THE RIGHT TO WATER AND CLIMATE CHANGE **2025** THE ARAB WATCH REPORT ON ECONOMIC AND SOCIAL RIGHTS

THE RIGHT TO WATER IN IRAQ

in Light of Climate Change

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Researcher

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Arab NGO Network for Development
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This report is published as part of the Arab NGO Network for Development's Arab Watch Report on Economic and Social Rights (AWR) series. The AWR is a periodic publication by the Network and each edition focuses on a specific right and on the national, regional and international policies and factors that lead to its violation. The AWR is developed through a participatory process which brings together relevant stakeholders, including civil society, experts in the field, academics, and representatives from the government in each of the countries represented in the report, as a means of increasing ownership among them and ensuring its localization and relevance to the context.

The seventh edition of the Arab Watch Report focuses on the right to water. It was developed to provide a comprehensive and critical analysis of the status of this right across the region, particularly in the context of climate change and its growing impacts. The information and analyses presented aim to serve as a platform for advocacy toward the realization of this fundamental right for all.

The views expressed in this publication are solely those of the author and do not necessarily reflect the positions of the Arab NGO Network for Development (ANND), Brot für die Welt, or Norwegian People's Aid.

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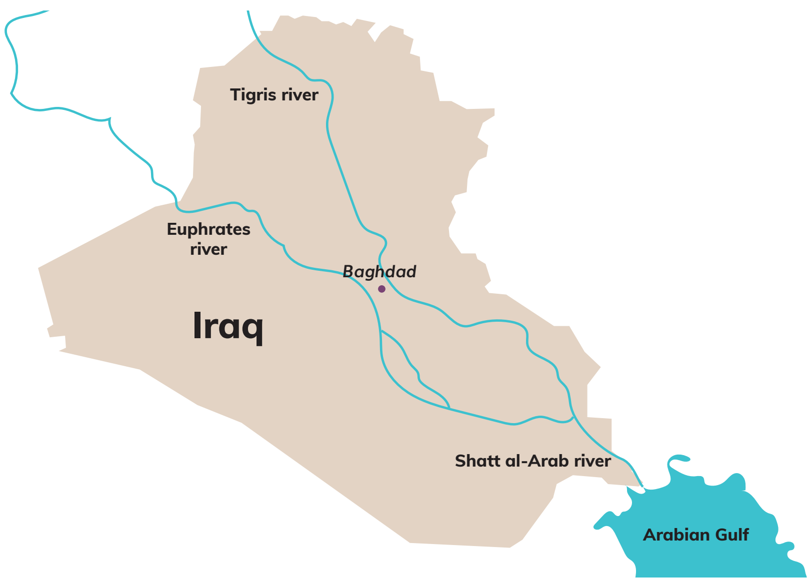
INTRODUCTION

Water is one of the fundamental rights recognized by international conventions, as it is an essential element for a decent life and for sustainable development. The United Nations High Commissioner for Human Rights has affirmed that "the right to water is indispensable for leading a life in human dignity. It is a prerequisite for the realization of other human rights" (United Nations, 2003), emphasizing the need to provide sufficient, safe, and affordable water for personal and domestic uses.

Although historically known as Mesopotamia due to its near-total dependence on the Tigris and Euphrates Rivers, which account for approximately 93–98% of its water resources (Iraq Energy Institute, 2018), Iraq faces significant challenges. These are due to its arid climate, the scarcity of other water resources, declining river flows caused by climate change and hydrological projects in upstream countries, as well as population growth and increased demand from the agricultural and industrial sectors. Since Iraq is a downstream country, it has faced serious challenges in managing water resources and ensuring fair and efficient distribution.

The Tigris and Euphrates basins are shared by six countries (Turkey, Iran, Syria, Iraq, Jordan, and Saudi Arabia). The Tigris River originates in Turkey and Iran, while the Euphrates River originates in Turkey and is partially fed by Syria and Iraq. The two rivers then meet in northern Basra Governorate to form the Shatt al-Arab River, which eventually flows into the Arabian Gulf (Figure 1).

Figure 1: Map of the course of the Tigris and Euphrates rivers



Source: (UN-ESCWA, 2013) (Ala et al., 2020)

The Tigris River originates in southeastern Turkey, with Turkey contributing approximately 51% of its water, while Iran contributes 10%. The Euphrates River is formed by the confluence of the Karasu and Murat rivers in Turkey, with Turkey, Syria, and Iraq contributing approximately 88%, 10%, and 2% of its water, respectively (Al-Asadi & Alhello, 2019).

Iraq has experienced significant population growth since the 1970s. The population increased from 12.4 million in 1978 to 45.4 million in 2024 (Central Statistical Organization, 2024). It is projected to reach 60 million by 2035 (Iraq Energy Institute, 2018).

Thus, demographically, Iraq witnessed a significant population surge during the aforementioned period. Coupled with agricultural and industrial expansion, this growth placed unprecedented pressure on water resources. In 1990, the total water withdrawal reached approximately 42.8 km^3, of which 92% was allocated to agriculture, 3% to domestic use, and 5% to the industrial sector (Iraq Energy Institute, 2018). During the 2022-2023 period, it decreased to 33.1 km^3 (Table 1) as a result of the decreased freshwater flow in rivers. The water use was redistributed as follows: 61% for agriculture, 20% for domestic uses, 7% for industry, and 12% for environmental uses (Central Statistical Organization, 2024).

Table 1: Quantities and percentages of water uses for the 2022-2023 water year

Type of use	Total (Km^3/year)	%
Agricultural	20.132	61
Domestic	6.753	20
Industrial	3.835	7
Environmental	3.835	12
Total	33.141	100

Source: (Central Statistical Organization, 2024)

Water service coverage is estimated at 93.9% (23,795,812 people) in urban areas and 73.4% (8,767,678 people) in rural areas (Central Statistical Organization, 2024). However, water is often provided for limited hours and is of poor quality and unsafe for drinking. Furthermore, a lack of awareness about water scarcity has led to high domestic consumption, reaching 392 liters per person per day, exceeding the global average of 200 liters per person per day (Iraq Energy Institute, 2018).

