

ASSESSMENT OF THE OLIVE VALUE CHAIN IN PAKISTAN

This Report refers to the following activities of the OliveCulture Project:

- 1.1 Assessment of the presence of Wild and Farmed Olives in the Country
- 1.2 Analysis of the Situation of Crops, types of plants and needs in the Project Areas
- 1.3 Mapping of existing services and facilities



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The Authors take the responsibility of any shortcoming left in the Report.

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Acronyms and Abbreviations

| | |
|-------------|--|
| 10 BTAP | 10 Billion Trees Afforestation Project |
| AJK | Azad Jammu & Kashmir |
| ARI Quetta | Agriculture Research Institute Quetta Baluchistan |
| ARI Tarnab | Agriculture Research Institute Tarnab KPK |
| BARI | Barani Agricultural Research Institute |
| CABI | Pakistan and Centre for Agriculture and Biosciences International |
| CIHEAM Bari | Centre for Advanced Mediterranean Agronomic Studies Mediterranean Agronomic Institute Bari |
| CPEC | China–Pakistan Economic Corridor |
| ECNEC | Executive Committee of the National Economic Council |
| FATA | Federally Administered Tribal Areas |
| FBR | Federal Board of Revenue |
| GB | Gilgit Baltistan |
| GOP | Government of Pakistan |
| HACCP | Hazard Analysis Critical Control Point |
| ICT | Islamabad Capital Territory |
| IMF | International Monetary Fund |
| IOC | International Olive Council |
| ISO | International Organization for Standardization |
| KPK | Khyber Pakhtunkhwa |
| MNFSR | Ministry of National Food Security and Research |
| MoC | Ministry of Commerce |
| NARC | National Agriculture Research Center |
| NTHRI | National Tea & High Value Crops Research Institute |
| PARC | Pakistan Agricultural Research Council |
| PCP | Planning Commission of Pakistan |
| PIDSA | Pakistan Italian Debt for Development Swap |
| POCCSP | Promotion of Olive Cultivation on Commercial Scale in Pakistan |
| POD | Pakistan Oilseed Department |
| PODB | Pakistan Oilseed Development Board |
| PPAF | Pakistan Poverty Alleviation Fund |
| PSDP | Public Sector Development Programme |
| R&D | Research and Development |
| SMEDA | Small and Medium Enterprises Development Authority |
| STPF | Strategic Trade Policy Framework |
| SWOT | Strengths, Weaknesses, Opportunities and Threats |
| UET | University of Engineering and Technology |

CHAPTER – 1

INTRODUCTION

Agricultural growth and development are inevitable for Pakistan's economic and financial sustainability. Agriculture has a paramount role in Pakistan's economy and is considered the backbone of the country's economy. It contributes virtually 21% to the GDP and employs 45% of the workforce. Due to the fast population growth rate, the country's middle class is intensifying and lashing demand for agricultural produce, including edible oils. During the last two decades, the agriculture growth rate remained around 1% to 4% and has merely shielded the population growth, consequently in particular, the imports of cooking oil jagged to \$3.56 billion in the first 11 months of the previous fiscal year that ended on June 30, 2022, which was equivalent to 60% of the three-year International Monetary Fund (IMF) loan of \$6 billion (Tribune Express, 2022). According to the latest data from the Pakistan Bureau of Statistics (PBS), the edible oil imports were 44% (or \$1.1 billion) higher compared to \$2.47 billion in the same 11 months of the fiscal year 2020–21 (PBS, 2022) and alongside the price of cooking oil in the domestic market are getting unaffordable high and are being subsidized. Pakistan's reliance on edible oil imports to meet domestic demand has increased over the past two decades. Some 86% of domestic edible oil consumption in 2020 came from imports, up from 77% in 2000 (SBP, 2022).

Edible oil is an essential item in the food basket; hence, its demand is relatively inelastic. Pakistan is the world's 8th largest edible oil consumer, with a per capita consumption of 22kgs. Pakistan is unable to produce edible oil sufficient for domestic requirements. Local edible oil demand is met through crushing oil seeds and importing cooking oil. The local industry relies entirely on imports to meet its demand for soybean seed, whereas cottonseed demand is met through local produce. In contrast, rapeseed and sunflower seeds are produced locally and imported. The edible oil sector is exceedingly dependent on imported oil seeds and refined palm oil to meet local demand.

