practical proposals to decision-makers that ensure the restoration of the environmental and agricultural balance in the region and reduce the negative repercussions of drought on the economic and social levels of the district's residents

Methodology Research

This study relies on the descriptive analytical approach as a general framework for describing the geographical and climatic phenomena associated with drought and interpreting their numerical implications on the ,productivity of wheat and rice crops in Al-Rifai district with the use of the statistical approach to analyze data issued by the agriculture and water resources departments to compare the years of abundance and the years of water scarcity in Al-Rifai district

Rice production in Iraq, local needs, and food security

Rice is a staple food for Iraqis, second only to wheat (for bread). While wheat cultivation relies on irrigation and rainfall, rice cultivation is entirely different . It requires large quantities of irrigation water that remain with the rice plant until harvest. Rice cultivation cannot depend on the limited rainfall typical of Iraq's arid and drought-prone region. This scarcity of rain has led to the decline of rice cultivation . The water available and supporting rice cultivation is scarce, whether due to drought factors or through the main and important reason, which is the unfair Turkish control over the release of water shares of the Tigris and Euphrates .



	9	8	7	6	5	4	3	2	1
السنوات	2023	2022	2021	2020	2019	2018	2017	2016	2015
انتاج الرز	13	12	422	464	575	18	266	181	109
استيراد الرز	2777	3195	1885	1506	2938	1689	1318	1399	1502

Source:Food and Agriculture Organization (FAO)

Fig 1: Global information and early warning system on food and agriculture (GIEWS)

The lack of water had created severe damage and a sharp ,shortage in the land areas allocated for rice production and this was naturally reflected in the total crop during the year, which posed a serious threat to food security, as well as burdening the state budget with exorbitant sums to cover the shortage through importing rice in order to cover the need for local consumption .

According to official data from the FAO/GIEWS regarding rice production in Iraq for the period 2015-rice production in 2018 was approximately 18,000 ,2023

tons, while imports to cover this shortfall amounted to tons, representing a deficit of about 99% of the 1,689,000 total demand for that year . In 2022, rice production was tons, while imports reached 3,195,000 tons, also 12,000 representing a deficit of about 99%. The highest rice ,production was recorded in 2019, reaching 575,000 tons while imports amounted to 2,938,000 tons. Despite the increased production that year, the deficit still reached .%83

The Water Crisis and its Negative Impact on the Wheat Crop in Al-Rifai District

Al-Rifai is a district in the Dhi Qar Governorate, located in southern Iraq. Situated 80 km north of Dhi Qar towards Wasit Governorate, it is bordered by Maysan Governorate to the east and Muthanna Governorate to the west. Al-Rifai is characterized by its rural, agricultural, and historical character, as well as its vast reserves of crude ,oil. Dozens of modern oil wells are currently in operation and many more are ready for utilization. The city also boasts a rich archaeological history . It contains sites of ,ancient Sumerian civilizations such as Umma, Gokha Bismayah and Lagash, dating back to 2500 BC . The city of Al-Rifai is located on the banks of the historic Al-Gharraf River, whose formation is linked to the formation . of the Tigris and Euphrates rivers .