Iraq is characterized by its vast agricultural lands, which amounted to approximately 94,390 km^2 in 2020 (Table 2) out of a total area of 434,128 km^2 (World Bank, 2025). The agricultural sector experienced significant decline before 2000 due to the use of traditional irrigation methods and increased water salinity, leading to soil salinization and reduced productivity. The crisis worsened after 2003 due to government neglect and increased reliance on imported agricultural products. In 2015, the government began taking steps to support agriculture by offering incentives to farmers, which contributed to a relative improvement in production.

Table 2: Area of agricultural land (km2) in Iraq during the 1970-2020 period

Year	1975	1970	1980	1985	1990	1995	2000	2005	2010	2015	2020
Area of agricultural land (km2)	89,930	92,850	94,390	94,650	92,300	91,000	85,000	88,400	82,200	92,690	94,390

Source: (World Bank, 2025)

As for the industrial sector, factories consumed approximately 372,995 m^3/day of fresh water in 2023 (Central Statistical Organization, 2024), with the oil sector accounting for the largest share, as producing one barrel of oil requires 3-5 barrels of water (Iraqi Parliament Organization, 2021). With a daily production rate of 4.12 million barrels in 2023 (OPEC, 2025), water consumption in the oil industry was estimated at around 16,480 million barrels/day (2,619 km^3/year).

1.1 THE ISSUE OF THE STUDY:

Iraq is ranked among the five countries most affected by climate change globally, making it vulnerable to increasing deterioration of its freshwater resources. Therefore, this study stems from a core question: What is the impact of climate change on the right to water in Iraq? Several sub-questions arise from this main question, specifically:

- What are the main factors affecting the right to water in addition to climate change?
- To what extent have the water levels of the Tigris and Euphrates rivers deteriorated in light of these changes?
- What are the repercussions of water resource degradation on agriculture, the Marshlands, women, and internal conflicts?

1.2 DATA COLLECTION:

The study relied on a combination of data published in official government sources (such as the Central Statistical Organization), international sources (World Bank, UN, OPEC), and a review of reputable scientific literature. Given the difficulty of obtaining unpublished data, the most recent available statistics and reports were used to provide an accurate picture of the water situation in Iraq.

1.3 STUDY METHODOLOGY:

The study adopts a descriptive approach to analyze the historical and contemporary context, and a quantitative approach to deduce the relationships between demographic, hydrological, and climatic variables, as well as to forecast future trends. This dual approach allows for an accurate description of the current situation and a deeper understanding of its connections to the right to water.

02

THE RIGHT TO WATER IN IRAQ (HISTORICAL CONTEXT)

Iraq's history has been closely linked to water since ancient times, as the first civilizations arose on the banks of the Tigris and Euphrates rivers in what was known as Mesopotamia. The ancient Iraqis established the first irrigation systems in history, which included building dams, digging canals, and organizing water distribution. This concern was reflected in the Code of Hammurabi, which contained the first water laws, written on stone tablets, specifically in Articles 53-56 (Qasha, 2007; Ostrom, 1990). The Sumerians paid great attention to maintaining irrigation networks, while the Assyrians focused on building dams and improving their infrastructure. With the rise of Islamic civilization, water was considered a shared resource according to Islamic law, and irrigation networks were strengthened, especially during the Abbasid era. In the Ottoman era, land ownership was regulated through the Tapu Law. Furthermore, a central administration was established to oversee irrigation networks (Hammoudi & Ayada, 2015).

With the beginning of the monarchy, Iraq underwent a fundamental modernization of water laws, most notably the Irrigation Law of 1923. At the international level, several agreements emerged to regulate the exploitation of the Tigris and Euphrates rivers as transboundary rivers, mainly the Treaty of Lausanne (1923) and the 1946 agreement between Iraq and Turkey, which ensured that Iraq would be informed of Turkish projects in the two river basins (Al-Assaf and Ali, 2004). In 1975, the Algiers Agreement was signed between Iraq and Iran to demarcate the fluvial boundary in the Shatt al-Arab according to the thalweg line, but it did not address the sharing of water quotas (Al-Fadhli, 2024). Similarly, in 1989, the Euphrates Water Sharing Agreement was signed between Syria and Iraq, granting Iraq 58% and Syria 42% of the water inflows (FAO, 2004).

The following decades saw significant legislative developments, including Law No. (12) of 1995, which regulated the management and operation of irrigation and drainage networks and assigned maintenance responsibilities to farmers (Hamoudi and Ayada, 2015), in addition to other fragmented legislations, such as the Law for the Protection of Rivers from Pollution (1967), the Water Conservation Law (2001), and the Environmental Improvement Law (2009). In 2004, the Ministry of Water Resources was established as an independent ministry, replacing its previous affiliation with the Revolutionary Command Council, to manage and distribute water resources institutionally (Rashid, 2017). Also, in 2017, the Irrigation Law was enacted, establishing the framework for water allocation and infrastructure maintenance under the ministry's supervision.

Despite these efforts, Iraq still lacks a comprehensive national water law, relying instead on fragmented legislation and a complex institutional framework involving several ministries, municipalities, and governorates (Institute for International Law and Human Rights, 2023). This legal and institutional fragmentation reflects the urgent need for legislative reforms that address current water challenges and affirm water as a fundamental human right in the face of climatic and political pressures.

03

FACTORS AFFECTING THE RIGHT TO WATER IN IRAQ

Iraq faces a number of natural and human factors that have directly impacted its right to water. The growing population in the Tigris and Euphrates basins, reaching approximately 52.4 million (Table 3), with more than half (around 28.6 million) residing within Iraq, has led to a surge in demand for fresh water. This demand is driven by both domestic uses, with individuals consuming between 250 and 350 liters daily, and agricultural uses, which account for the largest share. The uneven population distribution has exacerbated this pressure, particularly given that Iraq's annual population growth rate reaches 2.7% (Table 3), the highest compared to other basin countries.

With increasing food needs, agricultural land expanded significantly, as Iraq allocated over 3.3 million hectares to irrigated agriculture (Table 3), in addition to large-scale projects such as the Southeastern Anatolia (GAP) Project in Turkey and other irrigation projects in Syria and Iran. This has increased water consumption rates to approximately 10,000–15,000 m³ per hectare annually. This agricultural expansion, coupled with limited resources, exacerbated the water deficit in Iraq.

