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The Impact of Climate Change on Population Migration and Displacement Within the Southern Governorates of Iraq

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Abstract: This study explores the effects of climate change, particularly focusing on drought and desertification of land, on population displacement and migration in the southern governorates of Iraq, specifically Dhi Qar, Maysan, Muthanna, and Basra. Three of these governorates are characterized by marshes, and their inhabitants practice agriculture and pastoralism. The research links the effects of desertification and land degradation to population movement, using data from United Nations reports in a statistical model using simple linear regression. The study aims to demonstrate that desertification is a significant factor in population displacement, posing a threat to the sustainability of national food security by degrading natural resources and reducing agricultural production, leading to deteriorating household conditions and increasing poverty and unemployment rates. The statistical model revealed that land desiccation is not the only factor influencing population migration; still, it is an important factor within a range of other factors that contribute to the displacement of households.

Keywords: Climate change; Land desertification; Population displacement; Marshes; Thi-Qar; Maysan; Muthanna; Basrah

1 Introduction

The occurrence of climate change is described as a disturbance in the typical weather patterns that define various areas on the planet. Khudlhur and Al-Jawari [1] which leads to impacts on natural biological systems over time, and it is in direct contact with human life and interferes with basic rights such as the right to health, nutrition, a healthy environment, safety, and the right to life. The problem of climate change that the world is exposed to is a dangerous problem that threatens life on planet Earth due to its future repercussions in the short and long term. Given the location of Iraq and its possession of water bodies represented by the Tigris and Euphrates rivers, as well as the marshes in the south and lakes whose water source is the Tigris and Euphrates rivers, and within the framework of the new challenges threatening its water security, there is a possibility of the Tigris and Euphrates rivers drying up completely by 2040 [2]. Due to the doubling of the impact of climate change and the decrease in water supplies from the source countries, the storage rates of the Tigris and Euphrates basins in all its parts in Turkey, Syria, Iraq, and Iran are in continuous decline that warns of danger, as there is a risk that threatens water, food, and health security and population stability. Iraq, Due to its position on the globe, it is regarded as one of the nation's most susceptible to climate change [3], so the effects of these climate changes must be understood and prepared for. Drought waves, high temperatures, and declining rainfall rates have led to the transformation of agricultural lands into desertified lands. In addition to the negative effects, especially with regard to water resources, population movements have occurred as a result of the drying up of agricultural lands and water shortages, with water scarcity being the main reason for displacement due to the lack of basic necessities of life, including drinking water and work in agriculture and herding. Preliminary Model: Climate Change-Migration Nexus in Iraq. In this regard, the purpose of this study is to establish a conceptual model that directly illustrates the causal pathways that connect climate change to migration patterns in Iraq rather than provide simple descriptive correlations. Such an intersection of environmental, socio-economic, and institutional dimensions highlights just how these climatic stressors produce population displacement.

The conceptual framework explains the causal mechanisms linking climate change to migration patterns in Iraq and outlines four linked stages:

1. Climate Stressors: Rising temperatures, recurrent droughts, reduced precipitation, and land degradation (desertification) are direct environmental shocks.

2. Livelihood Impacts: These environmental strains result in reduced farm yields, household incomes, and lower rural livelihoods.

3. Socio-economic and Institutional Pressures: Loss of opportunities for jobs, eroded adaptive capacity, and reduced water infrastructure create vulnerability and social pressure [4, 5].

4. Migration Outcomes: Households react by temporary, seasonal, or permanent migration—within the governorate or beyond the governorate border-based on exposure burden and capacity for recovery.

In this causal continuum, desertification serves as a primary 'push factor' and socio-economic conditions (income; water access) act as moderators to the magnitude of migration responses. A decrease in livelihood becomes a mediating parameter between environmental stress and displacement behavior [6]. The model is grounded on two theoretical constructs: The Push–Pull Migration Theory, which sees environmental strain as a catalyst that leads people to leave marginalized locations [7]. The Livelihood Vulnerability Framework, which highlights the role of exposure, sensitivity, and adaptive capacity in determining household migration decisions combined.

