



Crop Monitoring and Food Security Situation Report

Wheat and Barley

Table of Contents

TABLE OF CONTENTS	1
LIST OF FIGURES	2
EXECUTIVE SUMMARY	3
INTRODUCTION	4
STUDY OBJECTIVES	5
METHODOLOGY	6
FARMERS SELECTION CRITERIA	6
BACKGROUND AND CONTEXT	7
AGRO-ECOLOGICAL ZONES IN SYRIA	7
SEASONAL RAINFALL	9
SYRIAN POUND EXCHANGE RATE	11
PRODUCTION AND HARVEST	12
ACCESS TO AGRICULTURAL INPUTS	12
WATER SOURCES AND IRRIGATION PRACTICES	13
ROLE OF FUEL IN PRODUCTION	14
HARVESTED WHEAT GRAIN IN NES	15
POST-HARVEST LOSSES AND STORAGE	18
ROLE OF NORTHEAST SYRIA LOCAL AUTHORITIES IN ENHANCING AGRICULTURAL RESILIENCE	19
IMPACT OF CLIMATE SHOCKS	20
OVERVIEW OF CLIMATE SHOCKS IN NES	20
ADAPTATION STRATEGIES	21
SUPPORT OF NES AGRICULTURAL INSTITUTIONS IN ENHANCING CLIMATE RESILIENCE	23
ROLE OF NES LOCAL AUTHORITIES IN MITIGATING CLIMATE CHALLENGES	23

ASSESSING FOOD SECURITY CONTEXT	24
PREVALENCE OF FOOD INSECURITY	24
ROLE OF WHEAT AND BARLEY IN LOCAL FOOD SECURITY	25
ROLE OF NES LOCAL AUTHORITIES IN MITIGATING FOOD SECURITY CHALLENGES	26
MARKET DYNAMICS AND IMPORT IMPACT	26
CURRENT STATE OF THE MARKET	26
DEMAND, SUPPLY AND PRICE TREND	27
ROLE OF IMPORTED GRAINS	28
ROLE OF NES LOCAL AUTHORITIES IN SUPPORTING WHEAT AND BARLEY VALUE CHAIN	29
FUTURE OUTLOOK	29
FUTURE OF THE WHEAT AND BARLEY VALUE CHAIN	29
NORTHEAST SYRIA AGRICULTURAL CONTRIBUTIONS	30
MAIN CHALLENGES FACED WHEAT AND BARELY PRODUCTIVITY	32
RECOMMENDATIONS	35
REFERENCES	35

List of Figures

Figure 1: Map of Agro-ecological zones in Northeast Syria	8
Figure 2: Percentage Change in Winter Growing Season (Sep-Apr) Rainfall Totals in Northeast Syria by District, 2018-2023	10
Figure 3: Average SYP Exchange Rate against USD (Jan 2022 - July 2023)	11
Figure 4: Challenges in Obtaining Fuel for Wheat and Barley Cultivation	14
Figure 5: Percentage difference between April 2022 and April 2023 total irrigated land area	15
Figure 6: Total irrigated land area per governorate in Northeast Syria in April (hectares)	16
Figure 7: Comparative NDVI Maps represent the total area in April from 2018-2023	17
Figure 8: Map of Climate Shocks Damage Areas	21
Figure 9: Use of Climate Smart Agriculture Practices - Per Governorate	22
Figure 10: Challenges in Improving Harvest for Wheat and Barley Cultivation	32
Figure 11: Syria Conflict, October 2023	34

EXECUTIVE SUMMARY

Northeast Syria (NES) faces multifaceted challenges in wheat and barley production, exacerbated by ongoing crises and climate shocks. The primary concerns revolve around the accessibility and affordability of agricultural inputs, notably fuel and fertilizer. A constrained access to the former burdens farmers and hinders sustainable practices. Furthermore, water scarcity remains a critical issue, necessitating modern irrigation methods for effective crop growth. Challenges in accessing high-quality seeds and harvesting equipment impact crop yields and labor efficiency during harvest.

This comprehensive report engaged local stakeholders, including farmers, through focus group discussions and consulted key informants and local authorities to identify these challenges. The study's holistic approach ensures that proposed interventions are well-informed and tailored to the specific needs of NES's farming community.

To address these challenges and improve food security in the region, targeted interventions are required. Additionally, the study emphasizes the role of the Agriculture Authority in supporting NES's agricultural sector through comprehensive plans and collaboration with local stakeholders.

By strengthening agriculture in NES, the overall food security situation in Syria can be enhanced, contributing to the well-being and stability of the entire nation. This report offers insights and recommendations for policymakers and humanitarian organizations to design effective measures to support Northeast Syria farmers, mitigate the impact of shocks, and alleviate food insecurity.

INTRODUCTION

Northeast Syria (NES) has a long-standing history as a vital region for wheat and barley crop production, playing a crucial role in ensuring the country's food security. (1) However, the agricultural sector in Northeast Syria has encountered significant disruptions due to the ongoing crisis and a series of other challenges.

In response to the pressing food security situation and the need to comprehend the current status of wheat and barley crops, IMMAP conducted a comprehensive Crop Monitoring and Food Security Situation Update report in coordination with the Food Security and Livelihood (FSL) Working Group in Northeast Syria. The primary objective of this study is to assess the impact of various shocks on wheat and barley cultivation in NES, including wildfires, droughts, and the scarcity of water resources. These challenges, coupled with the persisting issues caused by the armed conflict, such as fuel scarcity and unavailability of production inputs, have created an intricate web of obstacles for farmers in the region. Adding to these difficulties, Syria's economy has experienced rapid deterioration since the beginning of the year, with the situation further escalating following the devastating earthquakes that struck in February 2023. Consequently, the Syrian pound has experienced a significant depreciation, leading to rising levels of food insecurity, and exacerbating the already difficult living conditions for the population. According to the World Food Program (WFP) (2), food prices in Syria have surged dramatically, witnessing an astonishing increase of 532% between 2020 and 2022. This surge in food prices has not only burdened farmers but has also intensified the population's food insecurity across the Northeast Syria region.

To address these multifaceted challenges and identify potential solutions, this study primarily focused on conducting qualitative assessments through engaging focus group discussions with wheat and barley farmers. Additionally, key informants and local authorities were also consulted to gain valuable insights into the current situation on the ground. By understanding the unique challenges faced by farmers amidst the wildfires, droughts, and economic struggles, the report aims to identify targeted interventions that can bolster the resilience and sustainability of agriculture in Northeast Syria.

With the results and recommendations from this comprehensive study, policymakers and humanitarian organizations will be better equipped to design effective measures to support Northeast Syria farmers, mitigate the impact of shocks, and better contribute to alleviating food insecurity in the region. The study's holistic approach and emphasis on engaging local stakeholders will ensure that the interventions proposed are well-informed and address the specific needs of the farming community in Northeast Syria. By strengthening the agricultural sector in this critical region, it is expected that the overall food security situation in Syria can see a gradual improvement, thus contributing to the well-being and stability of the country as a whole.

Study Objectives

The objective of this study is to provide a comprehensive qualitative insight of the crop situation in Northeast Syria, focusing on the 2022-2023 season, particularly for wheat and barley crops, and to investigate the impact of fires, water resources, and other factors on agricultural production and the entire wheat and barley value chain. The primary objectives of the study are as follows:

1. **Understanding Farmers' Perspectives:** Explore wheat and barley farmers' perspectives, challenges, and opportunities of wheat and barley cultivation in 2022-2023 agricultural season.
2. **Identify Factors Influencing Production:** Identify and understand factors and shocks influencing wheat and barley production, including access to seeds, agricultural inputs, water availability, climate conditions, and fuel for irrigation and transportation.
3. **Assess Food Security Context:** Evaluate the food security situation in the Northeast Syria region, focusing on wheat and barley availability and access.
4. **Impact of climate shocks:** Investigate the impact of fires and drought on wheat and barley crops, including pre-harvest fires, and their consequences on agricultural productivity and food security.
5. **Market Dynamics and Import Impact:** Qualitatively analyze market dynamics for wheat and barley, including price trends, trading norms, and the role of imported grains in the local market, as perceived by farmers and key informants.
6. **Unearthing Climate Effects:** Analyzing 2023 seasonal findings in comparison to previous years (2019 to 2023) and conduct a trend analysis to understand any notable changes in agricultural production over the mentioned years.

METHODOLOGY

The study methodology implemented a mixed and participatory design to gather insight from multiple perspectives to ensure a comprehensive understanding of the wheat and barley crops production in Northeast Syria. This approach involved a literature reviews, as well as conducting focus group discussions (FGD) with wheat and barley farmers from all the five Agro-ecological zones of Northeast Syria to understand their experiences, challenges, and perspectives on crop production, food security, and the impact of climate shocks on their crops and the value chain. Also, key informant interviews (KII) were conducted with local authorities and local experts involved in the wheat and barley value chain.

The KII questionnaire/s and FGD protocol/s were developed by iMMAP in close coordination with the Food Security and Livelihood (FSL) Working Group and the Agriculture Technical Working Group (AWG) in Northeast Syria.

Eighteen focus group discussions (FGD) were held across 6 subdistricts in the governorates of Aleppo, Deir- ez-Zor, Ar-Raqqa and Al-Hasakeh through FSL AWG partners. Eight key informant interviews were held with the Local Authorities at district level, and two additional key informant interviews were held with the Northeast Syria Agricultural Office and Northeast Syria Multiplication Center.

Farmers Selection Criteria

Farmers for the FGD were selected based on a set of predetermined criteria as follows:

- Farmers who cultivate both wheat and barley, as well as those who may concentrate exclusively on either of these crops, comprised each focus group, with a targeted size of 5 to 8 participants per group.
- Farmers who do not receive assistance from international organizations were prioritized in the selection process.
- Farmers who do not have exclusive contracts with the General Organization for Seed Multiplication (GOSM) were specifically chosen.

BACKGROUND AND CONTEXT

Agro-ecological Zones in Syria

The Syrian Arab Republic is divided into the following five Agro-ecological zones (AEZs) based on the level of annual precipitation received⁽³⁾. The zones are defined in terms of suitability for rainfed crop production, and to some extent the probability of rainfall.

- **Zone 1:** This is the most humid zone and is divided into two areas: Zone 1a: Receives over 600 mm of precipitation, allowing productive rainfed cultivation of wheat, legumes, and summer crops. Zone 1b: Experiences 350–600 mm of precipitation, with the potential for two growing seasons in three years. Wheat, legumes, and summer crops are primarily there.
- **Zone 2:** With annual precipitation of 250–350 mm: Suitable for barley, wheat, legumes, and summer crops. Crop rotation varies based on soil depth. On deep soil, wheat pulses and forage legumes are planted; on shallow soil, barley dominates, and some land is dedicated to cumin.
- **Zone 3:** Experiencing 250–300 mm of precipitation: Mainly suitable for barley cultivation, with possibilities for certain legumes in the rotation.
- **Zone 4:** Marginal lands with 200–250 mm precipitation: Primarily used for barley or permanent grazing.
- **Zone 5:** Desert and steppe area with less than 200 mm precipitation: Reserved for grazing, predominantly used for sheep and camels. Characterized as a Badia Agro-ecological zone, unsuitable for substantial agricultural cultivation.