Table 3: Water demand in terms of population and irrigated areas in the countries of the Tigris and Euphrates river basin

Country	River basin	Population (millions)	Water requirements (liters/ person)	Population growth rate	Total cultivated area (million hectares)	Irrigated area	Water requirements (million m³/hectare)	Agricultural growth rate
Turkey	Tigris	3.47	250	1.3	0.54	57,000	-10,000	
	Euphrates	7.15			0.91	103,000	12,000	5.7%
	Total/Average	10.62			1.45	409,655	11,000	
Iran	Tigris	7.50	250	1.4	1.08	373,900	-10,000 12,000	2.2%
	Average						11,000	

Syria	Tigris	5.69	350	2.5	0.64	240,000	-10,000 12,000	2.6%
	Average						11,000	
Iraq	Tigris	18.40	350	2.7	2.20	1,166,880	-13,000	0.95%
	Euphrates	10.20			1.00	549,120	15,000	
	Total/Average	28.60			3.20	1,716,00	14,000	

Source: (Al-Asadi, 2017)

Population growth has been accompanied by clear effects of climate change. These effects have manifested through rising temperatures and declining rainfall rates. Climate data for the 1980-2020 period show that the average temperature has gradually increased, reaching 27.9°C in Basra in 2020, 21.1°C in Mosul, 23.4°C in Baghdad, and 20.1°C in Al-Anbar (Table 4).

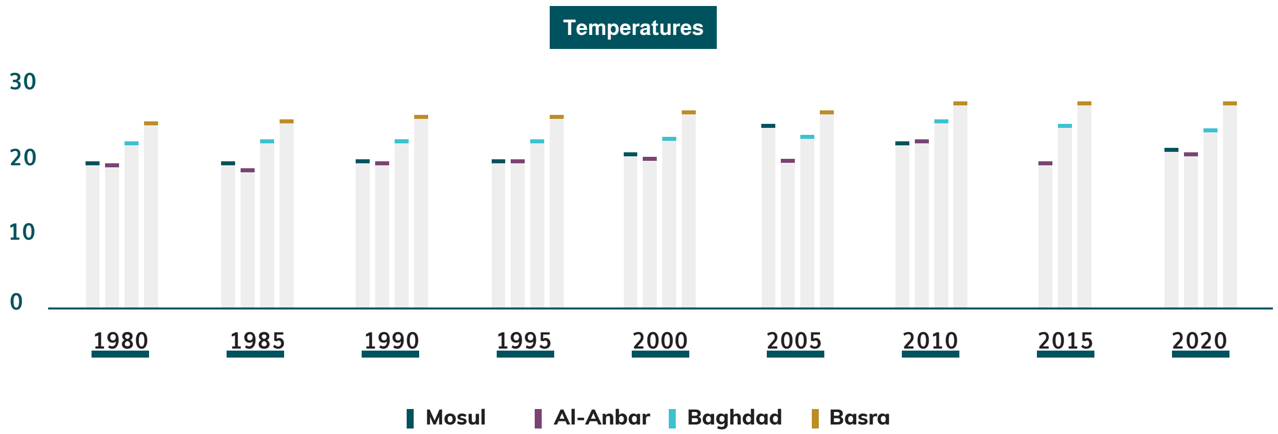
Table 4: Temperatures at Iraqi stations during the period 1980-2020

Year / Governorate[1]	1980	1985	1990	1995	2000	2005	2010	2015	2020	Overall average
Mosul	19.6	19.8	20.0	19.9	20.9	24.9	22.3	-	21.425	21.1
Al-Anbar	19.4	18.9	19.8	20	20.45	19.9	22.7	19.75	20.85	20.1
Baghdad	22.3	22.6	22.7	22.7	23.1	23.3	25.3	24.7	24.2	23.4
Basra	25.2	25.4	25.9	26.0	26.7	26.6	27.9	27.7	27.9	26.5

Source: (Al-Humaidawi, 2023) (Al-Fadhli, 2024)

[1] Temperature and rainfall data were selected using a scientific methodology based on the hydrological characteristics of the Tigris and Euphrates rivers. Mosul and Al-Anbar represent the two main entry points of the rivers into Iraqi territory, while Baghdad is characterized by the confluence of the Diyala and Tigris rivers. Basra is also considered as the downstream governorate for both rivers and the formation of the Shatt al-Arab waterway. Data for the governorates of Maysan and Dhi Qar were unavailable.

Figure 2: Temperature in Iraq during the 1980-2020 period



Source: Table 4

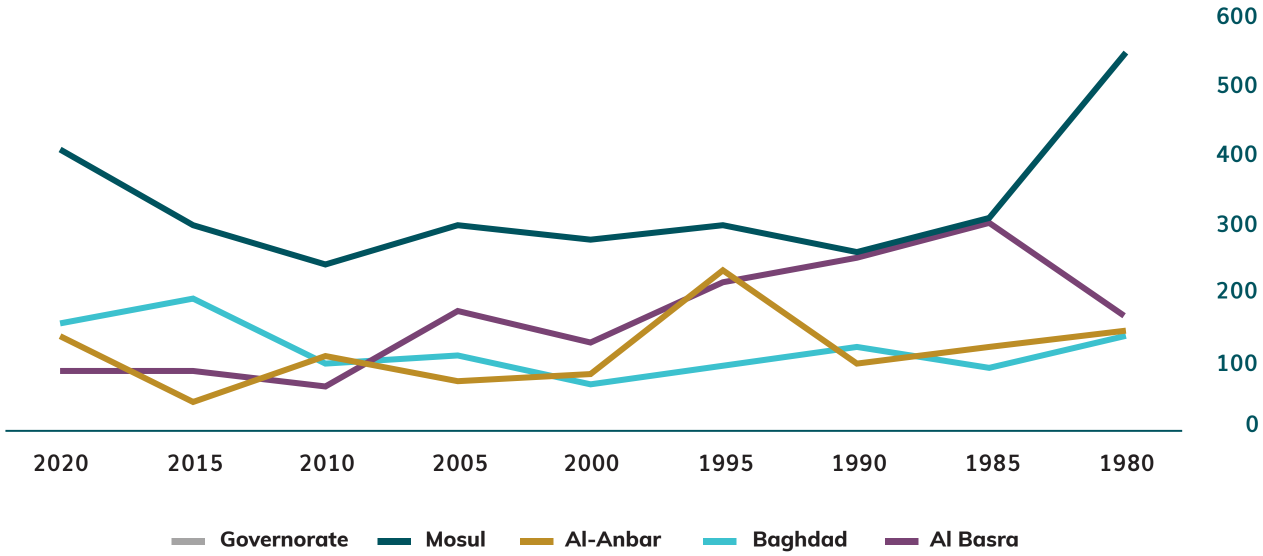
Precipitation in Iraq consists mainly of rain and snow during the winter in the northern regions. Unlike temperatures, rainfall rates have followed a downward trend, with the annual total for the same period reaching 2,904 mm in Mosul, 1065 mm in Baghdad and 1,035 mm in Al-Anbar, while it did not exceed 147 mm in Basra (Table 5). As such, there is a stark contrast between the rain-rich north and the semi-arid south. These climatic shifts have directly impacted the amount of water flowing in the two rivers, exacerbating recurring droughts.