1.1 Influence of Climate Change on the Tigris and Euphrates Rivers

It is anticipated that the Tigris and Euphrates River basins will experience a reduction in revenue, as studies have indicated that Iraq will experience a gradual decline in its ability to meet water needs. The estimated revenue for water in 2035 is projected to be significantly lower than the revenue in 2015, as shown in Figure 1. This indicates a reduction of 17.64 billion m^3 from the revenues recorded in 2015, which were projected at 77.37 billion m^3. Consequently, there is a shortfall of 10.94 billion m^3 when measured against the estimated water requirements of 70.67 billion m^3. This implies that the Tigris and Euphrates rivers could potentially run dry by the year 2040, attributed to the intensified effects of climate change and diminishing water resources from countries situated upstream.

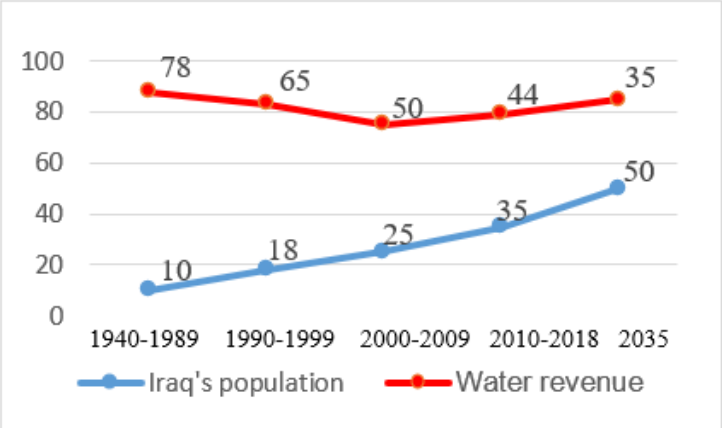


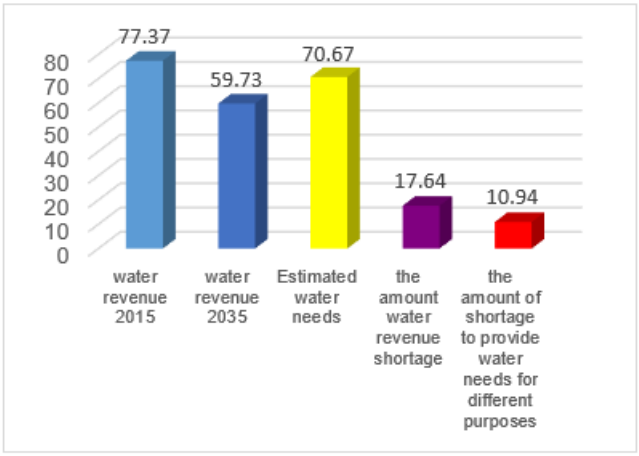
Figure 1. Future forecasts for water revenues in billion m^3 units [8]

1.2 Annual Per Capita Water Revenues and Per Capita Income

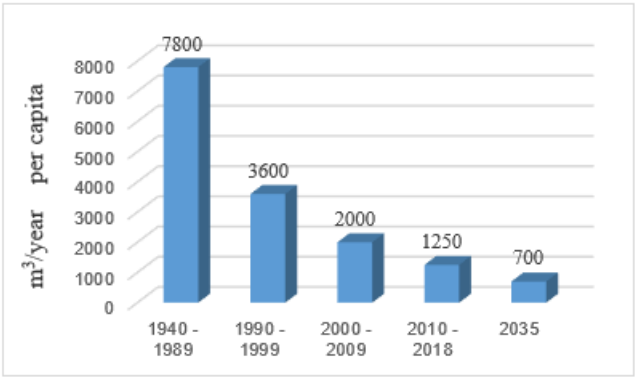
The Middle East region, in general, and Iraq, in particular, has been subjected to successive years of drought that have led to an increase in the scarcity of water resources in Iraq and affected the per capita share of water imports from the Tigris and Euphrates basins. During the period 1940–1990, this share amounted to about (7800 m^3) per year and gradually decreased to reach (1200 m^3) per year in the past ten years. It is expected to reach (750 m^3) per year in 2035, as shown in Figure 2a. If this situation continues, there will be serious repercussions on various environmental, economic, and social levels, as shown in Figure 2b.