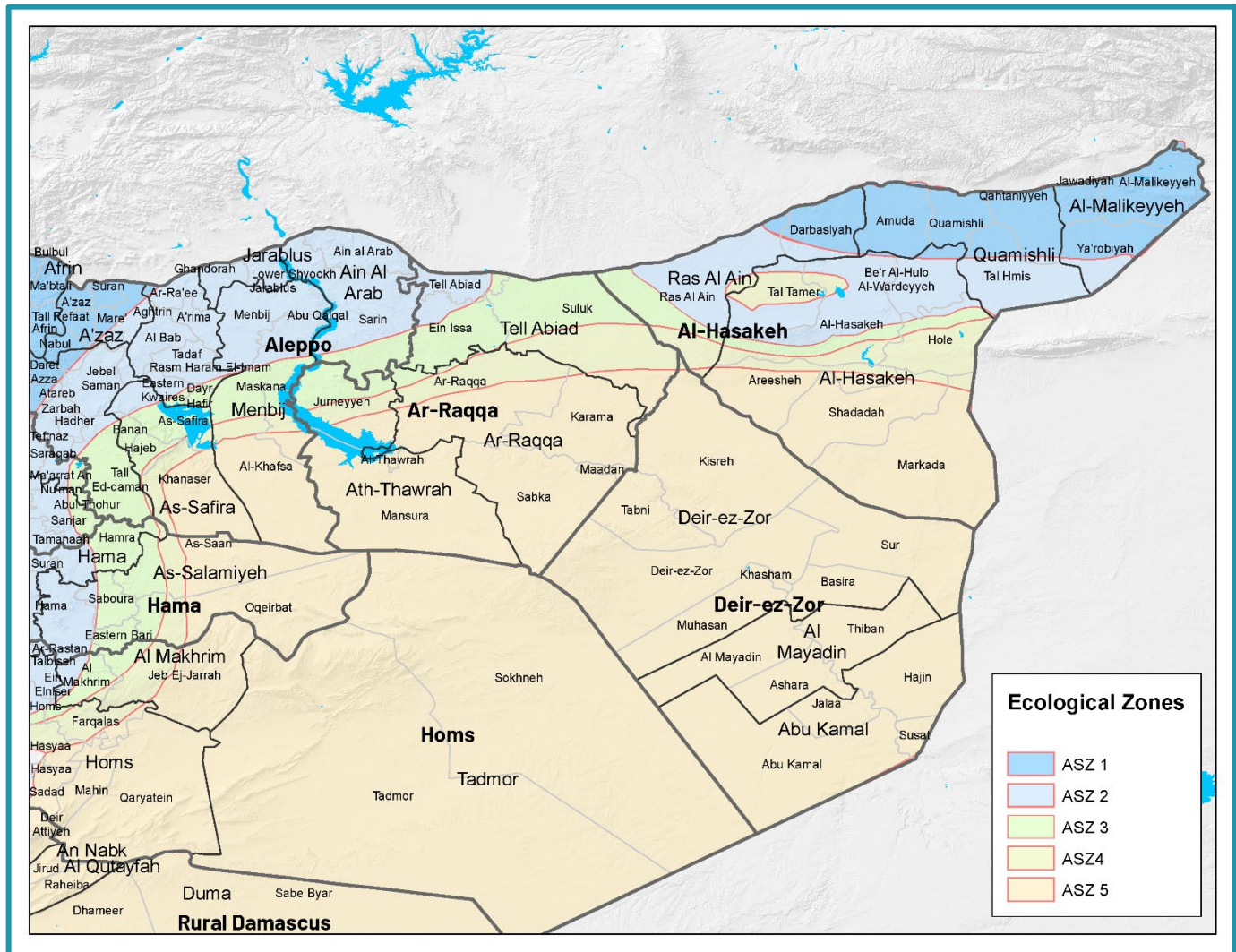


Figure 1: Map of Agro-ecological zones in Northeast Syria

Seasonal Rainfall

The stranglehold exercised by the Syrian government over the Euphrates River has dealt a devastating blow to wheat production in Northeast Syria (4). In the face of massive declines in the availability of water stemming from cross-border resources in Turkey, which serve as the lifeblood for the Euphrates River and the pivotal Alouk water station and compounded by the region's susceptibility to low and unpredictable rainfall patterns, the wheat industry finds itself grappling with severe repercussions.

However, amidst massive declines in available water from cross-border water resources in Turkey, flowing along the Euphrates River and the Alouk water station, coupled with low and erratic rainfall across Northeast Syria (NES), wheat production is currently facing negative impacts. Nonetheless, **there appears to be a slight improvement in the rainfall levels for the 2022/2023 winter season when compared to the previous 2021/2022 season**, based on district-level rainfall statistics derived from the Syria WFP VAM Seasonal Monitor (5) (Cumulative millimeters between September and April wheat growing season).

The Ain Al Arab district growing season rainfall total saw the most significant improvement, rising by (19%) in comparison to the last season. This increase has positioned its current rainfall levels above the long-term average by (1%). Furthermore, the Manbij and Abu Kamal districts also recorded enhancements in seasonal rainfall totals, reflecting improvements of 8% and 7% respectively. Conversely, the Ar-Raqqa and Ath-Thawrah districts experienced a 5% and 4% increase in annual rainfall, while the Qamishli and Al Mayadin districts saw (5%) and (3%) decline respectively.

Despite the modest progress in the annual rainfall for the 2022/2023 period in contrast to the previous season, as depicted in Figure 2, it is essential to note that the **overall annual rainfall remains relatively inadequate across all Northeast Syria governorates**.

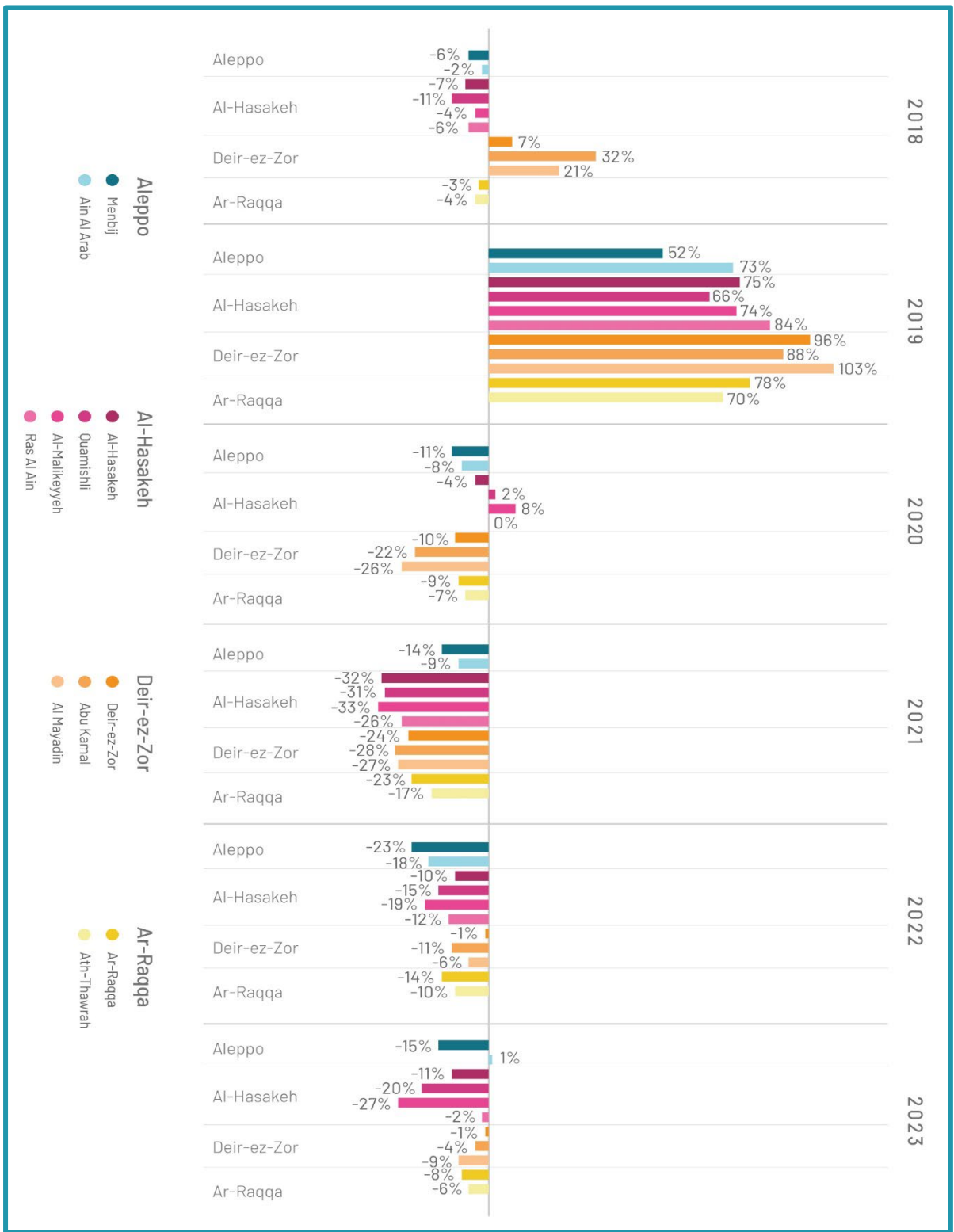


Figure 2: Percentage Change in Winter Growing Season (Sep-Apr) Rainfall Totals in Northeast Syria by District, 2018–2023

Syrian Pound Exchange Rate

The Syrians are experiencing a deteriorating economic crisis and its consequences include escalating household expenses, the scarcity of commodities and services, and the devaluation of the Syrian pound (SYP) (6). From July 2022 to July 2023, the SYP experienced significant notable fluctuation against the US dollar (USD) (7). It began at 4,000 SYP/USD in July 2022 and rose slowly, hitting 4,585 SYP/USD in September. Later in 2022, the rate kept changing, reaching 5,400 SYP/USD in November. In January 2023, there was a big rise to 6,070 SYP/USD – a 32% increase from November 2022.

Throughout 2023, the exchange rate continued on an unpredictable trajectory. It increased to 7,550 SYP/USD in March, followed by 7,700 SYP/USD in April and 8,350 SYP/USD in May. This trend persisted, with the rate reaching 9,400 SYP/USD in July and peaking at 13,125 SYP/USD in August. **These fluctuations vividly reflect the challenging economic conditions in Syria, impacting the purchasing power of its citizens and posing significant challenges to overall economic stability.** The Syrian Pound's devaluation against the US dollar underscores the urgency of addressing the economic crisis and its implications for the country's food security and livelihoods.

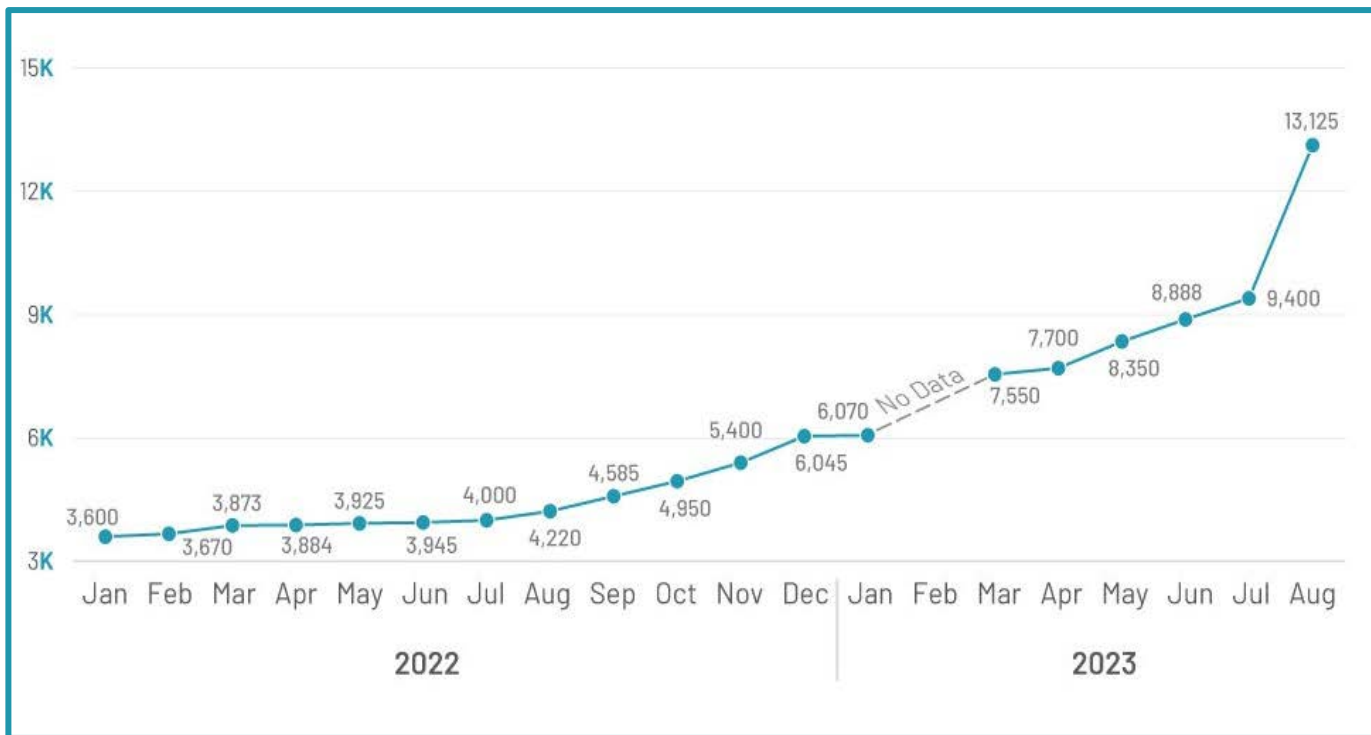


Figure 3: Average SYP Exchange Rate against USD (Jan 2022 – July 2023)

It is crucial to recognize that the devaluation of the Syrian Pound against the US dollar is closely intertwined with the protracted conflict, Western sanctions, the loss of oil-producing territories, and a host of other contributing factors. (8) Overall, the ongoing financial crisis has exacerbated the suffering of the Syrian population and imposed significant obstacles to the nation's economic recovery as well as food security.

