Food and Agriculture Organization of the United Nations

The assessment and improvement of the value chains and added value of agricultural commodities in the south of Libya

With a special emphasis on women's livelihoods

من الشعب الياباني
From the People of Japan

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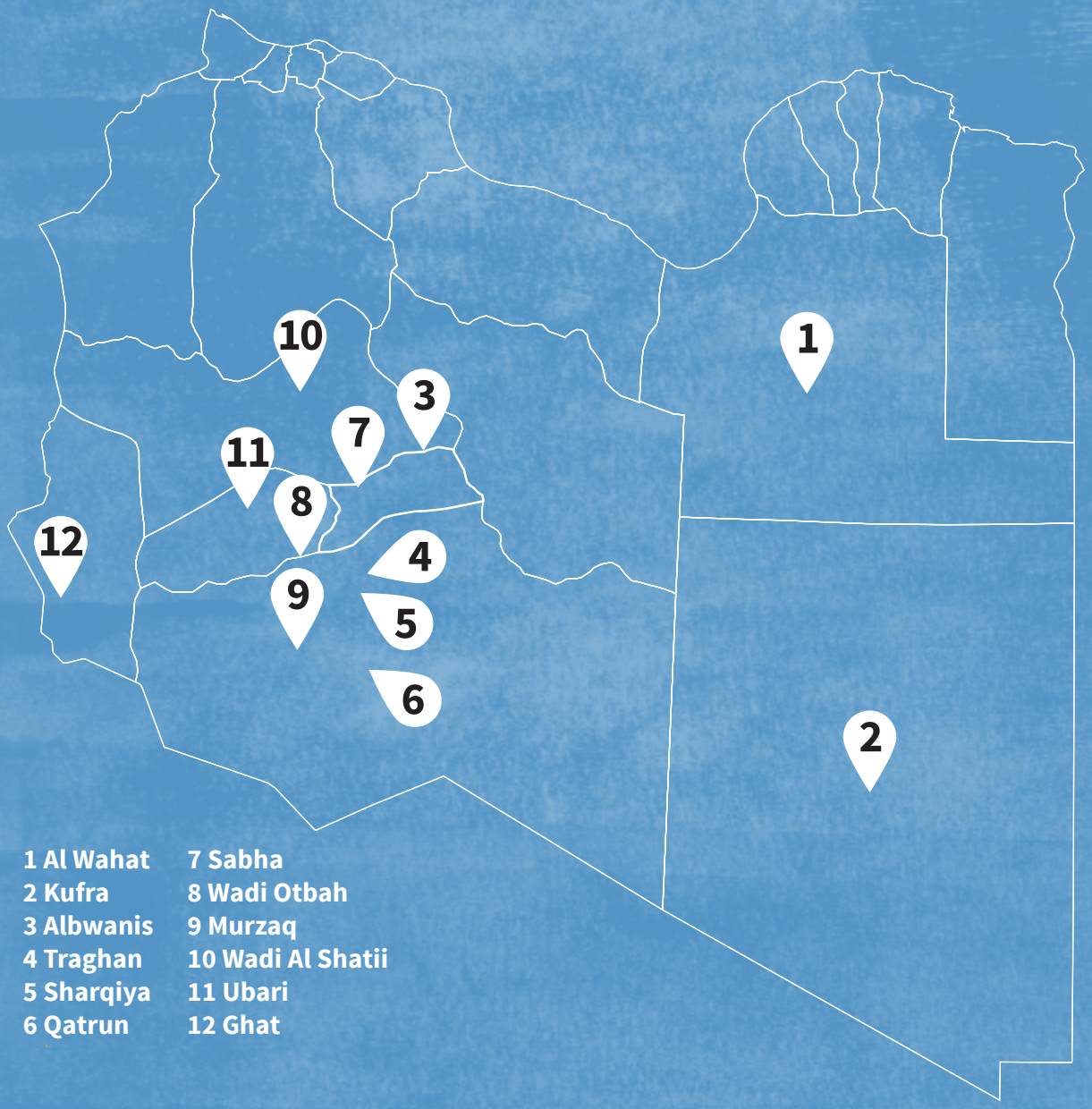

Figure 1.

Map of Libya indicating the south and the 12 municipalities covered in the study and report.

Source: © Bureau of Statistics and Census, Libya 2020.

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Prepared for: FAO and UNDP in Libya

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Disclaimer

Abbreviations & acronyms

CSO	Civil society organization
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
NGOs	Non-government organization
UNDP	United Nations Development Programme

Executive Summary

THE TEAM BEGAN this assignment in the first week of October 2020. The start of the work faced a number of major challenges, notably the COVID-19 pandemic and confinement and the instability and lack of security caused by ongoing conflict in Libya.

In a meeting with officers of the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Development Programme (UNDP) at the start of the work, on 6 October 2020, it was agreed to conduct the assignment in the south of Libya, instead of just in the Fezzan region, and to proceed in three stages:

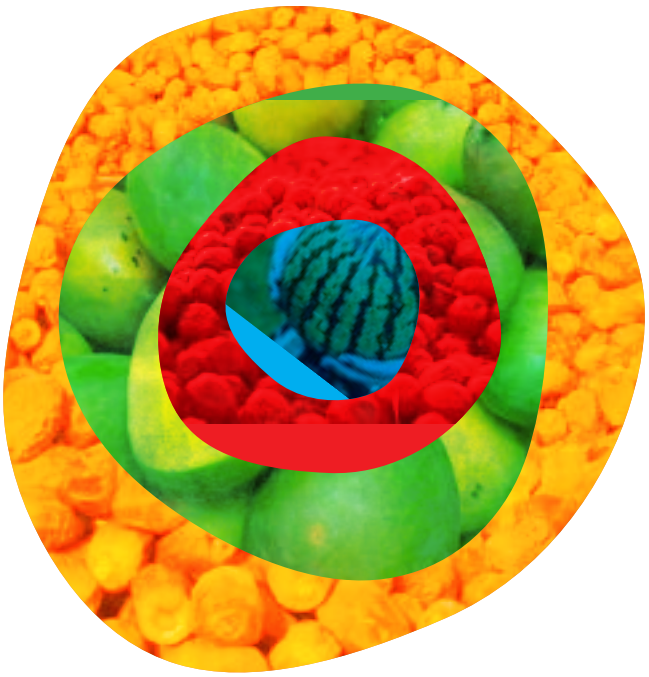
Stage 1: A general survey on (a) agricultural production and (b) agricultural cooperatives, and organizations and associations involved in food and agriculture, with special emphasis on women in the south of Libya, and (c) identifying and selecting important crops cultivated in the region to evaluate their value chain and added value.

Stage 2: This stage involved (a) studying and characterizing the value chains and added value of some important selected crops, and (b) collecting detailed information on agricultural cooperatives, and other organizations and associations involved in agriculture and food, with a special emphasis on women.

Stage 3: The third stage involved (a) formulating proposed pilot project(s) and (b) developing a road map for the collaboration between FAO and UNDP, based on the information generated in the previous two stages.

This report first describes the context of the agriculture sector in Libya and in the south of the country, the impact of the ongoing conflict in the country since 2011 and of the COVID-19 pandemic, and the specific configuration of the sectors in the south of the country. Secondly, it describes the main challenges in the value chains and added value of selected major crops cultivated in the south of Libya, providing an analysis and assessment of the cooperatives and associations in the region with significant involvement and participation of women.

The survey of agricultural production in the region found that 12 of the 15 municipalities in the south



of Libya produce various agricultural crops, including cereals and grains, fruits, and vegetables (tables 1–12 and charts 1–12 in annex V.1). The majority of the area cultivated for these agricultural commodities was given over to vegetables in Wahat (57 percent of this area), Murzuq (57 percent), Ubari (42 percent) and Wadi Etba (57 percent). The majority was used for fruits in Albwanis (88 percent), Kufra (70 percent), Sabha (74 percent) and Sharqiya (64 percent). Finally, the majority was used for cereals and grains in Ghat (59 percent), Qatrun (79 percent), Traghan (61 percent) and Wadi Shati (52 percent).

Based on the data gathered on agricultural production, alongside certain other factors and reasons, we have selected 16 crops for the evaluation and characterization of their value chains and added value. In addition to the significant area cultivated and significant quantities produced of these selected crops in the region, the other factors considered in the selection of these crops include:

1. Cereals and grains in the region have been cultivated for several decades, and there have been many projects, including some flagship governmental initiatives over the last five decades, in this sector. As such, we have opted to prioritize other commodities, with few projects and limited work on their cultivation and handling, and almost none on characterizing and improving their value chains and added value.

2. The selected crops are highly perishable, making their handling and marketing much more difficult, with much more loss and waste than cereals and grains. This increases the need for greater attention and improvement.

3. Perishable crops, especially those selected, are more often cash crops than cereals and grains. They are often processed (in addition to being sold fresh) and are therefore very commonly used by women for value-added activities like processing and packaging to improve their livelihoods and the economy of their households and of the region.

4. Value-added practices and methods are generally poor for all agricultural crops cultivated in the region, especially the crops we have selected, meaning they are much in need.

The selected crops and the municipalities where they are cultivated in significant quantities in the region are:

1. Cantaloupe (Sabha)
2. Citrus (Sabha, Qatrun, Ubari, Wadi Shati, Kufra and Murzuq)
3. Dates (Sabha, Qatrun, Ubari, Wadi Shati, Sharqiya, Ghat, Kufra, Wahat, Murzuq and Wadi Etba)
4. Eggplant (Qatrun)
5. Figs (Sabha and Wadi Shati)
6. Garlic (Sabha)
7. Grapes (Sabha, Ubari, Wadi Shati and Murzuq)
8. Guava (Qatrun)
9. Lettuce (Wadi Shati)
10. Mangos (Kufra)
11. Olives (Sabha, Qatrun, Ubari, Sharqiya, Albwanis, Ghat, Wahat, Murzuq and Wadi Etba)
12. Onions, green (Wadi Shati, Sharqiya, Kufra, Wahat and Wadi Etba)
13. Onions, dry (Ubari, Wadi Shati, Sharqiya, Wahat and Wadi Etba)
14. Potatoes (Sabha, Ubari and Wadi Etba)
15. Tomatoes (Sabha, Ubari, Kufra, Kufra, Wahat and Wadi Etba)
16. Watermelons (Sabha, Ubari, Wadi Shati, Ghat and Wadi Etba)

The value chains and added value have been evaluated and characterized for four crops (tomatoes, watermelons, mangos and dates). Our study found the value chains of the assessed crops to be highly deficient, with almost no proper post-harvest handling practices, and there is an almost total lack of added value (see section III).

Our surveys, interviews and studies in the region have identified three types of involvement of women in food and/or agriculture:

1. Very few women are members of classical agricultural cooperatives.
2. Some women are members of civil society organizations (CSOs) involved in agricultural and/or food activities.
3. Many individual women not associated with groups, associations and cooperatives perform some agricultural and/or food activities.

The three models have been studied. In terms of the first, of 56 registered cooperatives, the majority are currently inactive, while seven are active, seven have women members and two are both active and have women members. In terms of the second, we identified 15 CSOs that include women involved in agricultural and/or food activities. Finally, in terms of the third, we identified and contacted 98 individual women involved in agricultural and/or food activities. The objectives of studying these three models were:

1. Women members of cooperatives: actions that can be implemented in pilot project(s) to rebuild or strengthen currently active cooperatives and to improve their activities and the livelihood of women and their families, ensuring that cooperatives are organized or can be reorganized in a way that can further improve their activities.

2. Women members of CSOs involved in agricultural and/or food activities: since they are already organized in a more effective way than the first model, we believe it should be easier to work with these associations and their women members to improve organization and provide more effective support.

3. Individual women performing agricultural and/or food activities: we believe we may be able to help at least some of these women to associate with existing organizations (cooperatives or CSOs).

Seven of the 56 registered agricultural cooperatives include women members (section IV and annex V.1) but almost all (93 percent) are currently inactive. There are multiple reasons for their inactivity including political, social, technical and economic. Most of these cooperatives in the region were formed in the 1970s and 1980s through Government actions, with the objective of obtaining governmental support such as fertilizers, seeds, infrastructure and food. Of the seven currently active, six are only very slightly active and only one (the Fezzan Cooperative for Organic Agriculture, in the municipality of Wadi Etba) is sufficiently active. The Fezzan cooperative has 213 women members.

Fifteen CSOs (table 24, section IV) have been identified as including women performing agricultural and/or food activities. Almost all of these CSOs were formed after the change of the regime in Libya in 2011. The activities conducted by women in these CSOs conduct include processing products such as dates and other fruits, vegetables and grains.

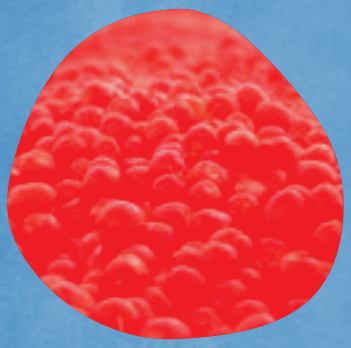
Of the 98 women contacted and identified as individually performing agricultural and/or food activities in the 12 municipalities (section IV, and annex V.2), 50 were identified as working on processed date products, 34 on dried grains and spices, 36 on processed vegetables, 11 on fruit juices and five on preserves.

In the south of Libya, there are major difficulties and challenges facing the agricultural sector in general and women in particular, especially due to the ongoing conflict during the last decade and the COVID-19 pandemic. Major challenges include the lack of security, confinement measures, the shortage of cash, higher prices in general and of inputs in particular, the low quality of inputs like seeds and fertilizers, the shortage and high costs of labour, the shortage of electricity and fuel, shortages and high costs of transport, difficulty marketing commodities that are produced, especially in distant markets, very little knowledge of value chain development and added value, very poor post-harvest handling, almost total lack of other value-added practices and an almost total lack of exports.

A range of activities needs to be implemented to support the agricultural sector and the livelihood of its inhabitants, especially women. Although the region is seeing significant growth in the cultivation of perishable commodities, the distances to national and above all export markets are large, transport and infrastructure (roads and vehicles) are poor, post-harvest handling techniques and the infrastructure indispensable for handling are extremely poor or absent altogether and other value-added practices like processing are practically non-existent.

The value chains and added value of most of the perishable crops cultivated in the region have never been assessed or characterized. Post-harvest handling and other value-added facilities, practices and treatments such as packing, packaging, cold chain (precooling, refrigerated transport and storage) are badly needed, as well as capacity-building and training on these handling techniques and practices.

Support for the improvement of women's livelihoods is essential, especially through the rebuilding and strengthening of cooperatives and associations, as well as technical support and capacity-building for their activities.



1 General Report

General introduction, objectives and scope of the report, methodologies, key findings, challenges, and general conclusions and recommendations

1.1
General introduction

Libya is located in North Africa on the southern coast of the Mediterranean Sea, with a coastline of around 1,770 kilometres and a population of more than 6 million. Much of Libya is covered by extremely arid desert, where very high temperatures prevail and rain is scarce.

The country can be divided into four different regions according to its climate: (1) the coastal plains that run along the Mediterranean Sea, with dry summers and relatively wet winters; (2) the northern mountains bordering the coastal plains, which include Jabal Nafusah in the west and Jabal al Akhdar in the east and benefit from greater rainfall and lower temperatures; (3) the internal depressions in the center of the country, with pre-desert and desert conditions; and (4) the southern and western mountain range, which has limited annual rainfall. Given the climate and soil conditions, the most important agriculture zones are the coastal plains, the northern mountains, Kufra and the southern mountain and Jifara plains. Approximately half of all crops are grown in Jabal al Akhdar, with the other half grown in Jabal Nafusah, Kufra and the desert mountains to the south.

Most of the foreign income of Libya comes from the oil sector, which makes up about 80 percent of national GDP and about 97 percent of exports. Libya is classified as an upper middle-income developing country with GDP per capita of USD14 429 in 2008, increasing to an estimated USD18 000 in 2010 (World Food Programme and FAO, 2011). The total population as of 2008 was 6.3 million, with 84.8 percent living in urban areas. Average population growth over the last 30 years has been 2.9 percent. Unemployment – particularly youth unemployment – is very high: while there are issues regarding the reliability of the available data (no single ministry collects comprehensive data), it is at least 14 percent (as in neighbouring countries), with reports of up to 30 percent (European Commission, 2009). As of 2010, industry (including the oil sector) contributed 64 percent of the GDP of Libya, while the service sector made up 33 percent and agriculture 3 percent (World Food Programme and FAO, 2011). The Libya Investment Climate Assessment (World Bank, 2011) states that with the hydrocarbon sector representing over 70 percent of GDP (in nominal terms), over 90 percent of Government revenues and 95 percent of export earnings, Libya appears to be one of the least diversified oil-producing economies in the world."

The 2011 civil war had an unprecedented impact on the Libyan economy. Oil production plunged from 1.49 million barrels per day in January 2011 to as low as 22 000 barrels by July 2011 as a result of the conflict. By the end of 2011, GDP growth had declined by 60 percent and oil production had fallen to an average of 500 000 barrels per day. Non-oil output growth also declined by 50 percent as economic activities were interrupted. Approximately 600,000 migrant workers fled Libya during the 2011 civil war, making it the largest migration crisis since the first Gulf War in 1991. In addition, food and cash shortages were reported in different parts of the country (World Bank, 2021).

Agriculture was considered an important economic sector in Libya until oil was discovered in the early 1960s. Oil exports suddenly became the major driving force of the country's economy, dwarfing its Government's interest in developing agriculture and resulting in enormous food imports. Agricultural production fell over the last few years, with its contribution making up 2.83 percent of GDP on average between 2000 and 2018. However, over the last three decades, increased threats of food insecurity have meant that some attention has been paid to agriculture and recent political changes since February 2011 have radically influenced all sectors, including agriculture. Instability and insecurity over the last decade had largely interrupted the little progress that had been made. A large number of foreign workers, who had been living in Libya for years, have left the country due to the armed crisis and the COVID-19 pandemic, which has affected agricultural and food production.

Total agricultural land is estimated at 15.4 million hectares, primarily made up of pastures (13.3 million hectares). Arable land makes up 2.2 million hectares, equivalent to just 1.7 percent of the total area of the country (World Food Programme and FAO, 2011). Of the total arable land, 52 percent has permanent crops such as olives, fruit trees, citrus and fodder, while 42 percent has annual crops, including wheat, barley, vegetables, potatoes, pulses (ibid., 2011).

Most of the arable land in Libya is located along the Mediterranean coast, in the eastern region. Cereals, fodder crops and some fruits are grown in the relatively small rain-fed area, while the coastal irrigated area is used for growing vegetables (potatoes, onions and tomatoes), fruit (watermelons, oranges, dates, grapes and olives) and cereals (wheat and barley). The average area planted with vegetables in Libya is 69,180 hectares and the average annual vegetable production is about 1,270,600 tonnes. Most farms are small, ranging from five to 20 hectares in size. Only 5 percent of the territory receives more than 100 millimetres of rain annually.

Only 19 percent of Libyan households own farmland, while another 7 percent own other land. Family farm holdings are scattered and fragmented: 45 percent of farmers have less than 10 hectares and just 25–30 percent have more than 30 hectares (Cambridge Energy Research Associates, 2006). Similarly, the World Food Programme and FAO (2011) found that agricultural land comprised 90 percent smallholdings of less than 20 hectares, 9 percent medium farms (20–100 hectares) and just 1 percent large farms (over 100 hectares). The average farm size was about 11 hectares, although many have been further fragmented into small, non-contiguous plots. The World Bank (2011) cites Libya stands as the only country surveyed in the region to date where land is the top-rated constraint for private-sector operation and growth.

Water shortage is one of the biggest limitations to agricultural production. Libya is one of the driest countries in the world, with limited annual rainfall, high evapotranspiration and scarce surface-water resources. Non-renewable groundwater provides the bulk of the country's water needs. Falling water tables from over-irrigation are creating a long-term ecological threat (World Bank, 2011). More than 20 percent of arable land (470 000 hectares) is developed for irrigation, with irrigation potential estimated at 750,000 hectares. Its full development would have to rely mainly on the use of fossil water.

(World Food Programme and FAO, 2011). Around 196 000 hectares is potentially irrigated in the coastal areas and a further 113 000 hectares in the southern and central regions. In 2006, a total of 309,000 hectares was estimated to be under irrigation (Cambridge Energy Research Associates, 2006), mainly through groundwater extraction, which far exceed the capacity for replenishment in coastal areas. In 2011, 240 000 hectares of land was irrigated. The irrigated areas in the Southern Zones of Murzuq and Al-Kufra, for example, are largely State-operated (50 000 hectares), while the rest is under private ownership (Mongabay, no date). Half of cereal production and 90 percent of fruit (excluding dates and olives) and vegetable production are produced on irrigated land. The Government began to recognize this in 1976, and adopted measures to discourage citrus and tomato cultivation, both of which require large amounts of water. However, the stricter measures required to save coastal water resources – principally the regulation of irrigation and changing the land tenure system to improve water efficiency – clashed with the Government's concept of economic equity, which favoured intensive irrigated cultivation of small plots for family use.

