

MAPPING LOCATIONS AT RISK OF CLIMATE-INDUCED DISPLACEMENT

SALAH AL-DIN

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INTRODUCTION

The effects of climate change and environmental degradation on Iraqi communities are wide-ranging and continue to escalate.¹ Iraq is witnessing these impacts in the form of increasingly severe and prolonged droughts, land degradation and desertification, and frequent sand and dust storms. Increasing water salinization continues to undermine rural livelihoods, including agriculture, livestock herding, and fishing. As environmental pressures persist and adaptive capacity remains limited, families increasingly leave their homes in search of alternative livelihood opportunities. Beyond displacement, these environmental factors also contribute to the abandonment of rural livelihoods and the adoption of short-term coping strategies, including debt accumulation and asset liquidation.

These environmental changes are occurring across Iraq, including in governorates affected by conflict displacement as well. However, there remains limited understanding of exactly where and the extent to which conflict and environmental factors interact, as well as the implications for affected communities. Thus, this mapping and assessment report aims to identify and understand areas at risk of climate-induced displacement and ongoing mobility pressures particularly in governorates that experienced conflict-related displacement during the ISIL conflict (2014–2017). The goal is to provide evidence-based insights into mobility drivers and livelihood impacts within Iraq's post-conflict, environmentally stressed context. Such insights not only serve to inform and support the country's climate and national development plans, but further the International Organization for Migration's (IOM) efforts globally in this regard as well. This includes contributing to its route-based and climate mobility

agenda and specific related commitments under both the Global Compact for Safe, Orderly and Regular Migration and the Sustainable Development Goals.²

This report focuses on Salah al-Din Governorate, the site of complex ecosystems, ethno-religious diversity, as well as legacies of conflict and governance. The Tigris River runs through the eastern areas of the governorate, which have historically been home to some of the most productive agricultural lands and are known for their ethno-religious diversity. Tuz Khurmatu is a district where both the Federal Government of Iraq and the Kurdistan Regional Government dispute control over governance.

Following the fall of the previous regime in 2003, Salah al-Din Governorate was subjected to severe violence, which intensified again during the ISIL conflict and resulted in significant mass displacement. As of December 2024, approximately **779,742 individuals (129,957 households)** have returned to their places of origin in the governorate³. Salah al-Din also hosts **42,078 internally displaced persons (IDPs) (7,013 households)** due to conflict, the majority of whom are from elsewhere in the governorate.⁴

Following a brief description of methodology, this report will explore findings on spatial mapping of climate-induced displacement risk and conflict-related displacement and return. Alongside, the effects of the slow-onset environmental events and the extreme weather events are analysed focusing on water resources for agriculture, livelihoods and coping strategies, public services and basic needs, social cohesion, existing adaptation strategies and ongoing needs.

Map 1: Topographical Map of Salah al-Din Governorate



1 See, for example, IOM DTM, *Understanding the Needs and Vulnerabilities of Climate-Induced Migrants in Iraq* (2025); IOM DTM, *Drivers of Climate-Induced Displacement in Iraq* (2023); IOM DTM, *Factsheet: The Impact of Climate Change on the Environment in IDP and Returnee Locations* (2022); and IOM and Social Inquiry, *Migration into a Fragile Setting: Responding to Climate-Induced Informal Urbanization and Inequality in Basra, Iraq* (2021).

2 This includes Global Compact for Safe, Orderly and Regular Migration Objectives 2 (Minimize Adverse Drivers), 5 (Regular Migration), and 7 (Reduce Vulnerabilities) and Sustainable Development Goal 13 on taking urgent action to combat climate change and its impacts.

3 IOM DTM, *Returnee Masterlist*, round 134.

4 IOM DTM, *IDP Masterlist*, round 134.

METHODOLOGY

Data collection for this assessment took place between **August and October 2025** through in-person key informant interviews across 17 subdistricts where locations had been identified as being at risk of climate-induced displacement in Salah Al-Din Governorate. Subdistricts were identified as being at risk of climate-induced displacement based on criteria outlined in the introduction, including environmental events and impacts on water resources for agriculture, disruptions to livelihoods and coping strategies, access to public services and basic needs, social dynamics, and evidence of related population movements. **Key informants included mayors and subdistrict representatives, officials from the Departments of Water Resources and Agriculture, representatives of NGOs and humanitarian actors, as well as community leaders and activists.** Key informants provided insight on climate-induced displacement risks, environmental events, livelihoods, services and unmet needs, social cohesion, adaptation measures and needs.

The climate-affected subdistricts were selected as part of the baseline for this assessment, based on the previous **Climate Vulnerable Assessment (CVA) conducted by DTM in 2023** across all displacement and return locations.⁵ Additionally, subdistricts identified by Rapid Assessment and Response Team (RART) in coordination with the local government were included.

The analysis conducted for this assessment includes not only the data collected above, but a triangulation of data from other relevant Displacement Tracking Matrix (DTM) indices to connect both climate and conflict mobility findings across IOM's existing evidence ecosystem. These indices include the following:

- The Return Index,⁶ which is a tool to measure and monitor the severity of living conditions in locations (i.e., village, town or neighborhood) with

returning populations previously displaced by the ISIL conflict. It gathers regularly collected data across 16 indicators divided into two scales: Scale 1, on livelihoods and basic services (including housing) and Scale 2, focused on social cohesion and safety perceptions. These indicators are then combined into a numerical score (0-100) for each location that serves as a proxy for the severity of living conditions. The weight of each indicator in the score determined by the strength of its correlation with the rate of returns based on a multivariate regression model. Scores of each scale and the overall index are classified in three groups: low, medium, and high severity of living conditions. Locations with high severity (i.e., a higher score) have worse conditions and lower rates of return of their original pre-conflict populations.