PRODUCTION AND HARVEST

Access to Agricultural Inputs

The availability of wheat production inputs plays a crucial role in agriculture. According to iMMAP Wheat to Bread Market Assessment (9), soft and hard wheat seeds are generally accessible to farmers, with about 70% reporting consistent access. Organic and chemical inputs, like fertilizers and pesticides, are also relatively available, with around 67% of farmers reporting constant access. However, fuel availability is a challenge, with only 48% reporting fair availability.

The responses from farmers during the Focused Group Discussions (FGD) shed light on the challenges and dynamics surrounding wheat and barley production in Northeast Syria for 2023. Regarding the availability of seeds for cultivation, respondents highlighted that **while wheat seeds were generally accessible, concerns arose regarding their quality and high prices**, especially for preferred varieties. Moreover, farmers in Ath-Thawrah subdistrict explained that these challenges were often exacerbated by the presence of monopolies held by certain merchants and traders in the seed market, leading to inflated prices and limited access during critical planting seasons. The farmers in Ar-Raqqa subdistrict, also decried the pervasive issue of **adulteration and mixing, with unfamiliar and less desirable seeds** frequently mixed with the sought-after varieties, causing confusion, and reducing the overall quality of seeds available. **Barley seeds faced scarcity**, further compounded by issues of quality and pricing. The proportion of seeds obtained in relation to land size varied but typically ranged between 20% to 90%, depending on crop type and farmer interviewed. The availability of good seed varieties suitable for the region was acknowledged, though concerns existed regarding their quality and the presence of better but unavailable varieties.

Farmers reported difficulties in accessing affordable fertilizers and pesticides, often citing poor quality and high prices as key concerns. The situation regarding agricultural inputs over the past five years revealed a declining trend, with **inputs becoming scarcer and more expensive**, impacting both wheat and barley production. The respondent farmers in Manbij district have pointed out that they used to have access to high-quality Syrian-made fertilizers. However, they have observed a shift, and now all fertilizers available are imported and of lower quality. Furthermore, they've noted that the packaging materials have transitioned from durable burlap to less sturdy plastic. In Ar-Raqqa subdistrict, the surveyed farmers have indicated that they have received better support in the past. This included access to high-quality seeds and assistance with weather-related issues. Unfortunately, these forms of support have reduced in recent years, leaving farmers in a more challenging situation. In the Al Karama area, farmers participating in the survey have expressed concern about declining seed productivity because of mixing and lack of monitoring.

In contrast, insights from Local Authorities emphasized the role of factors such as **fluctuating exchange rates and political conditions influencing the availability and cost of agricultural inputs**. The authorities' representatives emphasized the importance of input availability and affordability in impacting the entire value chain, from production to pricing, with the quality and cost of inputs playing a pivotal role in shaping the agricultural landscape in Northeast Syria.

Water Sources and Irrigation Practices

In the Northeast Syria region, a diverse range of water sources and irrigation practices are employed by farmers to sustain wheat and barley cultivation. **The primary water sources identified by the wheat and barley farmers include rainwater, artesian wells, and water pumping from the Euphrates River.** However, it's worth noting in February 2023, the Northeast Syria region experienced significant changes in its water supply routes. **Turkey's unexpected decision to allow water to flow into the al-Khabour River, following years of political interruptions, has become a turning point.** This action revitalized this vital water source, with the al-Khabour River now flowing at a rate of 15 cubic meters per second, serving fertile farming land from Ras al-Ain to its confluence with the Euphrates at al-Busayrah (10)

Cultivating barley requires lower water consumption compared to wheat, which is an important consideration in this context. Farmers reported utilizing various energy sources for irrigation techniques, with diesel-powered agricultural pumps being the predominant choice. While the availability of water sources has remained relatively stable over the past five years, there have been notable changes in certain areas. Specifically, in Ar-Raqqa subdistrict, farmers reported that they used to rely heavily on canal water, which was abundant at the time. However, there has been a shift, and now their reliance has shifted to agricultural drains in addition to canals.

Additionally, some participants in the survey have mentioned a decrease in water availability due to factors like reduced rainfall and drying up of wells. **This scarcity has forced farmers to dig deeper to access water, resulting in higher extraction costs** that have impacted the economic aspects of their farming operations.

Furthermore, **groundwater levels have experienced a notable decline in recent years**, many factors contribute to this, notably intensive usage of groundwater for agricultural purposes, along with natural influences like shifts in precipitation patterns. These same factors have also contributed to **degrading the quality of groundwater, leading to heightened salinity levels.** making groundwater less suitable for drinking and agricultural purposes. (11)

Adaptations in response to water challenges have included drilling new wells, utilizing water from agricultural drains, reducing irrigation frequency, and avoiding water wastage. Farmers in Al-Hasakeh district also mentioned efforts to shift toward drought-tolerant crop varieties. Regarding the shift towards drought-tolerant crop varieties, iMMAP Wheat to Bread Market Assessment (9) indicates that This shift reflects the adaptive strategies employed by farmers in response to water challenges, as they seek to optimize their agricultural practices and crop choices to address the pressing issue of water scarcity in the region.

Key Informant Interviews (KII) highlighted initiatives aimed at enhancing water use efficiency, such as promoting modern irrigation methods like sprinkler and drip irrigation. These initiatives have been somewhat effective in conserving water, with workshops and guidance sessions encouraging farmers to adopt these practices. Overall, the quality of water used for irrigation varies across different sources. The Euphrates River is generally regarded as excellent in quality by the interviewed farmers, while well water ranges from good to poor. Water from agricultural drains is considered suitable but may contain higher salinity levels. In evaluating the effectiveness of these strategies, it's evident that while some progress has been made in modernizing

irrigation methods and promoting water-saving techniques, ongoing efforts are required to address water scarcity challenges and improve the overall efficiency of water use in wheat and barley cultivation.

Role of Fuel in Production

Farmers across Northeast Syria have reported significant challenges related to fuel that pose significant obstacles to wheat and barley cultivation. They have highlighted **concerns such as high fuel prices and poor-quality fuel**, which make it difficult for farmers to obtain the necessary resources for irrigation and other agricultural operations. **Farmers have also pointed out the presence of fuel monopolies by traders and restrictions imposed by local authorities**, further complicating the situation. Additionally, farmers have noticed a sizeable decrease in the fuel quantities allocated by local authorities during the season. iMMAP Wheat to Bread Market Assessment (9) found that fuel was the least available among wheat production inputs, with 48% of respondents reporting fair availability.

The “word cloud” in Figure 4 below illustrates the most frequent challenges encountered by farmers in obtaining fuel for wheat and barley cultivation, with the size of each word representing the prevalence of each issue in the findings from the Focus Group Discussions (FGD).



Figure 4: Challenges in Obtaining Fuel for Wheat and Barley Cultivation

Despite these challenges, **farmers have emphasized their limited use of alternative energy sources due to their perception of high costs and inefficiencies**. This has left them heavily reliant on traditional fuel sources. These fuel-related issues have ripple effects, impacting the overall agricultural landscape, including crop production, marketing, and trade. Farmers have had to adapt to fluctuating fuel prices and shortages, with some resorting to purchasing fuel from the black market, often at exorbitant prices, or on credit.

Harvested wheat grain in NES

Most of the farmers expressed satisfaction with improved yields, particularly for local crop varieties. Farmers in Ath-Thawrah district noted that while local varieties thrived, imported ones faced challenges. Barley production in 2023 was consistent with the previous year, with varying outcomes among participants, while wheat production showed a mix of improvements and declines.

Participants who reported better harvests attributed their success to favorable factors such as good seed varieties and adequate rainfall. They also emphasized proactive measures, including increased spending on quality seeds, fertilizers, and pesticides. Interestingly, farmers in Ath-Thawrah district mentioned the absence of disease as a contributing factor. In contrast, those who did not experience improvements cited issues like poor-quality agricultural inputs, adverse climate impacts in 2023, and persistent water shortages. Farmers in Al-Karama specifically highlighted insufficient fertilizer application as a hindrance.

The observed increase in annual rainfall for the 2022/2023 year, when compared to the previous year, was corroborated by the study's findings on Normalized Difference Vegetation Index (NDVI) vegetation cover within irrigated lands in Northeast Syria. The data indicated a positive trend in irrigated land area across all Northeast Syria subdistricts in the 2022/2023 period compared to 2021/2022 (Figure 5). Notably, Aleppo governorate exhibited a substantial growth of 173% in irrigated land area, Ar-Raqqa governorate showed an improvement of 109%, and Al-Hasakeh and Deir-ez-Zor governorate recorded a 75% and 70% respectively increase in irrigated land.

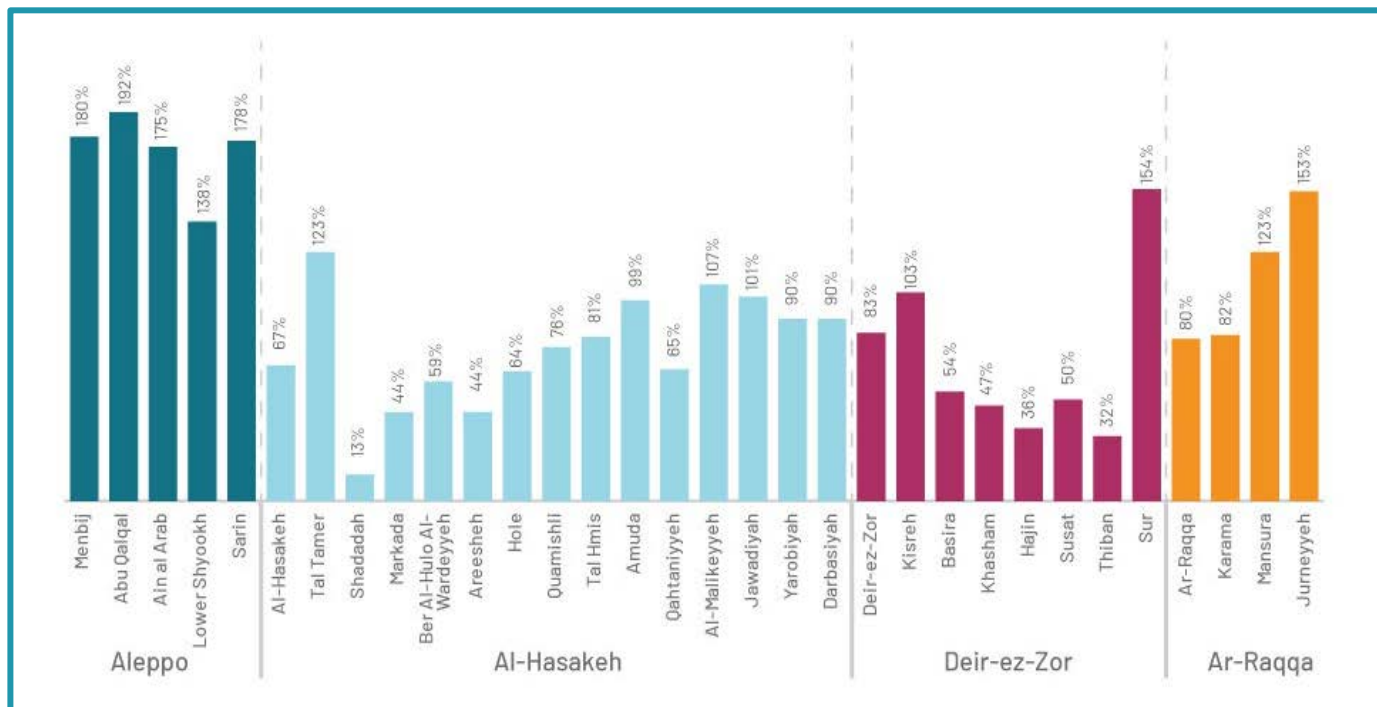


Figure 5: Percentage difference between April 2022 and April 2023 total irrigated land area

As per the NDVI analysis, Ras Al Ain Sub district in Al Hasakeh governorate had the largest irrigated land area with 45% of its agriculture land irrigated. In Ar-Raqqa governorate 36% of the agriculture lands were irrigated. Susat subdistrict in Deir Ez Zor governorate recorded the largest irrigated land (72%), while Lower Shyookh is the largest irrigated area in Aleppo (55%).

