



# Identification of Agricultural Value Chains Development In West Mosul – Iraq

# Abbreviations

FGD.....	Focus group discussions
KII.....	Key informant interviews
AVC.....	Agricultural Value Chains
ODK.....	Open Data Kit
IDP.....	Internally displaced people
ISIS.....	Islamic State of Iraq and Syria
CSA.....	Climate-smart agriculture
HHs.....	Households

## Acknowledgments

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# Executive Summary

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The agriculture sector plays a crucial role for Iraq's economy and is the third-largest employer and contributor to the economy. Over the last two decades, activity levels of the sector greatly declined mainly due to the conflict, economic downturn, urban migration and state policies that interrupted market dynamics and dramatically increased the country's reliance on imports to meet domestic food security needs.

Besides, the COVID-19 outbreak in the area and the emerging drought negatively affected livelihoods and available employment opportunities in the agricultural sector.

To develop productive agricultural value chains, the sector needs interventions and support based on comprehensive studies. Interventions should consider climate-smart agricultural practises for crop/vegetable and animal producers to improve their productivity while protecting the environment.

Practises will not only improve producers and enterprises' economic situation but will increase community resilience and household food security as well.

This report summarises the assessment findings to identify specific Agriculture Value Chains in Ninawa Governorate (West Mosul areas i.e. Hawi Al Kaisah, Al Ghabat (Al Salamia), Al Harajyah and Outside Mosul area i.e., Hamam Alil and Humedat).

During two months, September and December, 2021, the data collections took place using Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) with stakeholders. The interviewed key actors in agricultural value chains were farmers/producers, traders (collectors, open space markets, wholesale markets, processors and retailers) and consumers; besides, to the community leaders and agricultural experts. The data was collected through using questionnaires (quantitative and qualitative data collection tools) designed for the scope and objectives of the assessment.

An Open Data Kit (ODK) mobile data collection platform with tablets facilitated the data collection process targeting producers/ farmers and consumers.

Primary data collection faced numerous challenges, including COVID-19 pandemic, some of the involved key actors within the identified value chains were not accessible or it was difficult to organize meetings with such key informants. Thus, some interviews were conducted remotely and secondary data filled any gaps.

For quantitative (KIIs) and qualitative (FGDs) data collections, the assessment team selected the two biggest locations within the study area, in each location; two villages were selected for conducting face to face interviews (KIIs) and FGDs with the farmers/ producers. The villages' selection was based on their suitability and appropriateness for agriculture activities (diverse) and livestock activities.

The selected locations were Humedat (1350 HHs) and Hamam Alil (3080 HHs) sub districts. In Humedat (Al Zanazel Village and Badosh Al Sufla Village) and in Hamam Ali (Quntara Village and El Areje Village) were selected.

For quantitative data collection, a total of 124 KIIs were conducted, where 49 KIIs were held with farmers/ producers, 39 KIIs with local traders including wholesale markets, collectors, retailers and food processors, 20 KIIs with consumers from different locations of the study areas, 9 KIIs with Academic staff/ agricultural experts from the University of Mosul and the local agricultural departments and 7 KIIs with local community leaders (Mukhtars).

Whereas, the qualitative data collections were through FGDs sessions using split session group focus group discussions. 8 FGDs were held within the selected locations, 4 FGDs were in Humedat and 4 FGDs were in Hamam Ali. In each of the selected villages, two FGDs were held, one for men group and one for women group with 8 -12 members in each group.

There was a general readiness among the participants in the study and they were keen to provide the required details and share their views during the interview.

The selected participants were youth and adults from different agricultural backgrounds. The conducted focus group discussions followed all social distancing measures to limit the risk of COVID-19.

The analysed data revealed that four agricultural value chains (dairy, beef, tomato, and cucumber) are prevailing within the study areas; the selected value chains were based on their potential for development (market growth and local demand), their potential for improving of the food security, level of support available from public, private, and non-governmental actors.

The data provide information about the activities and processes associated with the flow of products from the producers to consumers of the products (livestock and agriculture) and the involved key actors/ identified value chain; these are identified and mapped.

This means that different key actors are involved within the processes which are producers, collectors, traders including wholesalers, processors, retailers and consumers.

Farmers/ producers in all four identified value chains are the main key actors and are suffering from the absence of the required assets and equipment's, facilities, and a downturn in production and income because of the crisis and lack of the required services from either the governmental side or development actors. They expressed dire need for support and interventions to help them to recover their businesses.

The main constraints that faced the local farmers to promote the quality of their products are the difficulties in access to, and costs of inputs and services (subsidies, required seeds, pesticides, herbicides, vaccinations, extension services/ required skills, transport, cold storage).

Dairy and beef value chains are the most profitable livestock value chains within the study area; the livestock industry within the study area is still suffering from consequences of the crises that faced the area.

The dairy products and beef are not covering the local demands. The livestock breeders are constrained by lack of the required interventions (hiked prices of animal fodder and veterinary services) and by the traditionally poor marketing infrastructure, absence of the linking between the key actors and the lack/ absence of advance level of the transportation facilities.

The tomato and cucumber value chains are the most promising agricultural value chains prevailing within the study area; the two value chains are affected by the lack of required infrastructure and weak enabling environment. Currently, the government support is insufficient, although extension services are provided.

Tomato and cucumber farming are still mostly a family business and access to financial services is limited.

The local producers are still practicing farming practices traditionally which negatively affect both yield and quality.

Besides, post-harvest management, such as proper sorting, grading and packaging, is practically absent. Lack of cold infrastructure, storage facilities and processing increases losses; the lack of a cold chain forces farmers to sell immediately even at low prices. The produced tomato and cucumber are either sold to traders (collectors) or directly transported to the market (wholesaler and retail).

The farming practices need to be improved through conducting tailored capacity-building programs and training on-farm management, pest control, organic and synthetic fertilizer use, and irrigation techniques, post-harvesting and marketing and linking them through either (Contractual agreement or through informal linkages and ad hoc arrangements).

There are many opportunities to improve on locally made products for local markets. The interventions in any of the four value chains should focus primarily on farmers/ producers to overcome the challenges that hinder improving the quantity and quality of their produces.

The interventions should concentrate on using the modernized farming technologies, restoration, and the enrichment of soil quality in the long term and usage of sophisticated efficient irrigation techniques that eco-friendly (Rationalization in the use of water), post harvesting management and marketing and establishing of the required agriculture infrastructure. Community-based organizations/ associations among the involved key actors need to be formed and therein interconnection between them.

# 1. Introduction

## 1.1 Background

Iraq's agriculture sector plays a fundamental role being the country's third largest employer and contributor to the economy<sup>1</sup>.

Some 33% of the Iraqi population live in rural areas where agriculture provides an important source of income and food security<sup>2</sup>.

The unstable security condition, economic downturn, internal displacement, urban migration and conflicts during in the past decade resulted in declining the activities of the sector in Iraq<sup>3</sup>.

The COVID-19 outbreak in early 2020 added new challenges, including closed borders, curfews and restrictions on movement.

Further, the occurrence of drought predicts a negative impact on livelihoods and employment, altogether expected to lead to a reduction of Iraq's economy by 9.7% by the end of the year<sup>4</sup>. Currently, local demands for agricultural products greatly rely on the import from neighbouring countries. Studies confirmed that poverty and hunger can be greatly reduced through support to the agricultural sector and agriculturally driven economic growth<sup>6</sup>.

Rising productivity in the agriculture sectors stimulates growth in non-agricultural sectors through forward and backward linkages<sup>7</sup>.

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<sup>1</sup> World Bank group, 2018. Iraq Economic Monitor From War to Reconstruction and Economic recovery

<sup>2</sup> FAO Stat 2015

<sup>3</sup> USAID, 2017. Iraq Agriculture

<sup>4</sup> Impact of COVID-10 on Small and Medium Sized Enterprises in Iraq, IOM, June 2020: <http://edf.iom.int/Content/Cov19/SME%20report%2003.06.2020.pdf>

<sup>5</sup> FAO., the WORLD BANK, 2018. Iraq Agriculture sector note

<sup>6</sup> FAO, 2017. ending poverty and hunger by investing in agriculture and rural areas

<sup>7</sup> Evaluation Knowledge Study, 2012. Support for Agricultural Value Chain Development



## 1.2 Purpose of the study

This assessment was conducted in Ninawa governorate, West Mosul areas, (Hawi-Alkanisa, and Al Harajyah) and Outside Mosul area (Hamam Alil, Humedat and Salamia) to select the most promising local agricultural value chains in the target locations which need support for optimization of their added value.

Support may be provided by activities such as tailored training courses, in-kind support and business coaching.

The assessment aimed to provide insight in existing skills and gaps required for effective and valuable value chain development through analyses of collected data related to farm productivity, agricultural practices, marketing and market linkages, and development of products.

This assessment was conducted for two months. Comprehensive desk review was done to determine the relevant key actors in each node of the value chain.

Tailored data collection tools were designed for the scope and objective of this assessment, which include key informant interviews (KIIs) with stakeholders (producers (men and women), collectors, processors, traders, distributors and consumers) and focus group discussions (FGDs) for qualitative data from men and women producers. Triangulation was done independently.