- The Displacement Index,⁷ which is a tool to measure and monitor the living conditions of IDPs from the ISIL conflict in the locations where they currently reside. It gathers regularly collected data across 22 indicators divided into five domains: 1) livelihoods, 2) housing, 3) infrastructure and services, 4) safety and security and 5) social inclusiveness. These indicators are then combined into a numerical score (0-100) for each location that serves as a proxy for the severity of living conditions. The importance of each indicator to its respective domain and the importance of each domain for the overall index is examined through confirmatory factor analysis. Scores of each domain and the overall index are classified in three groups: low, medium, and high severity of living conditions. Higher scores denote more severe living conditions for IDPs.

The findings presented in subsequent sections of this report are for Salah al-Din Governorate at the subdistrict level unless otherwise noted.

5 A subdistrict was classified as climate-affected if at least one assessed location in it met either of these two broad criteria: 1) family displaced as a result of environmental factors OR 2) its irrigation water supply decreased in the past 12 months, climate-sensitive livelihoods are among its primary livelihoods, AND family livelihoods were negatively impacted by environmental changes. See, IOM DTM, International Migration from [Climate-Affected Areas in Iraq: Exploring the Influence of Climate Change on Mobility Patterns](#).

6 For more details, see: IOM DTM, Returns Working Group, and Social Inquiry, [Building Blocks of the Return Index in Iraq](#).

7 For more details, see: IOM DTM, [Displacement Index Methodological Overview](#).

FINDINGS

Spatial mapping of climate-induced displacement risk alongside conflict-related displacement and return

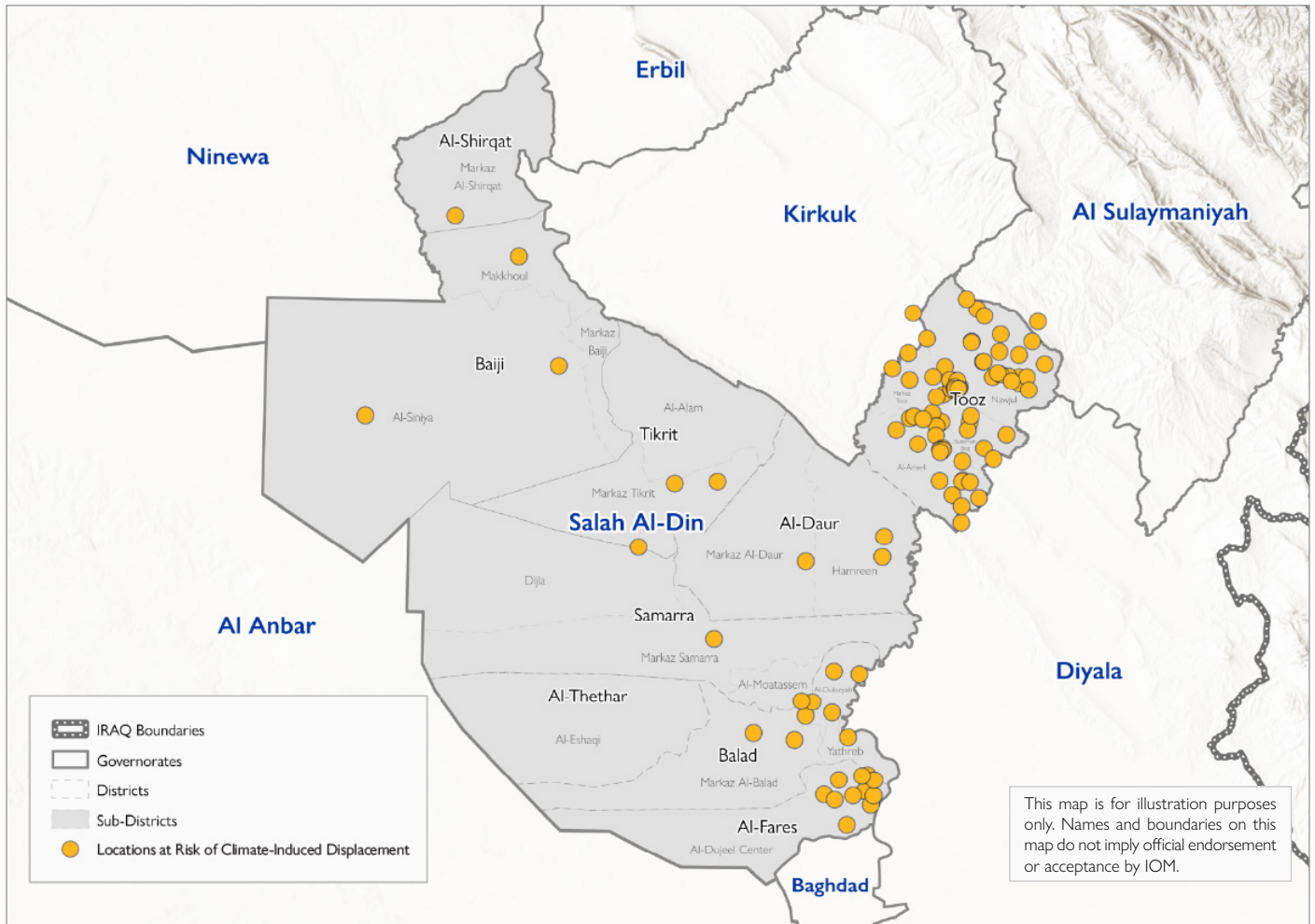
Table 1. Districts and subdistricts with locations at risk of climate-induced displacement

