Disrupted Lives

Climate Crisis and Internal Displacement: A Case Study of Sumel District, Iraq

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Boy in the village Eminke, Copyright © CARE International in Iraq

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Executive Summary

In navigating the complex landscape of migration in Iraq, this study highlights the complexities of displacement and the emergent challenges posed by climate change. When it comes to migration, often the distinction between conflict-induced and natural disaster-induced displacement is made. The former is the challenge of today; year after year the United Nations High Commissioner for Refugees (UNHCR) measures more people displaced by war and conflict. The latter is gaining increasing importance through climate change and is expected to become the major challenge of the future. As the case of Sumel district in Iraq shows, the lines between them are already today blurred in practice.

Iraq faces both, a convergence of conflict-induced migration and the incipient impact of climate change. While conflict initially drove the migration of Iraqis, climate change is increasingly becoming a factor hindering the return of IDPs to their Areas of Origin.

Sumel District, chosen as the study area, has experienced rising temperatures, reduced precipitation and increased environmental challenges over the past four decades. These transformations have had a profound impact on agriculture, food production, water and sanitation services as well as environmental conditions. Through key informant interviews and a comprehensive desk review, a preliminary qualitative vulnerability assessment for Sumel District was established. The calculated vulnerability index of 0.67 indicated high and concerning vulnerability levels in the area. Indeed, the high susceptibility of the area to climate change impacts resources, emergency response capabilities, infrastructure and essential services. It also undermines the area's economic capacity and recovery potential, posing health and safety risks to host communities and IDPs alike. In turn, the high vulnerability is thus expected to further pressure the ability of the district to host IDPs.

As this is an alarming result by itself, the second part of the study raises even more concerns as it shows that most of the IDPs in the region will not return to their AOO any time soon. With the support of Harikar, a local non-governmental organization, 1,024 IDPs in Sumel District responded to a questionnaire, revealing the following key insights:

- **People notice that weather is changing:** Prior to displacement, most IDPs noticed changes in weather conditions (91%) and environmental degradation (74%) in their AOO, with 80% often linking their challenges to accessing water in their AOO. Upon displacement to Sumel District, IDPs indicated that they observed changes in weather conditions (67%) and environmental issues (49%) in Sumel.

- **Almost 20% of the IDPs who decided to stay in Sumel, stay also because of climate reasons:** Around 44% of IDPs do not consider returning to AOO mainly due to security and political stability followed by living conditions.

- **Nearly one quarter of the people who plan to return to their AOO discussed climate during their decision making:** Around 56% of IDPs consider returning to their AOO of which 23% indicated that weather conditions played a role in their decision.

- **More than half of the interviewed people who plan to return expect challenges regarding income and water due to climate changes:** In case they return to AOO, 51% of IDPs anticipate weather and environmental changes to impact their source of income and 66% expect problems accessing drinking water.

- **Every tenth person named weather as contributing fact to their decision to return from the return:** Of the total 90 IDPs who have returned to Sinjar and decided to come back to Sumel due to family, job opportunities, security and living conditions, 10% raised concerns related to weather and environmental conditions in their AOO as contributing factors for their return to Sumel.

- **The figures rise higher between the people who are familiar with the term "climate change":**
  - Only 34% of IDPs indicated that they were familiar with climate change terms. Of these, 43% indicated that climate change related factors threaten their ability to go back to AOO and 8% said it partially does.
  - Of the total IDPs who indicated familiarity with climate change terms, 37% indicated that climate change will influence their decision to return to AOO.

The results of this report underscore the importance of recognizing the intertwined challenges of climate change and displacement in Iraq. They show the urgent need for comprehensive strategies to support IDPs and host community in a strategic and needs-oriented way.

Key highlights

This study aimed to investigate the extent to which climate change impacts Sumel District's capacity to host displaced populations as well as the extent to which it influences migration patterns in and out of the Sumel District.

The major findings indicate:

- War and conflict are the main reason for population displacements.
- Climate change has already affected Sumel District throughout the past 40 years. This includes increased temperature and changing rainfall patterns.
- As most agricultural areas in Sumel District are dependent on rainfall, changes in precipitation patterns due to climate change highly impact food production and livelihoods.
- The water and sanitation sector faces several challenges in Sumel District resulting from climate change and management constraints. This is exacerbated by the increased population through IDPs.
- Environmental degradation in Sumel District has been exacerbated by the overuse of fertilizers and pesticides and industrial pollution in surrounding areas.
- The high vulnerability of Sumel District is caused by higher exposure and sensitivity and lower adaptive capacity. The higher vulnerability of the area is caused by climate change which challenges also the capacity to act as host community.

To assess the extent to which climate change may impact IDP decision to return or stay, a total of 1024 questionnaires were administered to IDPs in the Sumel District by Harikar enumerators. The major findings indicate:

- 90 of the IDPs interviewed were return IDPs. The four main reasons for IDP return from AOO are related to family and job opportunities, followed by security and living conditions. Around 10% indicated that weather and environment were contributing factors to their return from AOO.
- Prior to displacement from AOO, 91% of total IDPs indicated that they noticed changes in weather conditions in AOO and 74% indicated that they noticed environmental changes. In addition, 80% indicated that they had problems in accessing water in their AOO.
- Throughout their displacement in Sumel District, 67% of IDPs indicated that they noticed changes in weather condition in Sumel and 49% indicated that they have noticed environmental changes.
- Around 36% of IDPs selected availability of natural resources (land and water) as one of the reasons for choosing Sumel District to migrate to.
- Around 44% of IDPs do not consider returning to AOO mainly due to security and political stability followed by living conditions. Only 17% of them indicated that weather conditions played a role in their decision.
- Out of the total people who reported that they do not consider going back to their AOO, 60% said they will or may return permanently to their AOO if they could sustain their agricultural livelihood (sufficient land, water, seeds).

- Around 56% of IDPs consider returning to their AOO of which only 23% indicated that weather conditions played a role in their decision.

- 72% of IDPs reported that they will or may return permanently to their AOO if they could sustain their agricultural livelihood (sufficient land, water, seeds).

- In case they return to AOO, 51% of IDPs anticipate weather and environmental changes to impact their source of income and 66% expect problems accessing drinking and domestic water.

- Only 34% of IDPS indicated that they were familiar with climate change terms. Of these, 43% indicated that climate change related factors threaten their ability to go back to AOO and 8% said it partially does.

- Of the total IDPs who indicated familiarity with climate change terms, 37% indicated that climate change will influence their decision to return to AOO.

Recommendations and Way Forward

The impact of climate change and the environmental degradation dynamics is so far receiving too little attention from governments and NGOs and is therefore also insufficiently evaluated. If this is not addressed, efforts to support people in their motivation to return could be in vain, especially as environmental trends will continue to worsen in the future. The findings of this paper provide valuable insights for policymakers, local communities and stakeholders to develop effective strategies and policies in response to climate change-induced migration. In general, targeted programming, policies and projects that explicitly address climate resilience are required to ensure that both, host communities and IDPs, are able to achieve durable solutions in response to climate change.

To increase the resilience of Sumel District and support the return of IDPs, CARE suggests the following recommendations:

- Develop more extensive research to follow up on this preliminary assessment which was limited by data and time. This includes:
  - Conduct a detailed and more comprehensive vulnerability assessment of the area which requires more stakeholder engagement and preparation of geographic information system data. Data includes climate change projections for the Sumel District, land use/landcover map, soil data, population density, water networks, among others.
  - Increase questionnaire sampling size to ensure a more representative sample, considering the substantial number of internally displaced persons (IDPs) in Sumel and Iraq
  - Collaborate with local authorities and humanitarian organizations to access and integrate additional data sources, such as health records, economic data and infrastructure assessments.
  - Assess the situation in the area of origin and interview returnees (those who returned back to IDP camps) to better understand their motivation to return.
  - Replicate this study in different districts to understand the various dynamics and perceptions across the different areas of Iraq.
  - Improve data on climate change modeling and update geographic information system (GIS) data to better understand the changing climate, land use patterns, soil conditions, population density and water networks in the region.

- Invest in capacity-building efforts for local communities, government agencies and NGOs. This includes training programs on climate resilience, data collection and analysis and disaster preparedness.

- Promote community-based adaptation strategies that empower local communities to take ownership of their resilience-building efforts. This can include training in heat and drought resilient sustainable farming practices, water management and disaster risk reduction.

- Provide training and support to farmers in adopting sustainable agricultural techniques, including organic farming, crop rotation, drought and heat tolerant plants and livestock and integrated pest management. Encourage the use of organic fertilizers and reduce reliance on chemical inputs.

- Foster stronger partnerships with international donors and organizations to channel funding and technical support towards programs that enhance the Sumel district's resilience to climate change as well as programs that support IDPs to return to their AOO.
  - Prioritize projects that focus on building adaptive capacity and reducing sensitivities to climate change, such as promoting climate smart agriculture practices and sustainable water management (rainwater harvesting and efficient water distribution systems).
  - In addition to investing in market value chain development to bolster the local economy, create livelihood opportunities and improve food security.
  - Invest in ecosystem restoration projects, such as reforestation and wetland preservation, to enhance natural buffers against climate change impacts and improve overall ecological resilience. Launch initiatives to restore and increase green cover in Sumel, particularly around camps. Focus on planting native trees that are well-adapted to the local environment and can contribute to water retention.
  - Establish proper wastewater treatment facilities and ensure that treated water meets safety standards for agricultural use. Implement recycling systems to utilize treated water for irrigation, reducing the strain on freshwater resources.
  - Invest in renewable energy sources such as solar energy, to increase access to electricity in the region and reduce dependence on fossil fuels.

- Support the construction of climate-friendly and disaster-resistant houses and villages in areas of origin to ensure the safety and well-being of residents during extreme weather events. Collaborate with local education authorities to incorporate climate change education into school curricula, raising awareness and building a foundation of climate literacy among future generations. Explore innovative solutions such as hydroponics, which can increase agricultural production while minimizing water use. Promote efficient irrigation techniques and provide training and resources to farmers on water-saving practices.

- Develop integration options for IDPs who may not return to their AOO. This could involve long-term settlement planning, livelihood support and access to essential services in host communities.

- Support host communities in exploring alternative livelihood options beyond agriculture. This could include vocational training programs and entrepreneurship support.

- Advocate for climate-resilient policies and regulations at the local, regional and national levels. Engage with policymakers to ensure that climate change adaptation plans are integrated into development plans.

- Increase education and vocational skills that are not highly dependent on agriculture, especially since temperatures may continue to rise in the future.

- Enable IDPs to influence climate change and migration policies so that they are better protected when they move.

1 Introduction

Conflicts, war and violence have constantly stood as primary reasons for human displacement on a global scale, with climate-related factors only emerging as subsequent drivers for IDPs. Worldwide, the number of people forced to leave their homes in search of safety and stability has reached 114 million in May 2023.[1] In parallel, climate change impacts including flooding, tropical cyclones, droughts and sea level rise have also emerged as significant drivers for human displacement.[2] Projections by the Intergovernmental Panel on Climate Change (IPCC), the United Nations body for assessing the science related to climate change, indicate that displacement, especially in areas of high exposure and low adaptive capacity, will continue to increase in the coming decades with the intensification of climate change induced events especially under high emissions scenarios.[3] The intersection of these displacement drivers becomes even more significant, as is evident in the situation in Iraq. In Iraq, there is convergence of both, conflict-related migration and the incipient impact of climate change. While conflict initially spurred the migration of Iraqis, this study explores whether climate change may be a factor hindering the return of internally displaced persons (IDPs) to their Area of Origin (AOO).

