

A RAPID VALUE CHAIN ANALYSIS INCLUDING AGROECOLOGICAL ASSESSMENT

Olive Oil Value Chain Analysis in El Kef Governorate, North-West Tunisia

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This report aims to identify and prioritize potential local value chains for integration of agroecological principles in Northwest Tunisia, particularly in Kef region. Based on the secondary data, a rapid value chain analysis, four focus group discussions at the living labs and participatory approach with the main stakeholders, three value chains were identified in The North-West: olive oil, sheep, and honey. The VC assessment according to agroecological principles conducted with the main actors places the olive oil VC in El Kef governorate as the major value chain with agroecological character. In this context, an olive oil business model was proposed to encourage the olive producers within the farmers' association to produce a labelled olive oil to improve their revenues, enhance livelihoods and create a system of values that includes land (terroir). The results indicate that integrating agroecological principles into the business model has the capacity to accelerate the shift towards agroecology.

The CGIAR initiative Transformational Agroecology across Food, Land and Water Systems develops and scales agroecological innovations with small-scale farmers and other food system actors in seven low- and middle-income countries. It is one of 32 initiatives of CGIAR, a global research partnership for a food-secure future, dedicated to transforming food, land, and water systems in a climate crisis.

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Terminology and acronyms

ALL	Agroecological Living Labs
APIA	Agricultural Investment Promotion Agency
CEPEX	Center for the Promotion of Exports
CRDA	Regional Commissariat to the Agricultural Development
CTAMA	Tunisian Agricultural Mutual Insurance Fund
FGD	Focus Group Discussion
FOPRODI	The Industrial Promotion and Decentralization Fund
FOPROHOC	Packaged Olive Oil Promotion Fund
FOPROTEC	Food Processing and Technology
GDA	Agricultural Development Group
Ha	Hectare
ICARDA	International Center for Agricultural Research in the Dry Areas
INORPI	National Institute of Standardization and Industrial Property
INRAT	National Institute of Agronomic Research of Tunis
IO	The Olive Institute
KII	Key Informant Interviews
ODESYANO	Northwest Development Sylvo-Pastoral Office
ODNO	Office of the Northwest Development
OEP	Office of Livestock and Pasture
ONH	The National Olive Oil Office
PACKTECK	The Packaging Technical Center
SMSA	Mutual Society for Agricultural Services (farmer's association)
SWOT	Strengths, Weaknesses, Opportunities, and Threats
SYNAGRI	Tunisian Farmers Union
TND	Tunisian Dinar
URAP	Regional Agriculture and Fisheries Union
UTAP	Tunisian Union of Agriculture and Fishing
UTICA	Tunisian Union of Industry, Commerce and Crafts
VC	Value Chain

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Abstract

This research work was implemented under the CGIAR Initiative on “*Transformational Agroecology across Food Land and Water Systems*” in the framework of the WP3 “*Inclusive Business Models and Financing Strategies*” led by the International Center for Agricultural Research in the Dry Areas - ICARDA. The aim of the work package 3 is to develop an inclusive Business Model that facilitates the agroecological transition through potential value chains.

The objective of this report is to analyze, map and select the main value chain with potential to integrate the agroecological transition in the Kef-Siliana transect. The methodology is based on secondary data analysis, a rapid value chains analysis, agroecological assessment, focus group discussions and participatory approach with the main stakeholders.

A participatory approach was adopted through 4 focus group discussions at the living lab level with all the relevant stakeholders through the organization of two workshops in Kef and Siliana governorates. The selection of the value chains by the members of the living lab was done according to a global evaluation matrix prioritizing the value chains based on a set of predefined criteria (economic, social, and environmental) of impact and feasibility.

In the second step of the participatory approach, two workshops on main value chains identification, prioritization and actors mapping took place on December 8th and 15th, 2022 in Siliana and El Kef (North-West Tunisia). The number of participants was 33 and 30 in Kef and Siliana, respectively.

In the plenary sessions of the workshops, the attendants were asked to choose the value chains (VC) the most adapted to the region based on economic, social, and environmental criteria. Different agroecological practices such as rotation, crop diversification, forage association, inputs reduction, recycling, etc., are revealed by the farmers interviewed during the focus group discussions. The 13 agroecological principles applied to the value chains selected by the participants are discussed and identified during the focus groups.

Finally, the business model proposed based on the participatory approach with the main stakeholders in both locations is olive oil in Kef governorate. The objective of the business model is to encourage the olive producers’ association (SMSA) to produce a labeled olive oil to improve their revenues, enhance livelihoods and create a system of values that includes geographic location.

1. Introduction

The agricultural and agri-food sector is the main source of income in rural areas and plays a social safety net in many regions of the country (M. de Lattre-Gasquet et al., 2017). The role of agricultural and agri-food systems is to ensure food security, stability, income generation and economic growth. However, we are facing nowadays systems that are failing, economically deficient with negative environmental impacts and unsustainable productivity (gas emissions, pollution, overexploitation).

In this context, new agroecological practices are emerging. They are based on the mobilization of the ecological functionalities of agro-systems, the optimization of natural processes, and the wise management of resources. Nevertheless, agroecology cannot be reduced to a set of technical practices. Indeed, this approach is a paradigm shift that addresses citizens' and consumers' concerns about nutrition, health, ecosystem health, equity, social and environmental responsibility (Altieri and Toledo, 2011; Rosset et al., 2011; Nyéléni, 2015; Côte et al., 2019).

Agroecological practices build on, preserve, and enhance organic and ecological processes in agricultural production, reducing the use of commercial inputs (such as fossil fuels and agrochemicals) and creating more diverse, resilient, and productive agricultural ecosystems (HLPE, 2019). The objective of this process is to transform actual food systems into more sustainable and equitable systems using biodiversity, natural processes, and recycling. The aim is to reduce the impacts on the environment and to increase resilience of farming systems leading the agroecosystems or food systems to become more environmentally and economically sustainable and socially equitable (Quintero and McCarteney, 2021). This process is based on 13 principles obtained from the High-Level Panel of Experts on Food Security and Nutrition (HLPE, 2019) setting the ground towards agroecological transition.

It is in this framework that the Agroecology Initiative was implemented by the CGIAR with the overall objective to redesign existing farming systems into more agroecological systems for seven countries: Burkina Faso, India, Kenya, Lao PDR, Tunisia, Peru, and Zimbabwe. As a result, these systems will be more resilient to climate change and able to face and overcome adverse and unpredictable events while ensuring food security and sustainable farmers' income. It is in this context and within the framework of the work package 3 "Inclusive business models and financing strategies" that this study is developed. The aim of the work package 3 is to develop an inclusive Business model that facilitates the agroecological transition through potential value chains at the living lab level.

The objective of this report is to analyze, map and select the main value chains with potential to integrate the agroecological principles. The methodology is based on secondary data, rapid value chain analysis, agroecological assessment, focus group discussions and participatory approach with the main stakeholders. This report is organized in five sections: Section 1 is the introduction; section 2 analyzes, maps, and selects the main value chains with potential to integrate the agroecological principles at the living lab; section 3 provides an overview of the olive oil value chain in Tunisia. Section 4 analyzes the olive oil value chain in Kef with a SWOT analysis and the potential to integrate the agroecological principles. Finally, section 5 concludes and provides a proposed business model for the selected value chain.

2. Value chain selection at the living lab level

2.1. Context and objective

The first activity of WP3 of the CGIAR initiative "*Transformational Agroecology across Food, Land, and Water Systems*" consists in selecting and validating value chains with high economic, social, and environmental potential, by living lab/study area in the framework of workshops and focus group discussions (FGD) with the main stakeholders.

The objective of these workshops is the identification and selection of agroecological value chains in the study area following a participatory approach with all relevant stakeholders. The aim is the co-creation of a common value chain vision with an identification of the main stakeholders and the linkages between the different steps of the value chain. As part of the objective of the workshops, participants were tasked to identify strengths, weaknesses, threats, and opportunities for the selected value chains after the first roundtable discussion with all the stakeholders.

2.2. Methodology

The process of selecting value chains started with a field visit and community visioning session held on October 5th, 2022, in El Kef, in collaboration with a rural women's association called Sers GDA. This association comprises 6 permanent members and 55 adherents who are engaged in small ruminant breeding, with farm sizes ranging from 2 to 2.5 hectares. Following this, three focus group discussions were conducted at the Agroecological Living Lab (ALL) in Siliana governorate with farmers' associations (SMSA Ankoud El Khir, SMSA Ettaawen, SMSA Kouzira) on November 1st, 2nd and 3rd, 2022, aimed at identifying primary value chains with agroecological characteristics.

SMSA Ankoud El Khir consists of 30 members and 100 beneficiaries, with 50% of members owning a minimum of 5 to 6 hectares, primarily engaged in small ruminant breeding and each member possessing between 100 and 400 olive trees. SMSA Ettaawen comprises 129 members with an average of 20 to 50 small ruminants and an average of 150 olive trees per farm. SMSA Kouzira has 117 members and 126 beneficiaries, focusing on fruit tree cultivation (olive, fig, cherry) and beekeeping activities.

The selection of value chains by the living lab members was based on a comprehensive evaluation matrix, considering predefined criteria encompassing economic, social, and environmental impacts and feasibility. The final stage involved two workshops held on December 8th and 15th, 2022, in Siliana and El Kef, respectively, focusing on value chain identification, prioritization, and actor mapping. During these workshops, the outcomes of previous focus group discussions and visioning exercises were presented to various stakeholders in attendance.

2.3. Results

The findings from the Focus Group Discussions (FGDs) held at the Agroecological Living Lab (ALL), considering economic, social, and environmental factors, have identified cereal, olive oil, and sheep as the primary value chains across all living labs. Additionally, SMSA Kouzira also selected Honey Value Chain (VC) and Fig Tree VC.

Following the visioning process, two workshops were convened in Kef and Siliana to present the results regarding the identification and selection of agroecological value chains at the living lab level. During these workshops, plenary sessions were conducted to determine two value chains with

significant potential for incorporating agroecological principles among the potential value chains in the study region (Sheep, cereal, honey, olive oil, and figs). The invited stakeholders encompassed various backgrounds, including farmers, representatives from the private sector, and public institutions such as OEP, CRDA, ONH, GiFruit, among others; two key questions were asked:

- (1) Considering economic, environmental, and social criteria, which value chain is most suitable for the region?
- (2) Among the value chains chosen by all stakeholders present, what are the two primary value chains with strong potential for integrating agroecological principles?

Participants were provided with flashcards to articulate their arguments for selecting a value chain based on economic, social, and environmental criteria. After identifying the most frequently cited value chain, participants were instructed to choose only two value chains with strong potential for integrating agroecological principles.

Subsequently, two concurrent working sessions were conducted on the selected value chains. Participants were tasked with characterizing and analysing different stages of the chain, mapping the value chain, identifying opportunities and threats, and evaluating agroecological principles.

Participants in both workshops showed strong preference for the "olive oil value chain," citing its alignment with economic, social, and environmental factors.

Economically, the olive oil value chain offers substantial opportunities, these advantages include low production costs compared to other crops and a notable expansion of olive tree cultivation areas in comparison to cereals. The productivity of olive trees, is also commendable, offering diverse uses ranging from culinary to cosmetic and beyond. Particularly noteworthy is the significant revenue potential for smallholders, with a notable impact on empowering women in agricultural activities. Additionally, the appealing price of olive oil both domestically and internationally, coupled with opportunities for product valorisation through labelling, further enhance its attractiveness. Furthermore, the high-quality nature of olive oil, alongside its increasing demand, positions it as a strategic product at both national and international levels.

From a social perspective, the olive cultivation holds symbolic significance. Farmers demonstrate a high level of technical proficiency and extensive experience, contributing to the cultivation of this noble crop. Moreover, these activities foster family cohesion, with harvest seasons serving as opportunities for collective labour and income generation, particularly benefiting women. The collaborative nature of the value chain engages various stakeholders and mitigates rural migration by providing employment opportunities. Furthermore, the cultivation of olive trees carries significant social values, encouraging the involvement of younger generations and enhancing overall family well-being. Associations play a pivotal role in disseminating knowledge and technologies among farmers, facilitating skill development and product valorisation. Additionally, these activities contribute to the preservation of local heritage, offering healthy, traditional food products and promoting the production of local varieties. Overall, the olive oil value chain not only sustain livelihoods but also uphold cultural traditions, enriching local diets and safeguarding regional heritage thereby contributing to regional socio-economic development.

