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Action plan and policy recommendations for a holistic development of the Pakistani olive value chain*

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Abstract. The sustainable development of Pakistan's olive sector requires a coordinated and participatory strategy capable of strengthening the entire olive value chain. This chapter presents an action plan and policy recommendations developed through a bottom-up approach involving a wide range of stakeholders, including public institutions, farmers, processors, researchers, private actors, and development partners. The work was primarily based on a SWOT analysis of the Pakistani olive value chain, which served as the main methodological framework for identifying strengths, weaknesses, opportunities, and threats affecting the sector. The chapter examines the current status of olive cultivation and processing in Pakistan while highlighting the main challenges affecting the sector. Strategic interventions and policy measures are proposed to improve sustainability, strengthen institutional coordination, support farmer capacities, and enhance value addition and market integration. The recommendations were presented and discussed during a stakeholder forum and received endorsement from the Ministry of National Food Security and Research.

Keywords. Action plan – Integrated management – SWOT analysis– Rural development.

Plan d'action et recommandations politiques pour le développement holistique de la chaîne de valeur oléicole pakistanaise

Résumé. Le développement durable du secteur oléicole au Pakistan nécessite une stratégie coordonnée et participative capable de renforcer l'ensemble de la chaîne de valeur oléicole. Ce chapitre présente un plan d'action et des recommandations politiques élaborés selon une approche « bottom-up » impliquant un large éventail d'acteurs, notamment les institutions publiques, les agriculteurs, les transformateurs, les chercheurs, le secteur privé et les partenaires du développement. Le travail repose principalement sur une analyse SWOT de la chaîne de valeur oléicole pakistanaise, utilisée comme cadre méthodologique central pour identifier les forces, faiblesses, opportunités et menaces du secteur. Le chapitre examine la situation actuelle de la culture et de la transformation des olives au Pakistan, tout en mettant en évidence les principaux défis affectant le secteur. Des interventions stratégiques et des mesures politiques sont proposées afin d'améliorer la durabilité, renforcer la coordination institutionnelle, soutenir les capacités des agriculteurs et favoriser la valorisation des produits ainsi que leur intégration au marché. Les recommandations ont été présentées lors d'un forum des parties prenantes et ont reçu l'approbation du ministère de la sécurité alimentaire nationale et de la recherche.

Mots-clés. Programme d'action – Gestion intégrée – Analyse SWOT – Développement rural.

*This chapter represents an updated version of a document previously published within the framework of the project.
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I – Introduction

This chapter presents the Action Plan and Policy Recommendations (AP&PR) for the holistic development of the Pakistani olive value chain. It is grounded in the recognition that, while agriculture remains a cornerstone of Pakistan's economy, the country continues to rely heavily on imports for key commodities such as edible oils. Addressing this imbalance requires a strategic shift toward diversification and the promotion of high-value, sustainable crops.

Within this context, olive cultivation represents a promising opportunity. Well-suited to Pakistan's agro-climatic conditions, olive farming has the potential to generate economic benefits, support rural livelihoods, and contribute to environmental sustainability. Moreover, increasing domestic olive oil production could help reduce the national import bill and strengthen food security.

The development of the olive sector has gained increasing attention at the national level, reflecting a broader commitment to fostering agricultural innovation and resilience. In this framework, the OliveCulture Project, funded by the Italian Agency for Development Cooperation (AICS), and implemented by CIHEAM Bari in collaboration with the Ministry of National Food Security and Research (MNFSR) and the Pakistan Oilseed Department (POD), aims to strengthen the olive value chain through a holistic and participatory approach. The project engages a wide range of stakeholders, including institutions, farmers, businesses, and consumers, to improve productivity, quality, and market integration. Particularly, the project aims to guide and support the Pakistan Oilseed Department of MNFSR to organize actions, make the interventions more organic and provide the appropriate know-how for its development. The project interacts very closely and operates in coordination with the *"Promotion of Olive Cultivation on Commercial Scale in Pakistan - Phase II"* (POCCSP -II) and its provincial components.

A key outcome of this initiative is the AP&PR presented in this chapter. Its development was supported by a multi-stakeholder process, including workshops, consultations, and study visits, and involved the contribution of a dedicated stakeholder group forming the basis of the future Pakistan Olive Oil Council. The analysis underpinning the AP&PR is based on a comprehensive assessment of the sector, including a SWOT analysis that identifies internal strengths and weaknesses, as well as external opportunities and threats.

Building on this analytical framework, the chapter outlines strategic priorities and policy recommendations aimed at supporting the sustainable growth of the olive value chain across its key components, production, processing, marketing, governance, and research. Particular attention is given to aligning sector development with broader national priorities, including rural development, economic diversification, and climate change adaptation.

In this regard, olive cultivation is not only considered a means of increasing self-reliance in edible oils, but also as a climate-smart agricultural practice capable of contributing to resilience in the face of environmental challenges. Given Pakistan's vulnerability to climate change and the availability of marginal lands suitable for olive cultivation, the sector offers significant untapped potential.

Overall, this chapter provides a structured and forward-looking framework to guide policymakers and stakeholders in strengthening the Pakistani olive value chain. Its effective implementation will depend on coordinated national efforts, sustained institutional support, and continued international cooperation.

II – Context and sustainability dimensions of the olive value chain

The sustainable development of the olive value chain requires a thorough understanding of its context, examined through the interconnected environmental, economic, and social dimensions of sustainability.

1. Environmental dimension

From an environmental perspective, Pakistan has consistently ranked among the ten countries most vulnerable to climate change over the past two decades, according to the Climate Risk Index. While the global climate crisis disproportionately affects the Global South, Pakistan has been particularly impacted by climate change induced natural disasters. Extreme weather events, including prolonged droughts and devastating flash floods, have caused widespread damage to crops and infrastructure, resulting in the loss of livelihoods and human lives. These events have had far-reaching consequences, with the agricultural sector being among the most severely affected.

The 2022 floods were especially catastrophic, inundating nearly three-quarters of the country and leaving close to a million people without access to safe and adequate housing. These events once again drew global attention to the urgency of addressing climate change. Pakistan played a key role at COP27 in Sharm El-Sheikh, Egypt, advocating for the establishment of a dedicated “Fund for Loss and Damage” to support developing countries that are particularly vulnerable to the adverse impacts of climate change.

In the absence of a single technological solution to address the complex challenges posed by climate change, Pakistan must adopt a diversified and long-term strategic approach. This includes promoting high-value, climate-resilient crops that are both heat- and drought-tolerant and suitable for cultivation across different agro-climatic zones. In this regard, olive cultivation stands out as a promising and cost-effective option. As a resilient crop capable of withstanding harsh environmental conditions, olive farming can contribute meaningfully to both climate change mitigation and adaptation strategies.

Nevertheless, climate change remains a major source of concern, as it exacerbates existing vulnerabilities such as income inequality, food insecurity, and gender disparities. These pressures can, in turn, intensify competition over scarce natural resources, including water and arable land. Although olive trees possess natural characteristics that make them relatively resistant to harsh climatic conditions, the potential impact of climate change on productivity and losses cannot be overlooked. Recognizing these opportunities, both federal and provincial governments are actively promoting olive cultivation, supported by the availability of suitable land and favorable environmental conditions. Notably, olive trees also play an important role in carbon sequestration, contributing to the development of a cleaner and greener environment.

Environmentally sustainable olive production can help mitigate climate change by reducing greenhouse gas emissions. Scientific studies have highlighted the positive environmental impacts of olive cultivation, including its role in preserving biodiversity, improving soil quality, and acting as a barrier against desertification. Olive trees have also been shown to capture atmospheric carbon dioxide and store it in biomass and soil, contributing to temperature regulation.

On the other hand, Pakistan faces significant challenges related to land degradation, including water erosion and soil incompatibility, which limit the cultivation of many plant species. Approximately 16 million hectares of land, i.e., about 20% of the country's total area, are affected directly or indirectly by soil erosion. Expanding olive cultivation could help address these issues by reducing erosion and desertification, while also generating economic benefits. However, it is important to note that in certain semi-arid and hilly areas with poor soil fertility and severe erosion, the feasibility of olive cultivation remains limited.

At the policy level, the Government of Pakistan has prioritized the Sustainable Development Goals (SDGs) as part of its broader development agenda, aiming to achieve upper middle-income country status by 2030. Pakistan was among the first countries to adopt the SDGs through a unanimous parliamentary resolution. Olive cultivation contributes to several of these goals, including poverty reduction (Goal 1), zero hunger (Goal 2), decent work and economic growth (Goal 8), responsible consumption and production (Goal 12), climate action (Goal 13), life on land (Goal 15), and partnerships for development (Goal 17).

To support this vision, the federal government has launched various initiatives to promote olive cultivation and production. Encouraged by favorable climatic conditions and growing prospects, provincial governments have also taken concrete steps. The Potohar and Sargodha regions in Punjab, as well as several districts in Khyber Pakhtunkhwa (KP), have been designated as olive valleys. Large-scale plantations are also underway in Balochistan and the merged areas of KP, while Azad Jammu and Kashmir (AJK) and Gilgit-Baltistan (GB) are increasingly considered suitable for olive cultivation.