Table 5: Rainfall values (mm/year) at Iraqi stations during the 1980-2020 period

Year / Governorate[1]	1980	1985	1990	1995	2000	2005	2010	2015	2020	Total
Mosul	542.9	301.4	256.6	296.2	272.8	294.5	294.5	292.7	406.9	2904.6
Al-Anbar	139.9	122.1	96.1	230.2	84.4	72.7	72.7	41.9	138.3	1034.6
Baghdad	138.1	91.5	123.8	96.7	67.6	108.2	108.2	190.9	155.6	1064.9
Basra	167	297	247	214	127	174	174	87	92	1470
Total	987	812	723.5	837.1	551.8	649.4	649.4	612.5	792.8	6474.1

Source: 1. (Al-Humaidawi, 2023); 2. (Al-Fadhli, 2024)

Figure 3: Trends in rainfall changes in Iraq during the 1980-2020 period



Source: Table 5

At the hydrological level, neighboring countries have extensively utilized the resources of the two rivers by constructing dams and large reservoirs. Since the 1970s, Turkey has been undertaking the GAP Project, with a total storage capacity exceeding 105.03 km³, including the Atatürk Dam, which is one of the largest dams in the world. Meanwhile, Iran has established a reservoir system with a capacity of 41.8 km³. Syria built three main dams on the Euphrates, with a total capacity of 13.7 km³. As for Iraq, since the beginning of the twentieth century, it sought to enhance its water system, so it built the Hindiya Barrage on the Euphrates in 1918, and the Kut Barrage on the Tigris in 1939, and then major projects followed, such as the Hamrin, Mosul and Al-Adhaim dams, to reach a total storage capacity of 136 km³ (Al-Asadi, 2017). However, these efforts remained insufficient to offset the impact of massive regional projects that reduced the amount of water reaching Iraq.

At the political level, Iraq's water diplomacy was characterized by relative weakness, as it has failed to conclude binding agreements with upstream countries except for Syria, while both Turkey and Iran refrained from ratifying the 1997 United Nations Convention on the Non-navigational Uses of International Watercourses; Turkey even explicitly opposed it. Although Iraq holds significant economic leverage as a major market for Turkish exports, which reached approximately $18.9 billion in 2023 (Central Bank of Iraq, 2023), and for Iranian non-oil exports, which reached $11.8 billion in 2025 (Abdi, 2025), the lack of specialized negotiating expertise weakened the country's negotiating position and led to results that fell short of resolving the challenges.

Domestically, the Ministry of Water Resources relies on a national strategy prepared in 2014 for the 2015-2035 period, known as the Strategy for Water and Land Resources in Iraq (SWLRI). While it is important for outlining general water management policies, the strategy contains several gaps. Most notably, it assumes an annual inflow of 35 billion cubic meters from neighboring countries without a binding agreement, relies on outdated data from the 1980s, and overlooks climate change scenarios. The strategy lacked clear solutions for distributing water quotas among the provinces or farmers. It also overlooked the problem of irrigation efficiency, which does not exceed 30%, while the strategy assumed it could be raised to 35%. The planned agricultural intensification of 120% was not achieved, with the actual rate not exceeding 50%, in addition to the loss of enormous quantities of water within the southern marshlands, reaching approximately 8 billion cubic meters annually. It should be noted that this strategy has not been updated for more than ten years, even though international standards require it to be reviewed every five years to keep pace with climatic, political, and economic developments (Al-Ansari et al., 2023).

The interplay of these demographic, agricultural, climatic, hydrological, political, and institutional factors has made the issue of the right to water in Iraq a complex crisis that goes beyond the limits of traditional management and requires a comprehensive approach based on strengthening water diplomacy, developing infrastructure, improving efficiency of use, and adopting renewed plans that adapt to climate change and regional pressures.

04

DETERIORATION OF THE QUANTITATIVE AND QUALITATIVE CHARACTERISTICS OF FRESHWATER

The Tigris and Euphrates basins cover a vast area estimated at approximately 938,305 km² (Table 6), placing them among the main transboundary water basins in Southwest Asia. Iraq occupies the largest area of the Tigris basin, at 292,000 km² out of a total of 375,000 km², while Syria has the smallest area at 1,000 km². Turkey contributes the largest amount of water discharge, at approximately 21.93 km³/year, while Syria's contribution is almost negligible.

The Euphrates basin covers an area of 439,000 km² (Table 6). Iraq contributes approximately 206,000 km², while Jordan contributes the smallest share, not exceeding 132 km². Turkey is the main source of its water, providing up to 88%, while the contributions of Saudi Arabia and Jordan remain almost negligible. The Shatt al-Arab River, whose total basin area is 938,305 km², originates from the confluence of the two rivers in the south. Iraq has the largest share at 498,800 km², while Turkey remains the largest contributor to its water supply at approximately 50.43 km³/year.