Environmentally, olive cultivation stands out as a resilient and environmentally friendly practice, characterized by minimal energy consumption and negligible pollution. Notably, olive trees contribute to ecosystem balance through their water-saving cultivation methods and adaptability to various climatic conditions, including those influenced by climate change. The cultivation of local olive varieties, such as Chetoui, not only conserves genetic diversity but also reduces reliance on

pesticides and fertilizers, thereby mitigating environmental impacts. Furthermore, olive oil production aligns with the principles of agroecology as it utilizes by-products such as olive wastewater, leaves, and tree trunks, which find uses in animal feed, charcoal production, and soap manufacturing promoting a sustainable and circular approach to agriculture. Importantly, the plantation of olive trees serves as a natural means of soil fixation, helping to prevent erosion and contribute to soil health while also reducing the greenhouse effect.

The olive oil value chain emerges as a multifaceted asset, offering economic prosperity, social cohesion, and environmental sustainability in the North-Western part of Tunisia, particularly in Kef region, the selected site for the study.

Consequently, a comprehensive analysis starting with a stakeholder analysis was undertaken. The objective is to understand the key stakeholders in the olive oil value chain, including farmers, processors, distributors, retailers, consumers, government agencies, NGOs, and international organizations. This will allow to identify their roles, interests, and power dynamics.

Following this analysis, a value chain mapping was done to map out the entire olive oil value chain in Kef region, from farm to table, identifying each step involved in production, processing, distribution, and marketing. This helped to visualize where potential bottlenecks and opportunities lie.

Finally, a SWOT analysis was conducted to identify the binding constraints currently limiting the adoption of agroecological practices in the value chain. These constraints could include technical, economic, social, regulatory, or institutional factors.

By analysing the olive oil value chain in Kef region, identifying binding constraints, and leveraging key points of intervention, it is possible to develop targeted strategies to promote the adoption of agroecological practices and business models for sustainable and resilient agriculture.

3. Description of the olive oil value chain in Tunisia

3.1. Country context

Tunisia's olive tree cultivation carries a deep historical significance, shaped by the influences of diverse Mediterranean civilizations including the Phoenician, Greek, Carthaginian, Roman, and Arabic cultures. Olive oil occupies a central role in the cultural traditions spanning the Mediterranean Basin, permeating culinary practices from Syria to Portugal. Despite this enduring legacy, the Tunisian olive production encounters notable fluctuations annually, primarily due to the inherent biological alternation characteristic of olive trees.

Olive cultivation covers an expansive area of 1.96 million hectares, representing 82.4% of the arboricultural area and 46.5% of the arable land. There are approximately 102.4 million olive trees, with 18% categorized as young plantations (1 to 20 years), 75% in full production (20 to 70 years), and 7% classified as old plantations (over 70 years old). Around 70% of the olive trees thrive in arid, semi-arid, and desert climates, highlighting their remarkable resilience and adaptability to harsh environmental circumstances.

The sector involves 310,000 producers distributed across the country: 32% in the North, 46% in the Center, and 22% in the South. In 2018, the olive oil sector contributed to 17.7% of the added value to the Tunisian agriculture (ONH, 2020). This heritage makes olive oil a strategic sector whose role,

both on the socio-economic and environmental levels, is undeniable, in the North, Center and South regions. Indeed, in addition to the production of oil, the olive tree provides income (in whole or in part) for nearly a million Tunisians and generates an olive-growing activity offering nearly 50 million days of work per year (COI, 2019). These olive plantations contain a rich assortment of varieties marking the edaphic and climatic features which characterize its area of establishment. Tunisia boasts diverse olive oil varieties, notably Chetoui in the North and Chemlali in the Center and South, making it one of the global leaders. Spain and Italy blend Tunisian oils with their own, acknowledging Tunisia's superior quality. These dominant varieties define Tunisia's olive groves, renowned for their exceptional quality and flavor, high productivity, and resilience.

3.2. Evolution of the olive oil policies in Tunisia

Since achieving independence, olive oil marketing policies have undergone significant transformations, profoundly influencing the primary political and strategic directions of the Government. Striking a delicate balance between liberalization and protectionism, these policies have left a lasting impact on the current landscape of marketing, consumption, and the organizational structure within the olive sector (Elfkhi, 2013). Four distinct phases emerge, each delineating key shifts in this evolutionary journey. First, from 1956 to 1962, a liberal policy prevailed in the agri-business sector, marked by the predominance of the private sector and the determination of prices through the law of supply and demand. The local market held a significant share, accounting for 45% of total production, with a minority of industrialists and exporters exerting control over olive oil prices.

Second, the period from 1962 to 1994 witnessed significant state intervention aimed at creating a fairer economy favoring farmers. This intervention led to an improvement in the foreign exchange trade balance receipts, with a policy shift towards exporting olive oil and importing seed. The establishment of the national olive oil office (ONH) in 1962 marked a significant step, followed by the reorganization in 1970, which saw the end of the cooperative system. During this period, ONH held a monopoly, overseeing the purchase, production, export, and importation of edible oils, with extensive market regulation including price control at all stages and management of buffer stocks. Additionally, agreements allowed ONH to delegate tasks to private operators. The entry of Spain and Portugal into the market in 1987, along with an agreement with the EU, set a quota for olive oil exports.

Third, from 1994 to 2002, there was a reduction in ONH's monopoly, allowing private individuals to participate in collecting and marketing olive oil. This period also saw diversification of export destinations, support for upstream activities, and improvement in the industrial infrastructure.

Finally, since 2002, the olive sector has been liberated, with the state disengaging from price regulation. While price increases have benefited the sector operators, they have adversely affected the purchasing power of Tunisian consumers. Consequently, the Tunisian State is once again considering a pricing policy balancing the interests of producers and consumers.

3.3. Olive oil value chain at national level

3.3.1. Production level

Olive oil production serves as a crucial pillar of Tunisia's agricultural sector, playing a fundamental role in its overall landscape. Data from the General Directorate of Agricultural Production (DGPA,

2023) underscores the significance of this industry: spanning 1.96 million hectares and hosting around 102 million olive trees, with 310,000 olive growers constituting 65% of the total producers across the country, the sector exerts substantial influence. During the 2021/2022 campaign, olive oil production surged to 240 thousand tons (Figure 1), with 80% being extra virgin olive oil, providing employment for 50 million days annually, equivalent to 20% of agricultural sector employment.

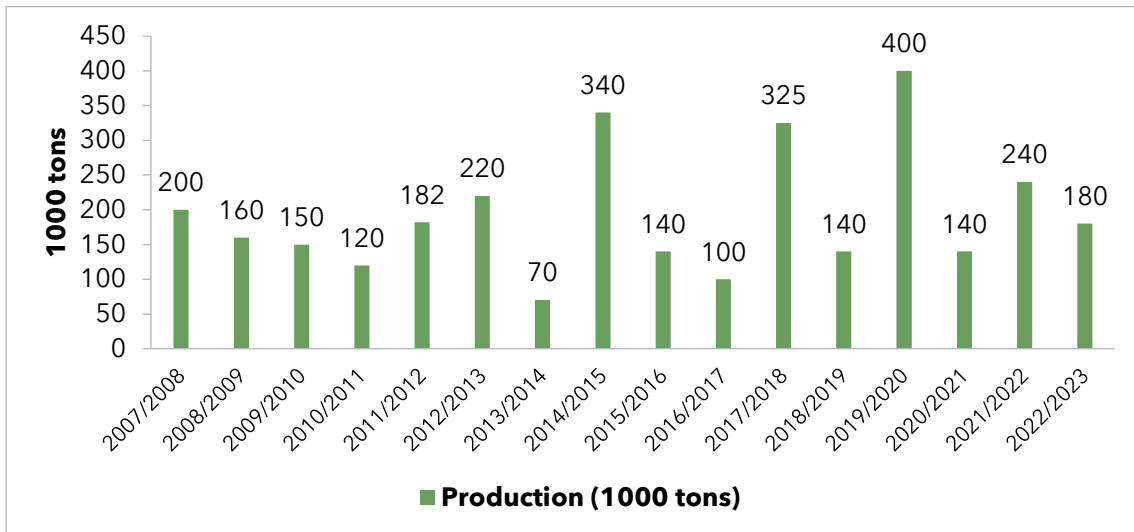


Figure 1. Evolution of the national production of olive oil (in 1000 tons) 2007-2023

Despite the modernization of the sector in Tunisia and the expansion of intensive and super-intensive crops, olive yields remain below the real potential. This is mainly attributed to the age and low productivity of olive groves, as well as water scarcity and inadequate irrigation systems. The average yield (olive/Ha) varies significantly depending on the variety, region, and rainfall. According to rough estimates, “oil” olive orchards give yields ranging from 600 kg/Ha to 900 kg/Ha, while the potential yield for “table” olive fruits is 1,400 kg/Ha.

In addition, Tunisia has witnessed a decline in the average productivity of olive trees. According to ONH estimates, yields have been decreasing by an average of 0.4 percent annually since 1990. Compared to nine producer countries in the European Union and the Middle East and North African region, Tunisia ranks last in terms of yield per hectare. While northern Tunisia shows comparable yields to Morocco, the central region lags with yields only half as much as Tunisia's international competitors. The southern region experiences yield more than four times lower. It is noteworthy that olive trees in Tunisia serve not only for production but also for land erosion prevention and gully control, consequently impacting productivity per hectare. Several factors contribute to this decline, including weak infrastructure and limited irrigation, a significant proportion of poorly maintained trees, suboptimal agronomic practices, low planting density, and an aging olive tree population. Additionally, low mechanization levels, limited phytosanitary protection, insufficient know-how, and inadequate post-harvest investments further exacerbate the challenges faced by the sector (World Bank, 2019a).

Tunisian olive production fluctuates greatly from one year to the next, due to the phenomenon of biological alternation of the olive tree and extremely unpredictable climatic conditions. The production of olives for oil during the cropping season 2022/23–was estimated at approximately

180,000 tons of oil while it was 240,000 tons in 2021/22. The Southern region accounts for 50% of olive production, compared to 29% in the Centre and 21% in the North. Furthermore, the oil content of olives produced in the South is slightly higher than in the other regions. The South, therefore, contributes to 55% of total oil production, compared to 27% for the Centre and 18% for the North.

Small family farms of less than 5 ha represent almost half of the olive farms nationwide; medium-sized family farms (5 to 20 ha) account for about 40 % of olive trees, while large farms (>20 ha) occupy 10% of the total acreage. There are three types of large farms: state farms, agricultural enhancement and development corporations (SMVDAs), and the capitalist enterprises (Lavie and al, 2023).

The average orchard density is between 100 and 150 trees per hectare, in irrigated fields. In orchards with high rainfall cultivated to produce olive oil, the density is 40 trees per hectare. As for olive trees producing table olives, the density of the orchard varies between 200 trees per hectare under irrigation and 100 trees per hectare under dry cultivation. Generally, there are 100 olive trees/Ha in the North, 60 trees/Ha in the Centre and 20 trees/Ha in the South. Currently, more than 2,000 Ha of orchards are managed super-intensively and produce an average of 7 to 8 tons per Ha.

At the world level, Tunisia is ranked as the second producer of olive oil during the campaign 2019/2020 (International Olive council, 2023), after Spain (Figure 2).

