



Department
for International
Development



CARE Syria Resilience Programme
Market System Analysis

Northeast Hub

Mapping of
Wheat and Small Ruminants
Market Systems
in Al-Hasakeh Governorate

Final Report
September 2018



Department
for International
Development



ACKNOWLEDGEMENTS

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Acronyms

ACDC	Agricultural Community Development Company
ACU	Assistance Coordination Unit
DAA	Democratic Autonomous Administration
DFID	The United Kingdom Department for International Development
FAO	United Nations Food and Agriculture Organization
FGD	Focus Group Discussion
FMD	Foot and Mouth Disease
GOS	Government of Syria
HS	Haemorrhagic Septicaemia
IDIs	In-depth Interviews
IRD	International Relief and Development
NDVI	Normalized Difference Vegetation Index
NES	North Eastern Syria
PYD	Democratic Union Party
SDF	Syrian Democratic Forces
SRP	Syria Resilience programme
SYP	Syrian Pound
UN-DESA	United Nations Department of Economic and Social Affairs
USD	United States Dollars
VC	Value Chain
WFP	United Nations World Food Program

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Executive Summary

Al-Hasakeh governorate is the staple crop reservoir of Syria, where 40% of the Syrian wheat is farmed. Also, due to the wide availability of wheat and barley field, livestock rearing is widely practiced in the governorate. Both value chains play a significant role in the food security, livelihood and resilience in Al-Hasakeh. With DFID support, Care is implementing the Syria Resilience programme (SRP) inside Syria to assess and revitalize the economic resilience In Syria, particularly in the agricultural sector. In this sense, Care and iMMAP have collaborated to study the wheat and small ruminants value chains in northeast of Syria. Data was collected over the spring of 2018 from seven subdistricts in the governorate. Two data collection teams from Care and Mercy Corps collaborated to collect the data. iMMAP, analysed the data, and reported the findings for dissemination.

The agriculture capacity of Al-Hasakeh governorate is considerably significant. Al-Hasakeh governorate is the staple crop reservoir of Syria, and the 2017 wheat harvest of the Al-Hasakeh represents 40% of total country wheat yield¹. In addition, livestock rearing is widely practiced in the Al-Hasakeh governorates due to pasture availability from wheat and barley fields.

The wheat and small ruminant value chains in the northeastern parts of Syria face several challenges that impact the value chain performance and worsens food security, livelihood opportunities and economic resilience in the governorate. Most of these challenges are induced by the collapsed governmental agriculture support, the deteriorated agricultural infrastructure,

and by climate change. Despite the efforts by self-administration to support the agricultural sector, the limited resources made it impossible to overcome these challenges.

These challenges significantly reduced the local production of wheat and dairy products. This season's wheat production is estimated at only 16% of the average production before the crisis. Dairy products in retail markets are almost ten times higher than pre-crisis levels due to deteriorated production and the overpriced inputs.

These challenges are potential opportunities to the international humanitarian sector, which is currently active in Syria. The humanitarian sector can help in achieving economic resilience through market recovery interventions. Based on the study findings, restoring the agricultural infrastructure, agricultural technology transfer, promoting efficient irrigation solutions, promoting green power solutions, promoting sustainable farming, promoting crop diversification, introducing new food processing value chains, and supporting the agri-industrial sector governance are the key recommended themes for market-based resilience building in the agricultural sector in Syria.

It is vital to consider the environmental impact of intervening in the small ruminant and wheat value chain. Overgrazing and high carbon footprint of livestock production are potential adverse environmental consequences of extensive livestock production support. In addition, groundwater irrigation in Syria is deeply overexploited, yet sustainable use of water receives less attention than the effects of food and income security. Consequently, the humanitarian actors are highly advised to seriously consider these risks when implementing market-based recovery interventions targeting the dairy sector in Syria, to assure sustainability and no harm.

1. Introduction

1.1. Objective

The Syria Resilience Programme aims at promoting resilience and restoring livelihoods of communities in Syria over the short and longer term. In combination with social safety net support for the most vulnerable, the programme adopts a value chain support approach to ensure that livelihoods initiatives will be sustainable over the long term.

Within this framework, market system analysis aims at providing a better understanding of constraints and bottlenecks that cut across value chains and identify appropriate community-based opportunities for livelihoods restoration and resilience.

The market system analyses aim at addressing the following analytical questions, for each selected value chain:

1. What is the structure of the market system², and how has it been impacted by the conflict (how does the current situation compare to the pre-conflict one)? How do target groups engage in the system?
2. What are the opportunities and inefficiencies in the current system enabling or hindering the ability of target groups to sustain their livelihoods?
3. What are the most appropriate interventions to support market systems in meeting the needs of communities to achieve resilience of livelihoods under a value chain approach?

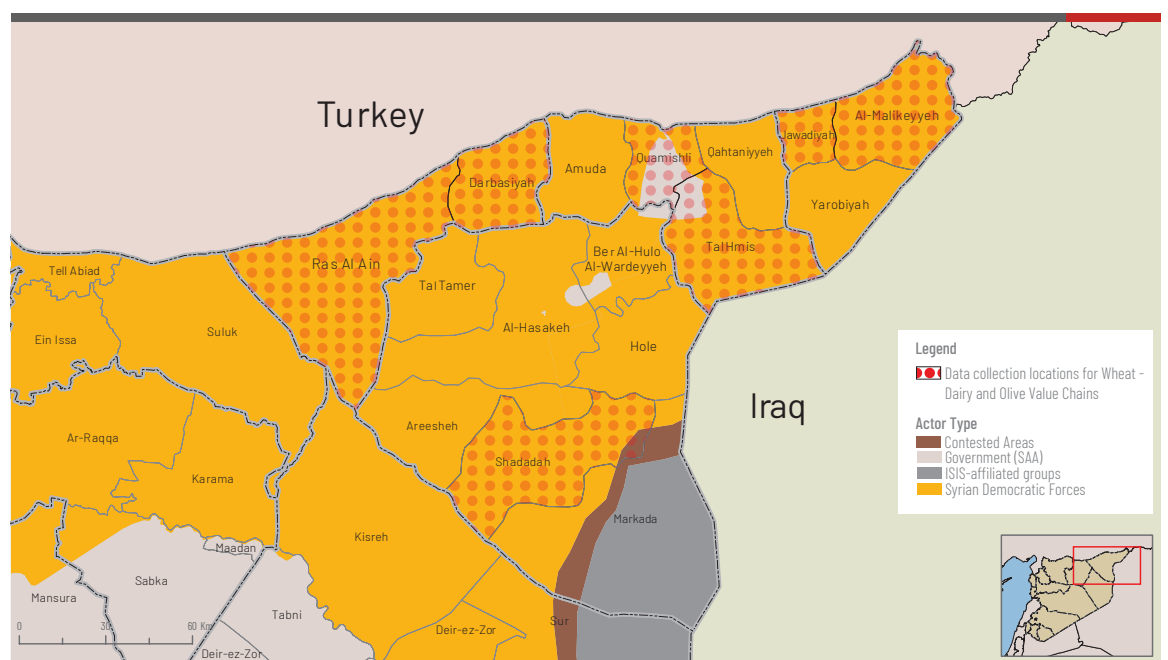
These analyses aim to be gender-sensitive and linked with contingency planning and risk analysis to ensure the programme's interventions are ready to adapt to the fluidity and volatility of the context.

1.2. Geographical coverage

Selection of locations where to focus fieldwork was based on the sites selected for the implementation of the Programme. This selection was initially made based on the accessibility to fieldwork.

Care and Mercy Corps conducted the fieldwork for the wheat and sheep value chains held in seven subdistricts in Al-Hasakeh governorate. The seven subdistricts are Qamishly, Tal Hmis, Al-Malikeyyeh, Jawadiyah, Ras Al Ain, Darbasiyah and Shadadah. Map 1 illustrates the data collection locations.

Map1. Data Collection Locations of Wheat and Sheep Livestock.



² Value chains represent the sequence of market actors involved in producing, processing, trading and consuming a given commodity. Value chains are embedded into broader systems, called market systems, which also comprise the market environment (regulatory functions, business enabling or disabling formal and informal factors, governance, social and environmental issues which affect the way market actors interact within the value chain) and support functions that facilitate functioning of the chain.

1.3. Methodology

1.3.1. Value chains selection criteria

The wheat and small ruminants value chains were selected from a pool of suggested value chains using a scoring tool. The tool assesses the potential impact of each value chain on four main aspects: Economic, Social, Institutional and Environmental. The wheat and small ruminants value chains scored the highest in this exercise.

1.3.2. Data collection

Data collection tools consist of semi-structured questionnaires for individual and group interviews, aiming at capturing mostly qualitative information, with some quantitative data. There are six different questionnaires for each of the value chain functions: producers, processors, traders, consumers, service and input providers, as well as key informants. Consumers were interviewed through gender disaggregated focus group discussions, disaggregating men and women. All other market actors were interviewed through individual in-depth interviews (IDIs).

Five interviews with each type of actor were held in each location. Interviews of female market actors were meant to be highly prioritized. However, only male market actors were finally interviewed.

1.3.3. Data Analysis

Analysis of data collected aims at producing market system maps to highlight the impacts of the crisis on the market system, allowing for a comparison between a baseline and an emergency-affected situation as well as identifying bottlenecks and opportunities for targeted support throughout the market system. Analysis of market maps supports a better understanding of all market actors and stakeholders' relationships and roles (e.g., farmers, traders, processors, service providers, etc.), trade flows and bottlenecks and opportunities for support within the market operating environment. Market system maps are diagrams showing the linkages between various market actors, their primary functions, and flows of value and information. They depict the dynamics at stake along the value chain as well as crucial support services and infrastructure. Also, market systems and value chains are heavily influenced in their functionality by the market environment, or enabling context, i.e., norms, rules, institutions and trends which shape the way market actors liaise and trade.

1.3.4. Results validation

After the analysis, the study team conducted a validation mission in NES. The mission included validation sessions with local experts, market actors, and humanitarian workers. The validation sessions presented and discussed the results with the technical attendees to highlight any misunderstanding or missing information. Besides, field visits were arranged to fill some information gaps and ask some follow-up questions. Based on the analysis and the mission outcomes, this report is drafted and disseminated to the study team and partners for comments. Based on the comments, the final report was prepared.

1.4. Limitations

The study is qualitative in nature, with limited sample size and semi-structured interview setting. The findings and conclusions are limited to the studied areas in Al-Hasakeh governorate. Also, the results are limited to the current context; significant changes in the political context are expected to impact the agricultural sector and the situation on the ground significantly. Finally, the study findings were limited to the time of data collection – March through May 2018.