In 2017 Iraqi Security Forces and its coalition partners defeated the armed militant groups. As such, the peak return of displaced communities to their AOO was between 2017 and 2018, reaching around 4 million people returning to their homes.[4] Since then, the return rate has slowed significantly with around 1.157 million people still displaced in 2023.[5] Indeed, the 5-year post conflict era has seen only modest recovery along with political and economic uncertainty, eroded public services and social unrest compounded by the 2020 collapse of the global oil prices and the COVID-19 pandemic.[6] Armed militant groups further continue to derail efforts to get the country back on track targeting civilians and economic infrastructure. This has impacted the ability of IDPs to return and in some cases triggered new displacement.[7]

1 UNHCR 2023. Mid-year trends 2023
2 IPCC AR6 WGII. 2022 Summary for Policymakers
3 IPCC AR6 WGII. 2022 Summary for Policymakers
4 IOM, 2020. Situation Overview of Return and Reintegration in Iraq: DTM Integrated Location Assessment V
5 UNHCR, 2023. Operational Data portal. Country – Iraq
6 WFP, 2022. Iraq Market Monitor Report, Issue No. 32.
7 IOM, 2020. Situation Overview of Return and Reintegration in Iraq: DTM Integrated Location Assessment V

At the same time, Iraq was ranked as the fifth most vulnerable country to climate change globally in 2019, as it faced challenges from escalating temperatures, prolonged droughts, environmental pollution and recurrent natural disasters.[8] While conflict has been the major driver of displacement in Iraq, the scale of climate change impacts is expected to be devastating, forcing more internal displacement especially to areas perceived as "resource rich".[9] **But although it is expected that climate change impacts may also shape the perception of IDPs to return to their AOO, it is yet to be documented in data and research.**

Efforts to track climate-induced displacement in Iraq have been increasing but mainly across the central and southern regions of the country.[10]

Based on 2023 data, the Kurdistan Region of Iraq (KRI) hosts more than 53% of the total 1.157 million IDPs in Iraq.[11] It has also been a major area of destination for IDP return (IDPs that left to their AOO but then returned to becoming IDPs again). In specific, the Sumel District, located in the southwestern part of KRI, hosts more than 138,000 IDPs[12] compared to its latest recorded population in 2019 of 179,074 people[13].

This study aims to examine Sumel District's vulnerability to climate change, assessing its ability to sustain displaced populations and the impact of climate change on internal displacement patterns in the area. The research methodology involves a combination of primary data collection through questionnaires and key informant interviews as well as a comprehensive desk review.

8 https://reliefweb.int/report/iraq/sustainable-solutions-combat-climate-change-iraq#:~:text=Background,its%20overall%20stability%20and%20prosperity.

9 CIVIC,2022.

10 IOM, 2023. Climate-Induced Displacement Southern Iraq. DTM emergency tracking

11 UNHCR, 2023. Operational Data portal. Country – Iraq

12 IOM Displacement Tracking Matrix Dataset Round 129 (January, February, March and April 2023. Accessed June 2023

13 دراسة تأثير زراعة الحنطة عمى التموث البيئي في قضاء سيميل بمحافظة دهوك بأقليم كوردستان العراق.
Umer, M.I. ; K.S. Nori, and Z.S.Khaleel (2022). Egypt. J. of Appl. Sci., 37 (7-8) 2022

2 Setting the scene

2.1 Climate change and migration in Iraq

Rainfall in Iraq varies according to regions: while the southwestern part receives less than 100mm of annual rainfall, the northern part receives more than 1000mm.[14] Most of Iraq experiences a subtropical desert climate and is also influenced by dry dust winds. Throughout the past years, increasing trends in minimum and maximum temperatures as well as decreasing precipitation and major extreme events have been observed.[15]

Iraq is highly susceptible to natural and slow onset disasters and as such 54% of the country is under serious threat of land degradation. Desertification impacts 39% of the land area.[16] Droughts and land degradation are major factors jeopardizing food production in the country with the north depending on rainfall and the central and southern parts relying on irrigation. Farming communities that rely on rain-fed agriculture have been among the most affected by droughts. Households that lack access to irrigation water and infrastructure due to remote locations or financial burden are left with no alternative for water supply for crops.[17]

An assessment by the Norwegian Refugee Council (NRC) in Iraq on the impact of the drought on agriculture production in the 2020-2021 cropping season reported that 37% of farmers experienced wheat crop failure and 30% barley crop failure. Similarly, up to 37% of households lost cattle, sheep, or goats in the last six months due to insufficient water and livestock feed or diseases. Accordingly, incomes for farming households dropped especially in Anbar, Basra and Kirkuk, where more than half of households rely on agriculture as their main source of income.[18] The NRC assessment indicated that 7% of households surveyed have had a family member forced to migrate as a result of droughts, water scarcity conditions and their socioeconomic effects.[19]

14 Sulaiman, S. O., Shiri, J., Shiralizadeh, H., et al. (2018). Precipitation pattern modeling using cross-station perception: regional investigation. Environmental Earth Sciences, 77(19), 1-11.

15 Agha, O., Mahmood, M. A. and Şarlak, N., 2016. Spatial and temporal patterns of climate variables in Iraq. Arabian journal of geosciences, 9(4), 1-11.

16 ICRC, 2022. Iraq: Expanding deserts, searing temperatures and dying land: Climate crises deepen struggle of farmers

17 NRC 2021. Iraq's drought crisis and the damaging effects on communities

18 NRC 2021.

19 NRC 2021.

Iraq has seen significant rural–urban migration due to crop failures, environmental degradation and loss of rural livelihoods.[20] In 2019, the IOM estimated that more than 21,000 people (families engaged in agriculture and pastoralism) have migrated from rural, agrarian lands to urban areas as a result of climate change and/or resource scarcity.[21]

Indeed, climate migration is already a reality where around 7 million Iraqis have been affected by drought and risk displacement.[22] Between 2016 and 2022, one in ten people have been displaced from central and southern Iraq due to climate change and environmental degradation.[23] In December 2022, more than 68,000 people were displaced due to drought in central and southern Iraq.[24] Climate migration is also most recently witnessed in governorates of Diyala, Babylon, Thi-Qar and Wassit where more than three-quarters of migration took place in 2022 primarily due to low rainfall and low water levels in the rivers and tributaries. **Between 2021 and 2022 a 141% increase in displacement was attributed to climate change and environmental degradation.25**

Current climate change projections estimate a 2°C increase in average temperature and a 9% decrease in precipitation by 2050.[26] By the end of the century, and under a business-as-usual scenario, temperatures are expected to further increase by 4.1-6°C. [27] Increasing temperatures have a direct impact on water and food security as well as related health risks. The headwaters of the Tigris and the Euphrates rivers, Iraq's two major rivers, are also projected to experience a notable rise in average temperature of 4.5-4.8°C under the same scenario.[28] One of the greatest current threats to Iraq's water supplies is the reduced water flow from the rivers which is already witnessed; the discharge from Tigris and Euphrates rivers is projected to decrease by 50% by 2030 as compared to 1980s levels.[29] Although these rivers account for 98% of the Iraqi water supply (drinking, sanitation and irrigation purposes), they are regulated by neighboring Iran and Turkey.[30] Due to dam projects, Turkey has reduced flows of the Euphrates to neighboring countries by around 60% since 2020.[31] The World Bank warns that if current trends continue, Iraq could face an annual water shortfall of up to 10.8 billion cubic meters by 2035.[32]

As environmental changes intensify, displacement is likely to increase exponentially.[33] At the end of 2021, IOM recorded approximately 20,000 people displaced due to water scarcity (in 10 of Iraq's 19 governorates).[34] The Iraqi government further expects the water crisis to lead to the displacement of 4 million people over the next eight years.[35] **Indeed, the scale of climate change impacts is likely to be devastating and may force Iraqis to relocate to survive as recent assessments have indicated that water scarcity will become the primary driver of internal displacement.**[36]

Yet it should be noted that climate change alone does not produce the conditions that push people to move. Other factors that are equally important to address since they intensify the impact of climate change include poor water resource management, outdated agri-

20 SIPRI 2023
21 CIVIC, 2022.
22 Iraqi Presidency, 2017. Mesopotamia Revitalization Project. A Climate Change initiative to Transform Iraq and The Middle East
23 IOM Iraq 2023. Drivers of climate induced displacement in Iraq: Climate Vulnerability Assessment Key Findings.
24 SIPRI, 2023.
25 IOM Iraq2023.
26 USAID, 2017. Climate Change Risk Profile: Iraq
27 Abdaki, M. et al 2021. Predicting Long Term Climate Change in Iraq. IOP Conf. Ser. Earth Environ. Sci. 779 012053
28 ESWCA, 2017. Arab Climate Change Assessment Report – Executive Summary. Beirut, Lebanon.
29 CIVIC,2022.
30 Theodore Krasik and Jacopo Spezia Depretto, 2019. Climate Change is Exacerbating Iraq's Complicated Water Politics.
31 Arab news, 2021. Region at risk due to divisive water policies.
32 World Bank Group. 2022. Iraq Country Climate and Development Report. CCDR Series. Washington, DC.
33 IOM Iraq 2022.
34 IOM Iraq 2022.
35 UNICEF, 2021. Running Dry: The impact of water scarcity on children in the Middle East and North Africa.
36 World Bank , 2022.

cultural techniques, pollution and reduced water flow caused by upstream countries.

2.2 Returnees in Iraq

Although the post-conflict period has seen the gradual return of more than 4.97 million people[37] to their areas of origin (AOO), as of 31 December 2022, over 1.1 million people (more than 200,000 households) are still internally displaced in Iraq.[38] An increase in IDPs is also witnessed in a few locations such as Ramadi, Al-Shikhan and Sumel districts. This is mainly attributed to a combination of secondary displacement and failed returns.[39]

In many cases IDPs face protracted displacement as they are unable or prevented from returning to their AOO. Reasons vary from lack of safety to lack of means to support their livelihood. Premature or forced returns caused by camp closures and evictions of informal sites, have resulted in over 590,000 returnees to live in locations presenting high-severity conditions and thus questioning the sustainability of returns.[40]

Further, conditions for returnees have been exacerbated by climate change impacts. For instance, various areas under former control of armed groups have been highly affected by water scarcity while they are experiencing high rates of IDP return.[41] For example in Hawija, Kirkuk province, a quarter of returnees have already had a family member forced to migrate again because of the drought. Ninewa, which was highly impacted by the 2021 drought, witnessed 1,800 newly returned IDPs (people that became IDPS again) as they were unable to survive without a livelihood.[42] **In that sense, the question arises on whether perception of such climate change induced challenges has been an integral factor in the decision of IDPs to stay or return**.

The Reach 2018 study indicated that for returning to Sinjar, home region of the Yezidi community, the most mentioned reason was a perceived improvement in security and a desire to return to land and property. Those remaining in displacement stayed because of the lack of sufficient services and continuing security concerns. [43] In Ba'aj area, the main reason to return was safety improvement, discontent as an IDP and fleeing extreme temperatures. Returnees reported very poor rain, insufficient water and the lack of pumps and other irrigation infrastructure. Those who did not return referred to lack of livelihood opportunities especially as the area before the conflict escalation in 2014 was heavily reliant on agriculture.[44]

A study conducted by Reach 2023, reported that return intentions are highly diverse across the 25 surveyed sub-districts.[45] Conditions in informal sites, factors related to AOO (destruction of housing, lack of financial means) and specific socio-economic variables (lack of funds, old age and fear or trauma) impact decisions to return or remain. **In all surveyed sub-districts, 82% of households stated their intention to stay in their current location, with only 5% expressing a desire to return to their Area of Origin (AOO).** The remaining 11% were undecided about their plans. Additionally, approximately 65% of households expressed worries about being exposed to climate-related hazards. Although climate change wasn't explicitly mentioned, concerns regarding exposure to hazards such as flooding, extreme temperatures, heatwaves, fires and drought indirectly alluded to its impact.

The Integrated Location Assessment (ILA) conducted by IOM is a comprehensive assess-

37 Iraq Crisis Response Plan 2022-2023. Global Crisis Response Platform Accessed June 11, 2023.

38 IOM Displacement Tracking Matrix, 'Iraq Master List Report 128', Data collection period: Oct.–Dec. 2022, Feb 2023

39 DTM. 2023. IRAQ MASTER LIST REPORT 128 DATA COLLECTION PERIOD: OCTOBER – DECEMBER 2022 20232194611467_DTM_128_Report_October_December_2022.pdf (iom.int)

40 Iraq Crisis Response Plan 2022-2023. Global Crisis Response Platform. Accessed June 11, 2023.

41 Terminology use: Returnee meaning retuned to area of origin; IDP return meaning returned to being internally displaced.