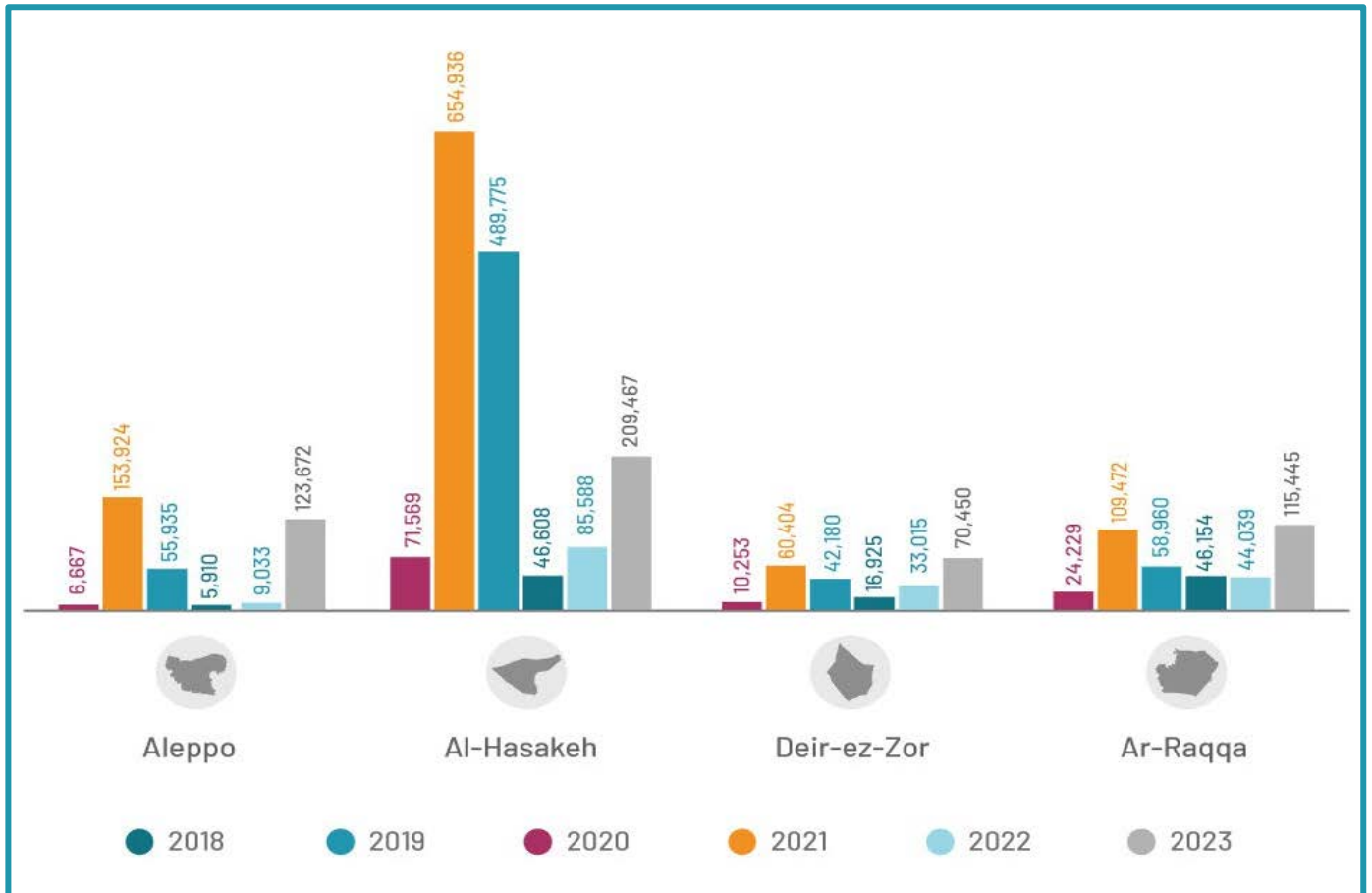


Figure 6: Total irrigated land area per governorate in Northeast Syria in April (hectares)

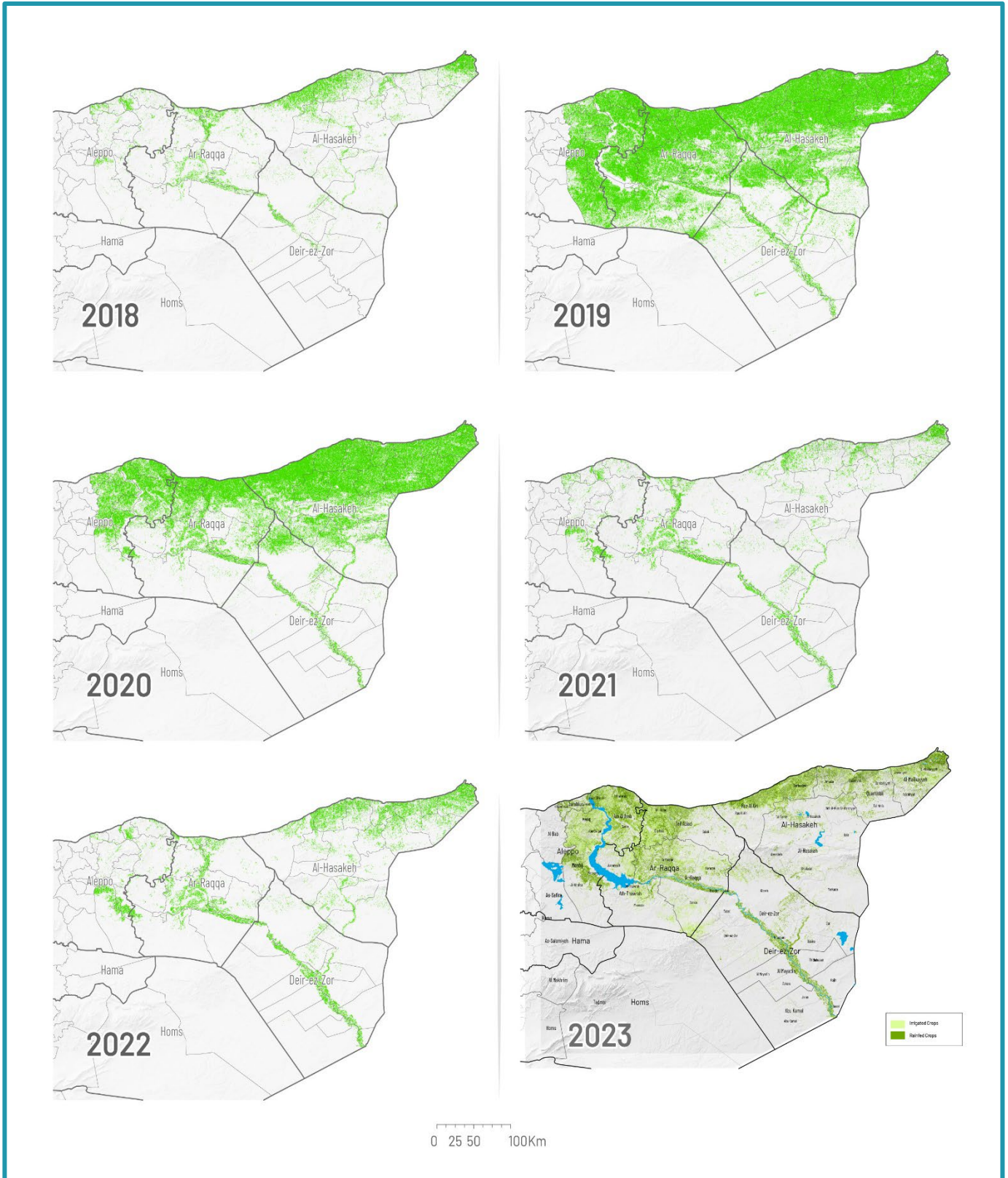


Figure 7: Comparative NDVI Maps represent the total area in April from 2018-2023

Post-Harvest Losses and Storage

According to the agricultural experts during the Key Informant Interviews (KII), when wheat and barley crops face losses due to climate-related factors, the local market copes by depending on imports. These imports originate from neighboring local markets and from outside the region. Moreover, the KII findings indicate that the Self-Administration has stocks from past years. An agricultural expert in Ar-Raqqa district raised that the local authorities closely monitor the market to enhance moderation in sales and effectively manage the stock allocated for agriculture.

Despite the existence of alternative sources, such as importing wheat or flour from neighboring countries, the KII emphasizes that these sources alone are not sufficient for the region's needs. The region aspires to achieve self-sufficiency in these essential crops, recognizing the importance of ensuring a stable and reliable supply.

Regarding the significance of post-harvest losses in the wheat and barley sector, key informants provided varying responses. In Ath-Thawrah district, one key informant reported no noticeable losses, while others indicated a range from 15% to 50%. Notably, a key informant from the agriculture authority in **Ain Al Arab district pointed out that over the past two years, rainfed lands suffered a 100% loss**, while irrigated lands saw neither profit nor loss during that period. Furthermore, Agriculture and Irrigation expert from Manbij noted that although farmers generally didn't experience losses, the administration incurred costs for storage, sterilization, and screening, resulting in a small loss rate of around 25% during grinding. In Ar-Raqqa district, a key informant emphasized that the 2023 season witnessed a 20% loss in irrigated wheat production, attributed to factors such as diseases, frost, and humidity. In contrast, rainfed wheat experienced no losses and generated a profit ranging from 50% to 70%.

In addressing measures to reduce losses and enhance storage practices, key informants highlighted various strategies. For instance, as reported by a representative of the Directorate of Agriculture from the Al-Malikeyyeh district, one strategy includes providing sufficient training to eliminate incorrect transportation methods and improper packaging techniques. Another involves ensuring a proper handling of the harvest and establishing warehouses under optimal safety conditions. A key informant from Ain Al Arab underscored the significance of sterilizing and screening wheat seeds before planting in order to boost production. Notably, given an abundant production, 2023 saw a shift from conventional storage silos toward open (open-air) storage.

However, some KIs emphasized the **necessity of equipping storage facilities with standardized specifications and implementing proactive measures to mitigate issues related to pests and rodents.** Also, KII respondents underscored the importance of providing farmers with agricultural inputs and ensuring that appropriate storage conditions were maintained. One key informant from the agriculture department from Qamishli district stressed there was a critical need to ensure grains achieve complete dryness, with humidity levels not exceeding 10 percent, while taking all necessary steps regarding storage.

In line with the findings from the Key Informant Interviews (KII), iMMAP Wheat to Bread Market Assessment (9) revealed that a small proportion of farmers (11%) stored their wheat grain for later sale in the season, often to leverage higher market prices or for the next planting season. Additionally, the data indicated that 89% of

farmers reported access to storage facilities, with home storage being the most prevalent, followed by privately owned warehouses.