District	Subdistrict	Number of location at risk
Al-Daur	Hamreen	2
	Markaz Al-Daur	1
Al-Fares	Al-Dujeel Center	11
Al-Shirqat	Markaz Al-Shirqat	1
Baiji	Al-Siniya	1
	MakkHoul	1
	Markaz Baiji	1
Balad	Al-Duloeyah	5
	Al-Eshaqi	1
	Markaz Al-Balad	2
	Yathreb	1
Samarra	Markaz Samarra	1
Tikrit	Markaz Tikrit	3
Tuz Khurmatu	Al-Amerli	26
	Markaz Tuz Khurmatu	24
	Nawjul	22
	Suleiman Beg	6
Total		109

Key informants reported 109 locations across 17 subdistricts in Salah al-Din Governorate as at risk of climate-induced displacement. Locations within the subdistrict of Al-Dujeel Center (Al-Fares District), MakkHoul (Baiji District), Yathreb (Balad District), Al-Amerli and Nawjul (Tuz Khurmatu District) are

very likely to experience displacement, while locations in other subdistricts are somewhat likely to experience it. The greatest number of locations at risk of climate-induced displacement are found in Al-Amerli, Markaz Tuz Khurmatu and Nawjul (Tuz Khurmatu District), followed by Al-Dujeel Center (Al-Fares District).

Map 2: Subdistricts with locations at risk of climate-induced displacement



Around half of the locations (52 out of 109) reported by key informants as being at risk of climate-induced displacement are located across 11 subdistricts that were assessed in the most recent round of the Return Index.⁸ These subdistricts include Al-Dujeel Center (Al-Fares District), Al-Siniya, MakkHoul (Baiji District), Al-Eshaqi, Markaz Al-Balad, Yathreb (Balad District), Markaz Samarra (Samarra District), Markaz Tikrit (Tikrit District), Al-Amerli, Markaz Tuz Khurmatu and Suleiman Beg (Tuz Khurmatu District).

Four additional subdistricts in this sample—Markaz Al-Daur (Al-Daur District), Markaz Al-Shirqat (Al-Shirqat District), Markaz Baiji (Baiji District) and Al-Duloeyah (Balad District)—had locations assessed in the Return Index. However, these locations were not reported as being at risk in this assessment, bringing the total number of subdistricts assessed in the Return Index to 15 out of 17.

Of these 15 subdistricts, six exhibit a high level of severity of living conditions in terms of livelihoods, access to basic services, social cohesion and safety perceptions, eight exhibit a medium level of severity of living conditions and one exhibits a low severity of living conditions. Al-Dujeel Center (Al-Fares District), Al-Siniya (Baiji District), Al-Eshaqi, Markaz Al-Balad, Yathreb (Balad District) and Markaz Samarra (Samarra District) subdistricts have the highest share of locations with high severity of living conditions across livelihoods, access to basic services, social cohesion and safety perceptions. This is primarily driven by limited livelihood opportunities, low recovery of small businesses