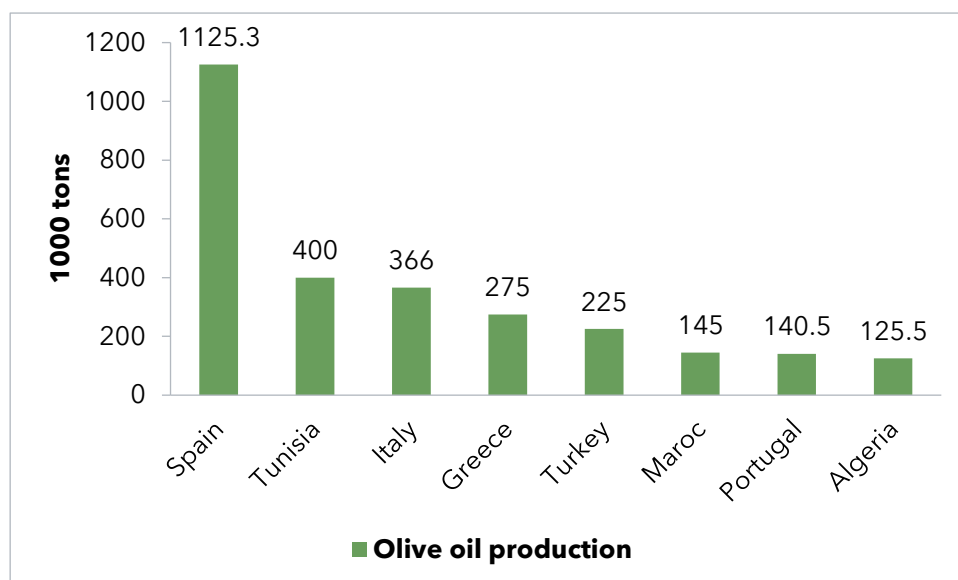


Figure 2. Olive oil production in Tunisia and in the world 2019/2020 (in 1000 tons)

3.3.2. Processing level

Tunisia has 1,750 oil mills, 15 refining units, 10 extraction units for olive oil, and approximately 20 bottling plants and soap factories. Over the past decade, the processing sector has undergone significant transformation with the establishment and modernization of mills, accompanied by the gradual phasing out of traditional oil mills. Consequently, the crushing capacity has increased from 8,000 tons per day in 1986 to over 40,000 tons per day. Despite these advancements, further efforts are needed as a substantial portion of traditional oil mills persist, accounting for 35% of the sector. Olive oil storage capacity stands at 365,000 tons, with 41% managed by the National Office of Oil, distributed across regional centres in Tunis, Sfax, Sousse, Sidi Bouzid, Kairouan, and Zarzis.

The sector's evolution has led to the establishment of additional refineries, increasing their count from 10 to 14 in recent years. Nevertheless, the predominant demand for refined olive oil results in these facilities primarily processing other vegetable oils. Concerning oil mills, they frequently operate below capacity, especially in years of decreased production. Moreover, this underutilization is compounded by production seasonality. Even in years of abundant harvests, the presses seldom function for more than 90 days annually.

More than two thirds of Tunisian production is distinguished by its superior quality (according to the commercial standard of the International Olive Council for the classification of olive oils). Indeed, our farmers and oil producers adopt good olive storage practices, in particular:

- They avoid harvesting olives in humid conditions,
- The olives collected from the ground are washed carefully as soon as possible,
- They avoid mixing olives of different varieties with different degrees of maturity,
- They separate healthy olives from damaged or heavily injured ones,
- They place the olives in crates because the pulp tissues are softened and the cells rich in oil are sensitive to lacerations and compressions from bagging,
- They take care to transport the olives picked during the day, to the oil mill, as soon as possible, to avoid hydrolytic, lipolytic or oxidative processes which deteriorate the quality of the oil obtained and which are favored by the compaction of the olives as well as the lack of aeration.

3.3.3. Consumption level

The average national consumption of olive oil in Tunisia has witnessed a decline from 40 thousand tons in 2019 to 30 thousand tons in 2023 (Figure 3), a trend largely attributed to the diminishing purchasing power of Tunisian citizens, particularly amid the ongoing economic crisis. As a result, domestic consumption has been affected, reflecting a shift in consumer behaviour. Notably, a significant portion of the national olive oil production is allocated for export purposes, highlighting the reliance on international markets to absorb surplus production.

Tunisians consume approximately 3 kilograms of olive oil per year, which is around 3 to 5 times less than in other leading olive oil-producing countries: 16 kilograms in Greece, 11 kilograms in Spain, and 10 kilograms in Italy. In addition, the olive oil consumption has fallen over the last decade, due to the following factors:

- Olive oil increasing price which is becoming inaccessible to a large segment of the Tunisian population. Indeed, the average price is around 22 DT (7 USD \$) per liter in 2023.
- Since the mid-2000s, there has been a push to promote local refining and packaging of vegetable oils, particularly sunflower and corn, to decrease state reliance on subsidized soy oil.

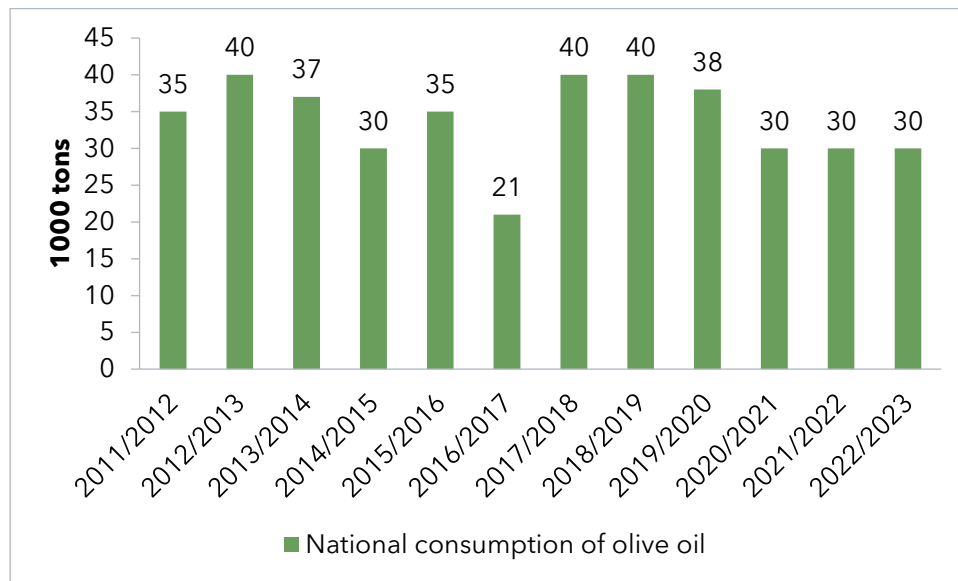


Figure 3. National consumption of olive oil 2011-2023 (in 1000 tons)

3.3.4. Export level

Tunisia is the second biggest exporter of olive oil worldwide, just behind the European Union. This shows how important Tunisia is in the global market. 43% of Tunisia's agricultural exports, consists of olive oil. Since the early 1990s, around 75% of the yearly olive oil production has been exported annually. Olive oil exports reached 372 thousand tons in 2020 (Figure 4), with 15% packaged, predominantly targeting European Union markets, particularly Spain (34%) and Italy (24%). However, despite these remarkable achievements, Tunisian olive oil remains largely commodified, marketed primarily for its physical attributes, while its symbolic value is predominantly recognized in developed nations. Geographical indications for agricultural products in Tunisia are scarce, with limited cross-border penetration.

While traditional markets like the USA and France show consistent demand, newer markets like Canada have been steadily increasing their imports over recent years, with quantities rising from 667 tons in 2011/2012 to 3,100 tons in 2015/2016. In the Gulf countries, demand for packaged olive oil evolves slowly due to the dominance of Italian and Spanish oils commanding high prices, as well as lower-quality oils from Syria or Turkey flooding the market. In this competitive landscape, Tunisia must position itself with superior quality olive oil, albeit at a slightly higher price point than lower-quality alternatives. It is worth noting that, particularly in mass distribution channels, price remains the primary determining factor for purchasing decisions in these regions.

Although Tunisia has implemented government strategies to boost returns, it has not fully leveraged the potential value of its olive production. This represents a missed chance for Tunisia to increase profits and competitiveness by exporting labelled olive oil products at premium prices.

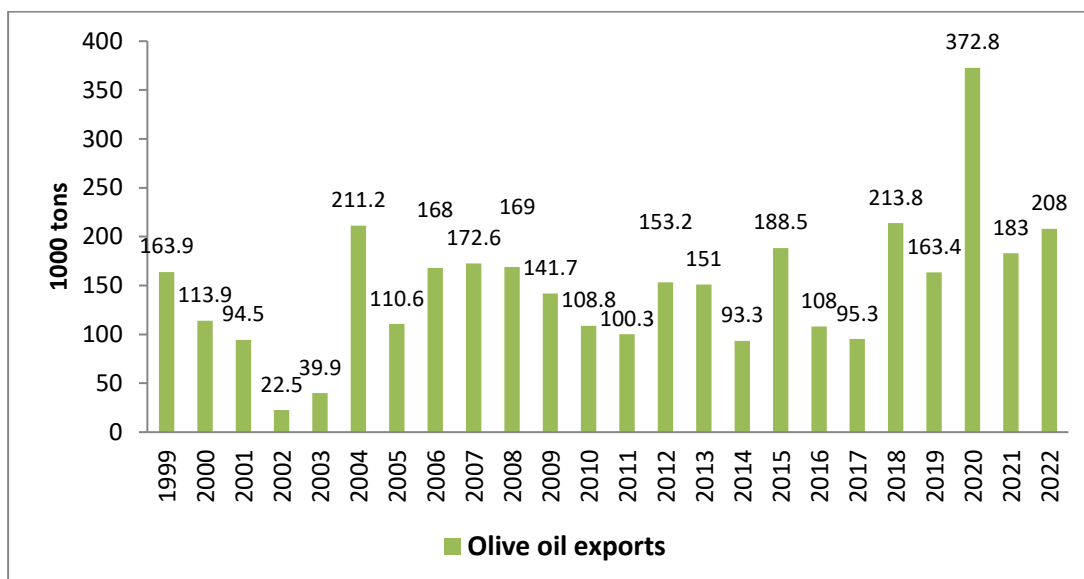


Figure 4. Evolution of national olive oil exports (in 1000 tons)

3.4. Mapping the stakeholders along the olive oil value chain in Tunisia

The olive industry comprises three key links: production, transformation, and marketing. In the production link, farmers play a central role alongside plant resellers and intermediaries involved in soil preparation, pruning, and harvesting services. The transformation link acts as an intermediary between production and marketing, involving operators in olive collection, transportation, and crushing units (oil mills). Finally, the marketing link focuses on the promotion and sale of olive products, featuring traders (both wholesale and retail), exporters, specialized conditioners of olive oil, and units for extracting pomace oil and manufacturing soap. Each link is essential for the successful operation and growth of the olive sector, encompassing various stakeholders dedicated to different aspects of olive production, processing, and distribution.

The institutions involved in the olive oil value chain are summarized in Figure 5.

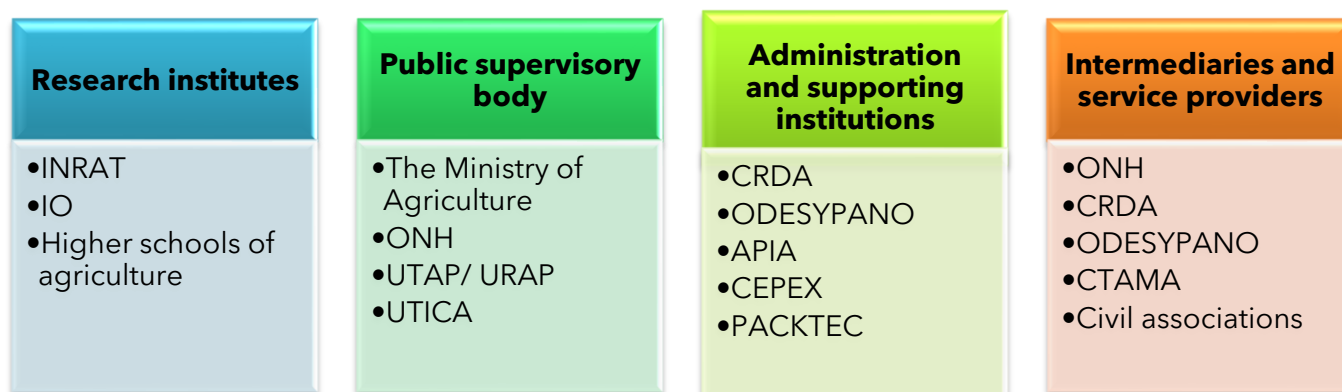


Figure 5. Institutions involved in the olive oil value chain.

The olive oil value chain, depicted in Figure 6, delineates a comprehensive framework encompassing various actors and processes crucial to the olive oil industry's functioning.