Regarding the contribution of climate shocks to losses in the wheat and barley sector and the estimated percentage of affected farmers, key informants emphasized a significant impact. A key informant from Ar-Raqqa highlighted that **climate shocks contributed significantly to agricultural losses, estimating it to be around 50% of the losses in the agricultural sector.** Others provided estimates ranging from 15% to 30% of the value of losses, with approximately 60%-70% of farmers in the region being affected. Key informants in the Ain Al Arab district pointed out that farmers who rely on rainfall for their agricultural activities had been severely affected, leading to an estimated 3,000 farmers experiencing significant losses. However, one KI from Manbij noted that there was no significant impact of climate shocks, with only around 2 percent being negatively affected by cold conditions.

Role of Northeast Syria Local Authorities in Enhancing Agricultural Resilience

Key informants shared various strategies, including the development of comprehensive agricultural plans, increased support for farmers, allocation of fuel in proportion to cultivated areas, and even guidance on alternative energy sources, such as solar power. Additionally, optimizing the management of administrative quantities, allocating the necessary amount of fuel, and organizing databases of irrigated areas were highlighted as essential steps.

In addressing resource challenges and enhancing resilience further, key informants noted ongoing efforts such as activating the **Seed Multiplication Corporation to improve and raise the quality of seeds and to provide all types of fertilizers in the market.** In addition to providing subsidized fuel, securing high quality seeds and reasonable prices, and educating farmers on agricultural plans.

It's important to acknowledge the **persistent challenges related to fuel availability, with no immediate solutions in sight.** However, local authorities' strides have been made in addressing issues related to fertilizer availability and pricing. Additionally, there are **initiatives to explore alternative energy sources** like solar power, although they may benefit a smaller segment of farmers.

iMMAP Wheat to Bread Market Assessment Q1(9) reflect that only 8% of farmers received assistance for their wheat production this season, primarily from the Agriculture Management Office (55%), NGOs (31%), and the General Organization for Seed Multiplication (14%). The Agriculture Management Office provided fuel support, while GOSM supplied wheat seeds. Those support initiatives often required commitments from farmers, such as specifying cultivated land and returning a portion of the harvest to the support source. Overall, the support programs are limited, highlighting the need for their further development and a closer collaboration between local authorities and NGOs to enhance agricultural resilience in Northeast Syria.

IMPACT OF CLIMATE SHOCKS

Overview of Climate Shocks in NES

Northeast Syria region has been experiencing a number of climate shocks in recent years, including droughts, floods, and extreme heatwaves. These shocks are having a significant impact on the region's economy, food security, and water resources. **The combination of reduced rainfall and rising temperatures has resulted in the loss of agricultural fields**, the spread of desertification, and the migration of approximately 2 million people from rural to urban areas.⁽¹²⁾ These climate-related factors have contributed to the ongoing civil unrest and economic challenges in Syria.⁽¹³⁾

2021 saw the worst drought in Syria in more than 70 years. This affects access to sufficient drinking water, electricity generation and irrigation water. Moreover, the **water crisis decimated the country's wheat harvest, with production down from 2.8 million tons in 2020 to just 1.05 million tons in 2021.**⁽¹⁴⁾ Flooding is another major climate shock in NES. The region is located along the Euphrates River, which is prone to flooding. In 2022, there have been a number of major floods that have caused widespread damage to infrastructure and crops. The floods have also displaced thousands of people.⁽⁴⁾

Farmers in the FGD reported a significant negative impact of climate shocks on their crops, with production being reduced by half due to adverse weather conditions and related challenges in agriculture. They pointed to various specific factors, including rust (fungal infections) due to excessive moisture, reduced pollination of spikes caused by east winds, and the impact of frost on grain quality. The presence of the Sunn insect, which is known as the most destructive wheat pest in West and Central Asia and East Europe⁽¹⁵⁾ was also noted as a consequence of the climate as reported by the farmers in the Hazemah community in Ar-Raqqa district. Additionally, some participants highlighted a strong airwave that affected fertile lands to a considerable extent. Figures 8 below presents verified data from the Agriculture Department, detailing the extent of damage and the affected area in donums resulting from climate-related shocks.

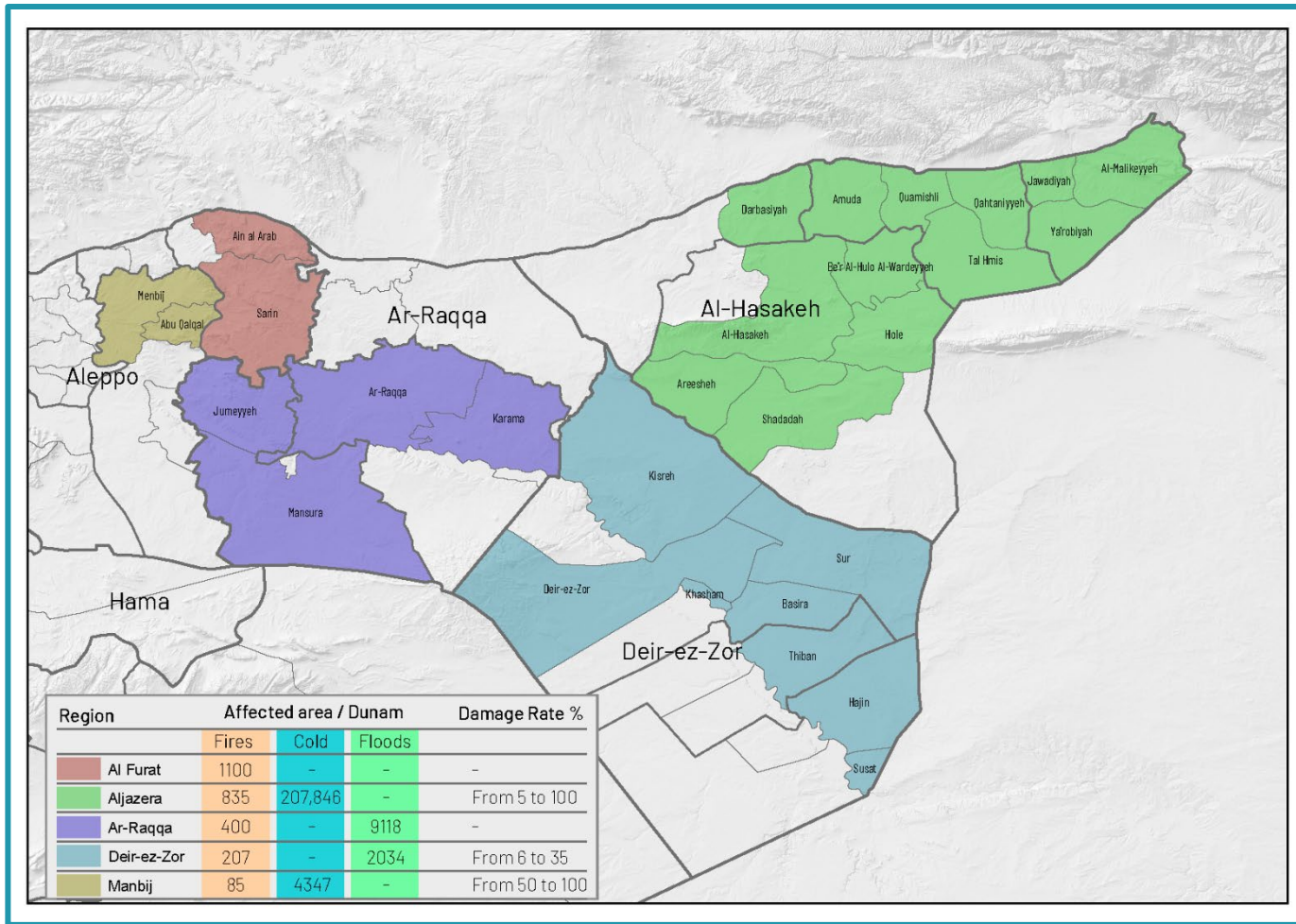


Figure 8: Map of Climate Shocks Damage Areas

Adaptation Strategies

In response to climate-induced challenges, farmers reported taking up a variety of adaptation strategies. Notably, the farmers emphasized the importance of ensuring an ample supply of fuel in advance to maintain the smooth operation of their agricultural pumps. In the face of diverse climatic difficulties, farmers have shown adaptability in their reported mitigation approaches. For instance, when confronted with storms, the farmers underlined the effectiveness of reducing the frequency of waterings and transitioning to manual harvesting techniques. The heavy rains experienced in the 2023 season prompted measures such as the reduction of irrigations and the adoption of pesticide control. When it came to addressing drought, farmers noted their reliance on alternative water sources and the reduction of irrigation practices. However, participants also acknowledged a lack of effective strategies when dealing with frost.

Moreover, farmers highlighted their experimentation with alternative practices. These included increasing fertilizer percentages, initiating crop cultivation early in the season, and opting for weather-resistant crop varieties. Notably, farmers in Ar-Raqqa subdistrict diversified their agricultural pursuits by engaging in vegetable cultivation. Specific strategies, such as deepening wells, transitioning to hybrid crop varieties, and

the adoption of sprinkler irrigation, were underscored as having yielded positive results for select participants. In Syria's recent history, countering drought has primarily relied on increased groundwater pumping. However, this approach has its limitations. Surface wells in the northern regions of Hasakeh province, reliant on rainwater recharge, are rapidly depleting due to insufficient rainfall and the inability of farmers to afford the necessary fuel for water extraction. Additionally, deep boreholes accessing slowly replenishing aquifers are facing overuse. Consequently, local authorities in northeast Syria implemented a ban on drilling new agricultural wells last autumn. (14)

Regarding using Climate-Smart Agriculture (CSA) practices in NES, the recent iMMAP Wheat to Bread Market Assessment(9), highlighted that most farmers in the assessed areas reported utilizing a range of CSA practices (Figure 9).

	Aleppo	Al-Hasakeh	Ar-Raqqa	Deir-ez-Zor	Total
Use of Herbicides	93%	84%	96%	93%	88%
Crop rotation	87%	91%	84%	68%	85%
Minimum soil tillage	67%	87%	75%	96%	85%
Certified Seeds	83%	85%	80%	75%	82%
Incorporate residue	63%	73%	61%	75%	70%
Use of Pesticides	63%	63%	92%	79%	70%
Drought Resistant Seeds	13%	57%	51%	32%	47%
Organic Manure	43%	44%	53%	38%	44%
Composting	17%	20%	29%	29%	23%
Water harvesting	17%	20%	16%	16%	18%
Modern Irrigation Systems	13%	14%	4%	2%	10%

Figure 9: Use of Climate Smart Agriculture Practices - Per Governorate

When it comes to access to early warning information in the local language, the key informants shared various approaches. In the Ath-Thawrah district, communication groups formed by the Agricultural Committee play a pivotal role in disseminating weather and climate information from available sources to farmers. In contrast, in the Al-Malikeyyeh district, weather forecasts are made available a day or several days in advance to provide farmers with essential information. However, as indicated by the key informants from Ain Al Arab, Ar-Raqqa, and Qamishli, these districts lack modern devices for predicting climate and weather factors, making it challenging to provide early warning information. Additionally, farmers in Manbij district receive agricultural guidance through social networking sites, but not all areas have access to this resource. Despite variations in access, the Agricultural Extension Department in agricultural institutions consistently publishes agricultural guidance regarding weather conditions.

Support of NES Agricultural Institutions in Enhancing Climate Resilience

In the discussions with local farmers, to understand the current landscape of support and perspectives on climate change adaptation, **none of the participants reported receiving any form of support from local authorities or organizations regarding climate change adaptation.** However, it is noteworthy that during times of drought, the local administration has stepped in by increasing the allocation of fuel. This support has proven invaluable, enabling farmers to augment their irrigation practices and mitigate the adverse effects of drought on their crops. On the other hand, inquiring about specific interventions or support that could enhance resilience to climate-induced challenges, the participants provided valuable insights. **The consensus among farmers was the need for drought-resistant seed varieties and support in adopting modern water-saving irrigation methods.** Additionally, they emphasized the importance of activating agricultural associations, providing high-quality inputs, and compensating for damages resulting from climate-related shocks. Fuel support for tractors and engines was also highlighted as essential.

Local experts offered significant perspectives regarding the role that local authorities and agricultural institutions can play in mitigating the impact of water availability on wheat and barley production and trade. The local experts emphasized the importance of the local authorities and agricultural institutions supporting agricultural projects that promote modern irrigation methods, known to save up to 40% of water. Additionally, the local experts highlighted the **need for self-administrations support to provide essential fertilizers to compensate for water scarcity and to encourage the cultivation of crop varieties that require less water.** The respondents stressed the need to secure sufficient fuel for emergency irrigation during water shortages and directing farmers to adopt alternative irrigation strategies.

