SITUATION OVERVIEW

Wheat and barley post-harvest assessment - 2023-2024 agricultural season

January 2025 | Northeast Syria (NES)

Context & Rationale

As of October 2024, Northeast Syria (NES) continued to face significant challenges stemming from prolonged conflict and economic crisis. The region remained plagued by recurrent flare-ups of armed conflict and destruction of civilian infrastructure,[1] including water systems and agricultural land, continuing to hamper the sustainable economic recovery of communities.[2] In 2024, the further depreciation of the Syrian Pound (SYP) against the US Dollar (USD) continued to fuel inflation, sharply increasing the cost of essential goods and pushing more households into poverty. Between October 2023 and October 2024, the Survival Minimum Expenditure Basket (SMEB) in SYP rose by 26%,[3] while according to REACH's 2024 Multi-Sectoral Needs Assessment (MSNA), 44% of households in NES faced food security and livelihoods (FSL) needs.

The agricultural sector, a historically vital source of livelihoods in NES, has been severely impacted by compounded challenges, undermining both productivity and long-term economic and environmental sustainability. Farmers face restricted access to arable land due to ongoing conflict and displacement, alongside reduced water availability.[4] Rising production costs have further strained the sector, making farming increasingly unaffordable. High operational costs remain a significant barrier to agricultural livelihoods,[5] contributing to the documented decline in agricultural production and exacerbating regional food insecurity.[6] Climatic variability and environmental factors, such as irregular rainfall, rising temperatures, and prolonged droughts, have also substantially hindered productivity.[7] [8]

This assessment evaluated the 2023-2024 wheat and barley agricultural season in NES, analyzing production trends, climate-related challenges, and input constraints. It also examined farmers' coping strategies and financial conditions, aiming to support FSL partners in future planning and advocacy to strengthen agricultural livelihoods and food systems in the region.

Methodology Overview

The assessment employed a mixed-methods approach. A total of 986 quantitative individual interviews (IIs) were conducted with wheat and barley farmers across 32 sub-districts in NES between September 22 and 30, 2024. In addition, 46 structured key informant (KI) interviews with agricultural authorities and experts were carried out between October 30 and 31, 2024. The study also incorporated remote sensing data analysis and a desk review of secondary sources to further inform the findings.

A purposive sampling method was employed, targeting farmers across various sub-districts, with an initial quota of 30 surveys per sub-district. This approach allowed for flexibility in data collection while ensuring comprehensive coverage of agricultural challenges. The findings were then aggregated at the sub-district and governorate levels. For more detailed information on the methodology, please consult the Assessment methodology section.

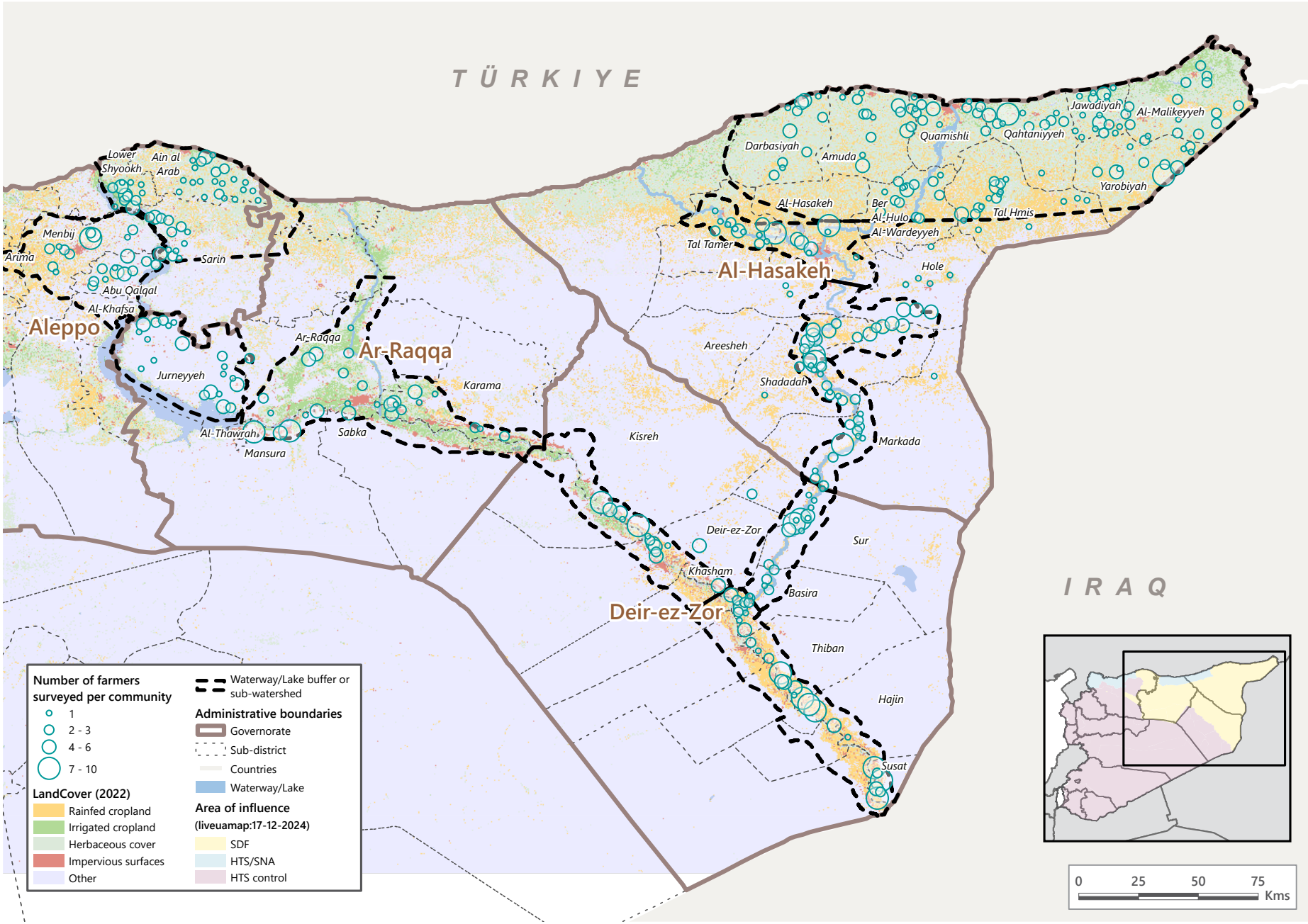
Due to this purposive sampling approach, findings from this assessment should be interpreted as indicative only.

Findings should be interpreted with caution, as they reflect the situation up until October 2024. Given the rapidly changing political, economic, and security context at the time of publishing of this report's publication,[9] the validity and relevance of the results may be limited. Nonetheless, these insights remain useful for informing policy and humanitarian interventions, but their applicability must consider the evolving circumstances in NES.

Key Findings

- **Wheat and barley production levels in Northeast Syria (NES) likely declined overall during the 2023-2024 agricultural cycle compared to the previous one, driven by significant yield reductions alongside the majority of farmers reporting stable or decreased cultivated land in all governorates.** Specifically, 82% of wheat farmers and 79% of barley farmers reported lower yields than the previous season. A potential decrease in aggregate barley and wheat production could reduce grain availability in markets, drive up prices, and exacerbate food insecurity risks for communities reliant on wheat- and barley-based staples.
- **Farmers' reports indicate that 33% of surveyed farmers faced insufficient water availability for their production plans.** The main reported causes were low rainfall levels, high fuel prices, and inconsistent fuel supply. This suggests that, despite slightly above-average rainfall and generally stable temperature and vegetation conditions, economic challenges played a greater role in limiting water access in the region, highlighting the significant impact of financial constraints on water availability.
- **The high cost of key inputs was overwhelmingly cited as the most significant challenge affecting the production cycle in NES, reported by 80% of surveyed farmers, followed by high temperatures (48%) and low rainfall levels (38%).** In fact, the totality of respondents in NES reported facing financial barriers for at least one essential input. Exchange rate fluctuations, rising fuel prices, and inconsistent fuel availability were found to be major drivers of inputs unaccessibility, hampering farmers' capacity to respond to environmental hazards and meet production needs.
- **Post-harvest losses emerged as a significant and reportedly growing challenge for wheat and barley production in NES, with 46% of farmers reporting such losses.** Notably, nearly half of these farmers indicated losing half or more of their harvest. Furthermore, 85% of those who experienced losses stated that these were somewhat or considerably higher than the previous season, overwhelmingly attributed to the rising costs of harvest-related expenses.
- **Farmers in NES face an increasingly unsustainable economic environment marked by rising operational costs and declining selling prices and revenues.** While 94% of all farmers reported higher operational expenses, KIs unanimously highlighted a downward trend in selling prices across both private and public marketing channels over the past year, emphasizing that even the Autonomous Administration of Northeast Syria (AANES) fixed price no longer covers the escalating costs of agricultural inputs.
- **Combined data on economic performance and coping strategies suggest that a significant portion of agricultural businesses in NES are facing increasing financial strain.** Nearly two thirds (63%) of all farmers interviewed reported that their revenues did not cover production costs, with limited differences across governorates. Among those experiencing losses, the great majority (72%) indicated they had to take on additional debt during the year to address the challenges they faced.