The Government's overall strategy for dealing with the impending ecological crisis has ignored its underlying practices. Instead, the cornerstone of agricultural policy since 1983 has been to avert disaster by pumping large quantities of water to the coast from the fossil reserves of the southern desert by means of the Great Man-Made River project. The project, which was embarked on in 1984, was designed to transport two million cubic metres of water per day via 2 000 kilometres of pipelines from 270 artesian wells in the east to connect the cities of Sirte and Benghazi. The first phase was inaugurated in 1991 at an initial cost of USD5 billion and the total estimated cost was USD25 billion. Overall, the scheme was designed to provide 50 years of irrigation to the coastal areas, where 80 percent of Libya's agriculture is located. As the project is based on the large-scale extraction of fossil water in the south and its transportation to the northern regions of the country, it affects all agriculture, both north and south. The World Bank (2011) warns that water deficits are expected to worsen and that water consumers – whether urban, industrial or agricultural – need incentives and assistance to conserve water and adopt more sustainable practices in its use.

As mentioned above, agriculture currently only makes up 2–3 percent of GDP, compared to 25 percent before the start of the oil boom in the 1960s, and currently less than 3 percent of the country's exports come from agricultural produce (European Commission, 2009; World Food Programme and FAO, 2011). Moreover, more than 75 percent of total food is imported, including about 1.5 million tonnes of wheat, equivalent to 80 percent of the country's wheat consumption (Cambridge Energy Research Associates, 2006).

Despite massive Government investment in agriculture (mostly very poorly planned), including large and costly projects in the south, growth has only been a modest 2.4 percent, which is below population growth (3.2 percent) (Cambridge Energy Research Associates, 2006). The agricultural sector employs 6–8 percent of the workforce, while the oil sector employs 2 percent, industry 8 percent, health 12 percent, education 27 percent and other public sector 16 percent (ibid.; World Food Programme and FAO, 2011). The United States Agency for International Development (USAID, 2011) estimated employment in the agriculture sector to be 18 percent. This is particularly true in rural areas, including in the south of the country. Of the total workforce, 30 percent are estimated to be women, rising to up to 70 percent in rural areas.

In addition to the lack of arable land, uncertainty in rainfall and limited source-to-farm irrigation systems, the Libyan agricultural sector is constrained by the lack of an enabling environment for agribusiness development driven by the private sector, especially from the 1970 to 2010 (Cambridge Energy Research Associates, 2006; European Commission, 2009).

Figure 2.

Farmer Salem Boukabul (53 years old), has been affected by pests damaging crops.

There are around 70 000 full-time and 100 000 part-time farming households in the country. Vegetables, fruit production and potatoes provide 70 percent of the total production valued at import prices, with hardly any exports. Cereal production per capita has declined since 2005 (from an index of 97 to 78 in 2009), resulting in wheat self-sufficiency of just 16 percent (World Food Programme and FAO, 2011). Publicly managed production projects and the Government's practice of setting production targets, as well as the corresponding subsidies, have failed to deliver an efficient market-oriented and export-driven agricultural sector. The main reasons for investment have been mostly political and social, rather than based on economic principles (Cambridge Energy Research Associates, 2006; IMF, 2012).

One of the reasons why Libya is dependent on cereal imports is that its cereal crop yield is lagging behind other countries in North Africa. The optimum yield for wheat cultivation in Libya was thought to be about 5 tonnes per hectare. However, by the mid-1980s, yields in the country were only averaging around 0.5 tonnes per hectare. The crop yield is primarily determined by the quality of the soil, the weather and production methods (crop types, use of fertilizers, machinery, irrigation, etc.). The mostly sandy soils in the country are shallow and coarse, with limited natural fertility and low levels of organic matter and water. In addition, more than half of the soil in Libya is estimated to be degraded to different degrees, with the loss in its quality and productivity primarily due to water and wind erosion and salinization. Citrus production declined to insignificant levels following the Government's water conservation measures of 1976. Tree crops remained popular because many farmers combined olive, date, apple and almond trees with cereal or vegetables production.

Table 1. General information on Libya and its agricultural sector.

Agricultural land (km^2)	155 850	2011
Agricultural land (% of land area)	8.85%	2011
Arable land (hectares)	1 750 000	2011
Arable land (% of land area)	0.99%	2011
Arable land (hectares per person)	0.28	2011
Fertilizer consumption (kg/ hectare of arable land)	40.26	2009
Agriculture, added value (% of GDP)	1.86%	2008
Food production index (2004 – 2006 = 100)	111.22	2011
Food exports (% of merchandise exports)	0%	2010
Food imports (% of merchandise imports)	12.13%	2010
Total Population	6 154 623	2012
Population density (people/km^2 of land area)	3.46	2011
Rural population	1 359 740	2012
Rural population (% of total population)	22.09%	2012
Agricultural population	193 250	2010
Agriculture population (% of total population)	3.14%	2010
Total economically active population	2 300 237	2011
Total economically active population in agriculture	71 000	2010
Total economically active population in agriculture (% of total economically active population)	3.08%	2010
Women economically active in agriculture (% of total economically active population in agriculture)	70.42%	2010

Sources: World Bank; FAO

In 2004, Libya was nearly self-sufficient in potatoes (94 percent), vegetables (94 percent) and fruit production (93 percent), with production valued at USD76 million, USD463 million and USD237 million, respectively. With regard to fertilizers, Libya is self-sufficient in urea production and exports to some countries, including the United States. The country has strong potential to further expand the sector, including for exports to neighbouring countries and the European Union. There have been attempts at private investment in the country, including external sources. For example, in 2006, a European consortium from Rieti, Italy, invested €500 000 to produce and process vegetables to export to Europe. This investment project alone was planned to create 3 000 jobs over six years. There are viable export opportunities for several products cultivated in Libya, including in the south, especially for organic commodities like dates, olive oil and vegetables. However, major work is still needed to facilitate this activity. In addition, significant effort is needed to improve the handling of commodities that are produced and international trade policy must be developed to address several issues such as olive oil exports. This would require certification and relations with other countries, including European markets and working on the corresponding accreditation. Libya has an advantage for growing some vegetables like potatoes, peppers and squash due to soil conditions and freedom from soil-borne diseases. In some regions and areas, Libyan agriculture can still enjoy an undisturbed environment and provide opportunities for quality farmers to specialize in organic produce.

Subsidies for agricultural production were provided based on price support and inputs (e.g. through the price stabilization fund). Examples include (i) the supply of cheap credit (no interest and small administration fees) through the Agricultural Investment Bank (the planned business development grant system for small and medium enterprises, which included agribusiness development, was similarly subsidized); (ii) serious investment in the supply of water through the Great Man-Made River programme, with water sold at very low prices (USD0.03 per cubic metre compared to the cost price of USD0.90) (Cambridge Energy Research Associates, 2006); (iii) Subsidies on different projects, notably irrigation (e.g. State-run large grain circles with pivot irrigation systems); and (iv) Subsidies of inputs such as seeds, pesticides, fertilizers and equipment, as well as other forms of subsidies. It is also claimed that there are special input subsidies for associations and cooperatives, although there is no evidence of their existence (European Commission, 2009). Currently no subsidies are provided to farmers, and much less to other stakeholders in the value chain, especially women.

Small- and medium-scale agribusiness development has not been supported in the past, meaning that most farmers – with perhaps very few exceptions – have not engaged in processing and other value-added activities. This is largely due to the nature of the supply chain development, which is driven by the public sector, with a focus on self-sufficiency in food production rather than on value-added aspects in the supply chain.

There has been little Government investment on roads infrastructure, which means roads all over the country, especially in rural areas, are in extremely poor condition. Similarly, most of the country suffers from unreliable electricity distribution and this remains a major obstacle to growth and operations, including in agriculture and its value chain.

As of 2019, the population of Libya was 7.471 million people (Central Bank of Libya, 2020), with a population density of 4.39 people per square kilometre and a growth rate of 5.51 percent. Men accounted for 50.71 percent of the total population and women 49.29 percent. According to the 2016 population census, about 80 percent of the population lives on just 10 percent of the country's land, concentrated in the major cities, especially Tripoli, Benghazi, Misurata, Sabha and Al-Bayda, where the average population density is around 50 people per square kilometre (compared

to less than 1 per person square kilometre in other regions and villages). The country's average GDP fell to around 582 billion dinars (approx. USD415.7 billion) between 2000 and 2018, due to the instability of global oil prices, especially after the conflicts in 2011 and the fall in oil production.

Value chains and added value for agricultural commodities have been very poor, since support for agriculture has concentrated solely on production, neglecting other important components of the value chain, particularly post-harvest handling and other value-added sectors. The country lacks agricultural development strategies. These should be developed based on the principles of value chain development. The focus should not only be on production but also on other value-added functions in the chain, such as storage (to avoid the high level of loss and waste, which is currently over 25 percent) and allow value-added practices such as processing and a more market-oriented approach.

Although the Libyan markets have been left to the private sector since the late 1980s, there has been significant governmental interference. Until recently, the Government would indicate the levels of production for different commodities. The subsidy levels were – and in many cases still are – high, but are likely to decrease further. The public sector-driven system has led to a relatively "artificial" situation, although a few well-performing subsectors show promise, including the horticultural sector. Despite its strategic location, which permits production of both Mediterranean and desert crops, Libya struggles to compete in the global market. It will require significant effort to improve efficiency and benefit from its climatic diversity to produce crops such as citrus, date palms, olives, table grapes, and melons (under natural conditions in the southern region).

Access to markets and the transportation of food and supplies have been a major challenge and have been further disrupted by the ongoing instability, which began in 2011, particularly in the south of the country, which has seen significant fighting and clashes, especially in 2018. The clashes around Sabha for example, meant that the Al Gardah agriculture road, linking Sabha to the rural and agriculture areas south of the city, was blocked for an extended period of time, preventing fuel and supplies from reaching these areas and agriculture products reaching the markets. There are no proper marketing channels and agencies. A Government agency was established in the early 1970s to market farm produce and was given the mandate and authority to operate cooperatives and farms but failed within a few years. Since 2011, prices of key inputs, food commodities and machinery and equipment have risen sharply. By means of example, the price of cereals has more than quadrupled.

Agricultural trade in Libya has suffered from poor management and inefficient communication networks, among many other problems. The system is considered inefficient by all standards, as reflected in very high qualitative and quantitative post-harvest loss and waste, and bottlenecks in distributing food and agricultural commodities. Packing, packaging, grading, handling and cold chains for storage and transport are either wholly absent or of a very low standard and Government intervention through support and subsidies has given the wrong signals to farmers and consumers and resulted in the misuse of agricultural resources. This is compounded by insecurity and the risks from rapid changes in laws and directives, reducing the ability to find foreign markets for Libyan products.

The impact of COVID-19 on the Libyan economy and the agricultural and agribusiness sectors

Just before the start of the COVID-19 pandemic in March 2020, the Libya Humanitarian Needs Overview (United Nations Office for the Coordination of Humanitarian Affairs, 2020) estimated that 900,000 people were in need of humanitarian assistance (about 13 percent of the population), an increase from 800 000 in 2019. Half of these people were internally displaced and migrants in/or transiting through the country. The current figures are likely to be higher, given the economic situation and the impact of the measures introduced to contain the spread of the pandemic (FAO, 2020b).

Increased unemployment, low purchasing power and continuing power cuts led to protests across the country in September 2020. While the official exchange rate is USD1 to 1.412 dinars, the rate on the parallel market during the second week of September reached 5.590 dinars. Food security has been impacted by dwindling access to food as a consequence of unemployment, unpaid salaries and lost income from lockdowns and other restrictions. Most Government employees were not paid on time, even before the pandemic. Private-sector workers usually work without a formal contract and the closure of business activities due to COVID-19 interrupted their income. In particular, the livelihoods of casual workers have been severely disrupted. According to the preliminary analysis of the 2020 Libya Multi-Sector Needs Assessment (REACH, 2020), 20 percent of the households reported that their main place of work closed down as a result of COVID-19 measures.

As of April 2020, the economy was forecast to contract by 20 percent in 2020, driven by low global oil prices, political instability and the measures to contain the pandemic. However, the real contraction is likely to be deeper. Oil fields, refineries and port infrastructure were shut down between January and mid-September 2020 due to fighting between the governing parties, effectively imposing a blockade on oil production. According to the Libyan National Petroleum Company, the blockade resulted in more than USD9.8 billion of lost revenue and aggravated power and fuel shortages throughout the country. During the blockade, the country was pumping less than 100,000 barrels a day, compared to the daily potential estimate of 1.2 million barrels (FAO, 2020b).

The agricultural sector was one of the important productive sectors that relied on diversifying the structure of the national economy to reduce the dominance of the oil sector over other parts of the economy. The Libyan State has put in place plans and programmes to channel development investments in this large and vital sector by establishing local projects, providing opportunities for foreign investors to invest in the agricultural sector and upgrading infrastructure.

The ongoing conflict and the spread of COVID-19 have worsened an economy that was already suffering from decades of underdevelopment, causing a further contraction in GDP. The ongoing conflict disrupted Libyan agrifood value chains, which were already underdeveloped prior to 2011 and COVID-19, has exacerbated this situation. The pandemic has highlighted the structural problems facing food chains. Economic challenges in Libya have further complicated supply and demand fundamentals, creating further challenges. Choke points suggest evidence of disruption in the country's food value chains (including in the south) and growing food insecurity. The Government is a major choke point for agriculture and food systems in the country, including in the south. Moreover, the cash crisis has forced many households to adjust their consumption by reducing food purchases.

COVID-19 measures, such as closures and confinement, have created an additional burden on all actors in the chain, reduced market access and sales, harming incomes and increasing costs. Labour,

energy and financing problems have been worsened by the pandemic and are a constraint on all food chains. Food loss and waste and produce stockpiling have also increased as a result of the pandemic. Producers are unable to procure inputs and it is highly likely that food access and availability will get worse. All actors in the chain are experiencing supply chain problems, which are likely to deteriorate as the COVID-19 caseload increases.

Consequently, COVID-19 confinement and market closures have impacted farm production and sales. Farmers are unable to move their crops to the markets, especially distant national markets in the north of the country, which has created high surpluses and low prices at the farm level. At the same time, food shortages and prices increased in destination and consumption markets. Moreover, agriculture depends on foreign workers from neighbouring countries who are now less willing to come to Libya during the pandemic. Inputs such as fertilizers, herbicides and pesticides depend on imports and their prices have increased by between 20 and 50 percent. Agriculture extension services and farmer assistance have also been negatively affected and are lacking. Farmers are unable to sell the commodities they produce as they cannot supply their buyers due to the logistical problems created by the pandemic. Producers and intermediaries who move from production areas in the south to sell in the north of the country have been unable to reach their markets since March 2020, creating an oversupply and resulting in downward pressure on prices for farmers. Storage facilities are limited, especially refrigerated facilities, which are particularly important for perishable goods.

These multiple problems and hardships may lead to some farmers abandoning agriculture and agribusiness due to the continued hardship from several years of ongoing conflict coupled with the hardship of the pandemic. Restrictions on mobility vary by region and municipality. In general, curfews and quarantines have impacted most of Libya, albeit slightly less so in the south.

With its current configuration and performance levels, the agricultural sector cannot and will not satisfy rising demand for food in the country or contribute to the desired overall economic development. Agribusiness development will require building capacity for innovation. These two aspects are interrelated: short and long-term individual capacity-building, including skills development (language, communication and facilitating participatory and multi-stakeholder approaches), as well as building knowledge on specific priority topics (e.g. water, horticulture, post-harvest processing and marketing). Current capacity-building can be correctly implemented through higher education programmes, as well as short courses and capacity-building programmes, training of trainers programmes and field schools for farmers, among other means. Organizational capacity-building, such as adequate human resource development strategies and providing incentives and opportunities for career development, is paramount. In addition to building individual and organizational capacity, institutional capacity also needs to be developed. This can be achieved by developing effective interaction between different categories of actors in the innovation system through multi-stakeholder platforms like public–private research partnerships, international collaboration (especially in education, involving universities and vocational training institutes, and with the private sector, e.g. joint ventures on knowledge-rich investments). Capacity-building does not work without the implementation of newly acquired knowledge and skills. In this respect, young people and women in the agriculture sector require opportunities beyond the local production of traditional commodities.

The importance of developing agro-industry (in a more extended form, rather than just food processing) has been emphasized in some agricultural development plans to increase the value of agricultural products and the contribution agriculture makes to GDP, reduce waste, stabilize supply by marketing agricultural products over a longer period of time and provide employment

opportunities, especially for young people and women. There have been large public investment projects to establish food processing factories, such as fruit and vegetable canning, beverages, baby food, milk factories and wheat mills. However, the sector has performed poorly as a result of over-dependency on imported raw materials, among other factors, resulting in low use of existing capacity and higher unit costs. Furthermore, the inability to compete with similar products due to lower quality and higher costs, inefficient management and the neglect of marketing local production has also hindered performance. Most food processing factories were later sold to workers and the private sector and laws and directives were adjusted to encourage private-sector participation in agro-industry.

The country's infrastructure in areas such as handling, packaging, grading, standards and quality control, storage, transport and marketing is very poor. The sector also suffers from limited capacity-building of human resources and poor trade policy, with few incentives to encourage export activities. The lack of proper planning and limited resources have negatively affected the efficiency of the sector and reduced its contribution to development.

With respect to institutional capabilities, the lack of stable and effective agricultural

institutions at all levels is the most important factor behind the inefficiency of the agricultural and agribusiness sector. Planning, implementation and follow-up responsibilities are not well defined. Libya clearly needs to define and establish proper, effective and stable institutions in the agricultural sector to move forward.

One of the key challenges facing agricultural development is setting realistic development goals while ensuring the sustainable use of resources. Ambitious goals like achieving self-sufficiency in major food commodities like wheat are not realistic, given the harsh environment and the fragile natural resource base. Plans to transfer technology for agribusiness, post-harvest handling, processing and other value-added practices, including plans to develop human resources, will make a major contribution to achieving the development goals and objectives of Libya in the long run.

Cooperation with finance and development partners like FAO and UNDP in providing technical support during the development process through capacity-building could ease the challenges. Some tangible opportunities in this regard include:

- Rehabilitation of the agricultural production sector, which requires major investment in infrastructure, capacity-building (education, training, extension and research), and institutional strengthening (such as cooperatives and other associations)
- Transformation of the sector from subsistence and traditional agriculture to commercial farming
- Development of the institutions needed for optimal operation of the sector, decision-making, policy formulation, financing, follow-up and monitoring
- Encouraging the private sector to assume most of the functions performed by public authorities and schemes
- Gradually opening up the sector to the international market and encouraging competition
- Strengthening and/or establishing quality control and other standards, and enforcing their implementation
- Monitoring the use of natural resources and establishing sustainable levels for their use.

1.2

Objectives and scope of the report

The overall objective of the assignment was to assess the agricultural production, value chains and added value of some important crops in the south of Libya, with a special emphasis on improving the livelihood of women.

The specific objectives include:

- Surveying the type and quantities of agricultural commodities produced in the different municipalities of the south of Libya
- Mapping producer associations and cooperatives, including women's associations in villages and municipalities in the region
- Analysing and assessing the value chains of some important perishable agricultural commodities cultivated in the region
- Identifying market-oriented value-added opportunities needed to reduce loss and waste of agricultural commodities, especially perishable ones, and to facilitate access to distant national and external markets
- Formulating pilot projects to implement market-oriented value-added activities, as well as actions to improve women's livelihoods
- Developing a road map (2–3 pages) for FAO and UNDP collaboration in agro-industry development in the south of Libya for 2020–2023 to strengthen collaboration towards advancing the 2030 Agenda, with an emphasis on the development of small and medium enterprises in agrifood industry.

This report was prepared as a deliverable of a FAO/UNDP-sponsored project for the assessment and improvement of the agro-industry sector, especially of perishable commodities in the south of Libya. The scope of the work of this report is structured in three interdependent parts: (1) surveying agriculture production and organizations and associations in the south of Libya, with special emphasis on women, and identifying gaps and challenges affecting their performance; (2) identifying the status and needs to fill gaps and overcome challenges; and (3) preparation of corresponding short- and medium-term development plans, proposing projects for improving value chains and added value, with an emphasis on improving the livelihood of women.

1.3 Methodologies implemented

The assessment surveyed samples of local stakeholders representative of a range of social and economic backgrounds and activities related to agriculture and agribusiness.

The stakeholders surveyed are involved in different aspects of agriculture in rural and urban areas of the south of Libya. The selection of the target locations was based on the extent of the agricultural production of commodities, especially perishables, and the consultants' experience of the region. The data collection took place during October and November 2020. In total, the research team interviewed about 350 farmers (98 women), 10 community leaders, 15 large commercial farmers, 56 agricultural cooperatives and 15 CSOs involved in food and agriculture.

The methodological approach focused on the collection of information, mostly through written surveys prepared by the team, telephone interviews and a limited number of secure meetings. This approach was adopted with the aim of achieving a general understanding of the main trends and dynamics affecting the agriculture and agribusiness sectors and the livelihood of women in the south of Libya without exposing consultants and other personnel to insecurity and COVID-19. Interviews were focused on assessing livelihood conditions, particularly of women but also of farmers, in terms of their current activities and the specific challenges they are facing. The interviews were also used to build up an in-depth understanding of the current access of stakeholders to services and assistance, including value-added practices and markets and marketing systems. Data and information were collected on agricultural production in different municipalities, value chains and added value for four selected commodities, agricultural cooperatives, CSOs with some agricultural and food activities and individual women conducting agricultural and food activities from these surveys, as well as other sources, including some previous reports and programmes on the agriculture sector in Libya and the region and official data from national and municipal offices and institutions.