Collected qualitative and quantitative data from value chain producers/farmers, traders (collectors, whole sale market traders, retailers) and consumers of each sectors (livestock and agriculture) were analysed and compared with that data from the conversations with/between community leaders, elders, firms, processors and other key actors.

Data was collected using ODK mobile data technology with tablets that facilitated the data collection process. Data collection exercises are described in more detail in Section 2 Methodology.

## 1.3 Agricultural Value Chains (AVC) - Definition

Agricultural Value Chains is a set of actors and activities that bring a basic agricultural product from production in the field to final consumption, where at each stage value is added to the product<sup>8</sup>.

A value chain involves a set of actors and activities that add value to agricultural produce before it reaches end consumers. AVC vertically links or networks business organisations through processing, packaging, storage, transport and distribution<sup>9</sup>.

It encompasses the flow of products, knowledge and information, finance and social capital and culminates in the final product for consumers while simultaneously determining price marks and distributing profits at its various stages<sup>10</sup>.

Actors on the value chain include producers/farmers, collectors and traders, whole sellers and retailers, lead firms, turnkey suppliers, and component suppliers. In agriculture, the structure of a value chain is that of a pyramid, with farmers at the upstream, firms and middlemen in the middle, and consumers at the downstream<sup>11</sup>.

It has been found that the engagements of the smallholders' farmers with developed value chains enabled them to promote the sources of their income, mitigate their risks, and increase their resilience.<sup>12</sup>

Development of agriculture value chains increases agricultural productivity, household welfare, and build social capital.<sup>13</sup>

Developing of agriculture value chains not only enable farmers to increase their incomes, but also increase the sustained demand for food production and constant the commercial relationships between sellers and buyers. Thus, AVCs should be an important component of the strategy of doubling farmers' income.

Due to the considerable variation within the agricultural value chains across countries and the agricultural products, extensive studies and survey need to be conducted to determine the gaps and area of interventions for development of agricultural value chains, which will enable the producers (farmers) to gain a greater share of their value and assume fewer risks. Value chain analysis provides valuable insights into policy formulation and implementation.<sup>14</sup>

According to Porter's generic value chain different stages/activities are included in chain including development and dissemination of plant and animal, genetic materials, input supplies, farmers' organization, farm production, post-harvest handling, processing, provision of technologies, grading, packaging local and industrial processing, storage, transport, finance, and feedback from markets.

Increasing demands for agricultural products (plant and livestock) of high-value and their processed products have increased the demands for expanding market opportunities not only by the farmers for selling their produce, but also by agribusiness entrepreneurs. The demands on the agricultural products are increasing because of increasing urbanization and foreign investments.<sup>15</sup>

In context of the increasing demands on the agricultural products of high-value, developing agriculture namely climate-smart agriculture needs to be supported by development partners, agribusiness entrepreneurs, local stakeholders (governmental and governmental organization) in order to meet the increased demand for high-value crops and processed products.<sup>16</sup>

The perspective of the nature of support is determined by the need for improving the competitiveness of the staple food subsector, including a move toward diversification and value addition. To determine the gaps in the needed supports and intervention, this survey conducted in Mosul governorate (West Mosul areas and Outside Mosul area to identify the priority needs and interventions in terms of climate-smart agricultural support for improving livelihood projects (agriculture (plant and livestock) and value chain sectors).

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<sup>8</sup> FAO.2010. Agricultural value chain development: Threat or opportunity for women's employment?

<sup>9</sup> Dunn, E. (2014) Smallholders and inclusive growth in agricultural value chains.

<sup>10</sup> Gereffi, G., Humphrey, J., & Kaplinsky, R. (2001). Introduction: globalization, value chains and development.

<sup>11</sup> Chengappa, P G. 2018. Development of agriculture value chains as a strategy for enhancing farmers' income

<sup>12</sup> Agriculture for Impact.2020. AGRICULTURAL VALUE CHAINS

<sup>13</sup> Rutherford et al(2016). Impact of an agricultural value chain project on smallholder farmers, households, and children in Liberia

<sup>14</sup> Kaplinsky, R. (2000). Globalization and un-equalization: what can be learned from value chain analysis

<sup>15</sup> Organisation for Economic Co-operation and Development and Food and Agriculture Organization. 2010. Agricultural Outlook.

<sup>16</sup> Evaluation Knowledge Study, 2012. Support for Agricultural Value Chain Development

## 1.4 Climate-smart agriculture (CSA) - Definition

Climate-smart agriculture (CSA) is an integrated approach to managing landscapes—cropland, livestock, forests and fisheries—that address the interlinked challenges of food security and climate change .

CSA is an approach that helps to guide actions needed to transform and reorient agricultural systems to effectively support the development and ensure food security in a changing climate. Hence, the combination of CSA into the agriculture value chain will further contribute to people, planet and profitability.

CSA aims to tackle three main objectives: sustainably increasing agricultural productivity and income; adapting and building resilience to climate change; and reducing and/or removing greenhouse gas emissions, where possible.

CSA is an approach for developing agricultural strategies to secure sustainable food security under climate change. CSA provides the means to help stakeholders<sup>18</sup> from local to national and international levels identify agricultural strategies suitable to their local conditions .

## 1.5 Required supports for successful agricultural value chains development - Definition

Based on the literature review, different interventions were identified adding to successful agricultural value chains development; smallholder farmers can be supported to benefit through increasing their skills and improving access to information necessary to move into new markets. This may be done through tailored training courses on modern and climate smart agriculture practices, and provision with assets necessary for effective and productive farming practices to meet market requirements.

Contract farming, an agreement between farmers and processing or marketing firms for the supply of agricultural products under forward agreements, frequently at predetermined prices, is one option that has shown some success in linking smallholder farmers to AVCs. The basis of such arrangements is a commitment on the part of the farmer to provide a specific commodity in quantities and at quality standards determined by the purchaser and a commitment on the part of the company to support the farmer's production and to purchase the commodity.

Transportation, markets, and other infrastructure need to be linked to production and market information to achieve better results. The present survey was conducted to determine main requirements and interventions needed for successful agricultural value chain development in Ninawa governorate.

More comprehensive study is needed to identify constraints and necessary linkages among the key criteria for AVC development.

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<sup>17</sup> The World Bank Group (2021). CLIMATE-SMART AGRICULTURE available at <https://www.worldbank.org/en/topic/climate-smart-agriculture>

<sup>18</sup> FAO (2021). Climate-Smart Agriculture. Available at <https://www.fao.org/climate-smart-agriculture/en/>

## 1.6 Access to the market and create market linkage - Definition

Regulated markets have played a supportive role in the development of value chains; farmers could realize better prices with improvement in regulated markets and transportation infrastructure. It has been reported that farmers earned higher net incomes when were linked with the other key actors involved in the value chain namely retailers for selling their vegetables. Besides, cooperative marketing was found to promote the efficiency of marketing and provision of extension services to value chain actors.

Connection of farmer (producers) to market linkages through contract (Contractual agreement or through informal linkages and ad hoc arrangements) found to accelerate the marketing process of farm produce and increase their incomes through decreasing in marketing and transaction costs and increasing the yields and assured prices.

# 2. Methodology

ZSVP Value Chain Team undertook this assessment in Ninawa governorate, West Mosul areas (Hawi-Alkanisa and Al Harajyah) and Outside Mosul area (Hamam Alil, Humedat and Salamia) over a Three-week period from the 15th October-5th November 2021.

The objectives of the assessment were to identify the gaps in most promising agricultural value chains development in Ninawa province- Iraq and to guide programmatic intervention, through recommendations at the following levels:

- Implementing the most relevant climate smart agricultural interventions and supports to ensure increases income sources among the youth including females.
- To improve agricultural based livelihood sectors in Ninawa through formulating clear recommendations for proper interventions based on report results and data analysis.
- Inform project planning and implementation in the agricultural value chain development and natural resources sectors.

In order to develop accurate and specific recommendations, quantitative and qualitative research were conducted through this assessment focused on both desk and field research/ primary data collected which was carried out by a team of five skilled data collectors/ enumerators trained initially two-days on data collection tools and techniques.

The research relied on a mixed quantitative and qualitative methodology, collected from the five areas. The methodology for this study is adapted to the local context to fit the objectives and the scope of the study and the limitations in time and resources.

The methodology consists of a set of processes, which are distinct but coherently linked, to identify the most promising AVC and the required CSA implementation to increase income generation opportunities of the proposed beneficiaries and the local communities in general.

Research is conducted micro (household\institution level) and the following data collection methods were utilised:

## 2.1 Quantitative Methods and Tools

The quantitative data collection was to understand the situation of agricultural and livestock value chain within the study area in terms of:

- Kind of business/activity as the main source of income.
- Possibility of business expansion.
- Duration of practicing the business.
- Amount of production of the produce in last year if applicable.
- Who are your main customers and buyers and their needs.
- Products incomes/ clear idea on cost of the product.
- Member of an association or trader group.
- Means of transportation use.