Map 1: Assessment coverage map



Farmer profiles

Figure 1: Assessed wheat and barley cultivated land sizes, in donums[14]

Figure 2: Proportion of assessed farmlands, by crop grown during the 2023-2024 agricultural season.

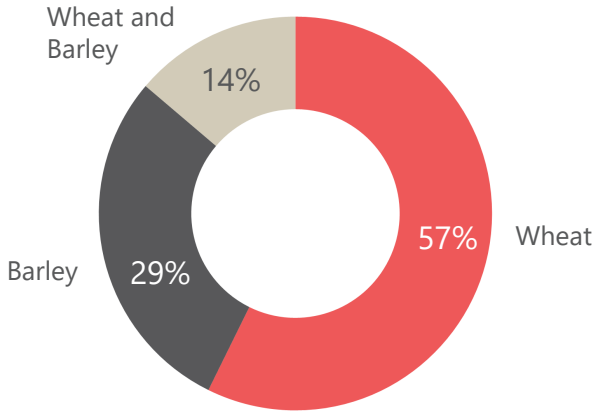


Table 1: Proportion of irrigation methods used per crop type, by percentage of respondents by governorate and overall

	Aleppo	Al-Hasakeh	Ar-Raqqa	Deir-ez-Zor	Overall
Wheat					
Irrigated	70%	42%	81%	97%	65%
Mix	5%	11%	6%	2%	7%
Rainfed	25%	47%	13%	1%	28%
Barley					
Irrigated	13%	22%	38%	88%	34%
Mix	5%	15%	6%	8%	10%
Rainfed	82%	64%	56%	5%	55%

In northeast Syria (NES), irrigation methods were found to be tied to the type of crop cultivated. Although the proportions of barley and wheat farmers were similar across the four assessed governorates, **the majority of wheat farmers (65%) relied on irrigated agriculture, while most barley farmers (55%) favored rainfed systems**, a pattern consistent across three of the four governorates (Table 1). This divergence can be explained by barley's higher drought resistance compared to wheat, making it more suitable for rainfed farming in water-scarce regions. Moreover, the lower operational costs associated with rainfed agriculture may further incentivize farmers to adopt this approach for barley cultivation.[10]

Beyond the influence of crop type, irrigation methods were strongly associated with agroecological zones and watershed conditions (Map 2). For instance, in Deir-ez-Zor governorate—characterized by an arid agroecological zone with the lowest average annual rainfall levels, the vast majority of farmers, regardless of crop type, relied exclusively on irrigated agriculture. Conversely, in Hasakeh governorate, characterised by higher average yearly levels of rainfall across most of its territory, rainfed agriculture was more prevalent for both barley and wheat cultivation.

Irrigation practices in NES are influenced not only by environmental and agroecological factors but also by economic and security conditions. The Euphrates and Khabur rivers are critical for irrigated agriculture in NES, supplying surface water for the cultivation of wheat and barley in the whole region. In recent years, water and irrigation infrastructure stemming from these rivers has been repeatedly affected by conflict, with reports documenting the direct targeting of infrastructure, as well as upstream water management practices, including dam construction, discretionary control over water flow, and the discharge of untreated wastewater into these sources.[11] [12] These actions have significantly affected agricultural land, reducing irrigation and cultivation capacity, leading to an uneven distribution and extent of irrigated agricultural lands, particularly in areas near the borders.[13]

Map 2: Wheat yields and reported main irrigation method for wheat farmlands during the 2023-2024 wheat growing season

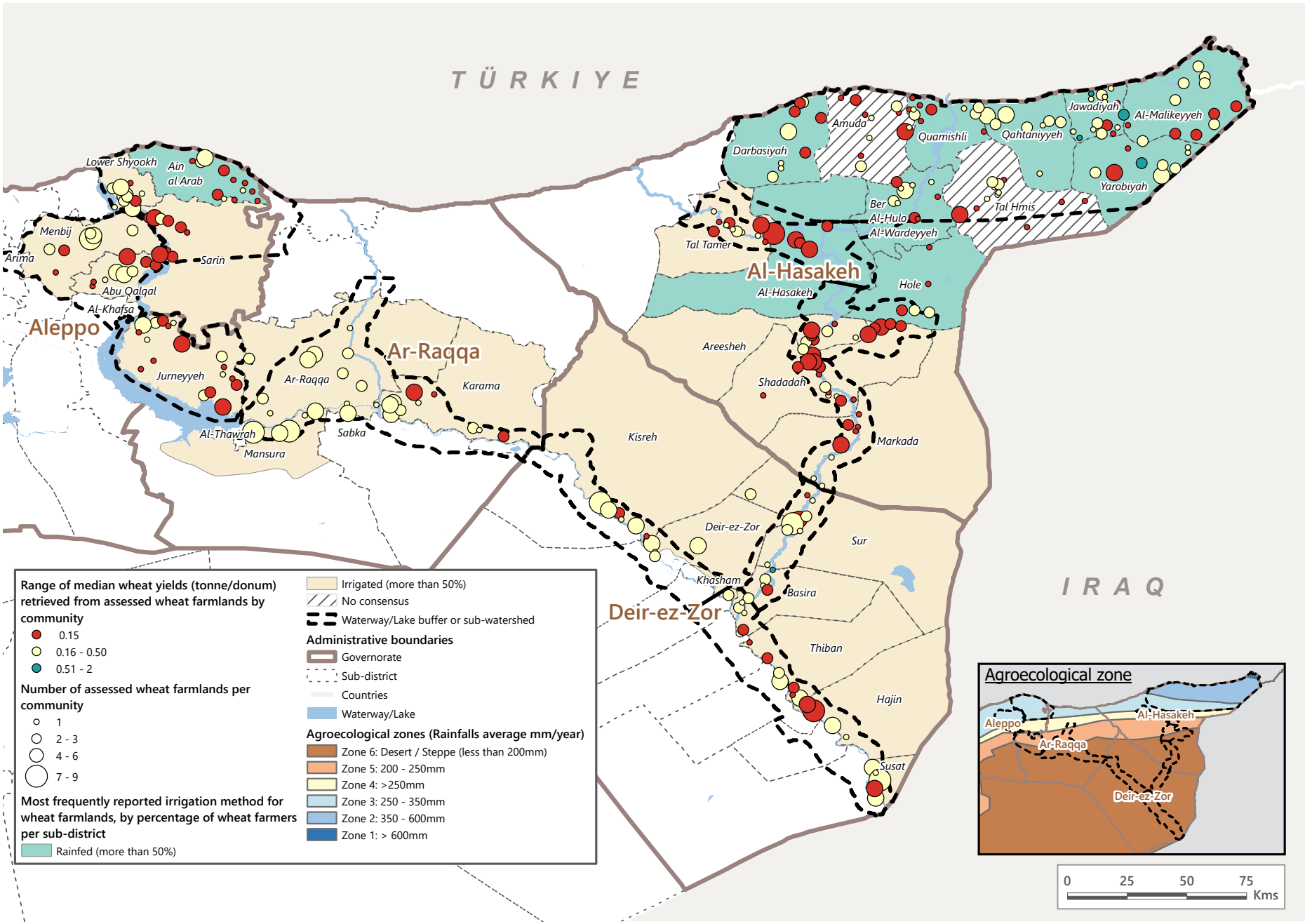


Table 2: Median wheat and barley yields[16] for the 2023-2024 agricultural season by irrigation method and governorate, alongside reported changes in productivity and cultivated area compared to the previous season, by percentage of wheat and barley respondents per governorate