42 IOM Iraq 2022.

43 REACH, 2018. Rapid Overview of Areas of Return (ROAR): Sinjar and Surrounding Area.

44 REACH, 2018.

45 Iraq – REACH 2023. Informal Sites Profiling & Movement Intentions Survey, May 2023.

ment of the vulnerability factors and mobility drivers among displaced and returned families living in locations affected by climate change and environmental degradation.[46] It covered 3,717 locations, reaching 4,963,230 returnee individuals and 1,139,566 IDP individuals (representing 99% of all recorded returnees and 97% of IDPs). Over the 12-month period, the most prevalent environmental event recorded was sand or dust storms, which impacted 97% of IDP locations (1,871) and all returnee locations (2,153), followed by changing rainfall patterns which impacted 55 % of IDP locations and droughts impacting 27% of IDP locations. It concluded that **the relationship between climate change and environmental degradation on one hand and agricultural livelihoods on another is a pressing concern for both, returnees and IDPs.**[47]

Sustainable or durable return is always supported by multifaceted factors, nevertheless, the negative impact of climate change and the environmental degradation dynamics is so far receiving too little attention and is therefore also insufficiently evaluated.48 This creates a dangerous gap in existing research and monitoring. If this is not addressed, efforts to support people in their motivation to return could be in vain, especially as environmental and climate trends will continue to worsen in the future.

2.3 Host communities of Iraq

Large-scale migration is a challenging situation for hosting communities. In situations of scarce or shrinking resources, it often increases tensions between host communities and migrants.[49] Migrants are often viewed as creating pressure on services and are often blamed for negative economic changes. Xenophobia among host communities is highly prevalent and, in some cases, migrants are scapegoated in response to shortages of government services, jobs and housing.[50] The public's perceptions on migration are overwhelmingly negative due to a perception that migrating people take economic opportunities and increase the strain on services. Local authorities also sometimes blame migrants for a rise in crime, poor service provision and unemployment. This contributes to an 'us versus them' divide[51].

Although the host community was welcoming the IDPs in the beginning and they have been living on friendly terms over the last years, tensions between residents and local authorities in Iraq have been increasing as residents and agricultural workers struggle with access to water. It is perceived that water is distributed unequally which causes frustration and has caused protests in recent years.[52]

Water scarcity and environmental degradation caused by climate change result in increased vulnerability of host communities. In some cases, this may lead to individuals losing their assets and adopting negative coping mechanisms.[53] **With climate change combined with water scarcity, it is expected that the ability of the host community to accommodate IDPs will be further compromised.** Nonetheless, more focused research is needed to assess increased vulnerability caused by climate change and ways in which it impacts host communities.

46 IOM, 2021. Factsheet: The Impact of Climate Change on the Environment in IDP and Returnee Locations – Integrated Location Assessment VII – Iraq.

47 IOM, 2021. Factsheet: The Impact of Climate Change on the Environment in IDP and Returnee Locations – Integrated Location Assessment VII – Iraq.

48 IOM, 2021.

49 SIPRI 2023. Climate, Peace and Security Fact Sheet: Iraq 2023

50 Center for Civilians in Conflict (CIVIC) 2022.I f I Leave… I Cannot Breathe": Climate Change and Civilian Protection in Iraq

51 CIVIC, 2022.

52 CIVIC, 2022.

53 Iraq Crisis Response Plan 2022-2023. Global Crisis Response Platform Accessed June 11, 2023.

3 The Case of Sumel District

Sumel District (also known as Semeel or Smail) is situated in the Duhok province in the south-western part of the Kurdistan region of Iraq (KRI). It is located 16 km in the west of Dohuk and lies on the international road to Zakho (connecting Iraq to Turkey).[54] The total area of the district is around 1,398 km2, which is divided among three sub-districts: Semeel center (306 km2), Faida (281 km2) and Batel (811 km2).[55]

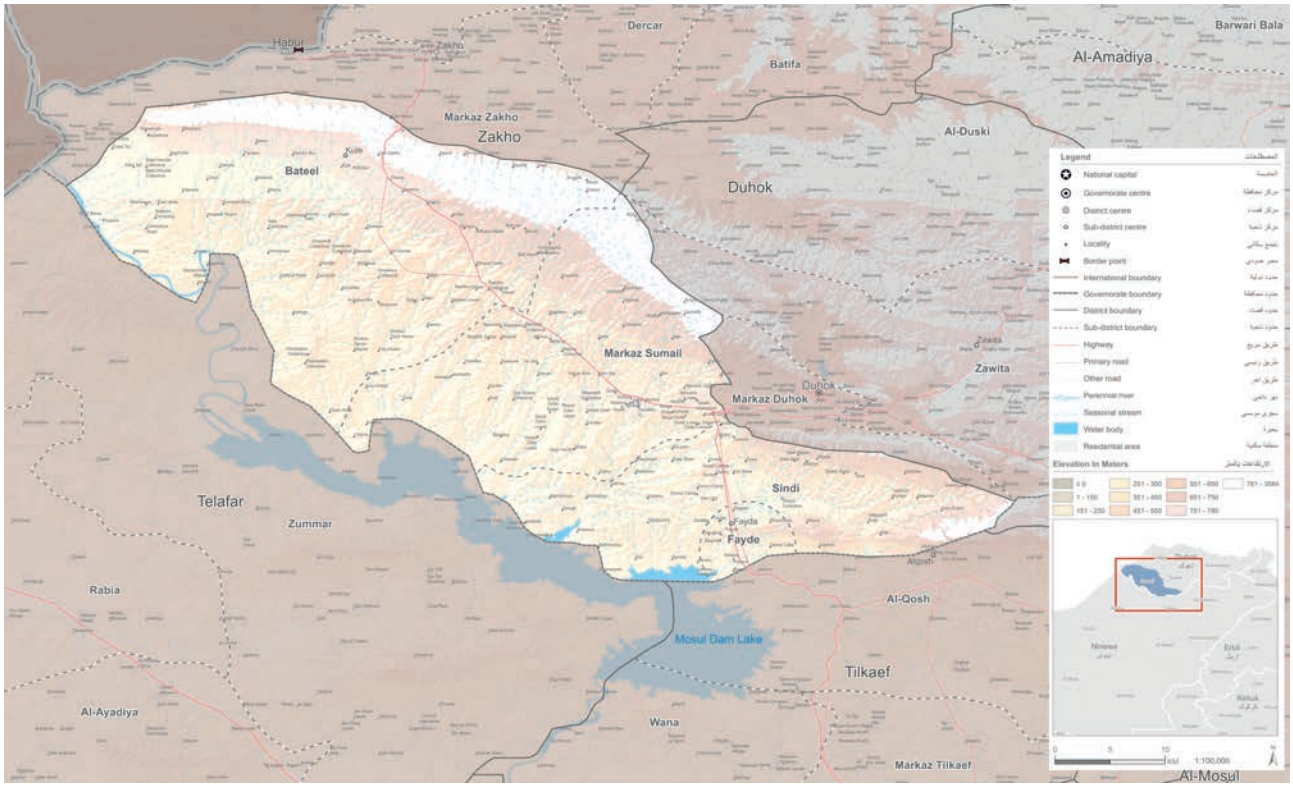

Figure 1: Sumel District Borders (OCHA, 2020)

54 Semel (duhokprovince.com). http://duhokprovince.com/semel/

55 Umer, M.I.; K.S. Nori and Z.S. Khaleel (2022)

Sumel was chosen for this study as it hosts a large number of IDPs – with a population of 179,074 people[56] and hosting more than 138,000 IDPs[57]. It is perceived as a resource rich area with stable security and easier access to aid organizations which has made it a common destination for many IDPs. Indeed, economic migration towards the KRI has been documented to be a major migration factor.[58]

The undertaken study had two objectives:

1. To understand how climate change has influenced the vulnerability of Sumel District and if it affected its capacities as a host community (section 3.1).
2. To understand if the perception of climate change has influenced IDP migration patterns in Sumel (section 3.2).

To achieve those objectives 1,024 questionnaires and 5 key informant interviews (KIIs) were conducted, together with a comprehensive desk review.

It is important to note that this is a preliminary assessment limited by data, nevertheless, it gives a comprehensive insight and indicates where more research should be undertaken.

3.1 Climate Change and Sumel District vulnerability

To better understand to which extent climate change impacts have increased the vulnerability of Sumel District and pressured its ability as a host community, literature review and key informant interviews (KIIs) were conducted. With the help of Harikar[59], a local non-governmental non-profit humanitarian organization, five semi-structured KIIs were conducted online with local experts in Duhok government and Sumel District.

Based on this information, a preliminary qualitative vulnerability assessment of Sumel District was developed and a vulnerability index was generated. This describes the area's vulnerability to climate change, further exacerbating its capacity to act as host for IDPs.

Vulnerability is comprised of the following components:[60]

- *Exposure*: refers to climate change parameters such as temperature and precipitation.
- *Sensitivity*: refers to the natural and physical environment as well as differing population groups that are mostly susceptible to climate change. It includes population as well as natural and man-made dimensions.
- *Potential impact*: result of coupling both exposure and sensitivity.
- *Adaptive capacity*: describes the ability to cope, mitigate and adapt to climate change. It includes infrastructure, economic resources, awareness, institutions and equity parameters.
- *Vulnerability*: The net difference between potential impact and adaptive capacity.

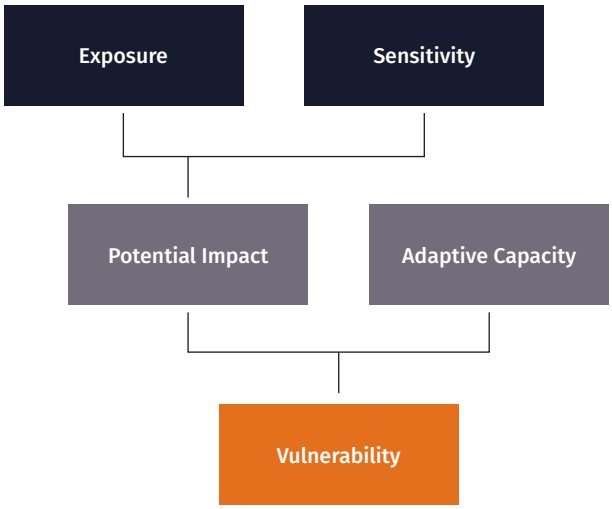

Figure 2: Vulnerability based on the IPCC AR4 approach (ESCWA, 2017)

Accordingly, by identifying exposure (change in climate parameters) and sensitivity (natural and physical environment indicators) the potential impact is calculated. A high potential impact is due to high exposure and high sensitivity. The higher the potential impact, the

56 Total population as of 2019. Umer, M.I.; K.S. Nori and Z.S. Khaleel (2022).
57 IOM Displacement Tracking Matrix Dataset Round 129 (January, February, March and April 2023. Accessed June 2023)
58 Eklund L and Pilesjö P. (2012). Migration patterns in Duhok Governorate Iraq, 2000- 2010. Open Geography, 5, 48-58.
59 https://www.harikar.org/
60 As proposed by the IPCC in its Fourth Assessment Report (AR4) IPCC, 2007

higher the expected vulnerability. On the other hand, the higher adaptive capacity (ability to cope) the lower is the expected vulnerability. Indeed, adaptive capacity counteracts the potential impact to eventually calculate the vulnerability.

- High vulnerability is caused by higher exposure and sensitivity (higher potential impact) and lower the adaptive capacity.
- Increasing adaptive capacity and decreasing sensitivity will reduce vulnerability.

Due to time and data limitations, both KIIs and desk review, were used to identify indicators within exposure, sensitivity and adaptive capacity as shown in Table 1.