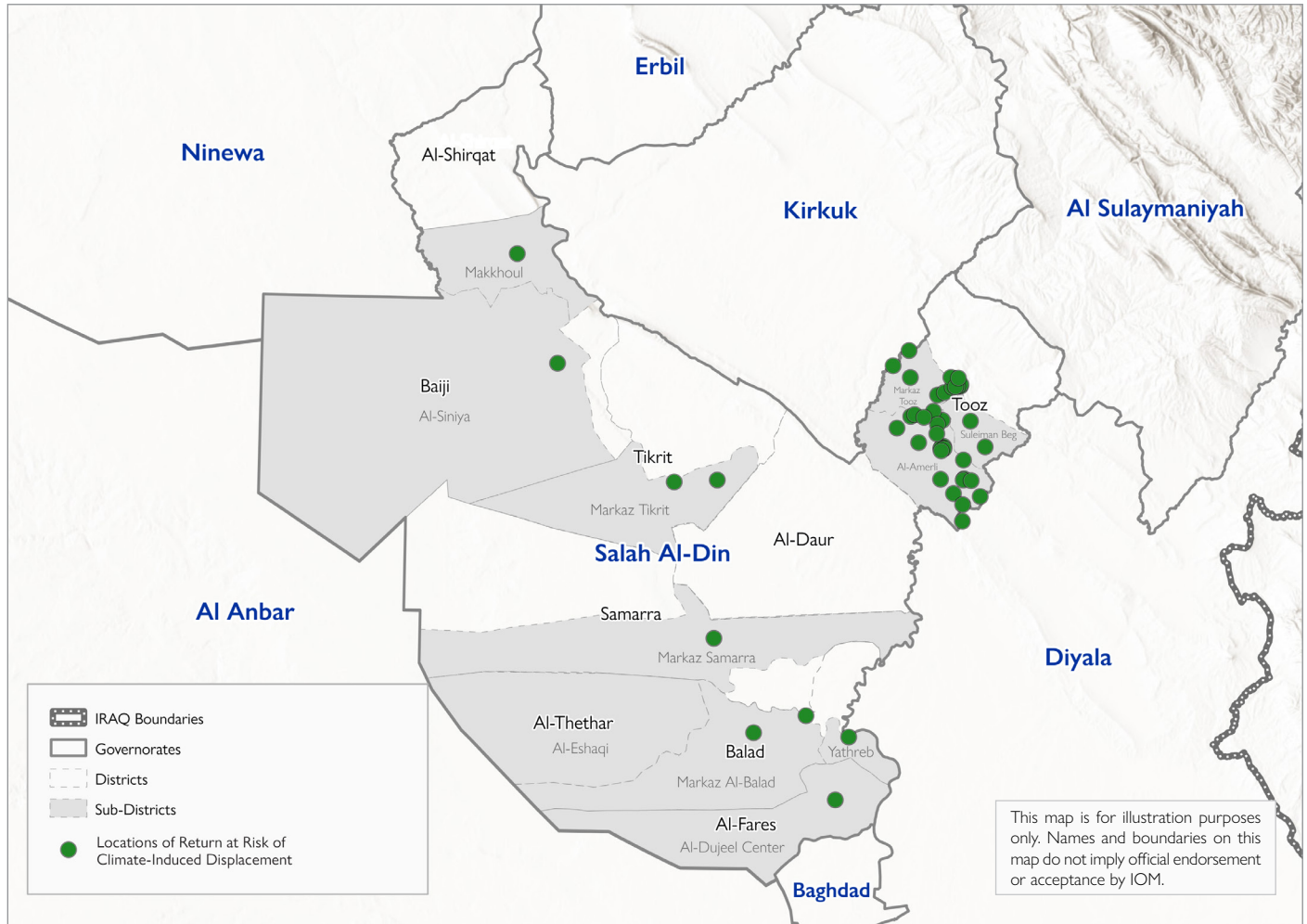
and agriculture activities, limited access to employment, residential destruction, inadequate electricity and water services, the presence of armed groups other than the Iraqi Army, Federal Police and Local Police at checkpoints and continued blocked return in addition to illegal occupation of housing. Except for Al-Dujeel Center (Al-Fares District), these subdistricts also have some of the fewest locations reported as being at risk of displacement in this assessment.

Subdistricts recording medium level of severity of living conditions include Markaz Al-Daur (Al-Daur District), Markaz Al-Shirqat (Al-Shirqat District), MakkHoul, Markaz Baiji (Baiji District), Al-Duloeyah (Balad District), Al-Amerli, Markaz Tuz Khurmatu and Suleiman Beg (Tuz Khurmatu District). This is primarily driven by concerns over potential for violence, ethno-religious tensions, revenge acts and harassment at checkpoints, respectively; the presence of other security actors in addition to the Iraqi Army, Federal Police and Local Police and the continued blocked return of certain families. Al-Amerli and Markaz Tuz Khurmatu (Tuz Khurmatu District) contain the most locations reportedly at risk of climate-induced displacement as well. Of note, Markaz Tikrit (Tikrit District) featured the lowest level of severity of living conditions overall.

Most of these subdistricts continue to be affected by the legacy of past conflict, having experienced conflict-related displacement and return of their populations are now exposed to renewed displacement risks linked to climate and environmental factors.