Furthermore, the agricultural experts suggested initiatives such as securing drought-resistant wheat seeds, encouraging organizations to dig wells equipped with solar energy, and transitioning to more efficient irrigation systems like sprinkler and drip irrigation. The overarching perspective is that local authorities and agricultural institutions can guide farmers toward water-efficient practices, including modern irrigation methods, to reduce water wastage. Additionally, the local authorities can play a pivotal role in organizing well-drilling efforts to ensure efficiency and avoid haphazard, isolated actions.

Role of NES Local Authorities in Mitigating Climate Challenges

Key informants provided insights into the pivotal role played by the Agriculture Authority in assisting farmers in facing various challenges. The respondents emphasized the Authority's guidance and efforts to improve methods of using production inputs. Additionally, the **Agriculture Authority secures essential resources for farmers, including subsidized fuel, reasonably priced fertilizers, and necessary pesticides.** It plays a crucial role in purchasing crops at prices that consider the cost and losses incurred by farmers while also providing seeds at nominal prices.

Moreover, as the key informants highlight, the Agriculture Authority is actively involved in organizing agricultural activities, such as distributing seeds, fuel, and pesticides to combat agricultural pests. It **extends support to farmers by granting seed loans and compensating those whose crops have been exposed to wildfires.** Encouraging the adoption of modern irrigation methods and offering agricultural guidelines are integral aspects of their assistance.

Furthermore, as the key informants pointed out, the **Agriculture Authority collaborates with selected farmers to multiply specific types of wheat for distribution among their peers.** They also ensure the availability of necessary levels of fuel to support wheat and barley crops. The authority actively guides and advises farmers, keeping them informed about weather conditions and organizing agricultural seminars. In addition to these efforts, as the key informants underscore, the Agriculture Authority plays a crucial role in insuring agricultural supplies. They disseminate technical bulletins that promote the use of scientific methods in agriculture to minimize production losses. Their support extends to various aspects of production requirements, contributing to the resilience of the agricultural sector.

ASSESSING FOOD SECURITY CONTEXT

Prevalence of Food Insecurity

The food security situation in Syria has significantly worsened in 2023, with an estimated 15 million people, or 68% of the population, needing food and agriculture assistance. (4) This crisis is driven by economic instability, currency devaluation, rising prices, drought-like conditions, and the Ukraine crisis.

In June 2023, the food security situation remained dire as food prices continued to surge, exacerbating the challenges faced by the already vulnerable population. The national average price of the World Food Programme's (WFP) standard reference food basket witnessed a staggering 27 percent increase during the first half of 2023. This alarming rise in food costs is a stark reminder of the ongoing crisis in the region. (16)

During the FGD, the local farmers provided valuable insights into the prevalent food insecurity challenges. The respondents, who have direct experience with these issues, highlighted a grim reality characterized by limited access to essential goods, prompting many to contemplate emigration. Additionally, the younger generation's decision to delay marriage due to uncertain income prospects was indicated by the respondents. The farmer respondents specifically pointed out the weakness of food security, primarily due to inadequate local production and heightened dependence on imports. This deficiency affects not only human consumption but also has repercussions for livestock. The situation has continued to deteriorate, compelling individuals to adopt negative coping strategies.

It's noteworthy that a significant majority of Northeast Syria region farmers struggle with the burden of high prices and low incomes, making it increasingly challenging to meet basic needs. These challenges are further compounded by complex factors such as political issues, exchange rate fluctuations, and migration, as highlighted by the respondents. When asked about sensitive periods when food needs become particularly challenging to fulfill, the respondents consistently pointed to the winter season. During this time, coupled with potential crop losses, there is a decrease in the availability of supplies and a decline in purchasing power.

In our KII, agricultural key Informants provided valuable insights into the challenges affecting food security in the Northeast Syria region. These encompassed **climate fluctuations, high costs, lack of support for losses, the blockade, and groundwater issues.** They also highlighted challenges like discouraging agriculture, diseases, high input costs, lack of loans, and reduced youth involvement due to migration. Key Informants also discussed climate-related challenges such as drought, on top of fuel shortages, high input prices, and external factors affecting water resources.

Key Informants noted significant impact which climate shocks have on crops, leading to reduced food security, decreased production, and withdrawal from reserve stocks. Occupation of agricultural areas in certain cities also limits **landowner access and affects production and food availability. Fluctuations in water and fuel resources directly impact food availability and affordability.** Drought affects wheat and barley production, leading to wheat imports and higher bread prices. Reduced government irrigation, higher fuel costs, and reliance on engines for irrigation contribute to these challenges.

Role of Wheat and Barley in Local Food Security

The feedback from farmers regarding wheat and barley production's capacity to meet the basic needs of Northeast Syria's communities is mixed. The majority of participants emphasized that these crops are indeed essential for fulfilling the community's daily requirements. They highlighted the crucial role these grains play in providing sustenance, generating income, and yielding materials like mortar. Furthermore, barley's contribution to animal husbandry enhances overall food security in the region.

However, it's important to acknowledge that not all responses were uniformly positive. **In Manbij subdistrict, for instance, there was a consensus that the current production levels were insufficient to meet the community's needs.** Nevertheless, participants in Manbij expressed optimism that with adequate support, production could be increased to a sufficient level. This suggests that while challenges exist, there is potential for improvement.

Furthermore, in Al-Hasakeh subdistrict, a subset of farmers raised concerns about the sustainability of production, particularly during dry years. They mentioned that production might decrease and may not meet community needs under such conditions. These responses underscore the importance of addressing climate-related challenges and ensuring resilience in agricultural practices.

Key informants highlight the critical role of wheat and barley production in addressing food security concerns in the region. These grains are viewed as fundamental and strategic crops that significantly contribute to enhancing food security. Agriculture and irrigation experts believe that they form the basis of daily sustenance for the local population and play a pivotal role in various food industries. The production of wheat and barley is essential not only for human consumption but also for livestock, making them indispensable for the region's overall food security. Additionally, directorate of agriculture in Al-Malikeyyeh district emphasize that local governments prioritize maintaining continuous production of these crops, recognizing their importance in ensuring the availability of basic food items, especially bread. However, the informants also acknowledge that the region's food security can be influenced by the volatility of wheat and barley prices, often driven by climate-related factors. High prices of these grains can pose challenges to food security, particularly for vulnerable groups.

While the average family income has not increased, food prices skyrocketed by almost 800% between 2019 and 2021. (17) This upward trend in food prices persisted throughout 2022. (18) By June 2023, food prices witnessed a nearly twofold surge within a span of just 12 months.

Families' dependence on buying wheat for homemade bread face challenges when prices are elevated. As of July 2023, the observed price for wheat flour stood at SYP 6,876 per kilogram. (19) Furthermore, when wheat

and barley prices experience an increase, as noted by some key informants, certain farmers could face difficulties intending to their fields, potentially resulting in diminished production.

The impact of price fluctuations, according to key informants, extends beyond farmers and affects various segments of the community. Livestock breeders are notably affected by rising prices, as it impacts the cost of feeding their animals. Moreover, key informants mentioned that the lack of a clear mechanism for purchasing crops from farmers, coupled with merchant control and restrictions on wheat trade by local authorities, can lead to price manipulation by merchants. This, in turn, affects both farmers and families, increasing the cost of purchasing agricultural products.

Role of NES Local Authorities in Mitigating Food Security Challenges

The insights provided by key informants shed light on crucial aspects of the region's food security and agriculture. According to these informants, the **Agriculture Authority plays a pivotal role in addressing food security challenges and harnessing opportunities in the agricultural sector**. Their responses emphasize the Authority's support for agricultural and livestock projects, which includes purchasing crops from farmers at attractive prices to bolster reserve stocks and ensure a consistent food supply. Additionally, the Authority's efforts in providing resources like fuel and seeds at reasonable prices are highlighted as instrumental in encouraging agricultural activities. Moreover, their **strategy of linking licenses for wheat cultivation across seasons demonstrates a commitment to promoting wheat production**. The informants also underscore the importance of managing water resources and securing them through canal rehabilitation. The Authority's role in stabilizing wheat prices by purchasing full quantities from farmers is emphasized as a key factor in maintaining affordable bread prices.

MARKET DYNAMICS AND IMPORT IMPACT

Current State of the Market

The region's agricultural sector, which is integral to the local market's value chains and productions, has faced significant challenges due to the Syrian crisis and subsequent barriers such as currency depreciation, restricted border crossings, limited input accessibility, water scarcity, and climate events. These challenges have notably affected wheat farmers, leading to changes in wheat production, impacting bread production and, subsequently, food security and livelihoods. (20)

The assessment of the current state of the wheat and barley market in the region, as provided by key informants, reveals a generally favorable outlook. **Multiple agriculture experts note self-sufficiency in wheat and barley production, indicating that the region can meet its own grain needs**. According to the agriculture experts the local market is described as strong, characterized by sufficient supply and a balanced situation, especially during the harvesting season when crops are readily available. Some key informant noted that **the administration has managed to secure a substantial wheat stock, purchasing it at prices higher than the local market rates**.

Market prices and their fluctuations in the wheat and barley sector within this region reflect a myriad of influences, as underscored by insights from agriculture and irrigation experts. Notably, these experts emphasize the significant impact of external production requirements originating from areas beyond the self-

administration regions, introducing an element of reliance on external factors. Additionally, they highlight the pivotal role played by the interplay of demand and supply dynamics, alongside the potential for exporting commodities beyond the regional borders, in shaping price determinants. **The accessibility of border crossings, be it open or closed, stands out as a critical factor significantly affecting market stability**, as acknowledged by these informants. Furthermore, factors such as increasing prices of pesticides and fertilizers, along with fluctuations in exchange rates, contribute substantially to market volatility. Moreover, market dynamics, encompassing seasonality, past productivity trends, and the provision of materials by local authorities, exert their influence on price dynamics. The imposition of restrictions on wheat movement within the region by local authorities adds another layer of complexity. Exchange rate fluctuations, particularly the Syrian pound's depreciation against the dollar, impose considerable pressure on the market environment. In May 2023, Self-Administration has set wheat prices at 43 US cents per kilogram while stating that they will pay farmers' dues in US dollars to mitigate the impact of currency depreciation (21).

The iMMAP Wheat to Bread Market Assessment (19) highlights substantial obstacles in wheat and barley production within Northeast Syria (NES). Approximately 42% of farmers perceive those entities such as the local self-administration and traders exert considerable influence over the wheat market. Challenges including high fuel costs, input limitations, and restricted availability hamper agricultural production. The presence of subsidized fuel leads to extended queues, negatively affecting productivity and pushing some individuals towards the costly black market for their fuel needs. Moreover, wheat grain prices experience a decline relative to the global market, exacerbating profitability concerns. The volatility of exchange rates further compounds the financial challenges faced in this context. Additionally, adverse climate conditions, such as drought, escalate production costs for farmers in NES.

Traders encounter limitations, with 42% facing trade restrictions, including taxes, fees, and transportation constraints. Local authorities exert control, making inter-region transport difficult without authorization and fees. Theft and disruptions during transportation are concerns, with some regions banning wheat trade. Only 33% of traders reported no rules affecting wheat trade. Additionally, 18% of farmers noted imports affect local wheat production, pressuring local prices.

Demand, Supply and Price Trend

Agriculture experts have consistently pointed out that population growth leads to increased demand, especially when coupled with a rise in livestock numbers. Conversely, a decrease in production often results in heightened demand and subsequently higher prices. In 2021 and 2022, unfavorable weather conditions, including insufficient rainfall, created a surge in demand for wheat and barley, yet the supply fell short. However, in the current year, there has been an ample supply, matching the high demand. The informants also emphasized the role of various factors, such as the provision of good quality materials and the cultivation of diverse wheat and barley varieties, in influencing both supply and demand dynamics. They highlighted wheat's strategic importance as a constant demand, while barley serves as a crucial material for livestock. Rainfed agriculture, influenced by rainfall levels, significantly impacts demand, as witnessed in increased demand following higher rainfall.