Exposure	Sensitivity	Adaptive capacity
Change in temperature	Number of refugees	Road network
Change in rainfall timing	Number of open waste dumps	Water network
Change in rainfall intensity	Degree of urbanization	Wastewater network
Drought index	Number of industries	Education centers
Frequency of sand and dust storms	Land degradation	Access to water and sanitation services
Flood index	Degree of pollution due to fertilizer and pesticides	Access to agricultural extension services
	Area covered by water bodies	Irrigation network
	Number of groundwater wells	Access to electricity
	Soil degradation	
	Livestock density	

Table 1: Exposure, sensitivity and adaptive capacity indicators based on KII and desk review

The purpose of the KIIs was to get a better perspective on both, sensitivity and adaptive capacity of Sumel District that increases its vulnerability to climate change and reduces its capacity as a hosting community.

3.1.1 Descriptive analysis of identified indicators

Climate change indicators

Looking at different parameters it is apparent that climate change has already affected

Sumel District. As shown in Figure 3, a positive trend in the mean annual temperature clearly indicates warming conditions over the past 40 years.[61] The warming color stripes represent the average temperature for a year where red indicates that the years are getting warmer above average over time.[62]

61 ERA5, the fifth generation ECMWF atmospheric reanalysis of the global climate, covering the time range from 1979 to 2021, with a spatial resolution of 30 km.

62 Meteoblue. Simulated historical climate & weather data for Simele, Duhok, Iraq, (36.86°N 42.85°E, 463m asl). Accessed June 23, 2023

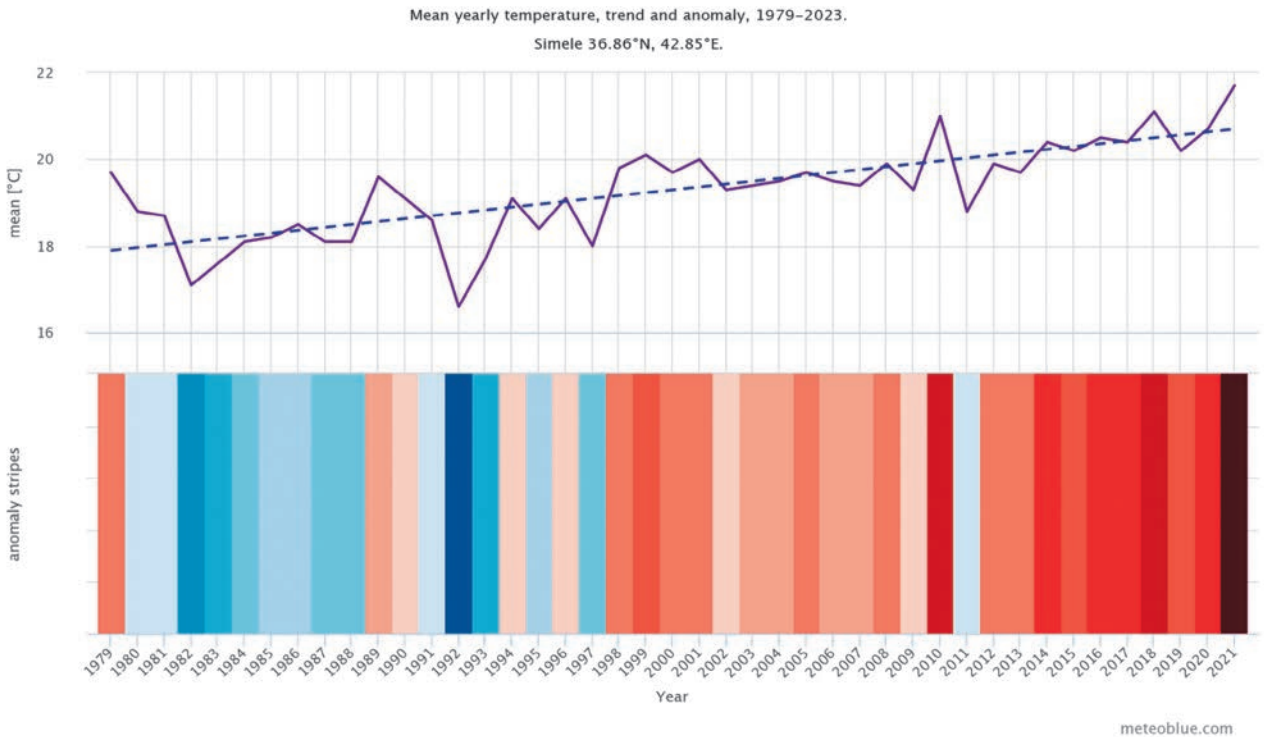

Figure 3: Mean yearly temperature, trend and anomaly, 1979-2023 in Sumel (36.86N, 42.85 E) (source: Meteoblue)

Similarly, the mean total precipitation shows a negative trend where conditions are becoming drier over time (Figure 4). The precipitation color stripes represent the total precipitation of a year (green for wetter and brown for drier years).[63]

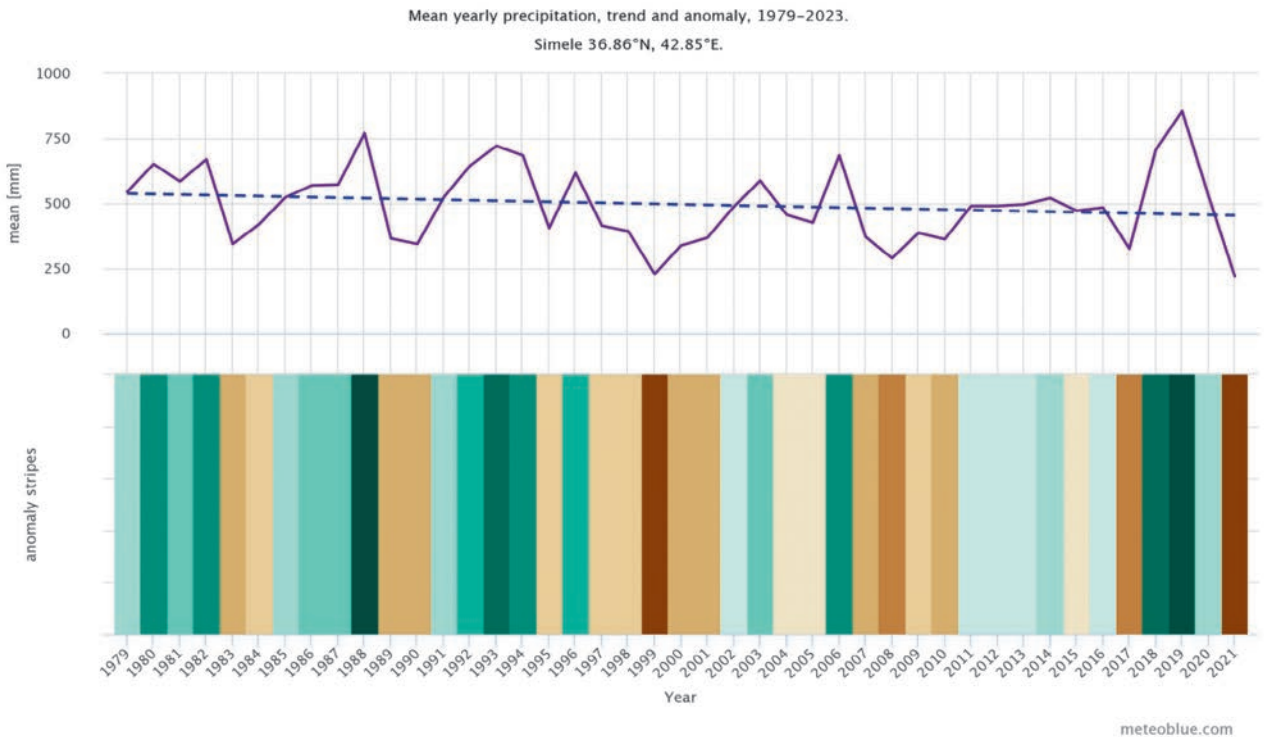

Figure 4: Mean yearly precipitation, trend and anomaly, 1979-2023 in Sumel (36.86N, 42.85 E) (source: Meteoblue)

63 Meteoblue. Simulated historical climate & weather data for Simele, Duhok, Iraq, (36.86°N 42.85°E, 463m asl). Accessed June 23, 2023

Also governmental reports have indicated that the annual rainfall rate in the Dohuk province has decreased within the past 15 years. A significant decrease in rainfall, particularly during the winter of 2017/2018, which was about one-third below average, resulted in an extremely dry summer in 2018.[64] Furthermore, the increasing drought episodes in Duhok Governorate (1998-2012) have reduced the water body surface area and decreased the precipitation averages.[65]

Box 1: KII description of Sumel District's climate change challenges

Sumel has experienced noticeable changes in climate over the past few years, particularly concerning precipitation patterns and temperature variations. These changes have been even more pronounced than anticipated, indicating the high impact of climate change in the area. Increased temperatures, reduction in the amount of rainfall, change in timing of rainfall, flash floods, proliferation of pests, soil degradation and sand and dust storms have all been attributed to climate change impacts.

Rising temperatures have had detrimental effects on agriculture, leading to heat stress in crops and livestock. Furthermore, the reduced availability of water resources due to decreased rainfall rates has impacted groundwater recharge, where a significant drop in the groundwater level is witnessed. In specific, the years 2014-2015 and 2020-2021 witnessed severe reduction in precipitation, highest temperatures and high evaporation from Duhok dam. Similarly, rainfall that arrived later than expected disrupted agricultural cycles and negatively impacted crop growth and yields. This delay in rainfall creates challenges for farmers who rely on specific seasonal patterns for planting and harvesting. The increased incidence of flash floods is also concerning as these sudden and intense floods have caused significant damage to agricultural lands, disrupted water availability and contributed to soil erosion. Moreover, the decreased infiltration rates have led to drying of soils and desertification, further jeopardizing agricultural productivity. The proliferation of pests, particularly the "suna," has further compounded the challenges faced by farmers. These pests have caused widespread destruction of agricultural crops, leading to further decrease in production and financial losses for farmers.

Agriculture and food production

Agricultural areas in Sumel District are dependent on rainfall, changes in precipitation patterns due to climate change highly impact food production and livelihoods. Dominant agricultural production in the area is devoted to wheat crops, with a varying productivity between years attributed to increased heat and reduced rainfall.[66] In recent years, some farmers have resorted to sprinkler irrigation. However, this method is not economically feasible for everyone and the water supply for proper irrigation is not available.[67]

64 ستراتيجية المياه والصرف الصحي لمحافظة دهوك 2018-2023

65 Heman Abdulkhaleq Gaznayee and Ayad M. Fadhil Al-Quraishi, 2020. Identifying Drought Status in Duhok Governorate (Iraqi Kurdistan Region) from 1998 through 2012 using Landsat TimeSeries Dataset. Journal of applied science and technology trends, 01(01): 17 –23

66 Umer, M.I., K.S. Nori and Z.S. Khaleel , 2022.

67 Umer, M.I., K.S. Nori and Z.S. Khaleel , 2022.

The interdependence of agriculture production and climatic conditions is apparent through the wide yearly fluctuation of cultivated areas. The largest cultivated area of wheat was recorded in the year 2019-2020, with a total area of 1,066,017 dunums.[68] The smallest cultivated area of wheat was recorded in the year 2009-2010, representing only 15% of the area cultivated in 2019-2020, followed by years 2011-2012 (17%), 2012-2013 (18%) and 2010-2011 (22%). The yearly fluctuation in cultivated areas is attributed to climatic conditions, especially drought conditions. [69] Severe droughts in 2022 resulted in the loss of around 80% of crops in the region. This has forced farmers to feed their cattle with composted chicken manure to prevent them from starving, which has raised serious concerns among locals.[70]

Furthermore, land use and land cover changes resulting from urbanization have displaced farmers and damaged their livelihoods.

Box 2: KII description of Sumel District's agriculture challenges

The Sumel Valley area is a fertile plateau rich in diverse agricultural activities, including crop production (wheat, barley, rice), fisheries, bee farming and cattle rearing. The availability of water for irrigation is crucial to support agricultural production in the area. While rainfall serves as the primary source of water (approximately 90% of agricultural areas are rainfed), the utilization of river tributaries for irrigation helps supplement water resources during drier periods. In addition, in some cases untreated wastewater has been used for irrigation.