		Aleppo	Al-Hasakeh	Ar-Raqqa	Deir-ez-Zor	Overall
WHEAT	Median yield (tonne/donum) for the 2023-2024 season					
	Irrigated	0.227	0.171	0.267	0.195	0.200
	Mix	0.200	0.121	0.217	NA	0.180
	Rainfed	0.100	0.130	0.075	NA	0.115
	Overall	0.200	0.150	0.250	0.195	0.183
	Reported change in yield compared to previous season (2022-2023)					
	Yield was less	89%	68%	94%	93%	82%
	Yield was the same	5%	9%	5%	3%	6%
	Yield was more	7%	23%	1%	4%	12%
	Reported change in cultivated land compared to previous season (2022-2023)					
	Remained the same	75%	52%	70%	60%	61%
	Decreased	16%	30%	19%	29%	25%
	Increased	9%	18%	11%	11%	14%
BARLEY	Median yield (tonne/donum)					
	Irrigated	0.200	0.133	0.183	0.144	0.150
	Mix	0.122	0.133	0.160	0.092	0.125
	Rainfed	0.100	0.080	0.100	0.025	0.089
	Overall	0.100	0.100	0.140	0.131	0.100
	Reported change in yield compared to previous season (2022-2023)					
	Yield was less	82%	71%	84%	91%	79%
	Yield was the same	8%	6%	10%	6%	7%
	Yield was more	10%	24%	6%	3%	15%
	Reported change in cultivated land compared to previous season (2022-2023)					
	Remained the same	72%	49%	59%	63%	58%
	Decreased	18%	37%	18%	26%	29%
	Increased	10%	14%	22%	11%	14%

Wheat and barley yields

Land productivity varied significantly across governorates in NES, likely influenced by environmental conditions, irrigation methods and crop types. Wheat consistently outperformed barley in productivity across all governorates and irrigation methods, with Raqqa reporting the highest productivity levels for both crops and nearly all irrigation practices.

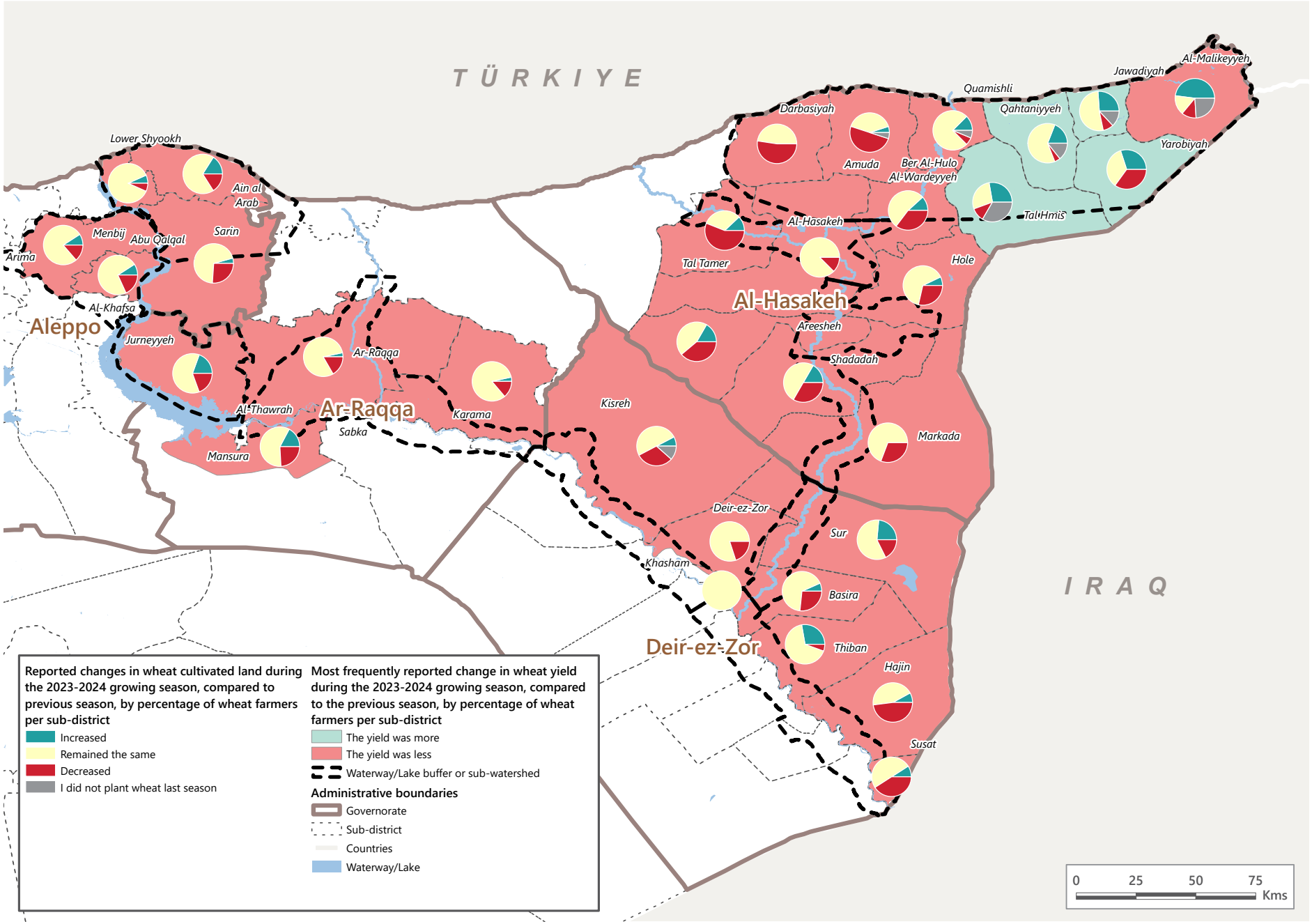
The extension of cultivated land exhibited relative stability compared to the previous agricultural cycle. A majority of wheat (61%) and barley (58%) farmers reported no changes in the size of their farmland between the 2023–2024 and 2022–2023 seasons. **However, widespread yield declines were evident across all governorates**, with the vast majority of all wheat (82%) and barley (79%) farmers reporting lower yields compared to the previous season. These declines were further reflected in high dissatisfaction rates, with 81% of overall farmers expressing moderate to significant dissatisfaction with the harvest, signaling a challenging agricultural season. Notably, declining wheat and barley yields in the region have been a recurrent trend in recent years, underscoring a chronically declining and worsening situation for agricultural productivity.

While the magnitude of changes in cultivated land and yield was not assessed, assuming equal scales for reported positive and negative changes, **the predominance of yield reductions—combined with a larger proportion of farmers reporting stable or decreased cultivated land rather than increases—strongly indicates that overall wheat and barley production likely declined at the governorate and regional level.** This trend was less pronounced in Hasakeh, which has the highest share of rainfed agricultural croplands, and may reflect the mitigating effect of the above-average rainfall during the 2023–2024 season.[15]

A potential decline in aggregate wheat and barley production could reduce local market availability, drive up prices, and exacerbate food insecurity risks for communities dependent on these staples.

Despite these retrieved challanges, the majority of the key informants (KIs) interviewed in NES (74%) indicated that, despite the reduced yield, local wheat and barley production in their district will likely remain sufficient to meet expected levels of demand for the 2024-2025 marketing period (July 2024–June 2025).