The Area of Arable Land and the Area Actually Cultivated in Al-Rifai District

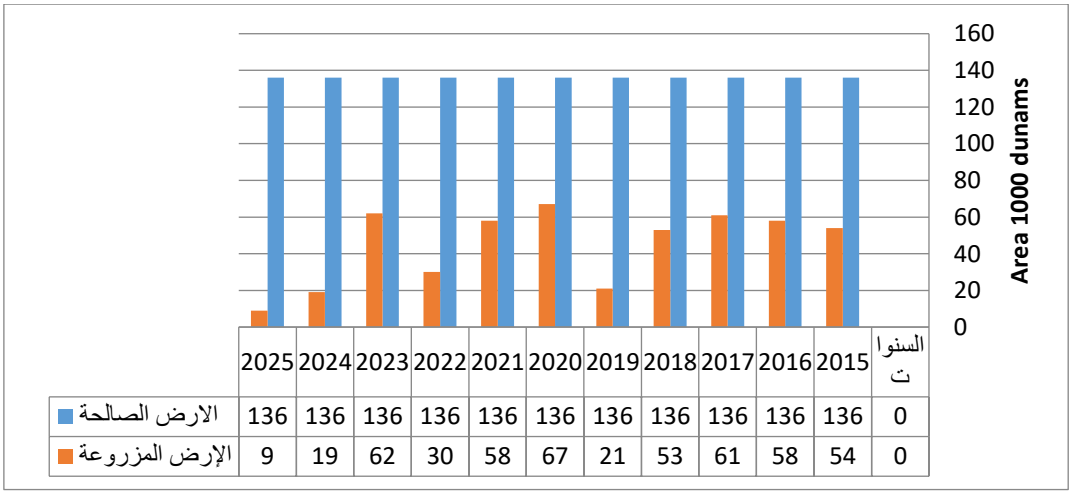
According to data from the Agriculture Directorate in Al-Rifai District dated December 15, 2025, the area of arable land is 136,000 dunams. However, the reality indicates that these vast areas are not being utilized, as evidenced by clear deterioration and a significant decrease in the area of cultivated land . This naturally leads to a substantial drop in wheat yields . Several other factors have contributed to this decline, in addition to the primary factor. In water scarcity, one of the negative factors is the .reduction of the irrigation area from one plot to another Water allocated for agriculture, as confirmed by the annual agricultural plans developed by the Department of ,Agriculture and communicated to it by higher authorities which are communicated to farmers, mandating their implementation and adherence to the directives against planting during the annual seasons . The indicator is in accordance with the established agricultural plan.

Through field monitoring, we note that the agricultural lands in Al-Rifai, far from the Al-Gharraf River, the main water supplier, which are usually irrigated from tributaries and small streams, are suffering from complete drought and the absolute lack of water for agriculture, for periods extending for more than a year. This situation has led to the damage of agricultural crops or the reluctance to cultivate them, the death of many palm trees and trees, the death of many animals, and the migration of wild birds .

A study conducted by the Badia Research Center at Al-Muthanna University in December 2012, in conjunction with the Directorate of Wells and Groundwater in southern Iraq, concluded that 1,100 cubic meters of water are needed to produce one ton of wheat. The study also indicated that relying on groundwater without planning and feasibility studies will negatively impact the water reserves. The drilling of artesian wells in the Samawah desert, along with the use of rudimentary irrigation methods and the excessive use of groundwater from these wells for cultivating economically unviable crops, poses a threat to the freshwater reserves in these areas. This is evidenced by the declining groundwater levels in these wells, particularly those near Lake Sawa

,available data, the highest use of arable land was in 2020 with cultivated land areas reaching 67,000 dunams out of a total area of 136,000 dunams, representing a usage rate of 49% of the total area

However, the lowest rate of agricultural land use was in ,when the cultivated area was 9,000 dunams ,2025 constituting 7% of the total agricultural land . In 2024, the cultivated area was 19,000 dunams, constituting 14% of the total cultivated area, and in 2019, the cultivated area was 21,000 dunams, constituting 15% of the total arable land(24)