2. Market Environment in Northeastern Syria

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Al-Hasakeh governorate shows the least negative impact on the agriculture sector as well as the lowest cost of food basket observed in Syria in June 2018.

The Syrian conflict notably impacted the agricultural sector in the country and led to higher food prices and less food availability³. Nevertheless, some areas of Syria were better off than other areas due to several factors. Al-Hasakeh governorate shows the least negative impact on the agriculture sector as well as the lowest cost of food basket observed in Syria in June 2018⁴. Several reasons lie behind this finding. Most of Al-Hasakeh is under relatively stable control and self-administration. The governorate experienced minimal military operations compared to the rest of Syria. This better-off security situation allowed the agriculture sector to survive. In addition to the security aspect, the agriculture capacity of the governorate is considerably significant. Indeed, Al-Hasakeh governorate is the staple crop reservoir of Syria, and the 2017 wheat harvest of the Al-Hasakeh represents 40% of total country wheat yield⁵. In addition, livestock rearing is widely practiced in the Al-Hasakeh governorates due to pasture availability from wheat and barley fields.

Collapsed Governmental Support System

The Syrian government heavily supported both wheat and small ruminant value chains before the crisis.

The wheat-to-bread system has been considered a strategic service by the government and solely managed by the Syrian state. The wheat value chain used to be government-led with regard to regulations, supportive farming services, and post-harvest production. The General Establishment for Cereal Processing and Trade (HOB00B) is the governmental entity dedicated to this central role. HOB00B used to manage the wheat-to-bread value chain through several bodies with different functions. The government management of the wheat value chain included seeds multiplication, certified high yield seed strains provision, subsidized farming inputs (fertilizers, insecticides, and machinery) distribution, financial services, and constant agricultural guidance was also provided to the wheat farmers.

Similarly, the post-harvest wheat activities were led by the government. HOB00B used to buy the local wheat production from farmers at a fixed price⁶. The wheat was then stored in government-owned silos and processed at government-owned mills for flour production. The flour was to be baked at government-owned or contracted bakeries to provide the market with subsidized bread.

Similarly, the small ruminant value chain used to benefit from a wide range of services provided by the government. Before the crisis, the herdowner used to own a herdowner card that qualified him to benefit from different support services. This card was issued after inspection of the herd by the government-managed local agricultural cooperatives. Based on that, service package provided to the herdowners included free of charge concentrate ration distribution, vaccinations and veterinary services.

The current situation is significantly different from the pre-crisis level. As most of Al-Hasakeh is out of the Syrian government control, the state system in the governorate for managing and supporting the wheat and small ruminant value chains has almost collapsed. Currently, all these supportive services aren't provided to the farmers and the herdowners. They have to rely on the local private sector as suppliers and service providers.

The Self-Administration Role

The self-administration or the Democratic Autonomous Administration (DAA) has administrative units as part of its structure to support the agriculture sector in the areas under the Democratic Union Party (PYD) control. According to one of the interviewed KIs, the DAA governs the economic entity that oversees the entity of agriculture. The entity of agriculture established the agricultural community development company (ACDC), which manage many agricultural units and facilities. Concerning the wheat value chain, the ACDC manages the wheat open-air storage area, mills, bakeries and the grains centres. The ACDC operates administratively at the subdistrict level through local councils as part of different services provided by the local councils to the local population. However, due to a limited financial capacity and competing priorities, the local councils' supportive services to the two value chains are insufficient and can't compensate the collapsed governmental support system.

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The state system in the governorate for managing and supporting the wheat and small ruminant value chains has almost collapsed.

3 UNWFP Market Price Watch Bulletin. Issue 43, June 2018.
4 Ibid
5 FAO/WFP Crop and Food Security Assessment 2017
6 FAO/WFP Crop and Food Security Assessment 2013

“

As reported by a wheat expert and one of the local officials, the self-administration is covering 80% of local bread market needs while the private sector covers the remaining 20%.

The ACDC-managed grains centre is supporting some farmers with limited services. These services include provision of high-productivity seeds (for example, seeds known as Sham 3, 4 and 7), subsidized fertilizers and pesticides in addition to technical guidance. Furthermore, the grains centre is purchasing the wheat grain yield from the farmers at a fixed price against specific quality criteria. The grains centre pays the farmer one to two weeks later against a voucher that was issued when grains were purchased. Also, the ACDC is managing part of the previously owned flour-to-bread system to provide low-priced bread.

As reported by a wheat expert and one of the local officials, the self-administration is covering 80% of local bread market needs while the private sector covers the remaining 20%.

Even though some silos survived the military operations in the area, the local authorities preferred to store the wheat in the open areas to avoid silos destruction in any expected military actions.

Evolving Private Sector

Due to ceased governmental agricultural cycle, many wheat farmers shifted to aromatic crops farming seeking higher profit than wheat farming can yield. In addition, the wheat farmers currently are paying for all the agricultural inputs out of their pockets. The previous subsidized inputs are no longer available. Similarly, the small ruminant value chain in Al-Hasakeh governorate is experiencing challenges at several stages of the value chain due to the lost governmental support. Currently, herdowners are purchasing the inputs from the private sector out of their pockets.

Currency Depreciation

The Syrian currency reached a historically low level against foreign currencies after the crisis. The exchange rate of May 2018 against USD was 439 SYP in Al-Hasakeh governorate⁷, which is ten times higher than the pre-crisis level. This increase induced a hyperinflated economy and resulted in skyrocketed agricultural and production inputs. As a result, some wheat and dairy products retail prices are currently ten times the pre-crisis levels.

Cross-border Trade

Many grain and livestock traders practice cross-border trade between Al-Hasakeh governorate and Iraq. Importing high-quality Turkish flour through Iraq is a common practice by the grain traders to fulfil the local market supply. On the contrary, Syrian livestock traders export male sheep and goats to Iraq. However, the border crossing status and policies are subject to unexpected changes, which alters the trade plans and impose a financial risk on the traders.

Value chains intersections

The wheat and livestock value chains in Al-Hasakeh governorate are intersecting with each other and with other local value chains. Barley, wheat grains and milling bran are commonly used as livestock fodder. Livestock manure is used as biofertilizer.

Challenging climate change

Wheat irrigation and livestock watering are a challenging requirement for both wheat and small ruminants value chains in the northeast of Syria. Around 70% of the farming land area in Al-Hasakeh governorate is rain-fed according to interviewed local senior agronomists. This makes the crop and pasture land sensitive to the changing Mediterranean climate. As figures 1 and 2 show below, for both crop and pastureland, winter rainfalls on Al-Hasakeh governorate recorded throughout 2017 were up to 40% less than average recorded rainfalls. Consequently, the crop and pasture land vegetation coverage as measured by NDVI is showing less than average anomaly: up to 30% less than the recorded average over the first half of 2018, as indicated in figures 3 and 4. This poorly-rained season derived the farmers and herdowner to utilizing more underground water from the open wells and even digging more wells. The climate change induced low rainfall is a serious risk to the food security and livelihoods situation in Al-Hasakeh. The growing dependency on underground water for irrigation and livestock production is a critically unsustainable practice; according to the FAO-AQUASTAT, that the agricultural sector is accountable for more than 85% of the water withdrawn from Syria's aquifers including groundwater⁸. Considering the population growth rate estimated by the UN-DESA⁹, Syria is already approaching the absolute water scarcity threshold of 500 m³/capita/year by 2050 according to Aw-Hassan et al., 2014¹⁰

⁷ UNWFP Market Price Watch Bulletin. ISSUE 43, June 2018.

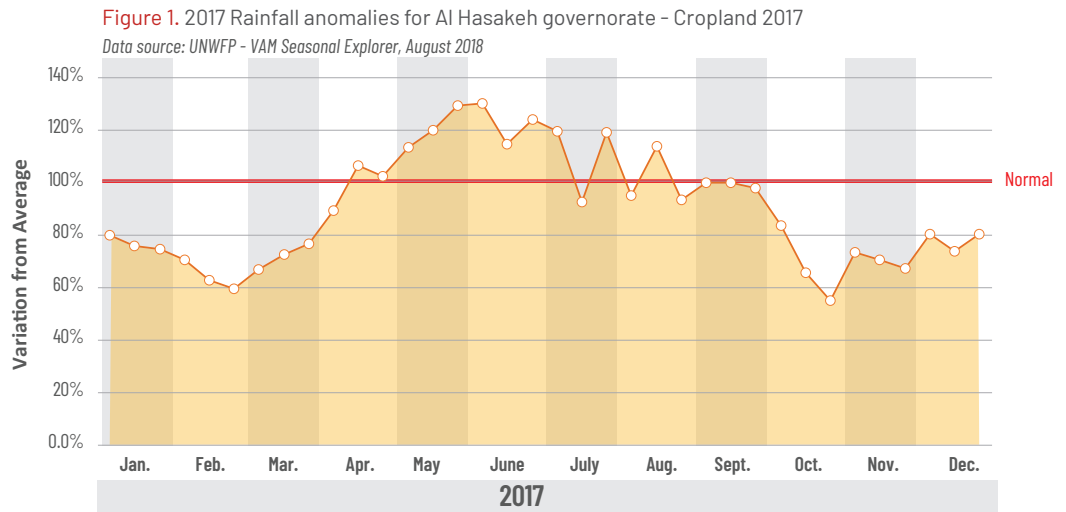
⁸ FAO-AQUASTAT, Syria country profile

⁹ UN-DESA, Population Division (2013). World Population Prospects

¹⁰ Aw-Hassan et al., 2014. The impact of food and agricultural policies on groundwater use in Syria. Journal of Hydrology, 513, 204-215