Table 6: Countries and key factors of the Tigris and Euphrates basins

River	Country	Basin area (km²)	%	Average discharge (km³/year)	%	Drainage length (km)	%
Tigris	Turkey	45,000	12	21.93	51	400	21.6
	Iraq	292,000	54	16.77	39	1418	76.6
	Iran	37,000	33.8	4.3	10	0	0
	Syria	1,000	0.2	0	0	32	1.8
	Total	375,000	100	43	100	1850	100
Euphrates	Turkey	123,000	28	28.5	88	1230	41
	Iraq	206,000	47	0.7	2.0	1060	35
	Syria	96,800	22	3.2	10	710	24
	KSA	13,068	2.97	0	0	0	0

	Iran	132	0.03	0	0	0	0
	Total	439,000	100	32.4	100	3000	100
Shatt-al Arab	Turkey	168,200	17.93	50.43	47.71	-	-
	Iraq	498,800	53.16	17.47	16.53	85+115	100
	Iran	160,305	17.09	34.60	32.73	85	42.5
	Syria	97,800	10.42	3.20	3.03	-	-
	KSA	13,068	1.39	0	-	-	-
	Iran	132	0.01	0	-	-	-
	Total	938,305	100	105.7	100	200	-

Source: (Al-Asadi & Alhello,2019: 362)

The annual discharge data for the 1970-2022 period indicate a clear decline in river flows within Iraq. The average discharge of the Tigris River was approximately 302 m^3/s in Wasit and 384 m^3/s in Maysan (Table 7). The highest value recorded in Maysan was in 1970 (646 m^3/s), while the lowest was in 2000 (262 m^3/s). In Wasit, the highest value was also recorded in 1970 (503 m^3/s), and the lowest in 2000 (134 m^3/s).

The Euphrates River showed a similar decline, with an average discharge of 535.4 m^3/s in Anbar, 320.7 m^3/s in Karbala, and 226.3 m^3/s in Nasiriyah. The highest flow was recorded in Anbar in 1980 (945.3 m^3/s), while the lowest was in 2020 (220.6 m^3/s). In Karbala, the highest discharge rate was recorded in 1970 (617.8 m^3/s) and the lowest in 2020 (around 261 m^3/s). Nasiriyah also recorded its highest rate in 1970 (439.8 m^3/s) and its lowest in 2010 (around 63 m^3/s).

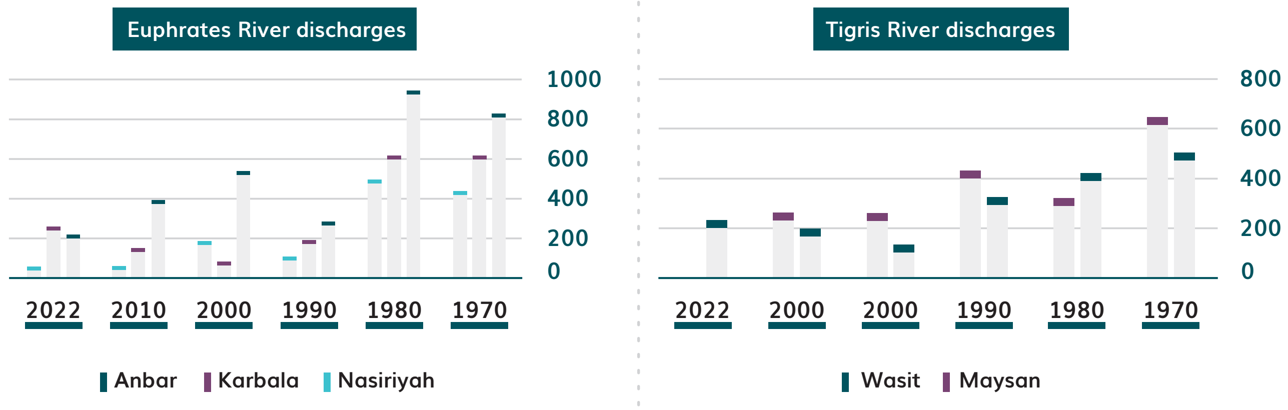
Table 7: Average discharge rates (m^3/s) at stations along the Tigris and Euphrates Rivers during 1970–2022

River	Year / Governorate	1970	1980	1990	2000	2010	2022	Average
Tigris	Wasit	503	421	262	134	200.91	*232.58	302.75
	Maysan	646	322	431	262	263	-	384.8
Euphrates	Anbar	828.5	945.3	285.3	538.4	394.5	220.6	535.4
	Karbala	617.8	616.9	192.1	83.75	152.75	261	320.7
	Nasiriyah	439.8	497	111	186.75	63	60.25	226.3

*Discharge data for the year 2021.

Source: 1. (Khalaf, 2018); 2. (Al-Khuza'i, 2024); 3. (Al-Hasani, 2024)