2. Economic dimension

From an economic perspective, over the past seven decades Pakistan has undergone a structural transformation, shifting from an agrarian-based economy to one increasingly driven by the services sector. Between 2011 and 2021, the services sector overtook agriculture as the dominant contributor to the national economy and currently accounts for approximately 52% of GDP, compared to 38% in 1960. Over the same period, the contribution of agriculture declined significantly, from 46% to around 23%, while the industrial sector (non-manufacturing) increased its share from 16% to approximately 20.9%. In 2021, agriculture contributed about 22.96% to GDP, industry 18.7%, and services accounted for more than half of the overall economic output (Figure 1).

Despite its declining share in GDP, agriculture remains a critical sector, particularly for rural livelihoods. However, its productivity continues to be constrained by several structural challenges, including rigid cropping patterns, over-reliance on a limited number of major crops, narrow genetic diversity, low-quality seed inputs, and inefficient water use and management systems. As a result, many rural areas remain underdeveloped and, in several cases, face persistent poverty and food insecurity, even though wheat, rice, sugarcane, and cotton dominate agricultural production.

Within this context, olive cultivation presents a promising economic opportunity. At the farm level, the olive plant offers a high-profit potential across its entire value chain, from cultivation to processing. Studies have shown that olive farming can be a financially viable investment, with an internal rate of return (IRR) of approximately 31% at a 10% discount rate, indicating strong profitability compared to prevailing market interest rates.

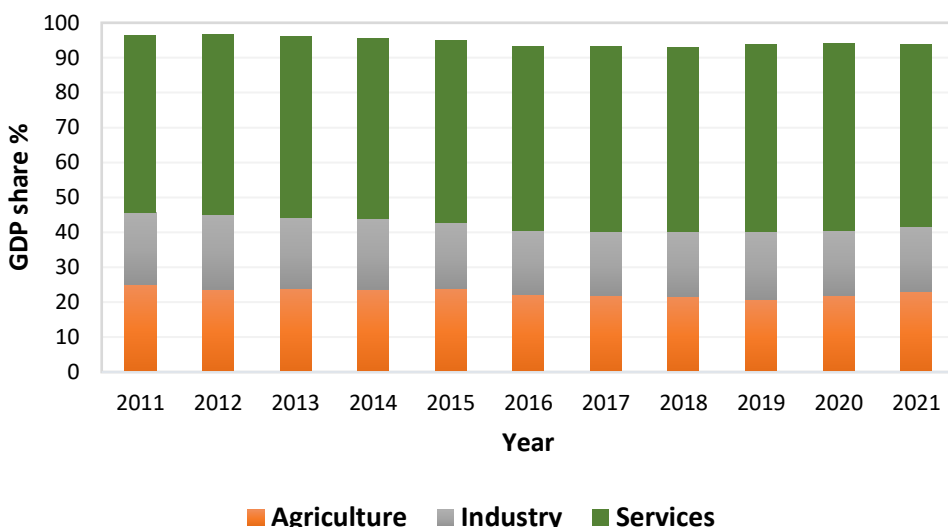


Figure 1: Share of different sectors in the GDP (%) of Pakistan from 2011-2021.

Beyond primary production, olive processing, including the production of oil, pickles, and other by-products, can further enhance income generation and improve living standards, particularly for rural communities, youth, and women. The development of a comprehensive olive value chain is therefore essential to maximize these benefits. In this regard, the sector offers substantial investment opportunities across multiple stages, from cultivation and processing to marketing and distribution.

According to recent estimates from the Pak Olive Project, the economic potential of the sector is considerable. The projected annual income from the cultivation of 50,000 acres is estimated at approximately PKR 14.58 billion from the eleventh year onward, while the cumulative income over a 25-year period is expected to reach around PKR 249.125 billion.

Table 1: Expected income from 50,000 acres of olive plantation.

Title	Calculations
Average fruit production per plant	15 kg/plant
Average oil production	12 %
Number of plants/acres after 5 years of plantation	108 (assuming 80% survival rate)
Average production/acre	1,620 kg
Average oil production/acre	195 Liters
Lowest price/liter	Rs.1500/-
Income/acre	Rs. 146,250/-
Average oil production/annum (50,000 acres)	10 million liters
Expected income (50,000 acres/annum)	14.58 billion Rs./annum (on year 11 & onward)
Cumulative income based on 25 years	249.125 billion Rs.

Source: Pak Olive Project

Overall, Pakistan has significant potential to expand domestic edible oil production through the development of the olive sector. Realizing this potential will require strengthening the capacities of both public and private stakeholders, particularly in areas such as orchard management, nursery development, value addition, business planning, and market integration.

3. Social dimension

From a social perspective, agriculture remains a major source of employment and livelihood in Pakistan, particularly in rural areas where a large proportion of the population depends directly or indirectly on agricultural activities. However, the sector faces increasing challenges related to unemployment, poverty, rural-to-urban migration, unequal land distribution, and the growing impacts of climate change. In a country where nearly 64% of the population is under the age of 30, the creation of sustainable livelihood opportunities has become an important national priority. Despite the continued importance of agriculture, rural economies in Pakistan are becoming increasingly diversified, with a growing share of the population engaged in non-farm activities due to declining agricultural profitability, land fragmentation, and urban expansion.

Within this context, the development of the olive value chain has the potential to generate significant social benefits, particularly in marginal and disadvantaged regions. Olive cultivation can contribute to rural development by creating employment opportunities in nursery management, plantation establishment, orchard maintenance, harvesting, processing, packaging, marketing, and agrotourism activities. The sector also offers opportunities for the development of small-scale and cottage industries, especially for women and youth, through value-added products such as table olives, olive oil, soaps, cosmetics, and artisanal products. Furthermore, olive cultivation on marginal and underutilized lands can improve household incomes without directly competing with major traditional crops, thereby supporting livelihood diversification and reducing economic vulnerability in rural communities.

The expansion of olive cultivation may also contribute to reducing rural migration by creating new economic opportunities at the local level and strengthening the participation of the private sector in rural economies. In addition, training programs, technical assistance, and international cooperation initiatives have enhanced local capacities and increased awareness regarding modern olive production and processing practices. Consequently, the olive sector is increasingly viewed not only as an agricultural activity, but also as a potential driver of inclusive rural development, social stability, and improved living conditions in olive-growing areas of Pakistan.

Following the growing recognition of the economic, environmental, and social importance of olive cultivation, Pakistan has increasingly prioritized the development of the olive sector through national policies, institutional support, and international cooperation initiatives. In recent decades, several public and private interventions have contributed to the expansion of olive plantations, the introduction of adapted cultivars, the establishment of processing facilities, and the strengthening of technical capacities along the olive value chain. These efforts have laid the foundation for the gradual development of olive production and processing activities in different regions of the country.

III – Production and processing

1. Cultivation

Pakistan has abundant land for the cultivation of olives and is considered an attractive country for commercial production of olives due to its suitable climate conditions, soil quality, and ecological diversity. Figure 2 illustrates the districts currently having olive cultivation in Pakistan.

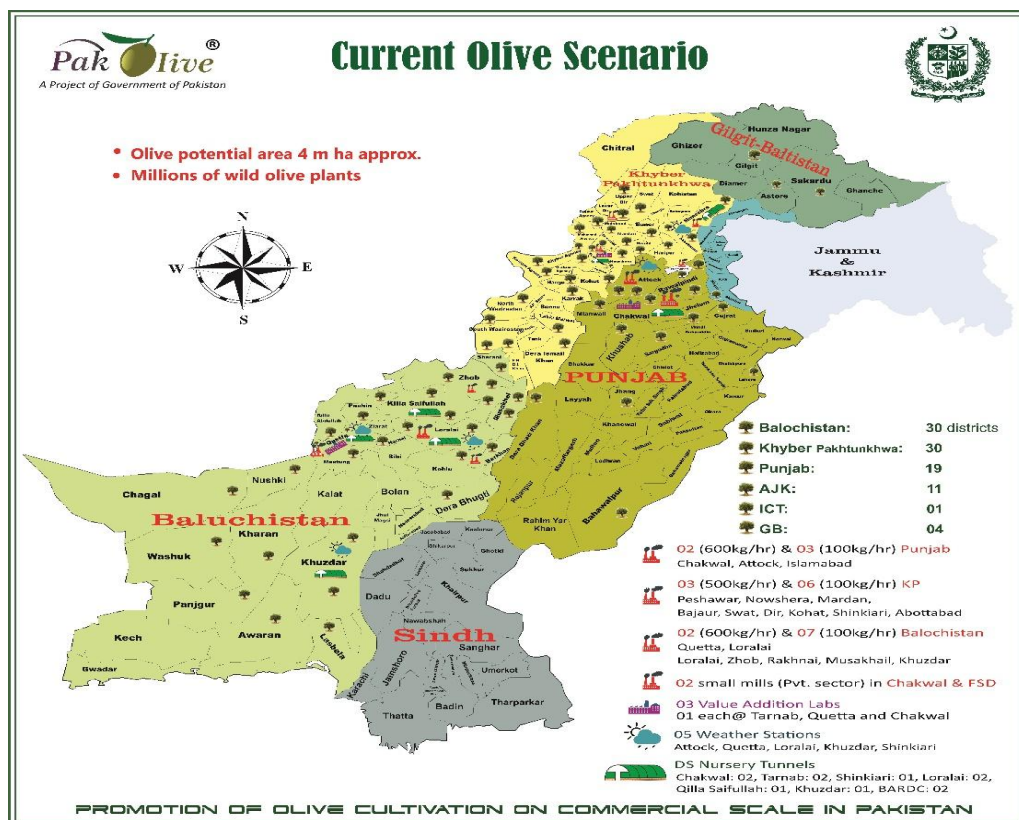


Figure 2. Status of olive plantation across districts in Pakistan (Pak Olive Project).