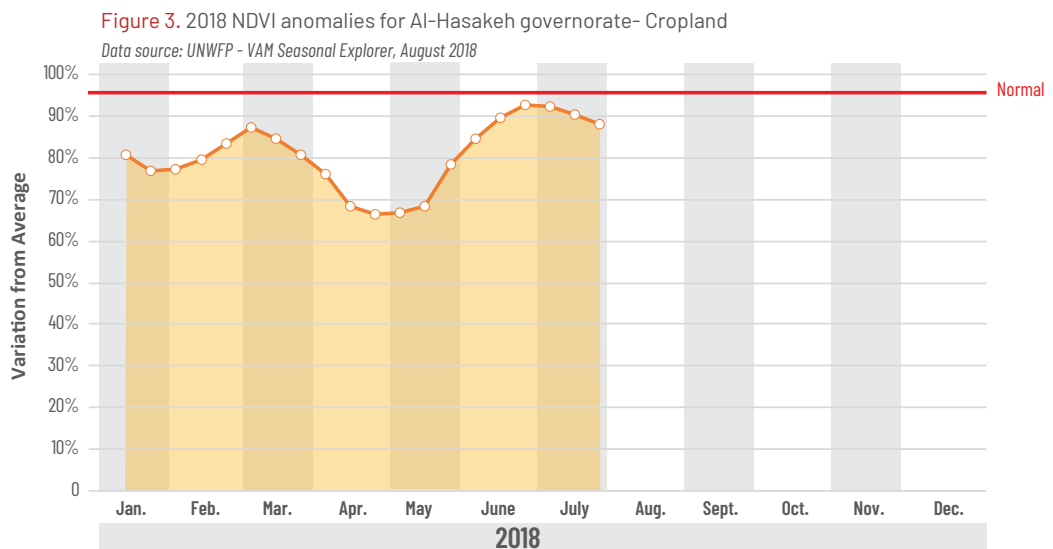
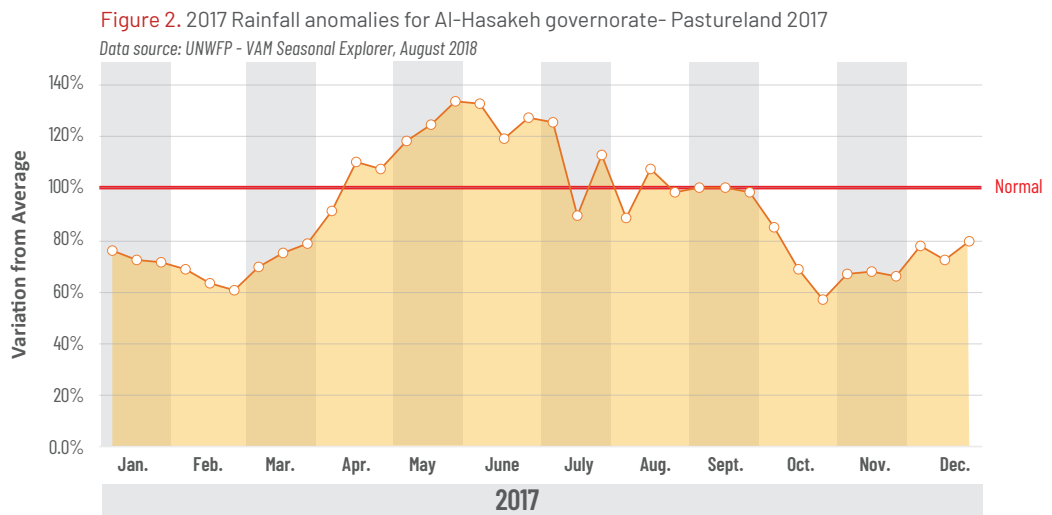
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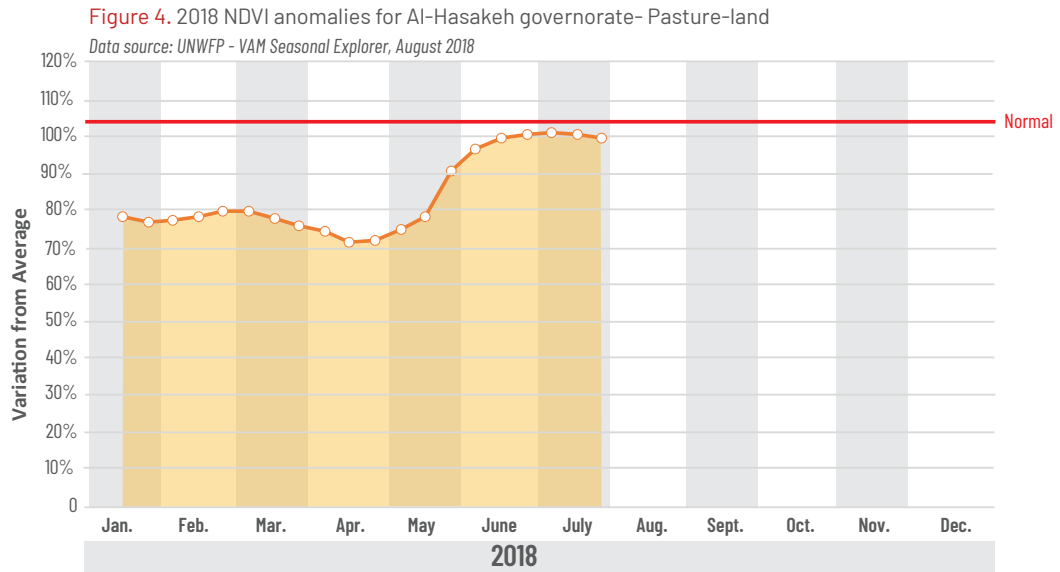
For both crop and pastureland, winter rainfalls on Al-Hasakeh governorate recorded throughout 2017 were 40% less than average recorded rainfalls.



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The crop and pasture land vegetation coverage as measured by NDVI is 30% less than the recorded average over the first half of 2018.





Security and Humanitarian Situation

The current Kurdish self-administration for northeastern Syria is expected to remain in place in the short to mid-term. However, major political changes are expected in the medium to long-term as a result of ongoing negotiations between the Government of Syria (GoS) and the self-administration. According to unconfirmed press reports, the GOS rejected the self-administration's demands for federalism or autonomy in areas held by the Syrian Democratic Forces (SDF) in northeastern Syria. Instead, the GOS requested the self-administration to surrender their weapons to GOS in exchange for SDF developing local governing bodies that will "represent all groups". However, the two parties agreed to negotiate over a roadmap that eventually leads to a "democratic, decentralized state". Consequently, no significant changes that might impact the humanitarian access and operations in the area are expected in the next few months. However, it is highly advisable that the humanitarian sector avoid investing in parallel systems that might be compromised by expected substantial political changes.

3. Market Infrastructure in Northeastern Syria

Fuel and Electricity

In addition to the high agricultural production capacity, Al-Hasakeh has a significant portion of the Syrian oil reserves and production ¹¹. The fuel availability enabled electricity production by the local power stations. Similarly, the fuel availability allowed farmers to use agricultural machinery: wheat farmers commonly use water pumps, cultivators, and harvesters. On the other hand, several farmers reported that the fuel's poor quality is negatively impacting the engines and pumps. Many farmers reported that they stopped using fuel-operated pumps for irrigation to avoid the regular fuel induced engine failures. On a relevant note, many farmers and herdowners reported that the power-cuts are too frequent to depend on electricity to power their machinery. Many households and market actors have shifted to alternative power solutions to fill the power gap, specifically solar power solutions.

Farming and Production Infrastructure

The interviewed wheat farmers reported that the land they farm is owned by their family, mostly family- inherited land. Small ruminants rearing is taking place in barns owned by the herdowner, where the barn is close or even attached to the owner's house.

Concerning the wheat-to-bread infrastructure, most of the silos are out of service due to ill-maintenance and conflict-related damages. The government mills reported low functionality due to intermittent electricity. This gap triggered wheat open-air storage and establishing new mills by the private sector. Transportation was reported a challenge due to poor roads and expensive fuel.

Wells are a common source for irrigation in Al-Hasakeh, where fuel-operated pumps used to water the wheat farms and livestock by well water. Some farmers reported exclusive rainfed- wheat farming. However, droughts and low rainfall were reported as a major risk to them. All herdowners practice grazing on pasture in the region during the green season starting March through July. However, pasture areas' availability and sufficiency are sensitive to the rainfalls and heat waves.

Labour and financial services

The wheat and small ruminant value chains in Al Hasakeh governorate are family owned and managed business, almost entirely dependent on the family members as free labour. Nevertheless, it is also reported that business owners hire workers to support their business, particularly for seasonal work as land preparation and harvesting.

Due to financial limitations, informal credit-based trade is being practiced significantly less than it was before the crisis. On a relevant note, formal banking and financial services aren't available.