Map 3: Reported changes in cultivated wheat land and wheat yields during the 2023-2024 wheat growing season compared to the previous season (2022-2023)



Production cycle

Table 3: Top 5 factors most frequently reported as most negatively impacting wheat and/or barley yields during the 2023-2024 agricultural season, by percentage of respondents per governorate and overall

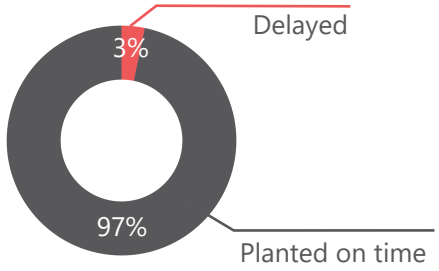
	Aleppo	Al-Ha-sakeh	Ar-Raqqa	Deir-ez-Zor	Overall
High cost of key inputs (seeds, water, fuel, fertilisers/pesticides)	92%	71%	92%	85%	80%
High temperatures	28%	54%	36%	55%	48%
Low rainfall	20%	50%	24%	33%	38%
Poor soil health/fertility	31%	22%	10%	22%	21%
Impact of disease or fungi	21%	18%	16%	10%	17%

All respondents (100%) indicated that one or more factors negatively impacted the 2023–2024 wheat agricultural cycle. The high cost of essential agricultural inputs—such as seeds, water, fuel, fertilizers, and pesticides—emerged as the most commonly reported issue affecting wheat and barley yields. This factor was highlighted by the vast majority of respondents across all governorates, standing out significantly compared to other reported challenges.

This finding highlights that affordability is a key determinant of agricultural productivity in NES. In this context, high input costs are not merely operational challenges but significant indicators of systemic barriers that undermine both the financial viability of farming and the long-term resilience of agricultural livelihoods, and ultimately the level of food security in the region.

Planting

Figure 3: Timeliness of wheat and barley planting, by percentage of total respondents



- **Planting timeline:** November was the primary planting month, with 64% of wheat farmers and 49% of barley farmers sowing their crops during this period, while smaller proportions planted in December (20% for wheat and 42% for barley).
- **Causes of planting delay:** delayed planting was mostly attributed to the high cost of inputs (22/32) and low rainfall (8/32 respondents).

Germination & health

- **Germination rate & plant health:** The mid-season crop assessment conducted by REACH in April 2024 indicated that the vast majority of farmers in NES reported a satisfactory germination rate (93%), with over half of their seeds successfully sprouting. Additionally, 91% of farmers reported the resultant crops to be in a somewhat or very healthy condition. For further details, please refer to the NES mid-season assessment report.

Harvest

- **Wheat harvest timeline:** most wheat (72%) farmers harvested in June, followed by smaller percentages harvested in May (14%) and July (16%).
- **Barley harvest timeline:** most barley (63%) farmers harvested in May, followed by smaller percentages who harvested in June (34%).
- **Harvest rate:** the majority of wheat and barley farmers reported harvesting all (79%) or more than half (12%) of their planted land. These rates were largely consistent across all governorates, with the exception of Al-Hasakeh, where a notably higher proportion of respondents reported harvesting half (7%) or less than half (7%) of their planted crops compared to other governorates.

Table 5: Top 5 challenges most frequently reported by wheat and/or barley farmers during the harvest stage, by percentage of respondents per governorate.

	Aleppo	Al-Hasakeh	Ar-Raqqa	Deir-ez-Zor	Overall
High prices of transportation	75%	64%	59%	61%	64%
High cost of labour force	58%	59%	56%	77%	63%
High cost of warehouse, bags	78%	53%	77%	43%	58%
Drought or excessive heat	8%	30%	12%	24%	23%
Shortage of transport resources	14%	15%	7%	20%	15%

Financial barriers to accessing essential agricultural inputs

Table 6: Most commonly reported inputs for which wheat and barley farmers faced financial barriers during the 2023-2024 agricultural cycle, by percentage of respondents per governorate and overall

	Aleppo	Al-Ha-sakeh	Ar-Raqqa	Deir-ez-Zor	Overall
Fertilisers	91%	70%	89%	94%	81%
Seeds	82%	66%	51%	68%	67%
Fuel	71%	52%	51%	85%	62%
Pesticides / Herbicides	65%	58%	40%	53%	55%
External services (machine maintenance, specialised agri-services)	42%	37%	18%	38%	35%
Tools, equipment and machinery	46%	40%	20%	10%	32%
None	0%	0%	0%	0%	0%

The totality (100%) of overall farmers interviewed in NES reported facing market or financial barriers in accessing essential inputs during the latest agricultural cycle (Table 6). This figures reinforce previous findings on access to agricultural inputs and financial barriers being the main factor that negatively affected production, highlighting the deepening economic unsustainability of agricultural operations in NES.

Notably, Aleppo governorate had the highest proportion of respondents reporting economic or financial barriers across the widest range of input categories compared to other governorates. This may suggest that farmers in Aleppo are facing more severe financial challenges compared to other governorates.

Fertilizers were the most commonly reported input facing financial barriers, cited by 81% of farmers across all four governorates. This proportion was consistent across all four governorates, for all types of croplands, regardless of irrigation methods, underscoring the critical reliance on fertilizers for improving productivity and the financial strain associated with their rising costs. Seeds were the second-most reported financial barrier overall (67%), though the prevalence varied widely across governorates.

Table 7: Top 4 financial barriers faced for the top 4 inputs for which farmers most commonly reported facing financial barriers, barriers by percentage of overall farmers

	High prices	Lack of access to liquidity	Lack access to credit	Poor quality
Fertilisers	83%	38%	35%	22%
Seeds	83%	33%	39%	23%
Fuel	73%	34%	32%	27%
Pesticides / Herbicides	79%	34%	34%	29%

Table 8: Degree of negative impact reported for the top 4 inputs for which wheat and/or barley farmers most commonly faced financial barriers, by percentage of overall respondents

	Low	Moderate	High
Fertilisers	10%	45%	45%
Seeds	18%	48%	35%
Fuel	8%	33%	60%
Pesticides / Herbicides	18%	53%	29%

High costs of agricultural inputs, coupled with reduced purchasing power among farmers and limited access to liquidity and financial services, have emerged as the primary drivers of financial barriers. For all the top four inputs—fertilizers, pesticides/herbicides, seeds, and fuel—farmers most frequently cited high prices as the primary market challenge, followed by limited access to liquidity and to credit. In contrast, issues like low quality, lack of availability, or non-functional markets were reported at negligible levels (Table 7).

Seeds

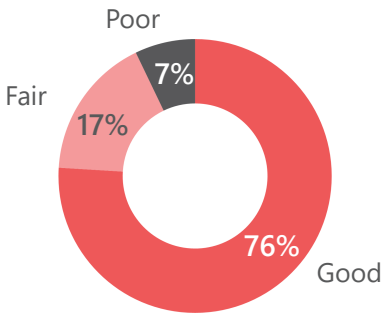
Data on seed access in NES suggests high levels of accessibility, with 93% of farmers reporting access to an adequate quantity of seeds and 97% stating that the seeds they obtained were suitable for their soil composition, land size, and local climatic conditions. Additionally, almost all (95%) farmers reported being aware of the origin of their seeds. The majority of farmers (77%) relied exclusively on local seeds for cultivation. Among the 18% of farmers who reported using all or some imported seeds, Turkey and Germany emerged as the primary suppliers, each cited by 33% of respondents.

Table 9: Top 3 most frequently reported seed sources among wheat and/or barley farmers during the 2023-2024 agricultural season, by percentage of respondents per governorate

	Aleppo	Al-Hasakeh	Ar-Raqqa	Deir-ez-Zor
Traders	76%	70%	85%	88%
Stored from previous seasons	20%	20%	21%	29%
From local council	15%	6%	3%	2%

Most farmers (89%) also reported knowing the number of seed varieties they were using, with 81% of these relying on a single variety and 18% using two. These figures confirm the previously widely documented low levels of seed variety adoption and diversification among farms in NES,[17] raising significant concerns for the sustainability of crop production and seed conservation. Limited genetic diversity increases vulnerability to pests, diseases, and decreases adaptability to environmental stresses, increasingly frequent with climate change. This reliance on a narrow genetic base jeopardizes long-term agricultural resilience, posing critical challenges to the sustainability of wheat and barley food security.[18]

Figure 4: Reported wheat and/or barley seed quality during the 2023-2024 agricultural season, as percentage of overall farmers interviewed in NES



This risk is compounded by the fact that **two-thirds of the seeds employed in NES were reportedly unregistered (65% of farmers) and uncertified (64%).** The use of such seeds threatens seed biodiversity and local systems by reducing genetic diversity, facilitating the spread of pests and diseases, and delivering inconsistent quality. The top challenges reported by KIs for the seed system in their sub-district were the low seed quality or adulteration (70%), the limited access to improved or certified seed varieties (46%), the lack of financial resources to purchase seeds (46%) and the impact of fuel shortages on the seed market (46%).