In that regard, the agricultural sector in Sumel has faced numerous challenges impacting crop production and livelihoods of farmers. Over the past 4-5 years, prolonged periods of drought have caused reduced agricultural production and increased the prices of essential crops such as barley, wheat and animal fodder. This, in turn, has had a negative effect on the local markets, with the cost of meat and eggs skyrocketing (suggest use alternative to 'skyrocket'). However, the purchasing power of people in the region remained low, further exacerbating the economic strain on the community. Despite these challenges, the year 2023 has witnessed high rainfall, which has alleviated water access issues and supported agricultural activities. It should also be noted that when agricultural production increases, prices tend to decrease, impacting farmers' profitability and their ability to cover their costs. Further, the karstic soil type prevalent in the area requires significant amounts of fertilizer and pesticide for optimal cultivation which adds to the financial burdens faced by farmers.

Agriculture workers face a set of challenges related to the high costs of agriculture, including fertilizers, pesticides, seeds, animal fodder, greenhouses and transportation costs. Additionally, poverty in the area prevents them from investing in agriculture. Due to urbanization, many farmers have reported that they were not adequately compensated for the loss of their agricultural lands, exacerbating the economic hardships they face.

68 1 dunum = 1000 square meter

69 Umer, M.I., K.S. Nori and Z.S.Khaleel , 2022.

70 Rudaw 2022. Lack of pasture for animals forces farmers to feed sheep with chicken manure.

Water and sanitation

Dohuk governorate is increasingly experiencing water scarcity or water stress conditions. The reduction in flow of the Tigris and Euphrates rivers is expected to decrease further due to the drought affecting the region, as well as the construction of dams by neighboring countries.[71] Reports indicate that the Tigris and Euphrates rivers which are two of the biggest water resources of the country may dry up by the year 2040. As such, tensions and conflicts over water distribution, allocation and priorities are likely to increase as water is a key factor for stability and security.[72]

Box 3: KII description of Sumel District's water and sanitation challenges

Due to water scarcity issues and increased demand over water resources, the authorities have in some cases allowed groundwater access in the area. Although this increases water for irrigation, it is feared to have negative impacts on the area hydrology due to overexploitation. Urbanization and loss of agricultural land has also impacted the hydrology of the area reducing infiltration rates. The construction of airports, malls and markets in previously agricultural zones has increased water stress and decreased groundwater recharge. Further, although a wastewater treatment plant is available, concerns arise especially as it does not cover the whole area. In some cases, trucks transport wastewater to the treatment plant.

The water crisis is aggravated by financing and governance issues, weak infrastructure and insufficient sector coordination and collaboration.[73] The per capita water consumption in different parts of the KRI region ranges from 350 to 550 liters per day. Distribution network losses reach 50-60% due to leakage or illegal connections to the public network. By 2023, water usage was estimated to increase significantly by 15.8% in total due to population change.[74] In Sumel District, average annual water consumption in 2018 was around 41 million m3 and was estimated to increase to 47 million m3 by 2023 if all IDPs remained. If the current supply rate is maintained, the water supply deficit by 2023 would be more than 2000 m3 per day, considering only population growth.[75] Furthermore, industrial and agricultural activities, along with overexploitation and misuse, have put scarce water resources in a critical condition. The IDPs and refugees have further exacerbated the water scarcity situation. Despite recent improvements in water infrastructure, the quality of services remains poor in terms of service continuity, adequate clean water pressure and access to clean water. [76]

Even though groundwater constitutes most water supplies, no serious measures have been taken to investigate and scientifically research the quantity and condition of groundwater reserves in KRI. There are also neither actions taken to close unlicensed wells nor even reliable statistics on the number of licensed wells.[77]

71 Duhok Water and Sanitation Strategy 2018-2023 [Online] https://dwod-dhk.org/wp-content/uploads/2020/10/Water-Strategy-in-Arabic.pdf
72 *Ibid*
73 *Ibid*
74 *Ibid*
75 *Ibid*
76 *Ibid*
77 *Ibid*

Environmental degradation

Environmental degradation in general increases the sensitivity of an area to climate change and reduces adaptive capacities of the population. The agricultural lands in Sumel require the use of various pesticides and fertilizers. These chemicals pose numerous environmental problems, contributing to soil and water pollution.[78] The excessive use of the Urea fertilizer (46% Nitrogen) by farmers in the region has led to significant environmental contamination, especially water contamination resulting from the ammonia volatilization in summer and nitrous oxide emission in winter. Additionally, significant impact on groundwater pollution is witnessed due to its conversion into nitrates. Most herbicides and diseases used by farmers accumulate in the soil year after year, adversely affecting beneficial organisms in the soil such as insects and bacteria and may even affect the food safety of people.[79] As water availability is measured in quantity and quality, a reduction in water quality also reduces water availability.

In addition, there are more than 900 industrial units in the Sumel District that include construction, food, plastics, oil, electricity and metalwork, among others. A study on the social impacts resulting from industrial activity found that the industrial pollution had a significant effect including pollution of external environments, damage to cleanliness and hygiene standards and the increased desire to relocate to a different residence.[80]

Box 4: KII description of Sumel District's environmental challenges

Sumel suffers from environmental degradation and pollution mainly caused by the surrounding industries. The lack of monitoring in these industries, particularly the petroleum refining and leather industries, has resulted in the release of harmful effluents containing carcinogenic chemicals. This pollution has affected the air, water and soil in the area. The death of fish in Mosul Dam has indicated the severe contamination of water bodies. Groundwater testing has revealed that groundwater in Sumel is contaminated with petrol. Efforts have been made by the government to address the pollution issues, particularly in the surrounding areas of Sumel where industries are located, such as Kashi. There are also challenges related to solid waste management, with wastes accumulating in certain areas and releasing liquids.

Sumel's current state of environmental degradation is also reflected in the lack of greenery (less than 5% greenery). This deficiency in vegetation has had a considerable impact on climate change and the overall ecological balance in the region. The area has also witnessed fires due to people discarding cigarettes and glass, which have induced spread of fires particularly when accompanied by increased wind speed.

78 Khalil, J.S., & Hasam, I.K. 2017

79 Khalil, J.S., & Hasam, I.K. 2017.

80 Khalil, J.S., & Hasam, I.K. 2017.

Sumel as a hosting community

"It is true that some people are not only displaced due to war and instability but also because of droughts in their AOOs. Lately, the Sumel situation has worsened due to overexploitation, pollution and the impacts of climate change. This may lead the host communities to become IDPs themselves."[81]

Based on the IOM displacement tracking matrix[82], more than 138,500 IDPs are still living in Sumel[83] (Table 2). Prior to 2019, there were 27 camps, with 23 of them designated for IDPs[84]. However, after 2019, the number of camps decreased to 20, with 15 of them being for IDPs.[85]

Total number of IDPs	Individuals	138,559
New arrivals	Individuals arriving from other location of displacement	65
	Individuals arriving from their AOO	543
Shelter type	Camp	71,725
	Own Property	5,592
	Apartment/House (not owned) (habitable)	44,880
	Tent/Caravan/makeshift shelter/mud or block house	10,722
	Unfinished/Abandoned building	5,640
AOO	Anbar	6
	Baghdad	60
	Kirkuk	6
	Ninewa	138,469
	Salah al-Din	18

Table 2: Sumel District IDP data (Source: DTM : IDP Master List 30-04-2023)

Table 2 shows that most IDPs come from Ninewa. The DTM has been tracking climate-induced displacement in Ninewa since June 2021. It shows that low rainfall was the major cause of displacement of returnee families as it impacted their ability to provide fodder for livestock.[86]

81 KII

82 Since 2014, IOM Displacement Tracking Matrix (DTM) unit in Iraq has collected information on IDPs and returnees using a network of key informants across the country. Master List data are collected continuously and reported on a quarterly basis. Data for this round were collected from 1 October to 31 December 2022.

83 IOM Displacement Tracking Matrix (DTM) Dataset Round 129, covering the months of January, February, March and April 2023

84 Remaining were Syrian refugees.

85 KI Camp Manager

86 DTM, 2021. Climate-Induced Displacement – Ninewa

Box 5: KII description of Sumel District's challenges as a host community

From the beginning, the host community has shown great generosity by accepting the IDPs as their families and providing them with shelter in their houses, schools and religious spaces. However, the increase in the number of camps and the influx of IDPs in Sumel has put a strain on the available resources and services in the area. The fact remains that the number of IDPs is significantly high, reaching 1.4 to 2 times the number of the host community. This has led to further division of already limited resources and services, particularly in terms of water availability.

Many of the IDPs have expertise in agriculture work from their AOO. As such, many work as daily wage laborers in the agricultural sector and have transferred their expertise to the host community. In some cases, IDPs rented and cultivated lands which increased agricultural production. Nonetheless, the high number of IDPs and camps has caused economic stresses, including limited access to water, reduced work opportunities and fewer hours of electricity supply.

KIs also reported that due to the insufficient infrastructure to transfer water from Mosul Dam or the tributaries of the Tigris River, groundwater wells were dug specifically for a few camps. Unfortunately, this has resulted in a reduction of water resources available to the host community. Moreover, the water level in the wells has been decreasing due to minimal recharge from precipitation, exacerbating the water scarcity issue. In other camps, water tankers have been used to provide access to clean water. Regarding wastewater management in the camps, there are no septic tanks available. The German Development Agency (GIZ) has built a wastewater treatment plant in one camp (Kaparto) to treat and reuse the wastewater for irrigation purposes. In other camps, wastewater and industrial sludge (fuel oil) are transported in trucks for treatment on a daily basis.

Although no major tensions have been reported between the host community and the IDPs, KIs indicated that minor tensions arise from concerns that resources, including electricity and water, are unequally divided between the host communities and IDPs. For instance, organizations supporting IDPs in agricultural activities within the camps have been utilizing drinking water. This has led to water shortage in the host community area reaching several days at a time. This situation has inconvenienced the host communities, forcing them to stay up all night to access water for essential tasks such as cleaning and cooking. Minor tensions also arise between the IDPs and local authorities, particularly due to water scarcity resulting from decreased water levels in the wells. However, no visible implementation of solutions to facilitate peaceful coexistence has been observed. Indeed, political conflicts have had an impact on the financial balances that were supposed to be received.

3.1.2. Qualitative Vulnerability Index for Sumel

Agriculture and food production, water and sanitation services, environmental conditions as well as increased socioeconomic stressors are prominent issues that need to be addressed to ensure the well-being of a community to host IDPs under changing climate conditions. Based on the descriptive analysis of the identified indicators (section 3.2.1), the indicators were rated (high, medium, low) and scored (3,2,1). For this initial exercise, indicators were given equal weights.

- Exposure indicators: red refers to high exposure (score 3), orange refers to medium exposure (score 2) and green refers to low exposure (score 1).
- Sensitivity indicators: red refers to high sensitivity (score 3), orange refers to medium sensitivity (score 2) and green refers to low sensitivity (score 1).
- Adaptive capacity: red refers to low adaptive capacity (score 3), orange refers to medium adaptive capacity (score 2) and green refers to high adaptive capacity (score 1).

