



Vision Foundation
For Strategic Studies



Evaluating The Environmental Crisis and Food Security Challenges in Iraq and the Kurdistan Region

VFSS
Studies Department

Category of Publication: Strategic Analytical Research

Topic: Environmental Economy and Food Security

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The conclusions and recommendations presented in this paper reflect the view of the researcher and do not necessarily represent the official position of the foundation.

Abstract:

The environmental challenges and food security issues faced by Iraq and the Kurdistan Region, which are intensified by population growth and political instability. The study analyzes the region's deteriorating environmental conditions, with a focus on desertification, water scarcity, frequent extreme weather events, and the mismanagement of water resources. Additionally, it explores the impacts of these environmental issues on agricultural productivity, the food security chain, and the broader implications for economic and social stability.

The research offers practical recommendations for mitigating environmental impacts and enhancing food security in Iraq and the Kurdistan area. Enhancing governance structures and institutional frameworks is a crucial approach for securing sustainable resource management. Furthermore, it advocates for the execution of agricultural development strategies aligned with climate change adaptations, with investments in water resource conservation and soil infrastructure improvement. Furthermore, the study emphasizes the importance of establishing a collaborative framework at the local, regional, and international levels to manage water resources in Turkey, Iran, and Iraq. Such cooperation is critical for lowering tensions and promoting mutually beneficial solutions.

Introduction

Both Iraq and the Kurdistan Region face significant threats from the adverse effects of the climate crisis. Rising temperatures, water scarcity, shrinking arable land, and a drop in rural employment possibilities are among the most significant issues. These challenges put additional burden on public services, raise food costs, and lead to rising social tensions, protests, and even acts of violence. Furthermore, insufficient governance impedes efforts to improve water management, resolve governorate issues, and create cooperation between the Kurdistan Regional Government and the central government. This lack of coordination undermines efforts to attract investment, generate jobs in the green economy, and adapt to climate change (UNDP, 2019). Political leaders and policymakers in both Iraq and the Kurdistan Region lack a comprehensive understanding of the crisis. Efforts to negotiate agreements with neighboring countries, particularly Turkey and Iran—both of which have constructed dams and implemented other water control measures that negatively impact Iraq's water supply—have been ongoing. These nations excuse their actions by referencing the inadequate water management policies implemented by Iraq. Concurrently, the disputes concerning water resources between Iraq and the Kurdistan Region continue to exhibit a high degree of complexity. Collaboration in tackling internal water challenges, overseeing water conservation initiatives, and formulating sustainable resource management strategies continues to be inadequate (Eklund, 2017).

Historically, a succession of events has functioned as indicators of climate change in Iraq. An illustrative instance of this phenomenon is the escalating occurrence of dust storms, which have impeded travel, obstructed economic activities, and resulted in more severe repercussions, including the diminishing water levels in Hamreen Lake located in Diyala Governorate and the

escalating pollution levels in Razzaz Lake in Karbala. Furthermore, in 2018, the quality of water in Basra faced a marked decline as a result of elevated water levels in the Persian Gulf, diminished river volumes, and a reduction in precipitation (Al-Ansari, 2021). In 2019, a United Nations report ranked Iraq as the fifth warmest country in the world based on temperature increases.

As temperatures globally increase at a rate seven times greater than the average for the past century, it is anticipated that annual precipitation in Iraq will decline by 9% by the year 2050. Meanwhile, Iraq's population is expected to reach 50 million by 2030—twice the global growth rate—and 70 million by 2070 (Ali et al., 2021). The increasing migration from rural areas to urban centers places significant pressure on public services, leading to resource limitations and a decline in job availability in cities. This trend also contributes to social insecurity, higher demand for fuel, and intensified competition and disputes among governorates (UNDP, 2019).