Derek and Qamishli Districts, Syria | Wheat Value Chain

May 2018

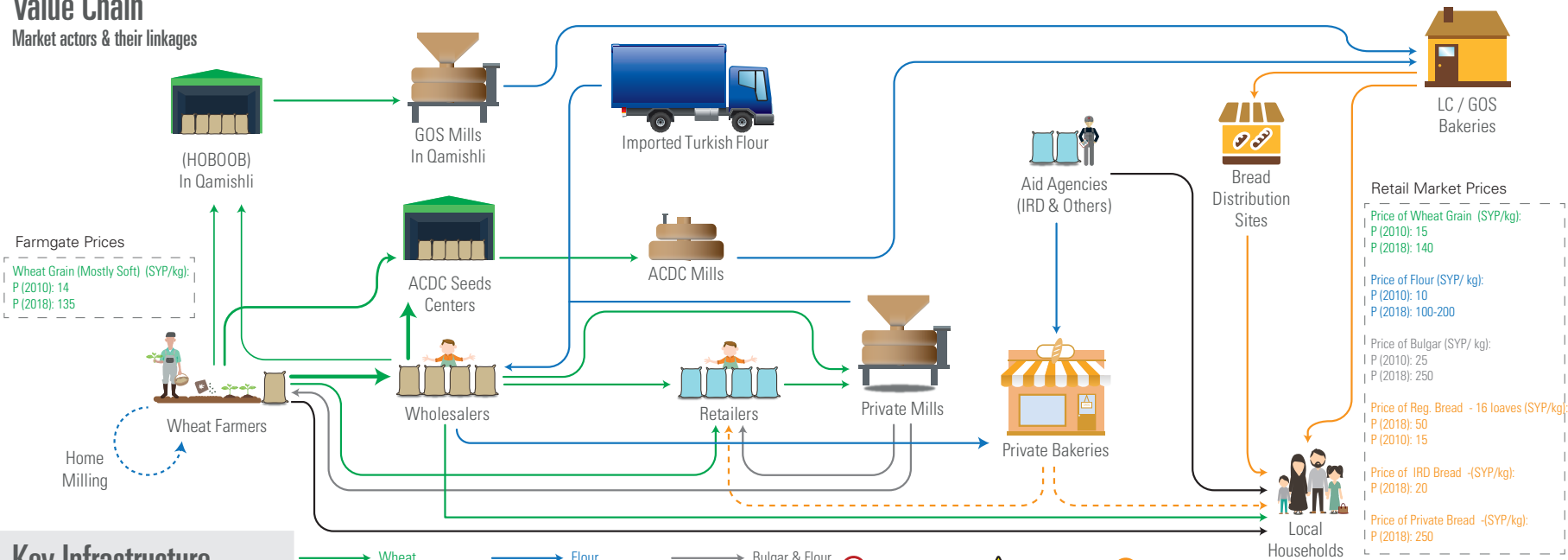
The Market Environment

Institutions, rules, norms & trends



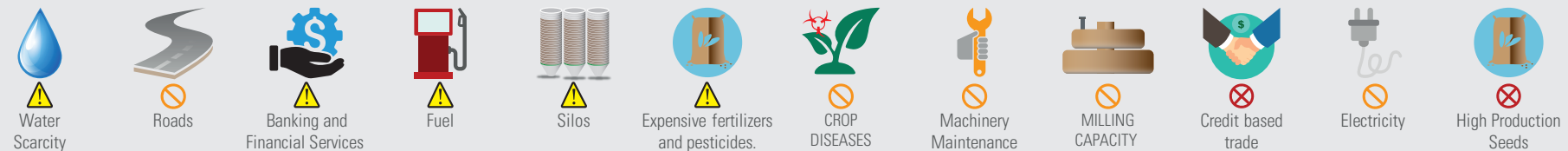
Value Chain

Market actors & their linkages



Key Infrastructure

inputs, market-support services



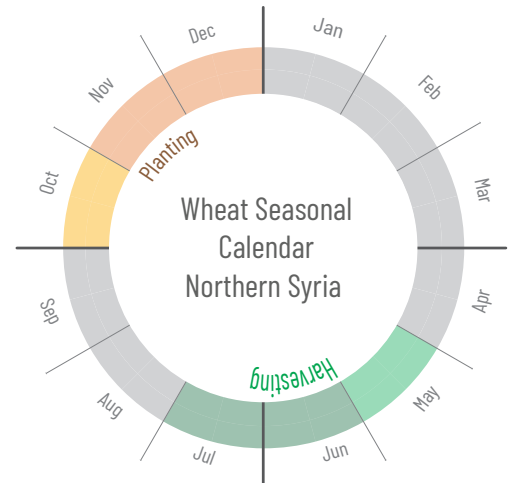
Retail Market Prices	
Price of Wheat Grain (SYP/kg):	
P (2010): 15	
P (2018): 140	
Price of Flour (SYP/ kg):	
P (2010): 10	
P (2018): 100-200	
Price of Bulgur (SYP/ kg):	
P (2010): 25	
P (2018): 250	
Price of Reg. Bread - 16 loaves (SYP/kg):	
P (2018): 50	
P (2010): 15	
Price of IRD Bread -(SYP/kg):	
P (2018): 20	
Price of Private Bread -(SYP/kg):	
P (2018): 250	

4.1. Wheat Value Chain

Production

According to local experts, more than 50% of the local population of Al-Hasakeh governorate are currently involved in wheat farming.

The interviewed wheat farmers reported long wheat farming experience. Regarding the wheat seasonal calendar; wheat planting is usually taking place from October till the end of December as indicated in Figure 5. The harvesting season starts May through July. Concerning land ownership, the wheat land is mostly owned by families used to farm wheat for decades. The reported land area ranges from 3 to 26 hectares. Most of the reported areas are around 15 hectares which reveals considerable agricultural land ownership that is dedicated to wheat farming. Tell-Hemis area reported higher average owned land area than the rest. However, many farmers said that they could not farm their full land area due to difficulties that include expensive inputs and lack of governmental support. According to the farmers, many farmers stopped farming wheat and shifted to aromatic crops seeking higher profit such as coriander and cumin.



Regarding agricultural inputs, all inputs are bought mainly from the local traders. The local council's grain centre sells high-quality grains to the farmers, yet a limited number of farmers can benefit from this service due to the grain centre's limited capacity. The farmers purchase wheat seeds from the local market at 145-165 SYP for 1 Kg. Some farmers store part of their production to be used as seeds for the following season. Some farmers reported that the local council provides subsidized fuel to the wheat farmers. Each rainfed hectare requires around 220 kg of wheat seeds, while the irrigated hectare needs about 120 kg seeds. On a relevant note, the chemicals used for agriculture as fertilizers and herbicides are bought from the local market. Nitrogen fertilizer is added in quantity of 100 Kg per rainfed hectare, the local nitrogen fertilizer (Urea 46) is price-tagged at 225 SYP/kg. Herbicides are sprayed in a quantity of 1.5 to 2 liters per Hectare and priced at 7,000 SYP/Lt. Concerning watering, rainfalls are the main wheat land irrigating technique; rainfed-wheat-farmed land is estimated at 70% of the total grain farmed by local agronomists. In most of the seasons, wheat farmers have to do complementary irrigation using underground water from owned wells. Well-water irrigation is powered by fuel operated pumps. Many farmers reported low fuel quality due to the limited capacity of the local refineries. Some farmers reported frequent pump engine failures due to diesel impurities, which encouraged some farmers to set up solar power system to operate the pump. These farmers assured the solution effectiveness despite the capital needed to install it. According to the farmers, the solar power solutions are available in the local market and warranted by the suppliers for ten years. The wheat farmers use artesian wells at a depth of 200-300 meters. The cost of drilling one artesian well ranges from 3 to 5 million SYP (USD 5,800 to USD 9,700), depending on the water depth.

On a relevant note, agricultural machines are commonly used for wheat farming. Mostly, the machines are rented from the local market. Land preparation by cultivator costs 6,000 SYP/ hectare. Seeding by planter costs 5,000 SYP/hectare. Harvester costs 10,000 SYP/hectare. Also, the nylon bags used to store the wheat grains are bought locally for 125 SYP for the bag. One bag can contain 100 kgs of wheat grains.

Concerning wheat production capacity, well-water irrigated lands reported wheat production of 2.5-3.5 tons/hectare; the rainfed land yielded an average of 1-1.5 tons/hectare this year. These volumes are almost 50% less than the pre-crisis ranges according to local agronomists. This low productivity is a result of many factors: deterioration of the local seed quality, irregular irrigation due to climate and fuel issues, insufficient fertilization due to limited financial capacity and expensive fertilizers. As reported by a local senior expert, Al-Hasakeh governorate produced this year a total of 300,000 metric tons of wheat grain, which is 16% of the average pre-crisis wheat production of 1.8 million metric tons.

After harvesting the land, the farmers keep a portion of their production for their household consumption where around 500 kg is stored at home as grains to secure the household requirements until the next season. If the farmer has the financial capacity, he may also store additional quantity as seeds for the next farming season, but most farmers reported their inability to do so because of their need to sell most of the production for highly needed cash at the harvest time. Also, the farmer may

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More than 50% of the local population of Al-Hasakeh governorate are currently involved in wheat farming.

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2018 total wheat production of Al-Hasakeh is less than 20% of the pre-crisis quantity.

“

In 2018 season,
rainfed wheat
farming was
profitable by 52%

mill a portion of the kept grains for flour and bulgur at private mills where milling costs 10 SYP per kg of wheat grains. The rest of the production is sold to the local grain traders.

The ACDC grain centres and HOB00B grain centre in Qamishli are a minor wheat grains buyer to the farmers. The farmers prefer to sell their production to the local traders against in-hand cash, while when they sell to the Syrian government or the local council, the transaction is made against a voucher that is cashed in two weeks to one month later. Also, the ACDC grains centres buy the wheat grain against strict quality measures that many farmers cannot meet sometimes. In addition to that, cars loading and transporting the wheat grain bags to the grains centres is on the farmer's expenses, which is an additional reason to prefer the traders.

Regarding workforce, most of the farmers reported that their land is family supported and mostly mechanized, so they do not need to hire workers. Nevertheless, some farmers seasonally hire workers to help in land preparation, particularly in large land areas. One of the farmers hired three workers to support his 15-hectare land area for this season. Each worker earned 100,000-200,000 SYP at the end of the season for his support in land preparation, seeding, irrigation and harvesting. Some workers are paid at the end of the season as lump sum payment, some others are paid monthly. The wage depends on the land area, services provided and availability of agricultural machines. On average, the working hour pay for light tasks as weeding is around 200 SYP and for the heavy work as manual irrigation, it goes up to 1,000 SYP.

Some other farmers reported that they have hired a family of 3-5 workers who gained a percentage of the land yield (8-10%) at the end of the season.

Concerning revenue, as reported by one of the farmers based on his experience this season, rainfed-wheat farming of a 15-hectare land area costed him around 1,500,000 SYP. The 15-hectare land area produced approximately 23 tons of wheat grains. When sold at 135 SYP/kg, the yield gained a total revenue of 3,150,000 SYP and topped up a profit of 1,650,000 SYP. This profit represents 110,000 SYP per hectare in one season of rainfed-wheat farming. This profit drops to 60,000 SYP per hectare if the land is rented. The detailed farming inputs for the one-hectare land area are indicated in table 1.

Table 1. Costing of wheat farming for the 1-hectare rainfed land area, Al-Hasakeh governorate.

Item	Quantity	Unit Price	Total Price
Seeds in kg	220	145	31,900
Tractor rent for land preparation and seeding	1	20,000	20,000
Local Nitrogen Fertilizer (Urea 46) in Lt	100	225	22,500
Herbicide in in Lt	1.5	7,000	10,500
Harvesting	1	20,000	20,000
Bags	11	1,000	11,000
Total			115,900

Trade

Several trading activities take place along this value chain. All the interviewed traders have been in this business for more than ten years. The grain traders are the main wheat grain wholesalers in the region. They buy around 80% of the land yield directly from the farmers. The grain traders then channel most of the wheat grains to the ACDC grain centres, then HOB00B centre and retailers or warehousing. This year, the ACDC grain centres purchased around 250,000 tons of wheat grains from the traders and farmers, the Qamishli grain centre bought only 40,000 tons. The ACDC grain centres purchased the first-grade wheat grain from the farmers for 170 SYP/kg this year; the HOB00B centre paid 170 SYP/kg as well. The second grade is purchased for 160 SYP/kg by both institutions. The grade quality of the wheat grain is determined visually after mechanical filtration according to the percentage of impurities and grain hardness. First grade harvest should be at least 99.4% free from other grains and dust. The maximum acceptable limits for barely and broken grains is 3%, and the maximum acceptable limits of mixed hardness is 15%.