1.3 Freshwater Shortage

The high temperatures in Iraq lead to the loss of approximately 75% of the rainfall and turn it into vapor, while 20% turns into surface water and 5% into groundwater [2]. In order to reduce the amounts lost to evaporation, measures should be taken to preserve it. Freshwater represents 3% of the total volume of water on Earth. It is the lifeblood of all living organisms. Freshwater is facing a deterioration in its quality and suitability due to pollution from human activities that make it unfit for use, such as poor management of sewage projects and a lack of delivery of potable water, and all these activities threaten the continuation of human life.



(a)



(b)

Figure 2. Water revenues and annual per capita share: (a) Annual water revenue per year; (b) Water revenue and the souls of Iraq for nearly a century

2 The Impact of Climate Change on Population Migration in Iraq

In the report titled "National Framework for Integrated Drought Risk Management in Iraq", published in 2012, the International Organization for Migration (IOM) indicated that 11% of displaced families had left their places of origin due to water scarcity. Additionally, the IOM report identified drought as the primary reason for these displacement events. Notably, in some governorates, the rates of drought-induced migration exceeded those caused by conflict and insecurity. Southern Iraq has experienced significant population displacement due to the drying of the marshes. According to the United Nations National Framework for Integrated Drought Risk Management in Iraq, 81% of the population in Dhi Qar, 33% of the population in Missan, and 12% of the population in Basra have been displaced due to water scarcity.

3 Methodology Field Study

The research used a descriptive approach to draw an accurate picture of the effects resulting from climate change, as well as an analytical approach to study the causal relationship between climate, population migration [9], and family displacement by using research tools represented by the statistical model of simple linear regression between the areas of desertification lands in the southern governorates of Iraq and the data of internal population migration through population statistics from official institutions such as the United Nations and local statistics of the Central Statistical Organization. And climate data on changes in temperature, desertification, drought, hurricanes, and sea level rise from sources such as international government reports. A simple regression approach was used for two primary reasons. First, this study is an attempt to isolate and quantify the direct environmental effect of desertification on displacement without the statistical interference of socio-economic factors that may act as mediators rather than independent drivers. This would enhance the clarity of the pure environmental-migration linkage in the analysis as an initial step. Second, the inclusion of multiple variables would decrease the robustness and comparability of the model because of the limited data obtained and the inconsistent data available across Iraqi governorates—particularly in reliable time-series data on income, water infrastructure, and employment. Thus, it resulted in the simple regression

being recognized as the most methodologically transparent and empirically feasible design on the currently available dataset.

3.1 Case Study

The study encompasses desertification lands and their impact on migration and population displacement in the governorates of Thi-Qar, Maysan, Muthanna, and Basrah, which are distinguished by the proliferation of water bodies within their marshes. Most of its resident's work in farming [10, 11]. In contrast to the Muthanna governorate, which has the smallest population compared to the other governorates, as shown in Table 1. That is due to its being part of the Western Desert of Iraq [12].

The marsh areas are subject to drought and high temperatures, as well as high rates of population displacement resulting from the drying up of the marshes and the alteration of their water supplies, as illustrated in Figure 3. This figure depicts the extent of changes in the area of the marshes from 1973 to 2011, as the marshes constitute a significant portion of the territory of the three governorates of Thi-Qar, Maysan, and Basrah [13].

Table 1. Number and percentage of the population of the four governorates

Province Name	Governorate Population	Ratio of the Governorate's Population to the Population of Iraq
Dhi Qar	1,944,000	5.4%
Maysan	1,008,000	2.8%
Basra	2,304,000	6.4%
Muthanna	756,000	2.1%

Note: The population of Iraq is 36 million people [8].

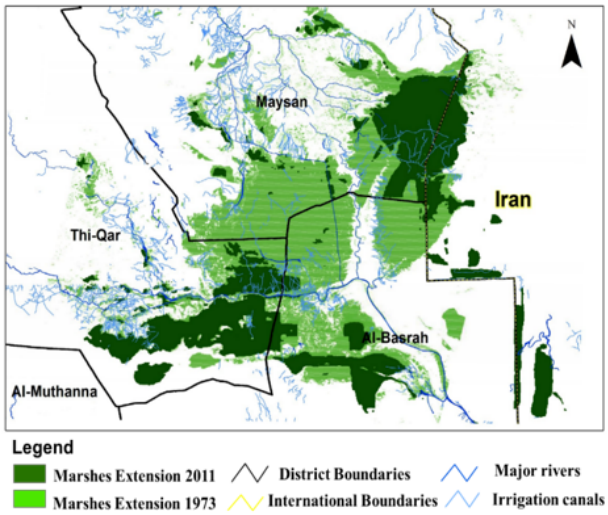


Figure 3. Changes in marsh area from 1973 to 2011 [6]