The production of indigenous nursery plants is being encouraged under current projects to reduce reliance on imported planting material. In this regard, nursery staff are being trained to ensure the certification of true-to-type, disease-free plants. There is significant potential to involve youth in nursery development activities, while women can play an important role in value addition processes.

At present, not all olive plants have reached the fruit-bearing stage, and due to the absence of baseline surveys, official production figures remain unavailable. However, based on initial plantation results, an olive tree produces, on average, between 20 and 35 kilograms of fruit annually, with an oil content exceeding 12%. Initially, plantations were established using a spacing of 20×20 feet, resulting in approximately 107-108 plants per acre. This density has since

increased to around 135 plants per acre, which is now commonly practiced in several regions. Assuming a density of 108 plants per acre, yielding approximately 2,160 kilograms of olives per acre, it is estimated that around 260 kilograms of olive oil can be extracted per acre under optimal soil and water conditions, provided that good agricultural practices are fully implemented.

Since the launch of the “*Promotion of Olive Cultivation on Commercial Scale in Pakistan (POCCSP)*” project in 2014, plantations have been established in different phases up to 2021, resulting in considerable variation in the age of olive trees across the country. A major constraint in conducting comprehensive technical, economic, and social evaluations is that only about 17% of the sampled orchards have started producing fruit, with productivity levels ranging from less than 1% to full capacity. Notably, only three out of 670 surveyed farmers reported orchards operating at 100% production capacity. While 129 farmers provided responses reflecting current conditions, a clearer picture of the sector’s performance will emerge once at least 50% of orchards reach full productivity. A more accurate assessment of the socio-economic impact is expected within the next 4-5 years, when a larger proportion of plantations becomes fully productive. At that stage, the availability of olive fruit in greater quantities will also enhance the effectiveness of supporting facilities such as extraction units and value addition laboratories.

The evaluation of olive plantation initiatives highlights overall positive impacts on farmers, local communities, and the environment. Most indicators suggest that olive cultivation has had beneficial effects, particularly through the productive use of marginal and previously barren lands. Survey results indicate that 303 farmers utilized such lands for olive cultivation, many of whom owned less than 10 acres. Additionally, respondents reported positive spillover effects on surrounding vegetation, suggesting that expansion of olive cultivation could further support ecological improvement.

Among the provinces, olives grown in Balochistan exhibit the highest oil content, ranging between 18-20%, which is comparable to international standards. In contrast, olives cultivated in Punjab typically yield around 12% oil content.

As olive cultivation is still at an early stage in Pakistan, there is a clear need to enhance farmers’ knowledge of best agricultural practices. In particular, improving integrated farm management and increasing productivity require targeted training and capacity-building efforts. Farmers, especially those new to olive cultivation, require support in areas such as planting techniques, fertilizer application, pest management, pre- and post-harvest handling, and irrigation practices to ensure consistent quality and yields.

Although olive trees are drought-tolerant, supplementary irrigation at critical phenological stages is essential to achieve optimal yields. High-efficiency irrigation systems, such as drip irrigation, not only conserve water but also improve fruit quality and reduce the incidence of pests and diseases. The provision of subsidized drip irrigation systems represents a significant opportunity for the government to further encourage olive cultivation. In contrast, many large and medium-sized farms continue to rely on inefficient practices such as flood irrigation for crops like rice, leading to excessive groundwater extraction. These practices have contributed to widespread issues of waterlogging and soil salinity, rendering large areas of land unsuitable for cultivation. Drip irrigation offers a viable alternative for improved water management. Although maintenance challenges exist, these can be addressed through targeted training programs. While only 17% of surveyed farmers currently use drip irrigation, most recognize its potential to reduce water use by up to 50%, while also mitigating land degradation caused by erosion and desertification.

The contribution of renewable energy to the olive sector remains limited, although it has increased slightly from 2.4% to 3.02%. Expanding the use of renewable energy across the entire olive value chain, from cultivation to processing and transportation, would support the development of a fully “green” olive production system.

Additionally, training and extension services are typically provided by government agricultural departments; however, additional efforts are needed to ensure that knowledge of best practices is effectively disseminated among farmers. Currently, improper harvesting techniques and inadequate tools are commonly used, which negatively affect both yield and quality. Similarly, poor handling practices during transportation, such as stacking sacks of olives, can damage the fruit and reduce oil quality. While hand-picking remains the least damaging harvesting method, it is labor-intensive and costly.

With regard to value addition infrastructure, facilities such as oil extraction units, laboratories, and weather stations have been established and are operational. However, farmers’ access to these services needs to be improved through increased availability, better outreach, and awareness initiatives. Expanding these facilities and enhancing digital access would further strengthen their utilization and impact.

Box 1 summarizes the main agronomic and technical requirements for olive cultivation in Pakistan, including cultivar selection, soil and climatic conditions, plantation management, irrigation, fertilization, pollination, and harvesting practices.

2. Processing

Olive processing, including the production of oil, pickles, and other value-added products, is aimed at obtaining edible oil and palatable olives, while enhancing profitability and improving the living standards and health of youth, women, and rural communities. The overarching goal is to develop a strong and sustainable olive value chain. This sector offers significant investment opportunities.

A. Olive oil

Olive cultivation is considered a national priority, and supporting farmers can contribute significantly to increasing domestic edible oil production and strengthening the national economy. Establishing effective linkages across the sector is essential for developing the entire olive value chain.

Currently, the supply of olive fruit varies across regions, largely due to differences in tree age, with less than 20% of trees presently bearing fruit. However, olive supply for oil extraction is expected to increase rapidly in the coming years. Some processing units already have storage facilities within their premises, and a few offer opportunities for producing value-added products. Certain units also assist farmers in developing olive-based products, while others are connected with meteorological services to provide relevant support.

Figure 3 presents the different steps of the extraction process of olive oil.

BOX 1: Olive cultivation requirements

a) Varieties: A wide range of olive varieties are cultivated in Pakistan. Among the most prominent are Frantoio, Arbosana, Arbequina, Coratina, Koroneiki, Leccino, Pendolino, Gemlik, Picual, and Hojiblanca.

b) Soil and climatic requirements: Olive trees perform best in deep, fertile soils and under moderate climatic conditions. Ideally, temperatures should average around 10°C and not fall below -10°C. However, heat-tolerant varieties are now available that can withstand temperatures up to 37°C. Although olive trees are relatively drought-resistant, irrigation is often required for optimal growth and yield. The trees require a chilling period (winter dormancy) of approximately 60-80 days, with average temperatures between 4-7°C, to ensure proper flower bud differentiation. This corresponds to about 250 chilling hours, depending on the cultivar. During the winter months (November to February), temperatures should ideally not exceed 22°C. Olive trees can tolerate short periods of gradual temperature decline to -10°C. Optimal fruit yield and quality are achieved in regions with mild winters and long, warm, and dry summers. Soils that are neutral to slightly saline, with about 5% clay content, are suitable. The optimal soil pH ranges between 5.6 and 8.5 (not below 5 or above 8.5). While nitrogen is essential for growth, boron deficiency can significantly affect plant development.

c) Land preparation: The soil should be thoroughly ploughed prior to planting. Pits measuring approximately 2.5×2.5 feet should be prepared at least one week before plantation.

d) Planting time: Olive trees can be planted during both spring and autumn. However, autumn planting is preferred, if there is no likelihood of frost during winter.

e) Planting geometry: Initially, olive plantations in Pakistan followed a spacing of 20×20 feet, accommodating approximately 107 plants per acre. This has now been increased to around 135 plants per acre in many regions. Trees are typically planted in a square layout, maintaining equal spacing between rows and plants. A spacing of 18×18 feet is considered optimal, provided regular pruning is carried out. Under suitable soil and irrigation conditions, this spacing allows for approximately 135 trees per acre.

f) Irrigation requirements: Although olive trees are hardy and drought-tolerant, timely irrigation is essential, particularly during the first two years after planting. In rainfed areas, annual rainfall ranges from 150 to 500 mm but is often irregular and insufficient for crop needs. In the absence of rainfall, trees should be irrigated two to three times annually, typically: i) before flowering; ii) after flowering; iii) 30-45 days before fruit maturation. Additional irrigation may be required during flowering under certain conditions.

g) Pollination requirements: Olive trees are monoecious, bearing flowers along the shoots in panicles. Both self- and cross-pollination can occur; however, the use of self-pollinating varieties is increasingly encouraged.

h) Fertilizer requirement

Fertilizer application depends on soil conditions (soil testing is recommended), as well as the variety and age of the trees. As a general guideline, after three years of plantation, approximately 300 kg/ha of phosphorus, 200 kg/ha of potash, 200 kg/ha of nitrogen, along with an adequate quantity of farmyard manure, should be applied.

i) Fruit harvesting: Olives typically mature between September and October. Harvesting methods include: i) hand-picking individual fruits for pickling or high-quality oil production; ii) shaking branches and collecting fallen fruits; iii) mechanical shaking of trunks and branches.

j) Harvesting for pickle: Fruits intended for pickling are harvested when they are light green. After washing, they are treated in a 1-2% sodium hydroxide (NaOH) solution for approximately 12 hours. The fruits are then washed 5-6 times and placed in an 8-10% sodium chloride (NaCl) solution for 14-21 days. Subsequently, they are washed again and preserved in a fresh brine solution (5-6%), with the pH adjusted to a safe level (below 4.6) using organic acids.

k) Harvesting for oil : Fruits for oil production are harvested when color changes begin (from green to purple), typically between September and October. The harvested fruits are then processed for oil extraction.