Inputs and services include the providers of olive trees at the meso-level with the involvement of CRDA and ODESYPANO. The orchestration of private nurseries under the purview of ONH (National Olive Board) contributes significantly to the functioning of the value chain.

Moving to the production phase, meso-level activities entail cultivation and maintenance by farmers, augmented by auxiliary services for tillage and pruning. At this level, institutions also provide support, these include CRDA (regional representation of the ministry of agriculture), ODESYPANO (the Office of Sylvo-Pastoral development of the Northwest), ONH, and research institutes which provide indispensable technical guidance.

Subsequent stages, encompassing collection and transport, feature meso-level operators engaged in olive collection and transportation, while meso-level subsidies from CRDA, APIA (Agricultural Investment Promotion Agency), and ONH facilitate logistical operations.

In the processing domain, micro-level oil mills play a pivotal role, supported by technical expertise from IO (Olive Institute) and financial aids from APIA and API.

Conditioning activities through bottling and branding the olive oil, involve micro-level conditioners, with quality assurance conducted through meso-level analysis laboratories.

Marketing and exportation efforts involve micro-level wholesalers and exporters, complemented by meso-level market research initiatives facilitated by ONH and private stakeholders.

The macro-level dimension of the olive oil value chain encompasses overarching entities such as insurance providers, farmer unions (UTAP, SYNAGRI) at the production phase, and specialized organizations like PACKTECK and FOPROTEC at the conditioning stage. Export-focused entities such as CEPEX and FOPROHOC are instrumental at the export level, with regulatory oversight and support from the Ministry of Agriculture spanning each facet of the value chain.

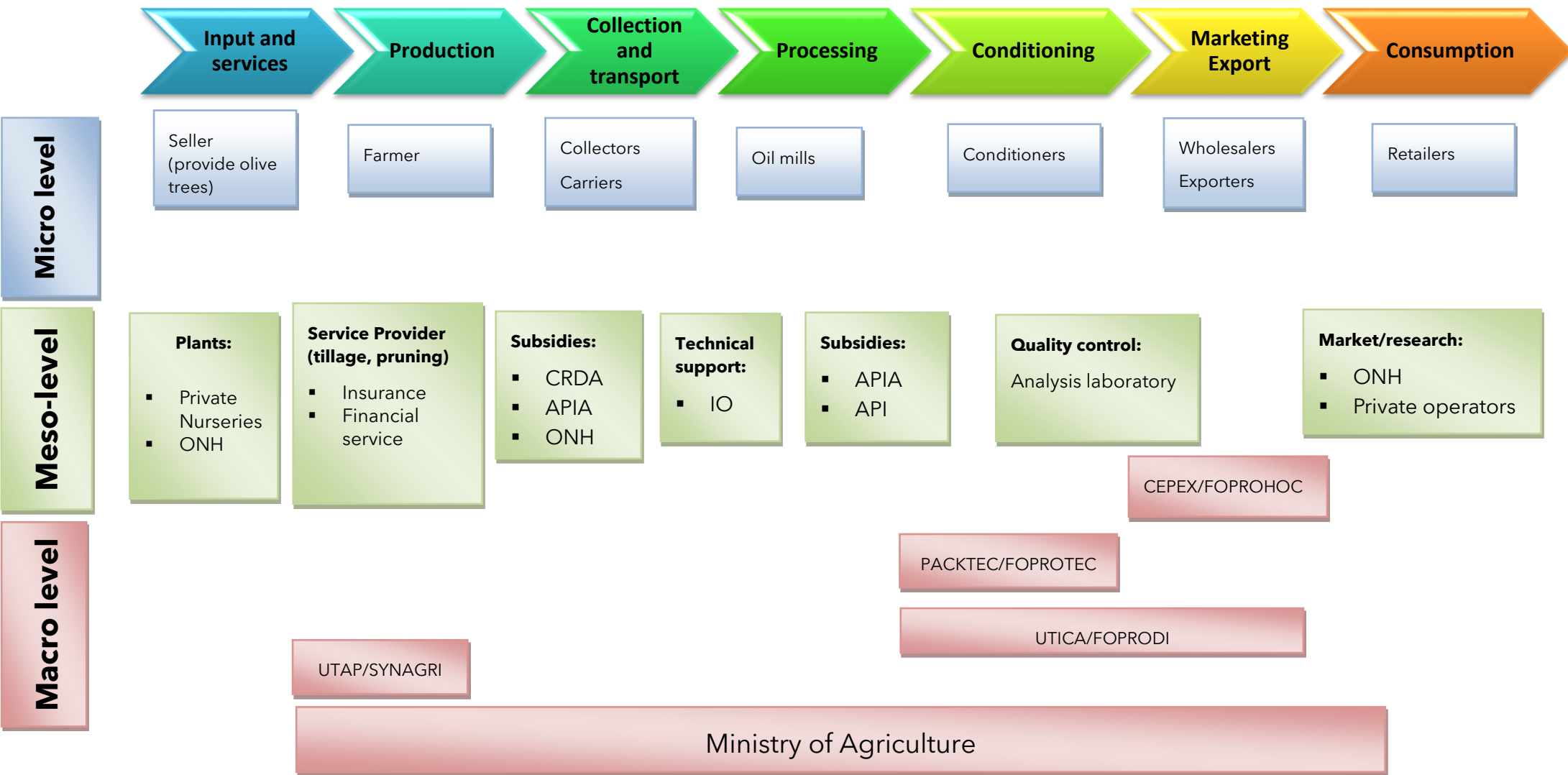


Figure 6. Mapping the different stakeholders of the olive oil value chain in Tunisia

4. Olive oil value chain analysis in Kef governorate

4.1. General description of the study area: Kef governorate

Tunisia is divided into 24 administrative governorates; El Kef is in the north-western part of the country and occupies a strategic position between Tunisia and the Maghreb countries, adjoining the Algerian border (Figure 7). Encompassing an area of 5,081 square kilometres, it constitutes 3.2% of the national territory and approximately 30.7% of the northwest region. According to the 2014 census, Kef governorate is home to approximately 243,156 individuals, comprising 2.2% of the country's total population. Notably, the population is predominantly rural, accounting for 43.5%, which exceeds the national average of 32.2% (RGPH, 2014).

The agricultural and fishing sectors constitute a significant portion of the labour force, representing around 14.6% of the total labour force (ODNO, 2017). Kef governorate contributes significantly to national food security, producing approximately 10% of the country's cereal output, 3.4% of milk, and around 7% of red meat (ODNO, 2020). This underscores its pivotal role as a key contributor to the nation's agricultural landscape.

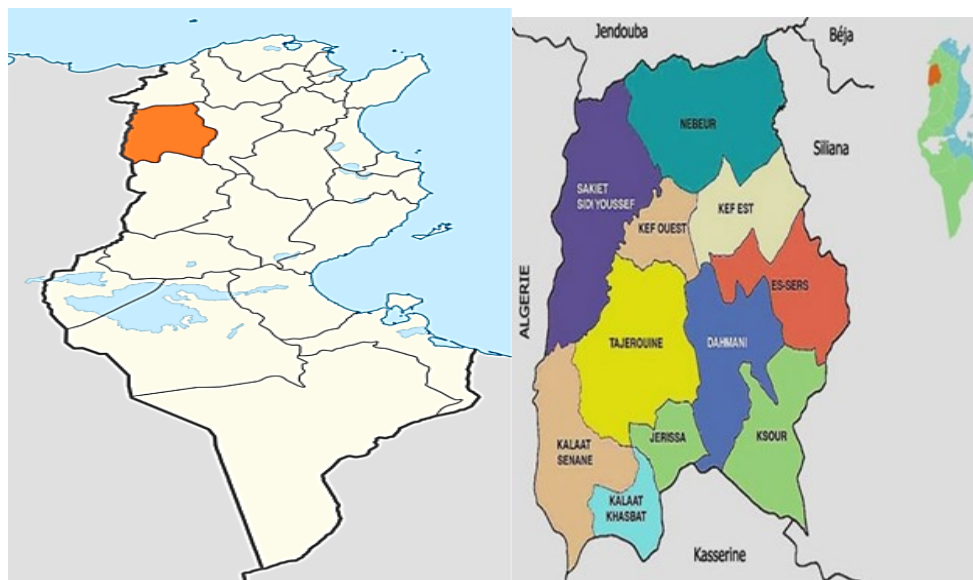


Figure 7. Kef governorate and its delegations (CRDA, 2020)

The semi-arid climate prevalent in the western and southwestern regions of Kef is characterized by pronounced aridity. Annual precipitation levels typically fall within the range of 300 to 600 mm (ODNO Kef, 2020), sustaining various water reservoirs, including notable dams like the Meleg Dam and the Tessa River.

Kef governorate boasts a rich agricultural heritage, rooted in traditional practices. Its agricultural landscape originally revolved around an extensive system that integrated cereal cultivation alongside small ruminant husbandry. Over time, this has evolved, with the extension of irrigated areas now encompassing approximately 16,600 hectares. The agricultural activities in the region are diversified, with four primary plant species cultivated: cereals, olive trees, forages, and

vegetable crops. However, the allocation of these crops varies across different delegations within the governorate (Table 1). This diversity reflects the dynamic nature of agricultural practices and the adaptability of farmers to local conditions and market demands.

Table 1. Main agricultural speculations in the Kef region in 2020 (in Ha)

Delegation	Cereals	Vegetables	Forages	Olive trees
The Kef Est	19,830	616	2,480	5,439
The West Kef	10,050	25	1,400	3,105
Dahmani	31,700	01	2,255	4,264
Tejerouine	22,960	-	3,595	7,895
Sers	18,700	200	5,049	6,305
Ksour	17,100	-	4,100	3,345
Djrissa	9,170	01	1,214	995
Kalaat Snen	15,870	-	1,690	2,741
Kalaat Khesba	10,960	-	211	1,719
Nebeur	13,560	1,012	1,690	7,310
Sakiet Sidi Youssef	20,050	70	4,141	5,033
Touiref	6,950	550	1,800	2,660
Governorate	196,900	2,475	29,625	50,810

Source: ODNO, KEF2020

Concerning animal production, the livestock sector holds a pivotal role within the regional economy, fulfilling approximately 70% of the governorate's demand for meat and milk products. Within this sector, three primary areas of focus have emerged, each playing a crucial role in sustaining the local economy. These include ruminant breeding, encompassing sheep, goats, and cattle, poultry farming, and beekeeping (Table 2).

Table 2. Main livestock production in the Kef region in 2020 (in Ha)

Delegation	Ovine (Female producers)	Bovine		Goats (Female producers)	Beekeeping		Poultry (1000 units)
		Local and crossbreed	Pure breed		Traditional hives	Modern hives	
The Kef Est	45,000	1,600	150	5,600	04	326	
The West Kef	19,500	157	322	2,330	10	580	75
Dahmani	35,000	367	432	3,000	27	725	-
Tejerouine	32,350	132	234	3,255	47	1395	-
Sers	42,615	474	531	3,418	-	200	-
Ksour	41,500	500	195	1,900	30	440	-
Djrissa	9,000	45	14	1,800	22	132	-
Kalaat Snen	49,885	120	94	12,460	426	445	-
Kalaat Khesba	9,000	01	09	1,500	30	560	18
Nebeur	20,530	992	112	2,505	58	1437	-
Sakiet Sidi Youssef	24,600	360	-	5,060	20	654	-
Touiref	16,100	355	250	715	20	654	-
Governorate	34,508	5,103	470	43,543	674	7,684	93

Source: ODNO, KEF2020

The distribution of farm sizes in Kef governorate highlights a diverse landscape of agricultural landholdings (Table 3). The smallest farms, ranging from 0 to 1 hectare, constitute a mere 0.04% of the total area, with 779 farms covering 168 hectares. Farms between 1 and 2 hectares make up 0.4% of the total area, with 1199 farms averaging 1742 hectares. As farm sizes increase, the percentage of the total area also increases, with farms between 2 and 3 hectares covering 1.0% of the area with 1547 farms, averaging 3754 hectares. Similarly, farms ranging from 3 to 4 hectares represent 1.4% of the total area, with 1540 farms averaging 5382 hectares. Farms between 4 and 5 hectares account for 1.6% of the area, with 1350 farms averaging 6048 hectares.