Fertilisers, Herbicides, Pesticides

Table 10: Share of inputs use and of disease incidence during the 2023-2024 agricultural season, by percentage of respondents per governorate

	Aleppo	Al-Hasakeh	Ar-Raqqa	Deir-ez-Zor
Inputs use				
Fertilizers	77%	47%	84%	93%
Pesticides	52%	35%	51%	47%
Herbicides	78%	57%	82%	72%
Pests and diseases incidence				
Diseases	66%	58%	60%	60%
Pests	49%	20%	49%	35%
Reported change in pesticide/herbicide use compared to previous season				
Increased	7%	30%	8%	16%
Same	59%	39%	74%	59%
Decreased	34%	30%	18%	25%

While the incidence of diseases and pests was found to be relatively similar across governorates, significant geographical variation emerged in the use of fertilizers, pesticides, and herbicides, as well as in changes to their use compared to the previous agricultural season. This variation likely reflects a combination of factors, including the high financial barriers that farmers face in accessing these inputs—identified as the primary constraint on production—and differing climatic conditions, rainfall levels, and irrigation methods, which influence the demand elasticity for these products.

The vast majority (87%) of KIs across the four governorates reported price increases for herbicides and pesticides in their sub-districts during the 2023-2024 agricultural season. This trend aligns with the rise in global and regional fuel prices during the same period, as well as the 23% increase in the USD/SYP exchange rate between October 2023 and October 2024, rendering any import of fuel-based products more expensive.[19] These factors have a significant impact on the cost of key agricultural inputs, including fertilizers, herbicides, and pesticides, thereby escalating the financial burden on farmers.

Al-Hasakeh, which has the highest percentage of rainfed crops, exhibited the lowest rates of input use across all three categories. This can be attributed to the nature of rainfed agriculture, which relies entirely on natural rainfall and offers a lower yield potential compared to irrigated systems. Given this lower yield potential and the substantial financial barriers to accessing inputs, farmers may be less inclined to invest heavily in fertilizers and pesticides, as the return on investment might be insufficient to justify the cost.

Water

A third of interviewed farmers across NES (32%) indicated that water availability, regardless of the irrigation method, was not sufficient to meet their production objectives for the season. Most farmers noted that water availability either remained the same (47%) or decreased (36%) compared to the previous agricultural season.

The reasons for insufficient water availability varied widely across governorates, often reflecting dominant irrigation practices. In governorates where rainfed agriculture is prevalent, **low rainfall levels** were cited as the primary challenge. Conversely, in areas more reliant on irrigated agriculture, the **high cost and unavailability of fuel** to operate water pumps were identified as the main barriers. It is worth noting that for irrigated irrigated crops man-made water access challenges and damage to the irrigation infrastructure in armed conflicts have been persistently documented in the last years.

Table 12: Selected remote sensing indicators by governorate for the 2023-2024 agricultural season

	Aleppo	Al-Hasakeh	Ar-Raqqa	Deir-ez-Zor
Average Land Surface Temperature (LST) anomalies[22]	-0.83	-0.29	-0.29	1.99
Average of NDVI anomalies[23]	0.058	0.057	0.102	0.034
Average of Standard Precipitations Index (SPI)[24]	0.061	0.227	0.113	0.355
Sum of rainfalls anomalies (in millimeters)[25]	52	715	199	279

Table 11: Reported degree of overall water availability during the 2023-2024 agricultural season, by percentage of respondents per governorate

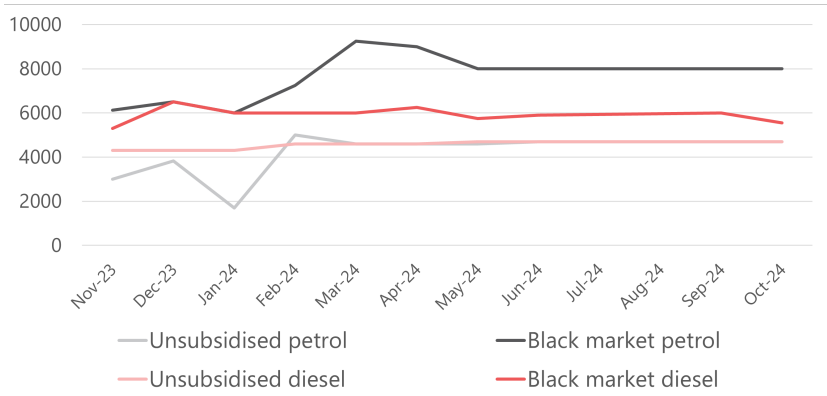
	Aleppo	Al-Hasakeh	Ar-Raqqa	Deir-ez-Zor
Main water source of irrigated wheat and/or barley crops				
Private well/borehole	82%	90%	23%	34%
Directly from surface water	17%	10%	67%	63%
Water availability (including rainfed and irrigated wheat and/or barley crops)				
Mostly sufficient	51%	42%	42%	36%
Completely sufficient	30%	15%	34%	41%
Mostly insufficient	13%	33%	19%	20%
Completely insufficient	6%	11%	5%	3%
Top 3 reasons for water shortages (including rainfed and irrigated wheat and/or barley crops)				
Low rainfall	76%	76%	62%	30%
Fuel/electricity to operate the water pumps was too expensive	31%	47%	21%	68%
Shortage of fuel/electricity to enable the operation of water pumps	10%	25%	18%	62%

Fuel

During the 2023–2024 agricultural season, petrol prices increased significantly, while overall reported availability declined. Data from REACH's Joint Market Monitoring Initiative (JMMI) showed a steady rise in the cost of of monitored petrol across both fuel stations and the black market (Figure 6). This trend was corroborated by most KIs (83%) across NES, which reported that fuel availability in their sub-districts was either considerably or slightly lower compared to the previous season.

The combination of higher fuel prices and reduced fuel availability has critical implications for irrigated agriculture. Fuel is essential for operating water pumps and irrigation systems, and its scarcity directly affects farmers' ability to maintain consistent water supply to their crops. In Deir-ez-Zor, where agriculture is almost entirely dependent on irrigation, this issue was identified as the primary cause of water unavailability during the season. Furthermore, higher fuel costs increase overall production expenses, making it even harder for farmers to afford other agricultural inputs, such as fertilizers and pesticides. This situation exacerbates financial pressures, reduces the profitability of farming activities, and increases the vulnerability of communities reliant on agriculture for their livelihoods and food security.[21]

Figure 6: Changes in median petrol and diesel unsubsidised and black market prices in NES during the 2023-2024 agricultural season, measured in TRY, as tracked by REACH JMMI[20]



Post-harvest losses

Almost half (46%) of farmers reported experiencing post-harvest losses (Figure 7), with higher incidences in Ar-Raqqa, Aleppo and Dei-ez-Zor (54%, 53% and 50% of respondents there respectively), compared to Al-Hasakeh (39%). Among those affected, half (54%) reported losing less than 40% of their harvest, while a significant 46% lost half or more—predominantly in Deir-ez-Zor. To note that 85% of overall farmers who experienced post-harvest losses also reported losses were somewhat or considerably more than the previous season.