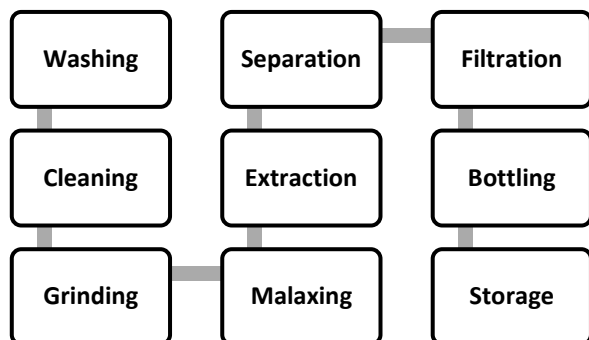


Figure 3. Olive oil extraction process.

Despite government efforts to provide olive oil extraction and processing facilities, a study by Khaity Technologies (“Impact Assessments”) revealed that 63% of farmers face high transportation costs when delivering olives to extraction units of their choice. Olive oil is sold in the domestic market at premium prices ranging from PKR 2,500 to PKR 3,000 per litre, making it more profitable for farmers to sell oil rather than raw olives. While some studies report olive fruit prices at around PKR 100 per kilogram due to market dynamics, farmers typically sell olives at PKR 150 to 300 per kilogram.

To maintain superior extra virgin olive oil quality, olives should ideally be milled within 24 hours of harvesting. However, most farmers are located far from extraction facilities, and many share limited processing units. As a result, delays in processing are common, which negatively impacts oil quality. Given the wide geographical distribution of olive farms, there is a clear need for a decentralized network of smaller mills closer to farms, as well as larger-capacity extraction facilities. At present, the number of extraction units remains limited, most of which have been established by the government or through collaborations with international organizations for research and development (Table 2). Additionally, the high cost of imported extraction machinery poses a challenge.

Poor rural infrastructure and fragmented landholdings further complicate timely processing and hinder the production of high-quality extra virgin olive oil. Storage also plays a critical role in maintaining quality, yet proper storage facilities are largely unavailable domestically. The use of inappropriate storage containers further degrades the quality of both olives and olive oil. Non-corrosive storage containers are imported and accessible only to a limited number of farmers. However, initiatives under the POCCSP project, such as providing lockable fruit baskets and non-welded stainless-steel containers, have contributed to safer transportation and better preservation of oil quality.

Another key challenge is the lack of technical knowledge among managers and operators of extraction units. Ensuring high-quality olive oil requires proper understanding of post-harvest handling practices, including transportation, storage, and pre-processing management, as well as best practices during extraction. While provincial agriculture departments offer extension services, additional capacity building is needed. In this regard, the OliveCulture Project initiated hands-on training programs for managers and operators of both public and private extraction units at the start of the 2022 crushing season. Training also covered techniques for table olive processing, and these activities are expected to continue in subsequent seasons.

Table 2. Olive oil extraction units in Pakistan (Public and Private Sector).

Brand	Capacity (kg/hr)	Number of units	Location	Phasing	Project
Pieralisi	600	3	GRS Attock, ARI Loralai and BARDC Quetta	2-Phase	Federal Project
Pieralisi	600	1	BARI, Chakwal	2-Phase	Punjab Govt.
Mori Tem	500	3	CCRI Pir Sabaq, Sanghbhatti Swat	2-Phase	ADP KP Government
Alfa Lavel	500	1	ARI, Tarnab	3-Phase	Italian grant with PODB
FORMA - Mori-Tem	250	3	Zhob, Muslim Bagh, Lower Dir	2-Phase	PPAF
FORMA - Mori-Tem	250	2	BARS Kohat, ARS Abbottabad	2-Phase	ADP KP Government
Kocomaz	200	1	Israr Farm Dherai Thalash, Lower Dir	2- Phase	SMEDA
(Turkish Brand) Oliomio Gold, Mori-Tem	200	1	Agriculture Research Station Khuzdar	2-Phase	ADP Balochistan
Oliomio Gold, Mori-Tem	200	1	Agri. Ext. Bajour	2-Phase	ADP KP Government
Oliomio Gold, Mori-Tem	100	6	Islamabad, Chakwal, Zhob, Rakhni, Lower Dir, and Shinkhari Mansehra	2-Phase	Federal Project
Oliomio Gold, Mori-Tem	100	2	Faisalabad, Chakwal	2-Phase	Private sector USAID matching grant
Oliomio Gold, Mori-Tem	100	1	Agri. Ext. Orakzai	2-Phase	ADP KP Government

B. Table olives

In addition to olive oil, table olives represent another important value-added product with strong potential in Pakistan. However, their processing requires specialized techniques. Table olive varieties are typically larger in size, and harvesting time depends on the desired maturity stage. Processed table olives can be marketed in various forms, including green or black, whole or sliced, and with or without pits.

Currently, most table olive processing in Pakistan is carried out manually, with limited availability of machinery for efficient and large-scale production. Although USAID supported the establishment of table olive processing units in the Potohar region in 2018 under a grant-matching program, these facilities face a shortage of raw material.

Under the POCCSP project, three value addition laboratories (table olive processing units) equipped with the necessary facilities, equipment, and chemicals have been established at Barani Agricultural Research Institute (BARI) Chakwal, Tarnab (Peshawar), and Agricultural Research Institute (ARI) Quetta. Despite these efforts, access to such facilities remains limited: 48% of respondents (276 individuals) reported having no access to value addition labs, 35% (200 respondents) indicated the question was not applicable, and 9% (54 respondents) were unaware of these facilities.

Although table olives have clear market demand and promising future potential domestically, there is limited emphasis on cultivating varieties specifically suited for table olive production. Most currently grown varieties are primarily used for oil extraction. Both government policies and farmer practices are focused on oil production, largely because oil extraction is subsidized, whereas table olive production receives no such support.

Furthermore, only a small number of commercial players are engaged in table olive production, and technological adoption remains minimal. Small-scale farmers and processors rely heavily on manual methods for de-pitting and slicing, as commercial-grade machinery is not widely available. Nonetheless, it is important to note that, unlike olive oil, which competes with substitutes such as palm, soybean, and canola oils, table olives have no direct substitutes. With the growing popularity of Mediterranean cuisine in Pakistan, including foods such as pizza, pasta, and sandwiches, the domestic demand for table olives is expected to rise significantly.

IV – Marketing

There is a lack of up-to-date and comprehensive market information on Pakistan's olive sector. Limited efforts have been made to understand key aspects such as product diffusion, product development, supply chains, consumer preferences, usage patterns, demand, and marketing prospects in local and regional markets. This gap has resulted in weak linkages for product development and poor market integration of locally produced olives. Notably, the study conducted by Pakistan Edible Oil Research Institute (PERI) titled *"Market Analysis for Value Chain and Olive Oil Consumption in Pakistan"* dates back to 2016, highlighting the need for more recent analyses.

Significant improvements are also required in branding and certification, which are essential for developing a competitive, supply-driven, and export-oriented olive value chain in Pakistan. In this context, regulatory frameworks offer valuable guidance and should be considered by emerging olive-producing countries like Pakistan to align with international standards. These regulations aim to prevent fraud in olive marketing by enhancing transparency through proper labelling, which ensures information about oil quality, origin, and storage conditions.

With growing awareness of the health benefits associated with agri-food products such as olives, demand for olive oil and value-added olive products is steadily increasing. This creates opportunities for revenue generation through both domestic sales and exports. However, access to markets remains a major challenge for farmers, with distance identified as one of the most significant barriers. As a relatively new entrant in olive cultivation and production, Pakistan requires enhanced cooperation among national and international stakeholders to strengthen its marketing systems.