3.2 Water Scarcity and Families Displacement in Iraq's Southern Governorates Thi-Qar, Maysan, Muthanna, and Basrah

Recent internal displacement due to water scarcity, according to statistical information and data obtained from the Climate Change Displacement Tracking Matrix (DTM) In the southern parts of Iraq, starting from June 2018, it has been observed that agriculture, livestock grazing, fishing, and related industries face ongoing challenges due to drought, land degradation, and rising salinity levels in key rivers and tributaries. As a result, numerous families in rural areas struggle to maintain sufficient and sustainable livelihoods [14]. The DTM is the IOM's information management system for tracking and monitoring population displacement and movement during crises. It consists of a variety of components and tools; The DTM consistently tracks and analyzes complex data, producing various informational reports that offer a comprehensive insight into the primary needs of displaced individuals, both at their displacement sites and during their journey to these areas. In 2023, according to the DTM, the Thi-Qar governorate experienced the highest levels of climate change-induced displacement, as climate change-induced displacement is a recent phenomenon in the Thi-Qar governorate. Almost three-quarters of climate-related displacements in this governorate occurred in 2022. The main drivers of displacement in the Thi-Qar, Maysan, Muthanna, and Basrah

governorates are low rainfall and water levels in rivers and tributaries. This is in addition to some aggravating factors, which include low groundwater levels, water salinity, conflict over water allocations, and restrictions on water use. Table 2 shows that the displacement rate in the Thi-Qar governorate is the highest among the southern governorates, reaching 60 percent in 2019, and it is expected to increase further in the future.

Table 2. Total displacement by governorates of origin and governorates of displacement

Origin Governorate	Number of Displaced Families	%	Governorate of Displacement	Number of Displaced Families	%
Thi-Qar	1553	60	Thi-Qar	1025	39.9
			Karbala	397	15
			Najaf	131	5.1
Maysan	694	36.8	Missan	694	37
Basrah	208	8	Basrah	196	7.6
			Qadisiyah	13	0.5
Muthanna	132	5.1	Muthanna	118	4.6
			Najaf	9	0.4
			Karbala	4	0.3
			Qadisiyah	1	0

Source: DTM due to water scarcity and drought for the period April 2018 to December 2019 and classification of locations affected by water scarcity in October 2018 and updated in January 2019/IOM (International Organization for Migration).

Displacement rates of the Thi-Qar governorate were the highest among the southern governorates. One of the key reasons is different geographic, socio-economic, and policy factors. Thi-Qar is located in the lower Mesopotamian plain, which is susceptible to drought, marshland desiccation, and salinization brought about by diminished water inflows from the Euphrates River. The drying of the marshes has had immediate repercussions for rural livelihoods relying on agriculture, fishing, and livestock. From a socio-economic standpoint, the income and employment levels of Thi-Qar are among the lowest in southern Iraq due to a significant reliance on climate-sensitive agricultural production. Due to little diversification of livelihoods, households become more susceptible to environmental shocks. Adverse implications of poor local adaptation, including irrigation rehabilitation, water management systems, and social support programs, have exacerbated displacement pressures at the policy level. Thi-Qar lacks major economic sectors (oil or industry, for example) compared to Basrah or Maysan. Thus, the rise in displacement rates in Thi-Qar is exacerbated by vulnerability in the context of the environment, weak socio-economic resilience, and insufficient adaptation policies. Maysan governorate hosts the largest number of displaced families, as shown in Figure 4, displaced from their districts due to climate change, followed by Thi-Qar. Amarah district is one of the districts hosting large numbers of displaced families from their original areas in the Qal'at Salih, and the Thi-Qar governorate's Shatra district hosts the largest number of families inside the Thi-Qar governorate, especially from Al-Rifai district, which is the origin of displaced families in Thi-Qar governorate.