Governance Deficiencies and Policy Implications

The deficiencies in internal governance have led to continuous water wastage, weakening Iraq's position in negotiations with Iran and Turkey. This situation provides both neighboring countries with strong justification for constructing additional dams on shared waterways. Consequently, Iraq and the Kurdistan Region face increased uncertainty and a deepening crisis. To address this challenge, Iraq and the Kurdistan Region must establish a comprehensive agreement, develop a strategic plan, and allocate a dedicated budget to reformulate policies and programs aimed at managing natural resources, preserving environmental diversity, and implementing national adaptation strategies for climate change (UN-Habitat, 2022).

While the international community can provide support through technical research and project implementation, the responsibility ultimately lies with Iraqi policymakers to understand and commit to these initiatives. This effort is not solely related to climate change adaptation but also plays a crucial role in strengthening internal governance and diversifying the country's economy (Hameed et al., 2020).

Economic Implications

Iraq is currently navigating a complex political landscape. Despite benefiting from high oil revenues due to elevated global prices, the country faces significant economic and governance challenges. One of the most pressing concerns is the government's potential inability to pass a new budget that addresses climate change-related issues or other matters requiring long-term investment and commitment. Securing substantial financial resources for climate adaptation efforts is further hindered by the lack of political consensus at both the national and factional levels. Moreover, intense political competition—particularly among Shiite armed groups that control vast geographical and administrative resources—exacerbates the difficulty of implementing effective climate policies. As a result, these groups bear considerable responsibility for the broader consequences of climate change in Iraq (OPEC, 2021). In November 2021, the Federal Cabinet adopted the Revitalization of Mesopotamia Project, an unprecedented initiative aimed at addressing Iraq's most pressing climate change challenges.

This comprehensive plan included key recommendations such as a national water management strategy, a reforestation program to restore devastated areas, and an investment framework for green energy development. Despite initial resistance, the project was ultimately accepted within a broader political agreement. However, the challenges in passing the national budget, coupled with the influence of populist politics, have significantly hindered the project's implementation. Many Iraqi policymakers, driven by short-term political gains, prioritize immediate, low-effort measures—such as expanding public sector employment and offering unplanned services—to garner public support. These approaches, often detached from long-term national strategies, reflect a broader tendency to prioritize political expediency over sustainable development (UNDP, 2019).

Social Implications

Water scarcity in rural areas, exacerbated by the mismanagement of water resources, irregular precipitation levels, and the depletion of underground water reserves, has significantly contributed to desertification and the drying of fertile lands. These factors have led to the abandonment of agricultural areas, a decline in biodiversity, and a reduction in green spaces, posing a serious threat to 92% of Iraq's agricultural lands. As a result, both internal and international migration are expected to increase drastically in the near future.

The primary driver of local migration—from villages to cities—is the collapse of employment opportunities in rural areas, particularly in the agricultural sector. As water shortages render irrigation increasingly difficult, agricultural productivity declines. The World Bank predicts a 20% reduction in Iraq's access to water will culminate in an 11.8% decline in agricultural employment and a decrease in local production equating to about \$6.6 billion, thereby impacting food security.(IMF, 2021).

Moreover, drought conditions have severely affected livestock farmers. Reduced agricultural yields have increased the cost of livestock feed, while water scarcity has facilitated the spread of waterborne diseases. These challenges disproportionately impact small-scale farmers and displaced communities, who struggle to withstand the economic and environmental pressures caused by drought. The broader social consequences of these environmental challenges include rising social tensions, heightened insecurity, increased migration, and population declines in affected areas. Additionally, the influx of displaced rural populations into urban centers places significant strain on city infrastructure and public services, fueling public dissatisfaction with governmental authorities and contributing to economic instability, including rising unemployment rates (IMF, 2021).

General Evaluation

Assessing the current state of climate change understanding in the Iraqi community is an issue. However, the public is increasingly aware of its consequences, particularly during periods of low rainfall, which intensify crises due to reliance on the diminishing lakes and other water bodies. Growing concerns over these environmental challenges are evident in the hardships that citizens experience daily, as they frequently articulate the impact of climate change on their lives. Water scarcity, in particular, has led to widespread protests, with many attributing the crisis to governmental and local authority mismanagement. There is a common perception that these institutions have failed to implement effective environmental policies and adequately respond to climate-related challenges (FAO, 2022).