Olive, a premium edible oil producing plant/crop, has been grown in Pakistan for two decades. Efforts are underway to harness the edible oil requirements through the promotion of Olive cultivation. According to the published data by M/o National Food Security and Research (MNFSR) and by the M/o Climate Change (MCC, 2022), Pakistan possesses about 4.1 million hectares (ha) of suitable land for olive plantation in various ecologies of the country (Tribune Express, 2022). Overall, it has been estimated that including all types of lands, ecologies and topography, the country has about 15.4 million hectares of potential suitable areas for olive cultivation, mainly spread over Punjab, Khyber Pakhtunkhwa, Balochistan, FATA and partially in Sindh.

Due to the impact of the government initiatives and the financial and human resources support of Italian Government, olive orchards are being grown in large areas in Balochistan, Khyber Pakhtunkhwa and Punjab by the farmers. The government is helping olive growers with subsidized plants, drip irrigation systems and olives processing machines by launching public

sector-funded projects. In 2020, Pakistan imported around 4,000 tons of olive oil. Since 2010 it has produced about 1,500 tons of olive oil and 830 tons of table olives per year, mainly consumed locally.

Pakistan needs to grow olive orchards/trees on a massive scale to enhance olive and olive oil production, productivity, and the development of vibrant processing industry in a value chain mode for improving competitiveness (Umair Piracha, 2022). The olive value chain development will depend primarily on the initiatives which are supported by creating an enabling environment by the government policies at the enterprise level. Whereas, the productivity improvement will result from technology adoption, backstopped by Research and Development, a culture of innovation, human resource development and marketing efficiencies. The olives and olive oil value chain in Pakistan are in emerging phase. It needs to take a number at the public and private levels to eliminate bottlenecks restricting sector growth potential.

The report explores the current inter-institutional information on the presence of the olive flora in Pakistan, on local and imported ecotypes and agronomic considerations on the wild Olives trees conversion into productive ones. In this regard, the relevant available information regarding efforts/activities to develop the olive and olive oil sector in Pakistan carried out by various public, private and other national and international organizations are being valorized through an extensive review of various reports, published articles, internet and interactive meetings with various stakeholders to compile a consolidated report/document.

CHAPTER – 2

SWOT ANALYSIS OF THE PROPOSED OLIVE VALUE CHAIN

The SWOT analysis has been in vogue for decades. It is one of the most widely used methods or strategic assessment tools for developing, assessing, and implementing a strategy. The SWOT is an acronym for Strengths, Weaknesses, Opportunities and Threats. These four elements are used to form a 4-box method for assessing the viability of a strategy and initiative in a particular context. Therefore, contextual knowledge is a vital and integral part of the SWOT analysis.

Policymakers, businesses, corporations and individuals employ the SWOT analysis method as it offers a simple approach to set realistic targets by helping identify the various internal strengths and weaknesses and external threats and prospects. Therefore, the strengths and weaknesses concerning the olive sector in Pakistan are considered internal to the sector, representing the current situation. At the same time, the opportunities and threats are classified as external (e.g., presented by the environment external to the thematic area) and represent a possible future. By employing this four-pronged framework of internal strengths and weaknesses, and external opportunities and threats, the SWOT not only offers a clear picture of a particular context but also provides unique insights for the efficacious implementation of a strategy.

The SWOT analysis of the whole Pakistani olive supply chain that is hereafter presented is structured in four thematic areas:

1. Production and processing (nursery, farm, mill, etc.), about technical and environmental aspects
2. Marketing, about commercial aspects
3. Legislation, certification, and policies, about the administrative, financial and development support
4. Research, education, training, extension service, scientific support, teaching, exchange of knowledge, technical assistance, etc.