1. Marketing channels of olive

The value chain concept is increasingly recognized as an effective and profitable strategy in agricultural and food systems. Sustainable development goals can be achieved by systematically integrating social, environmental, and economic considerations into all stages of the value chain. Identifying and optimizing marketing channels is essential to ensure benefits for both farmers and consumers. In developing countries such as Pakistan, the lack of well-structured agricultural markets remains a major constraint. A study titled *"Economics and Marketing of Olive in Punjab"*,

conducted in the Potohar region, analyzed olive cultivation and marketing systems and mapped trade flows within the olive supply chain (Figure 4).

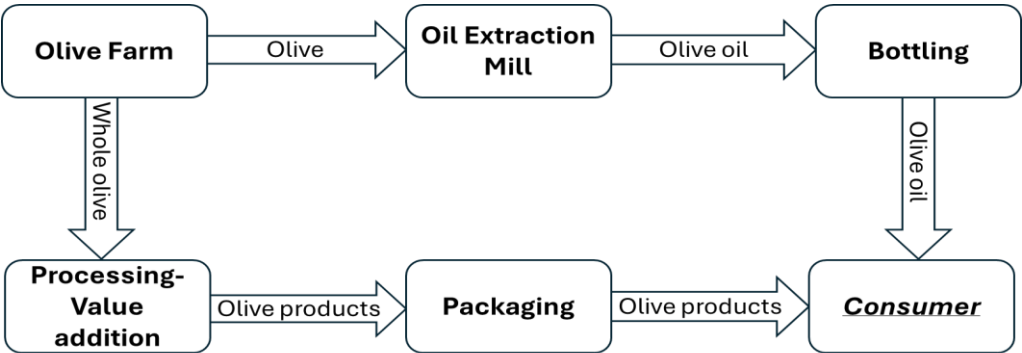


Figure 4. Trade flows in olive supply chain.

Based on focus group discussions involving farmers, agricultural extension agents, commission agents, retailers, and consumers, the study identified existing marketing channels in Potohar (Figure 5).

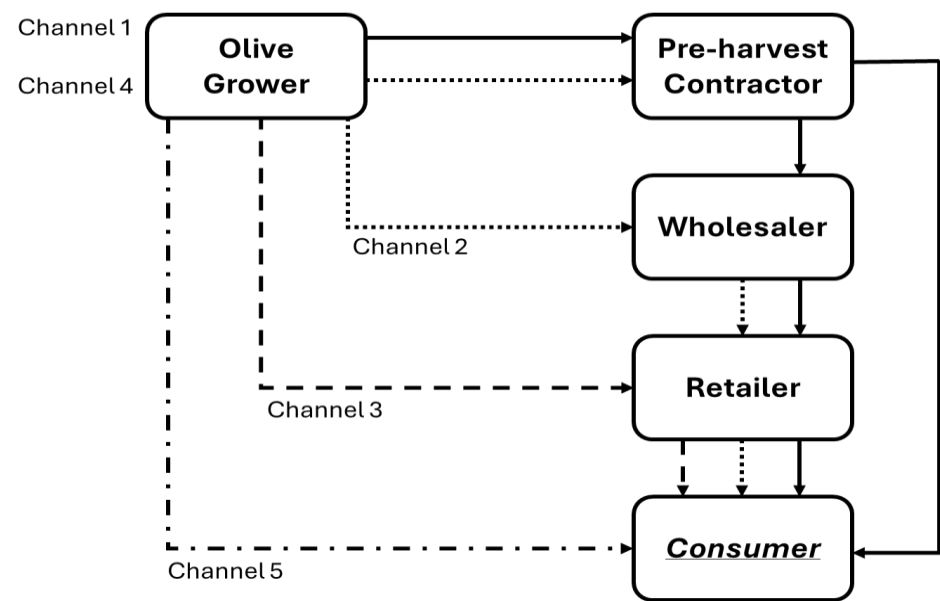


Figure 5. Identification of marketing channels in olive supply chain.

2. Domestic demand for olive oil

Olive oil imports in Pakistan have increased steadily over time. However, despite growing awareness of its health benefits, consumption remains limited due to high prices, low consumer awareness, and dietary preferences. Pakistani cuisine often involves deep frying and high oil consumption, leading consumers to prefer cheaper alternatives such as palm, sunflower, and canola oils. Since olive oil is largely imported, it remains relatively expensive and is mainly available in supermarkets and urban retail outlets. Consequently, affordability represents a major barrier to consumption, with approximately 70% of non-users reporting that they cannot afford olive oil. Even among middle- and high-income households, olive oil consumption remains relatively low compared to other edible oils.

3. Import of olive oil

To meet domestic demand, Pakistan relies heavily on imported olive oil. Out of a total edible oil import bill of USD 3.6 billion, approximately USD 3.4 billion was spent on palm oil in 2021, while only USD 13 million was spent on olive oil, representing just 0.36% of total edible oil imports. This indicates a relatively low demand for olive oil compared to widely used alternatives like palm oil.

Pakistan's per capita edible oil consumption is estimated at around 22 kg annually; however, olive oil accounts for only a very small share. In 2021, approximately 4,488 tons of olive oil were imported, compared to about 3.1 million tons of palm oil (94.6% of total edible oil imports). Per capita olive oil consumption is approximately 0.017 kg per year, which is extremely low compared to leading olive-producing and consuming countries such as Greece, Spain, Italy, Morocco, and Turkey. This comparison suggests that higher domestic consumption is closely linked to sustained investment in the olive sector.

Despite low consumption levels, there has been a significant increase in olive oil imports over the past two decades, from PKR 36 million (253 tons) in 2001-2002 to PKR 2,107 million (4,590 tons) in 2020-2021 (Figure 6). This upward trend reflects a gradual shift in consumer preferences toward healthier dietary options, increased awareness of olive oil benefits, and the growing influence of international cuisines that incorporate olive oil.



Figure 6. Import of olive oil in Pakistan (Source: Pakistan Bureau of Statistics 2020-2021).

The rising consumption trend presents opportunities for domestic producers to capture market share currently held by imported products. Additionally, there is potential for entering export markets. However, as a relatively new sector, research on olive cultivation and marketing in Pakistan remains limited. This lack of comprehensive market research represents both a weakness and an opportunity for stakeholders, researchers, and agribusinesses to explore.

4. Constraints in market development

The main constraints affecting market development are as follows:

- a. **Lack of cost-effective packaging:** Appropriate packaging is essential to preserve olive oil quality. Typically, olive oil is stored in tinted glass bottles to prevent light exposure and corrosion. In Pakistan, there is often a shortage of new glass bottles, forcing producers to reuse bottles for packaging extra virgin olive oil. Manufacturers also impose minimum order quantities that exceed the needs of small-scale producers. As a result, plastic bottles are sometimes used, which negatively affects oil quality.
- b. **Insufficient branding of Pakistani olive products:** There have been limited efforts to promote locally produced olive oil. Apart from initiatives such as the annual Olive Festival in Punjab, marketing activities remain minimal. While some participation in international trade fairs and exhibitions has occurred, exporting olive oil remains challenging without compliance with international standards.
- c. **Weak market linkages:** There is a lack of effective business linkages among farmers, processors, wholesalers, and retailers. Most large retail chains do not stock locally produced olive oil. Instead, sales are primarily conducted through informal channels such as word of mouth, small organic stores, or online platforms like social media pages.
- d. **Absence of quality standards and testing facilities:** Currently, most olive farms and processing units lack certifications such as Good Agricultural Practices (GAP), HACCP, or ISO. Traceability systems required for international trade are also absent. Olive oil is often sold without proper testing, making it unclear whether it meets virgin or extra virgin standards. Laboratory testing facilities are limited and costly. However, initiatives under the POCCSP-II project aim to establish laboratories and sensory evaluation facilities, while the OliveCulture Project is contributing through infrastructure design and technical training.
- e. **Limited private sector participation:** Large food processing companies have not yet entered the olive sector due to inconsistent supply and variable quality of olives. Edible oil processors typically require between 100 and 400 tons of olive oil annually, which is difficult to source domestically. Consequently, major retail and wholesale chains do not stock local olive oil. Increased private sector investment in cultivation, milling, and storage could significantly boost production volumes and quality, enabling both domestic market expansion and export potential.
- f. **Lack of demand-side strategy:** While government initiatives have focused on strengthening the supply side, there has been limited emphasis on demand generation. Market-based research on consumer preferences and behavior remains insufficient. As a result, domestic demand for olive oil and related products is still relatively low.

Overall, olive cultivation represents a strategic opportunity for Pakistan to convert degraded and marginal lands into productive agricultural systems. It can contribute to increasing domestic edible oil production, mitigating climate change impacts, and providing sustainable livelihoods to rural communities, particularly in areas with limited economic opportunities beyond agriculture.

Nevertheless, highly productive agricultural land and freshwater resources remain scarce and are primarily allocated to traditional food and cash crops.

V – Legislation, certification and policies

Regarding policy development, the need to establish a comprehensive national framework for the olive oil value chain in Pakistan was identified several years ago. In the absence of such a framework, various components of the value chain remain underdeveloped, fragmented, or evolving in isolation, without benefiting from accumulated knowledge and prior experiences. These components span a wide range of sectors, including sapling production and import, cultivar selection, plantation management, phytosanitary measures, pest control, harvesting, processing technologies, commercialization, quality standards, legal frameworks, monitoring systems, and research.