The impact of climate change has intensified significantly in recent years. Following the onset of the war against ISIS (Da'ash), national priorities shifted toward addressing corruption, education, economic recovery, and reconstruction, relegating environmental concerns to the background. However, as the immediate consequences of the conflict subsided, its detrimental effects on the climate became more apparent. Public attention increasingly turned to environmental issues, particularly as Iraq experienced frequent and severe dust storms, culminating in a nationwide crisis in 2022. Social media played a pivotal role in shaping public discourse, consistently highlighting the urgency of climate change. From a demographic perspective, Iraqi youth demonstrate a heightened awareness of environmental challenges. According to a census conducted by the UNDP, 67% of children under 18 recognize the deteriorating climate conditions (World Bank, 2022b; UNDP, 2019).

Enhancing the economic sector can play a crucial role in declining the negative effects of environmental challenges. In the last ten years, oil comprised 99% of Iraq's exports and provided over 85% of government budgets. Forecasts suggest that by 2050, if greenhouse gas emissions are curtailed to nearly zero, revenue for countries that produce oil could decrease by up to 75% (OPEC, 2021). Given this high probability, Iraq's heavy dependence on oil as its primary economic driver poses significant risks. Consequently, transitioning toward green energy presents a more sustainable and viable economic alternative (IMF, 2021).

Iraq is a signatory to the Paris Agreement, committing to the global effort to limit greenhouse gas emissions. Although the country has pledged to reduce greenhouse gas emissions by 1% by 2035, significant steps have yet to be taken to attract investments aimed at diversifying the economy. A critical factor in achieving this goal is addressing deep-rooted structural deficiencies within Iraq and the Kurdistan Region, particularly by combating corruption. Implementing such reforms would facilitate climate-adaptive investments and the adoption of emission reduction strategies while simultaneously creating job opportunities and alleviating social tensions (UNDP, 2019).

Governance Deficit in Iraq

Iraq lacks a unified consensus necessary to effectively address the challenges posed by climate change or to restructure its economic plans. These difficulties, at least in part, stem from weaknesses in governance and the inability to translate policies into practical measures for improving public services or restructuring economic infrastructure (United Nations, 2022).

Higher oil prices do not necessarily enable Iraq to invest in climate change adaptation or mitigate its effects, even if future governments allocate the necessary budget. Addressing these challenges requires resolving significant governance deficits. Temporary or superficial solutions cannot effectively counter the long-term impacts of climate change (World Bank, 2022).

On the national level, responsibility belongs to the Ministry of Agriculture and Water Resources. This division of responsibilities creates ambiguity in the design and implementation of policies aimed at water conservation. Additionally, the adoption of modern electronic techniques for managing and monitoring irrigation remains a challenge (Rudaw, 2021). This is essential because Iraq now depends on a system of irrigation which requires a disproportionate amount of water. To address this issue, it is essential to modernize the irrigation system. The Ministry of Water Resources, in collaboration with the local governments in the regions, must promptly execute a cohesive national strategy to assist farmers nationwide in adopting more effective water utilization practices and minimizing water use in agriculture (Iraq Energy Institute, 2018).

Iraq's Regional Water Position

Iraq's primary water sources, the Tigris and Euphrates rivers, have been experiencing increasing water scarcity, as evidenced by satellite observations. Overall, Iraq's water resources are depleting at a faster rate compared to other regions worldwide. This loss has been exacerbated by climate change, protracted droughts, variations in water levels, and the building of infrastructure alongside rivers (Al-Obaidy & Al-Khateeb, 2013).

Statistics indicate that the total water flow of the Euphrates and Tigris rivers will decrease by 30% to 60% towards the end of this century. Continued rising temperatures and decreasing rainfall are forecast. Türkiye and Iran say Iraq's water share is fair but mishandled (Rudaw, 2014), nevertheless population increase is increasing water needs. Iraq's water supply is further restricted by neighboring countries' infrastructure development, especially dams on stream branches in Turkey and Iran. This growing water scarcity not only limits Iraq's access to essential resources but also strains its diplomatic relations with these countries (Hameed et al., 2020).