The data collected was compiled, synthesized, analysed and arranged as shown in the tables and figures in the report and its annexes (section V). Some initial detailed data that is not presented here, including some data in Arabic, was already available to FAO. These included some survey forms, identification of the baseline state of the agricultural production of different commodities, the status of value chains and added value for four perishable commodities in some municipalities, and the cooperatives and CSOs involved in food and/or agriculture with an emphasis on women. The corresponding key findings, major challenges and conclusions and recommendations are presented in this report. Short- and medium-term action plans for value chains, post-harvest handling, processing and other value-added practices, as well as cooperatives, CSOs and women's livelihoods, are suggested in project proposals presented separately to this report.

Limitations of the methodologies implemented in this work include:

- Small sample size: The data on the production of agricultural commodities is broken down by municipality. The sample

Figure 3.

Farmers preparing pesticides for tomato crops.

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of farmers surveyed in each of the municipalities was limited by the instability, insecurity and confinement in the region due to the ongoing conflict and COVID-19. The data should thus be regarded as estimates and not as absolutes.

- Tense security environment. During the period of the study, instability and insecurity, the COVID-19 pandemic, challenging facing communications (including telephone calls and Internet), major electricity problems and fuel shortages have all negatively impacted the research, including the sample size, access to stakeholders and responses to some questions. To alleviate this challenge, the findings are compared to other research and sources, as well as informal information obtained from different institutions and individuals.

1.4

Key findings

The findings of this study show that agriculture still represents an important source of income, especially in rural areas, with notable variations among municipalities in the region.

The population is heavily dependent on income and pensions provided by the Government or private sector, meaning that for some households certain agricultural activities are secondary income sources.

The south of Libya has strong potential to enhance its agricultural and agribusiness sectors through better agricultural practices to improve productivity and the quality of produced commodities but – equally importantly – through improved value chains, post-harvest handling, processing and other value-added practices for all agricultural commodities, particularly perishable ones.

However, since 2011, multiple episodes of a decade-long conflict and political instability and insecurity have exacerbated the multiple existing challenges, such as water scarcity, plant diseases and pests, desertification and the low availability of workers. The COVID-19 pandemic has worsened the problems facing the sector.

The possible impact of climate change is felt in the region through shorter growing seasons and reduced crop yields. In addition, farmers such as those in Sabha have observed the spread of the green scale insect (Palmaspis phoenisis) as a new phenomenon that is potentially related to climate change. They have also noticed reduced yields of crops such as pomegranates and an increase in olive harvests. However, farmers have little knowledge of the best ways to adapt to these phenomena.

The ongoing conflict and COVID-19 have already further disrupted the availability and affordability of agricultural inputs. Similarly, the devaluation of the Libyan dinar and high foreign exchange rates have increased the prices of inputs and logistics. Farmers are unable to access migrant workers due to border restrictions and fears of becoming infected with COVID-19. Labour shortages and increased wages have resulted in several farming problems, including harvesting.

Farm to market channels are disrupted: farmers normally sell their products to intermediaries, wholesalers and retailers at markets or at the farm gate. However, these buyers have stopped coming to markets due to road closures, curfews and pandemic containment measures. Consequently, farm sales and prices have fallen and food loss and waste increased, while farm incomes have plummeted.

Food transport is a major bottleneck for all links in the agricultural chain. Logistics are stressed and costs are increasing due to travel limitations, freight restrictions, curfews, delays from labour shortages and a general reduction in volume. Farmers are unable to move their produce to buyers and buyers are not coming to farmers. Trading volumes are down, among other causes due to the shortage of labour, transport and shutdowns.

The lack of credit and cash has reduced the purchasing power of farmers and consumers, while limitations on operating times and curfews have reduced sales in many areas. At the same time, it has become harder to replenish stocks of a wide range of products and food commodities. The Government is not providing any COVID-19 financial support and all Government-related activities such as the issuance of letters of credit are not functioning.

Food consumption is compromised as food prices have increased and purchasing power has fallen. As incomes continue to contract, the depreciating currency and increasing cost of agricultural production and logistics has driven up food prices and increased food insecurity. Unaffordability is the primary cause of high food insecurity risks for most of the population. Similarly, high unemployment, unpaid salaries, a lack of cash, reduced savings, increased medical expenditure and higher food prices have reduced purchasing power, making food and health supplies less affordable.

The negative impacts of COVID-19 on agriculture and food value chains are continuing to unfold in the country and the region. We are likely to see severe shocks continuing to emerge in the short and medium term. This will increase food insecurity, including disruptions to trade, food price volatility, job losses and damage to agriculture production and agricultural and food value chains.

Applying innovative approaches and building value chain resilience are key to addressing some of these disruptions to mitigate food insecurity risks and reduce the potential shocks that lie ahead. It is necessary to improve value chains and increase the value-added practices of important agricultural commodities, especially perishables, to mitigate the impact of the ongoing conflict and COVID-19 on the region's agrifood system.

This report on the baseline, assessment, challenges and needs of agricultural production, value chains and added value, as well as cooperatives, CSOs and individual women with agricultural and/or food activities is – to our knowledge – the first comprehensive report in the south of Libya. However, due to the multiple challenges during the period (ongoing conflict, instability and insecurity in the country and the region, restricted movement of the population, the COVID-19 pandemic, the challenging economic situation, difficulties in communications and the short period covered by the study), there remains significant room for expanding, improving and updating this research.

1.5

General challenges

Although each of the assessed municipalities of the south of Libya faces its own unique challenges and opportunities, and so do the different subsectors (e.g. agricultural production, post-harvest handling, processing and other value-added practices, cooperatives, CSOs, women), the team identified multiple general challenges common to the region.

There is a lack of a well-planned agricultural strategy both in the country and in the region. One of the huge challenges facing by the crop production and value chain sectors is the lack of income and liquidity. While the population continues to be heavily reliant on public services and salaries, Government institutions have been affected by the political and economic instability faced by the country and struggle to maintain the spending levels required for these services. Among many consequences, the shortage of cash in banks has led to strict limits on withdrawals, including for public sector salaries and pensions. Additionally, the competition between the country's rival governments for control of its financial institutions has further weakened the Libyan financial system, leaving space for the black market and smuggling. In this context of conflict, the agricultural sector has primarily suffered from the lack of Government investment and initiatives, as well as a severe shortage of water, electricity,

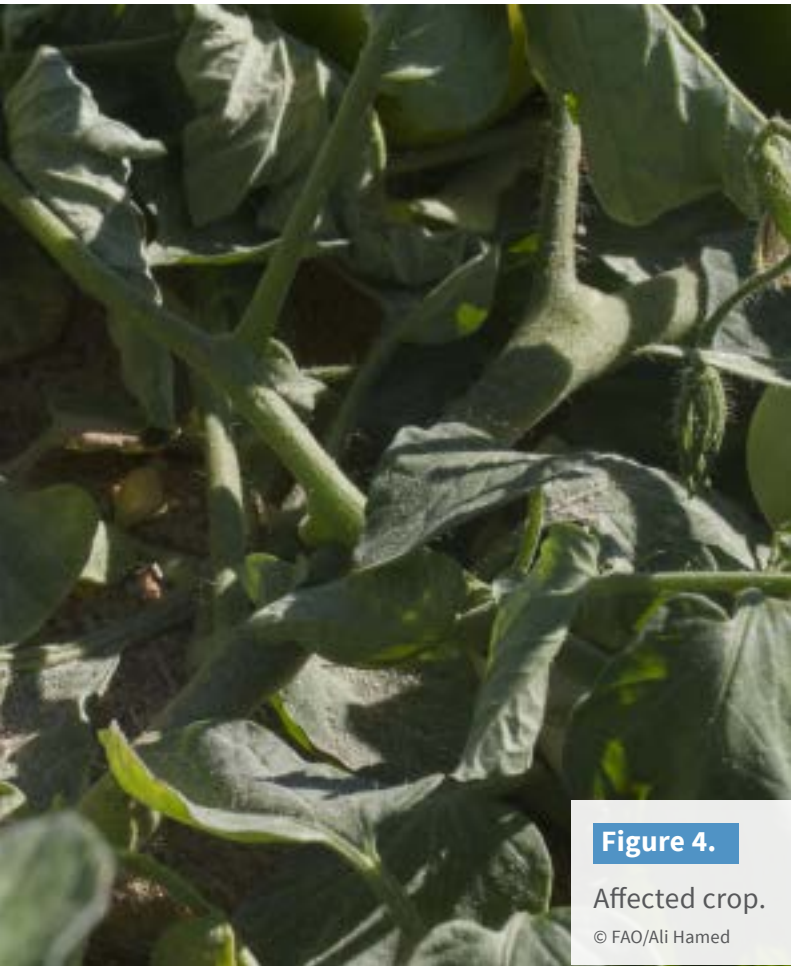

Figure 4.
Affected crop.
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transport and communications. The issue of cash liquidity shortages is particularly pronounced in the south of Libya, especially compared to the rest of the country, although farmers have suffered to different extents in different municipalities.

Low crop productivity has been further aggravated by the high cost of inputs and agricultural equipment like machines, water pumps, seeds and pesticides, compounding a number of the challenges faced by local farmers, such as the reduced quality of available seeds and pesticides, the spread of crop pests and diseases and limited access to irrigation water.
The black market has increased since February 2011 due to a lack of regulation, resulting in lower quality seeds for the local population. This shift can be seen in local crop production patterns: seeds sold on the black market are more expensive, forcing farmers to change the type and amount of seeds they purchase, opting for cheaper options, which are often less productive. The purchase of lower quality seeds has reduced the quantity and quality of crops. Mirroring the dynamics in the seed sector, the availability of fertilizers and pesticides is also currently determined by the black market, with higher prices than in previous years.

The ongoing conflict has also had major negative effects on the agricultural labour market. In specific terms, the number of migrant workers has fallen in recent years due to concerns about instability and insecurity in the country and most recently as a result of COVID-19. A lack of labour, combined with the falling value of the Libyan dinar, has pushed up wages compared to previous years, which creates a challenge for local farmers with limited financial resources and who lack access to bank loans and credit.

Selling crops is hindered by poor transportation, infrastructure and facilities, as well as fuel and electricity shortages, with frequent power cuts.
The team also faced several challenges during this study. Most notably, communication has been very limited, with instability and insecurity caused by the ongoing conflict and exacerbated by the pandemic creating major difficulties for communication between the different parts of the region and even within municipalities due to fear, curfews, and the severe shortage of fuel and electricity. The frequency of power cuts has made communication by phone and Internet very difficult. In addition, there are hardly any up-to-date data sets on Libyan agriculture and its economic and market systems, especially over the last decade. The pre-2011 era is marked by very limited data collection and the ongoing conflict since 2011 has further hindered collection, a situation compounded by the ongoing pandemic. The complex dynamic created by the ongoing conflict and the pandemic has limited access to some key participants. Government data was extremely hard to access and obtain and is of low quality. Despite all these difficulties, the team managed to collect data through surveys, phone calls, via the Internet and on a limited visits and interviews.

1.6

General conclusions

The main general conclusions of the study are:

- There are major difficulties in accessing quality data and information, especially due to the ongoing conflict and the COVID-19 pandemic, both in the country and in the region.
- The findings of this study show that agriculture is still an important source of income in the region, with notable variations among the different municipalities.
- As is the case for all the country, the region's population is heavily dependent on salaries and pensions provided by the Government (the majority) or the private sector, while agricultural activities are often considered secondary sources of income.
- Agriculture production in the south of Libya is very diverse but very weak, with extremely poor yields and very low quality.
- Value chains of all agricultural commodities produced in the region, especially perishable ones, were extremely weak before 2011 and COVID-19 and worsened as a result of these two recent problems.
- Post-harvest handling practices for agricultural commodities (especially perishables) are almost completely absent and many of the required value-added practices are non-existent.
- The key markets for agricultural commodities produced in the region are far away from production sites. Transport, communications and logistics are extremely challenging, especially due to the ongoing conflict and COVID-19. This has resulted in major loss and waste, especially due to the lack of adequate post-harvest handling and other value-added practices.
- The impact of the COVID-19 crisis on the region's agriculture and food systems has revealed structural problems in its agrifood value chains and has reduced food access for most of the population. The agriculture sector is in disarray and in desperate need of development, while agrifood value chains have been severely disrupted by negligence, the lack of proper plans, the ongoing decade-long conflict and the pandemic.
- The ongoing conflict and COVID-19 could deliver long-lasting shocks to agricultural production and demand, as shown by our surveys and interviews and the desire of some farmers to abandon agriculture. This has ongoing repercussions on the prices of agricultural products, livelihoods and food security, which are likely to persist long after the virus has been contained.

1.7
General recommendations

Based on the key findings and general conclusions, the following general recommendations can be made:

- There is strong potential for the region's agriculture and agribusiness sectors, meaning there is a pressing need to increase the agricultural productivity, improve food value chains and ensure proper post-harvest handling, processing and other value-added practices.

- Given the findings of the assessment, this study recommends a number of interventions to enhance the living conditions and productivity of farmers, with a particular emphasis on improving value chains and women's livelihoods. This can be divided into two parts: (1) a first category of initiatives focuses on improving food security and household resilience by strengthening sectors and reducing loss and waste through improved productivity, value chains and value-added practices, promoting local entrepreneurship (including focusing on the required infrastructure support) and capacity-building; and (2) a second category targets the strengthening of women's livelihoods, focusing on building and strengthening associations.

- Due to the limited time for this study, the size of the region and other previously mentioned difficulties and challenges, the value chain and added value assessment was only conducted for four of the 16 suggested commodities. As such, it is strongly recommended to assess the value chain and added value of all of the 12 other selected commodities or as many of them as possible. This will be detailed in section III and is suggested as one of the actions for a proposed project.

- From the assessments of the value chains and added value of the four selected commodities (two vegetables and two fruits, one of which is sub-tropical and the other tropical), several recommendations can be made for improving production practices, post-harvest handling (harvesting, packing, packaging, cold chain, transport and marketing), processing (processing methods, infrastructure and installations, and the handling of processed products) and marketing. Some of these are detailed in section III and suggested as actions of a proposed project.

- Support to maintain farmers' access to quality inputs and infrastructure and supporting them with the required services (e.g. agricultural extension, capacity-building and financial measures) are key. Inputs for crop production and handling could include certified seeds and high-quality pesticides, fertilizers, equipment, machinery and supplements. Access to agricultural inputs

can be through either direct distribution or financial support. There is a strong need to encourage regulatory oversight of agricultural input markets to improve the quality of locally produced commodities for national markets, and especially for potential export markets.

- Training and capacity-building for community-based associations and organizations, farmers and other value chain and value-added actors, especially women, is crucial. Awareness-raising programmes covering different topics, such as reducing food loss and waste among farmers (especially among value chain actors and households) and increasing value-added practices (especially proper post-harvest handling techniques and treatments, food safety, quality and nutritional standards, and pesticide use and precautions) would be highly beneficial in the region. training of trainers programmes, farmer field schools, workshops and other capacity-building programmes are badly needed on topics including (1) proper cultural practices for better cultivation and higher productivity; (2) proper post-harvest handling, processing and other value-added practices, such as cold chain, packing, packaging, quality standards, transport, and processing; (3) proper marketing infrastructure and marketing systems and access to distant (national and export) markets; and (4) export regulations and promotion, especially in the areas of quality and safety standards and enforcement.

- Establishing business incubators providing seed funding for medium or small farms that apply gender-sensitive, environmentally friendly and socially inclusive considerations is strongly recommended.

- There is a strong need to support the strengthening and rebuilding of cooperatives and CSOs, the creation of an intermediary body for farmers (preferably with a separate body for women, due to social and cultural issues in the region) that could facilitate access to credit from local and international institutions, and other important services and support.

- Support and mentorship to socio-professional organizations engaged in the agriculture and food and agribusiness sectors, especially those with significant involvement and participation of women, is of great benefit to the region.

- The rehabilitation of power generators and/or improving connectivity with the grid and training local stakeholders on best practices relating to the maintenance of new energy sources, and alternative energy sources, such as solar panels and generators, would provide significant support.

2

Agricultural production in the south of Libya

2.1

Introduction

Southern Libya is one of the most important strategic areas in the country, due to its important natural and economic resources, as well as being a gateway to the countries of the African Sahel, sharing borders with Algeria, Chad, Egypt, Niger and Sudan.

The majority of its area – estimated at more than 500,000 square kilometres, approximately 33 percent of the country's land – is covered by the Sahara Desert. Its cultivated area makes up just 0.06 percent of the country. The southern region's population was 485,700 in 2019. and its area makes up 33 percent of the country's land, with an estimated cultivated area of 0.06 percent of its total and exploited area. The region is dominated by the extremely hot desert climate, with drought in summer and cold weather in the winter. The region has pre-desert and desert climates, with high temperatures and large variations throughout the day. Precipitation is rare and irregular and annual rainfall is very low, averaging about 8 millimetres.

With scarce permanent water resources, southern Libya is almost completely dependent on non-renewable groundwater resources, with more than 99 percent of agriculture dependent on groundwater. According to the Ministry of Agriculture, the irrigated area in the region was estimated at 114,000 hectares in 2018. The most common type of irrigation is sprinkler irrigation (38.8 percent of all existing irrigation systems), followed by drip irrigation (26.8 percent). The majority of farmers in the south rely on the Government water network and electricity grid to access the irrigation they need. The south is an important region for agricultural production in the country and was identified as one of the regions where agriculture is most affected by recent crises.

The agriculture sector in the south of Libya is small compared to other regions of Libya. Most farms are between six and 10 hectares. In Sabha, however, there are also a number of larger farms (more than 20 hectares), typically located in the outskirts of the town. This is probably due to the fact that markets are more easily accessible and larger compared to the other locations and municipalities in the south. Smaller farms are located in the city and are usually inherited. In most of the region, almost all farmers own the lands they use for agriculture and renting of farmland is uncommon. When the land is rented it is most typically leased to foreign farmers.

Given the small size of the farms, farmers have a limited number of full- or part-time employees. In Qatrun, for example, the average farmer has less than one full-time and one part-time employee. Farms in Kufra have the most employees, with an average of 2.5 full-time employees and 2.6 part-time employees per farm. In Sabha, farmers have an average of 1.7 part-time and 1.6 full-time employees. Full-time workers on farms in Qatrun and Sabha are almost exclusively migrants from sub-Saharan Africa, mainly from Chad, Niger and Sudan. In Kufra, the composition of full-time employees is more varied, including Libyans and migrants from other North African countries like Egypt and family members. Libyans who work on farms are typically older people, with young people perceived as reluctant to engage in agricultural work. However, the shortage of job opportunities means young people are becoming increasingly involved in the sector. Part-time employees on farms are most commonly family members, although other Libyans and migrants from sub-Saharan Africa are also employed on a part-time basis.

Given the varying soil and rainfall conditions in the different municipalities in the south, the most commonly produced agricultural commodity is dates, which are present in the production portfolios of almost all farmers. Aside from dates, agricultural production varies widely in the different municipalities. In Qatrun, for example, barley, clover and wheat are key products, in addition to some limited vegetable and fruit production. In Sabha, olives, citrus and barley are common, along the production of vegetables including onions, tomatoes, eggplant and garlic. In Kufra, the abundance of water, the soil quality and the favourable climate mean crops include olives, mangos, vegetables and citrus fruits, in addition to dates.

Most farmers use wells to access groundwater, although in a few districts, such as Murzuq, farmers also use rainwater and surface wells. Certain population groups have faced limitations in accessing irrigation water, especially economically disadvantaged farmers.

In some municipalities like Sabha and Qatrun, few farmers use their produce for their own consumption, with the majority selling it at the local markets. For example, in Qatrun, dates and olives are sold locally, as well as crops for cattle and camel fodder, while vegetables are consumed by the farmers' own households. In Kufra, farmers use most of their agriculture outputs for their own consumption. One of the reasons for this is that Kufra is relatively isolated and farmers find it hard to sell their goods at local or other markets due to the distances and poor transport. Only dates, some vegetables and fodder are transported and sold in markets in the northern region.

2.2

Key findings

This part of the study provides a brief overview of the agricultural production, challenges, opportunities and needs in the south of Libya.

The review is based on primary qualitative and quantitative data collected from farmers and other stakeholders (including associations) in each of the 12 municipalities of the region.

The number of farmers in the 12 municipalities of the region is estimated to be 30 241, including 900 in Albwanis; 3 698 in Wahat; 966 in Ghat; 1,888 in Kufra; 4 096 in Murzuq; 4 076 in Qatrun; 2 096 in Sabha; 1 350 in Sharqiya; 2 087 in Traghan; 2 932 in Ubari; 3 052 in Wadi Etba; and 3 095 in Wadi Shati (annex V.1).

The number of agricultural holdings in the 12 municipalities included in the study was estimated at 12 515, including 900 in Albwanis; 2,819 in Wahat; 744 in Ghat; 1,790 in Kufra; 2,868 in Murzuq; 4 109 in Qatrun; 1,820 in Sabha; 1 350 in Sharqia; 1 577 in Traghan; 2 239 in Ubari; 1,638 in Wadi Etba; and 2 385 in Wadi Shati. The total area of these holdings is estimated as 216 621 hectares, including 28 260 hectares in Albwanis; 18 222 hectares in Wahat; 4 520 hectares in Ghat; 29 553 hectares in Kufra; 31 602 hectares in Murzuq; 31 602 hectares in Qatrun; 23 445 hectares in Sabha; 1 550 hectares in Sharqia; 3 634 hectares in Traghan; 17 084 hectares in Ubari; 11 685 hectares in Wadi Etba; and 15 464 hectares in Wadi Shati. The average area of agricultural holdings per farmer is estimated as 6.1 hectares in Ghat; 31.4 hectares in Albwanis; 6.5 hectares in Wahat; 16.5 hectares in Kufra; 11.9 hectares in Murzuq; 7.7 hectares

in Qatrun; 12.9 hectares in Sabha; 11.5 hectares in Sharqia; 2.3 hectares in Traghan; 7.6 hectares in Ubari; 7.1 hectares in Wadi Etba; and 6.5 hectares in Wadi Shati (annex V.1).