One kg of soft grain wheat is 10 SYP cheaper than hard grain. Some grain traders take wheat grain to private mills for milling for 10 SYP per kg and sell the flour to the retailers.

However, the traders offered the farmers 135 SYP per kg of wheat grains this year; the farmers preferred selling to traders than grain centres as they receive cash in-hand and save on transportation

costs.

The traders also store wheat grains to be sold as seeds for the next season after adding 15 SYP/kg over the buying price. The 15 SYP/kg is the revenue that covers sieving, decontamination, warehousing, and rodent control. Also, grain traders import high-quality Turkish flour from Iraq to supply private bakeries. The imported flour is sold at the retail shops for 200 SYP/kg.

In terms of inputs and services, grain traders use grain bags to carry the grains from farms to the local market. The bags are bought from the local market. Each bag carries 100-110 kgs of wheat grains. The cloth-made bag costs 750 SYP and the nylon bag costs 125 SYP. Ropes used to seal the bags are purchased in rolls for 500 SYP. Regarding labour, traders hire local workers for 2000-2,500 SYP daily. Some traders top-up the wage with a quantity of grains or bulgur around 120 kg as harvest share.

In terms of transportation, in case of selling to HOB00B centre or the ACDC grain, the trader is responsible for the transportation cost. The train is used to transport to Qamishli: this costs 10,000 SYP for one ton of wheat grains. Workers manually upload the wheat grains for 100 SYP for each bag.

Concerning warehousing, traders store the purchased yield of wheat grains in owned or rented storage areas. Storing the wheat grains is adding 15 SYP to the price of 1 kg as storage fees. The average warehouse monthly rental fees range from 5,000 to 10,000 in the rural areas and up to 20,000 in the city as reported by traders. The rental fees depend on the location and area. The average warehouse area is 60 m² which is enough for 50-75 metric tons. The traders avoid warehousing wheat grains in large quantities and for long period of time fearing rodents.

Regarding silos, most of the silos across the governorate are out of order due to conflict-related damages and lack of maintenance. The ACDC preferred storing the wheat grain in outdoor piles to building new silos. The silos are expensive to build and easy targets in such unpredictable conflict setting.

Regarding trade transactions and volume, during the harvest season, the trader can make an average of 15 daily buying and selling transactions. During the rest of the year, this goes down to 15 transactions per week. In terms of trade volume, the season average weekly quantity is 100 tons, the rest of the year weekly quantity is 2 tons.

All the transactions are made in cash. Grain traders buy wheat grain from farmers at 135 SYP/kg and sell it for 140 SYP/kg to retailers.

The market reported as a competitive market with an average of 25 active grain traders in each of the surveyed areas. Regarding profit, the harvest season – around six weeks – gains 250,000 SYP as net profit due to the high trade volume, the yearlong profit is 3,000,000 SYP as reported by average grain trader.

Concerning retailer trade, retailers sell wheat grains, bulgur, wheat flour and pastries to the consumers. Retailers have been active in this business for years. There are around 15-20 retail shops on average in each of the surveyed areas and around 25 to 30 transactions per week take place as reported by the retailers. About 200 kgs of wheat products are sold weekly in the form of flour, bulgur, and pastries. All the transactions are made in cash. The retailers purchase their supply from the wholesalers and the farmers. Bulgur is purchased for 200 SYP/kg and sold to the consumers for 250 SYP/kg. Pastries are bought for 300 SYP/kg and sold for 350 SYP/kg.

Regarding inputs and services, the average retail shop's monthly rent is around 15,000 SYP while the monthly electricity bill is approximately 9,000 SYP. Maintenance and licensing costs amount to an extra 2,500 SYP per month. The interviewed retailers have reported zero workers, as they are family-managed shops.

Processing

Processing wheat grains to flour, bulgur, and bread takes place in the area. Different types of bread are baked from different sources and grades of flour.

Two types of bread are baked in the area: the regular/public bread, and the 'private' bread. Regular bread is made from flour that is a milled using a mix of hard and soft wheat grains with some bran. The 'private' bread is a high-quality white bread, made from milled pure soft wheat. Both types are produced locally. However, because of the intermittent electricity, the milling capacity of local mills is not enough to cover the domestic market demand. As a result, the local traders import high-quality Turkish flour from Iraq to fulfil the market need for high-quality bread and pastries.

The ACDC is the primary regular bread maker in Al-Hasakeh governorate. It manages some mills and bakeries, which were previously operated by the Syrian government, and does this in a collaborative way with the central government in Damascus. These mills and bakeries are still receiving inputs from the Syrian government as before the crisis: fuel, flour, and yeast. Even the same employees who were employed before the crisis are still working in their stations. The DAA is guarding the facilities and facilitate the inputs inflow. In addition to that, after the crisis, the ACDC established mills and bakeries to fulfil the gaps in the local needs. The ACDC solely manages these mills and bakeries through the local city council. The public bakeries are responsible for producing around 80% of the

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Most of the silos across the governorate are out of order due to conflict-related damages and lack of maintenance.

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Due to the limited milling capacity of the local ACDC mills, several private mills were established in the area to bridge the gap in the local market supply.

local needs of the regular bread.

The ACDC grain centres purchase the wheat grains from the local farmers and mills it into regular flour. The regular flour is a mid-quality type of milled mixed soft and hard grains, which also contain some bran. The high-quality flour is a white flour resulting from milling soft grains with very low bran or milling residuals. This high-quality white flour is used for baking high-quality bread and pastries.

Around 12 to 30 % of the wheat grains are lost in the milling process as bran. Manual milling results in an even higher waste percentage and is adopted by some mills as a response to intermittent electricity supply. The ACDC exclusively supply the ACDC bakeries with their needs of flour, yeast, and diesel.

On the other hand, due to the limited milling capacity of the local ACDC mills, several private mills were established in the area to bridge the gap in the local market supply. The private mills process wheat grains to flour or bulgur when requested by customers. Milling one kg of wheat to flour or bulgur costs the customer 10 SYP. The bran that comes out from the milling process is sold at 100 SYP / kg. The wheat bran is mainly purchased by livestock owners to be used as fodder. Some private bakeries buy the wheat grains from the farmers to mill it and sell as flour to the retailers and the customers directly.

Regarding labour, mills hire full-time workers who are paid 50,000 SYP monthly and the senior worker who chiefs the milling is paid 85,000 monthly.

In terms of bread baking, the regular flour is backed at the ACDC bakeries to produce regular bread. The regular bread is sold at the ACDC bakeries to the local population directly through distribution points.

In parallel to the public-bread system, private bakeries are also active in producing bread. The private bakeries can register with the local councils to receive a specific amount of flour to bake regular bread; in this case, the private bakeries can only produce regular bread. Nevertheless, the private bakeries can work completely independently from the public bread system to produce 'private' bread. The private bakeries use high-quality flour (white flour) that is either domestic or imported from Turkey through Iraq. This type of bread is a white, thin, high-quality loaf like pita bread. It is sold at the private bakeries and retails shops for higher prices than the regular bread.

On a relevant note, International Relief Development (IRD) was mentioned as a flour distributor in the rural areas of many sub-districts where the data collection took place (Al-Malikeyyeh, Jawadiyah, Tal-Hemis and Ras Al Ain). IRD supplies specific private bakeries with free-of-charge imported Turkish high-quality flour. The produced bread is sold to the local households directly at the bakeries or through particular distributors. The IRD bread was the cheapest bread available in the area, which was sold at 20 SYP per kg, while the regular bread was sold at 55 SYP/kg and the high-quality, 'private' bread at 250 SYP/kg. IRD phased out from the area by the end of May 2018 and stopped flour distribution to the contracted bakeries. Some of these bakeries were previously registered with the Syrian government as regular bread makers. After IRD ended the flour distribution, some bakeries tried to register with the government again, but the government rejected the request as a penalty for working with an unregistered INGO. These bakeries had to shut down since IRD project termination.

Consumption

Wheat and wheat products are staple food commodities to the Syrian households in Al-Hasakeh governorate. Households get wheat, flour, bulgur and bread from several sources in their residential areas.

Non-wheat-farming households purchase wheat, bulgur, and flour from the local retailers. Bulgur and flour are reportedly either locally produced or imported from Turkey through Iraq. Bread is either bought from the local bakeries directly or through local bread distributors. The primary source of bread in the area is the local council bakeries for regular bread. Also, private bakeries provide high-quality bread at higher prices. Also, the IRD bread was reported as a significant part of the flour-to-bread supply by the households in IRD targeted areas until May 2018.

On a different note, when households are farming wheat, part of the production is kept for the own household consumption in form of wheat grains. Part of the stored wheat is processed to bulgur at the household level and milled to flour at local private mills against a milling fee of 10 SYP per kg. The flour is used to bake Tanour bread at the household mainly in case of low bread availability in the market. Tanour bread is a traditional bread usually baked at the household.

Concerning consumption norms, the reported weekly average of bread consumption is 5 to 6.5 kg per person. Bulgur is reported to be consumed in a weekly average of 0.5 to 1 kg per person. Extra amount of flour is consumed as pastries in a weekly average of 0.5 to 1 kg per person. Based on the reported quantities, the average monthly wheat and wheat products required for a family of four is around 116 kg (29 kg per person monthly). As reported by the households, the average consumption is not different from the pre-crisis levels.

Regarding prices, the regular bread is bought for 50-55 SYP/kg and sold in a two-kilogram (16 loaves)

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the average monthly wheat and wheat products required for a family of four is around 116 kg

pack for 110 SYP if bought from the bread distributor, 100 SYP if purchased directly from the bakeries. High-quality bread is bought from private bakeries or the retail shops as high as 250 SYP per kg. The IRD bread priced as low as 20 SYP for 1 kg at the IRD contracted bakeries. High-quality wheat flour is bought at 200 SYP per kg, regular quality flour bought at 100 SYP. Local and Turkish bulgur is bought from the local market at 250 SYP per kg. The pre-crisis prices were 15 SYP for 1 kg of subsidized bread, 10 SYP for 1 kg of subsidized regular flour, 25 SYP for 1 kg of bulgur. As reported by the households, no seasonal price volatility is observed in the area.

The interviewed households reported that wheat and wheat products are often available in the local market over the year. Sometimes, the local milling capacity limits the flour production and market supply, which results in intermittent market availability of the regular bread. In this case, the households buy the expensive high-quality bread, and bake Tanour bread as a coping strategy for low market bread availability. Also, corn is reportedly milled and used for baking bread as an alternative to flour unavailability. On the same note, higher consumption of rice and lentils was reported as a coping strategy to limited wheat flour and bread market availability.