The conducted quantitative data collection covered the below listed actors, 124 KIIs as follow:

### 2.1.1 Primary producers (farmers), 49 KIIs

Initially, the assessment team selected two biggest locations within the study area, in each location, two villages were selected for conducting face to face interviews (KIIs) and FGDs.

The villages' selection was based on their suitability and appropriateness for agriculture activities (diverse) and livestock activities. In Humedat (Al Zanazel Village and Badosh Al Sufla) and in Hamam Alil (Quntara Village and El Areje Village) were selected. A total of 49 farmers were approached to participate in a face-to-face interview. The interviewees were 25 farmers from Humedat sub district (13 livestock breeders and 12 agriculture producers) and 24 farmers from Hamam Alil (12 livestock breeders and 12 agriculture producers).

The provided information from livestock farmers was on a mix of livestock and dairy products (cattle, buffalo, goats and sheep, bees, poultry and bees). Whereas, the collected information from agriculture farmers was also on mix crops (main kind of crops and greeneries) production.

There was a general readiness among the participants in the study and they were keen to provide the required details and share their views during the interview.

### 2.1.2 Traders (Wholesaler, collectors and retailers)/29 KIIs

The local traders conducted twenty nine interviews, 18 with local retailers (10 livestock and 8 agriculture), 11 wholesalers(agriculture). The interviewed traders were selected from the different locations in Ninawa government. The interviews were conducted individually through face-to-face interviews.

### 2.1.3 Food processors and distributors/ 10 KIIs

Initially, the assessment team selected two biggest locations within the study area, in each location, two villages were selected for conducting face to face interviews (KIIs) and FGDs. The villages' selection was based on their suitability and appropriateness for agriculture activities (diverse) and livestock activities. In Humedat (Al Zanazel Village and Badosh Al Sufla) and in Hamam Alil (Quntara Village and El Areje Village) were selected.

A total of 49 farmers were approached to participate in a face-to-face interview. The interviewees were 25 farmers from Humedat sub district (13 livestock breeders and 12 agriculture producers) and 24 farmers from Hamam Alil (12 livestock breeders and 12 agriculture producers). The provided information from livestock farmers was on a mix of livestock and dairy products (cattle, buffalo, goats and sheep, bees, poultry and bees).

Whereas, the collected information from agriculture farmers was also on mix crops (main kind of crops and greeneries) production. There was a general readiness among the participants in the study and they were keen to provide the required details and share their views during the interview.

### 2.1.4 Consumers/20KIIs

A total of twenty consumers were approached to participate in a face-to-face interview, KIIs. All consumers interviewed were located within the study area.

The provided information from the consumers was on a mix of livestock and agriculture products.

The participants in the study were keen to provide the required details and share their views during the interview.

### 2.1.5 Consultation with academic staff/ Agricultural experts/9 KIIs

A total of nine academics and expert were approached from College of agriculture/ University of Mosul and the local Agricultural departments through phone calls and face-to-face interviews. The provided information was on a mix of livestock and agricultural products. The interviews were focused on

1. Known and successful value chains prior to conflict and displacement,
2. Suggestion to improve post-harvest handling and storage,
3. Problems related to production, and how can these problems be solved,
4. Suggestion for market linking, marketing of agricultural products, developing the value chain of the product, etc.

### 2.1.6 Local Mukhtars community leaders/7 KII

Seven KIIs were conducted with the local Mukhtars/ community leaders of the study area including villages of Al Zanazel Village, Badosh Al Sufla, Hawi-Alkanisa, Salamia, Harajyah, Al Quntara Village and El Areje Village.

The interviews and the discussions were focused on the current situation of livestock and agricultural products within their villages and the village profile. There was a good responses from the participants and they were keen to provide the required details and share their views during the interviews.

## 2.2 Qualitative Method and Tools

To identify the problems that related to the prevailing agricultural production (livestock and agriculture) and how these problems can be solved, and to understand the situation of value chain and roles of the different key actors in different steps of the produces, qualitative data collections through FGDs sessions were conducted using split session group focus group discussions.

The assessment team initially selected two locations and in each location, two villages were selected, the selected locations were Humedat (Al Zanazel Village and Badosh Al Sufla) and Hamam Ali (Quntara Village and El Areje Village). Then the team oriented the communities' leaders of four selected villages on the assessment activities to facilitate the women participation, youth (18-35 years) and elder participation as representatives of the farmers of both sectors (agriculture and livestock). In total, 8 FGDs were conducted within the selected villages.

In each village, two FGDs, one was for men group and one was for women group. FGDs were held for men group and women groups with 8-12 members in each group. The selected participants were from different agricultural backgrounds.

In terms of language, Arabic was used in the focus group discussions. The discussions were led by the research assistant and the lead research took notes. The conducted focus group discussions followed all social distancing measures to limit the risk of COVID-19. The Focus Group Discussions questionnaires are attached in Annex I and II respectively.

**Details on the data collection methods were employed are listed below (Table 1).**

**Table 1:** Data collection methods and samples size were employed

Data Collection Methods	Location		Samples size	Type of the participants
	Sub district	Village		
Qualitative				
8 FGDs	Humedat 4 FGDs	Al Zanazel Village 2 FGDs/ One for men and one for women	Men group (8 participants) Women group (9)	Youth and adult/ different agricultural backgrounds
		Badosh Al Sufla 2 FGDs/ One for men and one for women	Men group (9) Women group (12)	Youth and adult/ different agricultural backgrounds
	Hamam Alali 4 FGDs	Al Quntara Village 2 FGDs/ One for men and one for women	Men group (9) Women group (10)	Youth and adult/ different agricultural backgrounds
		El Areje Village 2 FGDs/ One for men and one for women	Men group (9) Women group (9)	Youth and adult/ different agricultural backgrounds
Quantitative				
49 KIIs and data collection on questionnaire with farmers/ producers	Humedat	Al Zanazel Village	13	Livestock
		Badosh Al Sufla	12	Agriculture
	Hamam Alil	Al Quntara Village	12	Livestock
		El Areje Village	12	Agriculture
39 KIIs and data collection on questionnaire with local traders, whole sell markets, retailers and food processors	from different locations of the study area and other cities of the Mosul governorate		18 Retailors	10 Livestock
				8 Agriculture
			11 wholesale market/	Agriculture
			10 Food processors	4 agriculture
				6 livestock (dairy)
20 KIIs with consumers	from different locations of the study area		20 Consumers	Agriculture and livestock
9 KIIs and data collection on questionnaire with Academic staff/ agricultural expert	University of Mosul/ College of Agriculture and Ministry of Agriculture		agricultural experts	4 university staff and 5 agricultural experts/ different agricultural backgrounds
7 KIIs and data collection on questionnaire with local Mukhtars/ community leaders	Al Zanazel Village		7 local Mukhtars/ Community leaders	
	Badosh Al Sufla			
	Hawi-Alkanisa			
	Salamia			
	Harajyah			
	Al Quntara Village			
	El Areje Village			
Total			8 FGDs 124 KII	





**Figure 1:** FGDs in Al Quntra Village, (A) Men FGDs, (B) Women FGDs



**Figure 2:** Interviews with retailer, (A) livestock butchers (B) dairy shop



**Figure 3:** interviews with some of groceries retailers

## 2.2.1 Sampling and Methodology

A mixed methodology (Qualitative and Quantitative) was used for data collection and analysis; an interview was made with the representatives of key actors of diverse sectors within the study areas. The data collection was through using Kobo Toolbox software, a free and open-source data collection software based on ODK technology.

## 2.2.2 Data Collection Modality and Capacity Building

ZSVP conducted three days training to ZSVP data collection field staff on following aspects but not limited:

- Scope, objective, and goal of the study.
- Basics of proper communication in Data Collection.
- Use of the tablets and Data Collection App (Kobo).
- Modalities of conducting the Survey, KIIs, and FGDs.

## 2.3 Assessment limitations

Primary data collection faced numerous challenges, including COVID-19 pandemic, some of the involved key actors within the identified value chains were not accessible or it was difficult to organize meetings with such key informants.

Thus, some interviews were conducted remotely and secondary data filled any gaps. However, the collected data were sufficient and aligned with designed goals of the assessment to identify the most promising AVC and the required interventions based on the recommendations for better improving livelihood sectors within the target areas.

## 2.4 Study area (Targeted Areas)

The targeted areas in Ninawa governorate were west of Mosul (Hawi Al Kaisah, Al Harajyah) and Outside Mosul area were Hamam Alil, Salamia and Humedat.

In each of the areas representatives for plants production and livestock breeders were selected for the assessment, (Table 2 and Figure 4).



Figure 4: the targeted area on Mosul Map

## 3. Value Chain Identification

### 3.1 Introduction

Ninawa Governorate, in north-western Iraq, is the country's third-largest governorate, with a population of 2.8 million people, and a land area of 37,323 square kilometres . Mosul, Hawi-Alkanisa, Salamia, Al Harajyah, Hamam Alil and Humedat, the five regions located on the banks of the Tigris River that are well known by their arable land for divers' crops/ vegetable production and livestock husbandry because of the favourable weather and abundance of water sources. The table below shows the agricultural profile of the targeted villages/ study areas.