Republic of Türkiye

Türkiye plays a pivotal role in regional water distribution due to the significant portion of Iraq's water supply that originates within its borders. Approximately 90% of the Euphrates' water flow and 40% of the Tigris' water flow come from Türkiye. Since the 1990s, Ankara has given priority to preserving water in response to climate change, leading to the implementation of extensive infrastructure projects along its waterways. The Southeastern Anatolia Project, recognized as one of the nation's most ambitious undertakings, is presently engaged in the construction of 22 structures along the Tigris and Euphrates rivers (FAO, 2022).

Since the 1960s, Iraq and Türkiye have engaged in multiple dialogues on water-sharing; however, no agreement has been reached that fully meets Baghdad's needs for securing a stable water supply from Türkiye. Recently, the two countries signed a memorandum of understanding in which Türkiye committed to providing an adequate water flow. However, Türkiye continues to expand its water infrastructure at a rapid pace. Since then Two days following when the Elisu Dam opened in late 2021, the Turkish president informed Iraq's Ministry of Water Resources that Ankara planned to build an additional dam along the same river (Al-Ansari, 2021).

The existence of the Kurdistan Workers' Party in northern Iraq forms among the major disagreements increased by the ongoing conflict between Iraq and Turkey regarding water resources. The Turkish government has been in conflict with the PKK for several decades, regarding it as a significant menace to national security. To combat the PKK, Turkey has established multiple military sites in Iraq and continues to conduct military operations, including Operation Claw-Lock. The Baghdad administration is uneasy, Iraq's authority is impacted, and it is diverted from crucial concerns like sustainable development and climate change by these measures. According to the government-run media, the Elisu Dam was built in part to impede PKK activities, a tactic that may also have contributed to the eviction of Kurdish villages in Turkey (Eklund, 2017).

Islamic Republic of Iran

Within the broader context of climate change, one of the key issues between Iraq and Iran is water sharing. Iraq remains highly dependent on Iran for securing an adequate water supply, particularly from the Karun and Karkheh rivers, which originate in western Iran and flow into the Shatt al-Arab near Basra. In recent years, Iran has increased water retention to meet its domestic demands, while Iraq has taken little action to prevent this. Realistically, Baghdad's ability to address the issue remains limited, given Iran's strong influence over Iraqi political figures. However, Tehran denies allegations that it has reduced water flows, instead arguing that Iraq should negotiate for additional water from Türkiye. These disputes are often politicized, becoming more pronounced during periods of local and regional tensions (UN-Habitat, 2022). Food exports play a significant role in this connection. Activists accuse Iran of deliberately reducing Iraq's water share to weaken its agricultural sector and create greater reliance on Iranian produce in Iraqi markets.

These allegations have led civil society groups to call for a boycott of Iranian goods. The October protests, sometimes turning violent, specifically targeted symbols of Iranian influence, including consulates and the embassy. Amid severe economic sanctions on Iran, Iraq remains a crucial source of hard currency for Tehran. Meanwhile, shortages and declining quality of local supplies have made Iraqis increasingly dependent on more affordable and readily available food imports from Iran, further deepening Iraq's economic reliance on its larger neighbor (Al-Ansari, 2021).

Public dissatisfaction escalates during summer heat waves, especially when Iran frequently interrupts the supply of electricity to Iraq. In 2018, protesters expressed their anger by burning posters of Iranian figures and offices of Iran-affiliated political parties—scenes that were frequently repeated during the October protests (BBC, 2019).

Kurdistan Regional Government

The permanent political tensions stay among the Kurdistan Regional Government (KRG) and the central government of Iraq. In numerous occasions, the KRG has attempted to take advantage of its strategic position as a negotiating tactic in negotiations with Baghdad. For instance, during budget disputes, Kurdish leaders have threatened to cut water supplies to the rest of Iraq. From 2014 until 2020, Baghdad responded vigorously to similar threats, and the Federal Government imposing the KRG of infringing against human rights and contravening the Iraqi Constitution. (Middle East Institute, 2020; Rudaw, 2014).