Table 3. Main livestock production in the Kef region in 2020 (in Ha)

Farm size	Number of farms	Area in Ha	Percentage
0-1 Ha	779	168	0.04
1-2 Ha	1199	1742	0.4
2-3 Ha	1547	3754	1.0
3-4 Ha	1540	5382	1.4
4-5 Ha	1350	6048	1.6
5-10 Ha	4221	30309	7.8
10-20 Ha	2903	40418	10.5
20-50 Ha	2776	84637	21.8
50-100 Ha	1170	78886	20.4
100 Ha et plus	624	136002	35.1
Total	18110	388356	100

Source: ODNO, KEF2020

Larger farm sizes show a more significant impact on the total area distribution. Farms between 5 and 10 hectares cover 7.8% of the area, with 4221 farms covering 30309 hectares. Farms between 10 and 20 hectares represent 10.5% of the area, with 2903 farms averaging 40418 hectares. Farms ranging from 20 to 50 hectares account for 21.8% of the total area, with 2776 farms averaging 84637 hectares each. The next category, 50 to 100 hectares, covers 20.4% of the area, with 1170 farms averaging 78886 hectares. The largest farms, those over 100 hectares, dominate with 35.1% of the total area, represented by 624 farms, averaging 136002 hectares. This distribution indicates that while small farms are numerous, larger farms occupy a more substantial portion of the total agricultural land, reflecting a skewed distribution where larger farms play a crucial role in the overall agricultural landscape.

4.2. Value chain description

The core functions of the olive oil value chain include input supply, production, processing, marketing, and regulatory actors.

4.2.1. Stakeholders along the olive oil value chain

a) Input suppliers

In El Kef region, the olive oil value chain operates efficiently, with a notable presence of relatively small-scale producers. Input suppliers for olive oil production encompass seedling providers along with essential inputs like fertilizers and pesticides. These input suppliers can influence the quality and quantity of olives if they supply improved seedlings and inputs that will go into the production of olives. The procurement of inputs in El Kef involves private nurseries supplying olive tree plants at prices ranging from 3 to 5 TND¹. Mabrouka Company was cited as one of the most important input providers. Since its establishment in 1994, this company has been supplying olive growers with high-quality plants and services, maintaining stringent standards. Various suppliers offer agricultural machinery and equipment (such as stainless-steel tanks, irrigation systems, etc.) to support olive growers.

Additionally, farmers rely on suppliers for fertilizers, particularly those with large olive plantations. Due to the region's low rainfall, farmers often need to rent water cisterns from private sources to ensure sufficient water supply for their crops.

b) Production

At the production level, there are 50,810 Ha planted with olive trees with a production estimated in 2022 to 18,699 Tons of olives. The average olive production over 15 years is 160 kg per hectare (Sai et al., 2017). According to Sai et al. (2017), four delegations in Kef governorate encompass the largest areas of olive trees. These delegations are Sers, Nebeur, Tejerouine and Kef Est which represent more than 50% of the olive grove in the Governorate (Table 1).

The distribution of the total olive farms in the four delegations is presented according to the total surface area (Table 4).

Table 4. Distribution of olive producers according to the total area of their farms

Farm size in Ha	Nebeur	Sers	Kef Est	Tejerouine	Total
<= 5	253	245	20	187	705 (45%)
5 -10	213	102	26	63	404 (25%)
10-20	56	71	21	34	182 (12%)
20 -50	57	41	22	23	143 (9%)
+ 50	25	32	69	13	139 (9%)
Total	604	491	158	319	1572 (100%)

Source: Sai and al,2017

Farmers are at the core of olive oil production. Their cultivation practices, including planting, nurturing, and harvesting olive trees, significantly impact the quantity and quality of the olives produced. They maintain the olive oil orchards some of which have been passed down generations. They have the skills of ensuring that they produce high quality olives. Their expertise in farming

¹ As per May 2024, 1\$=3,12 TND

practices, land management, and harvesting techniques directly influences the quality and quantity of olives, which in turn affect the final olive oil product.

According to Weber et al. (2020), employment is characterized by low levels of education and work experience in the olive oil value chain in north-west Tunisia. Trained female workers reach 60%, they are employed as permanent workers throughout all the stages of the value chain.

Most of the land is planted with the variety "Chetoui", which is well adapted to the region. Pruning of olive trees cost between 2 and 6 TND/tree, tillage cost 25 to 30 TND/hour. The harvest is done traditionally in this region. The products obtained are olives, leaves for animal feed and wood.

The olives are sold between 2.5 and 3 TND/Kg at the production level. The sale of the total harvest can be done before the harvest season at the price of 25,000 TND/Ha or after the harvest to intermediaries, private, oil mills or to other farmers coming from other regions.

The olive plantations in the Kef region boast a diverse array of five varieties: Sayali, Gerboui, Ragraoui, Meski, and the predominant "Chetoui", which encompasses over 95% of the olive groves. Characterized by medium size, Chetoui olives weigh an average of 2.8 grams and exhibit a pulp-to-stone ratio averaging 7 when ripe. Notably, the oil derived from Chétoui olives contains a significantly lower percentage of saturated fatty acids compared to Sfax chemlali oil, rendering it less solid. At maturity, the ratio between unsaturated and saturated fatty acids stands at 6.8, with oleic acid constituting approximately 70% of all fatty acids. Moreover, the oil maintains consistent stability throughout the ripening period of the olives.

On a sensory note, Chetoui olives yield a fruity oil with pronounced aromas of green almond, accompanied by a medium to strong perception of bitterness and spiciness. This oil is highly esteemed for its rich content of phenolic compounds and antioxidants. While the bitterness diminishes as the olives ripen, it remains perceptible, adding to the distinctive character of the oil.

The olive growing area increased from 27,975 Ha in 2000 to 35,650 Ha in 2010 to reach 50,810 Ha in 2020. Olive trees are most often planted in monoculture and sometimes interspersed with other fruit trees. They quite often occupy poor, marginal lands threatened by erosion. Except for the olive groves of Elless (Sers) and chtetla (nebeur) which date back several centuries, the olive plantation is recent in the governorate of Kef. After the massive plantations of the 1960s encouraged by the State, the sector has experienced remarkable expansion in recent decades due to two development projects in the South-West and the North of the Kef governorate, thus consolidated by an annual purchasing action of olive plants by the CRDA of Kef (CRDA budget/regional council budget) for small and medium-sized farmers. In recent years, we have noted a remarkable orientation of investors towards intensive (irrigated) olive oil plantations.

Olive production fluctuates greatly from one year to the next due to the phenomenon of biological alternation of the olive tree, extremely unpredictable climatic conditions, and the negligible attitude towards the maintenance of the olive trees. Despite this fluctuation, we note that the yield has improved over the last decade because of the importance allocated by farmers to olive groves which were, in the past, considered marginal from a cultural management point of view.

According to the analysis of the results offered by the agricultural map, the potential of the Kef region for olive plantations is estimated at 80 thousand Ha. By incorporating areas improved through CES (Conservation of Water and Soil) efforts (15 thousand Ha), the potential area is currently 95 thousand Ha of which only 51 thousand are planted.

c) Processing

Processing facilities and mill owners hold vital roles in converting harvested olives into olive oil. Their efficiency and adherence to quality standards determine the quality of the final product. Sometimes they are producers who process olive oil using traditional mills or they could be buyers of olives from producers then proceed to process olive oil using modern mills. The intermediaries and private operators sell the olives to the oil mills at the price of 3.5 TND/Kg and some quantities of olives go to the storehouses and the other to retailers. There are 12 functional oil mills in Kef (Table 5), among them two are organic.

Table 5. Olive oil mills in Kef Governorate

	Delegation	Number of oil mill	Characteristics of the oil mill		Processing capacity/day in tons	Oil storage capacity in tons
			Traditional	Modern		
Sers	Ellès	1	1		08	06
		1	1		14	02
		1	1		12	12
		1	Nonfunctional			
		1	1		8	6
	Sers	1		1	35	70
		1	Nonfunctional			
Nebeur	Chtetla	1		1		
	Sidi khiar	1		1	25	30
	Nebeur	1		1	100	170
Kef Est	Zafran	1		1	35	70
	Zafran station	1		1	70	435
Tajerouine	Sidi abdelbasset	1	Nonfunctional			
	Tajerouine	1		1	35	50
Dahmeni	Dahmeni	1		1	80	280
Total		15	4	8	474	1181

The distribution and characteristics of oil mills across various delegations in Kef governorate are detailed as follows: In the Sers delegation, Ellès has five mills, one of them is non-functional, they are all traditional with processing capacities ranging from 8 to 14 tons per day and storage capacities between 2 and 12 tons. Additionally, Sers itself has one modern mill with a processing capacity of 35 tons per day and a storage capacity of 70 tons, along with another nonfunctional mill. In Nebeur, Chtetla has one traditional mill, while Sidi Khiaar features a modern mill with a capacity of 25 tons per day and 30 tons storage. Nebeur also hosts a modern mill with a substantial capacity of 100 tons per day and 170 tons storage. In the Kef Est delegation, Zafran includes a modern mill with a 35-ton capacity per day and 70 tons storage, and Zafran Station has a modern mill with a 70-ton daily capacity and 435 tons storage. In the Tajerouine delegation, Sidi Abdelbasset has one nonfunctional mill, while Tajerouine has a modern mill with a 35-ton capacity per day and 50 tons storage. Finally, the Dahmeni delegation features a modern mill in Dahmeni with a processing capacity of 80 tons per day and a storage capacity of 280 tons. Overall, the total number of oil mills is 15, comprising 4 traditional, 8 modern, and 3 nonfunctional mills, with an aggregate processing capacity of 474 tons per day and a total storage capacity of 1181 tons.

The geographical distribution of these oil mills (Figure 8) reveals a high concentration of units and olive crushing capacity in the region traditionally known for its "Ellès" olive production in the Sers delegation. This spatial distribution of oil mills, which does not correspond to the spatial distribution of production, leads to transfers of olives from one delegation to another, with almost half of production being transferred outside the governorate. Olive oil is then commercialized in the local market or abroad. The exports are mainly in bulk for 95% of the exported oil. The processors have a key role in ensuring that the olive oil leaves their premises in packaging units that help to identify Tunisian olive oil as an original product.

According to the stakeholders present at the workshop in Kef governorate, which focused on the identification and prioritization of value chains as well as the mapping of actors involved in the olive oil industry, it was concluded that the final price of olive oil is set at 14 TND per litre. The workshop brought together a diverse group of participants, including local farmers, olive oil producers, distributors, and representatives from agricultural cooperatives and government agencies. These stakeholders collectively analysed the value chain from cultivation to consumer. The agreed-upon price reflects a balanced approach, aiming to ensure fair compensation for producers while remaining competitive in both local and international markets.