8 IOM DTM, Return Index, Round 23.

Map 3: Return and at Risk of Climate-Induced Displacement Locations



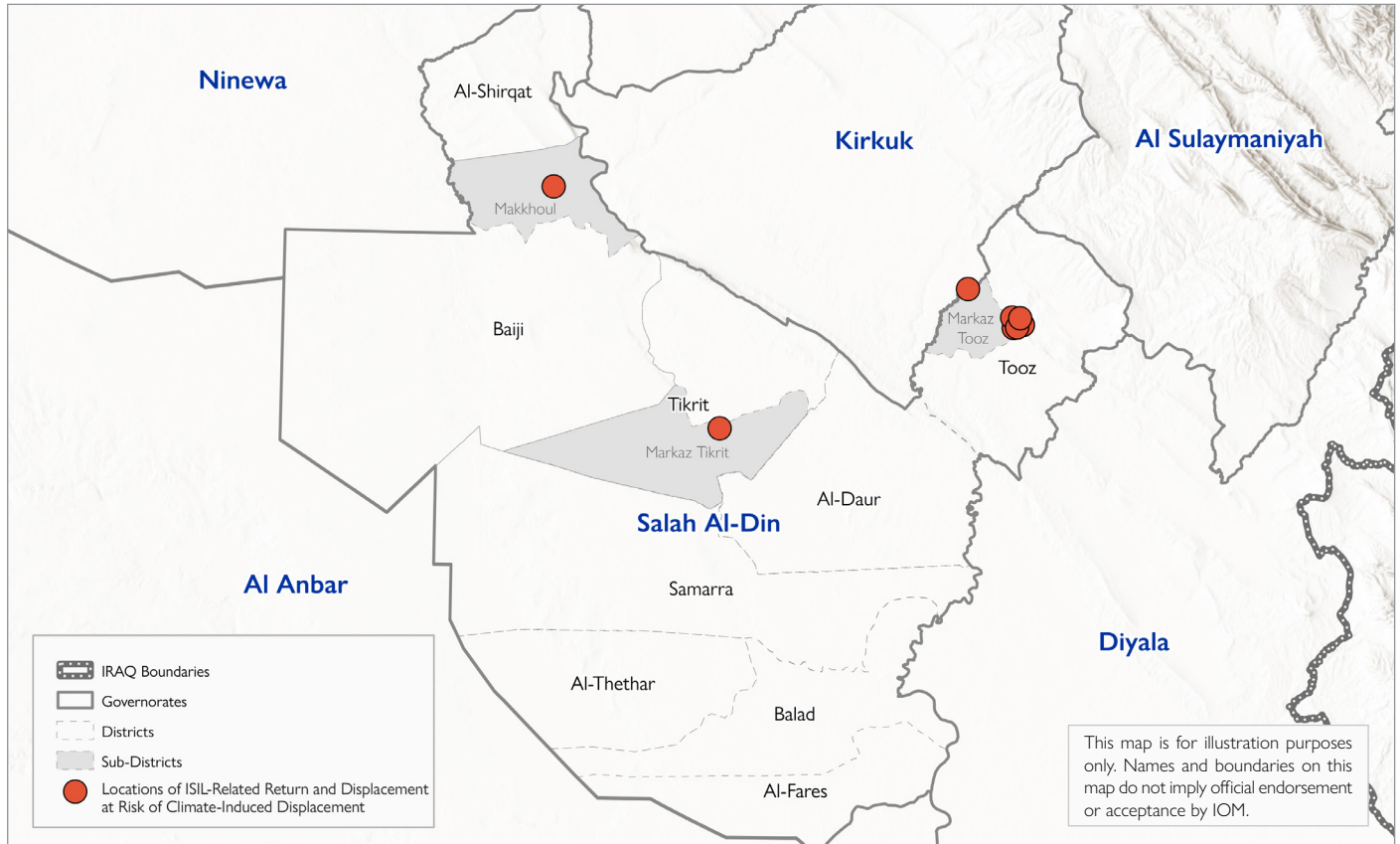
A smaller proportion of locations (28 of 109) were reported to host displaced families due to the ISIL conflict according to the most recent round of the Displacement Index.⁹ 15 locations are spread across Makkhoul (Baiji District), Markaz Tikrit (Tikrit District) and Markaz Tuz Khurmatu (Tuz Khurmatu), of these locations, 10 were also assessed under the Return Index. Displaced families in these subdistricts seem to experience low to medium overall severity of living

conditions. However, in MakkHoul (Baiji District) displaced families faced high severity of living conditions regarding livelihoods, services and social inclusion.

Thirteen of the 28 locations hosting displaced families are in Hamreen (Al-Daur District) and Nawjul (Tuz Khurmatu District), these locations are not reported as being at risk of displacement due to environmental factors.

9 IOM DTM, Displacement Index, Round 11.

Map 4: Displacement due to ISIL conflict and at Risk of Climate-Induced Displacement Locations



Finally, five subdistricts were reported to have received families displaced by environmental factors since 2016: Al-Dujeel Center (Al-Fares District), Markaz Al-Shirqat (Al-Shirqat District), MakkHoul (Baiji District), Markaz Samarra (Samarra District) and Markaz Tuz Khurmatu (Tuz Khurmatu District). In contrast,

families were reported to have left Al-Amerli, Nawjul, and Suleiman Beg (Tuz Khurmatu District) for the same reason during the past nine years, according to key informants, these families went to neighboring Kirkuk Governorate or elsewhere nearby in Salah al-Din.

Environmental events and impacts on water resources for agricultural activities

Table 2. Experience of slow-onset environmental events by subdistrict

	Hamreen	Markaz Al-Daur	Al-Dujeel Center	Markaz Al-Shirqat	Al-Siniya	MakkHoul	Markaz Baiji	Al-Duloeyah	Al-Eshaqi	Markaz Al-Balad	Yathreb	Markaz Samarra	Markaz Tikrit	Al-Amerli	Markaz Tuz Khurmatu	Nawjul	Suleiman Beg
Changing rainfall patterns	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Changing river levels		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Changing temperatures	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•
Changing water salinity				•		•	•	•	•					•	•	•	
Desertification	•	•	•	•	•	•	•	•	•			•	•				
Land degradation						•			•					•	•	•	•

All subdistricts in this analysis have experienced the negative effects of at least one slow-onset environmental event in the past five years. Changing rainfall patterns were reported in all subdistricts assessed. Followed by changing temperatures (16 subdistricts), changing river levels (15 subdistricts), desertification (11 subdistricts), changing water salinity (8 subdistricts), and land degradation (6 subdistricts), respectively. However, biodiversity loss was not reported by key informants in any subdistrict. Related to this, each of the 17 subdistricts assessed encountered dust storms, and heatwaves in the past year, 16 subdistricts faced drought, while Markaz Tuz Khurmatu and Nawjul (Tuz Khurmatu District) experienced wildfires.

Given these climate and environmental factors, it is unsurprising that key informants in all subdistricts reported reductions in the water available for agricultural activities. As such, water for irrigation is the reported main unmet household need for families in 16 of the 17 subdistricts in this sample, with Al-Siniya (Baiji District) as the only exception.