The high costs of harvest-related expenditures create financial pressure that can force farmers to compromise on essential post-harvest activities. Farmers may delay harvesting because they cannot afford machinery or labor at the optimal time, leaving crops vulnerable to over-ripening or adverse weather. Transportation costs can delay the movement of harvested crops to storage or markets, increasing the likelihood of spoilage. Additionally, many farmers may be unable to invest in proper storage facilities, leaving their produce susceptible to pests, moisture, or contamination. Financial constraints also limit post-harvest handling activities, such as drying, sorting, or packaging, further reducing

Figure 7: Share of interviewed wheat and/or barley farmers in NES who reported incurring into post-harvest losses during the 2023-2024 agricultural season

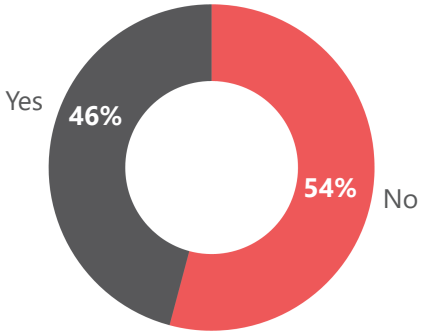


Table 13: Top 3 reasons for post-harvest losses, by percentage of respondents who reported incussing into post-harvest losses

	Total
High costs of harvest related expenditures	90%
Transportation challenges	26%
Limited access to markets	13%

Marketing strategies

Data on production management and farmers' marketing strategies reveal notable similarities across the four governorates, alongside a significant degree of diversification in output management approaches. Most respondents reported selling either all or part of their harvest immediately after production, reflecting a predominant market-oriented strategy. However, alternative strategies were also widely reported, including storing part of the harvest for next year's seeds, using it for home consumption, or allocating it for fodder.

In NES, different marketing channels are associated with varying costs, impacting farmers' decisions on where to sell their crops. On the other hand, the marketing channels farmers relied on to sell their wheat harvest reveal the overwhelming dominance of private traders as the primary intermediary (Table 15). When selling to private traders, farmers avoid vechicle rental and transportation costs, as the traders bear this expense. However, selling to the Autonomous Administration of Northeast Syria (AANES) involves additional costs. This is because farmers must cover the expense of transporting their crops, and prolonged waiting times to deliver their harvest can further increase these costs. Farmers may need to rent vehicles to transport their crops, and extended delays while waiting for their turn at collection points can lead to higher rental fees, adding a significant burden to their overall production expenses.

Table 14:Top 5 most frequently reported wheat and barley marketing strategies, by percentage of respondents per governotate

	Aleppo	Al-Ha-sakeh	Ar-Raqqa	Deir-ez-Zor
Sold immediately all of the harvest	56%	58%	59%	40%
Sold immediately only part of the harvest	39%	33%	30%	50%
Stored part of the harvest for next season's seeds	29%	22%	21%	32%
Used part of the harvest for home consumption	12%	14%	13%	37%
Used part of the harvest for fodder	16%	16%	15%	11%

Table 15: Most frequently reported wheat and barley marketing channels, by percentage of respondents per governorate

	Aleppo	Al-Hasakeh	Ar-Raqqa	Deir-ez-Zor
Traders	60%	69%	69%	88%
Local Council Silos	46%	31%	35%	12%
Local households	2%	2%	1%	4%

Costs and Profits

Across all regions, the majority of farmers reported selling their harvest at market prices, while a smaller proportion sold at prices fixed by authorities. The similarities retrieved in the most reported pricing structure across governorates likely reflect the consistent use of marketing channels and common types of buyers reported by farmers throughout the region.

These selling prices come with distinct contractual and economic conditions that significantly impact their appeal to farmers. The AANES fixed price is designed to be consistently higher than market prices, providing farmers with a stable and theoretically more advantageous rate. However, **over the past year, the AANES fixed price has reportedly decreased to levels insufficient to cover rising operational costs**.[26] Market prices, on the other hand, fluctuate based on local supply and demand dynamics, which often diverge from government-set rates, exposing farmers to greater financial uncertainty.

KIs unanimously confirmed a downward trend in selling prices across both private and public marketing channels over the past year. Notably, one-third of KIs (33%) emphasized that even the AANES fixed price was no longer adequate to meet the escalating costs of agricultural inputs. **The convergence of rising costs and declining revenues illustrates the compounded challenges faced by farmers, forcing them to navigate an increasingly unsustainable economic landscape.**

The majority of respondents across all governorates reported experiencing economic losses during the 2023-2024 agricultural season, with particularly high shares of loss observed in Deir-ez-Zor and Ar-Raqqa (Map 4). There was no apparent correlation between the selling price category and farmers' profitability. Similar proportions of respondents from both price categories reported financial losses, suggesting that factors beyond the selling price, such as escalating operational costs, played a more critical role in determining profitability.

The majority of respondents (55%) expressed an intention to reduce production levels or cease wheat and or/barley farming altogether. This trend was consistent across all four governorates, highlighting the economic unsustainability of wheat farming in NES and the growing challenges faced by farmers in maintaining viable agricultural practices (Map 5).

Table 16: Most frequently reported wheat and barley selling price regimes, along with reported changes in overall cost structure and economic performance (profit or loss) during the 2023-2024 agricultural season, by percentage of respondents per governorate

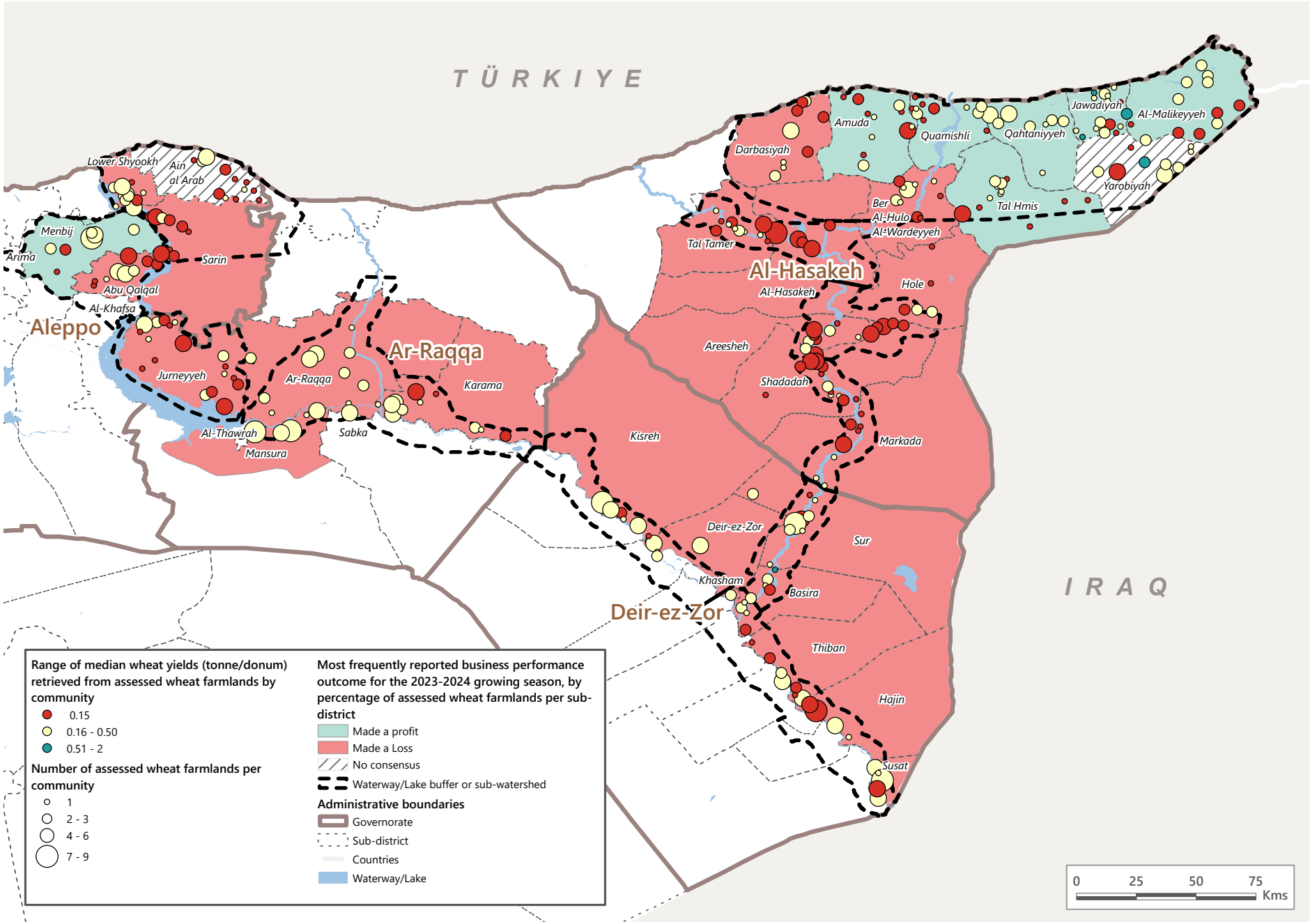
	Aleppo	Al-Ha-sakeh	Ar-Raqqa	Deir-ez-Zor
Reported pricing regime for wheat and barley sales during the 2023-2024 season				
Market price	52%	62%	63%	84%
Mix of market price and price fixed by authorities	40%	33%	33%	12%
Price fixed by authorities	8%	4%	4%	4%
Reported change in overall production costs compared to previous season (2022-2023)				
Increased	91%	90%	92%	94%
Remained the same	5%	7%	2%	2%
Decreased	5%	4%	6%	4%
Reported economic performance for the season (2022-2023)				
Made a loss	54%	51%	70%	89%
Breakeven	10%	12%	5%	5%
Made a profit	35%	37%	25%	6%