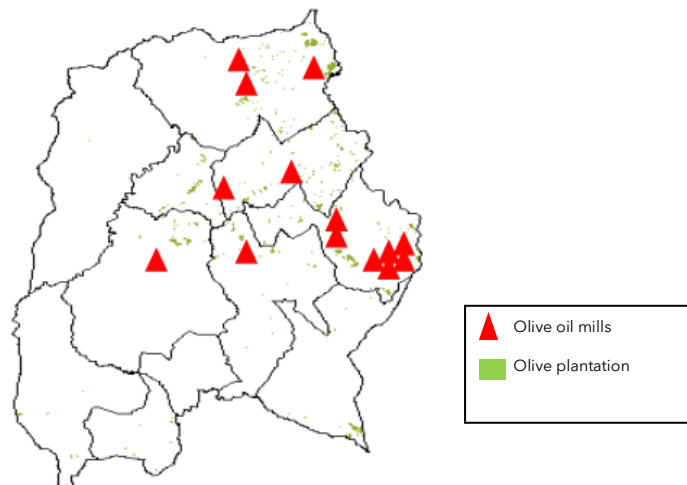


Figure 8. Geographical distribution of the oil mills in Kef region

The process of olive oil production in the Kef region faces several challenges. Firstly, the use of cement tanks for receiving olives, prevalent in most extraction units, leads to fruit deterioration and oxidation, resulting in an undesirable taste of the oil. Additionally, grinding systems employed contribute to a high degree of emulsion between water and oil, yielding lower quantities of oil and necessitating mixing, with the quality dependent on the temperature of this phase. Unfortunately, many mills prioritize higher oil production over quality, disregarding recommended temperature guidelines to reduce energy costs. Moreover, the three-phase decanter used in extraction units has significant drawbacks, including the need for prior dilution of paste with water, leading to excessive water consumption and the extraction of phenolic compounds. Although this dilution reduces pollutant levels in the resulting vegetable water, it increases disposal costs due to higher volumes produced. Overall, these technological constraints pose considerable obstacles to achieving optimal quality in olive oil production in the Kef region.

d) Olive oil commercialization

Small shops, retailers, and wholesalers dominate the commercialization node, while large counterparts dominate the manufacturing node; however, there is no standout dominant player in the distribution node. Throughout all nodes of the value chain, both small and large shops, retailers, and wholesalers, along with local processors or manufacturers, and individual customers, are represented, albeit at varying shares. The most prominently dominant player in any node is small shops, retailers, and wholesalers in agriculture, comprising 70 percent, with all other customer types at approximately 40 percent or below. In the agriculture node, individuals represent the second-largest customer type at around 23 percent, a higher representation compared to other nodes. Large shops, retailers, and wholesalers, as well as local processors or manufacturers, also feature, each comprising 15 percent or less. Despite low per capita consumption of olive oil, individuals seem to predominantly purchase olives directly. Locals can potentially reduce final packaged olive oil costs by directly processing bought olives at mills, obtaining the same value at lower costs. However, less than 2 percent of farms participate in selling outputs (World bank, 2019a).

Exporters and distributors bridge the gap between local production and international markets, facilitating the export of Tunisian olive oil. They could be bulk processors who sell to the international markets. They supply olive oil in barrels. They have the biggest impact in olive oil trade because they could be the game changers in value addition of the olive oil by adopting packaging units that are branded to give Tunisian olive oil recognition in international markets. Their networks, market knowledge, and distribution channels are crucial for reaching global markets, promoting Tunisian olive oil, and ensuring a steady flow of exports.

In Ellès community, there is only one exporter of olive oil who plays a crucial role in setting quality standards and pricing. The exporter has established a network with international buyers; however, he only exports his own production. For the other producers, their quantities of olive oil are low and are not exported.

e) Regulatory institutions

In the olive oil value chain, various government bodies and regulatory authorities set policies, standards, and regulations that govern olive oil production, quality control, and trade. Their role in enforcing quality standards, providing support to farmers, ensuring fair trade practices, and promoting the industry internationally is vital for the sector's growth and credibility. They can be considered as a support or service provider for the sector (Figure 6). These organizations concern:

- **The extension service (AVFA)**, this governmental structure aims to facilitate the adoption of best practices and research findings by farmers to promote agricultural sectors and enhance incomes. It also provides tailored training programs.
- **The different ministries** (agriculture, trade, industry).
- **The regional commissariat to the agricultural development (CRDA)** which stands as the primary government body organizing training sessions for olive growers on topics such as water conservation, pruning, harvesting, and more. Additionally, it facilitates administrative services for farmers.
- **ODESYANO**: Since 1983, the development organization ODESYANO (north-west silvo-pastoral development office) has been present in the Kef region. Through their

projects, notably their “Agroforestry” section, they contributed to the installation of half of the olive groves (around 400 hectares) already existing in the region. Beneficiary farmers contribute 50% of both the prices of the plants and the plantation costs. In addition, ODESYFANO supports the local value chain by providing support and technical advice to farmers, while offering them community materials and equipment such as irrigation tanks, pruning equipment and compost grinders.

- **The center for the promotion of exports (CEPEX)**, which aims at positioning Tunisian products and services internationally, driving the diversification of products and export markets, and working towards exporting Tunisian products and services with high added value.
- **The Northwest Cluster of Olive Oil**, a non-governmental organization established in 2016, unites stakeholders across the olive oil value chain, including olive oil mills and conditioning units, in the Northwest region of Tunisia. This organization plays a crucial role by offering support in by-products recycling, quality control, supply chain management, financial accessibility, marketing strategies, and business governance.
- **The national office of olive oil (ONH)**, it operates as a public industrial and commercial establishment. Its primary missions involve supervising and supporting olive growers to enhance productivity, promoting the quality of Tunisian olive oil, facilitating export development, and regulating the domestic market. This entity significantly influences olive growers by endorsing olive oil in foreign markets.
- **Research institutions and extension services** contribute to innovation, improved farming techniques, and advancements in olive oil production technology. Their research and development efforts lead to better agricultural practices, disease prevention, and technological improvements that benefit the entire value chain. While they play a key role in improving varieties and providing production assistance to farmers, the orchards are still able to produce quality olives due to the knowledge and skills passed down generations. In this context, the olive institute conducts experiments on innovative farm-level technologies and disseminates agroecological practices, such as intercropping or composting, within the scope of its research projects.
- **The financial institutions** provide financial services including giving access to credit at all levels of the olive oil value chain. Financial services such as Enda Tamweel which is a Tunisian microfinance company established by the non-governmental organization Enda inter-arabe, a pioneer in Tunisia's micro-finance sector; operates in Kef governorate. Enda Tamweel focuses on fostering financial inclusion among vulnerable populations, specifically targeting women and young individuals. Certain olive growers obtain credits from Enda Tamweel, albeit with relatively high interest rates.

- **The Agricultural Investment Promotion Agency (APIA)**, which is a public institution, established in 1983, tasked with the primary mission of encouraging private investment in agriculture, fishing, and related services.

4.2.2. Mapping the olive oil value chain in Kef region

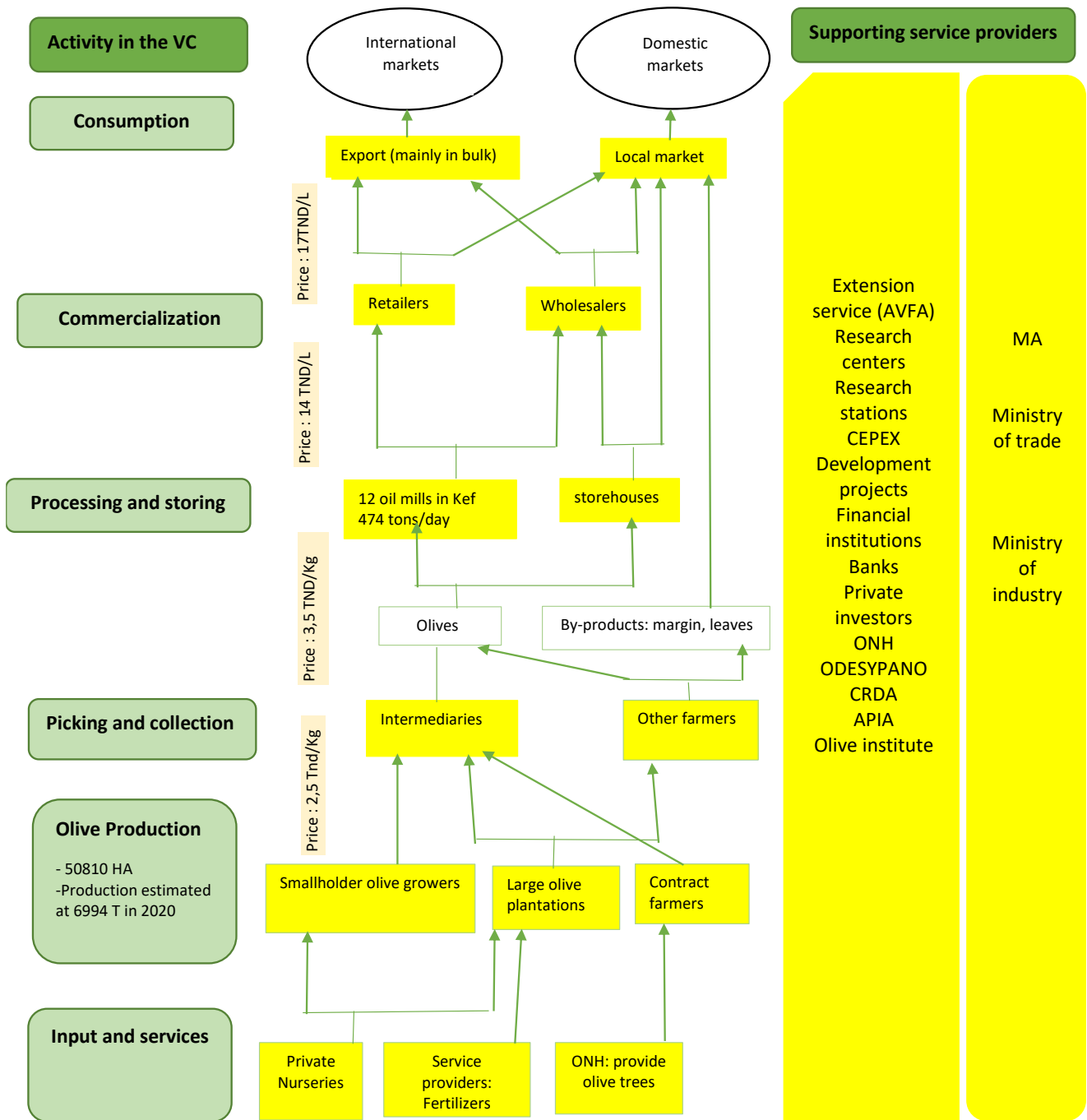
The Kef region olive oil value chain comprises six primary segments, which can be categorized across three key nodes: agriculture, manufacturing, and distribution. These segments include "input suppliers", "production," "picking and collection," "crushing and oil production," "commercialization," and "consumption."

Within the agricultural node, activities encompass "production" and "picking and collection," involving key stakeholders such as nurseries, olive growers, and harvest subcontractors. Primary suppliers for this node focus on fertilizers/pesticides and equipment and containers.

The manufacturing node involves "crushing and oil production" and "conditioning," with key participants including olive mill operators, pomace and other by-product producers, and olive oil bottlers.

The distribution node focuses on "commercialization," involving traders of olives to mills, wholesalers of olive oil in the domestic market, and exporters and ONH who sell to the export market. Additionally, olive mills, olive oil bottlers, pomace and other by-product producers also sell directly to end customers (domestic or export) primarily in cans, bottles, or small bulk quantities.

Throughout the value chain, various service providers contribute, including financiers, logistics companies, marketers, service agents, laboratory, and certification operators, among others.



Source: Own elaboration, 2023.

Figure 9. Mapping of the olive oil value chain Kef region

4.2.3. SWOT analysis for the olive oil value chain

The SWOT analysis for the olive oil value chain was conducted in a participatory manner and led to the identification of several constraints and opportunities for developing the sector.

The region of Kef benefits from favourable climatic conditions and fertile soils that support the growth of olive trees. The olive oil produced in this area is highly regarded for its exceptional quality, characterized by a distinct flavour profile and nutritional richness. This reputation contributes to the region's competitiveness in both domestic and international markets. Additionally, northwest Tunisia benefits from an established infrastructure, including processing facilities, transportation networks, and storage facilities, which streamline the production and distribution of olive oil products. Moreover, olive oil holds significant cultural importance, with traditional production methods and techniques passed down through generations. This cultural heritage fosters a strong sense of pride and identity within local communities, further enhancing the value of olive oil production in the region.

The strengths of the olive oil value chain are also related to the local variety of olives "Chetoui" which concerns 80% of the total orchards. It is a well-adapted type of olives to the regional climate and soils. Olive oil VC is a source of income for farmers, it also provides jobs especially during harvest season. It integrates agroecological principles and it is possible to valorise by-products (leaves for animal feed, margins, wood).

The olive oil VC suffers also from some weaknesses. They concern the lack of skilled olive growers and oil millers; an insufficient application of the technical package despite the presence of modern processing facilities, there may be a reluctance to adopt advanced technologies and practices, hindering efficiency and productivity improvements; the lack of availability for the workforce during the harvest and the lack of skilled workforce labour; the lack of olive oil valorisation because it is commercialized in bulk without packaging; the lack of quality control of olive oil and finally the lack of farmer's associations.