Though dates and cereal grains are the main crops grown in the region, several other crops are also cultivated, especially by economically disadvantaged households (including those of local residents, migrants and internally displaced persons), with a strong focus on cash crops like vegetables that can be grown year-round, greens and fruits. Details on the crops cultivated in 12 of the municipalities of the south of Libya are provided in the tables and graphs in annex V.1.

The most important cereal grains cultivated in the region are wheat and barley. The most important fruits and vegetables cultivated in the region include potatoes, tomatoes, onions (green and dry), garlic, carrots, peas, beans, cucumbers, peppers, lettuce, cabbage, parsley, watermelons, cantaloupe, dates, olives, citrus, grapes, almonds, figs, mangos and guava.

The municipalities where cereal grains are the main cultivated food commodities out of the three common types (cereal grains, fruits, vegetables) by area are Ghat (59 percent of planted area), Qatrun (74 percent), Traghan (61 percent) and Wadi Shati (52 percent). The municipalities where fruits are the main cultivated food commodities include Albwanis (88 percent), Kufra (70 percent), Sabha (74 percent), and Sharqia (64 percent). The municipalities where vegetables are the main commodities include Wahat (57 percent), Murzuq (57 percent), Ubari (42 percent) and Wadi Etba (57 percent) (annex V.1).

Olives are the most important food crop in Albwanis. Important vegetables and fruits cultivated in Wahat include tomatoes, green and dry onions, olives and dates. Important fruits and vegetables cultivated in Ghat are watermelons, olives and dates. Kufra cultivates a variety of fruits including dates, citrus, guava and mango. Important fruits cultivated in Murzuq include olives, dates and citrus. The most important fruits and vegetables produced in Qatrun include eggplant, olives, dates, citrus and guava. The Sabha district is a key producer of potatoes, tomatoes, green onions, watermelons, cantaloupe, dates, olives, citrus and grapes. Sharqia produces significant quantities of green and dry onions, olives and dates. Some of the most important fruits and vegetables cultivated in Ubari include tomatoes, potatoes, green and dry onions, watermelons, olives, dates, citrus and grapes. Important fruits and vegetables cultivated in Wadi Etba include tomatoes, potatoes, green onions, olives and dates. Wadi Shati produces significant quantities of green and dry onions, watermelons, cantaloupes, dates, citrus, grapes and figs (annex V.1).

Regarding the quantities of cereal grains produced in the region, wheat is the most important in Albwanis, Wahat, Ghat, Kufra, Qatrun and Traghan, while barley is the most important in Murzuq, Sabha, Sharqia, Ubari, Wadi Etba and Wadi Shati (annex V.1).

Regarding the quantities of fruits produced in the region, dates are the most important fruit in Wahat, Ghat, Kufra, Murzuq, Sharqia, Traghan and Wadi Shati; citrus is the most important fruit in Qatrun; and olives str the most important fruit in Albwanis, Sabha, and Ubari (annex V.1).

The productivity of the different cultivated crops in the region varies very greatly among the different municipalities. For example, estimated productivity for wheat is 3.4 tonnes/hectare in Kufra; 3.3 tonnes/hectare in Sharqia; 3.2 tonnes/hectare in Traghan; 3 tonnes/hectare in Sabha; 2.85 tonnes/hectare in Qatrun; 2.4 tonnes/hectare in Ubari; and 1.4 tonnes/hectare in Wadi Shati. Barley productivity is 4.79 tonnes/hectare in Sabha; 4 tonnes/hectare in Sharqia; 2.9 tonnes/hectare in Ubari; 2.76 tonnes/hectare in Qatrun; 2.2 tonnes/hectare in Kufra; and 1.2 tonnes/hectare in Wadi Shati. The productivity of dates is 16.13 tonnes/hectare in Wahat; 6.19 tonnes/hectare in Wadi Shati; 5.33 tonnes/hectare in Qatrun; 3.18 tonnes/hectare in Ghat; 3 tonnes/hectare in Traghan;

2.76 tonnes/hectare in Ubari; 2.46 tonnes/hectare in Kufra; 2.4 tonnes/hectare in Sharqia; 1.7 tonnes/hectare in Albwanis; 1.43 tonnes/hectare in Sabha; and 1.2 tonnes/hectare in Ghat. Grape productivity is 3.5 tonnes/hectare in Wadi Shati; 3.28 tonnes/hectare in Sabha; 2.48 tonnes/hectare in Ubari; 1.82 tonnes/hectare in Kufra; 1.7 tonnes/hectare in Ghat; and 0.8 tonnes/hectare in Sharqia. Olive productivity is 7.98 tonnes/hectare in Kufra; 5.15 tonnes/hectare in Wahat; 4 tonnes/hectare in Qatrun; 3.67 tonnes/hectare in Ubari; 3.55 tonnes/hectare in Ghat; 3.12 tonnes/hectare in Wadi Shati; 2 tonnes/hectare in Sharqia; and 1.09 tonnes/hectare in Traghan. Mango productivity is 10.44 tonnes/hectare in Kufra but just 2 tonnes/hectare in Wahat. Tomato productivity is 27.5 tonnes/hectare in Sabha; 6.9 tonnes/hectare in Ubari; 6.3 tonnes/hectare in Kufra; 4.3 tonnes/hectare in Traghan; and just 1.3 tonnes/hectare in Wadi Shati and Sharqia. Potato productivity is 21.1 tonnes/hectare in Sabha; 3.9 tonnes/hectare in Kufra; 3.4 tonnes/hectare in Traghan; 3 tonnes/hectare in Ubari; 2.5 tonnes/hectare in Wadi Shati and Sharqia; and as low as 1.3 tonnes/hectare in Ghat (annex V.1).

2.3

Challenges

Several challenges were identified from the results and key findings of this report.

Challenges pertaining to production are grouped into the broad categories of security, economic factors, the availability of inputs (such as seeds, fertilizers and feed), plant diseases and pest detection and control, weather, energy and electricity, and availability of water and irrigation systems.

There are major supply challenges for agricultural production across the region in terms of financial and technical resources. It is almost impossible for farmers to obtain financing. Moreover, access to the machinery, tools and equipment required for production is difficult. Crop productivity has been particularly affected by the high cost of agricultural equipment and inputs, such as machines, water pumps, seeds and pesticides. This issue has compounded a number of challenges facing local farmers, such as the reduced quality of available seeds and pesticides, the spread of crop pests and diseases, and a lack of access to irrigation water. After 2011, the black market has dominated due to a lack of regulation and enforcement, resulting in farmers being supplied with lower quality seeds. This shift can be seen in local crop production patterns: seeds sold on the black market are more expensive, forcing farmers to change the type and amount of seeds purchased in favour of cheaper and often less productive options. Lower quality seeds have resulted in lower yields and lower quality produce. Mirroring the dynamics observed in the seed sector, the availability of fertilizers and pesticides is also dominated by black market vendors, who are setting higher prices than in previous years.

Agricultural production suffers from poor conditions in terms of disease and pest detection systems and limited access to adequate pesticides at affordable prices. This lowers the yield and quality of food commodities and affects their preservation. Frequent power cuts have damaged irrigation systems, with a particularly severe effect on the functioning of water pumps. The lack of availability of skilled labour is also a major constraint in the country and in the region.

2.4

Conclusions

According to the survey and research, cereals (particularly wheat and barley) are the main crops cultivated in the region.

However, there are substantial differences in the production of agricultural commodities across municipalities.

Municipalities of the region have a desert climate, with extremely low rainfall, no perennial rivers and scattered oases.

It is almost impossible for farmers to obtain financing for agricultural production and handling. This is all the more concerning given that financing is evaluated as very important for enabling the production and handling of foods in the region, due to the high prices of equipment and fertilizers. While all types of financing are hard to obtain, general and agricultural loans are all but inaccessible, especially given that the Libyan Agricultural Bank has stopped providing loans. In Qatrun and Sabha, this situation is mainly a consequence of the lack of liquidity in banks. In Kufra, as well as in Qatrun, the banking sector is perceived as unwilling to provide financial support to agriculture producers. Furthermore, similar to the situation in the rest of the country, exchange rate fluctuations play a significant role in limiting access to financing in the region.

In the past, farmers received inputs such as seeds from agricultural cooperatives and associations, which would also ensure quality control. However, in recent years, these cooperatives and associations have not been active and no longer provide support. Inputs are now often only available on the black market, which has caused a spike in prices and uncertainty regarding the quality and safety of inputs.

In most municipalities, farmers find it extremely hard to obtain the machinery, tools and equipment needed for production and handling. This also includes basic machinery like tractors, the most commonly cited piece of equipment that is hard to obtain. In addition to tractors, plows and harvesting equipment are also hard to acquire. Given the remoteness of the region, the lack of availability of items in local markets and the lack of spare parts and maintenance represent a major challenge.

Some farms have become inaccessible due to insecurity or the presence of unexploded ordnances and mines, which are also a production barrier for farmers in some municipalities. Some armed groups are still present across the south, with some persistent fighting, which has also impacted the sector in some municipalities. Although the conflict has not directly affected farmers in a number of extremely remote border towns like as Qatrun in the same way as farmers in other municipalities, such as Sabha and Kufra, its impact can still be felt in several parts of the region.

Power cuts have caused droughts, damaging water pumps and preventing the correct functioning of irrigation systems.

Farmers find it hard to obtain the labour required for production, harvesting and other practices. When it comes to specific skills, it is mainly production planning, maintenance and repair skills that are hard to obtain. Continuous labour shortages are still felt in the region, exacerbated by the conflict and the COVID-19 pandemic.

The sector suffers from the spread of a number of plant diseases. Scales pose a threat to cereals, vegetables, ornamental plants, fruit and forest tree crops. Libya is also home to the cotton leaf worm (Spodoptera littoralis), chafer insects which destroy some crops, and the red flour beetle (Tribolium castaneum) which destroys wheat. Roundworms, such as root-knot, root-lesion and citrus nematodes, are another challenge. Furthermore, fungi such as powdery mildew, leaf spot, leaf blight, inflorescence rot and rust all have a significant presence. Viruses like the pea seed-borne mosaic virus, the alfalfa mosaic virus and the citrus tristeza virus are also common in the region. The region is also occasionally hit by locust swarms, which attack several crops, including dates. Several insects are found in the region, the Mediterranean fruit fly (Ceratitis capitata) being one of the most destructive. All this makes disease and pest detection and control systems vital. However, detection systems and control are poor in the majority of farms in the south. Some organic and integrated pest management methods are used for control, in addition to chemical pesticides in some parts of the region. Most farmers in the region use animal grazing to control weeds and some farmers burn plant residues after harvesting or use mechanical weeding. The use of crop rotation and/or intercropping is scarce.

In some parts of the region, such as in Sabha, shorter growing seasons and reduced crop yields have been observed, possibly as a result of climate change. Extreme and unpredictable temperatures in the region affect production. The spread of the green scale insect (Palmaspis phoenisis) is a new phenomenon and is potentially related to climate change.

The main source of water for agricultural production in the region is wells. Issues with water are mainly linked to electricity supplies, with frequent power cuts damaging irrigation systems and affecting the functioning of water pumps. Moreover, a lack of competent drilling companies and/or specific drilling skills among the workforce represent further obstacles to accessing water for agriculture.

Opportunities to grow and expand – especially for small farmers – are limited by the difficult situation facing the country, especially in terms of instability, insecurity and the lack of Government support. Nonetheless, there are still opportunities to optimize the production of the agriculture and agribusiness sectors. Dates, especially the important "Deglet Noor" variety, show the most adaptation and importance in the region. However, the cultivation of some perishable crops, such as mangos, guavas, watermelons, cantaloupe, lettuce and green onions can be improved and established in the region with the potential to trade with distant markets in the north of the country and for export to surrounding countries.

There is a high degree of uncertainty surrounding farmers' incomes over the coming months and years. Stable electricity, good quality seeds and fertilizers at affordable prices and financial support can all improve productivity and profits. There are also opportunities for farmers to assess price structures and production quantities, as well as focus more on the sale of produce and diversifying their crops.

Direct support providing seeds, fertilizers and small equipment is highly relevant. Support focused on providing high-quality products that are not available in local markets can make a qualitative difference to the region's producers. The provision of seeds for wheat, barley and clover would be particularly helpful for producers. Regarding the provision of machinery, there is a preference among producers for tractors, harvesting machines and water pumps. However, even smaller machinery would represent significant support. The extent to which providing farming equipment helps the situation is less clear than providing seeds and fertilizers. For smaller farms, equipment is not considered useful, since their operations rely

more on traditional methods and use less machinery. Access to equipment for post-harvest handling and for processing would be of enormous benefit to farmers and other value chain stakeholders to ensure the adequate preservation and sale of their produce. Directly providing equipment and machinery to farmers may not be the best approach as they do not have the skills to maintain them. Providing them to agriculture associations, such as the Fezzan Cooperative for Organic Agriculture, which then lease them out to the farmers, is more feasible.

Some farmers are currently receiving limited support from some sources. In Sabha, for example, a few farmers are receiving direct support in the form of seeds, fertilizers and pesticides, as well as access to small loans and finance. In Kufra, some farmers are receiving support, including access to small loans, training and seeds. In Qatrun and several other municipalities, farmers are generally not receiving support. The actors involved in providing this support are mainly municipal councils, local NGOs and agribusiness service centers. Agricultural associations used to be the main support actors for farmers, providing them with training and subsidized seeds. However, almost all the cooperatives are no longer active in the region. Agricultural banks also used to be active and provide loans and financing but they are no longer servicing farmers.

2.5 Reccommendations

The following recommendations are based on the key findings and conclusions:

- Some support should focus on the supply dimension of agricultural production.
  The study has found that key performance gaps in the agriculture sector are related to supply and – to some extent – the production of agricultural outputs. Direct support in the form of inputs like seeds and fertilizers or machines is highly relevant in the region. Ensuring the quality of inputs (such as seeds, fertilizers and pesticides), as well as organic pesticides, is particularly important given the current lack of quality control on the black market and difficulties obtaining pesticides. Regarding machinery, tractors and harvesting equipment are vital.

- A combination of direct, technical and financial support would be extremely helpful.
  While delivering direct in-kind support is key to closing agricultural supply gaps, this would be more effective if accompanied by technical and financial programming to ensure the sustainability of activities. Improving technical skills through training and capacity-building is important to help counter the lack of relevant skills among the labour force. Relevant topics for training could include greenhouse cultivation and other modern farming techniques related to planting, irrigation, tree pruning, fruit reaping, disease and pest control and the correct and safe use of pesticides. Collective grant schemes could support the purchasing of shared machinery and equipment for a group of small farmers or associations and cooperatives.

- Linking producers with the private sector and banks to provide support for the agriculture sector and access to finance would provide significant benefits and support for farmers. Bringing the private sector (farming businesses and chambers of commerce) and potential investors and bank representatives together to discuss and develop specific types of financial services and investments that cater to the needs of the agriculture sector is key. Such an exercise could be coupled with other types of direct and technical support.

- There is a pressing need for rebuilding and strengthening agricultural associations to ensure their sustainability and empower their stakeholders, especially small-scale farmers. Almost all the associations formed before 2011 (some have existed for 40 years) are currently inactive, due to political and other reasons. It is essential to rebuild producer associations to make them more effective and this would greatly help the sector in many ways, building capacity for collective bargaining and the ability to purchase inputs, developing technical skills and knowledge, providing access to infrastructure and equipment, markets and marketing information and systems. Soundly established and managed associations should enable knowledge sharing between stakeholders and raise awareness among the general population of the potential of the local agriculture sector.

- The engagement of young people in the agricultural sector through awareness-raising, education and capacity-building would be extremely helpful. Young people lack the motivation and interest to engage in agricultural activities in the region, especially due to its focus on physical labour. Improving and modernizing the agricultural sector requires more technical skills, with less emphasis on physical labour, alongside administrative planning. Targeted communication campaigns and projects can attract youth and bridge generational and educational gaps.

- There is a lack of training or placement programmes to provide employees (especially migrants) with relevant agriculture skills. Instead, once employed, labourers receive on-the-job training from employers. Before 2010, there were public training programmes specifically designed for migrants. As such, technical support (including training in specific skills) is vital to increase productivity. Enhancing the technical skills of farmers and their employees will increase production quality and productivity, reduce loss and waste and help protect crops, all of which will feed into the development of the agricultural sector and boost stability and livelihoods in the region.

- The majority of the region requires means to improve access to irrigation water for local farmers.

- Some of these recommendations are developed as suggested intervention actions in one of the proposed projects.

3

The status of value chains and added value for selected agricultural commodities in the south of Libya

3.1
General introduction

This part of the report assesses the value chains and added value of selected agricultural commodities cultivated in the south of Libya with the aim of improving their production, quality, handling and marketing and reducing loss and waste.

The value chains of almost all crops cultivated in the south of Libya, especially perishable ones, are not well developed. Stakeholders and the governmental and non-governmental agencies that support the agriculture sector have concentrated almost exclusively on production and have almost completely ignored the rest of the value chain for practically all agricultural crops, even for classical ones like dates that have been cultivated in the region for centuries. None of the value chains of the crops cultivated in the region has ever been fully studied and characterized. Unfortunately, the historical emphasis on production and almost complete ignorance of other crucial components of value chains (especially post-harvest handling, processing and other value-added practices) has resulted in the idea among farmers and almost all other stakeholders that these practices are of very little importance.

The main factors hindering development of crucial value chains in the south of Libya are: (1) a significant lack of awareness among the authorities, farmers and other stakeholders of the value chain; (2) a major lack of knowledge and technical skills, including in the highest educational institutions in both the country and the region; (3) a lack of finance and liquidity; (4) the scarcity of investments and initiatives from the Government and private sector, especially in rural areas in southern Libya.

As mentioned in various sections of this report, the livelihoods of Libyans (including in the agricultural and food sectors) have been significantly affected by the ongoing conflict and the disruption of law and order since February 2011. Moreover, this situation has been further aggravated by COVID-19. For example, while the Libyan population remains heavily reliant on public services and salaries, Government institutions have suffered from the political and economic instability, which means they have struggled to maintain the required levels of spending for these services. Among the many consequences, the shortage of cash in banks has led to strict limits on withdrawals, including for public sector salaries and pensions. Competition between the country's rival governments over the control of financial institutions has further weakened the Libyan financial system. The lack of water, electricity (frequent power cuts), means of transportation and security have further hampered the development of value chains and added value in both the country and the region.

3.2

Key findings

Of the 16 candidate crops selected for evaluation of their value chains and added value, the team was able to study four: dates, tomatoes, watermelons and mangos.

These crops (two fruits and two vegetables) were prioritized based on a number of factors: historical, cultural and economic importance (e.g. dates); production in most municipalities in significant quantities (e.g. dates and tomatoes); very high consumption in the country (e.g. dates and tomatoes); potential acceptance in distant markets (national and export); perishability and potential difficulties in reaching distant markets; and the potential for significant loss and waste (e.g. tomatoes, mangos and watermelons). The assessment of the value chains for the other 12 selected perishable commodities is suggested as an action of one of the proposed projects.

Assessing the value chain and added value of the four prioritized commodities revealed that key performance gaps in current handling practices are creating major challenges, resulting in major difficulties in marketing and significant loss and waste. The findings are detailed in the following subsections.

Figure 5.

Worker applying pesticide at tomato farm in the Wahat region.

3.2.1 Tomatoes

The initial location chosen for the assessment of the value chains was the Fezzan region. However, during the assessment, the team found that the value chains of most crops are connected to further geographical locations. For example, tomatoes are one of the most popular and important vegetables in Libya and the region and the area planted with the crop is increasing significantly in the south of the country. The assessment team identified tomato cultivation in municipalities such as Wahat, Sabha, Kufra, Ubari and Wadi Etba. The team also estimated the number of tomato farmers in southern Libya at 5 391, with the highest percentage (31 percent) concentrated in the municipality of Wahat, producing 145 463 tonnes. Since this municipality is located outside the Fezzan region, the assessment team decided to expand the scope of the assessment to analyse the value chain in detail.

Tomatoes are one of the most popular vegetables in Libya. They are grown in solar farms and cultivated under plastic covers (greenhouses). During the 1970s and 1980s, agricultural policies in Libya aimed to limit the expansion of tomato cultivation for industrial purposes due to water shortages and closed the tomato paste canning factories. Despite these policies, the area planted with tomatoes has increased significantly in southern Libya, although it is still almost exclusively cultivated by small farmers. Many farmers in the south are interested in producing tomatoes more than any other vegetable, since this crop delivers higher and faster profits per unit area compared to some other crops. Tomato cultivation is spread in several municipalities (Wahat, Sabha, Kufra, Ubari and Wadi Etba). Tomato production and marketing have improved much more in the cities listed than in other municipalities in the south. Nonetheless, traditional methods still dominate crop production, handling and trading, except for small segments in the region with modern farms that use improved production technology. The tomato handling, marketing and trading systems in the region are mostly traditional and lack proper handling and value-added practices (figure 5).