Nearly all subdistricts rely primarily on natural or man-made water resources for these activities. Only Markaz Al-Shirqat (Al-Shirqat District) relies on rivers and streams only.

Table 3. Main sources of water for irrigation and other livelihood activities by subdistrict

	Hamreen	Markaz Al-Daur	Al-Dujeel Center	Markaz Al-Shirqat	Al-Siniya	MakkHoul	Markaz Baiji	Al-Duloeyah	Al-Eshaqi	Markaz Al-Balad	Yathreb	Markaz Samarra	Markaz Tikrit	Al-Amerli	Markaz Tuz Khurmatu	Nawjul	Suleiman Beg
Borehole/well	•	•	•		•	•	•	•		•		•	•	•	•	•	•
Rainfall	•	•			•	•		•	•	•		•	•	•	•	•	•
Irrigation canal (man-made)		•	•			•			•	•	•	•		•	•		•
River/stream		•	•	•			•	•			•	•	•	•		•	
Water truck/tanker from private suppliers	•				•	•	•		•			•		•	•	•	•

Livelihoods and coping strategies

Key informants reported that the livelihoods most vulnerable to climate and environmental factors relate directly to the agricultural sector. These include livestock rearing (16 subdistricts), smallholder farming (14 subdistricts), commercial farming (12 subdistricts), and fish farms (8 subdistricts). Vulnerability was also reported among households engaged in informal and sporadic daily labour (12 subdistricts), likely linked to work within the agricultural sector as well.

These findings are further reflected in the fact that 13 subdistricts experienced loss in crop production, livestock deaths, or reduction in fishing yields in the past year. Notably, Marakz Al-Shirqat (Al-Shirqat District), Al-Siniya (Baiji District), Markaz Samarra (Samarra District) and Markaz Tikrit (Tikrit District) have not experienced any such losses. Regardless of whether losses were reported, some households that had previously engaged in these livelihood activities reportedly ceased them across all subdistricts included in the analysis, with the exception of Al-Siniya (Baiji District).

Table 4. Proportion of households abandoning farming, livestock, or fishing by subdistrict

District	Subdistrict	Proportion of HHs
Al-Daur	Hamreen	Some households (1%-24%)
	Markaz Al-Daur	Some households (1%-24%)
Al-Fares	Al-Dujeel Center	Some households (1%-24%)
Al-Shirqat	Markaz Al-Shirqat	Some households (1%-24%)
Baiji	Al-Siniya	None
	MakkHoul	More than half (50%-75%)
	Markaz Baiji	Some households (1%-24%)
Balad	Al-Duloeyah	More than half (50%-75%)
	Al-Eshaqi	Around half (25%-49%)
	Markaz Al-Balad	More than half (50%-75%)
	Yathreb	More than half (50%-75%)
Samarra	Markaz Samarra	Some households (1%-24%)
Tikrit	Markaz Tikrit	Some households (1%-24%)
Tuz Khurmatu	Al-Amerli	Around half (25%-49%)
	Markaz Tuz Khurmatu	Some households (1%-24%)
	Nawjul	Around half (25%-49%)
	Suleiman Beg	Some households (1%-24%)

Around half of the subdistricts in the sample (**9 out of 17**) reported that **some households previously engaged in agricultural livelihoods have abandoned these activities**. More critically, over half of households have given up these agricultural activities in MakkHoul (Baiji District), Al-Duloeyah, Markaz Al-Balad and Yathreb (Balad District). Regardless of severity of agricultural abandonment across subdistricts, key informants report that households are taking measures to adapt and cope to a situation in which farming, livestock rearing, and fishing are becoming increasingly difficult and unprofitable.

The primary coping strategies of such households are related particularly to agricultural practices and include **digging community wells (16 subdistricts), reducing the amount of land used for cultivation (15 subdistricts)** and relying more on water trucking (10 subdistricts). Households have also sought to diversify their livelihoods (13 subdistricts), sending working-age household members to other locations within the district (12 subdistricts) or to other districts (9 subdistricts) to earn an income and reduce expenditures (14 subdistricts).

Public service provision and basic needs

Table 5. Availability of public services and household ability to provide basic needs by subdistrict

	Hamreen	Markaz Al-Daur	Al-Dujeel Center	Markaz Al-Shirqat	Al-Siniya	MakkHoul	Markaz Bajji	Al-Duloeyah	Al-Eshaqi	Markaz Al-Balad	Yathreb	Markaz Samarra	Markaz Tikrit	Al-Amerli	Markaz Tuz Khurmatu	Nawjul	Suleiman Beg
Access to health facilities	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Access to education facilities	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Access to public water supply	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Have funds for food	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Have funds for non-food items	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

● Access to services in all locations / food or NFI secured
 ● Access to services in some locations / food or NFI partially secured
 ● No access to services in any location / food or NFI not secured

In around half of the subdistricts included in this analysis, key informants report a **relatively satisfactory level of access to basic services and basic needs**. Specifically, in 8 out of 17 subdistrict access to functioning basic services—such as health facilities, schools, and public water supply—ranged from some locations to all locations. Furthermore, **around half of households to few or no households have experienced food insecurity or difficulties in purchasing non-food items** in all subdistricts in the assessment as reported by key informants.

Across the sample, eight subdistricts report significant deficiencies solely with respect to access to public water supply.

