

# The drought in Iraq: Drivers, impact, and outlook

[...]

## Hydrological drought in Iraq

Hydrological droughts happen following prolonged periods of precipitation shortfall affecting the hydrological system, meaning stream, reservoir, and groundwater levels. This type of drought takes much longer to develop ([NCEI accessed 22/02/2023](#); [NDMC accessed 22/02/2023](#)). Iraq has already passed the sustainable water withdrawal level and currently faces water deficits. Iraq's total renewable water resources per capita declined from 8,477m<sup>3</sup> per inhabitant per year in 1972 to 2,393m<sup>3</sup> in 2017.

The Tigris and Euphrates Rivers represent around 98% of Iraq's surface water and previously provided nearly all the country's water needs ([AGSIW 27/08/2021](#); [USDA/GAIN 15/04/2022](#); [WB 09/11/2022](#)). In 2021, a 50% drop in the supply from both rivers likely resulted from the drought and extensive dam building upstream in Iran, Syria, and Türkiye ([VOA 29/05/2022](#); [WVI et al. 31/03/2022](#); [WB 09/11/2022](#); [NRC 23/08/2021](#)).

Population growth, economic development, upstream riparian countries increasing their water withdrawal from the Tigris and Euphrates Rivers, and climate change have increased pressure on Iraq's water resources ([WB 09/11/2022](#); [IOM 09/08/2022](#)). The rise in Iraq's population is also increasing water demand. The population rose from 7 million in 1960 to 42 million in 2020, and it is growing at a rate of 2.4% annually (one million per year), one of the highest population growth rates in the world. Reports predict that Iraq's population will reach 50 million by 2030 and more than 70 million by 2050 ([ERF 08/2022](#); [KAPITA 19/07/2022](#)). By 2030, water demand will likely exceed supply ([ERF 08/2022](#)).

Hydrological droughts affect southern Iraq the most ([USDA/GAIN 15/04/2022](#)). For example, some areas in the southern Basra province lack access to potable water. In the summer of 2018, decreased water levels and its impact on worsening salination and pollution levels led to decreased water quality that hospitalised at least 118,000 people ([HRW 22/07/2019 a](#); [Al Arabiya News 24/10/2022](#)). The hydrological drought has also severely affected the marshlands, a collection of alluvial salt marshes, swamps, and freshwater lakes in the south ([NYT 12/04/2021](#); [Al-Monitor 16/02/2022](#); [REACH et al. 22/09/2020](#)).

## Agricultural drought in Iraq

Agricultural drought refers to the impact of meteorological and hydrological droughts on agriculture, including soil moisture deficits, soil quality degradation, withering crops, low planting, and reduced yields. Agricultural drought can severely affect the economy and food security in countries where people's livelihoods or financial resources rely heavily on agriculture, particularly in regions with limited or unavailable irrigation ([NCEI accessed 22/02/2023](#); [NDMC accessed 22/02/2023](#); [Orimoloye 11/02/2022](#)). Meteorological and hydrological droughts affect the agriculture sector the most, and the reduction and unpredictability of precipitation especially affect rain-fed farming ([FAO 26/07/2022](#)). Hydrological drought also affects southern Iraq, which is highly dependent on irrigation for agriculture ([USDA/GAIN 15/04/2022](#)).

Around 22% (9.5 million hectares) of Iraq's total land is arable and suitable for agricultural production, yet farmers currently cultivate less than half of it ([WFP 31/03/2021](#); [WVI et al. 31/03/2022](#)). Wheat is a main crop, and almost all of it is for national consumption ([AgFlow 13/09/2022](#)). Wheat production in 2022 was less than 40% of that of 2020 ([USDA/GAIN 15/04/2022](#)). A 2022 IOM survey found that 12% of rural farmers abandoned their trade in the last five years, as did 8% of livestock owners. 76% of farmers who had left farming indicated the lack of water as the main cause ([IOM 13/06/2022](#)). In 2022, a survey found that nearly one quarter of farming communities received food assistance for crop production challenges and income supplementation ([NRC 10/2022](#)). The drop in agricultural production has led to an increase in food prices in the past few years. The drought has caused a degradation of the marshland, resulting in major decreases in fish, livestock, and farming production for its inhabitants because of water scarcity and salination ([REACH et al. 22/09/2020](#)).