Most households engage in vegetable cultivation like tomatoes and cucumber, okra, beans, eggplant, pepper, and watermelon. Vegetable cultivation traditionally was a household income generator, but most households surveyed reported that vegetable cultivation currently is not meeting their demand due to costs of necessary inputs like seeds, fertilizers, irrigation, and transportations, price downturn, and imported products .

Despite that the area is historically well known for its agricultural sector and the favorable weather for crop production, local farmers have experienced significant challenges in maintaining their livelihoods .

In recent years, higher temperatures and less rainfall have made it difficult to meet crop water demands. Besides, a lack of good quality seeds and fertilizers and/or their high cost hindered/interfered with the locals' demand on quantity and quality of produce, namely the availability of cheap imported products.

**Table 2:** The agricultural profile of the targeted villages/ study areas

<i>Profiles of the study villages</i>							
Study area and Village Names	Total HHs	Youth %	# of livestock Producers / villages	# of crops Producers / village	Primary crops type?	Primary livestock?	Total arable land in acre
1. Humedat							
Al Zanazel Village	350	40%	150	150	Tomato, cucumber, Okra, water melon ,snake cucumber	Cattle, sheep and buffalo	200
Badosh Al Sufla	1000	20%	250	150	Cucumber , eggplant , Okra	cattle and buffalo	100
2. Hawi-Alkanisa							
3. Salamia	360	40%	80	60	Tomato, cucumber, eggplant, pepper and beans	cattle and sheep	350
4.Al Harajyah	1400	30%	60	70	Tomato, cucumber, onion, celery, radish	Buffalo	40
5.Hamam Alil							
Al Quntara Village	288	40%	44	50	Okra, bean, eggplant, pepper and water melon	cattle	1500 acre
El Areje Village	2800	30%	240	150	Okra, bean, eggplant, pepper	Sheep and cattle	1000 are

On the other hand, collected data relating to livestock shows that cattle and to a lesser extent, buffalo and sheep are the main livestock raised in the area due to the strong local demand for their milk and meat. The local produce is characterized by their high quality.

The main challenges that breeders are facing are a lack of food processors/ milk derivative factories to receive the surplus of their produce and/or the lack of milk tank truck or cold truck for delivering produced milk to nearby areas for processing, mainly in the summer season. Besides, most recently, breeders faced a challenge in obtaining the required fodder for their livestock due to hiked prices in markets as a result of drought that affected the whole area.

The lack of support in terms of subsidies related to veterinary medicines and vaccination programs necessary for livestock in general, has exacerbated the struggle of local breeders.

The process for identification of the most promising agricultural value chain for development involved analysis of obtaining data from key actors in this study.

The focus was mainly on determining challenges in each step along the value chain of products (plants and livestock), from inputs to production, post-production, processing, and distribution and marketing.

This analysis mainly focused on the main key actors/producers taking into consideration challenges that each actor faces and recommendations to overcome such challenges toward value chain development in favor of all actors involved.

Value chain analysis moves through the production chain starting with producers/ farmers, then moving to collectors/ traders, to processes in production and storage, and eventually to retailers and consumers.

Finally, it examines the best ways of interventions through (climate-smart agricultural projects) and recommendations for better yield and marketing of produce, and the best ways to reach the final consumer. Value chain development analysis also takes into consideration how governance and regulation affect every part of the value chain, and how skill development and training contribute to product value as it moves along the chain.

## 3.2 Prioritizing of agricultural value chain

The process of Value chain selection or prioritization was based on multifactorial /criteria including:

1. The potential of the selected value chain for improving food security/ livelihood of vulnerable/ poor farmers/ producers taking into consideration the following points
  - a) Potential for poverty reduction through the products/ activity
  - b) Sustainable increase in income and employment
  - c) Contribution to other development objectives such women's empowerment, food security or natural resource management.
  - d) Low risk.
  - e) Social inclusion and gender.
2. Strong potential for growth and competitiveness (ability to achieve and maintain a competitive edge over market rivals through an optimal product and access to new or niche markets) basing on
  - a) Strong domestic and/or international demand for the products
  - b) Strong potential for expansion and investment
  - c) Involving a large number of people
3. Other criteria, such as
  - a) Value chain actors have entrepreneurial capacity to achieve improvement.
  - b) Within framework of national and regional strategies

Accordingly, the four value chains listed below were identified as having strong potential for development, with significant and sustainable opportunity for increase in income and employment in the study area and applicable for poor/ vulnerable farmers

- Dairy value chain
- Beef value chain
- Tomato value chain
- Cucumber value chain

### 3.3 DAIRY VALUE CHAIN

#### 3.3.1 Context: The Dairy Sector in Ninawa/ Iraq



**Figure 5:** photos of Dairy products from Ninawa/ Iraq

Prior to the crisis created by ISIS, animal husbandry was an important component of farmer livelihoods in Ninawa Governorate<sup>20</sup> where two main sources of income can be distinguished; crops such as wheat and barley (winter season) and to a lesser extent fruit and vegetables (during the summer); and animal husbandry, comprising some 20-25%<sup>21</sup>.

Previously locals in the study areas used to be self-sufficient in dairy products, which were processed locally and covered local demands. But the crisis greatly affected livestock production, mainly cattle and buffalo, and currently dairy production is still suffering from the consequences. Studies report that dairy products in Ninawa reduced to 50% because of the ISIS crisis<sup>22</sup>.

<sup>20</sup> FAO (2016) Agriculture and Livelihoods Needs Assessment In The Newly Liberated Areas Of Kirkuk, Ninewa And Salahadin

<sup>21</sup> UNDP, FAO (May, 2015: p. 10). Recovery and Stabilization Needs Assessment for Newly Liberated Areas in Ninewah Governorate  
Zummar, Wana, Rabiya, Sinuni

<sup>22</sup> FAO (2016) Agriculture and Livelihoods Needs Assessment In The Newly Liberated Areas Of Kirkuk, Ninewa And Salahadin

### 3.3.2 Dairy value chain Key actors

To understand the local dairy sector and the current situation of dairy value chain, and possible required interventions, ZSVP conducted 25 KIIs with the livestock breeders and 8 FGDs with the community of Humedat and Hamam Alil, and with six dairy processors (milk derivatives production) one in Humedat and the other within the Mosul District.

This included survey team also asked some a few questions about the consumption of dairy product consumptions of from local households/ consumers, 20 KIIs. Here, it is worth to mention that the dairy processors are grouped into large and small dairy processors. The small are in charging the milk collection, dairy processing/ production and selling/ marketing.

#### 3.3.2.1 Farmers/ Milk producers



**Figure 6:** : Photos of some of dairy projects in study

V KIIs and FGDs with males and females revealed that local products are for both of household consumption and selling purposes as a source of income.

Out of the 24 farmers who are practicing livestock industry as main source of income, 17 (71%) are raising cattle for milk production (Table 3).

**Table 3** : Type of business income / animal production

Type of business Income / animal production				
Location	Cattle/ milk	Beef	beekeeping	fish project
Humedat (12 participants)	7	2	2	1
Hamam Alil/ (12 participants)	10	2	1	0
<b>Total</b>	17 (71%)	4(17%)	3(12.5%)	1(0.04%)

The respondents stated they are ready to increase their production to cover local demands if they are ensured that their produce can be sold.

This may be solved through making farming contracts or agreements with other key actors including food processors (dairy producers)(Table 4).

**Table 4** : Readiness of the respondents to expand their livestock projects

Do you like doing and expanding this business?		
Location	Yes	No
Humedat (12 participants)	12	0
Hamam Alil/ (12 participants)	12	0
<b>Total</b>	24 (100%)	0

There was consensus among respondents that hiked animal fodder prices negatively affected their production and their businesses (Table 5). Respondents suggested a need for support either as price subsidies from the government or non-government, or in developing climate smart agriculture projects to increase animal fodder production through provision with required seeds, fertilizer, and irrigation infrastructure for watering the cultivated grass as well as machines to cut grass or transport animal feed.

**Table 5:** Current trend of the business/ dairy product and the livestock

Do you feel that this business is stable, regressing or expanding?			
Location	Stable	Expands	Reducing
Humedat (9 participants)	3	2	4
Hamam Alil/ (11 participants)	1	0	10
<b>Total</b>	4(20%)	2(10%)	14(70%)

Besides, the participants reported to suffer from the prevalence of livestock diseases, a lack of veterinary medicine, vaccination, extension services, and gaps in their management and marketing skills. Further, they stressed a need for more coordination with other key actors along with the value chain for better sale their products.

The potential for milk production and expansion of available livestock project in the project areas are dependent on the availability of fodder, veterinary services, and mainly on the existence of a guarantee that the product are accepted by other value chain actors. One report shows that running costs of farms are 3 to 5 million Iraqi Dinar (IQD) (approximately USD 2,500 – 4,200) per year, explaining that major operational costs include animal feed and fodder, followed by staff costs and vaccines.



The key informants are not as much concerned about imported (foreign) dairy products that are available at lower prices than local products as they worry about the challenges relating to obtaining sufficient fodder at acceptable prices.

This because the high quality of locally produced milk easily competes with imported dairy, even at their lower prices. Besides, informants/ producers stressed having a connection with other key actors to deliver their products to the consumers at better prices.