63% **of farmers interviewed across NES reported that their revenues did not cover production costs,** with the top five sub-districts reporting the highest shares of losses located in Deir-ez-Zor governorate: Basira (100%), Khasham (100%), Deir-ez-Zor (97%), Susat (97%), and Thiban (93%).

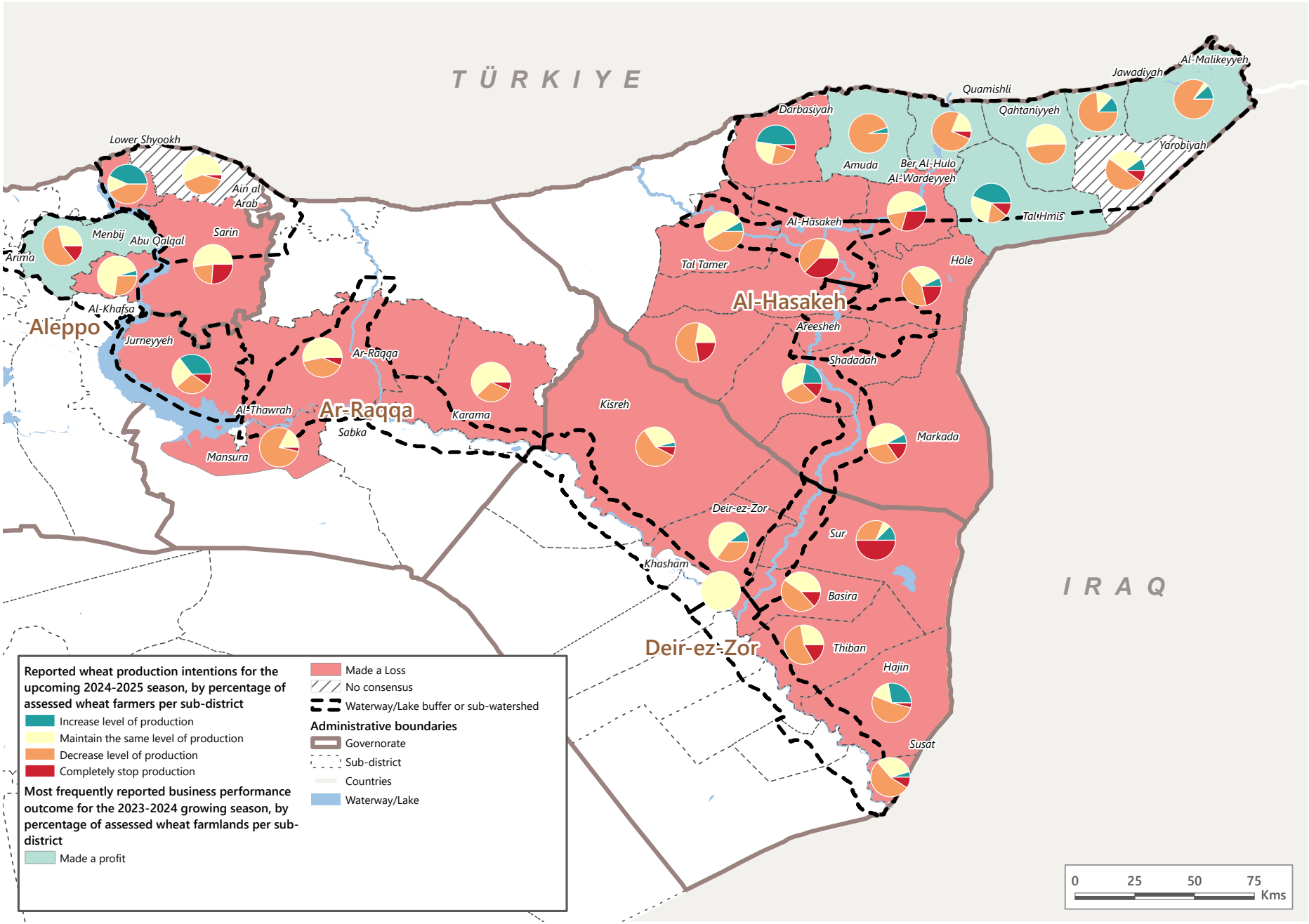
Table 17: Median governorate production costs[27] per donum of wheat and/or barley farmland for the 2023-2024 agricultural season, by cost category and overall, in US Dollars (USD/Donum)

Governorate	Fertilisers	Herbicides	Seeds	Fuel	Labour	Electricity	Transportation	Machinery	Rent	Taxes	Total
Aleppo	9	2	12	8	6	1	4	2	9	1	**52**
Al-Hasakeh	6	2	9	13	5	1	5	6	5	0	**52**
Ar-Raqqa	25	4	17	11	3	NA	5	3	6	0	**73**
Deir-ez-Zor	14	4	11	15	11	6	6	6	8	1	**82**

Map 4: Wheat yields and reported business performance of wheat farmlands during the 2023-2024 wheat growing season



Map 5: Business performance of wheat farmlands and reported wheat production intentions for the next season (2024-2025)



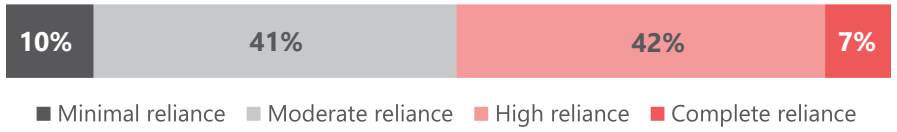
Coping mechanisms

Table 18: Top 5 coping mechanisms most commonly reported by wheat and/or barley farmers in response to challenges faced during the 2023-2024 agricultural season, by percentage of respondents per governorate and overall

	Aleppo	Al-Hasakeh	Ar-Raqqa	Deir-ez-Zor	Overall
Took on additional debt	87%	62%	79%	56%	67%
Reduced expenses on agricultural production	36%	33%	24%	25%	31%
Reused seeds saved from previous harvests	22%	21%	24%	35%	25%
Household members help in agricultural activities	22%	13%	26%	32%	21%
Cultivated less land	4%	24%	11%	20%	18%

72% **of farmers in NES who reported facing a loss during the 2023-2024 agricultural season also indicated that they took on additional debt during the year to cope with the challenges they encountered.**

Figure 8: Extent of reliance on additional debt as a coping mechanism, by percentage of respondents who reported taking on debt



A significant majority (95%) of farmers in NES reported adopting coping strategies during the 2023-2024 agricultural season. Among those who experienced economic losses during this period, 72% indicated that they took on additional debt to address the challenges they faced. This reliance on debt highlights the growing financial vulnerability of agricultural businesses in the region, potentially creating a vicious cycle of poverty. The necessity to incur debt to offset losses may further limit farmers' capacity to recover or reinvest in their operations, perpetuating their economic difficulties. **This trend appears particularly acute in Aleppo (92%) and Raqqa (88%) governorates.**

Assistance received and preferred modalities

Figure 9: Percentage of overall wheat and/or barley farmers reporting receipt of assistance during the 2023-2024 agricultural season, by source of support