## Socioeconomic drought in Iraq

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Water scarcity, below-average rainfall, and extreme heat associated with drought and climate change have adverse effects on Iraq's economy, particularly on agriculture and livelihoods ([WB 17/11/2022](#)). The increasing temperatures, more frequent natural disasters, salination, and desertification have also put the habitability of significant parts of the country at risk ([FAO 04/2021](#)). Meteorological and hydrological droughts affect Iraq's economy mainly through their impact on agriculture ([WB 28/09/2020](#); [WFP 31/03/2021](#); [UNDRR 2021](#)). These types of drought significantly affect labour demands and income generation in the agriculture sector ([UNEP 16/09/2017](#); [IFRC 27/12/2021](#); [WVI 26/05/2022](#); [ERF 11/2021](#)). The droughts have also reduced domestic production and increased government spending, especially for social programmes such as the Wheat and Barley Purchase programme and the public distribution system ([WB 09/11/2022](#); [CEIP 04/06/2020](#); [FAO et al. 05/01/2021](#)). Agriculture is also an important part of the value chain of related industries, such as retail, hospitality, and construction ([WVI 26/05/2022](#); [ERF 08/2022](#); [IOM 09/08/2022](#)). For example, around 16% of manufacturing jobs are in food processing ([WB 09/11/2022](#)).

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Iraq currently uses more than 60% of its water resources in agriculture ([Orient XXI 11/11/2021](#); [Fanack Water 06/12/2022](#)). Projections suggest that this will rise to 95% of the annual water supply by 2030 ([ERF 08/2022](#)). Inefficient water use characterises Iraq's agriculture sector ([Fanack Water 06/12/2022](#)). Around 70% of farming in Iraq uses flood irrigation, which results in 60% water loss ([1001 Iraqi Thoughts 06/07/2018](#); [Iraq Business News 12/09/2011](#)).

Iraq's industries also contribute to inefficient water use, especially the main industry, oil production, which is water-intensive. Oil production requires the injection of water to reservoirs and for drill cooling. One barrel of oil requires around 1.5 barrels of water ([CNN 25/04/2019](#)). Estimates show that a 10–20% enhancement in water use efficiency could reduce or limit the decrease in the country's gross domestic product (GDP) by approximately 3.1% and 2.4%, respectively ([WB 17/11/2022](#)).

## Aggravating factors of agricultural and socioeconomic droughts

### Sea intrusion

Sea level rise and the resulting intrusion of saltwater into Shatt Al Arab River and groundwater aquifers are causing irrigation, farming activity, and agricultural productivity disruptions, **consequently aggravating agricultural drought in the country**. A lack of good quality water to support crop and livestock production is already causing Iraqi farmers to abandon agriculture

(Adelphi 26/07/2022; ITC et al. 06/06/2021; AN 26/04/2022).

Falling river levels in Iraq and rising sea levels mean that seawater is pushing its way north of the Shatt Al Arab Estuary and into irrigation canals and underground water sources (ICRC 19/07/2021; AN 26/04/2022). The low topography of coastal lands in southern Iraq contributes to seawater intrusion (Alqurnawy et al. 31/05/2022). Since 2003, the mean sea level observed on the Iraqi Coast has been 5–100mm above the historical average, with the anomaly intensifying in recent years (IOM 09/08/2022; ITC et al. 06/06/2021).