Currently, local dairy produce does not fully meet local needs and there is little or no surplus production or potential for export to other areas; this is due to a range of factors, including:

1. Reduced numbers of livestock (mainly cattle and buffalo) as a result of ISIS crises.
2. Lack of required skills in management and post-harvesting process/ marketing.
3. Lack of required governmental subsidies in terms of fodder supplies and other interventions like veterinary services and vaccination programs.
4. Lack in availability of machinery and equipment including for transportation .
5. Absence of coordination of key actors involved in the milk value chain.

### 3.3.2.2 Dairy processors

The interviews with the dairy processors that are located in different regions of Ninawa government revealed that the processors are differed in size and in final products. The small sized dairy processors/ companies are covering milk collection as collectors, dairy production and retailing. Whereas, the larger companies are receiving milk both directly from the producers or intermediators (collectors) then process the product and distribute on the retailers/ traders to deliver it to the end consumers.

The processed products locally are yogurt, cream, cheese and Qaymagh. The local products are not covering the local demands; however, the high quality of the locally produced products are highly requested and easily compete the imported even at their lower prices than local products. The obtaining data revealed that the locally produced dairy product only cover up to 50%.

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### 3.3.2.3 Traders (collectors and retailers)

As it aforementioned above, the produces are retailing locally either directly by the producers (small sized processors) or through the traders which composed from the retailers, supermarket, coffee shops and restaurants to the consumers.

No independent collectors were found with the dairy value chain, where milk producers are delivering their products to the processors or the processors are collecting the milk directly from the producers.

### 3.3.2.4 Consumers

The interviewed consumers were asked about their daily need for dairy products and their preferences, source of the products and the difficulties in obtaining the products. The interviewees reported that they prefer the local produce and they obtaining it from the local market/ retailers; however, from time to time they are facing challenges in obtaining the local products.

In terms of the presence of the association/dairy association or cooperation, regulatory and financial environment in which farm businesses operate, all of the involved key actors reported that there is no association nor any support/regulation, and all are self-dependent.

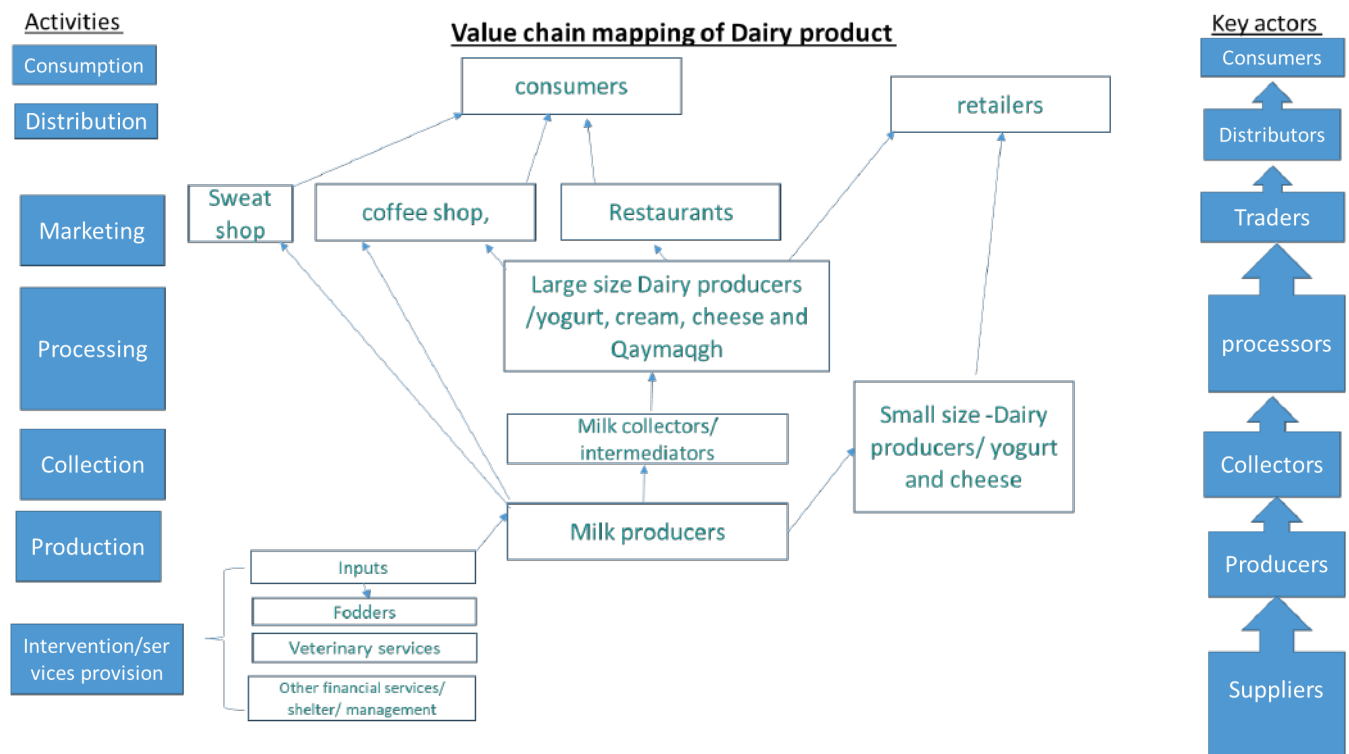
The prices of the local produce are determined according to local supply and demand, with no price control body at the government level or from trader unions. Formation of the market information systems would support dairy producers in their linkages to markets and traders then to the consumers.

### 3.3.3 Dairy Value Chain Conclusions and Recommendations

Dairy production enterprises within the study areas have significant potential for improvement and development of dairy production (derivatives including yogurt, qymagh, Creamy milk, cheese), processing, and marketing.

Producers are constrained by lack of the required interventions (Animal fodder, extension, and veterinary services) and traditionally poor marketing infrastructure, absence of the linking between the key actors and the lack/ absence of advance level of the transportation facilities, absence of the advance machine in the milking process.

The sector needs to be developed to expand the productivities. Data revealed that smallholder farmers/ producers, food processors are the dominant key actors in dairy value chain development. The involved key actors in dairy value chain are listed in below diagram.



**Figure 7:** Mapping core process in Dairy product value

## 3.4 BEEF VALUE CHAIN



**Figure 8:** Photos of feedlot livestock for beef production, (A) Buffalo, (B) cattle (C)

### 3.4.1 Context beef industry

Animal feedlot industry is considered as an important income generation sources for the locals based in Tigris bank including the study area. The sector has been significantly affected by the ISIS crisis through loss, theft or death of animals and shortages of feed/ fodder. Some report that 75-95% of local livestock including cattle and buffalo were lost during the ISIS control of Ninawa .

### 3.4.2 Beef producers

To understand the local meat industry, current situation of beef value chain and possible areas for interventions, ZSVP conducted KIIs and FGDs with the community of Humedat and Hamam Ali (beef producers) breeders, slaughter house, butchers and consumers.

The respondents (KIIs) revealed that out of the 24 participants, only 4 participants at rate 17% are raising cattle and buffalo for beef. The respondents are ready to expand their enterprises and increase their products (locally produced meat/ beef) to meet the local demand and actively participate in developing value chain of the product if the required support and intervention are available especially they have the required skills, knowledge and they are satisfied from the project income.

The interviewed breeders believe that the business is regressing as a result of diverse challenges that hindered the VC development, such obstacles as deficiency/ the high prices of the required animal fodder (concentrated diet), prevalence of the livestock diseases and the lack of the veterinary medicine, vaccination, extension services and the gaps in their required management and marketing skills and the absence of the coordination and the interaction between the traders/ producers and consumers.

There was consensus among respondents that the main challenge of business development which negatively affect produce prices in local markets and therein on consumers, are hiked prices of animal fodder, especially in drought season. Barley cost 200.000-350.000ID/ton in the last year and this year nearly doubled to 600.000ID/ton. Interviewees suggested to have fodder crop projects to cover their needs by providing them with seeds, fertilizer, and irrigation infrastructure or watering system, and farming machinery to cut grass and transport it to farms. Informants were not worried about competition of imported foreign products at lower prices because of the higher quality of local produce.

### 3.4.3 Beef traders (processors, butchers and retailers)

The assessment not only interviewed beef traders of the study area, but also involved beef traders from other areas of Mosul governorate especially those who have been working in this business for years revealed that they buy livestock either directly from breeders or from the open sale markets (animals market) then to the slaughter house/ butchers and retailers then to the consumers.

As in dairy value chain, independent collectors were not found within the beef value chain. Before the ISIS crisis, the beef value chain was doing better with meat prices 15000 ID/ kg. Currently, beef cost 12000 ID. Besides, business activities between cities/ Iraqi government were much better before the crisis compared to now.

The demand for locally produced beef is more and the trend of business is rising because of higher quality than imported beef. Traders reported that shortage within the domestic supply occur from time to time (mainly during the drought season and in winter time which has a direct relationship with a lack of available fodder) and on religious occasions such as during the month of Ramadhan, Eid Al Adha as a result of the increasing demands.