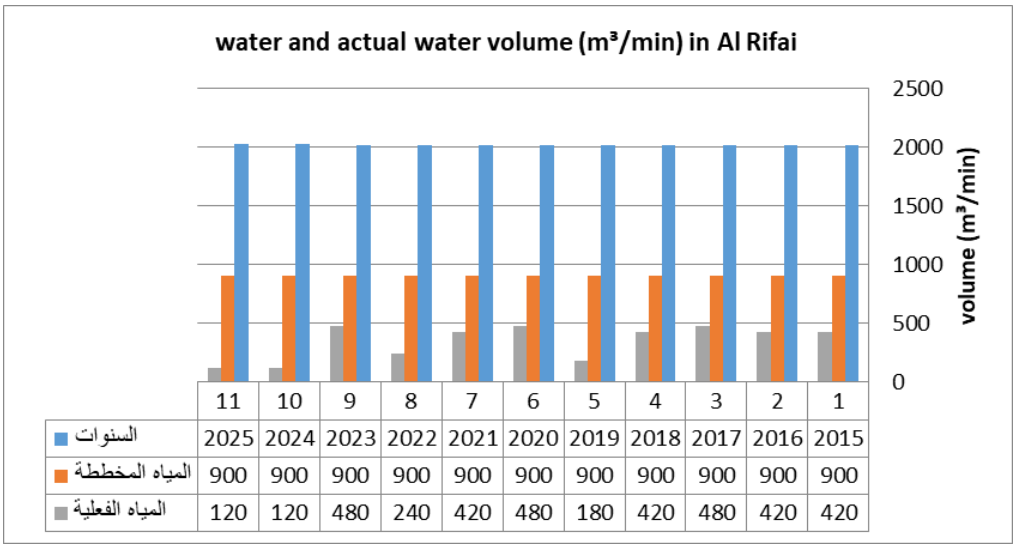
السنوات	2025	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
الارض الصالحة	136	136	136	136	136	136	136	136	136	136	136
الإرض المزروعة	9	19	62	30	58	67	21	53	61	58	54

Source: Directorate of Agriculture in Al-Rifai District / Dhi Qar Governorate, 15/12/2025

Fig 2:

According to data issued by the Irrigation Directorate in Al-Rifai District on December 15, 2025, the planned water supply for the agricultural sector in Al-Rifai City ,was estimated at 900 cubic meters per minute. However the actual and practical amounts released were significantly less than the allocated quota. The highest achieved rate for the years 2017, 2020, and 2023 was 480 cubic meters per minute, representing a substantial

shortfall of 47 % . The lowest supply level compared to the planned amounts was in 2019, when the supply was cubic meters per minute, representing an 80% 180 shortfall . In 2024, the supply was 120 cubic meters per minute, representing an 87% shortfall.

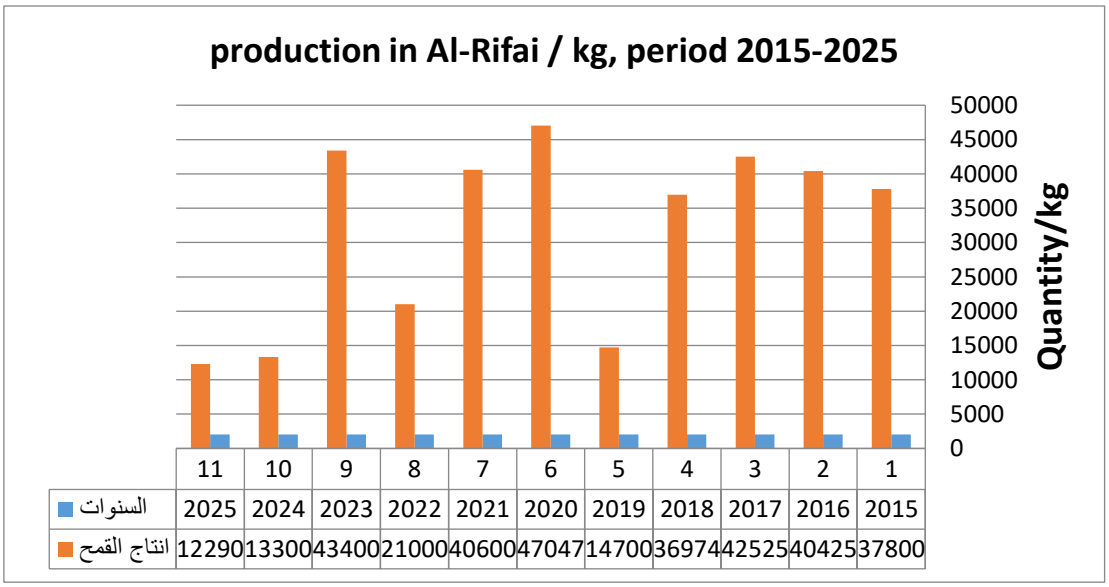


	11	10	9	8	7	6	5	4	3	2	1
السنوات	2025	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
المياه المخططة	900	900	900	900	900	900	900	900	900	900	900
المياه الفعلية	120	120	480	240	420	480	180	420	480	420	420