### Soil and water salinisation

Poor irrigation practices, such as the use of saline water, soil compaction leading to a low rate of drainage, and high evaporation rates causing salt accumulation in the soil, are the primary causes of soil salinisation in Iraq. Central and southern Iraq have the most soil salinisation (IAEA 14/05/2020; WB 09/11/2022; Cordaid 07/04/2022; KAPITA 19/07/2022). Only 10 out of 18 governorates have wastewater treatment facilities, and industrial activities and waste dumping cause soil pollution, adding to the problem of soil degradation (WB 09/11/2022; PSI 30/08/2022).

Saline soils and saline irrigation also **affect agricultural drought**, reducing the ability of plants to take up water and reducing plant growth and crop yields (ICARDA 02/09/2013). Salinisation has affected the productivity of at least 70% of the total irrigated area of Iraq, with up to 30% of this area turned into wastelands. Of the 3.5 million hectares of irrigation-fed land, about 1.5 million hectares have permissible salt content, whereas high soil salinity has stopped farmers from using 0.5 million hectares (KAPITA 19/07/2022; Nectaerra et al. 17/09/2021). 2002 estimates suggested that 4% of irrigated areas were severely saline, 50% were moderately saline, and 20% were slightly saline. 74% of irrigated land suffered from elevated salinity (ICARDA 02/09/2013). Estimates also suggest that salinisation and waterlogging lead to the loss of 5% of used areas annually and that Iraq loses about 2,000 hectares of agricultural cropping land per year from salinity (KAPITA 19/07/2022; IAEA 14/05/2020). Salinisation causes an estimated 50–60% drop in crop production, resulting in losses of almost USD 300 million annually in Iraq (KAPITA 19/07/2022; WFP 31/10/2018).

### Increase in sandstorm occurrence

Meteorological and hydrological droughts, desertification, and high evaporation rates are increasing the number of sandstorms in Iraq, **affecting agricultural drought** (PSI 30/08/2022; VOA 29/05/2022).

Sandstorms affect crops and soil. Sandblasting and seedling burial have an immediate effect on yields. Sand dust also causes the loss of nutrient-rich topsoil, reducing crop yield and quality and affecting agricultural productivity (WB 19/01/2020; PSI 30/08/2022; UNEP et al. 2016). In summer 2022, sandstorms caused losses of around seven million across different sectors, particularly

agriculture. The impact on livestock will likely affect incomes and livelihoods ([PSI 30/08/2022](#); [Al Araby 19/05/2022](#)).

## Water management

Poor water management is one of the key issues contributing to water scarcity in Iraq and **worsening all types of droughts and their effects** ([Elaiwi et al. 15/04/2020](#)). The lack of an overarching enforceable national water law, combined with a dysfunctional decentralisation of local water management, highlights this issue ([WPS 12/09/2022](#); [Fanack Water 06/12/2022](#)).

Poor maintenance, management, and investment have been worsening the state of water infrastructure in Iraq since the 1980s ([WPS 12/09/2022](#); [USAID 01/2004](#); [Elaiwi et al. 15/04/2020](#); [IMF 03/02/2023](#)). For example, treated water only serves 8% of the population, and 70% of sewage flows into rivers without purification ([Elaiwi et al. 15/04/2020](#)).[...]

The marshlands are a collection of alluvial salt marshes, swamps, and freshwater lakes that, together with their surrounding areas (buffer zones), currently cover 4,000km<sup>2</sup> of the surface of Iraq ([Yale E360 10/01/2023](#)). The marshlands play a big role in reducing dust storm severity and moderating temperatures in surrounding areas ([Wetlands International 25/07/2016](#)). Iraq's marshlands cover four governorates: Al Warqa, Basra, Dhi Qar, and Maysan ([ACF/REACH 30/03/2022](#)).