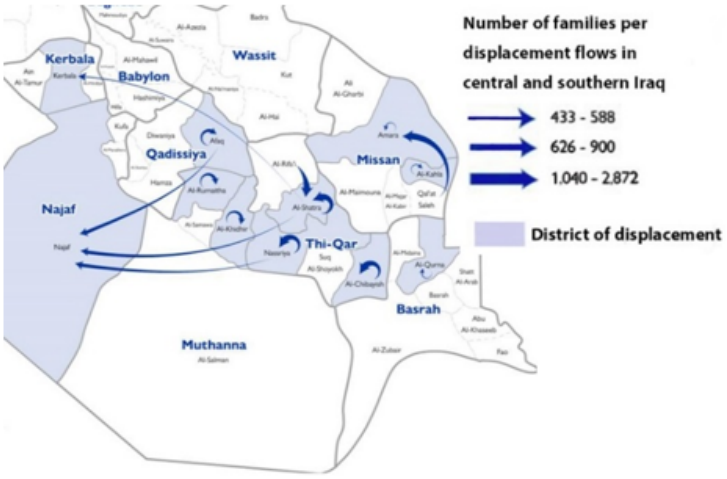


Figure 4. The flow of displacement families from origin areas to the displacement areas of and curved arrows indicate displacement within the same district caused by climate change within the southern governorates of Iraq

Source: International Organization for Migration (IOM) 2014.

Displaced populations face difficulties and challenges in resettling in the areas or governorates that received them after their displacement from their original places. These challenges include issues related to housing, infrastructure, and social, economic, and security challenges [15].

3.3 Environmental, Social, and Economic Effects of Climate Change in the Southern Regions

3.3.1 Drought, desertification lands and soil erosion

High temperatures and lack of rainfall led to increased evaporation, dust storms, and salinisation of the soil [16, 17], turning large areas of agricultural lands with poor drainage systems into unfit lands for agriculture, as well as droughts, sandstorms, low rainfall, and changing rainfall patterns [18]. This has led to the transformation of agricultural lands into desertification lands [19] and has resulted in farmer immigration [20]. As shown in Table 3, which illustrates the desertification area and threatened areas of desertification for the study sample consisting of four governorates, The United Nations characterized desertification in 1992 as the deterioration of land in arid, semi-arid, dry, and sub-humid regions. This decline is attributed to multiple factors, including climate change and human actions, which ultimately diminish the soil's productive potential due to improper management by humans. The total amount of desertification lands is about 50% of Iraq's total area, which poses a serious threat to its food security. Figure 5 shows the types of drought generated by climate change during long-term time periods [21]. Therefore, climate change threatens national security due to its environmental, economic, and social impacts [22]. Desertification and climate change are making traditional livelihoods in Iraq's southern governorates unsustainable, leading to increased displacement and migration [23].

Table 3. Areas of desert and desertification-threatened lands for 2020 for the southern governorates

Province	Desertification Land Area (dunam)	Area of Land Threatened by Desertification (dunam)
Thi-Qar	1459660	1759030
Maysan	1439960	2423940
Basrah	3348780	2920310
Muthanna	6515160	13796000

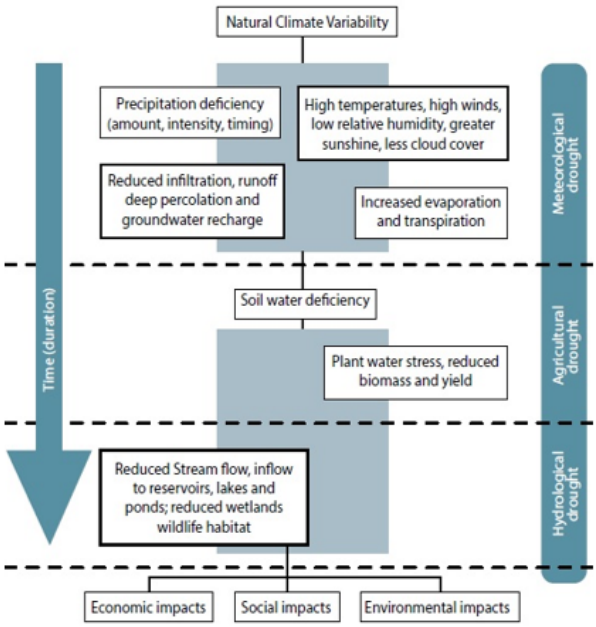


Figure 5. Relationship between different types of drought
Source: United Nations 2014 [9].