Water sharing has become a contentious issue in conflict zones. Arab farmers have always claimed that Kurdish authorities purposely decrease water availability to compel their evacuation of their region (Reuters, 2017). Conflicts over water ownership in Kirkuk have also been reported, involving Arab, Turkmen, and Kurdish communities. Following the vote on Kurdish independence in 2017, the Federal Government took control of the territory and sent troops to establish its rule (BBC, 2017).

The Federal Government showed significant disfavor of the Kurdistan Regional Government (KRG) for its independent participation in dam construction, executed without prior consultation with Baghdad. In April 2022, tensions among Erbil and Baghdad intensified when Iraq's Ministry of Water Resources criticized the Kurdistan Regional Government (KRG) for signing an agreement with Chinese companies to construct four new dams (The New Arab, 2022). This development occurred following to a decision by the Federal Court, which declared the Kurdistan Regional Government's independent exportation of gas and oil to be unconstitutional and thereby instigating frustration and uncertainty within the regional administration. As Baghdad starts the implementing of the court's ruling, the Kurdistan Regional Government (KRG) may use its control over water resources as a strategic advantage in upcoming negotiations (Reuters, 2022).

Conclusion

Iraq and the Kurdistan Region face two major interconnected crises: environmental challenges and threats to food security. Additionally, external pressures from neighboring countries, particularly Iran and Türkiye, have exacerbated the situation, as both continue to construct dams and barriers along shared waterways. These factors collectively hinder Iraq's development and stability. The reduction in water levels of the Tigris and Euphrates rivers, coupled with ineffective local water management, has further intensified the crisis, posing a serious threat to agriculture and food security.

Recommendations to Policymakers

1. Enhanced communication between the Iraqi Federal Government, Kurdistan Regional Government, and local government units is necessary for successful water management. This can be accomplished by developing a collaborative mechanism that ensures fair water distribution through transparent, unbiased, and trustworthy assessments of each region's needs. This method should also address present difficulties and reduce friction between local governments over water supplies.
 2. Iraqi banks, including the Ministry of Finance, anti-corruption authorities, and other relevant organizations, should expand investment possibilities and reduce reliance on petrochemical fuels. Particular emphasis must be placed on boosting green economy investments, as well as improving understanding and devising strategies for Iraq's green energy capabilities.
 3. Politicians should engage in water talks and climate debates with genuine intentions, avoiding media-driven language and unnecessary legal measures against Iraq's neighboring states over water problems. Policymakers should avoid exploiting water as a political tool at the local level and instead handle conflicts through diplomatic channels. A critical and collaborative plan will boost Iraq's overall standing, ensuring that water security is viewed as a national priority rather than a regional or factional issue.
 - 4- The Iraqi Federal Government and Kurdistan Regional Government should initiate nationwide public education campaigns on the impact of climate change, emphasizing the country's environmental challenges. The campaigns must offer an integrated message to encourage cooperation in dealing with the crisis.
 - 5- To address considerable frustration with Iraqis, political officials and stakeholders should prioritize solutions to environmental and public service concerns, regardless of political differences.
 - 6- Implement a permanent and efficient water management system with enhanced irrigation and wastewater treatment. Recycled water should be used in agriculture, and such initiatives must have widespread support across all farming regions.
 - 7- Farmers should be encouraged to use biotechnologically altered seeds that resist environmental challenges. Traditional farming methods should be replaced with smart agriculture and modern technology to increase efficiency and sustainability.
- To facing desertification, implement afforestation projects, restore damaged lands, preserve soil, and promote water conservation.
- 9- Expand environmental awareness programs to promote biodiversity, sustainable resource management, and education on environmental protection and food security.
 - 10- To improve food security, assist small-scale agricultural projects, build urban farms, and promote novel farming techniques including hydroponics and organic agriculture.

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