Olive oil VC also suffers from the seasonal variability as the olive oil production is subject to seasonal fluctuations influenced by weather conditions, posing challenges for consistent supply and revenue generation. Factors like temperature variations, rainfall patterns, and pest infestations can significantly impact crop yields, leading to unpredictability in production volumes and affecting the availability of olive oil throughout the year. Managing these seasonal variations requires careful planning, investment in storage facilities, and diversification of revenue streams to mitigate the risks associated with fluctuations in supply and demand.

Besides, the presence of numerous small-scale producers and fragmented supply chains may lead to inefficiencies in coordination, logistics, and quality control. Small producers often lack the resources and infrastructure to optimize their operations, resulting in challenges related to product traceability, transportation bottlenecks, and inconsistent quality standards. Collaborative initiatives such as producer cooperatives, vertical integration, and supply chain partnerships can help consolidate the supply chain, improve transparency, and enhance overall efficiency, benefiting all stakeholders involved.

The olive oil value chain presents significant opportunities within the region, seamlessly aligning with local climatic conditions and serving as a potential solution to erosion issues. Over time, there's potential for the creation of a distinct label, such as "Olive oil in the region of Ellès," further enhancing its regional identity. Additionally, various development projects are actively engaged in the area, contributing to its growth and sustainability. Investing in value-added processing facilities

for olive oil derivatives like cosmetics, pharmaceuticals, and culinary products can diversify revenue streams and bolster the competitiveness of the value chain. Expanding into new domestic and international markets, targeting niche segments and premium markets, holds promise for increasing market reach and bolstering brand recognition for Northwest Tunisian olive oil products. Furthermore, embracing sustainable agricultural practices such as organic farming, water conservation, and biodiversity preservation can bolster the environmental sustainability and resilience of the olive oil value chain, ensuring its longevity and positive impact on the region.

In terms of threats, the olive oil value chain faces significant challenges stemming from climate change effects, characterized by decreased rainfall and higher temperatures, which are likely to have long-term impacts on the industry. Additionally, the emergence of new diseases poses further risks to olive tree health and productivity. Moreover, there's a notable lack of valorisation of by-products and an insufficient professional organization, marked by the dominance of intermediaries, exacerbating the vulnerabilities of the value chain. Climate change-related factors such as erratic weather patterns, droughts, and pests, present ongoing risks to production and supply chains. Furthermore, fluctuations in global olive oil prices, driven by production levels, geopolitical tensions, and currency exchange rates, can directly affect the profitability of producers and processors in Northwest Tunisia. Adapting to evolving regulatory requirements, including food safety standards, labelling regulations, and trade agreements, also imposes administrative burdens and compliance costs on stakeholders throughout the value chain. Additionally, the intensifying competition from other olive oil-producing regions, both domestically and internationally, poses a significant challenge to the market share and competitiveness of Northwest Tunisian olive oil products.

An extended SWOT matrix olive oil in the kef region is presented in Figure 10.

Strengths	Weaknesses
<ul style="list-style-type: none"> ▪ A significant area including 1.96 million Ha in production. ▪ An average production of 18 thousand tons of olive oil ▪ Favorable climatic conditions and fertile soils that support the growth of olive trees. ▪ The olive oil produced in this area is highly regarded for its exceptional quality, characterized by a distinct flavor profile and nutritional richness. This reputation contributes to the region's competitiveness in both domestic and international markets. ▪ The local variety of olives "Chetoui" which concerns 80% of the total orchards. It is a well-adapted type of olives to the regional climate and soils. The "Chetoui" variety produces a fruity oil, with an aftertaste that is highly appreciated for its content of phenolic compounds and antioxidants. ▪ The great promotion possibilities of organic olive oil and signs identification of quality and origin (AB, AOC) ▪ Importance of aid mechanisms and supervision of operators in the sector 	<ul style="list-style-type: none"> ▪ Low productivity of plantations due to drought, alternation, and lack of maintenance. ▪ The absence of a regional strategy for the development of the olive sector ▪ The absence of horizontal and vertical integration between the links in the sector ▪ The weak efforts to preserve the quality and enhancement of the product (packaging, geographical indication, designation of origin etc.) ▪ Nearly 90% of regional olive oil production is sold in the national market. ▪ Difficulty accessing credit. ▪ The old olive plantations are in marginal soils. ▪ Lack of specialized labor and the increase in its cost ▪ The lack of skilled olive growers and oil millers; an insufficient application of the technical package despite the presence of modern processing facilities, ▪ Olive oil VC suffers from seasonal variability as the olive oil production is subject to seasonal fluctuations influenced by weather conditions, posing challenges for consistent supply and

<ul style="list-style-type: none"> ▪ A large surface area of new plantations is currently entering production. ▪ The cultivation of irrigated oil olive trees in gradual expansion ▪ Acquired know-how: specialized labor. ▪ The emergence of private operators in the collection and marketing ▪ Labor and mechanical traction are relatively cheaper compared to competing European countries. ▪ Northwest Tunisia benefits from an established infrastructure, including processing facilities, transportation networks, and storage facilities, which streamline the production and distribution of olive oil products. ▪ Olive oil holds significant cultural importance, with traditional production methods and techniques passed down through generations. This cultural heritage fosters a strong sense of pride and identity within local communities, further enhancing the value of olive oil production in the region. ▪ The olive oil VC is a source of income for farmers, it also provides jobs especially during harvest season. ▪ It integrates agroecological principles. ▪ It is possible to valorize by-products (leaves for animal feed, margins, wood). 	<p>revenue generation. Factors like temperature variations, rainfall patterns, and pest infestations can significantly impact crop yields, leading to unpredictability in production volumes and affecting the availability of olive oil throughout the year</p>
Opportunities	Threats
<ul style="list-style-type: none"> ▪ The increase in European demand for olive oil imports. ▪ The increasing demand of olive oil from emerging markets ▪ The inward processing trafficking regime exempts from customs duties. ▪ Improving the image of Tunisia as a producer and exporter of olive oil in traditional markets, including the European market. ▪ Tariff preferences granted by the European Union to Tunisia. ▪ The constant evolution of national consumption of olive oil. ▪ The region, seamlessly aligning with local climatic conditions and serving as a potential solution to erosion issues. ▪ There's potential for the creation of a distinct label, such as "Olive oil in the region of Ellès," ▪ Various development projects are actively engaged in the area, contributing to its growth and sustainability. ▪ Investing in value-added processing facilities for olive oil derivatives like cosmetics, pharmaceuticals, and culinary products can diversify revenue streams and bolster the competitiveness of the value chain. 	<ul style="list-style-type: none"> ▪ The emergence of new oil producing and exporting countries. ▪ Olives that can benefit from certain price preferences on the European market within the framework of association agreements (zero-duty quota). ▪ Production aid granted to producers in European Union member countries. ▪ The adoption of quality and marketing standards (traceability, labeling, packaging etc.) is increasingly restrictive. ▪ Climate change effects, characterized by decreased rainfall and higher temperatures, are likely to have long-term impacts on industry. ▪ The emergence of new diseases poses further risks to olive tree health and productivity. ▪ Fluctuations in global olive oil prices, driven by production levels, geopolitical tensions, and currency exchange rates, can directly affect the profitability of producers and processors in Northwest Tunisia.

<ul style="list-style-type: none"> ▪ Expanding into new domestic and international markets, targeting niche segments and premium markets, holds promise for increasing market reach and bolstering brand recognition for the northwest. 	
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Figure 10. SWOT matrix-olive oil in the Kef region

4.2.4. Suggested actions for promoting the olive oil value chain in Kef region.

The potential areas for development within the olive oil sector primarily revolve around enhancing production systems, managing natural resources, and fostering organizational structures among olive growers to bolster their positioning within the industry and augment their share of added value.

Regarding the restructuring of the olive oil sector, there's a need to redefine the roles and scopes of intervention for various support institutions and stakeholders, emphasizing the necessity to keep pace with industry evolution and sustain support for small-scale farmers.

Establishing a comprehensive database consolidating information across the sector would serve as a valuable decision-making tool.

At the production level, olive cultivation in Kef has been overlooked by both institutions and stakeholders, leading to diminishing returns. Strengthening this link for the future vitality of the olive oil value chain involves:

- Implementing sustainable agricultural practices such as soil maintenance, weed control, annual pruning, and environmentally friendly pest management.
- Enhancing production and productivity while prioritizing sustainability and environmental preservation through specific programs, extension campaigns, and adoption of intensive production systems.
- Improving olive oil quality and profitability by focusing on agronomic interventions, reducing production costs, ensuring oil quality during processing and storage, supporting organic producers, and promoting new products and designations of origin to enhance Tunisia's brand image.

A more targeted and ambitious strategy should be developed to enhance consumer perceptions of Kef olive oils, emphasizing their quality, richness in polyphenols, and traditional value.

Legislative provisions related to financing the sector should be reviewed to better adapt financial aid and increase credit accessibility for olive growers through mechanisms such as the Olive Sector Development Fund (FDSO) and subsidy extensions. Encouraging agricultural cooperation and organizational restructuring among sector players is crucial to improve competitiveness and access potential resources, particularly for small farmers.

At the processing and packaging levels, there's room for improvement in oil quality and packaging rates. This could be achieved by investing in advanced extraction technologies, promoting domestic high-quality bottle production, seeking partnerships with experienced foreign manufacturers, or supporting local bottling operations in export markets.

4.2.5. Agroecological assessment

The stakeholders present in the workshops were asked if the olive oil VC can integrate the agroecological principles. Questions were asked about the identification of the adoption of agroecological principles by different actors in the value chain, such as sustainable farming practices and environmentally friendly processing methods. The 13 principles applied to the selected value chain are presented in the Table 6.

Olive oil value chain in Kef actively engages in the recycling of inputs and outputs. This includes various practices such as shredding wood for repurposing, utilizing wood as livestock feed in the form of food blocks, composting organic waste such as branches, leaves, and margins, converting waste into charcoal for energy production, utilizing pomace as livestock feed, employing olive water as fertilizers for agricultural purposes, and repurposing wood in the manufacture of small tools. These initiatives not only contribute to waste reduction and resource optimization but also align with the commitment to sustainability and environmental responsibility throughout the Tunisian olive oil value chain. However, there could be an expansion of these practices by integrating advanced technologies for bioenergy production and improving composting methods to further enhance soil fertility and reduce waste.

This value chain is committed to promoting the reduction or elimination/replacement of purchased inputs for agricultural production, particularly in the cultivation of olive trees. Recognizing that olive tree cultivation is inherently undemanding in terms of inputs, efforts are made to further minimize reliance on external resources. One of the key strategies employed is the use of compost and margin materials, which not only enrich the soil but also reduce the need for synthetic fertilizers. Additionally, legume crops have been introduced as green manure, serving as a natural source of nutrients, and thereby reducing the necessity for soil preparation and synthetic fertilizers. Moreover, through good soil management practices, there is a prioritization of maintaining soil health and fertility, which in turn helps to reduce the incidence of diseases and pests. This approach allows for the underuse of pesticides, minimizing the environmental impact of agricultural practices while promoting sustainable and eco-friendly methods of production. Emphasizing these techniques aims to optimize resource efficiency, minimize costs, and foster long-term sustainability in agricultural operations. To upscale these practices, it is essential to provide more training and resources to farmers on advanced organic farming techniques. Additionally, the introduction of bio pesticides and organic soil amendments can further reduce reliance on chemical inputs. Government incentives and subsidies for adopting organic farming practices could accelerate this transition.

Regarding the soil health, olive plantations are instrumental in aiding floor fixing and erosion control, contributing significantly to soil conservation efforts. Furthermore, the utilization of organic materials, such as manure derived from olive cultivation, serves to enhance soil quality. These organic inputs play a pivotal role in improving soil structure and texture, creating favourable conditions for plant growth and biological activity. Through these initiatives, olive oil production strives to sustainably manage soil resources, thereby ensuring long-term agricultural productivity and environmental sustainability.

About animal health, olive trees serve as natural shelters for animals, providing protection from adverse weather conditions and offering a conducive environment for rest and safety. Additionally, olive products are utilized as a component of livestock feed, providing essential nutrients to support the health and vitality of animals. Furthermore, olive trees serve as a vital source of nutrition for bees, offering nectar and pollen that contribute to the health and sustainability of bee populations.