3.3.2 Agriculture, food security, poverty and unemployment

The percentage of agricultural land affected by recurrent droughts varies according to precipitation rates from one region to another in Iraq. In the southern governorates, agriculture depends on irrigation mainly from the Tigris and Euphrates rivers and their tributaries. On the other hand, irrigated crops suffer from low water levels in the rivers and lakes that feed them, causing a decrease in basic food production by up to 50% in the poorest areas in some countries, according to the World Health Organization [24]. This will lead to an increase in the rate of malnutrition

and undernutrition due to the lack of land suitable for cultivation as a result of the lack of water, as well as the decline in groundwater, especially in desert areas, the destruction of vegetation cover, and the extinction of many plant species. In addition, the decrease in groundwater, especially in desert areas, the destruction of vegetation, and the extinction of many species of natural plants in the Western Desert, along with the migration of farmers working in farming, will weaken and decline farming activity and its economic impact, leading to poverty as a result of the dryness of the land. Poverty and food security are interrelated and lead one to the other, as food insecurity is a source and consequence of poverty and deepens it, especially in rural areas where most people depend on agriculture to provide their livelihoods [25]. This leads to the intensification of migration and displacement of families in poor areas with high population growth that depend on agricultural land [26]. The 2016 Comprehensive Analysis of Food Security and Vulnerable Groups in Iraq survey revealed that 2.5 percent of the country's population is food insecure , and dependence on food imports is expected to increase in the coming years due to frequent climate change and population growth, which will affect national food security.

4 Agriculture, Food Security, Poverty and Unemployment

4.1 Results of the Simple Linear Regression Statistical Model

The results of the simple linear regression between the areas of desertification lands and the number of displaced families in the study sample consisting of four governorates, namely Thi-Qar, Maysan, Muthanna, and Basrah, as Appendix shows, all the results of the statistical model of simple linear regression between the independent variable X, which is the areas of desertification lands, and the dependent variable Y, which is the number of migrant or displaced families from their places of residence. The results showed that the R^2 value, which equals 0.56, represents the percentage of the variance in the dependent variable (Y) that is explained by the independent variable (X) and means that 56% of the variance in the dependent variable is explained by the independent variable in the model. In a subject related to climate change of a complex nature, here a moderately strong relationship appears between the variables in the statistical model. In this context, this value can be considered acceptable as a start but requires improvement if the goal is to obtain a more accurate explanation or prediction. It is explained that a range of factors or variables affect population migration. Still, desertification is a fundamental variable, and this is confirmed by the United Nations studies that identified a set of indicators affecting population migration, which are explained in the following paragraph. Figure 6 shows the degree of dispersion in the simple linear regression of the model.

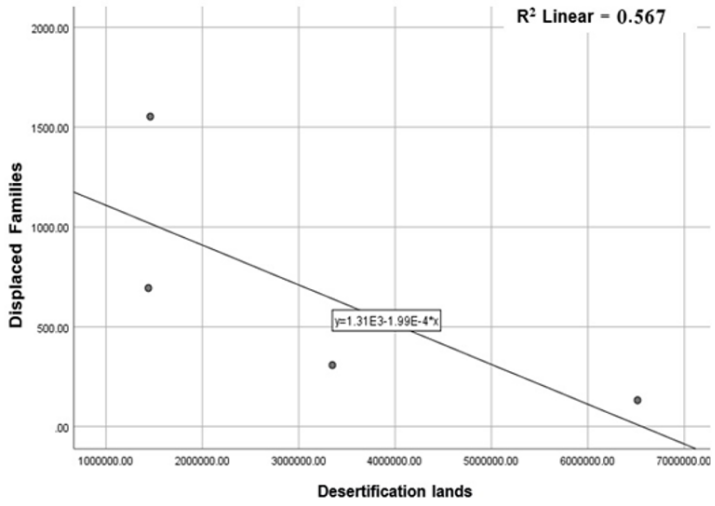


Figure 6. Scatterplots visually assess the relationship between desertification regions and displaced families in a simple linear regression model

Source: Prepared by a researcher use IBM SPSS Statistics software.