In terms of humanitarian assistance, some households reported receiving wheat flour from IRD in a quantity of 400 gm per family member per day. IRD distributes the flour to the beneficiary households daily except Friday. The beneficiaries are using this flour for baking their needs of bread and pastries. However, they highlighted that the distributed quantity is not sufficient to cover the household needs. On a relevant note, "Al Ber Wal Takwa and Al Ber Wal Ehsan" are local NGOs reported as a WFP flour and bulgur distributors. The distribution was reported to be from once to three times annually, in quantities of 10 kg of flour and 5kg of bulgur for the household. As reported, these limited quantities and distribution frequency do not represent a significant aid to the households.

Women Involvement

Women are involved in the wheat value chain as family members in support of the family-owned business, particularly in wheat farming, where women support the agricultural activities on land owned by their families. However, no women were reported to own agricultural land or any business.

4.2. Wheat Value Chain Challenges

The wheat value chain in Syria used to be entirely state managed due to its strategic importance to the population from the food security perspective. Most of the challenges that currently face the wheat value chain are related to the collapsed governmental management and support. The inaccessibility to subsidized agricultural inputs skyrocketed the farming and processing costs and products prices as a result.

Producers

- Absence of supportive and guidance policies
- Absence of farmers networks
- Absence of information sharing mean on production, market performance and climate
- Unavailability of high production seeds
- Absence of risk protection mechanism
- Absence of agricultural loans and official financial system
- Limited unofficial credit-based trade practices
- Volatile security situation
- Limited irrigation water resources
- Drought is a significant risk impacting rainfed wheat farming
- Expensive inputs as pesticides and fertilizers, particularly those imported from Turkey.
- Crop diseases

Traders

- High market entry capital
- Limited warehousing capacity
- Rodents and grain insects
- Absence of information sharing mean on production, market performance and climate
- Expensive transportation due to high fuel prices
- Poor roads conditions.
- Destroyed silos
- Price volatility
- High risk on business continuity (security, unpredictable price volatility.)
- Absence of risk protection mechanism
- Absence of agricultural loans and official financial system
- Limited unofficial credit-based trade practices
- Unstable cross-border trade policies
- Currency fluctuation

Processors

- Power cuts
- Limited mills production
- Expensive fuel
- Expensive transportation

Consumers

- Expensive wheat product (bread, flour and bulger)
- Intermittent availability of wheat product due to production issues
- Low income
- Price volatility

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It is recommended to invest in the market infrastructure by promoting and introducing efficient and sustainable agricultural solutions and technologies.

4.3. Wheat Value Chain Opportunities

It is not advisable for the humanitarian sector to invest in wheat-to-bread parallel systems, that will soon be at risk of collapse when the central government takes over the northeast and revitalize the previous systems. Instead, it is recommended to invest in the market infrastructure by promoting and introducing efficient and sustainable agricultural solutions and technologies, that can improve the productivity of the agricultural sector. Indeed, that is advised in addition to emergency interventions.

Producers

- Wheat farming support
 - Providing high-quality seeds - Cash and assets for work programmes (ex: seed multiplication)
 - Promoting and supporting green energy solutions for operating water pumps and machinery
 - Promoting and supporting low water production solutions
 - Promoting and supporting bio-fertilizing solutions.
 - Creating information sharing mobile application (share information on production, meteorological bulletins on weather updates & water availability and market prices)
 - Agricultural training,
 - Crop diseases identification and fighting

Traders

- Create information sharing channels (market support mobile app for traders to share information on production and market prices)

Processors

- Millers and Bakeries support
 - Introduce green energy solutions
 - Introduce solar energy solutions for operating mills and bakeries.
 - Introducing biofuel solutions

5. Small Ruminants Market System: Mapping, Key Challenges, and Opportunities

Derek and Qamishli Districts, Syria

Small Ruminants Value Chain

MAY 2018

The Market Environment

Institutions, rules, norms & trends



Syp Depreciation



Exchange Rate Volatility



Family managed business



Intersection with other VCs



Gov. support



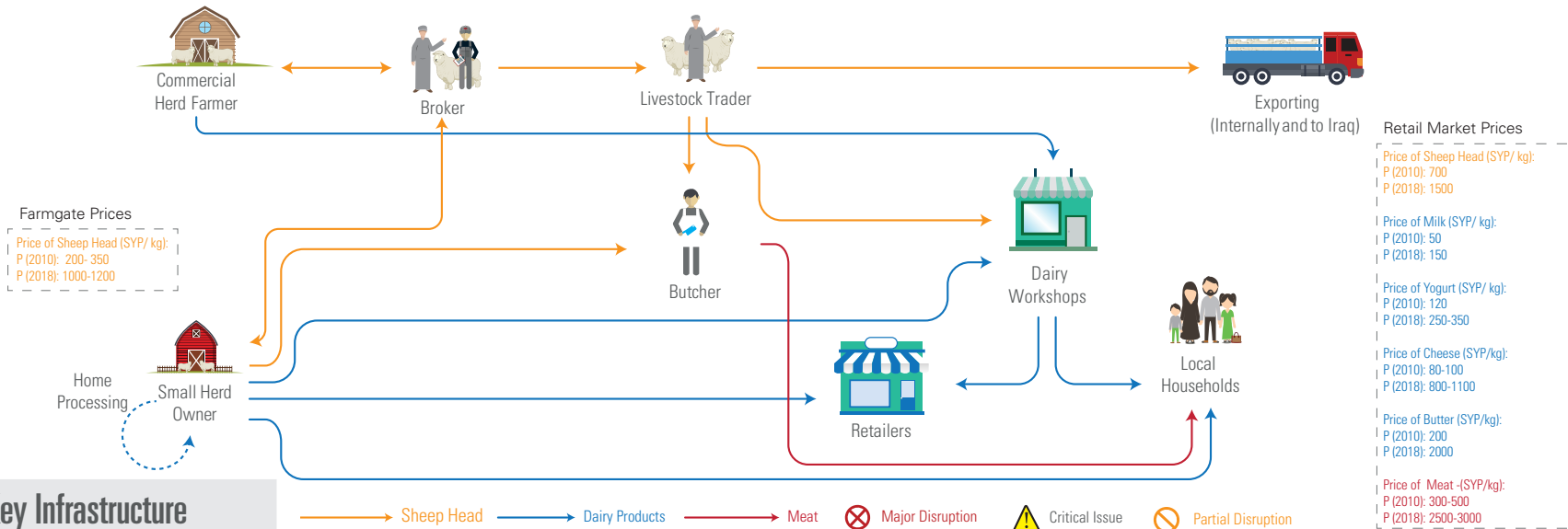
Quality Control



Drought

Value Chain

Market actors & their linkages



Key Infrastructure

inputs, market-support services



Water Scarcity



Poor roads



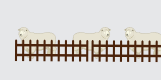
Banking and Financial Services



Expensive Vaccines and medications.



Electricity



Pasture Availability



Livestock Diseases



Expensive Fodders



Informal Credit based trade

5.1. Small Ruminants Value Chain

Production

Raising small ruminants is widely practiced activity by farmers in the northeast of Syria. This practice is coinciding with the agricultural nature of this area, mainly wheat and barley farming which provides vast fields of green and dry pasture. Almost all the interviewed livestock owners have more than ten years' experience in the livestock rearing business. The owners reported herd sizes ranging from 30 to 200 heads, mostly females kept for milk production. According to most of the owners, the livestock population in the area has significantly dropped after the crisis due to the skyrocketing production costs and unavailability of supportive governmental policies.

Purchasing from the local market and self-production are the reported sources of all production inputs for sheep and goats keeping.

Regarding animal fodder, natural pasture, own production, and the local market are the reported fodder sources. Pasture areas are available for grazing during the warm season, from March to July, mainly on barley and wheat farms after harvest. The herdowner pays a range of 120,000 – 140,000 SYP to the pasture landowner for letting his herd graze in a one-hectare land area for a period of one month. The herd owner will also pay a shepherd a monthly compensation of 60,000 SYP for taking care of the herd grazing. During the cold season, the farmers provide different rations to their herd to compensate for the lack of green pasture. Most of the farmers offer their flocks barley, hay, and wheat bran. Barley and wheat-bran are provided in daily quantities per head of 3kg and 1kg respectively. Barley costs 120 SYP / kg, wheat-bran 115 SYP/kg, and hay 75 SYP/kg. Some farmers top up this ration with concentrates mix to supplement the ration nutritional value and maintain high milk production. The concentrates ration is barley-based ration mixed with wheat and corn grains.

Additionally, salt and multivitamins are added to improve the ration nutritional value further. The mixed concentrates ration is offered to the herd in a quantity of 0.25–0.5 kg per head daily. The mixed concentrates ration costs 110 SYP/kg. This ration is enough for producing 0.5 – 1 kg of milk daily from each head¹². Nevertheless, maintaining daily fodder up to the standard is a significant challenge facing many livestock farmers due to their limited financial capacity. As a result, many livestock owners had to minimize the fodder quantities to as low as one kg of mixed barley, hay, and dry bread. As reported by some farmers, these small quantities heavily impacted the milk production to unprecedented low levels of 160 gm daily per head.

Regarding water resources, in-house well water is the main reported source for animals watering in the region. The farmers used to dig a well in their house or land to reach the underground water at a depth ranging from 20 to 70 meters. The depth of water differs from area to area. The areas that are closer to the Iraqi borders have underground water at lower depth. The water is stored at storage tanks after extraction.

In addition to fodder and water, other equipment is needed for keeping the herd, such as feeding & drinking troughs and shovels. Also, several vaccinations and medications are needed specifically as treatment and prevention against haemorrhagic septicaemia (HS), Pasteurella, pox and foot-and-mouth disease (FMD). The farmers reported that the vaccines are available locally at private clinics, however at high prices compared to pre-crisis. For vaccinating a herd of 100 head, HS vaccine costs 5,000 SYP, Pasteurella Vaccine costs 6,000 SYP, Pox vaccine costs 5,000 SYP and FMD vaccine is 10,000 SYP. In addition to vaccines, internal and external antiparasitic drugs are needed. The cost of external and internal antiparasitic pack is 1,500 and 3,000 respectively. One pack is enough for 60 heads. According to veterinarians, the currently available vaccines in the local market are smuggled from Turkey, Iraq, and Jordan. These smuggled vaccines are transported without cold containers or refrigerated trucks, which results in deactivating the vaccine and risking later outbreaks. Vaccines used to be provided exclusively by the government in mass vaccination campaigns before the crisis for free. Most of these vaccines and medications were locally manufactured and stored in government managed centres.