Commodity productivity enhancement is vibrant for improving the competitiveness of the enterprises, which are supported by creating an enabling environment by government policies, including services, input/output prices and implementation. A commodity value chain improvement overall comes from technology adoption, a culture of innovation, human resource progress and management efficiencies. This SWOT analysis of the olive sector value chain has been done based on the on-desk research while reviewing the past, and current project reports, published articles and interactive meetings with researchers, scientists, technicians, olive growers and olive oil processors operating in Balochistan, Khyber Pakhtunkhwa and Punjab. The findings of the SWOT analysis are that the Olive sector value chain possesses an excellent potential to grow and expand in future, particularly in light of recent public sector initiatives and private sector involvement and motivation. The SWOT analysis will provide the basis and guidelines for investment by the government and the private sector to promote olive farming and oil processing in the country. The SWOT matrix in the Table – 1 summarizes the key findings regarding the development and prospects of the olive and olive oil value chain.

Strengths

1. Appropriate agro-ecological diversity of the country for the cultivation of suitable olive varieties, as its climate as well as topography is varied, i.e. hot, warm, mild, cool, and cold distributed along the country. Generally dry and hot near the coast and along the lowland plains of the Indus River, and becoming progressively cooler in the northern uplands and Himalayas with enriched bio-diversity including abundant wild olive trees growing naturally.
2. Availability of vast cultivable waste/marginal lands that could potentially be used for olive cultivation because out of the total of 79.6 million hectares, only 22.1 million hectares are cultivated.
3. The availability of arable lands is 30,930 thousand hectares (39.57 % of land area), where Olives could also be cultivated along with other crops.
4. Around 16 million hectares of land (about 20% of the total area) are affected directly or indirectly by soil erosion. Massive olive plantation could help reduce soil erosion and desertification as well as could fetch economic benefits.
5. Increased biodiversity and carbon sinking by planting more olive plants, reducing water consumption, and expanding the micro irrigation system.
6. The high-profit margin for the whole olive plant, from seed to fruit, is beneficial. Studies have reported that olive cultivation is a profitable entity as the internal rate of return at a 10% discount rate was found to be 31%, indicating that the investment is feasible as the IRR is greater than the market rate of interest.
7. Ministry of Planning, Development and Special Initiatives have prioritized the government's development agenda to make the country self-dependence on edible oil. In this regard, provincial governments and the private sector must expedite the self-reliance process.
8. Promotion of oilseed crops has been identified by the federal level Food Security Policy and provincial level Agriculture/Horticulture Policy for their development, and specifically promoting value-chain driven, cultivation and utilization of edible oil producing as well as high-value crops like olives as alternate crops for edible oil import substitution.
9. The Ministry of Commerce's Strategic Trade Policy Framework (STPF) 2020-25 (MoC, 2021) envisaged that in collaboration with the provincial governments along with the related private sector stakeholders, will work towards the mechanization of the agriculture sector as well as integrate and upgrade the agriculture sector into the global value chain and Agri-businesses, participating in the production processes in the entire value chain. It is a governmental support to Olive-oil supply and value chain as olive sector is an integral part of agriculture, hence could avail the benefit of this trade policy.
10. The CPEC may also be a significant factor in increasing the importance of olive cultivation and olive oil production in corridor adjacent ecologies (M. Ahmad, 2020).

11. The olive (table and oil) produced locally retains distinct and good quality to meet international standards and hence has the potential for international trade to meet the increased international demand.
12. The country has the potential to provide the olive-based abundant local raw material for oil extraction, value addition and bi-products generation. Because there is the possibility to increase the productivity (yield/ha) as well already exist some capacity and infrastructure to produce seedlings. Already established plantations once in production and increasing public/private investments could cover the current consumption of olive oil in Pakistan.
13. The country has ample skilled and unskilled labor to engage in the olive value chain.
14. Above all, the Olive plant in Pakistan is considered a sacred religious plant with extended benefits once planted/cultivated (fruit-bearing life >900 years).