To address these challenges, the Government of Pakistan has mobilized key organizations involved in agricultural research and development to fully harness the country's potential for olive production. This effort is aligned with broader national objectives such as achieving self-reliance in edible oil production and addressing climate change mitigation and adaptation goals.

In this context, the POCCSP-II Project proposed the establishment of an Olive Advisory Council to address bottlenecks in value addition and to promote olive cultivation nationwide. Complementing this initiative, the recently established Pakistani Olive Stakeholder Group brings together representatives from the Pakistan Chambers of Commerce, Pakistan Business Council, academia, entrepreneurs, researchers, and progressive growers. This group is tasked with contributing to the development of an appropriate institutional and regulatory mechanism.

The establishment of the Pakistani Olive Stakeholder Group under the MNFSR has been finalized through the Italian-funded OliveCulture Project. Building on this, the proposed Pakistan Olive and Olive Oil Council is expected to be established through formal approval by the MNFSR, ideally via an Act of Parliament or a Presidential Ordinance, similar to the establishment of institutions such as the Pakistan Tobacco Board. This Council would oversee matters related to quality, standards, certification, and policy guidance for the olive sector. To this end, the Stakeholder Group has drafted a comprehensive regulatory framework titled *“Pakistan Olive and Olive Oil Council: Establishment and Regulations,”* comprising 22 articles that define the Council's purpose, structure, scope, and responsibilities (Annex I). Furthermore, a logo of Pakistan Olive Oil Council has been designed and proposed by the Pakistani Olive Stakeholder Group (Annex II).

Strong emphasis has also been placed on strengthening the capacities of both public and private sectors in areas such as nursery development, value addition, and marketing. The private sector is expected to play a key role across the entire value chain, supported through training and capacity-building initiatives, particularly in the production of locally adapted nursery plants.

Recent government-led policy initiatives relevant to the olive sector include:

- The Strategic Trade Policy Framework (STPF) 2020-2025 by the Ministry of Commerce, which aims to promote agricultural mechanization and integrate Pakistan's agriculture sector into global value chains. As part of the broader agricultural sector, the olive industry stands to benefit from these measures.

- Policy measures by MNFSR, implemented in coordination with provincial governments, focus on improving market intelligence, enhancing market access, strengthening regulatory frameworks, and promoting grading and packaging practices. The use of ICT tools for disseminating market information, as well as the development of farmer-centered marketing systems and e-marketing platforms, is also encouraged. These efforts are supported by a growing market niche for olive oil.
- The national branding initiative “Emerging Pakistan”, launched by the Ministry of Commerce, aims to support brand development among traders, investors, and firms. Olive oil processors can leverage this initiative to establish and promote their brands. Additionally, medium- and long-term support from international donors presents further opportunities for sector development.
- The Geographical Indications (Registration and Protection) Act, 2020, which provides legal protection for products originating from specific regions. This framework enables the registration of local olive and olive oil products, facilitating their entry into global markets.
- Rural development policies under the MNFSR which aim at promoting olive cultivation in some of the country’s poorest districts. These initiatives target marginal and degraded lands, estimated at over 7 million hectares, that are unsuitable for traditional crops but well-suited for olive cultivation, thereby supporting rural livelihoods and environmental sustainability.

VI – Research, education, training and extension

Pakistan, as an agrarian economy, has a well-established network of educational, research, and training institutions. However, continuous improvement in both quality and capacity remains essential, particularly in the context of ongoing innovations and advancements in agricultural research. The agriculture sector employs approximately 45% of the national workforce and contributes around 24% to the country’s GDP.

Numerous public and private organizations, as well as academic and research institutions, are actively engaged in studying the socio-economic and environmental benefits of olive cultivation. Key institutions involved in olive-related research across Pakistan include:

- National Agricultural Research Centre, Islamabad
- Barani Agricultural Research Institute, Chakwal
- Agricultural Research Institute, Tarnab (Peshawar)
- National Tea and High-Value Crop Research Institute, Shinkiari (Mansehra)
- Agricultural Research Institute, Sariab (Quetta)
- Balochistan Agricultural Research and Development Centre, Quetta
- Department of Agriculture, Muzaffarabad
- Mountain Agriculture Research Centre, Juglot (Gilgit)

A major component of the POCCSP initiative has been training and capacity development. Between 2014 and 2021, a total of 63 training sessions were conducted, benefiting more than 4,370 farmers and stakeholders. These programs provided hands-on training in best practices

related to olive cultivation, pruning, nursery establishment, processing, packaging, and marketing. Local experts with specialized knowledge were engaged to deliver these trainings.

The OliveCulture Project has further strengthened these efforts. During its first season (September-November 2022), Italian specialists trained 241 beneficiaries, including scientists, technicians, farmers, and women, on Good Agricultural Practices (GAP). In addition, 360 technicians and stakeholders received training on olive oil and table olive processing through both theoretical and practical sessions conducted in Balochistan, KP (including newly merged districts), and Punjab.

Research, development, and training activities are also supported by dedicated institutions such as the Center of Excellence for Olive Research and Training (CEFORT), established by the Government of Punjab at BARI Chakwal with technical assistance from USAID. This institution plays a key role in providing practical training and advancing expertise in olive farming, nursery management, value addition, branding, and marketing.

Finally, the growing emphasis on evidence-based decision-making highlights the importance of reliable data collection, monitoring, and evaluation systems. Effective measurement of activities, outcomes, and progress toward development goals is essential for strengthening the olive value chain. However, it remains unclear whether a comprehensive monitoring and evaluation system has been fully established, what type of data is being collected, whether it is standardized, and how effectively it is being analyzed and utilized.

VII – SWOT analysis

SWOT analysis has been widely used for decades as one of the most common strategic assessment tools for the development, evaluation, and implementation of strategies. The term SWOT is an acronym for Strengths, Weaknesses, Opportunities, and Threats. These four elements form a structured four-quadrant framework that is used to assess the viability of a strategy or initiative within a specific context. Therefore, a thorough understanding of the contextual environment is essential for conducting an effective SWOT analysis.

By examining internal factors (strengths and weaknesses) alongside external factors (opportunities and threats), the SWOT framework provides a comprehensive overview of a given situation. It also offers valuable insights that support the effective design and implementation of strategies. This method is widely employed by policymakers, businesses, corporations, and individuals as a practical tool for setting realistic objectives. It helps identify internal capabilities and limitations, as well as external risks and prospects.

In the context of Pakistan's olive sector, strengths and weaknesses are considered internal factors that reflect the current status of the sector. In contrast, opportunities and threats are external factors arising from the broader environment and represent potential future developments.

The SWOT analysis of the Pakistani olive supply chain has been structured into four thematic areas:

1. Production and processing (including nurseries, farms, mills, etc.), focusing on technical and environmental aspects (Table 3);
2. Marketing, addressing commercial aspects (Table 4);

3. Legislation, certification, and policies, covering administrative, financial, and institutional support (Table 5);
4. Research, education, training, and extension services, focusing on scientific support, knowledge transfer, and technical assistance (Table 6).

Table 3. SWOT matrix on production and processing.

Strengths		Weaknesses	
1.	Millions of wild olive plants exist in Pakistan, demonstrating strong agro-climatic suitability for olive cultivation.	1.	Limited cultivated areas under olives despite increasing demand for olive oil.
2.	Olive cultivation offers a valuable opportunity to utilize marginal, waste, and virgin lands unsuitable for conventional crops.	2.	Low productivity due to poor adoption of GAP and inadequate irrigation, leading to high sapling mortality.
3.	Promising olive oil yields have been observed in certain geographical regions.	3.	Limited and costly availability of key inputs such as fertilizers, pesticides, and water.
4.	Potential to significantly increase productivity (yield per hectare) through the adoption of GAP and standard operating procedures (SOPs).	4.	Limited knowledge of best practices among farmers, technicians, and processors.
5.	Existing capacity and infrastructure for seedling production.	5.	Inconsistent supply of good-quality olives for processing.
6.	Olive cultivation contributes to climate change mitigation, enhances biodiversity, increases carbon sequestration, reduces soil erosion and desertification, improves landscapes, and lowers irrigation water requirements.	6.	Farms fragmentation increases operational costs.
7.	Increasing adoption of efficient irrigation systems such as micro-irrigation.	7.	Limited use of mechanization and modern tools for cultivation and harvesting.
8.	Public sector (federal and provincial) support in establishing olive oil extraction facilities.	8.	Inadequate post-harvest handling, including delayed transportation and lack of proper containers.
9.	Feasibility of organic olive farming.	9.	Processing mills are often located far from farms and insufficient to meet farmers' needs.
10.	High potential profitability of olive farming with proper practices, infrastructure, and investment.	10.	Lack of farmer clusters, cooperatives, and associations.
		11.	Limited awareness of the sector's development potential.
		12.	Insufficient focus on table olive production.
		13.	Limited utilization of by-products (e.g., pomace, pellets) from processing.
		14.	Limited development of non-food olive products.
		15.	Minimal development of organic olive farming and certified organic products.
		16.	Olive cultivation is still a relatively new and emerging sector in Pakistan.
		17.	Lack of adequate storage facilities.
Opportunities		Threats	
1.	Government support for nursery development under POCCS project.	1.	Emergence of new pests and diseases affecting agricultural production.
2.	Vast suitable land area (over 4 million hectares) for olive cultivation, particularly in Balochistan, KP, Potohar (Punjab), Newly Merged Districts, and selected areas of Sindh (e.g., Ghorakh Hill, Dadu, Umarkot).	2.	Limited capacity of the national research system to rapidly adopt and disseminate new technologies.
3.	Strong agricultural labor base, with good availability of workers in rural olive-growing areas.	3.	Insufficient research and innovation support (e.g., weather stations, laboratories).
4.	Increasing global focus on climate resilience, creating opportunities for olive-based agro-systems.	4.	Limited availability and rising cost of inputs and machinery.
		5.	Climate change may negatively affect crop cycles, especially as Pakistan ranks among the most climate-vulnerable countries.
		6.	Risk of groundwater depletion due to expansion of irrigated agriculture.
		7.	Loss of skilled labor due to rural-to-urban migration and international migration.