Tomatoes are the vegetable crop that is most consumed in Libya, with about 40 kilograms per capita annually. Only small quantities (about 4 percent of production) are processed, primarily to make ketchup, sauce and tomato paste.

Tomato production is seasonal and the crop is highly perishable. Tomatoes are grown as a winter crop (main season) in October–November and as an out-of-season crop in the summer (June). During the summer months of April–September, there is a relative shortage of tomatoes, leading to higher prices in these months, while there is an abundance during the winter months.

There are about 3,391 tomato farmers in southern Libya, with an average farm area of about 10 hectares. The municipality of Wahat is the biggest producer with about 145 463 tonnes, representing about 31 percent of production in the region by volume. The municipality of Ubari is the second largest producer in the region, with 19,800 tonnes (tables 2 and 3).

Most tomato farmers in the region are small to medium in size and mostly work on old lands that are traditionally cultivated and characterized by low productivity, low quality and high loss and waste. Farmers sell their production in a number of ways, mostly to village merchants or wholesalers or at the farm gate. Farmers commonly receive low prices for their produce due to small quantities and weak bargaining power, while the larger farmers, mostly on the new lands, sell their produce directly to the wholesale market.

There are 825 tomato farmers in Sabha, 20 percent belonging to cooperative societies and with an average area of approximately 13 hectares per farmer. There are 46 women farmers, most of whom

Table 2. Cultivated area, production and productivity of tomatoes in southern Libya, 2020.

City	Area (hectares)	Production	
		Production (tonnes)	Productivity (tonnes per hectare)
Sabha	252	6 929	6 929
Ubari	2 852	19 800	19 800
Kufra	300	1 900	1 900
Wahat	28 421	145 463	145 463
Wadi Etba	421	1 352	1 352

Sources: Libyan Ministry of Agriculture and Livestock, statistics offices in the agricultural sector in (Sabha, Ubari, Kufra, Wadi Etba, and Wahat), 2020.

Table 3. Number of tomato farms and the area of agricultural holdings in the southern region of Libya

Region	Number of farmers			Agricultural holdings			Number of tomato farms
	Men	Women	Total	Number	Area (hectares)	Average (hectares)	
Sabha	2 050	46	2 096	1 820	23 445	12.9	**825**
Ubari	2 565	367	2 932	2 239	17 084	7.6	**1 132**
Kufra	1 780	108	1 888	1 790	29 553	16.5	**800**
Wahat	2 851	130	2 981	2 819	18 222	6.5	**1 652**
Wadi Etba	2 851	201	3 052	1 638	11 685	7.1	**982**
Total	12 097	852	12 949	10 306	99 989	50.6	**5 391**
Average	2 419	170	2 590	2 061	19 998	10.1	**1 078**

Sources: Libyan Ministry of Agriculture and Livestock, statistics offices in the agricultural sector in (Sabha, Ubari, Kufra, Wadi Etba, and Wahat), 2020.

use traditional manual methods of production and handling. In Kufra, there are 800 farmers, most of whom bear the costs of production, with no support from agricultural associations. There are 108 women cultivating tomatoes, most in Bazima, Jawf (West) and Al Talab, which are 30 kilometres from the city of Kufra. In Ubari, there are 1 132 farmers, 367 of whom are women, with an average farm area of 7.6 hectares

per farmer. In the municipality of Wahat, there are 1 652 farmers, with 130 women and an average farm area of 6.5 hectares per farmer. In Wadi Etba, there are 982 farmers, including 201 women.

Village merchants for tomatoes buy from small and medium farmers and sell to wholesalers (either in public markets or supermarkets) or to retailers. Village merchants make up 15.6 percent of tomato crop sales in Sabha, 17.7 percent in Ubari, 13.2 percent in Kufra, 15.0 percent in Wahat and 16.6 percent in Wadi Etba (table 4).

Brokers collect tomatoes from production centers and largely sell to wholesalers. The brokers' share of tomato crops averages 15.8 percent across the different municipalities, with the largest share in the municipality of Wahat at 22.4 percent (table 4).

Wholesalers buy from farmers directly or collect the crop from production centers, and sell to retailers by auction for a commission of between 8 and 10 percent of the selling price. Their average share of tomato sales across the municipalities is 14.7 percent, with the largest in Kufra at 16.5 percent (table 4).

Intermediaries collect crops from wholesalers and sell to retailers. Their average share of tomato sales in the region is 13.5 percent, with the largest share in the municipality of Wadi Etba at 16.6 percent (table 4).

There are two types of retailers. The first is traditional merchants, such as small shops and kiosks on public roads, which buy from wholesalers, village merchants or intermediaries at the city level and sell to consumers. The second type is modern retailers, such as supermarkets and malls, which buy from large contract farmers. The average share of retailers is 24.7 percent and is highest in the municipality of Wadi Etba at 30 percent (table 4).

Table 4. Relative distribution of total tomato production in the south of Libya

Region	Production	Village mechants		Brokers		Wholesalers	
	Quantity (tonnes)	Quantity (tonnes)	%	Quantity (tonnes)	%	Quantity (tonnes)	%
Sabha	6 929	1 078.7	**15.6**	940.1	13.6	1 039.3	15.0
Ubari	19 800	3 512	**17.7**	2 325	11.7	2 512	12.7
Kufra	1 900	251	**13.2**	381	20.1	314	16.5
Wahat	145 463	21 789	**15.0**	32 514	22.4	23 581	16.2
Wadi Etba	1 352	225	**16.6**	151	11.2	141	10.4
Total	**175 444**	**26 855**	**15.6**	**36 311**	**15.8**	**15.8**	**14.1**

Figure 6.

Traditional post-harvest handling of tomatoes in the region.

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	Intermediaries		Retailers		Post-harvest losses		Total
	Quantity (tonnes)	%	Quantity (tonnes)	%	Quantity (tonnes)	%	
	996.45	14.4	1 732.3	25.0	1 142	16.5	**100**
	2 254	11.4	5 521	27.9	3 676	18.6	**100**
	214	11.3	550	28.9	190	10.0	**100**
	19 971	13.7	15 722	10.8	31 879	21.9	**100**
	225	16.6	414	30.6	196	14.5	**100**
	23 660	**13.4**	**23 939**	**24.7**	**3 708**	**16.4**	**100**

Sources: Libyan Ministry of Agriculture and Livestock, statistics offices in the agricultural sector in (Sabha, Ubari, Kufra, Wadi Etba, and Wahat), 2020.

Table 5. Average costs of post-harvest operations for the tomato harvest during the 2019/2020 season in the region.

	Cost (dinar/tonne)	%
Collecting	100	33.90
Screening and grading	75	25.42
Packing	60	20.34
Transportation	35	11.86
Advertising	25	8.47
Total	295	100

Sources: Compiled and calculated by the team according to market prices in the south of Libya, 2020

The chain suffers from difficulties in the supply of the inputs required for the production and sale of tomatoes (seeds and seedlings, chemicals such as fertilizers and pesticides, weeds, biological resistance supplies, containers, plastic tunnels for production, and greenhouses), as well as equipment for preparing land for cultivation, irrigation systems, packing facilities, cooling, storage and transportation facilities. In addition to supply issues, there is also the problem of low quality and high prices as a result of monopolistic conditions in the markets for these inputs.

All seeds used to produce tomatoes in Libya are imported, which means it is not possible to control or direct production to specific varieties, in addition to the inherent risk of being fully dependent on the external market. Moreover, farmers do not grow the right varieties for processing. There are also problems related to pesticides and chemical

Table 6. Farm and consumer prices, and marketing margin for tomatoes in the south of Libya, 2020

Region	**Farm price** (dinar/tonne)*	**Consumer price** (dinar/tonne)*	**Marketing margin**** (dinar/tonne)	**Farmer's share of price** (%)
Sabha	1 500	1 750	250	**85.71**
Ubari	1 850	2 000	150	**92.50**
Kufra	2 000	2 252	252	**88.81**
Wahat	1 600	2 000	400	**80.00**
Wadi Etba	1 750	2 005	255	**87.28**
Total	8 700	10 007	1 307	**5 391**
Average	1 740	2 001.4	261.4	**1 078**

Sources: Compiled and calculated by the team according to market prices in the south of Libya, 2020

* Prices are the average market prices during the 2019/2020 agricultural season in the south of Libya.

** The marketing margin is the traders/wholesaler's costs, determined by subtracting the farm price from the consumer price.

fertilizers, in terms of adulteration and non-conformance with specifications

Tomato production in southern Libya is affected by the problems facing the agricultural sector in general, especially the fragmented nature of holdings and the prevalence of small farms, the resulting lack of modernization of the agricultural system, the use of poor agricultural practices, the use of inputs that do not guarantee adequate quality, and the associated low productivity and quality.

The challenges that face tomato production and that lead to low production and quality include:

- The prevalence of open fields versus protected cultivation (low and high plastic tunnels and greenhouses) and the use of wires to support crops.
- Dependence on winter production in areas such as oases due to high temperatures and the impact of residues from the surrounding oil fields.
- The prevalence of inherited traditional practices versus good agricultural practices.
- The lack of information on the needs of national and global markets in terms of quantity and varieties, resulting in a gap between production and consumption.
- Risks of fluctuations in productivity due to climatic fluctuations and pest infestations (e.g. Tuta absoluta) and their effect on incomes.
- High losses at the farm level, where the average loss is around 16 percent, as a result of poor harvest timing, poor fruit picking and the unskilled labour involved in the harvesting process.
- Using inappropriate packaging (leaf cages) and exposing the fruits to the sun, in addition to inappropriate varieties. The farmers' share was about 86 percent of the commodity price, while the share of intermediaries and traders was around 14 percent. This shows the weak post-harvest handling of tomatoes in southern Libya, which is evident in the marketing margin for tomatoes in the five regions (around 261 dinars per tonne).
- The biggest problem in the tomato value chain is post-harvest loss, which is estimated at 15 to 30 percent of total production volume in the regions in question. Post-harvest loss starts at harvesting and is aggravated in packing, storage and transportation, where appropriate facilities and equipment are not available and there is widespread use of traditional cages, in addition to the lack of refrigerated transport vehicles or refrigerated storage rooms.
- About 80 percent of the farmers in the region use plastic cages (box) for local marketing (estimated price of five dinars) and 20 percent of farmers use wooden crates (from palm fronds). Wooden cages are one of the biggest sources of physical damage to crops and as such are responsible for a large proportion of post-harvest loss.
- Loading and transport operations are not carried out properly as a result of overloading transport vehicles. Roads are commonly unpaved and transport vehicles lack refrigeration and are not fit for purpose. The average cost of transporting a tonne of tomatoes from farm to market is 35 dinars.
- Merchants and intermediaries of all kinds play a major role in the value chain: they have full control of the marketing process, imposing their conditions on producers and determining the purchase price of products

without providing information about market conditions. Merchants also commonly bear all transportation costs of the product and do not provide the necessary facilities for proper storage, which contributes to increased loss and waste. The study found major weakness in the marketing of tomatoes in the region. It also found that there is no effective role for mediators in the region's tomato value chain (especially in Sabha, Kufra, Ubari, Wadi Etba and Wahat). The highest profit was obtained by retailers, followed by wholesalers.

- Most tomatoes are grown in scattered holdings and far from wholesale markets. This increases damage and losses due to the absence of refrigerated transport.

- This study finds the tomato value chain is ineffective in terms of the main indicators, especially quality and loss and waste. Some of the main reasons for the inefficiency of the tomato value chain are poor knowledge among farmers, the lack of associations of farmers, the lack of correct post-harvest technologies, poor coordination and a lack of support services, such as extension, research and financing.

3.2.2 Mangos

Data on the value chain for mangos was collected in the Kufra region, which is the biggest producer of the fruit in both the region and the country. Data consisted of 100 samples: 75 farmers, three processors, seven traders, eight intermediaries and seven nursery units.

The total area of mango cultivation in Libya is about 5,439 hectares, of which about 78 percent is located in Kufra. Production of the fruit in Kufra is approximately 40,452 tonnes (table 7).

Table 7. Area and production of mangos in the main areas of the south of Libya

Region	Area			Production	
	No. of trees	Hectare	%	Production (tonne)	Productivity (tonnes/hectare)
Kufra	268 512	5 000	92.5	52 178	10.4
Sabha	335	56	1.0	150	2.7
Murzuq	100	50	0.9	100	2.0
Wadi Shati	500	50	0.9	100	2.0
Wahat	500	200.0	3.7	400	2.0
Ghat	50	50	0.9	74	1.5
Total	269 997	5 406	100	53 002	-

Sources: Ministry of Agriculture and Livestock, Planning and Follow-up Department, Agricultural Statistics Department, Tripoli; Head of the Area of Development Authority (Al-Kufra and Al-Sarir), Agricultural, Office of Information and Statistics, Agricultural Census, Kufra, 2020

Table 8. Distribution of the most important actors in the mango value chain in Kufra

District (Mahalla)	Distribution of actors in the sample					Total
	Farmers	Processors	Traders	Nursery units	Intermediaries	
Jawf (Central)	5	1	1	0	1	**8**
Jawf (East)	10	-	1	1	1	**13**
Jawf (South)	10	-	1	0	1	**12**
Jawf (West)	10	1	1	3	1	**16**
Bazima Aljadida	10	-	1	2	1	**14**
Altullab	10	-	-	-	1	**11**
Hawari	10	-	1	1	1	**13**
Huwiwiri	10	1	1	-	1	**13**
Total	75	3	7	7	8	**100**

Source: Data collected by the team using questionnaires

Table 9. Distribution of actors by the size of mango farms in Kufra

District (Mahalla)	Size of mango farms			Total
	Small farm (area <10 hectares)	Medium farm (area 10–20 hectares)	Large farm (area >20 hectares)	
Jawf (Central)	5	2	2	**9**
Jawf (East)	5	2	5	**12**
Jawf (South)	2	5	3	**10**
Jawf (West)	3	5	4	**12**
Bazima Aljadida	5	4	2	**11**
Altullab	4	3	3	**10**
Hawari	2	3	2	**7**
Huwiwiri	2	-	2	**4**
Total	28	24	23	**75**

Source: Data collected by the team using questionnaires

Figure 7.

Mango farm in Kufra city at harvest time.

In Kufra, mangos are planted in March and April, about a month after germination of the seeds. Drip irrigation is the main irrigation system used. In Kufra, mangos are fertilized using organic fertilizer at a rate of 15 cubic metres per hectare for the first year, 25 cubic metres in the second and 30 cubic metres in each of the third and fourth years.

There are a few nurseries operating in Kufra (table 8), such as the Al Amin and Al Biskari Nurseries, in addition to a Government nursery. Seeds are planted in polythene bags filled with compost and water is provided as needed until purchase by farmers for planting at prices between 5 to 35 dinars per seedling. Nurseries commonly have two types of planting materials: local (non-grafted), which makes up 80 percent of the available planting material, and improved (grafted), which makes up 20 percent of available planting material.

Eight varieties of mangos are cultivated in Kufra (table 10), all of which are of foreign origin, from countries such as India, Egypt and Sudan. The most important varieties are Sugary (26 percent) and Bull Heart (22 percent).

Table 10. Area, production and productivity of the main mango varieties in Kufra

Mango Varieties	Mango area (Hectares)	%	Mango Trees (Number)	Production (Quantity)	Productivity (Tonnes/ Hectares)
Sugary	130.00	26.00	515 600	21 800	213.85
Tommy Atkins	65.00	13.00	7 800	900	13.85
Keitt	40.00	8.00	4 800	300	7.50
Kent	20.00	4.00	2 400	200	10.00
Alphonso	10.00	2.00	1 200	125	12.50
Ivory	25.00	5.00	3 000	421	16.84
Bull Heart	110.00	22.00	13 200	1 214	11.04
Misk	100	20.00	12 000	1 241	12.41
Total	**500**	**100**	60 000	6 201	-

Source: Data collected by the team using questionnaires

Table 11. Mango harvest timing and methods in Kufra

Harvest	Size of farm			Total
	Small farm	Medium farm	Large farm	
Harvest time				
Before fruits ripen	8	13	6	**27**
As fruits ripen	5	5	7	**17**
After fruits have ripened	15	6	10	**31**
Total	28	24	23	**75**
Harvest process				
By farmers themselves	19	11	15	**45**
By employed contractors	5	8	4	**17**
By neighbouring farmers	4	5	4	**13**
Total	28	24	23	**75**
Harvest method				
By hand	20	19	18	**57**
Ladder	6	4	4	**14**
Stick	2	1	1	**4**
Total	28	24	23	**75**

Sources: Data collected by the team using questionnaires

In Libya, mangos are largely marketed by a few traders who visit the markets of Kufra as the mango harvest season begins. Traders also organize teams of "brokers" to pick the mangos at the farms and pack them into refrigerated trucks to be delivered to the northern towns of the country including Benghazi (1 025 kilometres away), Ajdabiya (850 kilometres) and Tripoli (2 000 kilometres). About 70 percent of large mango farms sell the crop to merchants outside of the city. No selection, grading, packaging or any other post-harvest treatment for insects or diseases are performed, which means farmers are unable to add additional value to their crop. Prices average 1 to 1.75 dinars per kilogram from farmers and 3 to 7 dinars per kilogram at retail markets.

About 60 percent of Kufra farmers sell their crop to wholesalers or intermediaries "on the tree" and do not perform any operations. About 40 percent

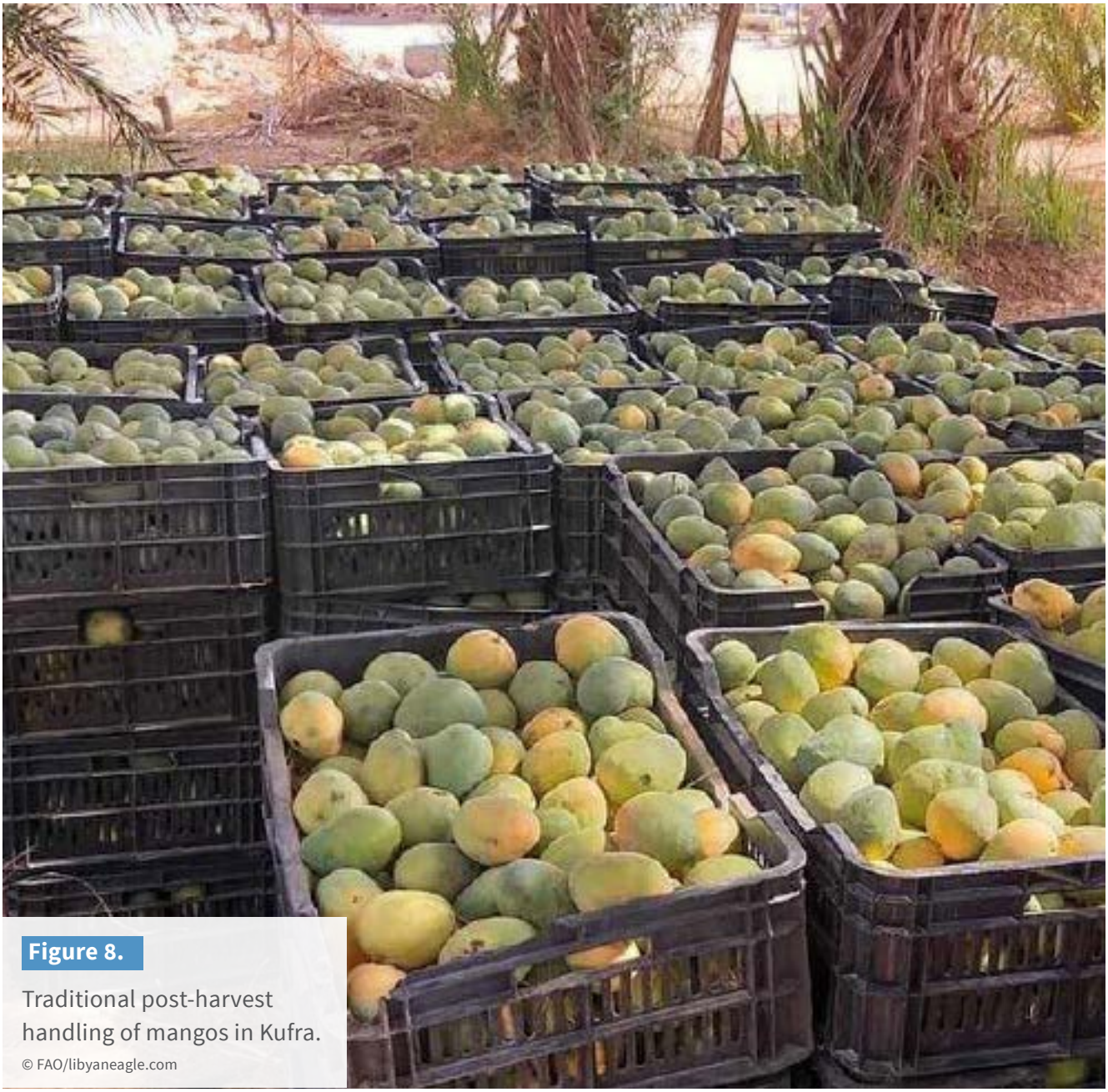


Figure 8.