Research into the nutritional benefits of olive by-products for livestock can optimize feed formulations and improve animal health further.

Concerning the maintenance and enhancement of species diversity and genetic resources, olive cultivation offers opportunities for intercropping with other trees such as almond and pomegranate, fostering species diversity. Moreover, olive trees serve as effective windbreaks, providing protection to other crops within agroecosystems. These practices should be more encouraged in Ellès community.

In terms of promoting positive ecological interactions and complementarity within agroecosystems, olive cultivation contributes to improved water retention capacity and provides food for livestock, particularly sheep. Additionally, olive farming practices prioritize water and soil conservation efforts.

As regards to the promotion of productive and income diversification on farms, olive trees offer various avenues for income diversification throughout the year. The olive industry provides income stability during winter months, and olive products being non-perishable can be sold at any time. Additionally, by-products of olive processing contribute to additional income streams, and the valorisation of sub-products enhances farmer income. Following recommended technical practices also improves productivity and income. To further support income diversification, developing value-added products like olive-based cosmetics or health supplements can open new markets. Training farmers in business management and marketing strategies can enhance their ability to capitalize on these opportunities.

In terms of enhancing co-creation and sharing of knowledge, there is a facilitation of the knowledge transfer, including practical know-how and the exchange of olive varieties among farmers. Furthermore, co-creation of knowledge is facilitated through farmer associations such as SMSA and GDA. To expand this, organizing regular workshops and field days can foster continuous learning and innovation among farmers.

Regarding contributions to building healthy, diversified, and culturally appropriate diets, the creation of labels ensures the recognition and promotion of healthy olive products, deeply ingrained in dietary habits and cultural traditions. Additionally, olive conservation materials, such as those used for pickling, contribute to healthy and diversified diets. Besides, creating more educational campaigns about the health benefits of olive oil and developing new healthy recipes incorporating olive products can increase consumer awareness and demand.

Concerning supporting dignified and robust livelihoods for all actors in the food system, olive oil value chain contributes to improved family income, especially with large, planted areas or intercropping. Moreover, providing microfinancing options and financial literacy training for small farmers can improve their economic stability. Developing cooperative models like SMSA or GDA in Ellès community can also empower smallholders and increase their bargaining power.

On the topic of ensuring proximity and confidence between producers and consumers, olive oil ensures short sales circuits and offers purchase options at the farm or oil mill. However, there is a lack of connectivity between institutions within the value chain structures, leading to a lack of trust between producer and consumer. Establishing an electronic platform on the internet could address these issues. Implementing certification schemes for origin labelling for olive oil can also reassure consumers about the quality and ethical production of their purchases.

Regarding strengthening institutional arrangements to include the recognition of farmers as managers of natural and genetic resources, this value chain provides institutional support, adheres to sector regulations, and collaborates with specialized organizations such as ONH and IO.

However, challenges such as land division due to inheritance and inadequate use of water resources need to be addressed to ensure sustainable management of resources. Strengthening land tenure security and promoting equitable water distribution are critical for long-term viability.

As regards to encouraging participation in decision making, decentralized governance, and local management of food systems, in the olive oil value chain there is a facilitation for small participation through support organizations such as ONH, CRDA, IO, and ODESYPANO. However, there is negligible involvement in decision making and olive variety choices, indicating a need for greater participation and engagement. Increasing farmer involvement in decision-making processes and variety selection by establishing more inclusive governance structures and participatory planning sessions can empower farmers and improve the relevance of policies and practices.

Table 6. Agroecology principles applied to the olive oil value chain

Principles	Olive oil value chain
<p>1. Recycling</p> <p>Does your organization engage or promote the recycling of inputs or outputs within the company and with your partners?</p>	<ul style="list-style-type: none"> - Shredding of wood - Wood used as livestock feed (food blocks) - Composting (Cutting brunches, leaves, margins) - Charcoal (energy) - Pomace used as livestock feed - Use of olive water as fertilizers - Use of wood in the manufacture of small tools
<p>2. Input reduction/replacement</p> <p>Does your organization engage or promote the reduction or elimination/replacement of purchased inputs for agricultural production?</p>	<ul style="list-style-type: none"> - Olive tree is an undemanding culture concerning the inputs - Use of compost and margin - Introducing legume crops as manure: reduction of soil preparation - Good soil management reduces disease: reduction of pesticides use
<p>3. Soil health</p> <p>Does your organization engage or promote the management of organic matter and soil biological activity?</p>	<ul style="list-style-type: none"> - Olive plantations help floor fixing - Erosion control - Improves the soil quality (manure) - Improves soil structure and texture
<p>4. Animal health</p> <p>Does your organization ensure animal health and welfare?</p>	<ul style="list-style-type: none"> - Olive tree can serve as an animal shelter - It is used as a livestock feed - A source of bee feeding
<p>5. Biodiversity</p> <p>Does your organization maintain and enhances the diversity of species, functional diversity and/or genetic resources?</p>	<ul style="list-style-type: none"> - There is a various genetic potential in the olive crops - Can be planted with other trees (almond, pomegranate) - Can be used as windbreaks to protect other crops
<p>6. Synergy</p> <p>Does your organization enhance positive ecological interactions and complementary in the agroecosystems? (Animals, crops, trees, soils, and water).</p>	<ul style="list-style-type: none"> - There is an ecological interaction between production units - Improves water retention capacity - Provides Food for livestock (sheep) - Water and soil conservation
<p>7. Economic diversification</p> <p>Does your organization promote productive and income diversification on farms?</p>	<ul style="list-style-type: none"> - Olive tree provides an income diversification through: - Procuring in come in winter - Olive is a non-perishable product, and can be sold at any time - By-products can provide additional income

	<ul style="list-style-type: none"> - Valorisation of sub-products improves the farmer's income - If the farmer follows the technical package the productivity will improve
<p>8.Co-creation of knowledge</p> <p>Does your organization enhance co-creation and sharing of knowledge? (Local, scientific innovation, farmer to farmer exchange)</p>	<ul style="list-style-type: none"> - Transfer of knowledge (know-how) - Exchange of olive varieties between farmers - Co-creation of knowledge can be realized in case the farmers are in an association (SMSA, GDA)
<p>9.Social values and diets</p> <p>Does your organization contribute to building healthy, diversified and culturally appropriate diets, based on identity, tradition, social and gender equity of local communities?</p>	<ul style="list-style-type: none"> - Local product - Creation of a label - High nutritional value - Healthy product - Included in dietary habits and medications - Conservation material (used for pickling)
<p>10. Fairness</p> <p>Does your organization support dignify and robust livelihoods for all actors in the food system (trade, employment, intellectual property rights, transparency)?</p>	<ul style="list-style-type: none"> - Improves family income - Olive oil VC guarantees decent livelihoods in case there are large areas planted or in case there is intercropping
<p>11. Connectivity</p> <p>Does your organization ensure proximity and confidence between producers and consumers?</p>	<ul style="list-style-type: none"> - Sales circuits are short - Purchase at the farm, at the oil mill - Total lack of connectivity between the institutions in the value chain structures. - Lack of trust between producer and consumer. - An electronic platform on the internet needs to be established
<p>12.Land and natural resource governance</p> <p>Does your organization strengthen institutional arrangements to include their cognition of farmers as managers of natural and genetic resources?</p>	<ul style="list-style-type: none"> - Institutional support - Sector regulation - Presence of specialized organizations (ONH, IO) - Land division due to inheritance - Inadequate use of water resources - Depletion of water resources
<p>13. Participation</p> <p>Does your organization encourage participation in decision making, decentralized governance and or local management of food systems?</p>	<ul style="list-style-type: none"> - There is a small participation through support organizations (ONH, CRDA, IO, ODESYPANO) - Negligible involvement in decision making - Negligible involvement in olive variety choices

Source: Own Elaboration, 2023.

5. Conclusion

The objective of WP3 is to identify the potential for co-developing/upgrading business models in the selected value chains through the integration of HLPE's agroecological principles. To reach this objective, a rapid value chains analysis and an agroecological assessment were used on the main agricultural and food value chains in the northwest of Tunisia. In addition, a participatory approach was adopted through 4 focus group discussions at the community level (living lab in Siliana and Kef) and with all the relevant stakeholders at the value chain level through the organization of two workshops in Kef and Siliana.

Based on the secondary data and on the participatory approach, the main value chains selected according to economic, social, and environmental aspects were olive oil, cereals, sheep, fig tree and honey for Siliana and Olive oil, sheep, cereals, honey, and medicinal and aromatic plants for Kef. The two workshops conducted with the main stakeholders in Kef and Siliana have identified the olive oil VC as the main value chain with great opportunities to integrate agroecological principles.

Compared to other VC, the olive oil VC has a high potential to improve resource efficiency by the reduction of inputs use (water, chemical inputs, etc.) and the recycling opportunities for the by-products (margin, leaves, and branches). Indeed, olive oil VC contributes to strengthen the resilience by improving soil fertility (soil erosion control), biodiversity (enhance functional agro biodiversity), synergy (recycle olive by-products for animal feed) and economic diversification (different uses of the product and by-products). In terms of social equity/responsibility, the olive oil VC is engrained in the local culture, and part of the social values and diets. Olive oil is considered by all stakeholders as a noble product with a very long tradition. Public and private institutions, development institutions and research institutions are involved in the olive oil VC to share knowledge to olive producers grouped into associations to promote an olive oil product with a high quality. While the olive oil value chain in Kef already exhibits many strong agroecological practices, there are numerous opportunities for improvement. By integrating advanced technologies, promoting knowledge sharing, and enhancing policy support, the value chain can become even more sustainable, productive, and resilient.

The olive oil value chain faces several challenges that need to be addressed for improved productivity and sustainability. Low plantation productivity, exacerbated by drought, can be mitigated through advanced irrigation systems, drought-resistant varieties, and enhanced maintenance practices.

Integration between the different links of the value chain is weak, highlighting the need for cooperatives and associations to foster collaboration. Efforts in quality preservation are insufficient, requiring better quality control measures and the promotion of geographical indications. High domestic market dependence calls for export promotion programs and marketing campaigns to raise the profile of Tunisian olive oil globally.

Access to credit is difficult for many growers; tailored financial products and literacy training could alleviate this. Old plantations on marginal soils should be replanted with more productive varieties, supported by subsidies. The insufficient application of technical packages needs increased extension services and practical support for farmers.

Tunisia had always been known as one of the leaders in the olive oil production worldwide, unfortunately most of the olive oil is exported in bulk without any differentiation. There is a great

potential in creating a label for the olive oil from the North-West of Tunisia which will contribute to the creation of a positive territorial, socioeconomic, and cultural externalities. Labelling the olive oil will improve the connectivity in ensuring the proximity and confidence between olive producers and consumers. This label could be organic or a designation of origin like the Protected Denomination of Origin whose qualitative characteristics are essentially or exclusively dependent on the geographic setting in which they are produced.

The business model proposed based on the participatory approach with the main stakeholders in both locations is olive oil labelling. The objective of the business model is to encourage the olive producers of SMSA to produce a labelled olive oil to improve their revenues, enhance livelihoods and create a system of values that includes geographic origin (territory).

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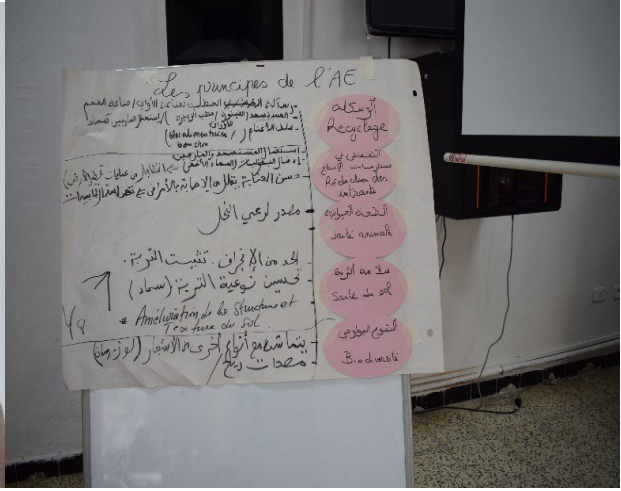
7. Annex

Annex 1. Participant's list (Kef workshop)

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Annex 2. Kef workshop photos







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