Figure 4: Discharge of the Tigris and Euphrates Rivers at hydrological stations



Source: Table 7

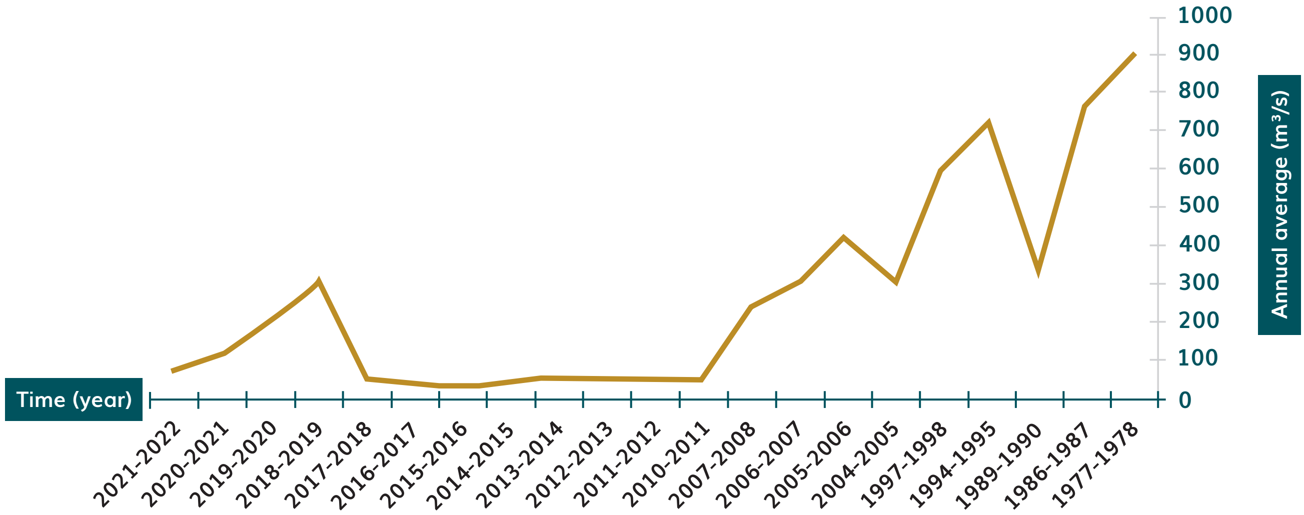
The decline in water discharge was not limited to the Tigris and Euphrates Rivers but also extended to the Shatt al-Arab River. The average discharge rate of the river at the Qal'at Saleh regulatory gate during the 1977-2022 period was about 441.5 m³/s (Table 8). The highest value was recorded between 1977 and 1978 (903 m³/s), while the lowest was between 2017 and 2018 (56 m³/s). This decrease resulted from reduced freshwater inflows in river channels, in addition to the Iranian government's closure of the Karun River outfall after 2009, one of the Shatt al-Arab's main tributaries, which significantly reduced the river's overall discharge.

Table 8: Freshwater discharge rates (m³/s) in the Shatt al-Arab River at the Qal'at Saleh regulatory gate during 1977–2022

Year	1977-1978	1986-1987	1997-1998	2007-2008	2017- 2018	2021- 2022	Overall average
Annual average	903	759	606	246	56	79	441.5

Source: Al-Fadhli

Figure 5: Annual average discharge of the Shatt al-Arab River during 1977-2022



Source: (Al-Fadhli, 2024)

The close relationship between climate change and this quantitative decline is evident, as the decrease intensifies toward the south due to rising temperatures and declining rainfall. However, climatic factors alone do not explain the situation. The construction of dams and hydrological projects in upstream countries, coupled with poor local management and the absence of fair water allocation, has exacerbated the crisis.

From a qualitative perspective, reduced water discharge has contributed to higher pollutant concentrations and the deterioration of water quality. The direct disposal of untreated wastewater and industrial waste, together with the excessive use of agricultural pesticides and fertilizers, has led to an increase in total dissolved solids (TDS) concentrations in river water. Data from 2022 (Table 9) reveal that salinity levels in the Tigris reached 752 mg/L in Wasit and 821 mg/L in Maysan, while in the Euphrates they measured around 431 mg/L in Anbar, 589 mg/L in Karbala, and 630 mg/L in Nasiriyah. In the Shatt al-Arab, concentrations reached critical levels of 1,319 mg/L at Qurna and surged to 26,484 mg/L at Faw, due to the intrusion of saline Gulf waters and reduced river discharge. The spatial distribution of salinity concentrations shows a clear increasing trend southward (Figure 6), clearly reflecting the combined impact of hydrological, human, and climatic factors on the qualitative degradation of water.

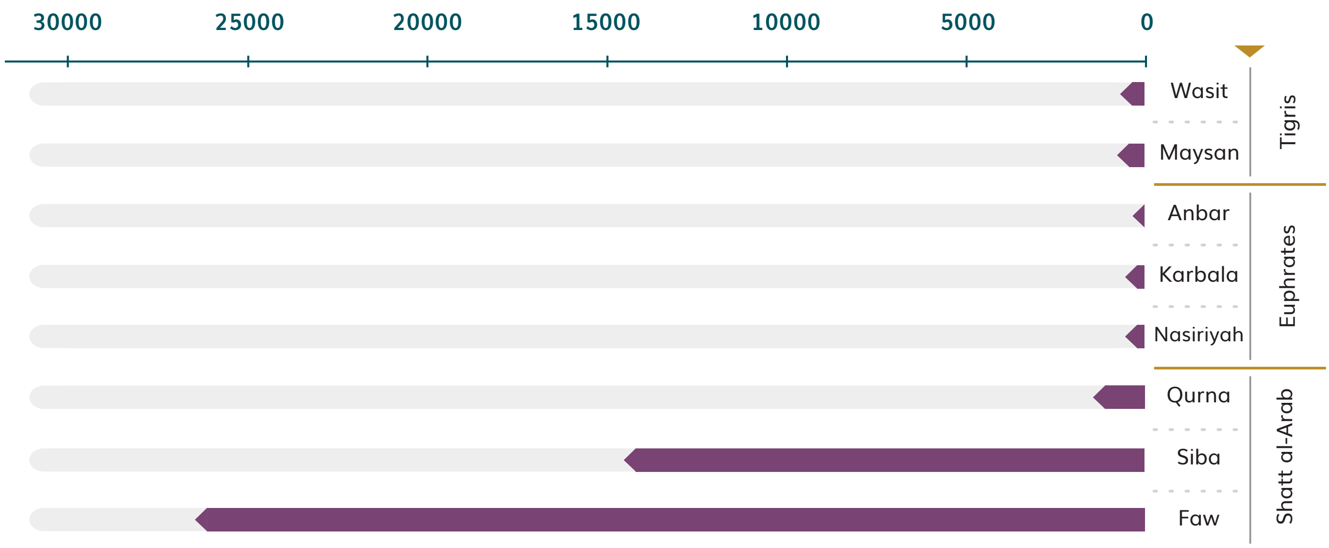
Table 9: Total dissolved solids (TDS) concentration (mg/L) in the Tigris, Euphrates, and Shatt al-Arab Rivers in 2022

River	Station	Annual average
Tigris	Wasit	751.67
	Maysan	820.5
Euphrates	Anbar	431
	Karbala	589
	Nasiriyah	630
Shatt al-Arab	Qurna	1319
	Siba	14600
	Faw	26484

Source: 1. (Al-Zubaidi, 2022); 2. (Central Statistical Organization, 2024); 3. (Al-Hasani, 2024); 4. (Al-Fadhli, 2024)

The continued decline of Iraq's water resources, both in quantity and quality, represents a serious indicator of the fragility of the country's water security. It underscores the urgent need for an integrated management approach that balances water use, reduces pollution sources, activates water diplomacy to confront upstream countries' water policies, and finds practical solutions to the salinity problem in southern Iraq.