Exposure Indicators	High	Medium	Low
Change in temperature			
Change in rainfall timing			
Change in rainfall intensity			
Drought index			
Frequency of sand and dust storms			
Flood index			
Sensitivity Indicators	**High**	**Medium**	**Low**
Number of Refugees			
Number of open waste dumps			
Degree of urbanization			
Number of Industries			
Land degradation			
Degree of pollution due to fertilizer and pesticides			
Area covered by water bodies			
Number of groundwater wells			
Soil degradation			
Livestock density			
Adaptive Capacity Indicators	**High**	**Medium**	**Low**
Road network			
Water network			
Wastewater Network			
Number of education centers			
Access to water and sanitation services			
Agriculture extension services			
Irrigation network			
Access to electricity			

Table 3: Rating of exposure, sensitivity and adaptive capacity indicators

To determine the vulnerability index, values were normalized such that 0 is least vulnerable and 1 is most vulnerable. **The vulnerability index of Sumel was thus calculated to be 0.67 indicating higher vulnerability than average (0.5).**

The 0.67 vulnerability index is representative of the situation in Sumel District that suffers from higher sensitivity to climate change and lower adaptive capacity. Such high vulnerability is worrisome especially as the area hosts a large number of IDPs. For instance, the high susceptibility to climate change impacts such as extreme weather events can strain the area's resources, including emergency response capabilities, infrastructure and essential services. It also has detrimental impacts on the area's economic capacity and ability to recover. In turn, this adds pressure to the ability of Sumel to accommodate IDPs and may pose health and safety risks to residents and IDPs. **In that sense, more targeted efforts are required for the area to increase its resilience to climate change in terms of adaptation.**

3.2 Perception on climate change and migration patterns

To address the second objective on identifying perceptions, trends, patterns and correlations between climate change and migration, a total of 1,024 questionnaires were administered to IDPs in the Sumel District. Respondents were identified through existing Harikar networks. Data collection took place between 11 and 22 June 2023 through face to face interviews conducted by Harikar enumerators. The questionaire constituted of a combination of close and open questions that aimed at understanding migration patterns and assessing whether perceptions of climate change is a driving force that either enhance or inhibit IDP return to their AOO. Despite the relatively large number of interviews, there is also a relatively large number of IDPs in Iraq. As such, the findings from the interviews should be interpreted as indicative rather than statistically generalisable to the assessed area.

3.2.1 Sample Description

A total of 1,024 IDPs were interviewed of which 52% were males and 48% females. Around 11% of the interviewed IDPS represented women headed households. Most interviewees (around 75%) had an age range between 25 and 55 and 83% were married. Around 50% of the interviewees had more than 4 children (Figure 5)

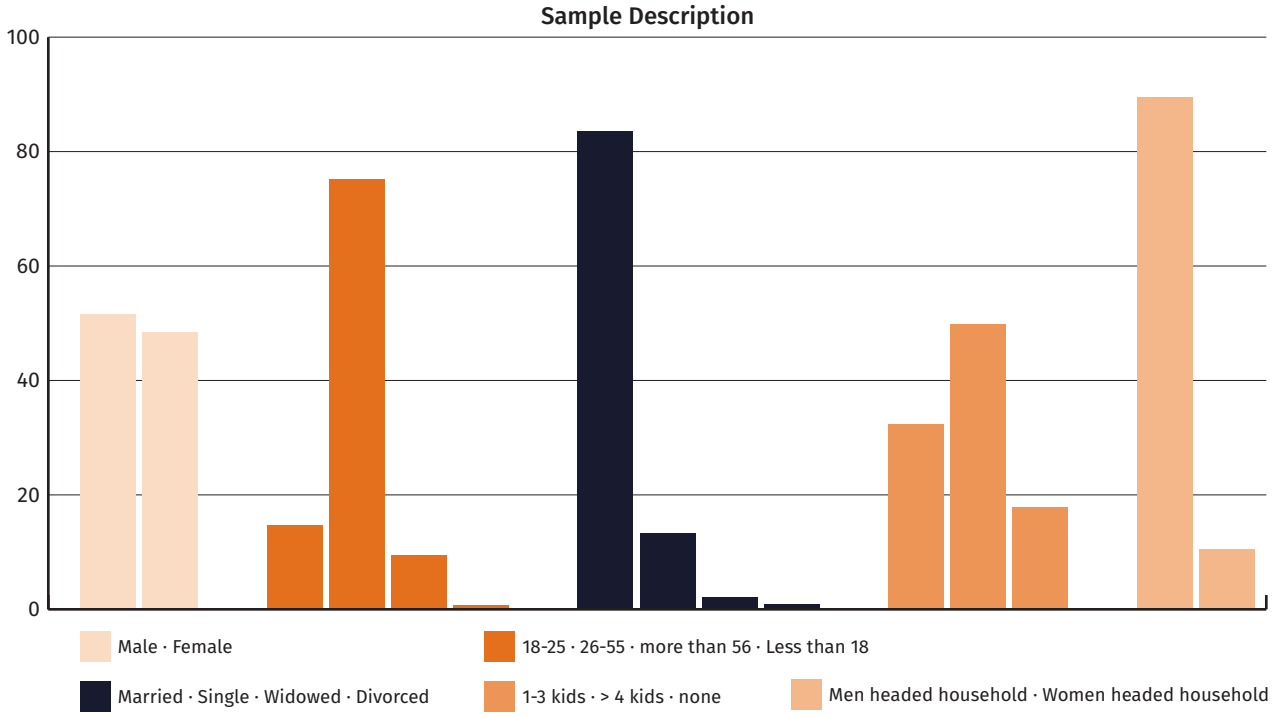

Figure 5: Sample description, grouped by gender, age, marital status, number of dependents, and head of the household

Ninewa was reported to be the AOO for 98% of interviewed IDPs of which 92.5% were from Sinjar while the others were distributed between Albaaj (6.4%), Telafir (0.5%), Almosil (0.3%), Alhamdania (0.1%) Alhadr (0.1%) and Mkhmoor (0.1%). The remaining 2% were from Alkadsiya, Duhok, Karkook, Najaf and Wasit.

Around 97% of IDPs from Ninewa were displaced in 2014, of which 90 people were returnees from Sinjar – they returned to their AOO Sinjar but were displaced again and returned to Sumel.

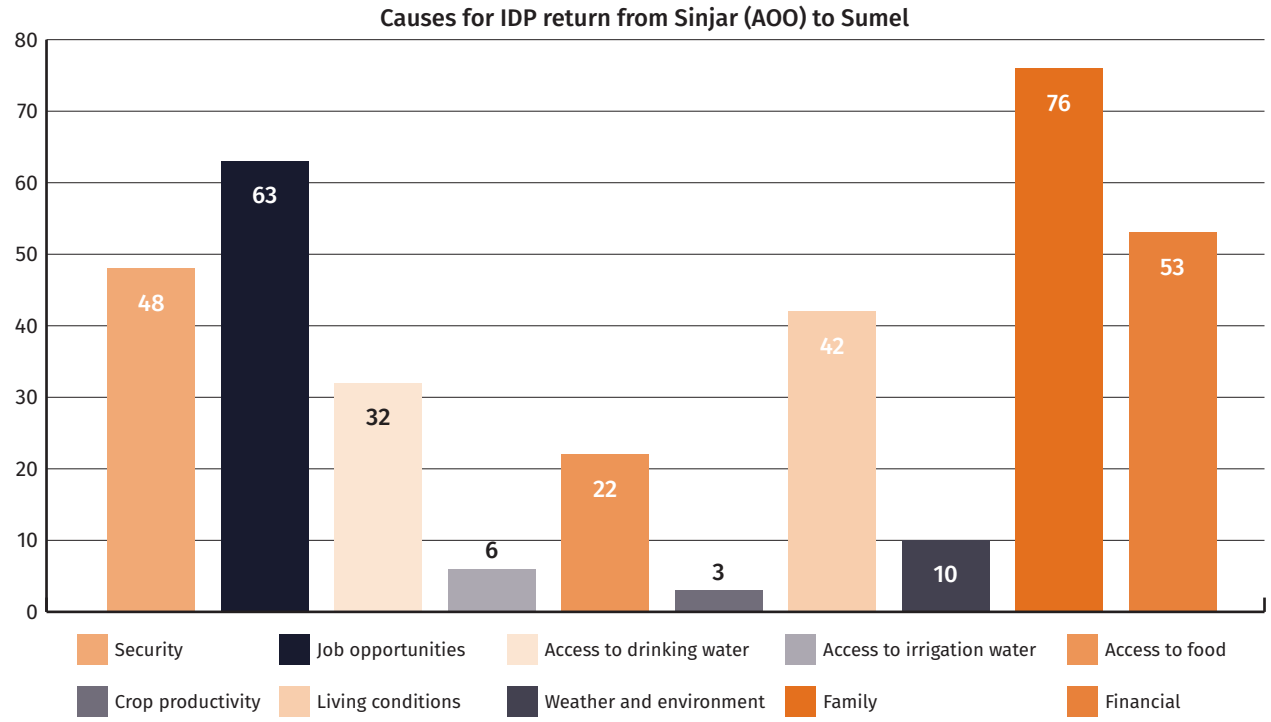

Figure 6: Causes for IDP return from Sinjar (AOO) to Sumel

The top four reasons for returning to Sumel were related to family, job opportunities, security and living conditions. **Nonetheless, it could be noted that concern over weather and environment are arising within the IDP population as 10% reported that weather and environment were contributing factors to their return.**

Around 93% of interviewed IDPs indicated that they were permanently displaced whereas others indicated that their displacement is seasonal, referring to reasons such as working in agriculture, visiting and other work.

3.2.2 Prior to displacement

Prior to displacement, the main source of income in AOO was from temporary jobs (labor in a daily job) (41%) followed by agriculture and livestock activities (29%). Others stated government salary, retirement (14%), private sector job and nongovernmental (trade, private business) jobs (12%), among others.

Of the total IDPs interviewed, 91% indicated that they have noticed changes in weather conditions in their AOO. Sandstorms (32%), temperature changes (27%) and droughts (23%) were especially highlighted as shown in Figure 7. Similarly, **74 % indicated that they have noticed environmental changes in their AOO prior to displacement,** especially land use changes (25%), water pollution (23%) and deforestation (22%) (Figure 8).