Traders regarded the government as primary decision maker and champion of change as it controls imports and plays an important role in providing favour for local producers and the consumers: the government is first and foremost because it is the entity that can controls entry of foreign products.

### 3.4.4 Beef Consumers

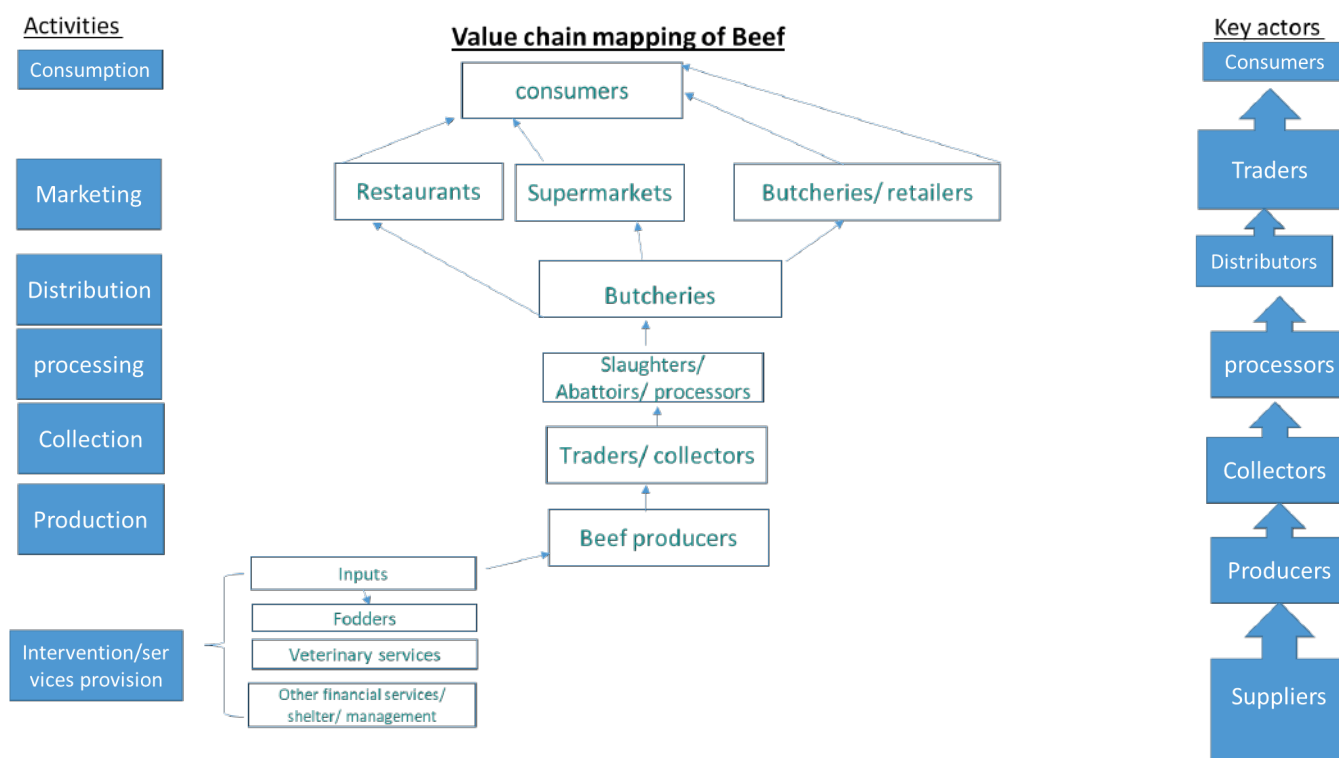
KIIs with the local consumers focused on the kind of meat the consumed and the reasons behind that. Respondents reported that they prefer locally produced beef for its competitive price with mutton and its higher quality than the imported beef. In terms of any dairy association or cooperation, respondents reported there is no association and all respondents are working independently. Locally produced beef prices are determined by local supply and demand and to a great extent by fodder prices. Formation of market information systems would support producers in their linkages to markets and traders, and to the consumers.

### 3.4.5 Beef Value Chain Conclusions and Recommendations

The beef industry in the study area has significant potential for improvement and development, especially locally produced beef which is well known for its competitive price to other red meat/ mutton and its higher quality than imported beef.

Local breeders are suffering from hiked fodder prices mainly during the drought seasons, which in turn affect produce prices and therein the consumers' affordability. The sector needs to be developed to expand productivity through providing certain value chain actors, mainly breeder, with inputs needed for producing animal fodder to cover their needs and thus the local demands.

They are in need of capacity building through provision of training courses and workshops. There is traditionally poor marketing infrastructure available, lacking any marketing information system and absence of linkages between key value chain actors.



**Figure 9:** Mapping core process in Beef value chain in Ninawa governorate

## 3.5 TOMATO VALUE CHAIN

### 3.5.1 Context: Tomatoes in Ninawa

Tomatoes are a major food crop and are widely cultivated throughout the country at different times of the year and through different ways, such as in open air and closed or plastic houses. Generally, the crop is produced during the summer season. Local tomato producers face diverse challenges from time to time, which range from water scarcity, absence of quality inputs, and unfavourable environmental condition such as high temperature.

The plants require fresh irrigation water and good quality soil. Besides, post harvesting challenges exist relating to packaging, transportation and marketing of produce, and the question of surplus with acceptable prices.

### 3.5.2 Tomato Producers

During the conducted interviews with crop producers through KIIs (25 crops producers) and FGDs (4 FGDs, 2FGDs for men and two for women, one men and one women FGDs were in Humedat (Alzanazel Village) and the other in Hamam Alil (Alarej Village).

Some 48% of interviewees stated that they are relying on the crop as their main income source. Respondents expressed they are ready to increase their production and expand their enterprises as they produce the most marketable crop, best suited for its cultivation, especially considering they have the necessary knowledge and experience. Besides, the quantities produced are good and their incomes as well.

Locally produced tomatoes are sold fresh, either collected by traders directly from the field or transferred by producers to open sale market and then delivered to wholesalers'/ wholesale markets. From there they find their way to retailers and consumers or via local vendors and markets to consumers.

Transportation of products from farms to consumers is usually in plastic boxes of diverse sizes, by producers using their own vehicle or rented. Small farmers have no cold storage room to keep the surplus for long time nor cold truck for delivering fresh tomatoes in good quality to markets to be sold in better prices; therefore, local farmers are forced to sell their produce immediately to avoid deterioration of the product and lose its quality even in downturn and low market prices.

Farmers reported that from time to time are facing downward pressure on prices resulted from the imports of lower prices from the neighbouring countries. However, the interviewees believe that tomato sector is expanding within the area due to increase profit or it is the only option as the available job opportunity (income source) for the locals/ interviewees.

There is consensus among the respondents that the sector has potential for expansion and better yield in terms of both of quality and quantity to meet the local demands and compete the imports when the required inputs and support are available. The most challenges that the respondents faced in producing the crops are listed in below table (Table 6).



**Table 6:** The common challenges that respondents faced in producing the crop/ tomatoes per the priority

Priority 1	Priority 2
High prices of fertilizer	High prices of the available seeds
In availability of the good quality seeds	Irrigation
Plant diseases	Pests
Lack of the electric power	
Tough environmental condition	
short storage life	

**The suggested interventions and/ or recommendations by the respondents are listed below (Table 7)**

**Table 7:** The suggested needed interventions and supports

Priority 1	Priority 2	Priority 3
Fertilizer	Fuel	Irrigation system and the irrigation equipment
Good quality seeds	Extension services	
Required machine	Plastic house to do cultivation throughout the year	
Pesticides and Herbicides		
Electricity for pumping water		
Cold room		

Respondents stated that they harvest their produce at average rate 45 times/ season. Productivity was observed to differ from farmer to farmer, based on land used. Estimated productivity of some interviewee are listed in the below table (Table 8), showing an average net income around 900.000ID/month.

**Table 8:** Tomatoes productivity in Kg/ season of some of the interviewees

Interviewee	Produced tomatoes KG/ season
1	22500
2	22000
3	5000
4	12700
5	10400
6	400000

### 3.5.3 Tomato traders (collectors, wholesale markets and retailers)

KIIs (11 wholesale markets and 8 retailers) with crops traders in various places in Ninawa governorate who have been working in this business for 15-45 years revealed that they bought their local commodities (tomatoes) from rural areas of Ninawa and from the study areas. The traders sell their products to the retailers (Local supermarkets, Road side groceries vendors and restaurants) in Ninawa area in fresh. The demand on the local produce is high because they do not contain chemicals local products have a good flavour - local products are cleaner.

However, trade in local tomatoes began to decrease gradually because of imports with competitive price and quality. Almost 80% of traders reported that their businesses are mainly relying on tomatoes as a dominant crop in market. Traders believe that overall, there is a shortage of domestic supply due to a lack of support to farmers, which resulted in increased production cost as a consequence of higher costs for inputs, transportation and commission costs (4%-7%).

Some traders provide producers with plastic boxes, from time to time, or cover a part of the transportation costs and reducing the commission as much as possible. In addition some provide loans or storage space for crop produce almost free of charge in cold stores located in the wholesale offices.