Figure 6: Total dissolved solids (TDS) concentrations (mg/L) in the waters of the Tigris, Euphrates, and Shatt al-Arab Rivers in 2022



Source: Table 9

05

IMPLICATIONS OF WATER RESOURCE DEGRADATION

In recent decades, Iraq's water resources have experienced a rapid decline due to a combination of natural and human factors, negatively impacting the country's economic, social, and environmental conditions. Climate change, the construction of dams in upstream countries, and poor domestic water management have all contributed to the reduction of inflowing water quantities and the deterioration of water quality. This degradation has affected several key areas, most notably agricultural land. The deterioration in water quality has had harmful effects on farmland, as water salinity and chemical composition influence its suitability for irrigation. The quality of irrigation water is a critical indicator of agricultural productivity; however, it depends not only on the composition of water but also on soil characteristics, climatic conditions, crop types, and their tolerance to salinity, in addition to the volume of water used for irrigation.

Consequently, increased salinity and pollution have rendered irrigation water unsuitable, leading to declining agricultural productivity and rising soil salinity. Data on total dissolved solids (TDS) show that concentrations have exceeded acceptable limits for several crops, reaching levels above 2,100 mg/L in some areas such as Wasit, Maysan, and Faw, rendering the water unfit for irrigation (Al-Asadi, 2024).

Desertified areas cover around 100,949.7 km^2, with an additional 342,221.2 km^2 at risk of desertification (Central Statistical Organization, 2023). Due to this degradation, the share of land irrigated by rivers fell from 72% in 2015 to 18% in 2022, while reliance on rain-fed irrigation increased from 7% to 52%. Dependence on groundwater also rose from 21% to 25% during the same period, while modern irrigation systems remained limited, covering only 17% of arable land (Central Statistical Organization, 2016, 2023). Climate change, reduced rainfall, and increased evaporation, together with land clearing and its conversion to residential, commercial, and industrial uses, have contributed to the decline in agricultural land. Meanwhile, the drying of wetlands such as the Marshlands and lakes has resulted in the loss of vast areas of natural vegetation and the degradation of biodiversity.

The impact of wetland loss extends beyond the decline in vegetation cover to include a reduction in their surface water area due to severe drought events. The southern Iraqi Marshlands represent an integrated ecosystem that dates back more than five millennia and constitute one of the largest wetland areas in the Middle East. They were listed under the Ramsar Convention in 2008 (Ramsar, 2025) and inscribed on the World Heritage List in

2016 (UNESCO/CPE, 2025).

The Marshlands consist of three main areas, Hawizeh Marsh, the Central Marshes, and Hammar Marshes, in addition to several secondary wetlands. In 1970, the area of permanent marshlands covered about 8,926 km², but it declined to 1,296 km² in 1999 due to a politically motivated plan to drain the Marshlands. After 2003, local communities' efforts contributed to their restoration, reviving the ecological system. The total area increased to 2,507 km² in 2010 and then to 6,198 km² in 2020 (Al-Zubaidi, 2022).

However, in light of climate change, reduced water releases from upstream countries, and poor domestic water management – and given the geographical nature of the Marshlands as extensive and shallow water bodies – they have become increasingly vulnerable to evaporation. As a result, some marshes have shifted from being permanent to seasonal, while vast areas have dried up permanently.

The Marshlands continue to suffer from severe environmental degradation (Figure 7). The presence of underground natural resources, such as oil, in certain areas has led to government control and drainage of parts of the Marshlands to allow oil extraction. This is particularly evident in the case of Hawizeh Marsh, which was transferred to an oil company and converted into an oil field, with local residents prohibited from entering or fishing in those areas. This development poses a significant threat, especially since oil industry operations involve drilling, exploration, and emissions from fossil fuel combustion, exposing the marsh environment and the area's inhabitants to serious risks.

Figure 7: Two images of the Hawizeh Marsh in 1976 and 2000

1976

2000

Source: (Khalaf, 2018)

Sawa Lake is one of Iraq's most distinctive natural features, owing to its unique formation. Located in a desert region, it is fed by groundwater that reaches it through fissures and faults in Earth's crust. The lake has suffered from drying and declining water levels in recent decades due to the desiccation of the springs that used to feed it. Its water is saline and unsuitable for various uses, including agriculture (Al-Khuza'i, 2024).

Drought and the degradation of water resources, particularly in southern regions, have led to a sharp decline in agricultural and livestock production. This has directly affected the livelihoods of local populations who depend on water-related activities such as farming, fishing, and livestock rearing. Drought and increasing salinity have also aggravated the phenomenon of internal migration.

At present, the effects of climate change are most visible in southern Iraq, where migration has become widespread due to the loss of agricultural land and water scarcity. Between 2021 and 2024, approximately 13,949 individuals were displaced as a result of climate change, including 8,158 due to desertification, 5,294 due to drought, and 497 due to water shortages (Central Statistical Organization, 2024). If these conditions persist or worsen, their impact could extend to central and northern regions of the country. Estimates suggest that around 4 million people could be at risk of displacement due to drought by 2030 (UNICEF, 2021a).

Women, particularly those in rural areas and the Marshlands of Iraq, are among the groups most affected by climate change and drought, as their livelihoods depend heavily on agriculture and livestock. The decline in agricultural and livestock production has reduced household income, forcing many families to withdraw girls from school due to the inability to cover educational expenses or to direct them toward domestic and agricultural work to compensate for labor shortages. This has limited girls' opportunities to access education.

Economic pressures resulting from climate change have also given rise to harmful social practices, such as child marriage as a means of alleviating financial burdens, and, in some cases, the forced marriage of two sisters simultaneously.

These impacts are not limited to rural areas but also extend to women who migrate to urban centers, where they face compounded challenges in adapting to new economic environments that often require skills and qualifications they do not possess. This reality forces them into exhausting, low-paying jobs, further increasing their economic and social vulnerability within the urban context.