Traditional post-harvest handling of mangos in Kufra.

of farmers perform some handling, including marketing operations. Farmers depend on the unskilled seasonal labour for sorting the crop, separating damaged fruits or fruits contaminated with sand and dust, and classifying fruits into fully ripened and less ripened. Some mangos are washed and the fruits are packed in 20-kilogram plastic boxes. Mangos are generally sorted into three classes. The lowest quality is used as animal feed or stored as seed for the next season. The first-class mangos (the fully ripened fruits) are consumed locally because they do not withstand storage or transportation. The prices of these fruits range between 35 and 45 dinars per 20 kilograms.

It is common for pickers to climb the trees, pick the fruits and throw them onto the ground, resulting in significant injuries and damage to the fruit, less desirable fruit and increased loss and waste. Most wholesalers prefer to buy unripe fruit to avoid

this problem and reduce losses during transport. All transport to northern markets is done by road and takes up to 48 hours using trucks.

About 95 percent of farmers in Kufra sell their produce immediately after harvest. Only about 20 percent have some means of preserving or refrigeration but fruits are not held for long periods due to a lack of proper storage facilities and knowledge.

Transportation is one of the highest marketing costs of the mango crop produced in Kufra, including transport from farms to local markets but especially to distant markets and from farms located in desert areas, where four-wheel-drive trucks are needed. Transport costs range from 10 to 15 dinars per tonne to local markets to 70 to 120 dinars per tonne to distant markets like Benghazi. In general, the average cost of internal and external transportation of mangos is about 37.5 dinars per tonne.

Market channels include direct sales from growers to village consumers and on-farm sales to local traders. Mangos are marketed in different forms, including traders, transporters, village markets, wholesalers, small home stalls, street stalls, small grocery stores and supermarkets (table 12).

Mango farmers in Kufra are concentrated in Jawf (West), Hawari, Tulab and Bazima (table 13). They use traditional production systems in cultivation and irrigation. Intermediaries obtain about 72 percent of the crop directly from the farms in the Jawf (West) and much less from Jawf (Central) due to the proximity of the markets to the city center. In another area, Tulab which is about 35 kilometres from the city center, farmers do not use intermediaries.

Table 12. Marketing costs and post-harvest transactions for mangos in Kufra

Costs	Cost (dinars/ tonne)	%
Collecting	35	27.9
Screening and grading	15	12.0
Packing	35	29.9
Transportation	37.5	29.9
Storage	3	2.4
Total	**125.5**	**100**

Sources: Data collected by the team using questionnaires

Authorized agents (Al-Wakil) serve as the link between producers and wholesalers, retailers and consumers, and are the only “legally recognized” sellers. They receive an estimated commission of 10 percent of sales, with a fixed rate for all sizes. The unit of sale (20-kilogram plastic box) and the selling price of the product (mango) is estimated by the farmer, and the agent sells the quantity presented by the farmer, at the price agreed upon with the agent, while ensuring that the agent receives a 10 percent commission of the sales value. Village merchants buy from small and medium farmers and sell to wholesalers, supermarkets and retailers. The area of the Kufra municipality with the highest share of village merchants is Hawari, with around 36 percent, while the proportion is very low in Jawf South. Brokers collect mangos from farms for wholesalers, reaching the largest share in Jawf (West), with 42.5 percent. Wholesalers commonly buy mangos from a large number of farmers and

Table 13. Distribution of the share of different actors in the value chain of mango crops in Kufra

Region	Production	Village merchants		Brokers		Wholesalers		Intermediaries		Retailers		Post-harvest losses	
	(tonnes)	(tonnes)	%	(tonnes)	%	(tonnes)	%	(tonnes)	%	(tonnes)	%	(tonnes)	%
Jawf (Central)	396	52	5.92	28	3.14	34	2.97	80	2.30	147	4.40	55	7.91
Jawf (East)	857	180	20.48	61	6.83	91	7.96	252	7.25	235	7.04	38	5.47
Jawf (South)	171	10	1.14	8	0.90	38	3.32	50	1.44	20	0.60	45	6.47
Jawf (West)	4 880	200	22.75	380	42.55	500	43.74	2 500	71.94	1 100	32.94	200	28.78
Bazima Aljadida	715	25	2.84	10	1.12	180	15.75	303	8.72	50	1.50	147	21.15
Altullab	500	37	4.21	15	1.68		0.00	48	1.38	300	8.98	100	14.39
Hawari	2 158	322	36.63	307	34.38	200	17.50	142	4.09	1 187	35.55	100	14.39
Huwiwiri	647	53	6.03	84	9.41	100	8.75	100	2.88	300	8.98	10	1.44
Total	10 324	879	100	893	100	1 143	100	3 475	100	3 339	100	695	100

Sources: Data collected by the team using questionnaires

sometimes bear the cost of harvesting. They sell to retailers at auctions for a commission ranging between 10 and 20 percent of the selling price. The largest share of mangos sales through wholesalers is in Jawf (West). There are two types of retailers in Kufra. The first is traditional merchants, such as small shops and kiosks on public roads, who buy from wholesalers, village merchants or intermediaries at the city level and sell to consumers. The second type includes modern retailers like supermarkets and malls, with Hawari having the largest share at about 35.5 percent.

About 95 percent of farmers are men and just 5 percent are women. About 80 percent of farmers are not registered with an agricultural cooperative, while about 20 percent are registered with the currently inactive associations in Kufra. There are three very small mango processors (foreign workers on farms) who dry mangos and process them into powder.

Regarding production challenges, the study found that mango producers face many problems that hinder the productivity of this important fruit. The most important problems are (1) irrigation, including the lack of a suitable programme, the shortage of water at many farms, especially in the summer, and the high salt content (underground wells in Jawf (West), Tulab, Hawari, Al-Huwairi and Bazima are at 52 percent, 20 percent, 54 percent, 35 percent, and 40 percent, respectively); (2) employment problems, including the high cost of employing workers and the shortage of skilled workers, which has been aggravated by the ongoing conflict and COVID-19; (3) lack of availability and high prices of seedlings and a lack of control over types of varieties and homogeneity; (4) the lack of adequate organic fertilizers and the high prices of chemical ones; (5) the lack of certified sources for pesticides; (6) high fuel prices; (7) poor availability of machinery; (8) pests and diseases such as powdery mildew, fruit flies, scale insects and the mango blossom disease; and (9) a lack of financial support.

The biggest marketing problems facing the mango sector in Kufra include the number of intermediaries and price speculation, the absence of the State's role in marketing, the monopoly of wholesalers over pricing, high transportation costs and the difficulty of accessing export markets.

3.2.3 Dates

The date palm is one of the most important trees in the world's semi-arid and desert regions. Libya is considered among the best areas in the world to produce the finest date palm varieties throughout the year. With about 392 varieties in the country, Libya is an important genetic source for hybridization and the development of varieties with good genetic characteristics. There are an estimated 2 million date palms in the western region of Libya, about 250 000 in the eastern region, about 4 million in the southern region and its neighbouring oases and about a million in the Al-Jufra and the oases regions. Annual date production in Libya is about 153 500 tonnes.

There are currently 85 236 hectares of date cultivations in southern Libya. Kufra is one of the largest producing cities in the south, with an estimated production area of 34 877 hectares, equivalent to about 40 percent of date production area in the south of Libya.

Total date production in southern Libya is estimated at 375 439 tonnes. The municipality of Wahat has the highest production, with 198 426 tonnes, representing 53 percent of total production in southern Libya (table 14). The average annual production of dates in southern Libya was about 448 200 tonnes for the period 2012–2019 and the average tree production is 117 kilograms (table 14).

Table 14. Cultivated area and production of dates in the south of Libya, 2012–2019

Agricultural season	Total product (thousands of trees)	Average production (kilograms/ tree)	Total production (thousands of tonnes)	Price per kilo (dinars)	Total value (thousands of dinar)
2012	3 105	118.4	367.67	3.5	1 286.9
2013	3 323	116.6	387.51	3.5	1 356.3
2014	3 600	116.6	419.77	3.5	1 469.2
2015	3 924	122.1	479.13	4	1 916.5
2016	3 838	115.6	443.75	4.5	1 996.9
2017	4 085	115.0	469.80	4.5	2 114.1
2018	4 332	114.4	495.85	5	2 479.2
2019	4 580	114.0	521.89	5.5	2 870.4
Total	**3 849**	**116.6**	**448.2**	**4.3**	**1 936.2**

Sources: Ministry of Agriculture and Livestock, Planning and Follow-up Department, Agricultural Statistics Department, Tripoli, Libya; Aboulgasem Amer Saidy, Agricultural Policies and Their Impact on the Development of Date Productivity in Southern Libyan During the Period 2012–2016

Table 15. Cultivated area and production of dates in the main municipalities of southern Libya

Region	Area			Production	
	No. of trees	Hectare	%	Production (tonne)	Productivity (tonnes/hectare)
Kufra	279 018	34 877	40.9	85 729	2.46
Sabha	199 813	13 302	15.6	16 064	1.21
Murzuq	23 397	10 000	11.7	18 426	1.84
Ubari	18 747	2 343	2.7	6 466	2.76
Wadi Shati	28 747	3 593	4.2	22 254	6.19
Wahat	98 384	12 298	14.4	198 426	16.13
Ghat	26 470	8 823	10.4	28 074	3.18
Total	674 576	85 236	100	375 439	-

Sources: Ministry of Agriculture and Livestock, Planning and Follow-up Department, Agricultural Statistics Department, Tripoli, Libya

The study was conducted via questionnaire-based interviews with all actors in the value chain and covered the production and marketing of dates in southern Libya and the regions (municipalities) with a comparative advantage in producing the crop. The study covered six regions in southern Libya, namely Sabha, Ubari, Ghat, Wadi Shati, Kufra, and Wahat, where more than 80 percent of Libyan dates are produced.

Data on the date value chain was collected from primary and secondary data sources using the sample survey method. Primary data was collected via a questionnaire for 140 date palm production actors (100 farmers, 10 processors, 14 traders, 10 intermediaries and six nursery units). Personal interviews, phone calls and social media were also used. The primary data includes the most important stages of the date value chain in the region, from the beginning of production to consumption through marketing of the product after harvest. We have also drawn on published and unpublished secondary data from the Ministry of Agriculture and Livestock in Libya, FAO, the Arab Organization for Agricultural Development and published scientific studies.

Input suppliers in the date value chain in southern Libya supply the agricultural inputs like seeds, cuttings, fertilizers and pesticides needed to grow dates. They also provide technical guidance on using these inputs and the timing of inputs to date farmers.

The lack of nurseries means that about 95 percent of farmers in southern Libya depend on cuttings to grow dates, with an average length of 30 centimetres. Offshoots are cut from the mother tree using a sharp axe (especially for small farms). However, about 45 percent of offshoots are not healthy because of the unskilled labour used for cutting and because they are not fully grown and are less than three years old. The seedlings are not protected from the sun and wind when they are initially planted, with farmers using pieces of cloth around the offshoot. After planting, the offshoots are cut in the spring at a temperature of under 21°C. Suppliers also provide offshoots from date palm projects in the region (about 20 percent), about 10 percent come from cooperative societies and about 15 percent from fertilizer and seed supply companies. About 55 percent depend on retailers, with an average price of between 10 and 100 dinars, depending on the variety. Seed planting is uncommon because of the long period till production and genetic variability. Cuttings are planted by manual digging, with a depth of 50–80 centimetres, within 24 hours from cutting and leaving a distance of five to six metres between plants. About 60 percent of farmers in the south plant their own offshoots due to the lack of skilled labour, while the remaining 40 percent depend on unskilled labour.

About 20 percent of farmers in southern Libya use inorganic fertilizer (NPK), with the remaining 80 percent using organic fertilizer.

The only source of water in the south is underground water and flooding irrigation is the most common practice for watering plants in old date palm farms, which are randomly planted without proper organization. Drip irrigation systems are costly, averaging 3,500 dinars per hectare. Newly planted offshoots are irrigated every day for 40 days, without interruption, then once every three days when the palm is between one and four years of age. Irrigation is usually applied two or three times each week in the summer. Farmers in southern Libya irrigate early in the morning and before sunset to reduce the rate of water evaporation. About 85 percent of the soil of palm farms in the south is sandy and the remaining 15 percent is a mixture of clay and silt soil.

Among the most important date varieties cultivated in southern Libya are Deglet Nour, Saidi, Thales, Tagiyat, Khudary, Tafsert, Athwai and Magmaq (table 16).

Table 16. Cultivated area and production of the main varieties of dates in the south of Libya

Date palm varieties	Date palm trees		Average production	Production	Price
	Total number of trees	Number of productive trees	kilograms/tree	tonnes	dinars/kg
Deglet Nour	718 702	647 480	160	103 596.80	7.0
Saidi	622 874	561 149	180	101 006.82	4.0
Thales	479 134	431 652	110	47 481.72	5.0
Tagiyat	718 701	647 478	120	77 697.36	4.0
Khudary	479 135	431 653	140	60 431.42	4.0
Tafsert	958 270	863 307	100	86 330.70	3.5
Athwai	383 308	345 321	100	34 532.10	3.5
Magmaq	431 221	388 486	80	31 078.88	3.0
Total	4 791 345	4 316 526	-	542 155.80	-

Sources: Palm and Olives Development Authority, Southern Region Office

Dates are harvested between five and six years from cultivation during the months of July, August and September, when the temperature is 32–38°C. Growth is steady until temperatures climb above 40°C, especially in the regions of Fezzan and Kufra.

Dates are harvested in three different stages. The first stage is called biser and takes place when the fruit colour changes to yellow or red, depending on the type. Some varieties such as Deglet Nour, Saidi and Thayyat are cut completely in one batch and moved to storage inside the farm with low humidity and far from water, taking care to avoid shaking during transport. About 18 percent of production in southern Libya is harvested at this stage and most is destined for immediate consumption. The average price of biser dates at the start of the harvest season is 3–5 dinars per kilogram. Dates harvested at the second stage (rutab) make up about 67 percent of production in southern Libya. The third stage (tamar) is the fully ripened stage, when the dates are characterized by a dark brown colour.

Among the traditional methods of harvesting dates in southern Libya about 36 percent of farmers use ladders (wooden or aluminum), about 12 percent climb trees without ropes and 14 percent climb the trees using ropes. Mechanical harvesting using machinery like cranes is used only by about 4 percent of farmers in the region. While this type of mechanical harvesting equipment is needed, its use is limited due to irregular distances between trees, the high density of palm trees, intercropping under trees and high costs (table 17).

Table 17. Method and time of harvesting dates in southern Libya.

Harvest	Size of farm			Total
	Small farm	Medium farm	Large farm	
Harvest time				
Before fruits ripen	10	10	5	**25**
As fruits ripen	15	10	14	**39**
After fruits have ripened	16	5	15	**36**
Total	41	25	34	**100**
Harvest process				
By farmers themselves	20	12	25	**57**
By employed contractors	10	8	5	**23**
By neighbouring farmers	11	5	4	**20**
Total	41	25	34	**100**
Harvest method				
By hand	13	8	5	**26**
Ladder	15	5	16	**36**
Mechanical ladder	2	1	5	**8**
Climb by hand	3	6	3	**12**
Climb using rope	6	4	4	**14**
Shaking the tree	2	1	1	**4**
Total	41	25	34	**100**

Sources: Data collected by the team using questionnaires

About 57 percent of the farmers harvest their own crop, 23 percent use contracted labour and 20 percent use neighbouring farmers (table 17).

About 22 percent of farmers in the south carry out washing operations, spraying with clean water and then drying by leaving the fruit for three to five days. The first class of dates is commonly packed in carton boxes weighing one kilogram. These are commonly sold in small quantities in retail stores and supermarkets in the city.

Figure 9. (both images)

Handling of dates in wholesale markets in the south of Libya.

Only about 10 percent of the farmers own refrigerated storage facilities (freezing at minus 18°C), which allows the storage period to be extended for up to a full year until the month of Ramadan, when demand from date consumption increases. However, power cuts and a lack of diesel fuel cause major interruptions. The average refrigeration space is about 2x6x2.5 metres. Adequate storage facilities and knowledge allow about 85 percent of farmers to store dates after washing and drying. They are stored in sealed 100-kilogram sacks in a pit dug in the sand at a site free from moisture and water and buried for 8–12 months.

In terms of total costs, transport represents 40 percent, storage 20 percent, sorting and grading 12 percent, advertising 12 percent, packaging 8 percent and assembly 8 percent. The average cost of post-harvest operations is about 25 dinars per 20-kilogram box.

Market channels include direct sales from growers to village consumers, on-farm sales to local traders, village markets, wholesalers, small home stalls, street stalls, small grocery stores and supermarkets. There are several date markets in the region (figure 9), such as the Mahdia market in Sabha, Souk Al Arab in Kufra, the Ubari market, Wahat and Wadi Al-Shati markets and some local markets at which dates are sold in large quantities. Wahat Market is the largest in the region in terms of the quantities traded, the number of buyers and sellers and the range of varieties. This market is about 400 kilometres from the Benghazi market and offers more than 30 types of dates of different sizes, shapes and varieties.

Figure 10.

Fully laiden truck headed for market.

Table 18. Distribution of actors by the size of date farms in Kufra

Region	Size of date palm farms			Total
	Small farm (area <10 hectares)	Medium farm (area 10–20 hectares)	Large farm (area >20 hectares)	
Kufra	8	5	7	**20**
Sabha	7	3	10	**20**
Murzuq	5	5	5	**15**
Ubari	6	4	5	**15**
Wadi Shati	7	5	3	**15**
Wahat	8	3	4	**15**
Total	41	25	34	**100**

Sources: Data collected by the team using questionnaires

Table 19. Distribution of the main actors in the date value chain in the south of Libya

Region	Distribution of actors in the sample					Total
	Farmers	Processors	Traders	Nursery units	Intermediaries	
Kufra	10	3	3	2	2	**20**
Sabha	10	2	4	2	2	**20**
Murzuq	10	-	2	-	3	**15**
Ubari	10	1	1	2	1	**15**
Wadi Shati	10	-	2	2	1	**15**
Wahat	10	1	2	1	1	**15**
Total	60	7	14	9	10	**100**

Sources: Data collected by the team using questionnaires

Industries based on dates and their products are considered one of the most important operations in southern Libya. Products include date juice, date molasses and date pickles. Some industries based on wasted produce include jam, date sweets and dried date powder. Some products are manufactured from vinegar, alcoholic products and oil extracted from the seeds. However, these processes are very traditional, very small scale and usually made at home.

Table 20. Processed date products and their use in the south of Libya

Processing	Unit	Production	Post-harvest losses		Household consumption	Quantities sold
			Losses from processing	Losses from marketing		
Juices	Litre	618	150	50	3.5	1 286.9
Drying	Tonne	800	280	20	3.5	1 356.3
Molasses	Litre	3 500	320	20	3.5	1 469.2
Freezing	Tonne	3 581	210	12	4	1 916.5
Household products	Kilogram	3 451	167	52	4.5	1 996.9
Oil from seeds	Litre	50	5	2	4.5	2 114.1
Coffee from seeds	Kilogram	40	10	2	5	2 479.2
Others	Tonne	200	-	-	5.5	2 870.4
Total		**12 240**	**1 142**	**158**	**583**	**10 357**

Sources: Ministry of Agriculture and Livestock, Planning and Follow-up Department, Agricultural Statistics Department, Tripoli, Libya; Aboulgasem Amer Saidy, Agricultural Policies and Their Impact on the Development of Date Productivity in Southern Libyan During the Period 2012–2016

The production of date palm juice is about 618 litres in southern Libya, with losses estimated at 280 litres during manufacturing and 20 litres during marketing. Around 425 litres are sold at an average price of 10 dinars per litre. Date molasses is a thick dark brown syrup with a very sweet taste. It is a common ingredient of traditional foods in Libya and is commonly produced by women in the south of the country. It is estimated that 3 500 litres of date molasses are produced in the region, with losses during manufacturing and marketing of about 340 litres. Date molds are made from small fruits or when the general appearance does not match the specifications required for marketing.
The manufacturing process include sorting, washing, separating the seeds, chopping, packing and packaging in the form of molds.

Table 21. Distribution of the total date production in the south of Libya

Region	Production	Village merchants		Brokers		Wholesalers		Intermediaries		Retailers		Post-harvest losses	
	(tonnes)	(tonnes)	%	(tonnes)	%	(tonnes)	%	(tonnes)	%	(tonnes)	%	(tonnes)	%
Kufra	8 573	1 500	17.5	2 100	24.5	1 363	15.9	1 000	11.7	1 257	14.7	1 353	15.8
Sabha	1 606	753	46.9	70	4.4	100	6.2	300	18.7	345	21.5	38	2.4
Murzuq	1 843	1 000	54.3	80	4.3	231	12.5	150	8.1	128	6.9	254	13.8
Ubari	1 347	117	8.7	380	28.2	100	7.4	200	14.9	350	26.0	200	14.9
Wadi Shati	2 225	314	14.1	200	9.0	300	13.5	520	23.4	541	24.3	350	15.7
Wahat	19 843	5 930	29.9	2 813	14.2	2 832	14.3	2 851	14.4	2 843	14.3	2 574	13.0
Ghat	2 807	506	18.0	300	10.7	642	22.9	854	30.4	351	12.5	154	5.5
Total	38 244	10 120	189	5 943	95	5 568	93	5 875	121	5 815	120	4 923	81

Source: Data collected by the team using questionnaires

Table 22. Average costs of post-harvest operations for dates for the 2019/2020 season in the south of Libya

Costs	Cost (dinars/20 kgs)	%
Collecting	2	8.0
Screening and grading	3	12.0
Packing	2	8.0
Storage	5	20.0
Transportation	10	40.0
Advertising	3	12.0
Total	25	100

Sources: Data collected by the team using questionnaires

In general, producers add little or no value, which means returns are often very low. The analysis found the price gap between the consumer and the producer to be 45 dinars per 20-kilogram box.