Weaknesses:

1. Limited agro-ecological specific research and scientific-based olive adaptability trials, Olive production technological package and limited backstopping of technology transfer in olive value chain approach. Few reliable local data, not yet organized and systematized on cultivation techniques, cultivars performances, olive oil costs of production.
2. Lack of certified olive plant nurseries and lack of knowledge to implement Good Agricultural Practices for orchards management by most growers resulting in low productivity of olive orchards/plantation. No functional certification system concerning plants propagation complying with international standards.
3. Lack of knowledge and technology for specific care to post-harvest practices such as proper picking of olives, picked olives are not to be mixed with olives that have been falling from the tree before harvest and avoiding physical damage to trees during harvesting.
4. Limited scale value addition such as jam, pickle, olive tea and other value-added products.
5. Lack of suitable packaging, storing and transporting competencies with most of the Olive growers (mainly small holding) and due to the perishable nature of olive fruits, post-harvest losses occur that increase costs and minimize farmer's income.
6. With a lack of an established and regulated marketing system with improved facilities, farmers anticipate leasing out their orchards to pre-harvest contractors or paying high transportation costs to sell their produce in distant markets, or selling the olive at lower price after harvesting. Insufficient know-how and inadequate awareness concerning olive oil marketing/selling dynamics.
7. Reduction in farmer's income/prices due to several intermediaries in the fresh olive marketing channels.

8. Weak linkages of fresh olive producers with agro-processing industries cause low returns, particularly for smallholding olive growers.
9. No returns from olive plantation during the first years as it begins to bear some fruits after almost four years; hence the olive growers must have a supplementary choice of inter-cropping based on research endeavors.
10. A limited number of state-of-the-art olive oil processing machinery/units are available, and of a relatively small capacity.
11. The processing plants are new, but storage and glass bottles are not available as per required SOPs. Moreover, almost all processing units are owned and managed by the Public Sector, with limited efficiency.
12. Lack of administration and customer awareness about olive oil quality standards, specifications, origin and regulations.
13. Lack of interest of processors/industrialists due to non-availability of olive clusters because mostly olive plantation lands are fragmented and have small production plots.
14. Lack of specific strategic action plans and data for sustainable development of the olive and olive oil sector at the national level and provincial levels, whereas the contender oilseed crops such as canola, sunflower, cotton, corn and even imported palm oil sectors have comprehensive strategic action plans and comprehensive data of the domestic value chains.
15. Lack of key legislation concerning traceability, labelling, regulatory framework on quality requirements and food safety, development policy, production and marketing regulations (an Olive Oil Act).

Opportunities:

1. Pakistan owes an inexpensive labor force that provides an opportunity to lower the cost of olive production and employment generation for youth and women as most of the labor force comes from family, especially women, particularly in smallholding olive growers.
2. National Food Security Policy recognizes it a challenge to enhance value addition in agro-based products in the country, and there is a need to develop a value chain financing model in public-private partnerships.
3. Support by the Ministry of Commerce through the newly launched Strategic Trade Policy Framework (STPF) 2020-25 envisages that in collaboration with the provincial governments along with the related private sector stakeholders, will work towards the mechanization of the agriculture sector, as well as integrate and upgrade the agriculture sector into the global value chain and Agri-businesses, participating in the production processes of the entire value chain. It is also an opportunity for olive and olive oil value chain stakeholders.
4. The increasing edible oil demand of the country mainly depends on palm oil imports, and in fact, Pakistan does not have a suitable climate to grow palm, but olives do have

proven prospects. Hence it provides an opportunity to invest in the promotion of olive cultivation and establish olive oil processing, keeping in view its value chain.

5. Pakistan has enormous olives and olive oil growth potential and geographical position. The CPEC will provide an opportunity to have the fastest access to both the domestic and regional markets.
6. The federal and provincial governments, hand in gloves with international donors, are underway to develop the olive and olive oil sector and establishing linkages of the olive value chain with the rural community, agro-tourism activities, modernizing marketing systems, diversifying and increasing farmer's income on a sustainable basis.
7. The M/o National Food Security and Research (MNFSR) describes policy measures in coordination with provinces to improve market intelligence, marketing access and regulations, grading and packaging practices, promote the use of ICTs to transfer market information to producers, promote farmers' marketing systems and establishment of e-marketing of agriculture products. Market niche is in expansion with positive trend of demand of olive oil.
8. The Ministry of Commerce has launched a national brand-building strategy/ initiative called "Emerging Pakistan". This initiative will focus on supporting traders, investors, individuals, tourists, corporations, and firms in developing and acquiring brands. The olive oil processors could avail this opportunity of branding their product. Medium and long-term support from international donors is an additional prospect for olive sector development.
9. The government under M/o Commerce has implemented an act to recognize and protect the geographical indications for public interest and to advance the economic reform and development of the least developed areas. This act is called as Geographical Indications (Registration and Protection) Act, 2020. It identifies goods, including agricultural goods, natural goods or manufactured goods originating or manufactured or produced in a territory, region or locality as determined by the country. Registering the local olive and olive oil in corroboration with this act provides an opportunity to enter the global value chain.
10. Rural development policy options for the introduction of the olive oil supply and value chain in some of the poorest Districts of the country. Involving local community, waste/marginal lands (more than 7 million hectares) where cash crops cannot be cultivated could be successfully planted with olive trees.