In the 1990s, after the Iraq-Iran war, under the rule of Saddam Hussein, the Iraqi Government started draining the marshlands to push a government-opposing community to leave ([Reuters 17/07/2016](#)). By the 2000s, the Government had drained and destroyed around 90% of the marshes' 9,000m<sup>2</sup> surface area. Following the US invasion of Iraq and the fall of Saddam Hussein's Government, Iraqis began demolishing the systems draining the marshlands. This action led to the reflooding of much of the marshlands ([Wetlands International 25/07/2016](#)). By 2006, reflooding had restored roughly 58% of the marshland present before the 1990s. By the late 2000s, the marshlands faced new threats, mainly cycles of drought and the building of new dams upstream ([Wetlands International 25/07/2016](#); [Earth Observatory accessed 13/03/2023](#)). Water levels have fallen by more than 3ft since 2018, following an extremely hot summer, low precipitation, and dam building upstream, causing reduced river flow ([NYT 12/04/2021](#); [Al-Monitor 16/02/2022](#)). This fall has created water scarcity in the marshlands and increased salination ([REACH et al. 22/09/2020](#)).

The marshes are one of the poorest regions of Iraq, and water scarcity affects this region the most. Around 400,000 people lived in the area before the 1990s, when Saddam Hussein's Government targeted Marsh Arabs, causing forced displacements ([Reuters 17/07/2016](#); [AMAR 30/11/2001](#)). Estimations suggest that in the 1990s, the Government displaced around 100,000 people internally, while 40,000 fled to Iran. Current estimations suggest that 20,000–40,000 people live in the marshlands ([UNEP 23/11/2016](#); [RI 13/06/2003](#)).

Most people in the marshlands are buffalo breeders who rely heavily on water buffalo trading, farming, and fishing ([REACH et al. 22/09/2020](#); [NYT 12/04/2021](#)). The drought-caused degradation of the marshlands has decreased the amount of economically valuable fish species. Livestock-rearing as a livelihood has become unsustainable and expensive. Water scarcity and salinisation also affect agricultural activities for local communities ([REACH et al. 22/09/2020](#)). The drought's impact on livelihoods has caused many living in Iraq's southern marshes to relocate to other marshland areas for better water resources for their buffalos. These relocations increase tensions over limited water

resources. Others have abandoned the marshlands and moved to cities like Basra or Baghdad ([Yale E360 10/01/2023](#)).

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Nineveh and Kirkuk were the most affected areas, where low rainfall meant that in 2022, farmers could only harvest 25% and 65% of the planted areas in each respective governorate. In 2022, Ninewa and Kirkuk respectively accounted for 30% and 5% of all wheat-planted areas in Iraq ([USDA/GAIN 15/04/2022](#); [REACH 07/11/2022](#)). As shown in figure 3, the yields of harvested areas in northern governorates were almost half of those in central and southern Iraq ([USDA/GAIN 15/04/2022](#)). This difference is because most wheat crops in northern Iraq are rain-fed. In Ninewa governorate, 85% of the wheat areas are rain-fed, and in Iraqi Kurdistan, 80% are rain-fed ([FAO 11/06/2021](#)).

Hydrological drought has also severely affected irrigated wheat agriculture, which accounts for 70% of cultivated areas and yields 75% of total production ([WFP 31/03/2021](#); [FAO 11/06/2021](#)). In 2022, water scarcity cut irrigated wheat areas by 50%, leading to a 25% reduction in wheat production compared to the previous year ([USDA/GAIN 15/04/2022](#)).

The hydrological drought affects the governorates in central and southern Iraq, which depend highly on irrigation ([USDA/GAIN 15/04/2022](#)). The hydrological drought has led the MOA to exclude central Iraq's Diyala governorate from its National Annual Agricultural Plan, which determines wheat production areas. This movement excludes wheat-growing farmers in Diyala from subsidies and makes them ineligible to sell their products for higher prices to the Ministry of Trade's silos ([RUDAW 18/10/2021](#); [USDA/GAIN 15/04/2022](#)). [...]