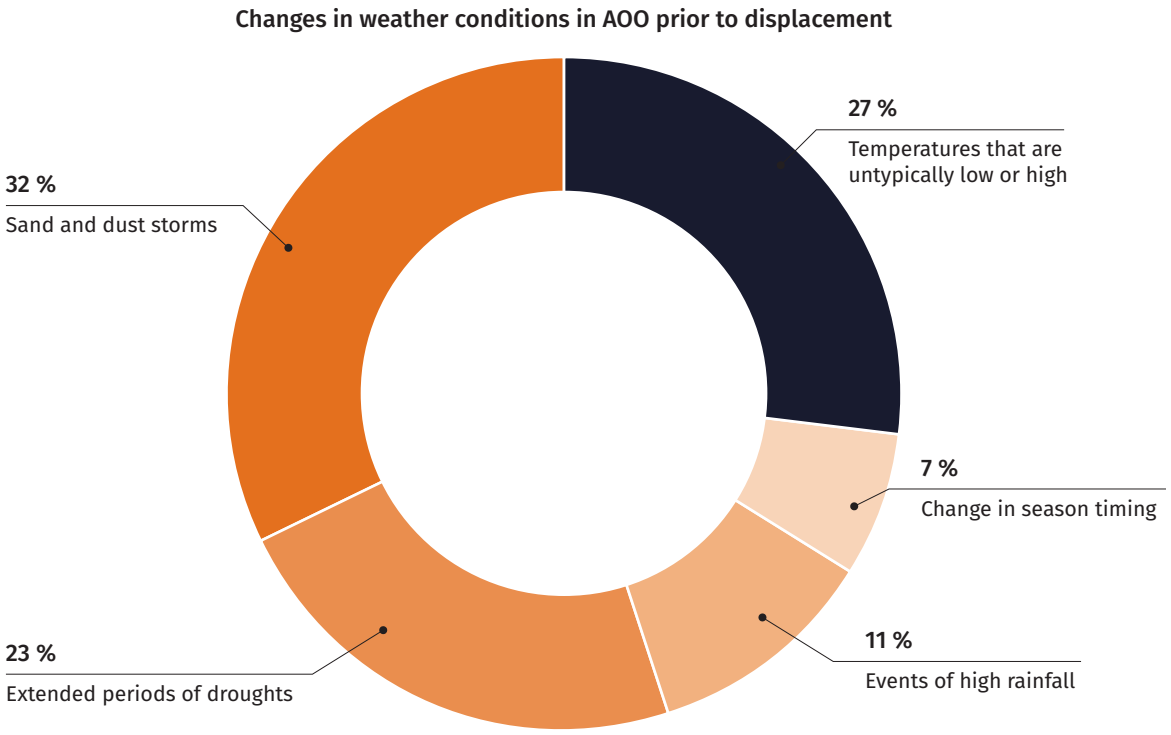

Figure 7: Changes in weather conditions in AOO prior to displacement

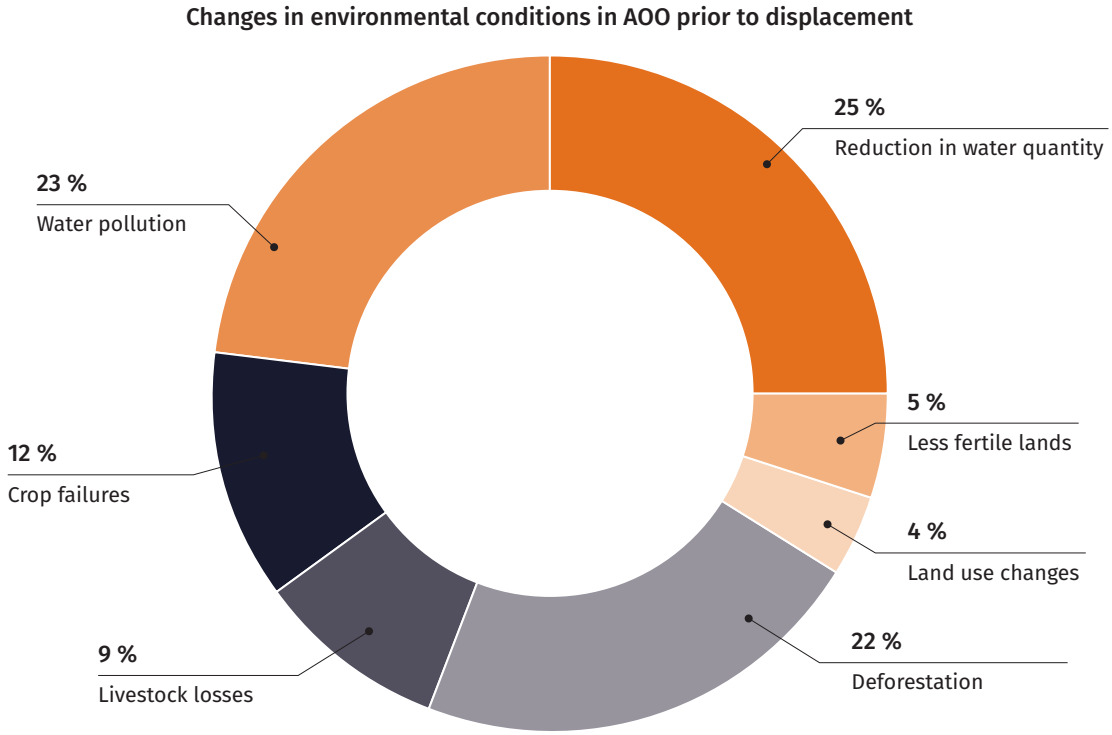

Figure 8: Changes in environmental conditions in AOO prior to displacement

80% of IDPs indicated that they had problems in accessing water in their AOO. In these cases, the majority said that they bought water whereas others indicated that they either dug wells, drank contaminated water and/or transported/received water from neighbors or other areas.

IDPs were asked to order the challenges faced in their AOO (Figure 9). Lack of livelihood opportunities (45%) was the dominant first challenge whereas security challenges were reported by less than 14%. The dominant second challenge faced was worsening living conditions (30%), lack of livelihood opportunities (27%) and limited access to drinking and domestic water (24%). Living conditions (31%) and limited access to drinking and domestic water (20%) were the third dominant challenges. Interestingly, the dominant fourth challenge was change in weather conditions (28%). It is apparent that even before displacement, the changing weather conditions have been a challenge.

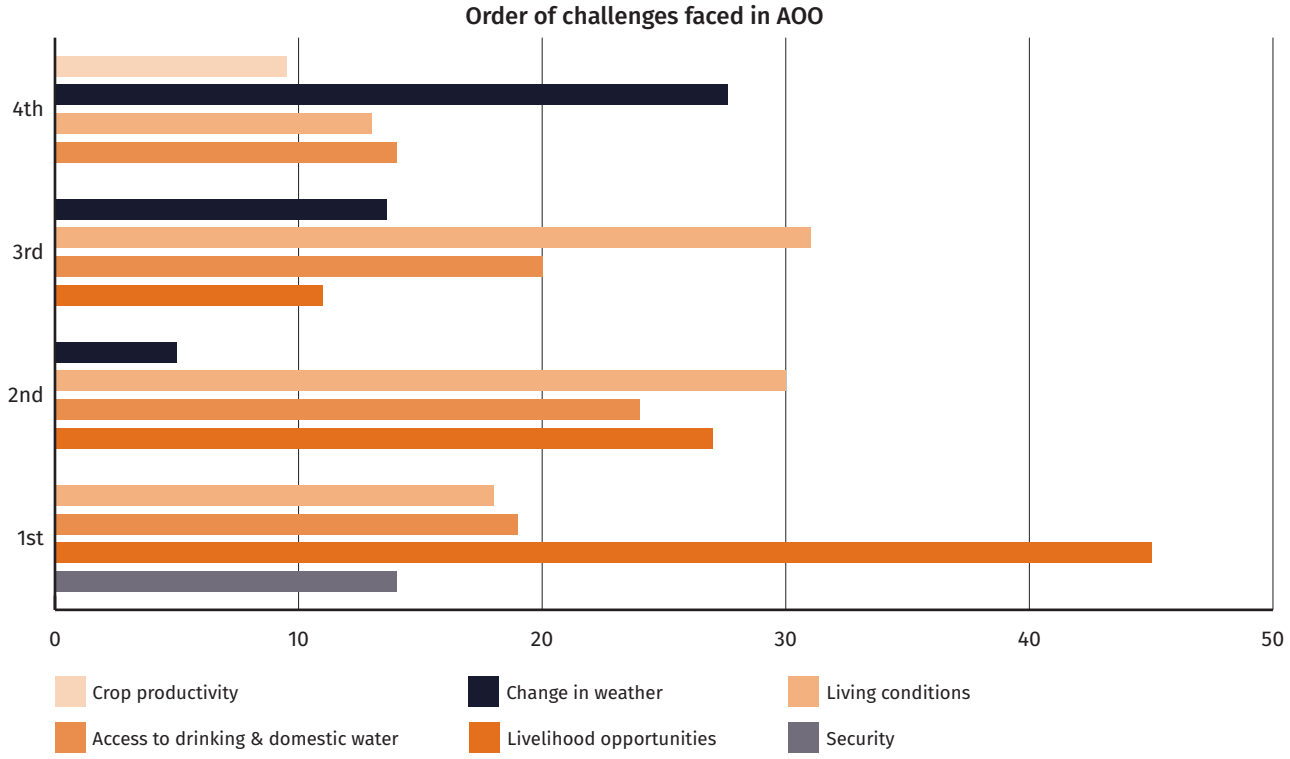

Figure 9: Order of challenges faced in AOO

Around 47% of IDPs had a family member involved in agriculture, farming, livestock or related activity. Of these, **76% indicated that they were challenged by droughts, 63% challenged by extreme winds and storms and 59% by pest or locus infestation** (Figure 10). Indeed, 41% of those involved in agriculture activities indicated that the magnitude of losses engendered by these changes were more than 50%. They indicated that the major measures taken to address these challenges were shifting to other crops (45%), finding other sources for water (35%) and finding alternate sources of income (23%), replacing/selling livestock (20%) **and even migrating (11%).** Indeed, 64% of IDPs interviewed indicated that migration alleviated the issues they were experiencing in their AOO. Nonetheless, it should be noted that the main reason that pushed IDPs to migrate from AOO in the first place was war and political instability (93%), followed by loss of job opportunities (48%), reduced access to services (35%) and food insecurity (22%).

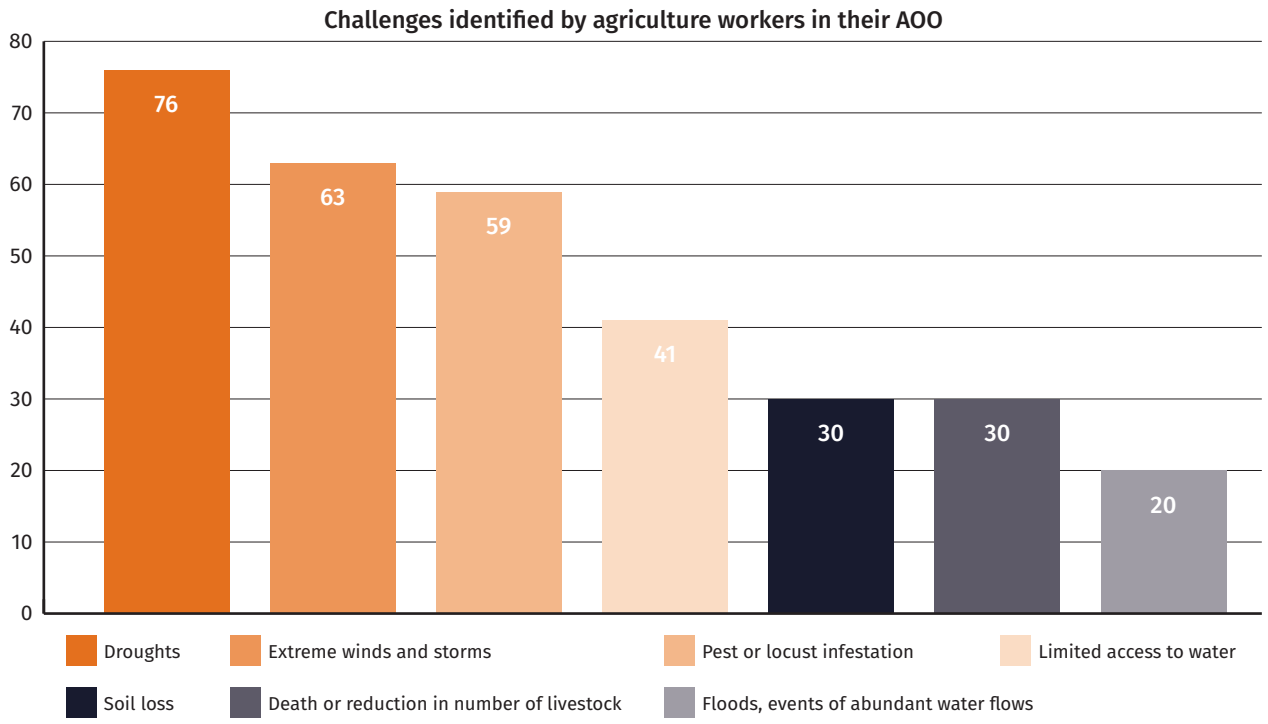

Figure 10: Challenges identified by agriculture workers in their AOO

3.2.3 Conditions in Sumel

When asked why Sumel District was chosen by IDPs as their area of destination, the first dominant reason was due to the security situation (52%), the second and third dominant reasons were better services and the fourth dominant reason was availability of natural resources like land and water (19%). **Indeed, 36% of IDPs selected availability of natural resources (land and water) as one of the reasons for choosing Sumel District**.

Around 67% of the total IDPs interviewed indicated that they also noticed changes in weather condition in Sumel since their displacement in 2014. This included temperature changes (31%) and sand and dust storms (31%). Although at this point of the survey the term climate change was not introduced, it was interesting to see that a considerable amount of IDPS referenced indirectly climate change through weather changes.