One factor that may help account for households being able to meet their basics, drawn from this assessment, is that in Al-Amerli, Markaz Tuz Khurmatu, Nawjul and Suleiman Beg (Tuz Khurmatu District), eligible households reportedly receive assistance from **UN or humanitarian organizations as well as from the government (including through its social welfare network)**.

However, there is one major outlier that was identified within this sample. in **Al-Duloeyah (Balad District)**, where **no locations have functional and accessible**

services. No assistance from either humanitarian actors or government sources was reported in this subdistrict.

The indicator with the poorest overall performance across subdistricts is related to public water supply. In line with this finding, the key informants identified that predominantly water for irrigation **is the most critical need for households (16 out of 17 subdistricts)**, followed by **water for drinking and domestic use (15 subdistricts)**. Other reported unmet needs include infrastructure and other services including roads, sewage system, garbage collection, electricity. (13 subdistricts), health (11 subdistricts), improved safety and security (11 subdistricts) and improved shelter and housing conditions (10 subdistricts). These findings align with those from the most recent Return Index and Displacement Index as well where locations tended to exhibit a mix of both poor material and social and safety conditions. **Al-Eshaqi and Al-Duloeyah (Balad District)** have the most reported unmet needs within the sample, highlighting it as a priority hotspot for both humanitarian response and climate-adaptation interventions.

Table 6. Most important unmet needs by subdistrict

	Hamreen	Markaz Al-Daur	Al-Dujeel Center	Markaz Al-Shirqat	Al-Siniya	MakkHoul	Markaz Baiji	Al-Duloeyah	Al-Eshaqi	Markaz Al-Balad	Yathreb	Markaz Samarra	Markaz Tikrit	Al-Amerli	Markaz Tuz Khurmatu	Nawjul	Suleiman Beg
Water for irrigation	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
Water for drinking and household use	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•
Infrastructure and services (roads, sewage system, electricity, garbage, etc.)	•	•	•	•	•	•	•		•	•	•		•		•	•	
Health (including building health centres)	•	•	•		•	•		•	•	•	•	•	•				
Improved safety and security	•		•		•	•	•	•	•	•	•	•	•				
Improved shelter/housing conditions	•	•		•		•	•	•	•		•	•	•				
Education (including building schools)	•	•	•		•	•			•			•	•				
Access to employment/livelihoods				•			•	•	•	•	•						•
NFIs				•				•	•					•		•	•
Food								•	•		•						
Access to legal land and housing ownership									•							•	
Freedom of movement (e.g. ability to move through checkpoints)								•	•								
Request approval from local government/security authorities to move to another location								•	•								

Social dynamics

Overall, **Key informants reported tensions, disputes, or violence** linked to environmental factors in **almost half of the subdistricts (8 out of 17)** in the sample. Disputes are reported between host community members (i.e., residents) in **Al-Dujeel Center (Al-Fares District), Markaz Tuz Khurmatu, Nawjul and Suleiman Beg (Tuz Khurmatu District)**, involving both host community members and tribes in Al-Duloeyah, Al-Eshaqi, Markaz Al-Balad and Yathreb subdistricts (Balad District).

Incidents among residents are generally characterized as **“disputes over irrigation”** concerning both water sources and usage volumes. However, in **Yathreb (Balad District)**, these incidents are specifically referred to as **“armed**

disputes”. Such disputes are taking place in settings where social and safety conditions are already relatively poor and concerns around potential for violence span multiple sources, including ethno-religious tensions and revenge acts, among others, based on findings from the Return Index for these overlapping areas.

Finally, key informants from subdistricts that have received families displaced due to environmental factors since 2016 report **good to very good community acceptance**, even in Al-Dujeel Center (Al-Fares District) and Markaz Tuz Khurmatu (Tuz Khurmatu District), where some disputes related to environmental factors happen.

Existing adaptation measures and needed support to reduce displacement risk

Table 7. Government, civil society, or community mitigation and adaptation measures implemented by subdistrict

	Hamreen	Markaz Al-Daur	Al-Dujeel Center	Markaz Al-Shirqat	Al-Siniya	MakkHoul	Markaz Baiji	Al-Duloeyah	Al-Eshaqi	Markaz Al-Balad	Yathreb	Markaz Samarra	Markaz Tikrit	Al-Amerli	Markaz Tuz Khurmatu	Nawjul	Suleiman Beg
Dig new boreholes or deepened existing ones										•	•			•	•	•	•
Implement policy and regulations to promote water conservation								•	•	•	•						
Provide water through water trucks								•		•							•
Public awareness campaigns								•		•	•						
Build dams/harvest rainwater																•	
Form volunteer groups to assist in disaster response								•									
Improve resilient infrastructure																	•
None	•	•	•	•	•	•	•					•	•				

Among the **eight subdistricts** that have reported implementing mitigation and adaptation measures, the most frequently cited is **digging new boreholes or deepening existing ones (6 subdistricts)**, followed by implementing policy and regulations to promote water conservation (4 subdistricts) and launching public awareness campaigns (3 subdistricts). **Markaz Al-Balad and Al-Duloeyah (Balad District)** have reportedly undertaken the most mitigation and adaptation measures.

Notably, **nine subdistricts were reported to have no adaptation or mitigation measures** in place. These included Hamreen, Markaz Al-Daur (Al-Daur District), Al-Dujeel Center (Al-Fares District), Markaz Al-Shirqat (Al-Shirqat District), Al-Siniya, MakkHoul and Markaz Baiji (Baiji District), Markaz Samarra (Samarra District) and Markaz Tikrit (Tikrit District).