Furthermore, the impact of fuel price fluctuations on the supply chain and market dynamics has been highlighted by key informants. As in July 2023, the average price of fuel reached 6,770.95 SYP per liter.(22)

Several informants indicated that fuel prices have indeed affected the wheat and barley supply chain. For instance, increased costs incurred by farmers due to rising fuel prices have been noted, although some mitigations are in place, such as subsidized fuel provided by the administration. Additionally, the price of barley was influenced by the fuel market's fluctuations. While it didn't entirely disrupt the supply chain, it did lead to increased transportation costs and reliance on the black market for some farmers' purchases. The purchase prices of wheat have witnessed continuous fluctuations in previous years, with the price determined either in USD or in SYP. In terms of price trends over the past five years, informants noted various factors influencing fluctuations. Exchange rate appreciation, particularly the rising value of the dollar, has been a significant factor impacting prices. Additionally, changes in pricing dynamics have been observed due to shifts from local currency-based transactions to USD-based transactions. Two years marked by high prices for wheat and barley due to production shortfalls were followed by a year in which the self-administration purchased wheat from farmers at elevated prices to encourage cultivation. This led to consistent increases in wheat and barley prices year-on-year. For barley, factors like inflation and market shortages contributed to price increases, while wheat prices were affected by inflation, climate fluctuations, and monopolistic practices.

Lastly, the sensitivity of wheat and barley prices to climate shocks, such as extreme weather events and prolonged droughts, has been highlighted by informants. They indicated that these crops are highly sensitive to climatic fluctuations, with instances of low rainfall in 2021/2022 causing reduced production and consequent losses for farmers. In some cases, climate shocks prompt farmers to seek higher prices to cover their production costs and losses. The informants emphasized that climate shocks, particularly droughts, can significantly impact production and, subsequently, availability and prices. This is manifested through reduced cultivated areas, decreased grain quality due to climate-related diseases, and a weakening of the agricultural chain. While wheat prices remain relatively stable due to government support, barley is substantially affected. Drought conditions and their impact on rain-fed crops have led to increased prices and shortages in the market.

Role of Imported Grains

Key informants have emphasized the critical role of imported grains in addressing reduced local supplies of wheat and barley caused by climate-related factors. They pointed out that **when crop production is reduced, the local markets turn to imports as an alternative supply source**. However, they highlighted **significant challenges due to the regional blockade, leading to extremely high prices for imported grains**. In response, traders' resort to importing Ukrainian barley or hybrid wheat. Meanwhile, the Self-Administration maintains stocks from previous years. Furthermore, in the Manbij district, the key informant pointed out that **strategies may involve grinding corn instead of wheat for breadmaking purposes and importing whole wheat (zero) flour**. Regarding the extent of NES's reliance on imported wheat and barley to meet local demand, key informants pointed out variations in dependency. They highlighted that while the region aims for seed development and self-sufficiency through its Seed Multiplication Center, it does rely on imports, especially during dry years when import volumes rise due to challenges in securing grains amid the regional blockade.

Notably, key informants indicated that import dependence is prominent for hybrid wheat and Ukrainian barley, used for fodder, and a smaller percentage for agriculture. Nevertheless, the region's focus on self-sufficiency in seeds results in readily available hybrid varieties in the local market, unaffected by crop shortages. Key

informants indicated that import volumes remain relatively stable, influenced by previous season production, demand for specific varieties, and overall agricultural circumstances.

According to the recent iMMAP Wheat-to-Bread Market Assessment, farmers indicated that they acquire 82% of their wheat seeds from local sources and the remaining 18% from imported sources. (20) Key informants indicated that Northeast Syria imports wheat and barley primarily from regions such as Iraq and the Syrian interior. The Manbij district agricultural key informant emphasized that while imports do take place, their contribution to the overall crop volume remains limited, not surpassing 5% of the total crops. Key informants indicated that essential importing regions include Al-Hasakah, Amuda, Qamishli, Manbij, and Northern Iraq, serving as vital sources to meet local demand.

Regarding the imported seed varieties, key informants highlighted the diverse range of options available to NES. They pointed out specific varieties such as ACSAD 65, Doma 1, and Doma 3 for hard wheat, and Doma 2, Doma 4, and Doma 6 for soft wheat. These imported seed varieties, they highlighted, contribute significantly to enhancing the region's seed diversity and strengthening its agricultural resilience. Key informants pointed out additional varieties, including Brugen (American) and German for wheat, as well as Ukrainian and Russian for barley.

Role of NES Local Authorities in Supporting Wheat and Barley Value Chain

Key informants across various districts in Northeast Syria provided insights into the crucial role played by local authorities in supporting the wheat and barley value chain. Specifically, they highlighted that these authorities are actively involved in securing the production requirements, categorizing wheat and barley based on quality and currency exchange rates, and ensuring fair pricing. Additionally, the Self-Administration was noted for its support to farmers, offering wheat and fuel at reasonable prices and purchasing wheat at higher rates than the local market, while barley follows local market pricing dynamics. Furthermore, the key informants pointed out that local authorities support harvesters with fuel and fodder, encourage the use of modern irrigation methods, and provide agricultural inputs at competitive prices. They also emphasized the importance of efforts to secure fuel, quality seeds, and contracts with farmers, all of which contribute to the sustainability of the wheat and barley value chain.

FUTURE OUTLOOK

Future of the Wheat and Barley Value Chain

The future of wheat and barley cultivation in the region, as described by local farmers during the FGD, appears to be facing significant challenges due to climate events and increasing climate shocks. **Farmers expressed concerns about a decrease in cultivated land each year**, with some fearing that if the situation remains unchanged, they might be forced to limit themselves to cultivating barley due to its lower water requirements compared to wheat. **Participants emphasized the negative impacts of continuous climate events, including instability and recurring droughts, which are expected to lead to reduced productivity.** In response to these challenges, **some farmers are considering shifting to alternative crops like vegetables or even discontinuing wheat cultivation altogether in favor of more resilient options such as beans or greenhouse farming.** The

consensus among these farmers is that the situation is deteriorating, with the potential for a shift from irrigated to rainfed agriculture if climate-related issues persist.

In the Key Informant Interviews (KII), respondents expressed their outlook on the evolution of the wheat and barley value chain in the region during the Key Informant Interviews (KII). They noted that **the sector could witness significant development, primarily driven by the support provided to local farmers by local self-administrations**. However, they also voiced concerns about the impending challenge related to the strategic importance of wheat and barley as agricultural products, emphasizing the need for mobilizing efforts to achieve self-sufficiency in the coming years through well-structured plans.

Furthermore, the respondents identified several factors that they believe will be crucial in shaping the future of this sector. Providing vital resources such as water, production inputs, and support to farmers ranked high on their list of priorities. They also acknowledged the impacts of war, siege, and climate fluctuations, underscoring the importance of mitigating these challenges. Efficient water management, including the utilization of artesian sea wells and river water, emerged as key strategies. Additionally, ensuring the availability of good quality agricultural inputs, addressing dehydration issues, and managing water shortages were cited as pressing concerns. The availability of water, closely tied to access to fuel and electricity, as well as affordable organic fertilizers and high-quality seeds, was deemed pivotal to the sector's future.

The challenges faced by stakeholders in the wheat and barley value chain, as highlighted in the Key Informant Interviews (KII), are multifaceted. High prices and the closure of borders have emerged as significant obstacles, impacting the availability and affordability of essential resources like agricultural inputs, fuel, and electricity. Climate fluctuations, unavailability of quality seeds and fertilizers, and the rising costs of servicing wheat and barley crops further compound the challenges faced by farmers, merchants, and families involved in the value chain.

Despite these challenges, there are untapped opportunities for improving production and trade. Respondents suggested the use of organic fertilizers, adequate training, agricultural courses, and logistical support to enhance farming practices. Importing improved types of seeds, improving the agricultural cycle, and drilling artesian wells are seen as avenues for potential improvement. Additionally, the establishment of an agricultural bank that provides farmers with seeds, fertilizers, and agricultural loans could significantly benefit the sector.

Moreover, the interviews also revealed the importance of managing and securing fuel quantities efficiently, which not only positively impacts production but also enhances the trade sector.

Northeast Syria Agricultural Contributions

Key informants highlighted several vital functions of the Agriculture Authority in the region. One of the key roles identified by the key informant is the encouragement of farmers to secure essential production inputs, particularly fertilizers and fuel. The Authority's initiatives, such as providing sterilized seeds at subsidized prices compared to neighboring sources and offering subsidized fuel of appropriate quality and quantity, have been pivotal in supporting local agriculture. These measures not only enhance crop yields but also alleviate financial burdens on farmers, ensuring sustainable production.

Financial support to farmers emerged as another critical aspect by the key informants. The Authority's provision of financial assistance to farmers, be it in the form of grants or loans, has been instrumental in empowering farmers to invest in their agricultural endeavors. This financial aid not only improves the livelihoods of farmers but also contributes to the overall food security of the region.

Furthermore, key informants recognized the Agriculture Authority's commitment to lifting customs duties on fertilizers and pesticides. This measure was acknowledged as a significant boost to the agriculture sector by reducing the costs associated with essential inputs. Additionally, the Authority's emphasis on scientific research to develop crop varieties resilient to climatic fluctuations and water scarcity was seen as a forward-looking approach to ensure long-term food security.

In terms of coordination and support, the Authority's role in dealing with and coordinating with various organizations was praised for fostering collaboration among stakeholders in the agriculture sector. Moreover, their commitment to purchasing crops at favorable prices during the harvest period was noted as a key driver in motivating farmers to continue their agricultural activities.

Import facilitation of agricultural inputs and support for renewable energy, including solar energy, were also highlighted by informants as crucial aspects of the Authority's work. These efforts contribute to ensuring the availability of necessary resources for farming while promoting sustainability and reducing the environmental impact.

Main Challenges Faced Wheat and Barely Productivity

The challenges faced in wheat and barley production in Northeast Syria encompass a range of critical issues that affect both farmers and the agricultural value chain.

- **Access and Affordability of Agricultural Inputs:**

A significant hurdle for farmers in Northeast Syria is the accessibility and affordability of essential agricultural inputs, notably fuel and fertilizer. These inputs are often costly, placing a substantial financial burden on farmers and impacting crop productivity. Addressing these issues is crucial to ensure sustainable agricultural practices.

Figure 8, shows a word cloud representing the mentioned challenges by the farmers, visually depicting the most prevalent concerns.



Figure 10: Challenges in Improving Harvest for Wheat and Barley Cultivation

- **Water Scarcity and Irrigation Methods:** Water scarcity is an ongoing concern in the region. Limited access to this vital resource underscores the pressing need for modern irrigation methods to effectively sustain crop growth. Traditional practices have proven insufficient, necessitating a shift toward more advanced approaches to water management.
- **Seed Varieties and Harvesting Equipment:** Farmers' access to high-quality seed varieties is hampered by both availability and cost. Strategic interventions are imperative to alleviate this challenge, as the quality of seeds directly influences crop yields. Additionally, the difficulties in accessing modern harvesters contribute to increased labor costs and reduced efficiency during the harvest period.

- **Climate-Related Shocks and Early Warning Information:** Climate-related shocks, such as extreme weather events, pose a significant threat to agricultural stability. Respondents recommend the establishment of a support fund for farmers during such conditions, coupled with crop insurance. Access to early warning information is essential but is currently inconsistent across different regions.
- **Market Complexities:** The Northeast Syria wheat and barley market is intricate and influenced by various factors. Entities like the LSA and traders wield control, while high input costs, trade restrictions, and declining wheat prices compared to the global market present challenges. Exchange rate volatility and the impact of imports further complicate market dynamics.
- **Stakeholder Challenges in the Value Chain:** Multiple stakeholders in the wheat and barley value chain, including farmers, merchants, and families, confront a myriad of obstacles. These encompass high prices, crossing closures, fluctuations in climate, availability and affordability of quality seeds and fertilizers, and numerous other challenges that impact the region's agricultural resources.
- **Escalation of Conflict and Its Impact:** The recent surge in hostilities within Northeast Syria (NES) has had a profound and devastating impact on both civilian populations and essential infrastructure. (23) The Government of Türkiye's declaration, designating infrastructure, superstructure, and energy facilities in Syria and Iraq as legitimate targets, has led to a significant increase in Turkish Armed Forces (TAF) aerial strikes and artillery exchanges. This has resulted in extensive damage to critical infrastructure, including water and power stations, farms, and regions in proximity to civilian villages and Internally Displaced Persons (IDP) camps. This escalation has resulted in six confirmed civilian casualties and has severely disrupted electricity generation and distribution, affecting over 800,000 individuals in northern and central Hasakah Governorate. The implications of this conflict extend to food security, as power outages impact essential services, potentially causing delays in agricultural activities. An additional concern stems from the lack of electricity from the Swediyeh station, which has implications for oil infrastructure and the production of cooking gas, affecting a wide range of residents across NES.