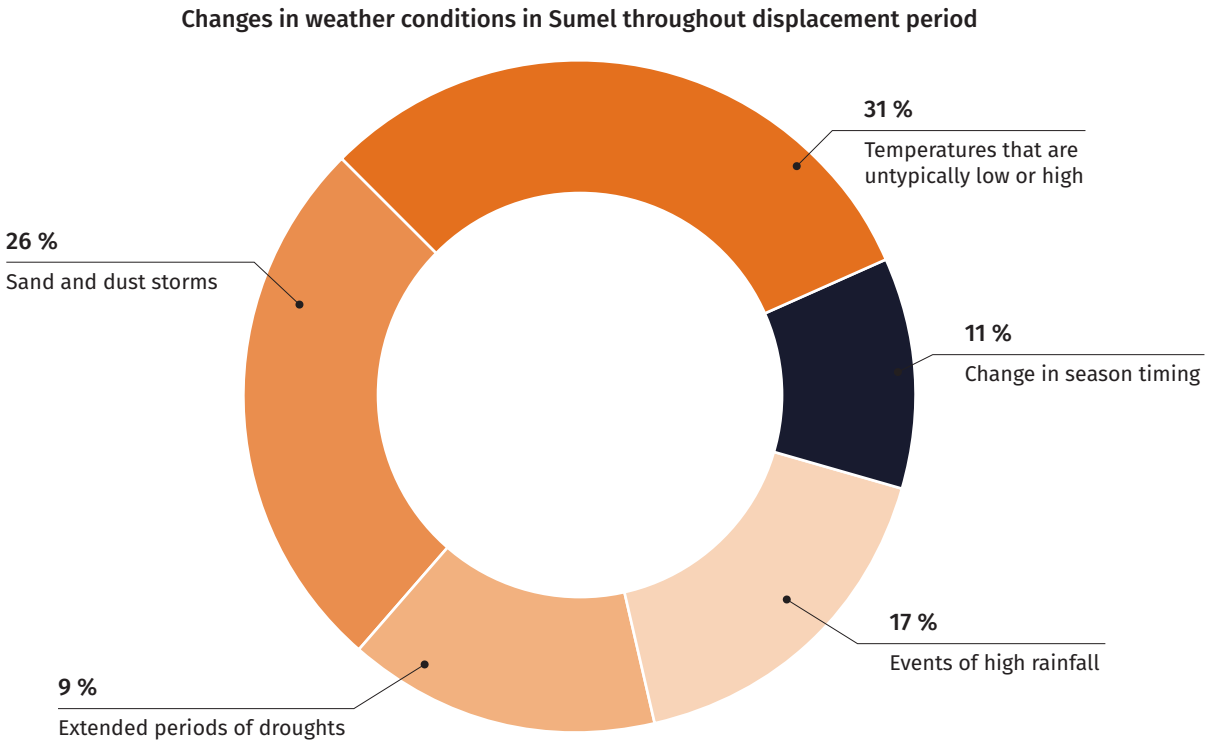

Figure 11: Changes in weather conditions in Sumel throughout displacement period

Similarly, **49% indicated that they have noticed environmental changes in Sumel since their displacement in 2014,** especially in the reduction of water quantity (36%) and water pollution (29%) (Figure 12)

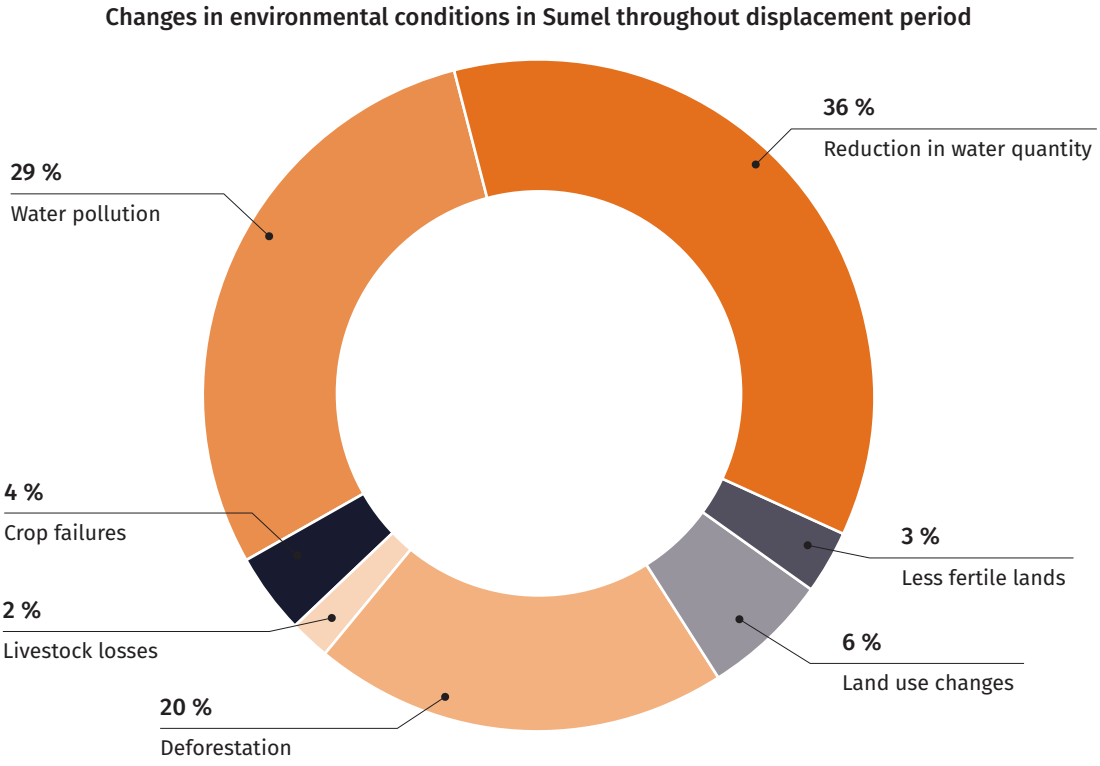

Figure 12: Changes in environmental conditions in Sumel throughout displacement period

Only 15% of the interviewed IDPs indicated that they are involved in agriculture, farming, livestock and related activities. Nevertheless, they still **indicated that their daily activities were challenged by episodes of extreme/unusual droughts (45%), pest or locust infestation (44%), extreme winds and storms (40%) and access to water (36%)**. Indeed, 47% indicated that the magnitude of losses engendered by these changes was between 30-50%. Still, only 62% of IDPs indicated that they face challenges of which the dominant challenge was fewer working opportunities (50%).

Box 6: Some highlights from Khanki camp (source: KII)

Khanki camp, which is home to 25,000 IDPs, has a population size similar to that of the host community nearby. The camp receives water through infrastructure, originating from the Mosul Dam. Although the year 2023 has seen good rainfall, there were previous instances where people did not receive water for up to 7 days. To prepare for drought years, both the IDPs and the host population store food, particularly barley and wheat. Most IDPs in Khanki camp work in the agriculture field. They often leave the camp to work in other areas such as Shekhan, Duhok and Erbil for around 3 months before returning to the camp. This migration occurs because Khanki does not have access to groundwater. Despite digging a well to a depth of 220 meters, water has not been obtained. Therefore, families leave the camp, including women, men and children, to engage in agricultural work and they return to the camp afterward. IDPs in the camp are highly aware of the changes in climate, which have significantly impacted their agricultural yields. The heavy reliance on rainfed agriculture in Khanki makes the community vulnerable to climate variations. Insufficient rainfall directly translates to poor yields and can significantly impact the livelihoods and food security of both the IDPs and the host population in the camp.

3.2.4 Return to AOO

When asked about whether they consider returning to their AOO, 44% said they do not. **The first dominant reason they attributed their decision to is security and political stability (70%),** second and third dominant reason is living conditions (36% and 33% respectively) and fourth being both, family and friends (21%) and financial reasons (21%).

Only 17% of those who responded with "no" did not indicate that weather conditions played a role in their decision.

Indeed, **out of the total people who said they do not consider going back to their AOO, 60% said they will or may return permanently to their AOO if they could sustain their agricultural livelihood (sufficient land, water, seeds).**

The 56% who said they would consider returning to their AOO indicated that the first dominant reason was security and political stability (32%), living conditions (38%), working conditions (25%) and financial reasons (23%). **Only 23% of those who responded yes indicated that weather conditions played a role in their decision.**

Out of the total IDPs interviewed, 72% said they will or may return permanently to their AOO if they could sustain their agricultural livelihood (sufficient land, water, seeds). Nonetheless, 23% reported that people in their AOO are not receiving any support and 40% indicated that they are receiving support, but it is not enough. When asked about their source of information, 70% indicated it was from friends (Figure 13)

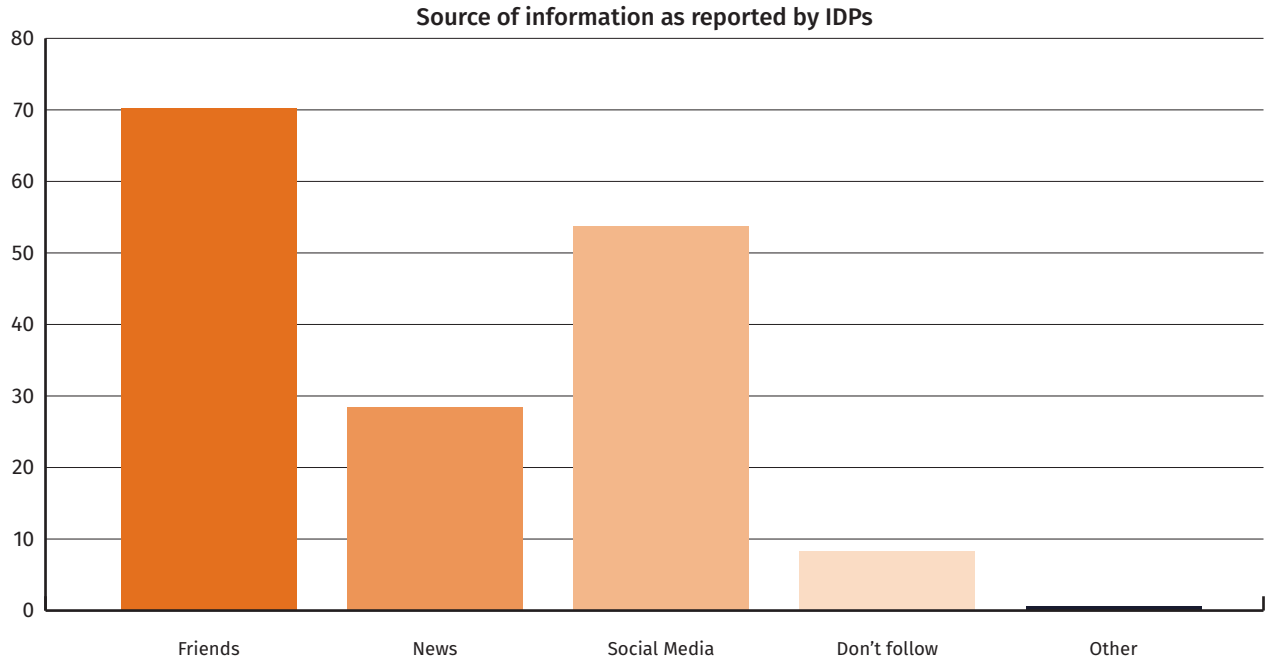

Figure 13: Source of information as reported by IDPs

In case they return to AOO, 51% reported that they expect weather and environmental changes to impact their source of income and 19% did not know. Around 66% indicated that they will have problems accessing drinking and domestic water in case they return and 15% did not know.

3.2.5 Climate Change Familiarity

To maintain neutrality of the questionnaire, the term climate change was not introduced until this last section. In this section interviewees were asked about their familiarity with the term. Only 34% of IDPs indicated that they were familiar with the term climate change. Of these, 43% indicated that climate change related factors threaten their ability to go back to AOO and 8% said it partially does. Less than 8% indicated that they have heard of the term but do not know what it means.

Furthermore, **of the total IDPs who indicated familiarity with climate change term, 37 % indicated that climate change will influence their decision to return to AOO**. Around 85 % of IDPs indicated that there is a need for increased awareness and understanding of climate change among IDPs. The results show that indeed there is a critical need to increase awareness about climate change and its impacts among IDP communities.