Table 4. SWOT matrix on marketing.

Strengths	Weaknesses
- Existing plantations, once fully productive, can potentially meet Pakistan's current olive oil consumption. - Introduction of a national brand, "PakOlive," under a Geographical Indication framework. - Development of value-added products (e.g., olive pickles, jam, biscuits, cakes, olive morrabba), with knowledge transferred to the private sector. - Presence of private entrepreneurs engaged in olive-based businesses.	- Inconsistent quality of olive oil produced in certain regions. - High domestic demand results in limited availability of locally produced olive oil. - Limited consumer demand for olive oil, table olives, and value-added products. - Consumption is mainly limited to restaurants and higher-income consumers. - Lack of cost-effective and suitable packaging solutions. - Absence of quality standards and limited access to testing facilities, especially for exports. - Low consumer awareness of olive oil quality and origin. - Inefficient distribution systems. - Limited participation of large private-sector players in domestic marketing. - Insufficient knowledge of olive oil marketing and sales dynamics. - Absence of a demand-side marketing strategy.
Opportunities	Threats
- Olive oil represents a niche market with strong growth potential due to increasing consumer preference for healthier diets. - Government subsidies and support programs encourage olive cultivation at a commercial scale. - Rising domestic demand for table olives driven by the expansion of the fast-food and restaurant industry. - Import restrictions create an opportunity for local producers to replace imported olive oil in retail markets.	- Imports from Spain, Italy, and Turkey already meet current demand, limiting space for local producers. - Increasing olive production in neighboring countries (Afghanistan, India, Iran) intensifies competition. - Limited demand for organic products in Pakistan. - Low household income limits the affordability and consumption of olive oil. - Declining global purchasing power due to inflation makes olive oil less competitive internationally. - Seed oil remains more affordable and competitive than olive oil. - Heavy reliance on imports of edible oils and oilseeds. - Low overall health awareness among consumers. - Influx of non-certified imported olive oil undermines local production. - Rising costs of inputs (fertilizers, fuel, energy, etc.).

Table 5. SWOT matrix on legislation, certification, and policies.

Strengths	Weaknesses
1. The olive oil sector is increasingly being prioritized in national and provincial agricultural policies, encouraging both public and private investment across the value chain. 2. Significant medium- and long-term financial and technical support is available from international donors. 3. Olive cultivation has strong potential to reduce poverty, improve socio-economic conditions in rural areas, and support cottage industries involving youth and women. 4. Olive oil holds cultural and religious significance in Pakistan, alongside its recognized health benefits, supporting its acceptance among consumers. 5. Olive sector development aligns with Pakistan's National Development Agenda 2030 and contributes to multiple Sustainable Development Goals, including poverty reduction, food security, economic growth, responsible production, climate action, and partnerships.	1. Olive farms and processors largely lack certifications such as GAP, HACCP, ISO, Organic, and Geographical Indication (GI). 2. Absence of a functional certification system for olive plant propagation aligned with international standards. 3. Lack of an effective legislative and regulatory framework covering traceability, quality standards, food safety, development policies, and marketing. 4. Absence of comprehensive feasibility studies and business plans for medium- to large-scale investments. 5. Lack of government support services for transportation, increasing production costs and farmer dissatisfaction with market prices. 6. Limited development and experience in farmer cooperatives and associations. 7. Weak integration with complementary sectors such as agri-tourism and handicrafts. 8. Absence of a comprehensive National Strategic Plan for olive sector development. 9. Limited policy focus on table olives as a viable domestic market opportunity.
Opportunities	Threats
1. International projects and collaborations provide opportunities to expand domestic olive oil production. 2. Rural development policies support the expansion and strengthening of the olive value chain, particularly in suitable and marginal lands. 3. Potential certification and recognition by the International Olive Council (IOC) could facilitate access to global markets. 4. Recent initiatives by key ministries (Commerce, National Food Security and Research, Planning) aim to strengthen food value chains and supply systems.	1. Limited access to government loans and subsidies for small-scale entrepreneurs. 2. Lack of government procurement mechanisms to support farmers during market downturns. 3. Poor rural infrastructure (healthcare, education, markets, postal services) reduces the attractiveness of rural livelihoods. 4. Economic instability reduces consumer purchasing power, limiting demand for relatively expensive products like extra virgin olive oil. 5. Dominance of foreign companies in the market may limit benefits to the local economy. 6. Rural-to-urban migration reduces agricultural labor availability and cultivated land (urbanization). 7. Political instability discourages both domestic and foreign investment in the olive sector. 8. Policies facilitating imports (e.g., reduced tariffs on oilseeds) increase competition for local olive producers. 9. Persistent underdevelopment, poverty, and food insecurity in rural areas constrain sector growth.

Table 6. SWOT matrix on research, education, training, and extension services.

Strengths	Weaknesses
- Public research and educational institutions in Pakistan are actively engaged in olive cultivation and processing, providing human resources and infrastructure. - Presence of an institutional network of international research and educational organizations supporting the olive sector. - Government departments regularly organize training sessions and seminars for stakeholders.	- Incomplete knowledge of local and international olive varieties, particularly regarding quality traits and adaptability to different agro-ecological zones. - Limited knowledge of best practices in farming, processing, and marketing. - Low awareness of the nutritional and health benefits of extra virgin olive oil. - Shortage of trained and skilled workforce for key activities such as pruning, harvesting, and drip irrigation management. - Limited availability of reliable and systematized local data on cultivation techniques, varietal performance, production costs, and monitoring systems. - Insufficient market research to evaluate the full potential of Pakistani olive oil in domestic and international markets.
Opportunities	Threats
- Increasing use of social media platforms for awareness, knowledge sharing, and guidance on olive farming and marketing. - Availability of effective communication tools (TV, radio, and internet) to disseminate information and provide training through campaigns and programs. - Access to extensive international knowledge and research on olive cultivation and processing that can be adapted to local conditions.	- Emergence of new pests and diseases affecting olive cultivation. - Limited capacity of the national research system to rapidly adopt and implement new technologies. - Insufficient support from research and innovation systems (e.g., weather stations, laboratories, extension services).

VIII –Needs and policy gaps

Based on the SWOT analysis and across the identified thematic areas, the key needs and policy gaps in Pakistan's olive sector, from farm to fork, are outlined below:

1. Production and processing

- Expand olive cultivation, particularly in marginal and virgin lands, to enhance production and contribute to climate change mitigation;
- Ensure certification of olive seedlings in terms of phytosanitary status and varietal authenticity, while reducing field mortality rates;
- Improve yields both at the farm level and during processing;
- Increase the availability and affordability of essential inputs (e.g., fertilizers, pesticides, water) and agricultural machinery;
- Enhance the quality of olives, olive oil, and table olives;
- Upgrade storage systems and packaging technologies;
- Promote the production of certified organic olives and olive oil;

- Encourage a more balanced and accessible distribution of oil mills across olive-growing regions;
- Improve mechanization systems for cultivation and harvesting;
- Promote the development and utilization of non-food products and by-products (e.g., soap, olive wood products);
- Increase farm profitability by reducing costs and/or enhancing revenues.

2. Marketing

- Reduce dependence on imported seed oils;
- Increase consumer awareness of the health benefits of olive oil to stimulate demand;
- Promote the consumption of olive oil and table olives, particularly locally produced products.

3. Legislation, certification, and policies

- Develop new legislation and update existing regulatory frameworks to ensure business registration and compliance with international standards (sanitary, quality, trade, and export requirements);
- Strengthen certification systems, particularly for international standards such as GAP, HACCP, ISO, and organic agriculture;
- Promote horizontal and vertical cooperation across the supply and value chains;
- Encourage multidisciplinary agricultural development, integrating sectors such as tourism and handicrafts;
- Increase subsidies to support quality production;
- Improve farmers' access to credit;
- Address rural-to-urban migration, particularly among youth and skilled labor;
- Strengthen international cooperation and attract investments from public and private stakeholders;
- Establish the proposed Pakistan Olive and Olive Oil Council;
- Develop a National Strategic Plan for the olive sector, along with a National Action Plan for organic agriculture.