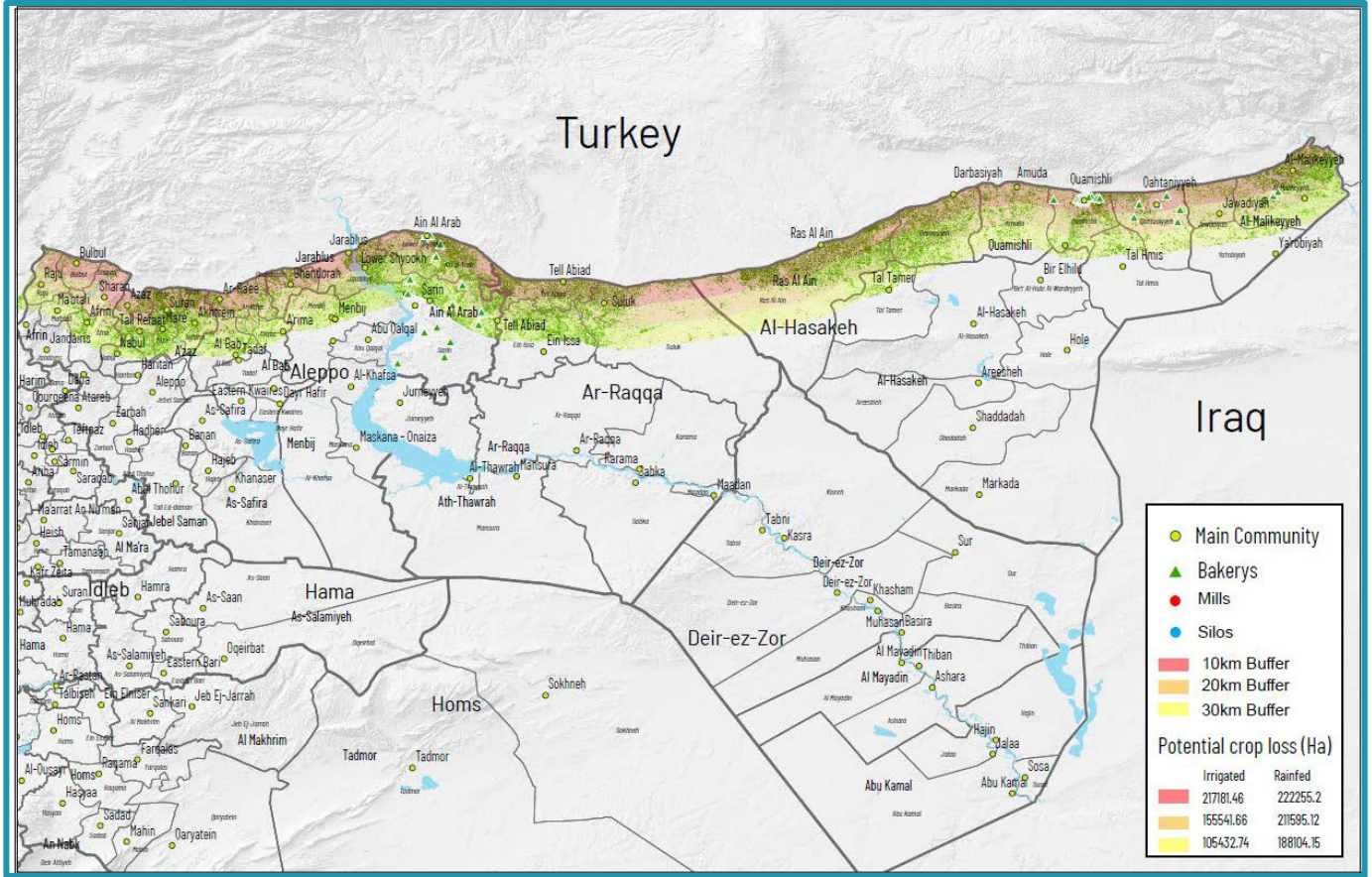


Figure 11: Syria Conflict, October 2023

Recommendations

In light of the significant challenges encountered in wheat and barley production, several recommendations have been formulated to enhance agricultural practices in Northeast Syria (NES).

- Given the persisting challenges faced by farmers, it is recommended that local authorities, humanitarian partners, and farmers increase their funding for wheat production projects. Vulnerable farmers require immediate support in the form of cash, inputs, and training to navigate the challenging conditions they confront.
- Collaboration among local authorities, farmers, humanitarian partners, national and international research centers is recommended to enhance the production of quality wheat seeds. The focus should be on drought-tolerant varieties, which can be provided to vulnerable smallholder farmers at subsidized prices. Cooperation with the private sector to distribute improved seeds with controlled profit margins can help stabilize prices.
- Efforts should be made to alleviate the financial burden of high prices of fertilizers, pesticides, herbicides, and other agricultural medicines. Local authorities, humanitarian partners, and international institutions can cooperate to ensure the availability and affordability of these inputs. This includes gathering appropriate information to understand the quantity and quality of input needed, possibly through imports. Long-term strategies may involve local production to reduce costs and dependency on imports.
- Local authorities can contribute to reducing the cost of transporting wheat to delivery centers, particularly for small farmers. Furthermore, streamlining procedures and eliminating obstacles for direct financial benefits to farmers is essential.

References

1. **FAO.** Special Report: 2021 FAO Crop and Food Supply Assessment Mission to the Syrian Arab Republic. *Reliefweb*. [Online] December 2021. <https://reliefweb.int/report/syrian-arab-republic/special-report-2021-fao-crop-and-food-supply-assessment-mission-syrian>.
2. **WFP.** Syria: life in the time of food insecurity. *European Commission*. [Online] October 2022. https://civil-protection-humanitarian-aid.ec.europa.eu/news-stories/stories/syria-life-time-food-insecurity_en#:~:text=Syria%2C%20a%20country%20that%20used,and%20the%20upward%20trend%20continues.
3. **Aydın-Kandemir, Fulya and Yildiz, Dursun.** Water Conflicts and the Spatiotemporal Changes in Land Use, Irrigation, and Drought in Northeast Syria with Future Estimations. *ResearchGate*. [Online] January 2022. https://www.researchgate.net/publication/357832011_WATER_CONFLICTS_AND_THE_SPATIOTEMPORAL_CHANGES_IN_LAND_USE_IRRIGATION_AND_DROUGHT_IN_NORTHEAST_SYRIA_WITH_FUTURE_ESTIMATION S.

4. **OCHA.** Syrian Arab Republic: 2023 Humanitarian Needs Overview. *ReliefWeb*. [Online] Dec 2022. <https://reliefweb.int/report/syrian-arab-republic/syrian-arab-republic-2023-humanitarian-needs-overview-december-2022-enar>.
5. **VAM, WFP** -. DataViz - World Food Programme. *Dataviz Visualizations: Seasonal Explorer: Rainfall and Vegetation*. [Online] Sep 25, 2023. <https://dataviz.vam.wfp.org/version2/climate-explorer>.
6. **ACAPS.** ACAPS Thematic Report: Northern Syria - Key crises to watch. *ReliefWeb*. [Online] <https://reliefweb.int/report/syrian-arab-republic/acaps-thematic-report-northern-syria-key-crises-watch-4-august-2023>.
7. **CWG/REACH.** *CWG/REACH JMMI dataset for Northeast Syria*. July 2023.
8. **Agencies, News.** Syrian pound sinks to historic low on the parallel market. *Aljazeera*. [Online] July 19, 2023. <https://www.aljazeera.com/news/2023/7/19/syrian-pound-sinks-to-historic-low-on-the-parallel-market>.
9. **iMMAP.** Wheat-to-Bread Market Assessment in Northeast Syria - NES. *iMMAP*. [Online] April 2023. <https://immap.org/product/wheat-to-bread-market-assessment-part-1-northeast-syria-april-2023/>.
10. -. Context Update - Earthquake Edition. *iMMAP*. [Online] Feb 2023. <https://immap.org/product/context-update-syria-february-2023/>.
11. **REACH.** Current Situation of the Water Crisis in Northeast Syria and its Humanitarian Impacts, July 2023 | Northeast Syria. *ReliefWeb*. [Online] Jun26 2023. <https://reliefweb.int/report/syrian-arab-republic/current-situation-water-crisis-northeast-syria-and-its-humanitarian-impacts-july-2023-northeast-syria>.
12. **Holleis, Jennifer.** How climate change paved the way to war in Syria. *DW*. [Online] 26 2, 2021. <https://amp.dw.com/en/how-climate-change-paved-the-way-to-war-in-syria/a-56711650?ref=enhibamohammad.com>.
13. **PAX.** "We fear more war, we fear more drought": How climate and conflict are fragmenting rural Syria. *ReliefWeb*. [Online] 2 16, 2022. <https://reliefweb.int/report/syrian-arab-republic/we-fear-more-war-we-fear-more-drought-how-climate-and-conflict-are?ref=enhibamohammad.com>.
14. **Mauvais, Lyse and Amin, Solin.** Double blow: Syria braces for historic drought after earthquake. *Al-Monitor*. [Online] 2 18, 2023. <https://www.al-monitor.com/originals/2023/02/double-blow-syria-braces-historic-drought-after-earthquake>.
15. *Sources of wheat resistance to Sunn pest, Eurygaster integriceps Puton, in Syria.* **Mustapha El Bouhssini, Ken Street, Abdallah Joubi, Zakaria Ibrahim & Fawzi Rihawi.** 2009, Vol. 56.
16. **WFP.** WFP Syria Situation Report. *Reliefweb*. [Online] June 2023. <https://reliefweb.int/report/syrian-arab-republic/wfp-syria-situation-report-6-june-2023>.
17. -. Ramadan in Syria: Rising food prices push basics out of reach. *WFP*. [Online] April 2022. <https://www.wfp.org/stories/ramadan-syria-rising-food-prices-push-basics-out-reach>.

18. —. WFP Syria Price Bulletin. *FSCluster*. [Online] Aug 2022. <https://fscluster.org/syria/document/wfp-syria-price-bulletin-august-2022>.
19. —. WFP Syria Price Bulletin. *FSCluster*. [Online] July 2023. <https://fscluster.org/syria/document/wfp-syria-price-bulletin-july-2023>.
20. **iMMAP**. Wheat to Bread Market Assessment. *iMMAP*. [Online] Aug 2023. <https://immap.org/product/wheat-to-bread-market-assessment-part-2-northeast-syria-august-2023/>.
21. **AANES**. Muhammad Shawqi: The Autonomous Administration set wheat prices to raise the interest of farmers, despite the political and social challenges. *Official Website of AANES*. [Online] May 2023. <https://aanegov.org/?p=3679>.
22. **FAO**. FAO Agriculture Input and Commodity Price Bulletin. *FSCluster*. [Online] July 2023. <https://fscluster.org/syria/document/fao-agriculture-input-and-commodity-5>.
23. **SIRF**. Situation Report #1, October 7, 2023: Escalation of Hostilities Targeting Critical Civilian Infrastructures in Northeast Syria. *ReliefWeb*. [Online] Oct 9, 2023. <https://reliefweb.int/report/syrian-arab-republic/situation-report-1-october-7-2023-escalation-hostilities-targeting-critical-civilian-infrastructures-northeast-syria>.
24. **Network, Tribune News**. Qatar Charity rehabilitates water station in Syria's north. *Qatar Tribune*. [Online] Aug 10, 2023. <https://www.qatar-tribune.com/article/77717/nation/qatar-charity-rehabilitates-water-station-in-syrias-north>.