Traders regard the government as primary decision makers and the champion of change in favor of local producers and consumers, as the government is the entity who can control entry of foreign products.

Traders are not members of any trade associations and had not received any support from government or other organizations. They also noted that loans and finance are difficult to obtain, with stringent application procedures and high interest rates. Traders also highlighted some of the problems that farmers face in tomato production, including insecurity, low prices, and challenges with water and irrigation.

### 3.5.4 Tomato processor

Currently there is no tomato paste processing factory in Mosul and nearby areas. However, some of locals traditionally produce tomatoes paste during the downturn prices and during the surplus glut and some dry tomatoes for winter seasons.

The producers and the experts suggested to have tomato paste processors to cover the local produces and meet the local demands in terms of tomato paste. It has been reported by the Turkish Uludağ exporters Association that the total exports of tomato paste to the world (99 countries) during the first eight months of this year 2020 amounted to 93.4 million dollars", adding, "Iraq came in first place to import Turkish paste, as its share reached 63.35% of the total Turkish exports of tomato paste".

### 3.5.5 Tomato Consumers

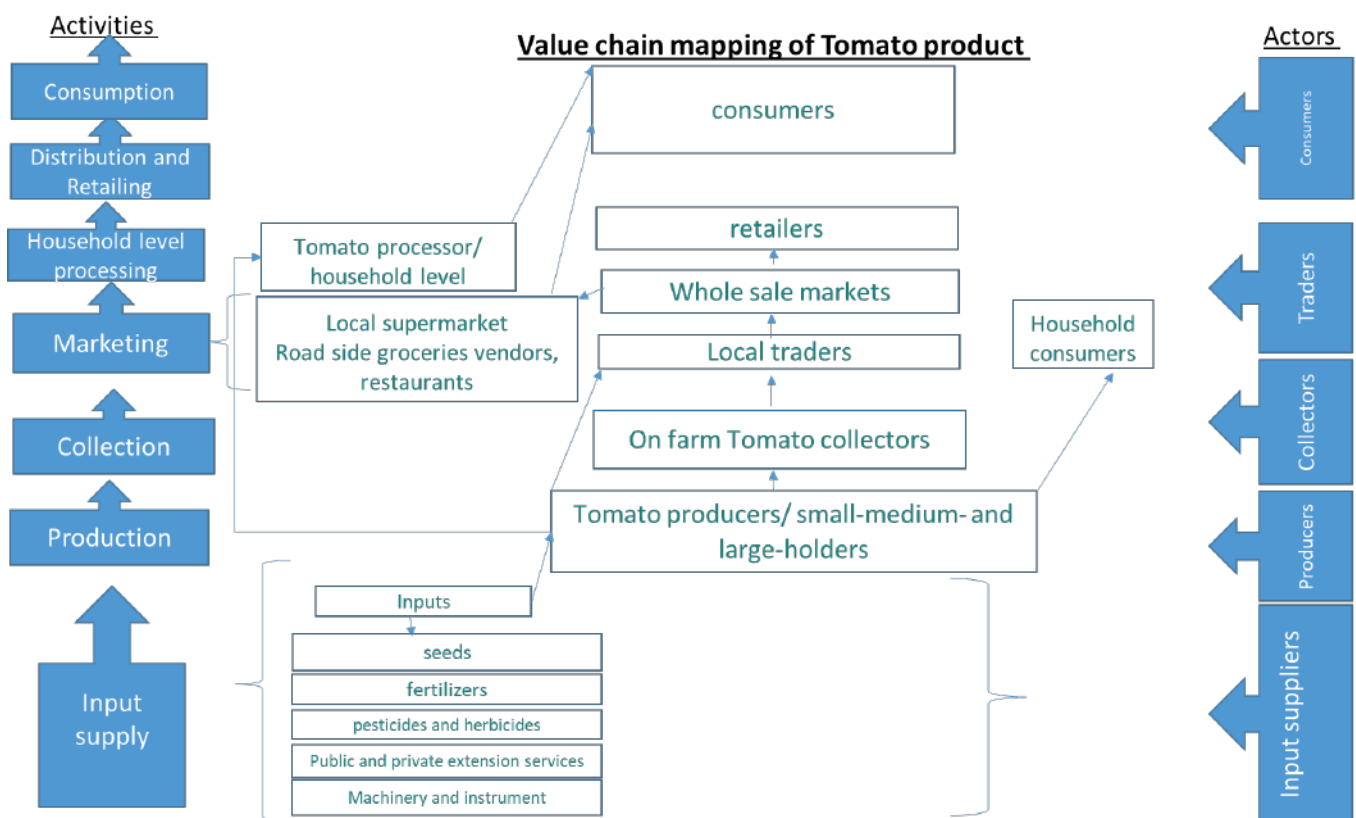
KIIs with local consumers considered the age, sex, location of the headed households and the kind, quantities and frequency of most common commodities that they buy each week. Among the purchased vegetables, tomatoes ranked at top with quantities of 1.5-2kg/twice per week. They also revealed that they mostly bought from mobile / local retailers.

### 3.5.6 Tomato Value Chain Conclusions and Recommendations

Tomato is the predominant local crop in the study area and most consumed vegetable by locals. The tomato value chain has strong potential for development. Local farmers are ready to expand their production and are in dire need of interventions and support for essential inputs such as fertilizer, quality seeds, machinery, pesticides and herbicides and storage/cold chain infrastructure (cold room), subsidies in terms of fuel, electricity and transportation.

This in addition to irrigation systems and extensions services. The tomato value chain in study area observes very little cooperation among key actors and there is no formal mechanism for promoting sector interests. There is no local tomato processing capacity present. Training and capacity building on topics such as irrigation, crop and pest management, quality control and marketing would be beneficial.

Besides, to overcome the shortage of the local supply and the seasonality in production, usage of greenhouses to lengthen the season, which would also protect and improve the quality of the product, was proposed, including tailored training courses for raising awareness and skills required in using greenhouse technologies.



**Figure 10:** Mapping core process in Tomato product value chain in Ninawa governorate

## 3.6 CUCUMBER VALUE CHAIN

### 3.6.1 Context: Cucumber in Ninawa

Cucumber is one of the major food crops and is widely cultivated and produced throughout the country at different times of the year and through different ways, such as open field and the closed/ plastic houses. Generally, the crop is produced during the summer season. Like with other crops, producers are experiencing challenges during the production, mainly the summer season.

Common challenges are relating to watering system and water scarcity, increased summer temperatures, absence of necessary inputs and post-harvesting challenges relating to packaging, transportation and marketing of produce, on time with acceptable prices.

### 3.6.2 Cucumber producers

Collected data from crop producers through KII (25 respondents) and FGD (one in Humidat and one in Hamam Ali) revealed that 60% of interviewees cultivate the crop as the second main income source, following tomatoes. All respondents are ready to increase their production and expand their business (table below) since cucumber is one of the most marketable crops and best suited for cultivation, especially considering they have the required experience. Besides, quantities of produce are good and their incomes as well.

The cucumbers are sold locally, either collected directly from the field by traders or transferred to open sale market by the producers and then delivered to the wholesalers/ wholesale markets.

From there they find their way to retailers and consumers or via local vendors and markets to consumers or to food processors (pickles industry). Transportation from farms to markets is usually by producers using Nylon bags and plastic boxes of diverse sizes, with vehicles that are owned or rented. Transport has great impact on product, especially in the hot summer season. Small farmers have no cold room nor cold truck for keeping/storing surplus to be sold at better prices; therefore, local farmers are forced to sell their produce immediately, even in downturn and low market prices. This is to avoid deterioration of the product and loss of quality.

Respondents stated that they face downward prices as a result of lower price imports from neighbouring countries. There is consensus among respondents that the sector has potential for expansion and better yield in terms of both of quality and quantity to meet the local demands and compete with imports if required inputs and support are available. The most challenges that the respondents faced in producing the crops are listed in the table.

Table 9: The common challenges that respondents faced in producing the crop/ cucumber per the priority

Priority 1
Water and watering system
Electric power and fuel
Fertilizer
Availability of the good quality seeds
Plant diseases and pests
short storage life

The suggested required interventions and/ or recommendations by the respondents per the priority are listed

Table 10: The suggested needed interventions and supports

Needed interventions and supports
Installing modernized watering system, irrigation system (drip irrigation)
Providing solar power units or subsidizing fuel
Providing trusted good quality seeds and fertilizer
Providing Pesticides and Herbicides
Plastic house to do cultivation throughout the year
Required machine and Cold room

Respondents stated that they harvest their produce at average rate 36 time/ season. Productivity was found to differ from farmer to farmer based on the used land. The estimated productivity for some of interviewees is listed in below, with an average estimated net income around 500.000ID/month.

Table 11: Cucumber productivity in Kg/ season of some of the interviewees

Interviewee	Produced Cucumber KG/ season
1	9000
2	1500
3	5000
4	4800
5	8000
6	350000
7	4000
8	6400
9	6400

### 3.6.3 Cucumber traders (collectors, wholesale markets and retailers)

KIIs (11 wholesale markets and 8 retailers) with local traders who have been working in this business for more than 25 years, revealed that traded Cucumber is from rural areas of Ninawa and from targeted study areas. Wholesalers receive farmers products delivered by vehicle, owned or rented, at cost of 30.000ID/delivery for sale to local/ mobile retailers, processors before the product moves to consumers in fresh form. Demand for local produce is high because they have a good flavour and are clean.