Threats:

1. M/o National Food Security and Research Policy lack a comprehensive research and policy development framework/action plan focusing on enhancing oilseeds production and value chain development for a sustainable edible oil sector. The same applies for the Olive sector. National oilseeds and edible oil policy framework/action plan for agricultural innovation, provincial integration, industrial collaboration, regulated trade,

and implementation of standards roadmap are indispensable; this lack is a threat to the sector's development.

2. A national policy framework/action plan supporting each step of the edible oil production value chain is needed to ensure the developmental needs of participating blocks to bring maximum value addition, nutritional profiles, food safety compliance, lowering wastage and improving efficiency for sustainability and national edible oil demand.
3. In the current scenario, the public sector and federal and provincial investments in the development of the olive value chain are based on the Public Sector Development Programme (PSDP) oriented projects with defined activities and life spans. These projects have not established coordination, cooperation and motivation of private sector stakeholders in letter and spirit to carry on the activities undertaken and investments after the end of project life. An advisory/monitoring system at the government level needs to be in place to backstop the project's development of the olive and olive value chain for future sustainability.
4. The low priority for involvement of private sector stakeholders to the future harvest of the public sector projects achievements foresees future threat towards the development of the olive sector.
5. Lack of response/investment of the processors in general, and specifically from traditional big players of oil and ghee manufacturers in the olive oil value chain development. The domestic crushing and distribution sectors find more attractive to import edible oil rather than crushing/distributing locally produced oil seeds, as in 2005 the government facilitated imports by eliminating tariffs and duties on all oilseeds.
6. Many private sector firms/traders have been creating turmoil in supplies, inputs, and output prices of agro-based produce. Such a situation hinders and threatens the development of primordial sectors such as the olive sector.
7. Climate change sequential/successive anomalies such as floods, heavy or shallow rains, drought and occurrence of smog during winter may impact the olive crop productivity from season to season or year to year.
8. In the country, it has been reported that underground water resources are depleting very fast (in Balochistan in particular), as well as water resources are getting scanty over time.
9. The promotion of olive cultivation and olive oil processing sector is in the developing phase, and political commitment is also required for sustainable development of the sector; however, prevailing political instability may be a potential threat to the prosperity of the olive and olive oil sector as it lacks of experience in dynamic growers' associations.