Figure 6 indicates the extent of the divergence of points from the regression line, and its understanding of the statistical model is of great importance in assessing the quality of the model and its effectiveness in interpreting the data. The value of R, the correlation coefficient that measures the strength and direction of the linear relationship between the independent variable (X) and the dependent variable (Y), is 0.75 and indicates that the relationship between the two variables is strong but not perfect. It can be said that 75% of the variance in the dependent variable Y can be explained by the variance in the independent variable X, which means that the model has a good ability to explain the data.

4.2 Indicators of Climate Change-Induced Population Displacement in Iraq

The DTM of the IOM came up with five indicators of population displacement after measuring four dimensions of the root causes of population movements shown in Figure 7 as follows.

Figure 7. Top five indicators for displacement index due to climate change in Iraq

1. Environmental events and access to water: The locations from which families were displaced were exposed to different types of extreme weather conditions such as drought, dust storms, lack of rainfall, and reduced irrigation supplies for years.

2. Services and Infrastructure: Ineffective water infrastructure and decreased water supply mean that displaced households do not have enough water for drinking or domestic purposes, making it difficult for the service to reach the consumer.

3. Livelihoods and mitigation measures: All districts from which families have been displaced have experienced crop loss, livestock mortality, or reduced fishing as a result of environmental factors. As families struggled to feed their livestock, this led to widespread abandonment of agricultural, livestock, and fishing activities. These changes in the environment led families to resort to mitigation measures, including sending family members to other locations to work and earn money, while other families reduced their expenses or sold their property, land, or livestock.

Tensions and conflicts: The presence of tension or conflict, especially between members of the same clan sharing the same livelihoods, indicates that natural resources are a driver of tensions or conflicts over resources, particularly over water, pastures, and agricultural land, and their motives often concern the sharing of water, especially when farmers are suspected of exceeding their water quota. All these indicators lead to family displacement and immigration, necessitating new frameworks that prioritize human rights and long-term adaptation strategies.

4.3 Governorates-Level of Vulnerability and Adaptation

The four southern governorates that participated in the study, such as Thi-Qar, Maysan, Muthanna, and Basrah, have different degrees of exposure, vulnerability, and adaptive capacity to climate change and desertification. Explaining the variation of displacement rates across regions requires these differences to be recognized.

Thi-Qar Governorate: Thi-Qar is experiencing the highest level of displacement due to extreme drought, loss of marshland ecosystems, and salinization of farmland. The economy is based on conventional agriculture and fishing, with low diversification potential and low institutional ability to adapt to climate stress. Their geographic exposure and weak capability to adapt are why Thi-Qar is the most exposed of the four governorates.

Maysan Governorate: Maysan has moderate exposure to desertification while exhibiting a relatively good ability to respond because there are ongoing irrigation and marsh restoration projects. Local agricultural projects and the partial rehabilitation of water systems have cushioned migration to some extent, although rural livelihoods are vulnerable. Muthanna Governorate: Muthanna, in Iraq's western desert region, has high arid exposure and a low population. Surface water and arable land are scarce, causing a high environmental vulnerability, but the lower population pressure means that the scale of displacement is lower than Thi-Qar. Economic diversification is still limited, and adaptation mechanisms are largely informal.

Basrah Governorate: Due to water salinity and pollution, Basrah suffers particularly close to the Shatt al-Arab, but has a more diversified economy (industry, ports, and oil sectors). These non-agricultural opportunities reduce reliance on climate-sensitive livelihoods and the reliance on the adaptation capability under environmental stress.

The southern regions are not equally vulnerable to climate-induced displacement. Thi-Qar and Muthanna show high exposure and low resilience, whereas Maysan and Basrah exhibit intermediate to upper-level adaptive capacities,

which were influenced by adequate infrastructure, economic diversification, and persistent restoration efforts. This spatial differentiation highlights the importance of governorate-dependent adaptation and migration control policies.

5 Governorates-Level of Vulnerability and Adaptation

5.1 Conclusions

1. Increased frequency and intensity of extreme climatic events such as droughts, heat waves, low rainfall, and the conversion of large areas of agricultural land with poor drainage systems into land unsuitable for future agriculture, i.e., an increase in desertification and land threatened by it.