Regarding labour, almost all the interviewed owners reported that it is a family managed business. The family members are responsible for feeding, milking, dairy processing and shepherding the herd in the pasture. Nevertheless, a shepherd can be hired to lead the grazing for 2000–3000 SYP per day.

Concerning production, the average 70-head herd produces 40 lambs per season. Males are kept and fed until one year old at least and then sold for meat production. The female lambs are kept and fed till the reproduction and dairy production. The reported average milk production is 0.5 – 1 Kg of milk per head depending on the head nutrition, health, age and season. Most of the milk quantity is sold after processing as dairy products. Just a small amount is sold as raw milk. Almost the entire interviewed sample does in-house milk processing to yogurt, cheese, and butter. Around 10% of the production is kept for the household consumption, and the rest is sold directly to the locals or retail shops.



The low fodder availability reduced the milk production to low levels of 160 gm daily per head

¹² However, liter is the standard unit for milk globally, kg reported by the market actors as the unit of measurement. In fact, one kg of milk is very close to 1 liter of milk in terms of weight.

Trade

Trading activities in the small ruminant value chain are taking place on several levels in the region. Starting from the herd owner or animal farm, a broker plays an intermediary role in facilitating the transactions from farms to livestock traders and butchers. The broker mediates heads purchasing from farmers to traders, butchers and consumers against specific quality measures. These measures include weight, age and health conditions. On a relevant note, the broker can purchase heads from the owners and resell them to traders and consumers after topping up a profit margin. The broker buys the average head weighted 28 kg for 30,000 SYP and resell it for 35,000 SYP. In this reselling model, brokers acting as traders usually deal with a limited number of transactions, in a range of 20-30 head per season. Brokers work on their own, have no employees as reported, dealing with cash and on credit. In the surveyed areas, there are up to 200 active brokers in the livestock markets.

Livestock traders deal with bigger trade volume than the brokers deal with. The traders purchase the animals from the farmers directly or through a broker. The traders deal with a trade volume that ranges from 50-200 heads per month.

The traders do frequent informal short-term credit-based transactions in a range of 1-2 weeks. Most of these transactions are with farmers and brokers. In case of supplying from the broker, the trader pays the brokers 300 SYP per head as mediation fee. Transactions are all made in cash. Mostly, livestock trading takes place in the local livestock market. The average male head is sold in the livestock market for a range of 30,000 SYP - 40,000 SYP and the average female head is sold for 60,000 SYP - 70,000 SYP. Before the crisis, the average price for a male head was 5000-10000 SYP.

Exporting small ruminants is a common practice by the traders in the region. Male sheep and goats are exported internally to other governorates in Syria or externally to Iraq. However, the border crossing policies are changing frequently which alters the exporting plans, costs and trade profits.

Most of the traders depend on their family members as workers. However, some of them reported hiring some workers to support their business. The worker helps in maintenance and cleaning the barn and the animals, against a monthly salary of 50,000 SYP.

A trader deals with a monthly trade volume of 60 to 70 heads, reporting a monthly profit of 100,000-120,000 SYP. Profits are higher during the spring season as animal weight is higher due to pasture availability.

Processing

Small ruminants are kept for dairy and meat production. Dairy workshops and butchers are the main processors involved in this value chain.

Processing milk to dairy products takes place on two levels: at the household level where the herd owner processes the milk and sells the dairy products for cash, and at the commercial level in dairy workshops. The household-based milk processing is the main source for dairy market supply in this region. The herd owner processes his milk production utilizing several inputs from the local market and sell his production to the neighbouring household and the local retail shops.

The dairy processing workshops have been active in this business for more than ten years continuously. These workshops buy milk directly from the local farmers to process it at their workshops to yogurt, cheese and butter and buy milk at an average of 150 SYP/kg. In terms of other production inputs, fuel is purchased at 100 SYP/Lt, cheesecloth for cheese preparation is 800 SYP/square meters, cheese culture is bought at 600 - 400 SYP/pack (one pack is used to produce 100 kg of cheese).

Regarding production capacity, the interviewed processors reported a range of 2,000 kg of milk bought monthly as input. After processing, 700-1000 kg are sold as yogurt and 160 kg as cheese. On average, each kg of milk is processed to 900 gm of yogurt or 160 gm of cheese or 100 gm of butter. In other words, 1 kg of milk is needed to produce 900 gm of yogurt, 4-8 kgs of milk are needed to produce 1 kg of cheese and 15-20 kg of milk are needed to produce 1 kg of butter. These ranges are sensitive to the fat content of the milk, which depends on the nutrition and milking profile of the herd. The dairy workshops reported a range of 20-70 sales per week. Financial transactions with suppliers and customers are mainly cash-based. However, informal credit can cover around 50% of the transactions on both sides, mostly for a period of a few days.

Concerning profit, processing and selling dairy products out of 2,000 kg of milk monthly makes 300,000 SYP monthly as a net profit. During the spring and summer seasons, profitability is higher due to grazing-induced higher milk production. Concerning labour, all the interviewed dairy workshops reported no employees. The business is 100% family dependent.

Butcher shops sell small ruminants meat to the local population. The male sheep and goats at the age of 1 year at least are subject to be sold to butchers or consumers for meat production.

The butchers are active in this business for more than ten years. Around 10-30 butcher houses are reported in each sub-district. Regarding production inputs, around 100-150 heads are slaughtered monthly per butchery. The sheep or goat heads are bought between 40,000 and 70,000 SYP depending

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Male sheep and goats are exported internally to other governorates in Syria or externally to Iraq.

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Processing and selling dairy products out of 2,000 kg of milk monthly makes 300,000 SYP monthly as a net profit.

on the weight.

Hiring fulltime workers is reported by the interviewed butchers. Butcher house hires 2-4 workers, each paid 2,000 -3,000 SYP daily. Additionally, each worker is given 1 kg of meat on a weekly basis.

Regarding storage, warehousing is reported by butchers in their shops. It is limited to one day in the shop fridge.

In terms of trade volume, the reported weekly transactions are up to 150, around 30-100 heads slaughtered monthly by the butcher house, which produces 1,000-2,000 kg of meat. This trade volume is half the value before the crisis. The demand for meat is reduced due to the population economic hardship. The meat sold at a price of 2,000-3,000 SYP/kg. Butchers reported a monthly average profit of 150,000 - 300,000 SYP.

Regarding wool production, it was interesting to find that the wool is not processed or used in any means in Al-Hasakeh governorate. According to the herdowners, 1 kg of wool is the average production per head per year. The herdowners distribute it as gifts or charity contributions. The interviewed herdowners see no value in investing in wool processing by the humanitarian sector, which requires validation.

Consumption

Rearing small ruminants is a main source for several food commodities in the area according to the local households. The local population raises sheep and goats for their dairy and meat production. Meat production and dairy processing in the area is a local activity, and mostly comes from the local small-ruminant herds and dairy workshops.

In terms of consumption patterns, small-ruminant milk is not consumed as raw milk by the locals due to its high price and strong taste, they instead process it to yogurt, cheese, and butter. The current consumption quantities of dairy products per person are almost half the pre-crisis quantities according to most of the interviewed households. Some households reported that they don't consume meat at all currently due to their low income and overpriced meat. The locals report consumption quantities in an average range in kg per person per week. Yogurt, cheese, and, meat are consumed in ranges of 0.5-1, 0.25-0.5, 0.15-0.5 respectively. Concerning retail prices; milk said to be priced at 150 SYP/ kg, yogurt at 250-300 SYP/ kg, cheese at 800-1,100 SYP/ kg, meat at 2,500-3,000 SYP/ kg and the live head of male sheep or goat is priced based on its weight on a unit price of 1,500 SYP/ kg. The current prices are much higher than the pre-crisis level. Milk is three time higher than the pre-crisis price, butter and cheese are ten times higher than the pre-crisis levels. Concerning seasonality in prices, spring and summer are the high production season due to fodder availability. Therefore, dairy products are cheaper over this period. On the other hand, fall to winter is the low production season due to lower fodder availability. As a result, dairy products are overpriced during the cold season induced by high fodder prices.

According to the interviewed households, sheep and goat dairy products are staple commodities and everyday items in the Syrian kitchen. Nevertheless, high prices and low income constructed a financial barrier and limited the affordability of buying small-ruminant products as reported by the locals. On a relevant note, the local households adopted coping strategies to the low affordability of these items. Reduced consumption is the most reported strategy, consuming cow and cattle milk is an alternative to the overprices sheep milk, consuming chicken as alternative to the expensive sheep and goat meat also reported as a coping strategy. In case of severe economic hardship, thyme with olive oil is the alternative food to the unaffordable dairy and meat products according to the interviewed locals.

In terms of accessibility, no difference was reported between women and men in accessing these commodities. Equal distribution of the family food is the standard practice according to the local household. The family woman is the lead in the household purchasing, consumption and resources management.

Regarding food-aid, only one participant reported sheep meat distribution during al Adha Eid by local NGO. The distributed meat was 4 kg weight for a single time per household.

Women Involvement

Women involvement in the small ruminant's value chain in NES is noticeable. The common family-based business in other parts of Syria is also widely practiced in NES, where female family members contribute to the business activities as labour. Housewives and daughters are heavily involved in several activities along the value chain, starting from animal keeping to dairy processing. However capital possession and business ownership are mainly men-dominated in this value chain, and only one of the interviewed livestock owners was a lady in her fifties. She owns and manages a 200-head-sized herd for dairy production. She has been active in this business for years. The dairy production is home-based where she is processing the milk manually to cheese, yogurt, and butter. Her family members are supporting her business. She has not reported any challenges or problems facing her

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Milk said to be priced at 150 SYP/ kg, yogurt at 250-300 SYP/ kg, cheese at 800-1,100 SYP/ kg, meat at 2,500-3,000 SYP/ kg

business related to her gender. She mentioned no discrimination in the treatment she receives from the different market actors compared to her male competitors. The challenges reported by this lady were mainly the inefficiency of manual techniques she uses for milk processing and frequent power outages.

However, the research team could not meet any other female herdowner in the area. It is expected that women in the Kurdish region have higher business ownership representation due to cultural reasons compared to the Arab communities in Syria.

On a different note, women have a say in managing the household financial resources, consumption and warehousing.