Consumers emphasized that dates are consumed throughout the year but that demand increases during the month of Ramadan. The main varieties preferred by consumers are Deglet Nour, Saidi, Thales, Tagiyat, Khudary, Tafsert, Athwai and Magmaq. Average annual consumption per capita in the south is 14.7 kilograms, with consumers preferring to buy dates directly from farms at low prices. It was also found that consumers buy imported dates and date products due to perceived higher nutritional quality standards. Date prices rise significantly during the month of Ramadan (reaching 200–260 dinars per box), which shows the importance of good handling and adequate storage facilities and methods.

Table 23. Marketing margin of a 20-kilogram box of Deglet Nour dates in the south of Libya

Types of intermediaries	Sales price (dinars)	Purchase price (dinars)	Marketing margin (dinars)	Marketing cost (dinars)	Net margin added value (dinars)
Processor	200	-	3200	35	165
Intermediaries	225	200	25	10	15
Retailer	245	225	20	8	12
Total	3 849	116.6	448.2	4.3	1 936.2

Source: Data collected by the team using questionnaires
Added value = gross margin – marketing cost » **Gross margin** = sales price – purchase price

3.2.4 Watermelons

According to the survey results, in the south of Libya there are 2 354 watermelon farms in the south of the country, with a total planted area of 20 874 hectares and total production of approximately 80,000 tonnes. The main growing areas in the region are Sabha, Ubari, Wadi Shati, Ghat and Wadi Etba, with Wadi Shati and Ubari representing about 46 percent of watermelon cultivated in the region by area. The average size of farms in the region is about 1.5 hectares.

In southern Libya, watermelons can be grown on a wide range of soil types, although sandy soils are preferred. In general, the highest yields are produced on well drained sandy loam soils.

Regarding the choice of varieties, the focus is usually on size. The main varieties are those from the companies Zaptia Agricultural and HM Clause, considered as one of the varieties with high production efficiency and large fruits. Numerous varieties of watermelon are cultivated in the region and the fruits vary widely in taste, size, shape, texture and colour. Common varieties include Sugar Baby, which matures in 75 days, is very sweet, weighs 15–20 kilograms, has red flesh, is well suited to small cultivation spaces and is grown in Sabha, Ubari, and Wadi Shati. Another common variety is Crimson Sweet, which matures in 85 days, weighs 15–25 kilograms, has sweet red flesh, a high sugar content and thin rinds, is highly resistant to disease and is grown in Sabha, Ubari, Wadi Etba, Ghat and Wadi Shati.

More than 90 percent of watermelon farmers in the region use 1.2–1.8 kilograms of seeds per hectare, depending on the variety and spacing. Most soak seeds overnight to speed up germination. In most farms, seeds are planted in the open ground in soil that is rich in organic matter in a hole approximately 30 centimetres deep and over 45 centimetres wide. Holes are covered with fertilizer, the seed placed on top and pushed down manually until at least 15 centimetres deep. Between four and six seeds are sowed per hole, eventually thinning to two to three seedlings. There is usually spacing of 100–150 centimetres between rows and 90–100 centimetres between plants to allow the vines enough space to spread out when the plant begins to grow. Watermelon performs better in warm temperatures, which are available throughout most of the region, with an optimum temperature range for production of 22–28°C.

Watermelons are drip irrigated to prevent leaves being permanently moistened and vulnerable to fungal diseases. Water deficits during flowering and fruit development seriously impact yields, while excessive irrigation causes fruits to split and crack, which affects their taste. Farmers reduce or stop irrigation seven to 10 days prior to harvest.

All watermelon seeds used in the south of Libya are imported, meaning there is no way of controlling or directing production to specific varieties, in addition to the risk of being fully dependent on the external market. There are also problems related to the adulteration of pesticides and chemical fertilizers and their failure to meet specifications.

Compound chemical fertilizer (NPK) is applied at a rate of 80 kilograms per hectare, with half applied on planting, a quarter after 40 days and the remaining quarter after the fruit has set.

As fruits start to ripen, they are gently lifted, placing cardboard or straw between the fruit and the soil to prevent rotting. Blossoms are also pinched off to focus the plant's energy on fewer melons to improve size and quality.

The survey indicated that most watermelon farmers in the south of Libya rely on pesticides to combat insect infestations, fungi and bacteria. For insect infestations, either Dursban, Lannate- Fiercely 25 percent 90, Granite, Mospilan 20 SP, Dimethoate 40 EC, Alsystin 480 SC and Caspertin 50 WP are used. For fungal infections (downy and powdery mildew), micronized sulfur is used. For nematodes, Vaidate,

Figure 11.

Watermelons at the marketplace.

spider repellent and Dictator 73 are used. For bacteria, Dorspan, Abamec 1.8 EC, Itamec 1.8 EC and Gallant Super are used.

Our survey indicated that about 63 percent of farmers in southern Libya prefer pruning their watermelons, while others claim that pruning may delay the development and growth of fruit. For pruning, growers remove most of the terminal branches of the plant during the early stages of growth, when the plant only has three to four branches. This forces the plant to develop further through the main branch.

Watermelons are generally harvested in the south of Libya 10–18 weeks after planting. Fields can be harvested several times, two to three days apart. Most farmers harvest watermelons early in the morning, when the temperature is lower.

The sign of ripeness used by most watermelon growers for most varieties is the colour of the spot where the melon sits on the ground. As the watermelon matures, the spot turns from almost white to a rich yellow. Another sign is given by the tendril closest to the melon stem: when this turns brown and dries up, the melon is considered ripe. Others tap the melon and judge the sound: if the watermelon sounds hollow, this means it is ripe. About 85 percent of farmers in the region harvest watermelons using scissors, while 15 percent cut watermelons by hand.

The survey data indicates that after harvesting watermelons, growers in the region keep them in the shade and transfer them for packing as soon as possible to prevent the fruits from overheating and reduce losses. Fruits are sorted into three sizes: small (less than six kilograms), medium (six to 10 kilograms) and large (more than 10 kilograms). Melons affected by pests and diseases are sorted from those that are healthy.

The duration of watermelons in storage depends on how ripe they are when they are harvested, as well as the variety and the temperature and relative humidity in storage. However, watermelons cannot be stored for a long period of time. Farmers in the region store them uncut for about 10 days.

Transportation is one of the highest marketing costs of watermelons in the region due to the size of the fruit and its perishability.

Watermelons are handled as bulk cargo in trucks. The driver places a layer of straw on the ground and between the watermelons and the side walls of the truck. Watermelons are shaded from direct sunlight that causes sunburn.

The price ranges from 20 to 25 dinars per tonne in the internal market and 100–150 dinars per tonne for the external market.

The main actors in the watermelon and melon value chain are the input suppliers (mainly seedling suppliers), farmers, local consolidators and wholesalers.

There are two major categories of watermelon producers in the south of Libya: very small producers and larger commercial farmers. The first category grows approximately 85 percent of the total output using limited technology. They usually perform spot market transactions and are largely disorganized. About 60 percent of farmers cultivate more than one hectare, about 30 percent cultivate about two hectares and only about 10 percent of watermelon farmers cultivate more than five hectares.

Four sources of farm labour were identified in the region farmers themselves, family labour, communal labour and hired labour. Most farmers (55 percent) use hired labour, followed by family labour (30 percent), then their own labour (10 percent). Communal labour was found to be the least-used source of farm labour. Farm labour and inputs constitute a significant portion of the total cost of watermelon production. According to the results of the survey, most of the watermelon farmers in Sabha

are Palestinian, since Palestinians make up the largest percentage of local employment. Labour and fertilizer make up 35 percent and 30 percent of the cost of watermelon production, respectively.

Village merchants buy from small and medium farmers and sell to wholesalers (either at markets or in supermarkets) or retailers. The share of village merchants in sales of the watermelon crop in the municipalities of the south of Libya is 25 percent. Brokers collect produce from production centers for wholesalers. The average broker share of the region's watermelon market is 15 percent. Wholesalers buy directly from farmers or collect the crop from production centers and sell to retailers by auction for a commission of 10–15 percent of the selling price. Their average share of the watermelon market in the region is 30 percent. Intermediaries collect the crop from wholesalers and sell to retailers, with an average market share of 10 percent. There are two types of retailers. The first are traditional merchants, such as small shops and kiosks on public roads who buy from wholesalers, village merchants or intermediaries at the city level and sell to consumers. The second are modern retailers like supermarkets and malls, who buy through contract farming, with an average share of 20 percent of the region's watermelon trade.

3.3

Challenges

There are major challenges for the value chains and added value of agricultural commodities produced in the south of Libya.

These include the remoteness from major national and export markets, the poor conditions of transport infrastructure (notably roads), the lack of proper vehicles for transport (especially refrigerated), the lack and poor conditions of storage facilities (especially refrigerated), insecurity and instability, fuel shortages and power cuts. Taken together they leave supply chains weak and vulnerable to fast and easy disruption, especially from the decade-long conflict and the COVID-19 pandemic.

The ongoing conflict has also had a significant impact on the availability of labour. The number of migrant workers has fallen significantly in recent years due to concerns about the country's fighting and insecurity, and most recently as a product of the restrictions introduced to control COVID-19. Labour shortages, together with the low value of the Libyan dinar, have pushed up wages compared to previous years, creating an additional challenge for local farmers and value chain actors with limited financial resources.

The lack of an adequate market structure, infrastructure, marketing systems and regulation has led to major challenges and problems, high levels of food loss and waste (both qualitative and quantitative) and distorted prices, all of which has a significant impact on the functioning of local markets throughout the region. Imports (especially from surrounding countries) and price dumping pose

a major challenge for small farmers in their communities. Moreover, production inputs are often only available on the black market at high prices. The same applies to several other additional charges, such as transportation costs.

The ongoing conflict has also impacted the functionality of local markets, causing security incidents, power cuts and liquidity issues. For example, in some municipalities, local market buildings or structures have been damaged or destroyed due to volatile security conditions. Frequent power cuts have also disrupted marketing operations and the functionality of markets.

Farmers also report that power cuts, insecurity and expensive inputs, such as seeds, water, fuel, tools and machinery, continue to constrain their production capacity. Restrictions on movement have reportedly hindered the access of intermediaries to farms, depressing farm-gate prices and lowering farm income.

While agricultural inputs, such as seeds, fertilizers, pesticides, tools, equipment and machinery, can be found in most of the 12 municipalities covered in this report, they are not always regularly available. Almost all requirements are met from imports from outside Libya. The ongoing crisis and the COVID-19 pandemic have hindered access to and the transportation of quality agricultural inputs. Several farmers reported purchasing inputs from sources and companies that have no control over their quality.

The availability of inputs such as fertilizers, urea and organic fertilizers, as well as phosphorous fertilizers, which are sold in the local markets at high prices, has dropped since 2011. This is compounded by the lack of cash and a lack of availability in agricultural societies and cooperatives.

3.4

Challenges

The supply chains and added value of all crops in the region are very weak and food loss and waste are very high.

Products cultivated in the region do not usually have proper access to markets (often not even national ones). Value chains and added value have been further disrupted by the ongoing conflict and the COVID-19 pandemic.

Value chains of agricultural commodities and the added value of food products in the region have never been properly studied. There are major problems and challenges facing value chains and added value. Key performance gaps in the agricultural sector in Libya and the region are related to the lack of emphasis and knowledge on value chains and added value.

The selling and marketing of agricultural products cultivated in the region are held back by the poor functionality of local markets, roads and transportation, as well as the lack of or incorrect cold chains (precooling and refrigeration), certification and marketing.

Local markets are the main sales channel for most farmers in the region because of the lack of properly developed value chains and extremely low added value. Some farmers from Sabha sell in markets in other cities in the region. The ongoing conflict has damaged the functionality of markets in terms of their physical accessibility and the availability of

cash. Some local market buildings and structures have been damaged or destroyed and the volatile security situation has prevented some farmers from accessing their land. The nationwide liquidity shortage is especially severe in towns and municipalities like Sabha. In a very few small and remote towns like Qatrun, there have been less issues with the functioning of the local markets.

A lack of market regulation both at the national and regional levels has distorted prices, with a major effect on the functioning of local markets throughout the region. The underlying market dynamics mean price dumping is a major challenge for small farmers in their communities, since production inputs are often only available on the black market at high costs that cannot then be recovered through sales.

Extremely poor road infrastructure in the region and the country as a whole is one of the major challenges for transporting agricultural products, especially perishable goods. Access to farms is hindered by a lack of paved roads in most municipalities. There is a lack of transport companies and refrigerated transport vehicles are scarce. Given the remote locations of farms in the south, poor transportation and road systems prevent farmers from accessing large markets, especially distant markets in the north of the country and export markets. This means produce is mostly sold in local markets or used for household consumption. This results in high levels of loss and waste and low income for producers. Local markets can only absorb a very small part of the locally produced crops and in the absence of appropriate and secure marketing mechanisms and systems for other markets (especially in the north of the country, where most population is concentrated, but also for export markets) and proper storage facilities and other added value practices (especially processing), significant quantities of commodities produced in the south are often lost and wasted, with the corresponding effects on farmers' incomes.

In some municipalities like Sabha and Qatrun, few farmers use their produce for their own consumption and the majority sell to local markets. However, there are a number of obstacles. In the district of Sabha, for example, there is low demand in local markets as a result of the generalize lack of liquidity and rising prices, insecurity and COVID-19 confinement measures. In Qatrun, palm trees, dates and olives are sold locally, as well as crops for cattle and camel fodder, while vegetables are consumed in farmers' own households. Due to the relatively isolated location of Kufra and the difficulty of selling goods at local or other markets as a result of the distances involved and poor and expensive transport, most farmers use the majority of their agriculture outputs for their own consumption. Only some dates, vegetables and fodder are transported and sold in markets in the northern regions. Low quality and a lack of adequate market infrastructure negatively impact markets in the region. Substandard transportation conditions (poor roads, a lack of refrigerated vehicles, insecurity and fuel shortages) all have major negative effects.

Unfortunately, post-harvest handling of commodities has never been prioritized by producers, intermediaries and Government officials, due to the shortage of technical expertise and a significant lack of knowledge. This means in large-scale loss and waste of food products in both qualitative and quantitative terms (especially perishable commodities) are extremely common in both the country and the region. Post-harvest handling is essential for marketing, especially for servicing distant national markets and for export. Post-harvest handling practices make a significant contribution to improving quality and safety, increasing added value, reducing loss and waste and thus significantly improving competitiveness and returns.

3.5

Recommendations

Based on the key findings and conclusions, the following recommendations are made.

Classification of produce in different qualities (for local, national or export markets or for processing). At present classification is extremely limited, resulting in major marketing difficulties and loss and waste.

The rehabilitation of infrastructure would allow producers to sell their commodities in more markets (including for export), boosting profits and turnover. For example, markets in the region need structural improvements and improved infrastructure for better handling of commodities, especially perishable food. Other key value chain infrastructure is also in need of maintenance, including storage (especially refrigerated), packing, processing and transport facilities.

Export opportunities exist, especially for certain irrigated horticultural and fruit commodities. Rain-fed production of quality dates and olives (including olive oil), particularly when organic farming is used, could open up export opportunities, including to European markets. However, quality control, grading, classification and certification, food safety measures (especially for organic produce), proper packing and packaging practices, and cold chain, which are mostly absent in the Libyan agricultural sector and in the region, need to be established. In particular, the vegetable production sector provides export opportunities. Libya (including the south) has a comparative advantage, since it can produce vegetables for the European Union in winter and do so earlier than neighbouring countries like Algeria, Egypt and Tunisia. One such example would be supplying melons at Christmas and New Year. However, exports of this nature would require quality improvements and increased value-added practices, such as classification, packing and packaging, cold chain and processing (drying, freezing, canning, freeze-drying, fresh cut products, chips and pre-cooked potato products).

Young people need to become involved in agriculture, particularly through small and medium projects in the value-added sector. This can be done through capacity-building and awareness-raising. The common perception is that young people lack the motivation and interest to engage in agricultural activities, especially due to the prevalence of physical labour. However, modernizing the agriculture sector by improving the value chain and increasing value-added activities, which would involve more technical skills as opposed to physical labour, as well as administrative planning, can be achieved by involving young people. Well-planned value-added projects can significantly reduce unemployment among both men and women (especially among young people) and are more attractive to young people compared to classical agricultural activities. Targeted communication campaigns and projects (e.g. with university students) can also help attract young people and bridge generation and education gaps.

Cold chain infrastructure and equipment and good storage and transport practices are essential for preserving food commodities (especially perishable goods) and excess production not sold in local markets and not used by households. They can significantly reduce qualitative and quantitative post-harvest loss and waste, stabilize prices and help producers access distant national and export markets.

As is the case in most of the country, the vast majority of farming activities in the region are managed by resident communities, who in turn

employ paid migrant labour. More action is needed to support local agricultural production and value chains, targeting resident communities engaged in agriculture and agribusiness while also providing workers (including young people and migrants) with employment opportunities. Protection issues and human rights relating to ethnic diversity and migrant populations mean agricultural support programmes must ensure social cohesion and adequately take into consideration community-level protection concerns.

Financial support in the form of investments, loans and grants is key to unlocking the potential of the value chain and value-added sectors by creating major employment opportunities for youth, boosting profits and income by enabling more value-added opportunities for small and medium businesses, supporting the procurement of machines and equipment and opening up access to distant national and export markets, among other benefits. However, providing financial support should come with control mechanisms, such as follow-ups by local agricultural associations or specialized authorities.

Technical support, such as training in specific skills, is vital and is urgently needed to improve value chains and increase the added value of commodities cultivated and produced in the region. Enhancing the technical skills of stakeholders (including farmers) will significantly improve the quality of produced commodities, reduce loss and waste, facilitate access to markets and open up non-local ones, increase profits, which in return will contribute to the development of the agricultural sector, and significantly improve stability and livelihoods in the region.

The rehabilitation and maintenance of infrastructure in the region, such as stores, transportation vehicles and local markets, will allow farmers and other value chain actors to sell products in more markets and further afield. This will boost profits and revenues and ideally requires a combination of live, technical and financial support.

This initiative promotes the economic empowerment of farmers by improving the knowledge and practices of female and male farmers in the market and forming new market linkages to sell their products. It also strengthens social leadership by women by encouraging entrepreneurial farmers to play the role of agents and intermediaries. Connecting farmers to markets (including intermediaries), leveraging the private sector and banks to provide support to this sector, would be highly beneficial.

This initiative will increase awareness of the need to create and access productive agriculture and food processing technologies at all levels of the supply chain. The main activities include:

1. Increasing productivity and agricultural production in southern Libya, reducing the gap between women and men farmers, and improving women's participation in market decision-making.

2. Promoting effective farming and food processing techniques by distributors and food processors.

3. Effectively promoting agricultural and food processing techniques by public and private partner institutions.

4. Providing an appropriate environment for associations and cooperatives to develop businesses and services designed to improve productivity, and to foster close links between farmers and markets.

5. Adopting new technologies and environmentally friendly production methods and achieving sustainability in cooperation with governmental institutions and organizations.

Focus on rebuilding local agricultural associations to ensure the sustainability and empowerment of small farmers, especially young people (to be discussed in section IV).

Consideration should be given to prioritizing locations that are isolated from support due to their small size and remoteness (e.g. Qatrun).

In view of the above, it is clear that major work is still needed, highlighting the importance of short-term and medium- to long-term measures to address the multiple challenges and improve the value chains and added value of agricultural commodities produced in the region.

Examples of short- to medium-term measures include (1) a baseline survey of the status of value chains and added value of the 12 agricultural commodities identified and selected in this study; 2) providing refrigerated four-wheel-drive transport to transport crops from farms to markets to preserve the properties and quality of products (especially for areas far from wholesale markets); (3) providing access to foreign markets and encouraging exports through associations that organize foreign trade for the biggest agricultural commodities in southern Libya, exempting members from customs duties and taxes; (4) making electricity supplies more reliable by providing generators on farms in specific parts of southern Libya that suffer frequent power cuts; (5) improving cultivation and cultivation mechanisms, as well as developing adequate harvesting mechanisms and machinery for collecting, packaging and processing crops; (6) Supporting training programmes for farmers in the field on post-harvest operations and good practices for handling products and reducing crop losses in cooperation with agricultural extension agencies, agricultural research centers and colleges in southern Libya, drawing on international experience of agricultural marketing; (7) engaging young people in the food and agriculture sector, especially on small value-added projects related to food will significantly reduce unemployment, improve household livelihoods and reduce instability.

Examples of medium- to long-term actions include (1) support for the agricultural sector by increasing investment in the sector in southern Libya; (2) improving skills for the use of modern technology and mechanization in agricultural activity in the region; (3) maintenance of agricultural roads and opening new roads linking agricultural areas to markets; (4) allocating Government agricultural land to the private sector and providing medium- and long-term agricultural loans for young people; (5) encouraging young people (especially women) to engage in agricultural education, providing opportunities to study at the best international agricultural universities and colleges to gain experience and apply it in the region.