In 2020, the Iraqi dinar experienced a decline in value against other currencies, most notably the US dollar. Several factors, such as the adverse economic consequences of the COVID-19 pandemic, the oil price downturn, and persistent internal political instability, led to this depreciation. In 2020, the Central Bank of Iraq lowered the dinar's value by over 18% to reduce the difference between official and black market exchange rates ([WFP 03/03/2021](#)). After the 2020 dinar devaluation, headline and core inflation rose, respectively peaking at 8.4% and 8.6% year-to-year in November 2021. In 2022, food and fuel subsidies muted high global commodity prices, helping contain inflation; average inflation fell to 5% ([IMF 07/12/2022](#)). That said, the increase in global prices affected local food prices, such as wheat flour, which has increased by more than 45% since 2020 (see figure 9).

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### Public Distribution System as a mitigation measure for food insecurity

Drought and its impact on crop yield reduce domestic production and increase government spending. This impact reduces the Government's fiscal space to subsidise food through programmes such as the PDS, which could affect poverty and food security ([WB 09/11/2022](#)). The PDS is one of the largest food distribution programmes in the world. Following UN-imposed sanctions, the Government started the programme in 1990 in response to food shortages. In 2018, PDS spending approximated USD 1.4 billion, roughly 2.3% of Iraq's 2018 total expenditure ([WB 02/2020](#)).

Drought has slightly increased food prices in Iraq, but essential food prices have remained generally stable compared to global prices ([KII 13/01/2023](#); [WFP 05/12/2022](#)). This is mainly because of the PDS,

which provides a food assistance safety net for almost the entire population ([CEIP 04/06/2020](#); [WFP 09/01/2019](#)). For example, in 2022, worldwide wheat prices rose by 89%, but within Iraq, the PDS helped stabilise local wheat prices, which only rose by 26% ([IOM 13/06/2022](#)).

Iraq's PDS programme fulfils the basic calorie and food requirements for displaced and non-displaced households, playing a vital role in household food security. The current programme covers ten commodities, including rice, sugar, oil, flour, beans, and some cleaning materials, such as soap ([KII 11/01/2023](#); [IOM 13/06/2022](#); [Al-Monitor 27/04/2022](#); [WFP 09/01/2019](#)). The programme also plays a significant role in reducing the reliance on negative coping mechanisms and food deprivation. Estimates indicate that having access to the PDS lowers a person's probability of falling into poverty by 10% ([WB 20/02/2020](#)).

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### Wheat and Barley Purchase programme

Drought is also straining government spending, as it has to pay more for wheat through the Wheat and Barley Purchase programme, which cost USD 1.25 billion in 2019 ([CEIP 04/06/2020](#)). Drought and water shortages in Iraq severely affect wheat yield, and wheat production is increasingly falling short of fulfilling domestic demand as a result. Current domestic production capacity is about two thirds of the annual domestic demand, which is six million tonnes ([WB 28/09/2020](#); [ERF 08/2022](#); [WFP 31/03/2021](#); [FAO 05/12/2022](#)). The Government purchases domestic wheat and then redistributes it through the PDS ([FAO et al. 15/12/2016](#)). In 2021, the government budget for the Wheat and Barley Purchase programme was USD 2.3 billion, a more than 80% increase since 2019 ([WFP et al. 05/01/2021](#)).

In 2022, following a difficult harvest season, the Iraqi Government increased the price it pays farmers for wheat by IQD 290,000 per tonne, from IQD 560,000/tonne to 750,000/tonne. In May 2022, the Government further increased the payment to IQD 850,000/tonne ([FAO 03/02/2023](#); [The National 19/05/2022](#)). In 2022, the Government allocated about USD 3.4 billion to the Ministry of Trade for the Wheat and Barley Purchase programme ([FAO 03/02/2023](#)).

### Drought impact on food imports

The direct impact of meteorological and hydrological drought and water scarcity on Iraq's fiscal resources is limited, as agriculture represented only 3.9% of the country's GDP in 2021. This number has consistently decreased, from 20% in 1995, 8% in 2003, and 5% in 2010 ([WB accessed 15/03/2023 a](#)).