Local producers are looking for contractual agreements with traders as they believe this will help them sell their produce at better prices and on time. Up to 70% of respondent sell their product to wholesalers' traders. Traders believe that overall there is a shortage of domestic supply due to the lack of support to farmers.

Production costs increased because of higher expenses for inputs, transportation and the commission costs (4%-7%). Some of the traders, from time to time, provide producers with plastic boxes, plastic nylon or cover a part of the transportation costs and reducing the commission as much as possible, in addition to providing loans, storage space in cold stores located in the wholesale offices almost free of charge.

### 3.6.4 Cucumber processors (Pickle traders)



**Figure 11:** Pickle shop

Interview with pickle producers revealed that they obtain their required cucumber either directly from local producers or from the same wholesale markets because they are providing the required quantities and quality (same size, soft and fully grown) .The processors revealed that daily they are producing 1.5 -2 tons/ day.

### 3.6.5 Cucumber Consumers

Kills with the local consumers of different areas in Mosul city revealed that cucumber is among the list of the most consumed vegetables on weekly basis and that they are mostly purchased from mobile / local retailers for their convenient prices and freshness; the quantities of the purchased vegetables based on the family size, time of the year and the availability of the product.

### 3.6.6 Cucumber Value Chain Conclusions and Recommendations

Besides tomato, cucumber is the predominant locally produced crop in the area and among the most consumed vegetables by locals. The cucumber value chain has a strong potential for development.

Local farmers are ready to expand their production, are in dire needs of interventions and supports regarding to essential inputs such as efficient watering system, electric power and fuel, fertilizer, quality seeds and the provision of pesticides and herbicides. In addition they need convenient storage and transportation facilities. Just like the tomato value chain, there exists no or very limited cooperation among key value chain actors, which is usually based on informal mechanisms.

Training and capacity building on topics such as irrigation, crop and pest management, quality control and marketing would be beneficial. To overcome the shortage of local supply and seasonality in production, greenhouses to lengthen the growing season, which would also protect and improve product quality, have been proposed together with tailored training courses for raising awareness and skills required in using greenhouse technologies.

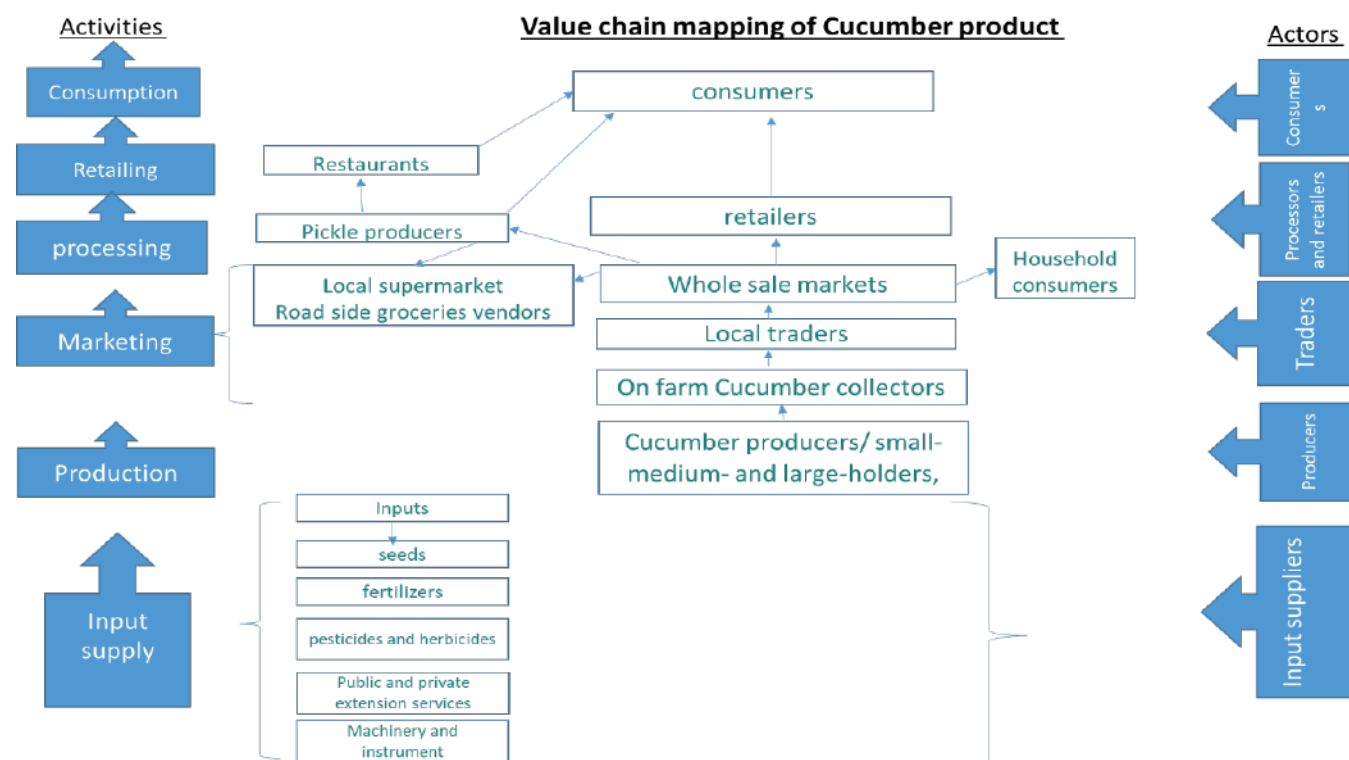


Figure 12: Mapping core process in Dairy product value chain in Ninawa governorate

## 4. CONCLUSIONS

Dairy, beef, tomato and cucumber are four identified agricultural value chains that have great potential for improvement and development within the study area of Ninawa, Iraq. The identified agricultural value chains are supplied by smallholders operating small-scale family farms that are acting independently.

Producers in all value chains are in dire need for interventions and support like replacement of lost agricultural equipment and restoration of damaged farming infrastructure. This to overcome their challenges and increase their productivity to supply and cover local needs.

So far, traditional farming methods are prevailing in the area, which need to be improved through capacity-building programs such as training courses and workshops (practical learning) relying on experts. Contractual and formal agreements between farmers and key value chain actors are essential to enhance and raise local productivity in both of quantity and quality. Providing micro-loans or other forms of support to smallholder farmers for expanding their agribusiness is likely to be a highly beneficial component in any future intervention in the identified value chains.

## 5. SUMMARY OF RECOMMENDATIONS

### 5.1 Dairy and beef value chain; Increase resilience and sustainability of local breeders through:

- a) Linkages between key actors through forming of groups or associations for livestock breeders, particularly producers, for sharing market information. And linkages to markets and traders, price monitoring at different levels, to meet emerging market opportunities.
- b) Providing producers with advanced transportation facilities (cold truck) for delivering produce to processors, in particular in hot summer seasons.
- c) Providing of advance milking machines to milk producers.
- d) Establishing of fodder crops agribusiness for animal breeders to cover local demand of animals' fodder, in particular during dry seasons. This can be achieved by building knowledge, skills and increasing awareness of local breeders through tailored training courses by experts (e.g. university staff) on crop production techniques. Such activities may also be designed for female participants.



## 5.2 Tomato and cucumber value chain; Increase resilience and sustainability of local farmers through:

- a) Building knowledge, skills and increasing awareness of local farmers through tailored training courses by experts on techniques with long term impact. Examples include importance of using of organic fertilizer (animal manure) on soil quality, which affects all soil physical, chemical and biological properties, and which has a direct correlation with soil fertility, plant nutrition, water holding capacity, bulk density, and aggregate stability.
  - b) To allow for longer production seasons, they may be provided with facilities to establish plastic/greenhouse to enable plant production in extended growing seasons and to produce kinds of produce that would not normally survive in the local climate.
  - c) Encouraging farmers to use plant varieties that are resistant to diseases and pests. This can be achieved through increasing awareness among farmers and making a v with suppliers such as plant nurseries using properties such as tissue culture unit at the College of Agricultural Engineering Sciences -University of Duhok.
  - d) Linking farmers with trusted seed producers for better quality seeds to improve overall quality of crop production and crop market value (selling price).
  - e) Establishing of CSA watering system such as sprinkle and drip irrigation and introducing modernized energy systems (solar energy) to farm to mitigate high prices for pumping and irrigation.
  - a) Providing farmers with cold storage facilities and cold truck for delivering fresh produce to consumers for better prices; lose in produce during post harvesting phase is estimated to be around70%.
- It is recommended to organize workshops for multi-stakeholder such as government of Iraq/ related department, food security cluster partners/donors/ NGOs, private sector including the involved key actors in identified value chain to validate these findings and provide concrete recommendations for each value chain.
  - Involvement of the aforementioned stakeholder in agricultural planning, implementation and monitoring in order to achieve sustainable agriculture development