2. The drought of the Mesopotamian plains has implications for the sustainability and scarcity of natural resources, in addition to its environmental, social, and economic impacts.

3. Increase in the number of families displaced from their original homes due to water scarcity, as drought is the main reason for their displacement in the affected areas.

4. Due to high temperatures, drought, and changing rainfall patterns, the production of staple foods has decreased due to the difficulty of maintaining agricultural lands, creating a threat to food security and increasing poverty and unemployment rates in Iraq.

5. Poverty and food insecurity are interrelated; one leads to the other, and both are generated as a result of drought and desertification of agricultural lands, which are the source of livelihood for families in the affected areas.

5.2 Recommendations

Referring to the study results, some concrete policy measures are made to address the environmental and socio-economic determinants of climate-induced displacement in southern Iraq. The recommendations for change for addressing climate-induced migrants are as follows in accordance with the following policy interventions based on the study results and their implications for the future of those forced to migrate to remote areas in southern Iraq:

• Restoration and wetland management of marshlands: Restore the southern marshes in the south through controlled water releases, sediment dredging, and vegetation replanting programs to repair and/or restore local wetlands to support productive fishing and pastoral lives in the southern marshes, especially in Thi-Qar and Maysan.

• Building more efficient irrigation systems: Invest in new irrigation systems (drip and sprinkler irrigation): Install more advanced modern irrigation systems and maintain main and secondary canals so that less water loss occurs and water is used by farmers in agricultural regions.

• Climate-resilient agriculture: Advocate for drought-resistant crop varieties, provide agricultural extension services, and introduce early warning systems for drought and salinity risk reduction.

• Rural livelihoods diversification: Implement other kinds of jobs beyond agriculture, such as in eco-restoration projects and other industries, as well as small-scale production for new industries like solar power, to prevent migration pressure from rural areas to urban areas.

• Governance and infrastructure in water: Establish local water management committees to act as a common language between farmers, municipalities, and the Ministry of Water Resources. Invest in reservoirs and rainwater harvesting systems in areas with heavy drought.

• Coordination of institutions and integration of data: It would be beneficial to see that the national coordination mechanism (Ministry of Environment, Ministry of Planning, and IOM) is improved if there was improved linkage across all national organs that contribute to the common climate-induced migration framework, using updated displacement tracking data.

• Promote local awareness and capacity building: Offer local awareness programs for sustainable water use, household adaptation practices, and climate risk education to improve community resilience.

Taken together, all these would not only reduce displacements; they would also help ensure the long-term environmental and livelihood future of Iraq's southern governorates.

Author Contributions

Conceptualization, K.H.A. and S.M.A.; methodology, A.M.M.; software, Y.H.O.; validation, K.H.A., Y.H.O., and S.M.A.; formal analysis, A.M.M.; investigation, S.M.A.; resources, K.H.A.; data curation, Y.H.O.; writing—original draft preparation, S.M.A.; writing—review and editing, K.H.A.; visualization, A.M.M.; supervision, S.M.A.; project administration, K.H.A. All authors have read and agreed to the published version of the manuscript.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Appendix

Results of the statistical model for simple linear regression between desertification regions and the number of families migrating or displaced due to climate change.

Table A1. Variables entered/removed[a]

Model	Variables Entered	Variables Removed	Method
1	Desertification lands b	-	Enter

Note: a. Dependent variable: displaced families.

b. All requested variables entered.

Table A2. Model summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.753[a]	0.567	0.351	509.78081

Note: a. Predictors: (constant), desertification lands.

Table A3. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	680987.799	1	680987.799	2.620	0.247[b]
	Residual	519752.951	2	259876.476		
	Total	1200740.750	3			

Note: a. Dependent variable: displaced families.

b. Predictors: (constant), desertification lands

Table A4. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients Beta	F	Sig.
		B	Std. Error			
1	(Constant)	1307.804	468.356	-	2.792	0.247[b]
	Desertification lands	519752.951	0.000	-0.753	-1.619	0.247

Note: a. Dependent variable: displaced families.

Source: Prepared by a researcher use IBM SPSS Statistics software.