4. Research, education, training, and extension services

- Enhance knowledge and adaptability of olive varieties to diverse regional conditions;
- Improve knowledge and dissemination of best practices in farming, processing, transportation, trading, and marketing;
- Promote the adoption of quality standards and certification systems;
- Support the development of geographical indications;
- Assess and improve the environmental, economic, and social sustainability of the olive sector, including research on local adaptation of varieties;
- Increase the availability of trained and skilled personnel;

- Strengthen extension services to effectively transfer knowledge and innovations to stakeholders.

IX – Strategic objectives

The following strategic objectives are defined for the holistic development of Pakistan’s olive value chain. These objectives are derived by combining identified strengths and weaknesses with external opportunities and threats across each thematic area.

1. Production and processing

- Expand olive cultivation in suitable regions such as Balochistan, KP, Potohar (Punjab), and the Newly Merged Districts, where agro-climatic conditions favor olive production and labor availability is high. This expansion can also contribute to climate change mitigation;
- Strengthen knowledge, expertise, and technical capacity across all stages of olive and table olive production, from farming to processing and trade;
- Modernize mechanization and equipment to improve efficiency and competitiveness in cultivation, processing, transportation, storage, packaging, and marketing;
- Promote advanced irrigation techniques (e.g., smart irrigation systems) to optimize water use, given increasing water scarcity and costs;
- Encourage organic farming as a strategy for climate change mitigation and sustainable production;
- Improve farm profitability and increase workers’ incomes to reduce rural-to-urban migration and outward migration;
- Strengthen cooperation among farmers to improve productivity and business performance;
- Foster collaboration among value chain actors to enhance coordination, management, and competitiveness.

2. Marketing

- Increase the consumption of olive oil and table olives by leveraging favorable production conditions, expanding cultivation areas, and responding to growing consumer demand for healthier foods;
- Improve olive oil quality through certification and standardization at both farm and processing levels to compete effectively with imported oils and seed oils;
- Promote the national brand “PakOlive” to enhance competitiveness and improve quality perception in the market;
- Encourage the development and promotion of innovative value-added products to meet evolving consumer preferences;
- Modernize marketing strategies and tools to increase value addition and market penetration.

3. Legislation, certification, and policies

- Develop and implement a comprehensive National Strategic Plan for the olive sector;

- Strengthen and update the regulatory framework, particularly for the organic sector (e.g., National Action Plan for Organic Agriculture).
- Improve regulations related to plant propagation materials (seedlings), quality standards (e.g., organic certification, geographical indications, GlobalGAP), certification systems, food safety, traceability, and trade (import/export);
- Establish the Pakistan Olive and Olive Oil Council to oversee regulatory, certification, and policy matters;
- Promote inter-ministerial coordination among key institutions (Commerce, National Food Security and Research, Planning, Education) to optimize resources and program implementation;
- Leverage financial and technical support from international agencies and foreign partners to stimulate investment in the olive sector;
- Increase subsidies and promote the establishment of cooperatives among value chain actors, both horizontally and vertically;
- Support the development of complementary sectors such as agri-tourism and handicrafts to reduce rural outmigration.

4. Research, education, training, and extension services

- Strengthen research, education, and training systems through improved infrastructure (e.g., laboratories) and enhanced human resource capacity.
- Develop efficient extension services to facilitate knowledge transfer across the value chain, including the use of modern ICT tools.
- Enhance partnerships among international, national, and research institutions to enhance knowledge exchange and innovation.
- Establish a robust and standardized national data collection and monitoring system to support evidence-based decision-making.

X – Action points

The following key action points are proposed based on the identified needs, gaps, and strategic objectives:

- Provide subsidies for inputs and tools at both cultivation and processing levels (e.g., seedlings, eco-friendly pesticides, fertilizers, herbicides, pheromones, nets, plastic crates, glass bottles, stainless steel containers);
- Invest in physical infrastructure and assets to support development, modernization, and adaptation (e.g., plantations, machinery and equipment, agricultural vehicles, irrigation systems, reservoirs, storage facilities, farm shops, solar panels, and rural road networks);
- Support organic agriculture through subsidies for conversion, certification, quality control, and marketing;
- Promote extra virgin olive oil and table olives through fairs, seminars, conferences, school education programs, awareness campaigns, and promotional materials;

- Strengthen knowledge transfer to olive sector stakeholders through training systems, extension services, and ICT-based platforms;
- Support research and innovation, including experimental and demonstration fields, laboratory development, smart farming technologies, Agriculture 4.0 approaches, and digital transformation;
- Facilitate the establishment of producer cooperatives and associations within the value chain framework;
- Provide financial support to entrepreneurs through mechanisms such as subsidized loans, microcredit schemes, and tax incentives;
- Promote investments in agri-tourism, olive parklands, handicrafts, and renewable energy to enhance the multifunctionality of olive farming systems;
- Establish a comprehensive certification system covering genetic and phytosanitary quality of planting material, as well as product quality (registration, inspection, labelling, and certification).

XI – Conclusions

Despite existing challenges in olive production and processing, the expansion of olive cultivation in Pakistan is expected to generate positive economic outcomes and increase employment opportunities. This optimistic outlook is supported by several factors. Olive cultivation is primarily being promoted on underutilized and marginal lands where alternative crops are often not economically viable, thereby minimizing opportunity costs for farmers. In addition, the government has subsidized several key cultivation inputs through initiatives such as the POCCSP-II project, under which farmers contribute only partially to the costs of irrigation systems, technical training, and, in some cases, harvesting and pruning tools. The government has also facilitated access to olive oil extraction facilities, often free of cost, enabling farmers to process their produce locally and market olive oil at higher value. Furthermore, the OliveCulture Project has contributed to strengthening the sector through capacity-building activities, including the training of olive mill managers and operators.

These factors have collectively encouraged olive cultivation by improving profitability prospects. If farmers are able to produce high-quality olives with optimal yields, and if demand for locally produced olive products increases, the sector can achieve long-term economic sustainability for farmers, processors, and traders. However, demand-side considerations must not be overlooked. If supply outpaces demand, domestic prices may decline, negatively affecting farmers' incomes. Therefore, improving the quality of Pakistani olive oil and enhancing consumer perception of its health benefits are critical to stimulating demand and maintaining market balance.

Nonetheless, Pakistan's olive sector is still in its early stages of development and faces multiple challenges. These include the need for stronger international cooperation in technology transfer and knowledge sharing, as well as coordinated domestic reforms to establish a comprehensive regulatory framework and increase public awareness of the environmental, economic, and health benefits of olive cultivation and consumption. In this context, the Pakistani Olive Stakeholder Group has proposed the establishment of a Pakistan Olive Oil Association/Council, which is essential for ensuring coordinated and sustainable sector development. Such an institution would

strengthen regulatory oversight, improve quality standards, support certification systems, and enhance competitiveness in international markets.

However, despite its potential, Pakistan's agriculture sector has long faced stagnation due to several structural constraints. Key challenges affecting olive cultivation include:

- High mortality rates of olive plants and low productivity due to insufficient irrigation, fertilizers, and pest management inputs;
- Limited availability of certified, disease-free, true-to-type planting material at affordable cost;
- Underutilization of vast areas of suitable marginal land for olive cultivation;
- Political instability, leading to inconsistent policy implementation;
- Insufficient number of processing and extraction units, causing delays and potential post-harvest losses;
- Limited scientific knowledge among farmers and reliance on outdated agricultural practices;
- Inadequate access to modern technologies that could improve productivity and profitability;
- Shortage of high-quality research and feasibility studies on olive cultivation;
- Limited information on varietal adaptability across different agro-climatic zones.
- Lack of a trained and skilled workforce;
- Weak marketing systems and insufficient support for product commercialization;
- Poor buyer-seller linkages, particularly affecting new producers entering the market.

The absence of a comprehensive regulatory framework has left the olive sector largely dependent on market forces. Addressing these challenges requires a coordinated, evidence-based strategy to support farmers through improved access to information, training, inputs, and services. Moreover, there is an urgent need for government intervention to utilize marginal lands effectively for olive cultivation, thereby reducing reliance on imported edible oils and improving economic resilience. At the same time, production growth must be balanced with demand stimulation to ensure market stability. Currently, locally produced olive oil is often more expensive than imported alternatives due to limited economies of scale. Increasing domestic demand for locally produced olive oil will be essential to achieving price competitiveness and market equilibrium. Furthermore, greater emphasis should be placed on research and data generation to support informed decision-making and investment planning. Well-documented, research-based information on olive cultivation in Pakistan is essential for both domestic and international stakeholders.

Overall, Pakistan has strong potential to become a significant player in the global olive market. The country benefits from diverse agro-climatic conditions and vast areas of marginal land suitable for olive cultivation. Approximately 10 million acres have been identified as suitable for olives, with over 40,000 acres already under cultivation. Combined with its strategic geographic location and agrarian economic base, Pakistan is well-positioned to develop a competitive olive sector.

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