Meteorological and hydrological drought and water scarcity still directly affect Iraq's public expenditure. Droughts put a strain on the balance of trade and government spending as it increases the import bill; for example, the lack of water forces the Government to buy foreign cereals at a higher cost and support farmers moving to urban centres for work ([WB 28/09/2020](#)). After Egypt, Iraq is the biggest wheat importer in the Middle East. Food supplies represent a burden ([Miller 13/09/2018](#)). Cereal imports, which include wheat, cost around USD 0.9 billion in 2021. For 2022, the Government allocated USD 3.4 billion, more than three times the previous years' spending, to purchase wheat alone ([The National 25/02/2022](#); [AgFlow 13/09/2022](#); [OEC accessed 04/01/2023](#)). In April 2022, the Government allocated two million tonnes of wheat for food reserves to sufficiently cover six months of consumption ([FAO 2022 c](#)). In June, the Iraqi Government passed a IQD 25 trillion (USD 17 billion) bill



titled 'Emergency Law for Food Security and Development' for food security and public servant salaries ([Al-Monitor 08/06/2022](#)).

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The upward trend in import dependence began in the 1970s. By 1980, Iraq was already importing about half of its food supply. With the Oil-for-Food programme and the subsequent Iraq War (2003–2011), the country shifted from being a net food exporter to a food importer ([EveryCRSReport 07/06/2004](#)).

Iraq is highly reliant on food imports. Drought and water scarcity worsen this dependency. Cereal import alone for the 2022–2023 marketing year will likely reach above 5.3 million tonnes (including 3.2 million tonnes of wheat) and cost USD 3 billion, a 6% increase from the previous year ([FAO 03/02/2023](#); [The National 25/02/2022](#); [AgFlow 13/09/2022](#); [OEC accessed 04/01/2023](#)).

Because of the country's high import dependence, government food spending in Iraq is very sensitive to global price changes. This creates pressure to meet the food requirements of an increasing population, which is likely to increase by 2.6% annually to reach an estimated 50 million in 2030 and 80 million in 2050 ([Kurdistan24 18/09/2021](#)).

The system is vulnerable to crises affecting the availability and price of food supplies. For example, Russia's invasion of Ukraine led to a wheat price surge that forced the Iraqi Government to purchase Australian wheat at about USD 70 more per tonne than it pays local producers. The international crisis occurred at a time when 37% of Iraqi wheat farmers were experiencing crop failure. The combined effects of these issues forced Iraqi lawmakers to pass an emergency bill allowing the Government to transfer USD 17.14 billion of public funds to meet urgent needs, such as energy costs and public servant salaries, and to buy cereals. Experts estimate that the continuing conflict could add up to USD 3 billion to Iraq's bill in 2023 ([The National 25/02/2022](#)).

In 2021 and 2022, the Iraqi Government had enough oil export revenue (which makes up 90% of the country's income) to allow the import of necessary commodities. The revenues reached USD 115 billion. As a result, the Government was able to save 18% more from oil export revenues in 2022 than in 2021. Earning money from oil exports will likely continue until 2024 if oil prices remain high. With reduced oil prices and a global shift towards decarbonisation and saving the environment, Iraq's oil export revenues will likely drop, reducing its income and affecting the economy ([WB 17/11/2022 and 16/06/2022](#); [FAO 03/02/2023](#)).

### Slowed economy growth

The lack of water supply will likely affect capital, hindering agricultural and non-agricultural activities, such as construction and manufacturing. Job opportunities will also become less available, since investments in agriculture and non-agricultural activities will decrease, driving wages in the agriculture sector further down ([WB 28/09/2020](#)).

With the predicted 20% water supply reduction in Iraq in the next 30 years, the World Bank anticipates that the country will experience a 3.45 reduction in its GDP, equivalent to USD 5.9 billion, as shown in figure 12 ([WB 09/11/2022 and 28/09/2020](#)).

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