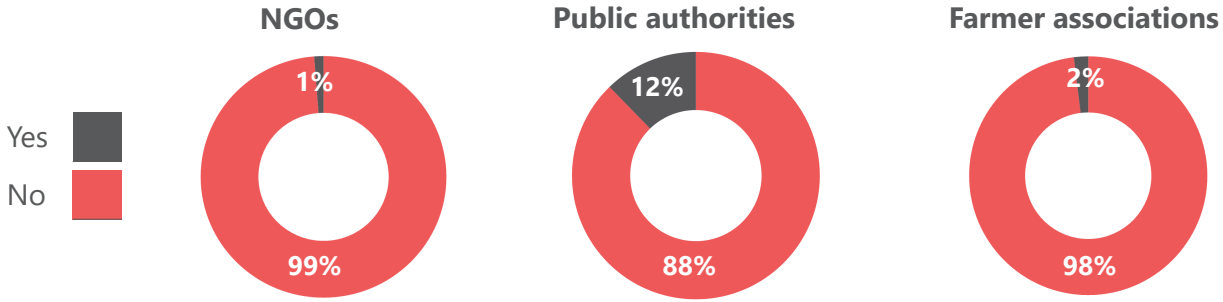


Table 19: Top 3 assistance modalities most frequently indicated as preferred by respondents if assistance were to be provided, shown by percentage of overall respondents

In-kind support for agricultural inputs (seeds, fuel, fertiliser, pesticides)	80%
Cash support for agricultural inputs (seeds, fuel, fertiliser, pesticides)	72%
In-kind support for productive assets (equipment, solar systems, pumps, machinery)	54%

Methodology Overview

The assessment aimed to evaluate the 2023-2024 wheat and barley agricultural season in NES. It focused on identifying production trends, challenges encountered by farmers—especially those related to climate factors and critical inputs such as seeds, fertilizers, pesticides, fuel, and water—, coping mechanisms adopted, and the overall financial status of farmers. The findings were intended to inform FSL coordination and partners' planning and advocacy efforts for the upcoming agricultural season to ensure ongoing support for agricultural livelihoods and food systems in NES.

Methodologies

The assessment employed a mixed-methods approach, including 986 quantitative individual interviews (IIs) with wheat and barley farmers, conducted between September 22 and 30, 2024, and 46 structured key informant (KI) interviews with agricultural authorities and experts, conducted between October 30 and 31, 2024. Additionally, the study incorporated remote sensing data analysis and a desk review of secondary sources.

Geographical Coverage

Data collection was carried out in 32 sub-districts in NES. Surveys were conducted both in-person and remotely via telephone when necessary. Sub-district selection was undertaken in collaboration with the NES Food Security and Livelihood Working Group based on several criteria:

- Agricultural Prioritization: Sub-districts with the largest absolute agricultural land areas and those with a high proportion of agricultural land relative to total land area were prioritized.
- Agro-Ecological Representation: The selection ensured representation across agro-ecological zones 1-5, which are characterized by shared environmental factors like rainfall that significantly influence agricultural production.
- Watershed Inclusion: Croplands within the six watershed catchment areas identified by REACH GIS specialists were included to ensure comprehensive geographical coverage.

Sampling Approach

Given the absence of farmer lists required for representative sampling, a purposive sampling approach was used. A target quota of 30 farmer surveys was established per sub-district. The purposive sampling strategy aimed to capture a diverse range of farmer profiles based on the following inclusion criteria:

- Farmers who cultivated wheat and/or barley during the 2023/2024 agricultural season.
- Farmers managing at least 10 donums of land to ensure that farming constituted their primary livelihood.
- Farmer selection deliberately excluded beneficiary lists to mitigate selection bias.

For the KIs, at least one agricultural expert was interviewed per sub-district to triangulate findings from the farmer surveys. A purposive sampling strategy ensured that the most knowledgeable stakeholders in Syria's agriculture sector were included.

Endnotes

1) Human Rights Watch (HRW) (October 2023), "Northeast Syria: Turkish Strikes Disrupt Water, Electricity", ReliefWeb
2) World Bank (December 2022), "Syria Joint Damage Assessment of Selected Cities", Whashington DC
3) REACH (October 2024), "Joint Market Monitoring Initiative (JMMI) - NES - October 2024", REACH Resource Centre
4) REACH (November 2024), Syria Land and Water Monitoring, last consulted on January 2025
5) REACH (June2024), "Humanitarian Situation Overview of Syria (HSOS) - Northeast - June 2024", REACH Resource Centre
6) IMMAP (April 2023), "Wheat to Bread Market Assessment - Part 1 - Northeast Syria"
7) IMMAP (October 2023), "Crop Monitoring and Food Security Situation Report Wheat and Barley - Northeast Syria"
8) REACH (July 2023), "Current Situation of the Water Crisis in Northeast Syria and its Humanitarian Impacts", REACH Resource Centre
9) NES NGO Forum (January 2025), "Update #12: Humanitarian impact of recent developments in Syria on Northeast Syria (20 January 2025)", ReliefWeb
10) FAO (June 2004), "Barley: Post-harvest operations"
11) Enab Baladi (November 2024), "Drought of Khabour River: A catastrophe affecting hundreds of villages in Syria"
12) Pax For Peace (November 2021), "Killing the Khabur: How Turkish-backed armed groups blocked northeast Syria's water lifeline"
13) REACH (November 2024), Syria Land and Water Monitoring, last consulted on January 2025
14) A donum (or dunam) is a unit of area measurement traditionally used in Syria and other countries in the Middle East; 1 donum is equivalent to 1000 m^2
15) CHIRPS; computed in GEE, sum of rainfalls, anomaly compare to historical average of last 20 years; Monthly aggregation; Spatial resolution: 5.5km
16) The median yields by governorate were calculated by determining the median yield of all the assessed farms within each respective governorate, rather than averaging the medians of individual sub-districts. This methodology ensures that the calculation reflects the overall distribution of yields within each governorate, avoiding potential bias from sub-district variations and providing a more reliable representation of central tendencies.
17) Syria Direct (October 2022), "Seeds of Syria: How a birthplace of agriculture lost troves of its native crops, and why we should all worry"
18) Khoury CK. et al., (September 2021), "Crop genetic erosion: understanding and responding to loss of crop diversity", New Phytologist, DOI: https://doi.org/10.1111/nph.17733
19) REACH (October 2024), "Joint Market Monitoring Initiative (JMMI) - NES - October 2024", REACH Resource Centre
20) REACH (October 2024), "Joint Market Monitoring Initiative (JMMI) - NES - October 2024", REACH Resource Centre
21) Syria Direct (February 2024), "Fuel crisis and weak subsidies threaten Syria's northeastern bread basket"
22) MODIS Land Surface Temperature, anomaly of temperatures compare to the average of last 20 year; Monthly aggregation; Spatial resolution: 1km
23) MODIS vegetation indices; computed in Googl Earth Engine (GEE)
24) CHIRPS; computed in GEE, sum of rainfalls, anomaly compare to historical average of last 20 years; Monthly aggregation; Spatial resolution: 5.5km
25) CHIRPS; computed in GEE; Monthly aggregation; Spatial resolution: 5.5km; Monthly aggregation; Spatial resolution: 250m
26) Syria Direct (June 2024), "Wheat price 'disaster' in northeastern Syria spells trouble for next season"
27) The median costs by governorate were calculated by determining the median cost of all the assessed farms within each respective governorate, for each cost category, rather than averaging the medians of individual sub-districts. This methodology ensures that the calculation reflects the overall distribution of yields within each governorate, avoiding potential bias from sub-district variations and providing a more reliable representation of central tendencies.

ABOUT REACH

REACH Initiative facilitates the development of information tools and products that enhance the capacity of aid actors to make evidence-based decisions in emergency, recovery and development contexts. The methodologies used by REACH include primary data collection and in-depth analysis, and all activities are conducted through inter-agency aid coordination mechanisms. REACH is a joint initiative of IMPACT Initiatives, ACTED and the United Nations Institute for Training and Research - Operational Satellite Applications Programme (UNITAR-UNOSAT).

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