Source: Irrigation Directorate in Al-Rifai District / Dhi Qar Governorate, 15/12/2025

Fig 3:

This significant decrease in the volume of water releases has Its negative impact was reversed and directly affected the agricultural sector, the environment, and the activation of demographic change in the population, and wheat crop production in particular. (24)



	11	10	9	8	7	6	5	4	3	2	1
السنوات	2025	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
انتاج القمح	12290	13300	43400	21000	40600	47047	14700	36974	42525	40425	37800

Source: Directorate of Agriculture in Al-Rifai District / Dhi Qar Governorate, 15/12/2025

Fig 4:

Wheat Production in Al-Rifai District for the Period 2025-2015

The yield per dunam of wheat, or any agricultural crop, is ,affected by several factors, including soil fertility ,fertilizer availability, pesticide use, irrigation methods good management practices, and other factors. It appears that the most sensitive factor affecting land use and wheat ,yield in the Al-Rifai district is the allocated water release which has been low and has contributed to leaving large areas of arable land uncultivated . This neglect has led to the vulnerability of these uncultivated areas to desertification, erosion, and salinization.

The average yield per dunam of wheat was 700 kg Assuming full utilization of the 136,000 dunams of agricultural land, the hypothetical yield would be 95,200 ,tons (ninety -five tons and two hundred kg). However the practical reality, due to the scarcity of water allocated for agriculture,significantly impacted the total expected yield of the wheat crop. Productivity was at its highest in reaching a total yield of 47,047 tons (forty-seven 2020 tons and 47 kg), representing 49% of the total expected yield from the total area . The lowest wheat production occurred in 2025, reaching 12,290 tons (twelve tons and kg), representing 13% of the total expected yield. (25) 290

The Relationship Between Wheat Production Volume and Water Quantities According to the Agricultural Plan

With the decline in the size of the wheat yield characterized by a decrease and falling below the required level throughout the production years, it can be noted that the lowest level of production was affected by the shortage of water allocated for agriculture and work below the planned and established 900 cubic meters/minute. We note that in 2019 the wheat production reached 14,700 kg and the actual water allocation was low to 180 cubic meters/minute. In 2022 the production was kg and the actual water allocation was 240 cubic 21,000 meters/minute. In 2024 the wheat production was 13,300 kg and the actual water allocation was 120 cubic meters minute. In 2025 it constituted the lowest level of wheat/ production, which reached 12,290 kg and the actual water allocation was 120 cubic meters /minute due to the large decrease in the actual water quantities

,Despite being an agricultural city with abundant farmland and rice being a staple food for citizens after wheat, it is regrettable that rice cultivation is nonexistent, and there are no indications of this crop in the agricultural plans of the Al-Rifai Agriculture Directorate for the past years. It seems that the main reason is the problem of water scarcity, not only for wheat and rice cultivation, but it has expanded to become a suffering that citizens experience in their daily lives and for their personal uses, which has driven many citizens to leave the villages, abandon their land, and migrate to the city. The problem of rice cultivation cannot be limited to water scarcity alone, as ,other factors have contributed to entrenching the problem such as the failure of government policies and local administrations in managing economic and agricultural crises, and the absence of appropriate solutions, which has ultimately led to the deterioration of agriculture and ,agricultural production in Iraq in general, and logically these negative effects extend to the rest of the governorates, districts, and towns.