Table 8. Initiatives that could effectively reduce risk of climate-related displacement by subdistrict

	Hamreen	Markaz Al-Daur	Al-Dujeel Center	Markaz Al-Shirqat	Al-Simiya	MakkHoul	Markaz Bajji	Al-Duloeyah	Al-Eshaqi	Markaz Al-Balad	Yathreb	Markaz Samarra	Markaz Tikrit	Al-Amerli	Markaz Tuz Khurmatu	Nawjul	Suleiman Beg
Implement efficient irrigation systems (longer-term structural)	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
Provide cash assistance (short-term feasible)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•
Provide job opportunities (longer-term structural)	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•
Drill wells (short-term feasible)	•	•	•	•	•	•	•		•	•	•		•	•	•	•	•
Conduct workshops and trainings on climate resilience measures (short-term feasible)	•	•	•	•	•	•	•	•	•	•	•	•	•				
Provide incentives to plant trees and sustainable farming projects (short-term feasible)		•	•	•		•	•	•	•	•	•			•	•	•	•
Promote drought-resistant crops (short-term feasible)	•	•	•	•		•	•	•	•	•	•	•	•				

Overall, key informants across the subdistricts in the sample reported that multiple initiatives are needed to effectively reduce the risk of climate-related displacement. These initiatives primarily focus on **implementing efficient irrigation systems (16 subdistricts), providing job opportunities (16 subdistricts), providing cash assistance (16 subdistricts) and drilling wells (15 subdistricts)**. With respect to the latter, a key informant from Al-Amerli (Tuz Khurmatu District) noted that

a well digging plan was submitted to authorities to address water scarcity but is still pending approval to commence. Markaz Tuz Khurmatu (Tuz Khurmatu District) reportedly has a proposal for the digging of 120 artesian wells for the same purpose, but a few have been completed. Additionally, a key informant in Nawjul (Tuz Khurmatu District) also identified the need for desalinization and other water treatment facilities to ensure drinking water is safe and potable.

Key takeaways and next steps

- **Overlap of conflict factors and climate risks:** Subdistricts at risk of climate-related displacement in Salah al-Din substantially overlap with areas that have experienced conflict, displacement and return in recent years. Both returnee and displaced populations in these locations continue to face relatively severe living conditions. Some areas have **high levels of severity in terms of both material and social conditions** and others particularly in relation to social conditions across many domains.
 - **Systematic environmental stress and water scarcity:** Subdistricts assessed have already experienced **at least one slow-onset environmental event** and reported **reductions in water supply for farming, livestock and fishing**.
 - **Continuing agricultural decline and emerging mobility patterns:** Agricultural livelihoods (livestock, farming and, to a lesser extent, fishing) are reported as the most vulnerable to climate and environmental factors, followed by **informal daily labour** often linked to the agricultural sector. Households engaged in agricultural livelihoods have already experienced losses in the past year and have begun to abandon this sector in most subdistricts. Common coping strategies **include digging community wells, reducing the amount of land used for cultivation, diversifying livelihoods and sending working-age household members to other locations within or outside their districts to earn income**.
 - **Need for deeper understanding of livelihood dynamics:** To better assess impacts on agricultural households, more data are needed regarding other sources of income these households may already have, recognizing that agriculture may not be their sole livelihood activity. Greater understanding is also required on the functioning of other livelihood sectors available in these areas, particularly as many at-risk locations in Salah al-Din are still recovering from conflict impacts.
 - **Services are relatively stable but key gaps remain:** Levels of service provision and households' ability to meet basic needs appear relatively good overall, possibly reflecting assistance provided following conflict-related displacement.
- However, the most frequently reported unmet needs relate to water for irrigation and domestic use, as well as broader infrastructure, health services, improved safety and security, and better housing conditions.
- **Conflict factors predominate social dynamics:** Nearly half of the assessed subdistricts reported disputes related to irrigation and water sources, though only in one case did it involve weapons. However, many subdistricts report moderate to high severity in social and security dynamics linked to the legacies of violence and conflict, including the ISIL period. Key risks include tensions between security actors or armed groups, ethno-religious tensions, revenge acts, harassment at checkpoints, the presence of multiple security actors, illegal occupation of housing, social exclusion and the continued blocked return of certain families. These conflict-related challenges remain critical and should not be overlooked as climate and environmental pressures gain increasing attention.
 - **Adaptation measures are uneven and limited:** Official and community mitigation and adaptation measures vary across subdistricts but tend to focus on digging new boreholes or deepening existing ones, promoting water conservation policies and launching public awareness campaigns. In multiple subdistricts, no adaptation measures have been taken at all. Key informants highlighted the need for structural support, including modernization of agricultural practices, increased job opportunities, cash assistance and expanded well-drilling initiatives. Some well-drilling projects have begun or are awaiting approval, though progress remains slow. Water treatment facilities were also raised as necessary to address pollution in drinking water supplies.
 - **Need for deeper, targeted diagnostics:** To more accurately assess the specific mitigation and adaptation strategies, as well as ways to improve livelihood opportunities, water supply and infrastructure, more detailed systemic assessments are required to ensure that interventions are appropriate for individual subdistricts and the wider geography in which they are situated.

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