The repercussions of the water crisis are not confined to environmental and livelihood aspects; they also extend to the political and security spheres. Water has been linked to various forms of conflict, including disputes over water shares between governorates and clashes among farmers over resources. The Tigris and Euphrates basins rank among the top five river basins globally in terms of incidents where water has been used as a weapon and occupy the first position worldwide in the number of fatalities resulting from such events (Mueller et al., 2021).

The Basra protests of summer 2018 stand as a stark example of the direct link between deteriorating water services and escalating social unrest. Rising salinity and pollution led to widespread cases of poisoning that triggered large-scale demonstrations. Similarly, waves of displacement have placed growing pressure on urban services and infrastructure, leading to tribal disputes and social tensions. Furthermore, the drying of wetlands has sparked local conflicts over ownership of newly exposed land due to water retreat, intensifying disputes within rural communities.

These developments confirm that the degradation of Iraq's water resources is no longer merely an environmental or developmental issue; it has become a central factor affecting the country's food, social, and political security, and it poses a serious threat of escalating internal conflicts, migration, and displacement amid ongoing climate change and regional pressures on shared water resources.

06

THE ROLE OF CIVIL SOCIETY ORGANIZATIONS IN DEFENDING THE RIGHT TO WATER

Following 2003, Iraq witnessed a noticeable opening toward international organizations that provided financial support to local civil society organizations (CSOs) in order to strengthen their capacity to advocate for civil and environmental rights. However, this support was, in some cases, misused, leading to the emergence of nominal organizations whose role was limited to receiving funds without engaging in real activities or creating tangible impact on the ground.

With the worsening effects of climate change and water scarcity, several serious initiatives by local environmental CSOs have emerged despite the absence of official support. These efforts have included conducting scientific research, organizing training courses and awareness campaigns, participating in international forums, and establishing partnerships with international organizations. Although these efforts remain limited compared to similar initiatives in other states, they reflect a gradual and growing engagement.

The slow development of the environmental civil society sector in Iraq can be attributed to several factors, most notably that the post-2003 period represented a foundational phase for CSO work after decades of political repression that had restricted civic activity. In addition, the shortage of volunteers poses a major challenge, driven by security concerns resulting from ongoing threats against environmental activists, including kidnapping and assassination by unidentified actors. This fragile security context constitutes a significant obstacle to the growth and effectiveness of CSOs in fulfilling their environmental and social roles in Iraq.

07

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

» The climatic characteristics of the Tigris and Euphrates river basins have undergone significant changes during the 1980-2020 period, marked by a gradual increase in temperatures across several Iraqi governorates, with the general average ranging from 20.1°C in Anbar to 26.5°C in Basra. Meanwhile, annual rainfall rates showed a downward trend, decreasing from 2,904.6 mm/year in Mosul to 147.0 mm/year in Basra.

» Climate change, coupled with water projects in neighboring countries and poor domestic water management, has led to marked fluctuations in river discharge rates across Iraq during 1980-2020. The average discharge of the Tigris River was 302.75 m^3/s in Wasit and 384.8 m^3/s in Maysan, while the Euphrates River recorded flows ranging between 535.4 m^3/s in Anbar and 226.3 m^3/s in Nasiriyah. The Shatt al-Arab River recorded an average discharge of 441.5 m^3/s.

» Total dissolved solids (TDS) concentrations in river waters have increased, ranging between 431 and 630 mg/L in the Euphrates and between 752 and 821 mg/L in the Tigris, while the Shatt al-Arab registered the highest concentration (26,484 mg/L at Faw), indicating severe environmental degradation.

» Hydrological deterioration has resulted in reduced agricultural productivity and the drying of vast wetland areas, contributing to waves of rural-to-urban migration.

» The role of CSOs remains weak due to political pressures, limiting their ability to effectively address environmental crises.

RECOMMENDATIONS

» We recommend that the Iraqi government work to manage the challenges related to external water issues, particularly the policies of upstream countries, in order to reduce their negative impact on Iraq's water rights. This should be achieved through the adoption of a clear strategic vision and effective policies, as well as the formation of a specialized negotiating team capable of understanding the crisis and managing it efficiently.

» Utilize economic leverage as a negotiation tool with riparian states, especially Turkey and Iran, to secure Iraq's water rights.

» Reject unilateral policies on dam construction along shared rivers, given their negative impacts on Iraq's water security.

» Develop protection plans for wetlands such as the Marshlands and natural lakes within the framework of sustainable development.

» Develop new non-conventional water sources, including rainwater harvesting, desalination, and the treatment and reuse of wastewater to compensate for shortages in water resources.

» Enforce and implement water resource management laws to ensure fair and sustainable use, while carrying out awareness programs aimed at fostering a culture of water conservation among citizens.

» Adopt a comprehensive national strategy to guarantee fair access to water for all citizens.

» End all forms of encroachment on rivers, including pollution and wasteful practices, by enacting strict and deterrent laws.

» Empower executive authorities to take appropriate legal measures to combat infringements on water resources.

» Ensure fair distribution of water shares among governorates and curb encroachments on the water quotas of others, particularly in southern regions such as Nasiriyah, Amarah, and Basra.

» Approve a national agricultural strategy that prioritizes achieving water security as a key objective.

» Reclaim new agricultural lands to enhance agricultural production and adopt modern irrigation methods to reduce agricultural water demand.

» Cultivate crops suited to available water quality, such as salt-tolerant varieties in some southern regions, and encourage eco-friendly agriculture to moderate the climate, stabilize soil, and mitigate dust storms.

» Minimize the squandering of potable water in industrial and oil sectors by implementing efficient water management systems.

» Treat water as a sovereign issue linked to Iraq's national security, given its strategic importance to the country's stability.

» Support and empower CSOs to contribute to achieving national water and food security.

» Limit horizontal urban expansion and promote vertical development to accommodate population growth while preserving agricultural lands and preventing their conversion to urban uses.

» Reduce environmentally harmful activities contributing to rising temperatures and climate change, such as emissions from oil facilities, and limit the import of fossil-fuel-based transport vehicles.

08

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