Conclusions

1. The study proved that Al-Rifai district suffers from a severe shortage of water releases because it is located at the "ends of rivers" (the tails), which deprives it of its fair share compared to the central regions
2. The shrinking of agricultural areas, and the significant decline in areas allocated for wheat and rice cultivation, as thousands of acres have gone out of service due to the drying up of the Al-Gharraf branch streams
3. The deterioration of soil quality, the decline in water levels, led to increased soil salinity levels, which negatively affected the quality of the "rice" crop and caused a decrease in the productivity per dunam of "wheat"
4. Traditional irrigation has failed: The results showed that flood irrigation methods are no longer viable in light of the current scarcity, and that they cause a great loss of limited water resources
5. Rural exodus: The study observed a worrying
6. demographic shift in Al-Rifai, where many farmers were forced to abandon their profession and migrate to city centers as a result of the cessation of agricultural production

Recommendations

1. Securing water quotas requires strict monitoring by the Ministry of Water Resources to ensure that water reaches the lower reaches of the streams in Al-Rifai and to prevent violations in the upper regions
2. Mandatory technological transformation, linking the provision of government support and loans to farmers to the use of modern irrigation systems (sprinkler and drip) to reduce consumption by up to 50%
3. Expanding the drilling of artesian wells in areas far from rivers, while providing desalination equipment (salinity pesticides) to ensure their suitability for .wheat cultivation
4. Providing hybrid wheat and rice seeds that are able to withstand drought and high salinity, which has recently increased in Al-Rifai district
5. Holding educational seminars for farmers in the district on “dry farming” and changing agricultural dates to suit current climate changes

Reference

1. UNESCO. The UN World Water Development Report 2024: Water for prosperity and peace. Paris: UNESCO; 2024.
2. United Nations World Water Assessment Programme (WWAP). UN World Water Development Report 2024. UNESCO, Paris; 2024.
3. UNESCO. Water crises threaten world peace: UNESCO report. 27 Mar 2024.
4. United Nations World Water Assessment Programme (WWAP). UN World Water Development Report 2024. UNESCO, Paris; 2024.
5. United Nations World Water Assessment Programme (WWAP). UN World Water Development Report (UN WWDR) 2025. 22 Mar 2025.
6. Ahmed MS. The upcoming water battles in the Middle East. Cairo: Arab Future House; 1991. p. 34.
7. Ahmed MS. The upcoming water battles in the Middle East. Cairo: Arab Future House; 1991. p. 49.
8. Ahmed MS. The upcoming water battles in the Middle East. Cairo: Arab Future House; 1991. p. 65.
9. Mukhaimer S, Hijazi K. The water crisis in the Arab region: facts and possible alternatives. Kuwait: Alam Al-Ma'rifah; 1996. p. 66.
10. UNESCO. The Iraq water crisis: report. 30 Sep 2025.
11. United Nations Office for Project Services (UNOPS). [Report/Publication details not provided].
12. UNESCO & European Union. National water sector of Iraq. [Report].
13. Bani R. Agriculture in Iraq. 1st ed. London: Dar Al-Rafid; 1991. p. 178.
14. Al-Mansour Journal. Vol 35, Issue 1; 2021. Al-Mansour University College, Baghdad.
15. Al-Bayan Center for Studies and Planning. The drought crisis in Iraq. 2022. p. 5.

16. Food and Agriculture Organization (FAO). Country Brief: The Republic of Iraq. Global Information and Early Warning System (GIEWS); 18 Sep 2025.
17. FAO. Global Information and Early Warning System (GIEWS) report. 27 May 2015.
18. Directorate of Agriculture, Al-Rifai District. Data report; 15 Dec 2025.
19. Irrigation Directorate, Al-Rifai District. Data report; 15 Dec 2025.
20. Directorate of Agriculture, Al-Rifai District. Data report; 15 Dec 2025.
21. Al-Muthanna University. Center for Desert and Lake Sawa Studies.

How to Cite This Article
Bani Shannan R. Wheat and rice production, water crisis and drought in Iraq (Al-Rifai District / Dhi Qar Governorate as a model). Int J Multidiscip Res Growth Eval. 2026 May–Jun;7(3):494–499.