Profitability Analysis of herd keeping for dairy production

This paragraph relates a case study of a herdowner rearing female sheep and goats for home-based dairy production. His herd counts 75 heads, fed to produce milk over the season. Table 2 presents the needed inputs for a milking season of 4 months with no pasture availability. The inputs assumed as a family managed herd with no paid labour. The inputs included fodder, vaccination, and dairy processing equipment. As shown in table 2, the total input cost is 1,779,813 SYP.

Table 2. Costed inputs for rearing 75 heads sheep and goats herd for dairy production over four months of milking season.

Input	Quantity	Unit Price	Total Price
Hay - kg	9,900	50	450,000
Concentrates Mix - kg	4,500	110	495,000
Wheat Bran - kg	4,500	115	517,500
Vaccines - ML	400	45	18,000
Vitamins - Lt	12	5,000	60,000
Salt - kg	60	75	4,500
Cheese Culture	10	1,000	10,000
Food Troughs	6	12,500	75,000
Water Troughs	6	12,500	75,000
Water - Lt	168,750	0.15	25,313
Fuel - Gasoline - Lt	400	100	40,000
Cheesecloth	50	100	5,000
Shovels	3	1,500	4,500
Total			1,779,813

Concerning revenues from sales of processed outputs, as indicated in table 3, the size of a herd with 75 heads produces of 9,000 kg of milk over the 4 months long season at a daily average of 1 kg. This quantity is enough to be processed into 1,100 kg of yogurt and 1,317 kg of cheese, which is based on producing 900 gm yogurt out of 1 kg milk and 1 kg soft cheese out of 6 kg milk. Along the season, the 75 females produce 40 lambs. Based on yogurt selling price of 250 SYP/kg, cheese of 1000 SYP/kg and lambs of 25,000 SYP / head, the total revenue is 2,592,000 SYP. This revenue generates a profit of 812,187 SYP (46%).

Table 3. Herd production revenue

Season Total Milk Production	Processed Products	Quantity	Unit Price in SYP	Total Price
	Yogurt	1,100 kg	250	275,000
9,000 - kg	Cheese	1,317 kg	1,000	1,317,000
	Lambs	40 heads	25,000	1,000,000
Total				2,592,000

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Rising a 75 heads sheep and goats herd for dairy and meat production generated a profit over the season that is equal to the monthly wage of skilled labour.

This profit is calculated based on favourable production and processing conditions: financial capacity, no sick or dead animals, no birth losses and stable 1 kg of daily milk production along the season. It is interesting to find that the 495,187 SYP profit is almost equal to 6,000 SYP daily wage, which is the average daily wage of skilled labour or almost four times the daily wage of unskilled labour (1,200 SYP¹³). According to the interviewed herd owners, considering the efforts and risks associated with this complicated business, the profit margin is not helping enough for business expansion or market entry. On a relevant note, the high financial capital that is needed to run this business represents an additional barrier facing business development in this area, particularly with the current absence of risk protection mechanisms and financial services.

Looking at the inputs costs in Table 1 reveals that fodder is representing 82 % of the total costs for this season. This indicates that fodder price is the primary explanatory indicator for the low profitability and the high retail prices of the dairy and meat products.

5.2. Small Ruminants Value Chain Challenges

The small ruminant value chain faces several challenges and bottlenecks along the different segments of the value chain. Most of the challenges are due to the deteriorated market environment and the market infrastructure. Many of these challenges are cross-sectional issues that face all agricultural value chains in the region. The study team assessed the top challenges that have the highest impact on the value chain production. After thorough technical discussions, three main challenges were identified: low availability of fodder; limited energy supply; low availability of vaccines. Following are the full list of challenges which are summarized below and grouped by the market actor.

Producers

- No governmental support
- High market entry capital
- Unavailability of official banking and financial services
- Drought impacts pasture availability
- Expensive fodders
- Expensive veterinary medications and vaccinations

Traders

- Expensive transportation
- Unmaintained and poor roads conditions
- Changing cross-border policies with Iraq
- High market entry capital
- Unavailability of official banking and financial services

Processors

- Drought impacts pasture availability, which impacts the milk production and reduces production volume and profitability overall.
- Increased inputs prices (including fuel and transportation) due to currency devaluation
- Power outages
- Unavailability of official banking and financial services

Consumers

- Limited income
- Expensive food items

5.3. Small Ruminants Value Chain Opportunities

The small ruminants value chain can provide many livelihood opportunities: livestock rearing, dairy production, processing, trading activities and their supportive service provision, which can provide opportunities to youth, men, and women. Given that dairy processing is mostly women-led and a home-based activity in the region, supporting vulnerable women with dairy processing capacity can help women achieve economic empowerment. Similarly, targeting the most vulnerable groups from the protection standpoint with income generating activities as part of the small ruminant value chain can help them reach aid-independency as active market actors.

The study team brainstormed the potential solutions for the most impacting challenges. The main principles behind the potential interventions are improving the value chain production, considering the humanitarian sector capacity, prioritizing technology transfer, building sustainability and resilience. Mainly, the discussions recommended exploring and investing in innovative farming techniques for green fodders farming as hydroponic barley farming. With the current unavailable rain-dependent pasture, hydroponic-raised green barley might positively impact the fodder availability and dairy production. Also, exploring and promoting innovative energy technologies to support the cold chain and the processing energy requirements are also recommended. Following are the recommended potential interventions grouped by the market actor.



Hydroponic-raised green barley might positively impact the fodder availability and dairy production.

Producers

- Supporting local production of Fodders
 - Promoting and supporting Hydroponic Agri-solutions
 - Promoting and supporting chemical treatment of straw
- Veterinary services support
 - Conducting Vaccination campaigns
 - Launching Veterinary info sharing mean (app for medicines availability, reporting on outbreaks. etc.)
 - Initiation Mobile vet clinics programme
 - Subsidized Medicines and vaccines provision (Vouchers)

Processors

- Introduce alternative power solutions
 - Introduce solar energy solutions for processing and warehousing
 - Introduce biofuel solutions for fuel production

6. Livelihood and Resilience analysis

Livelihood and Food Security

Before the crisis, the agricultural sector was the primary income source for 50 % of the population in Syria ¹⁴. The long-term crisis heavily impacted the agricultural sector and the population's food security and livelihood opportunities as a result. According to 'Counting the Cost' study by the FAO ¹⁵, over the seven years of war, the Syrian agricultural sector lost around USD 16 billion regarding production loss including damaged assets and sector infrastructure. The annual crops and the livestock are accountable for USD 7 billion USD 5.5 billion respectively; together they account for 78 % of the total agricultural sector losses.

Despite the seven years of war and its catastrophic impact, the sector still represents around 26 % of the country's GDP ¹⁶. Nowadays, the rural households still depend on agriculture as their primary source of income and around 80 % of the population is involved in annual crop farming activities ¹⁷. Regarding the urban areas, according to ACU ¹⁸, 30 % of rural Damascus residents adopting rooftop vegetable farming as a coping strategy to the high market prices. Accordingly, the agricultural sector represents a vital foundation for the resilience of 6.7 million Syrians as reported by FAO ¹⁹.

Resilience Elements

Despite the several challenges that face the crop and livestock sectors in NES, many farmers and herdowners are still practicing wheat farming and livestock rearing. The production, processing, and trading activities managed to survive, benefiting from several resilience elements the local society had:

1. Agricultural land ownership was a critical resilience element in NES, where landownership maintained farming as a cross-generations livelihood and food security enabling factor;
2. Agricultural knowledge and skills were common in the area due to its historical agricultural nature;
3. Diverse water sources; rivers as al-Khabour and Euphrates, rainfalls and underground water made farming possible;
4. Responsive and evolving private sector was able to fill the public-sector gaps incentivized by profitable opportunities;
5. Internal and external trading opportunities with other governorates, Iraq and Turkey;
6. Oil and Electricity: oil availability in Al-Hasakah fuelled local power grid, and the power sources in Al-hasakeh were significantly more available than the rest of Syria during the conflict;
7. The homogenous Kurdish community was able to quickly arrange a stable and evolving self-admiration to fill the government collapse induced gap;
8. The ties with Iraq Kurdistan secured both ways trading route that eliminates the risk of siege;
9. The Kurdish self-admiration had a significant international support;
10. The relatively stable security situation enabled the agricultural sector and markets to maintain functionality.

¹⁴ FAO (2016). Syrian Arab Republic and FAO. Building resilience and sustainable food and nutrition
¹⁵ FAO (2017). Counting the Cost: Agriculture in Syria after six years of crisis.
¹⁶ FAO (2017). Counting the Cost: Agriculture in Syria after six years of crisis.
¹⁷ Ibid
¹⁸ ACU - Assistance Coordination Unit (2017). DYNAMO – Syria Dynamic Monitoring Report
¹⁹ FAO (2017). Counting the Cost: Agriculture in Syria after six years of crisis

Economic Recovery Opportunities in NES

On principle, increasing the market production through adopting innovative techniques, solving the value chain bottlenecks and increasing the active market actors will improve the food security in the local community. The food security situation is expected to recover because of improving the food items physical availability in the market, increasing the food affordability and access due to higher supply and income. The community with higher food security and more livelihood opportunities are more resilient to shocks, mainly when the livelihood opportunities and food productions are based on the local capacities and resources. This represents an opportunity for the humanitarian sector to support the economic recovery and resilience building. In addition to distributing food baskets, the humanitarian sector working in NES can support the Syrian population utilizing the local resources to rehabilitate the agricultural sector. This can be achieved through several themes such as restoring the agricultural infrastructure, agricultural technology transfer, promoting efficient irrigation solutions, promoting green power solutions, promoting sustainable farming, promoting crop diversification, introducing new food processing value chains and supporting the agri-industrial sector governance.

Risks and Sustainability

It is critical to assess the risks associated with market-based interventions in the small ruminant value chain to assure no harm and sustainability. Studying and continuously monitoring the market supply, demand, and performance indicators are crucial before and during any market-based interventions. As a common example, oversupplying the market with food commodities through extensive support for food production can lead to surplus induced market recession and losses to market actors, which will in return kill the market as an infrastructure for food security, livelihood, and resilience. On a relevant note, it is vital to consider the environmental impact of intervening in the small ruminant and wheat value chain. Overgrazing and high carbon footprint of livestock production are potential adverse environmental consequences of extensive livestock production support. In addition, groundwater irrigation in Syria is deeply overexploited, yet sustainable use of water receives less attention than the effects of food and income security. Consequently, the humanitarian actors are highly advised to seriously consider these risks when implementing market-based recovery interventions targeting the dairy sector in Syria, to assure sustainability and no harm.