4

The status of agricultural cooperatives and civil society associations with agricultural and food activities, with a special emphasis on women's livelihoods

4.1

Introduction

This part of the study provides a brief assessment of the challenges, opportunities and needs of agricultural cooperatives and CSOs, with a particular emphasis on women's livelihoods.

The rural livelihoods of women in the south of Libya have been particularly affected by the ongoing conflict and COVID-19. Agricultural food processing is one of the most important tasks performed by women in southern Libya to achieve family food security. It is a key source of food self-sufficiency over longer periods and surpluses provide women with additional income that improves the economic position of their families. One of the most important traditional food industries for women in southern Libya is the manufacture of date and dairy products. Women also preserve and manufacture food by air drying vegetable crops and other agricultural products that are not for immediate consumption, as well as pickling and preserving food with sugar to make jams or juices. The main goals of sustainable development focus on achieving food security for families by striking an appropriate and sustainable balance between self-sufficiency and self-reliance, creating employment opportunities, generating income and eradicating poverty in rural areas, as well as preserving natural resources against degradation.

Unfortunately, in Libya adequate cooperatives and associations in general have not been promoted or properly supported for at least the last five decades, for food and agriculture in particular.

4.2

Key findings

Our results found 56 agricultural cooperatives registered in the south of Libya –

– four in Albwanis, four in Ghat, two in Kufra, two in Murzuq, one in Qatrun, 10 in Sabha, four in Sharqia, five in Traghan, three in Ubari, 15 in Wadi Shati, five in Wadi Etba and two in Wahat (annex V.1).

Out of an estimated 30,241 farmers in the 12 municipalities studied in the region, we estimate 2 228 are women, with 130 in Wahat, 96 in Ghat, 108 in Kufra, 409 in Murzuq, 409 in Qatrun, 46 in Sabha, 132 in Traghan, 367 in Ubari, 330 in Wadi Shati and 201 in Wadi Etba (annex V.1.).

Seven of the 56 cooperatives registered in the region in the last four to five decades include women members, with just one (in Wadi Etba) classed as a "women's cooperative" (annex V.1.).

Because of the traditions and customs in Libya, especially in the south, few women work in agriculture in the region. Based on social customs women are not able to work with or as men on farms. This makes the role of women limited, if at all.

Only seven out of the 56 registered agricultural cooperatives in the region are currently functioning: six are only slightly active and only one (the Fezzan Cooperative for Organic Agriculture) is functioning properly (table 25). The majority of cooperatives were formed by the Government before 2011 and face major operational difficulties for political, economic and other reasons.

The Fezzan Cooperative for Organic Agriculture is located in the Sbeitat area of the municipality of Wadi Etba. With 213 women members, it is the association with the largest number of women in southern Libya. These women are the most active in the field of agriculture and food. Some women in this cooperative perform activities related to agricultural processing and traditional production, as well as extension campaigns and training for families and affiliates of the association and other families who own farms. The Fezzan cooperative has nine branches operating in the municipalities of Wadi Etba, Murzuq, Trajan, Sabha, Sharqia, Ghat, Qatrun, Qarda and Aqar Shati).

All the active cooperatives (table 25), including the Fezzan cooperative, concentrate exclusively on agriculture and food production. Practically none are involved with the rest of the food supply chain, particularly post-harvest handling and other important added value practices. This is due to several problems but especially the lack of knowledge, skills, facilities and infrastructure.

Several CSOs have been formed in Libya following the regime changes in 2011. They have many purposes and cover a range of activities. The team identified 15 CSOs with women members conducting food activities (table 24, figure 11).

The project team also identified and contacted almost 100 women (annex V.2.) working individually (without association with any groups) and involved in food-related activities (mostly processing traditional commodities, including dates and other fruit and vegetable products).

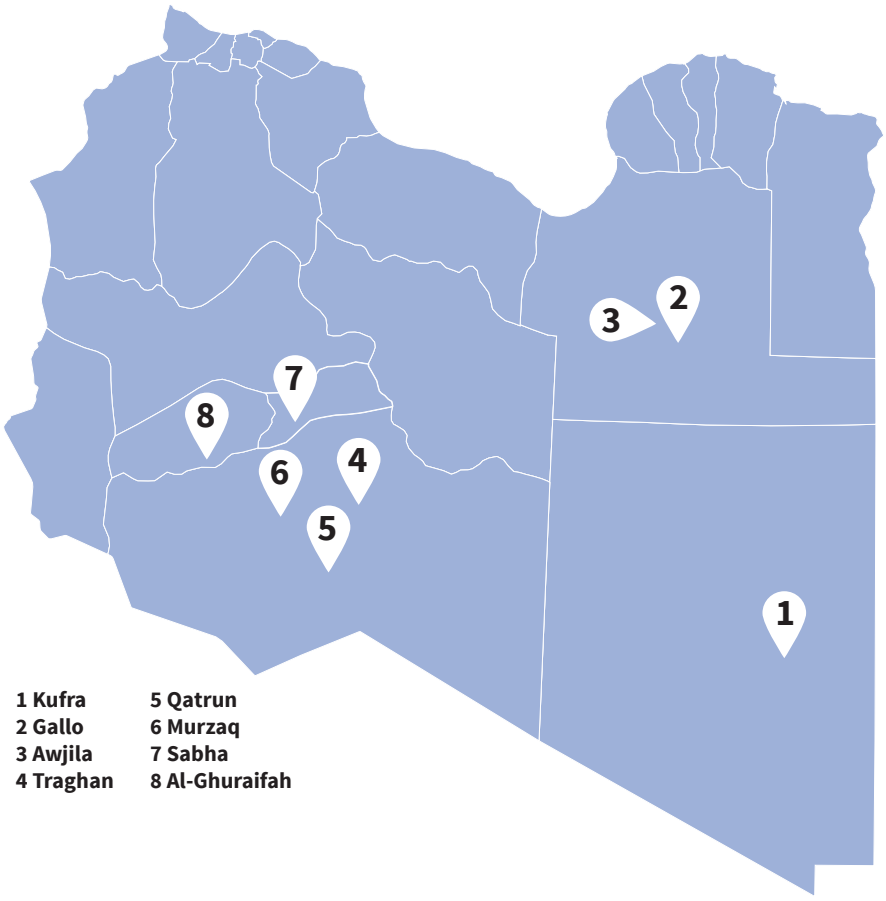
The study has identified major needs for women at both the group and individual levels regarding facilities and infrastructure, but especially for skills and knowledge.

The study team has approached CSOs to discuss the possibility of accepting some women working individually as members, and there is widespread acceptance of the idea (see table 24).

Figure 11.

Map of southern Libya showing the locations of the 15 CSOs with women members conducting food activities that were identified and interviewed by the project team (see also table 24).

Source: © General Information Authority, Ministry of Planning , Libya 2015.



1 Kufra
2 Gallo
3 Awjila
4 Traghan
5 Qatrun
6 Murzaq
7 Sabha
8 Al-Ghuraifah

Table 24. Civil society associations with women members conducting food activities in the south of Libya, 2020

Date of establishment	Organization name	Phone number / email	Members		Location
			Men	Women	
2012	Al-bayit Alasil Organization	0925143250 ganai7700@gmail.com	12	65	Sabha
2015	Frond Heritage and Charitable Activities	0925351677 Ganai80@gmail.com	6	14	Sabha
2011	Fezzan Association for Fashion and Popular Collectibles	095135306 hamansalima@gmail.com	10	20	Sabha
2019	Agriculture and Development Cooperation	0925219793 howod1977@gmail.com	2	3	Sabha
2017	Libya Organization for Agriculture and Environment	091333965 libya.aeo.2017@gmail.com	118	33	Wadi Etba
2003	Najma Charitable	0925359879	-	200	Wadi Etba
1993	Alwaqfah Alnisaiya	0923205045	-	60	Qatrun
2016	Harayir Traghn for Albar Wa Altaqwa	0928770970 Hara88tr@gmail.com	-	100	Traghan
2016	Tadrart Association for women and child rights	0917472560 m0m705899@gmail.com	1	4	Gharifa
2017	Harayir Al-kufra for Charitable Activities	0913530654 hraeralkofra@gmail.com	3	14	Kufra
2009	Zahraa Women's Charitable Society	0916897316 hna99hani77@gmail.com	-	102	Awjila
2009	Women's Renaissance Association	0913429286	10	60	Jallo
2011	Leila Gallo Organization for Women	091326621 Real1969jalo@gmail.com	-	50	Jallo
2009	Labah Women's Organization	0914143891 Mbrwktshhat@gmail.com	-	70	Jallo
2020	Ethar for Agriculture and Development	0924355619 Ethar81@gmail.com	-	14	Murzuq

Source: Ministry of Culture and Civil Society, Heads of NGOs in Southern Libya, 2020

	Contact person	Association activities	Specific needs	Other comments
	Aisha Matouk	Manufacturing of milk, juices, vinegar, date kernel coffee, grain products, perfumes and incense	Cooling devices for products, four ovens, plastic and paper bags, packaging tools for date vinegar and date liquid, printing machine, grain mills	Can add seven women
	Ibrahim Saeed Al-Ghanai	Manufacturing vinegar, date kernel coffee, juices, drying vegetables and herbs	Devices for preserving juices, devices for cooking and drying vegetables, plastic boxes and bags to preserve products	
	Salima Haman	Manufacturing vinegar, date kernel coffee, juices, dried tomatoes and onions	Date core removal tool, date liquid squeezer, juice chopper, medium grain mill	Can add seven women
	Abdullah Idris	Date packaging	Packaging machines, chopper, date core removal tool	
	Idris Milad Aljadi	Training in the fields of agricultural production, food processing, organic agriculture, animal production, food science	Modern printing machine, visual projector, computers, high-resolution camera	Can add six women
	Kalthoum Quraish	Manufacturing cereal products, date paste, pickles	Packaging machines, medium mill, electric oven	
	Zakia Saleh Marwa Masoud	Manufacturing traditional drinks	Grain removal machine, date liquid squeezer, medium mill	Can add seven women
	Khadija Yassin	Manufacturing vinegar, date kernel coffee, pickles for vegetables and olives, roast wheat, date packing	Grain removal machine, date liquid squeezer, medium mill, packaging machines	Can add five women
	Khadija Altaher Al-Hashemi	Manufacturing butter, ghee, hot sauce pickles, dried tomatoes, pepper	Grain removal machine, date liquid squeezer, packaging machines, juicer	Can add 10 women
	Aisha Muhammed Ali	Manufacture of juices, traditional foods, pickles, spices	Grain removal machine, date liquid squeezer, packaging machines, juicer	Can add 10 women
	Fathia Ibrahim Al-Oujili	Manufacture of traditional drinks pickles, spices	Date liquid squeezer, date pressing and packaging, electric ovens, juicer	Can add two women
	Ghazalan Bashir	Manufacturing vinegar, traditional foods, pickling, dried tomatoes, hot sauce and date packaging	Grain mills, oil press, ovens, date liquid squeezer, core removal tool	
	Salima Fnoush	Traditional foods, pickled olives, olive oil filling, spices	Grain mills, oil press, ovens, date liquid squeezer, core removal tool	Can add five women
	Mabrouka Shahat	Dates vinegar, kernel coffee, kernel kohl, kernel oil	Large ovens, grains and spices mill, olive kernel removal machine, packaging bags	Can add five women
	Juma Mulia Bedi	Manufacture of juices and pickles	Electric oven, electric mixers, date seed mills, canning and packaging tools	-

Table 25. Active agricultural cooperatives in the south of Libya, 2020

	Name	Location	Date of establishment	Type of activity	
1	Al-Jadeed Agricultural Association	Sabha / Al-Jadid	1971	Agricultural, services	
2	Al-Qarda Agricultural Association	Sabha / Qardah	1972	Agricultural, animal	
3	Ghadwa Agricultural Association	Ghadwa	1974	Services	
4	Wadi Etba Agricultural Association	Wadi Etba –Tsaoua	1968	Agricultural, animal	
5	Zigan Agricultural Cooperative Society	Albwanis – Zeghin	2014	Services	
6	Fazan Association for Palm and Olives, Wadi Utbah branch	Wadi Etba / Marhaba	2018	Agricultural, services	
7	Fezzan Cooperative Society for Organic Agriculture*	Wadi Etba / Sbeitat	2018	Agricultural	

Source: Ministry of Agriculture and Livestock, statistics offices in the agricultural sectors in (Sabha, Wadi Etba, and Albwanis), Libya, 2020; Heads of agricultural cooperatives active in the south of Libya, 2020.

4.3

Challenges

The biggest challenges facing agricultural cooperatives in southern Libya include:

- The reliance of various cooperatives on Government support. Their role was limited to meeting production requirements, which ceased a long time ago. Most of the cooperatives were established in the 1970s and 1980s.
- A lack of confidence in agricultural cooperative societies among many farmers in southern Libya, especially older organizations, since many failed and were liquidated. While a few are still active, they do not provide any services to their members.
- Poor technical and marketing efficiency among farmers in southern Libya, including the technical issues responsible for the high rate of loss and waste of food commodities, and the poor performance of functions, particularly post-harvest handling and other value-added practices like sorting, grading, packing, transportation, storage, processing and marketing.
- The bargaining power of most farmers (including those involved in cooperatives, which tend not to be fully operational) is very weak, especially when dealing with wholesalers, manufacturers and food companies.
- The lack of training for cooperatives, since there is no one authority in the region with responsibility for training and education when it comes to agricultural cooperatives. This results in a low level of administrative and managerial skills in the associations.

	Men	Women	Head of cooperative	Phone number / email
	750	-	Abdullah Omar Al-Hudayri	0925136787
	700	-	Abdul Salam Muhammad Saqr	0925137176
	400	-	Abdullah Muhammad Buri	0923122803
	900	15	Ahmed Saleh Abdul Rahman	0927835125
	800	-	Salem Ali Obeida	0925752997
	42	-	Khalifa Al-Mahdi Al-Murtada Muhammad	0928052343
	158	213	Ismail Mohamed Ismail Tamer	0925139586 fazanassociotion@gmail.com

4.4

Conclusions

Most registered agricultural cooperatives registered in the region are inactive.

The few currently active cooperatives only deal with agricultural production. None cover post-harvest handling or other value-added practices. Some CSOs have women members who perform value-added activities related to food. However, their activities are on a small scale and mostly use traditional processing methods. Many women work individually, processing traditional food commodities using small-scale and traditional techniques.

Opportunities for women in the agricultural production sector include beekeeping, nurseries, flower cultivation and marketing or administrative work on farms. However, modernization of the sector has the potential to create significant further opportunities, especially for women with higher levels of education. There is more potential for opportunities for women in rural areas than in big cities like Sabha. Finally, there are major opportunities for the engagement of women in value chains and value-added activities, especially processing but also other activities like packing, packaging and marketing.

4.5

Recommendations

Given the scale of the different sectors in each municipality, their variation and the wide range of potential impacts, we recommend that the main focus should be on women's livelihoods, especially women involved in organizations and associations, due to the potential impact on families, households and society as a whole in the region.

There is a need to empower women in the region, especially by promoting participation through associations, more active participation in the agriculture sector and improved value-added activities. Taking into account social factors, women's participation in the agriculture sector can be promoted through training or in-kind support for care-based work, such as beekeeping, vegetable and flower cultivation, and marketing, but above all in the value-added sector in areas such as packing, packaging and processing.

As part of further modernization of the region's food and agriculture sector, the potential for medium- to long-term inclusion and gender equality will improve significantly with engineering and management jobs for women graduating from college and university education, as well as their engagement on issues related to agricultural and food activities (including administrative and managerial ones).

According to the expert assessment, the policy measures implemented in southern Libya have had a negative impact on the development of agricultural cooperatives in the country, particularly in the south. Agricultural policy measures implemented in southern Libya to support cooperatives were largely based on political and economic conditions and did not fully take into account their adequate development, much less that of the agricultural sector. To improve the impact of these policy measures on the development of cooperatives, it is necessary to pursue targeted policy measures that will allow support for the region's agriculture, cooperative and agricultural extension sectors. The main issue identified during the expert survey is that the institutional environment focuses on the traditional concept of cooperatives, which is linked to a governmental institution. These traditional principles are typical of traditional modes of production but they are not relevant to a modern and better functioning agribusiness sector. In addition, the heavy focus on the Government sector prevents cooperatives from achieving suitable goals. As such, the policy of supporting cooperatives and associations in southern Libya should focus on groups of farmers or other agribusiness actors in their various forms in Libyan agricultural societies to organize and achieve their goals through the following measures:

- Encouraging the establishment of effective and efficient cooperatives and associations. The restoration and revival of Libyan agricultural associations previously supported by the Government and support for new associations, especially those with the active participation of women, would bring immense benefits to the region and the sector. This could mitigate the high costs of poor-quality agricultural inputs and equipment, improve the procurement and maintenance of facilities and infrastructure, facilitate access to loans and credits, support

access to distant markets, improve marketing systems and reduce loss and waste, among many other benefits.

- Working to strengthen relations between members of associations, developing the spirit of cooperation and finding ways and means to build ties between them to advance the association process.
- Analysing the organizational structure and understanding the prevailing forms, systems and structure of cooperatives and other forms of association to solve the problems that hinder progress and development.
- Boosting the role of farmers and other food supply chain actors and training them in managing and developing their cooperatives and associations.
- Working to raise the educational level of members through different forms of capacity-building and training programmes.
- Encouraging the participation of people with qualifications and experience.
- Encouraging the participation of women in agricultural and food activities and as members of cooperatives and associations, including on boards of directors.
- Enforcing laws for the formation of proper associations and their protection.
- Encouraging coordination between cooperatives and associations, and between them and the Government and its ministries and institutions, such as extension and research.
- Encouraging cooperatives and associations to be self-reliant and independent.
- Enhancing the role of cooperatives and association extension work as a vector for new technologies and information.
- With its various organizations, the civil society sector in Libya (especially in the south) is particularly well placed to compensate for the lack of Government resources, with the Government failing to provide effective solutions to citizens in many aspects of life. The role of CSOs in southern Libya could be expanded to encompass many programmes, especially for improving women's livelihoods, such as the establishment of kindergartens, youth clubs and private women's associations for agricultural and food products. Associations can provide a bridge to restoring confidence in the State's relationship with the public and can contribute to achieving a balance of interests in local communities. The State must reconsider the nature of its relations with CSOs, especially organizations related to food security and food processing, drop restrictions and obstacles that prevent the expansion of their role and amend its legal framework in the law governing the work of these organizations, helping them to fulfil their responsibilities. A federation could be formed in southern Libya, including CSOs that work and have a relationship with agricultural and food products.
- One important way to empower women working individually and improve their livelihoods would be to help them to join already active cooperatives or CSOs. Our interviews and discussions with CSOs indicated that most CSOs in the region can

accept and agreed to admit new women working individually on value-added activities. The 15 interviewed CSOs indicated that they can accept up to 64 women (see table 24), which represents significant support. However, this process must be based on the locations and activities of the CSOs and the individual women, as well as other cultural and social considerations. The organizations are as follows: (1) the Fezzan Association for Fashion, Popular Collectibles and Charitable Work in Sabha could include seven women from Sabha; (2) the Al-Bayt Al Aseel Association could include seven women; (3) the Harayir Al-Kufra Association can admit 10 women from Kufra; (4) the Waqfaa Women's Association could admit seven women from Qatrun; 5) six women in the city of Traghan can join the Harayir Traghan Association for Charitable Activities and Piety; (6) the Zahra Women Charitable Association can welcome two women; (7) the Libyan Organization for Agriculture and Environment can admit six women; and (8) the Tadartar Association for Women's and Children's Rights can welcome 10 women.

Financial support in the form of investment, small loans and grants is key to significantly improving the livelihood of women, households and the region in general. Engaging women in value-added agricultural and food work through small projects in areas like processing, transformation, packing and packaging is greatly needed. This could significantly improve employment prospects for women, boost their income, support the procurement of machines and equipment on a small scale, improve value-added practices like processing, packing and packaging, and facilitate access to local and distant markets.

Technical support, such as training in specific skills, is vital to improve the lives of women and household livelihoods. Building the technical skills of women, especially through associations, will increase the production of better-quality foods, boost value-added practices, dramatically cut loss and waste, increase returns and profits (in turn improving women's and household livelihoods) and contribute to the stability and prosperity of the region. A combination of direct, technical and financial support types would be ideal.

Linking women to markets (including brokers), the private sector and possibly with banks to provide support would be highly beneficial. Policy interventions can empower women to close the gender gap in agricultural and labour markets in rural parts of southern Libya. These interventions include providing adequate conditions for women's access to agricultural productive resources, access to financial loans and improving productivity, in addition to receiving educational opportunities, counselling and investment in technology. This allows women to increase productive activities and improves their access to quality jobs, participation in fair labour markets and inclusion in decision-making processes within families, communities and organizations, as well as at all levels of government.

Women farmers and women working in the value chain need support to access market information. This can also be done more actively, for example by linking women farmers with merchants directly through women's agricultural associations or cooperatives and helping them understand the requirements of the market and consumers for their products. Traders can build stronger relationships with women farmers by explaining the risks and costs involved in transportation and selling in local markets, especially in areas far from large central markets like Qatrun, Ghat, Kufra and Murzuq, which must be taken into account and prioritized due to their remote and isolated geographical locations.

5 Annexes

ANNEX 5.1

Agricultural production in 12 municipalities and cooperatives in the south of Libya

ANNEX 5.2

List of some of the women identified and contacted by the study team who conduct food activities in the south of Libya (alongside their association with any groups)

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