Table – 1 SWOT ANALYSIS SUMMARY

| STRENGTHS | WEAKNESS |
|--|--|
| <ol style="list-style-type: none"> 1. Appropriate agro-ecological diversity of the country for cultivation of suitable olive varieties 2. Availability of vast cultivable waste/marginal lands that potentially could be used for olive cultivation 3. Availability of the arable lands that where Olives could be cultivated 4. Massive olive plantation could help to reduced soil erosion/desertification and could fetch economic benefits 5. Increased biodiversity and carbon sinking by planting more olive plants 6. Olive cultivation profitable entity as the internal rate of return at 10% rate of discount found to be 31%, IRR is greater than the market rate of interest 7. Ministry of Planning, Development, and Special Initiatives have put edible oil including olives on the top priority government's development agenda 8. Promotion of oilseed including olive crops have been identified by the federal level Food Security policy and provincial Agriculture/Horticulture policy 9. Support by the Ministry of Commerce's Strategic Trade Policy Framework (STPF) 2020-25, envisaged the mechanization of the agriculture sector as well as integrate into the global value chain 10. The CPEC also be a major factor to contribute to increase the importance of olive cultivation and olive oil production in corridor adjacent ecologies 11. The olive produced locally retains distinct and good quality to meet international standards – export potential 12. Potential to provide olive based local raw material for oil extraction, value addition and bi-products generation 13. Ample skilled and unskilled labor force to be engaged in olive value chain | <ol style="list-style-type: none"> 1. Limited agro-ecological specific research and scientific based olive adaptability trials, technological backstopping in olive value chain approach. 2. Lack of certified olive plant nurseries and lack of knowledge to implement Good Agricultural Practices 3. Lack of knowledge and technology for specific care to post-harvest practices 4. Limited scale value-added products 5. Lack of suitable packaging, storing, and transporting competencies 6. Lack of established and regulated marketing system with improved facilities 7. Reduction in farmer's income due to intermediaries in the fresh olive marketing channels 8. Weak linkages of fresh olive producers with agro-processing industries 9. No returns from olive plantation during first four years 10. Limited number of state-of-the-art olive oil processing machinery/units 11. Lack of administration and customer awareness about olive oil quality standards 12. Lack of interest of processors/industrialists due to non-availability of olive clusters 13. Lack of olive policy and specific strategic action plans and data for sustainable development of the olive and olive oil sector 14. Insufficient extension services are available from provincial and federal sector institutions. 15. Lack of coordination between institutions and private sector at federal and provincial level. 16. Low yields, pest and disease need research backstopping. 17. Few reliable local data, not yet organized and systematized on cultivation |

| | |
|--|---|
| <p>14. Olive plant in Pakistan is considered religiously as a sacrosanct plant with long life benefits once planted/cultivated</p> | <p>techniques, cultivars performances, olive oil costs of production.</p> <p>18. Lack of legislation concerning traceability, labelling, regulatory framework on quality requirements and food safety, development policy, production and marketing regulations (an Olive Oil Act).</p> |
| <p>OPPORTUNITIES</p> | <p>THREATS</p> |
| <ol style="list-style-type: none"> 1. Pakistan owes inexpensive labor force 2. National Food Security Policy recognizes to enhance value addition in agro-products 3. Support by the M/o of Commerce through Strategic Trade Policy Framework (STPF) 2020-25 4. Increasing edible oil demand of the country 5. Pakistan has huge olives and olive oil growth potential 6. The federal and provincial governments, hand in gloves with international donors to develop the olive and olive oil sector 7. The M/o National Food Security and Research describes policy measures in coordination with provinces to improve market system 8. The Ministry of Commerce has launched a national brand-building strategy “Emerging Pakistan” 9. An act in place to recognize and protect the geographical indicators 10. Investment potential in the processing sector with the promotion and expansion of olive plantation as “Olive Valley” declared by two provinces Punjab and KPK. 11. Identification and promotion of climate smart olive varieties through adaptability trials and genetic manipulations by provincial and federal research organizations. 12. Interaction with public sector federal and provincial departments and progressive | <ol style="list-style-type: none"> 1. There are no establish model nurseries for supplying genuine planting material as well as informality about standardization and quality controls 2. Lacks of comprehensive research and policy framework/action plan focusing production and value chain development for a sustainable edible oil sector 3. Lack of national framework/action plan supporting each step of the edible oil value chain, value addition, nutritional profiles, food safety compliance etc. 4. PSDP oriented projects having defined project activities and project life span and have not established coordination, cooperation and motivation of private sector stakeholders to carry on project activities and investments after the end of project life – future sustainability issues 5. The low priority for involvement from private sector stakeholders 6. Lack of investment from processing units from traditional big players 7. Private sector firms/traders creating turmoil in supplies and prices of inputs and output of agro-based goods 8. Climate change anomalies such as floods, heavy or very low rains, drought, heat waves, occurrence of fog and smog during winter and intermittent rain during growth can reduce olive yield. 9. Water scarcity and deteriorating quality of water will negatively affect olive yields |

| | |
|---|---|
| <p>farmers that can help improve olive productivity.</p> <p>13. Medium and long-term support from international donors.</p> <p>14. Rural development policy options for the introduction of the olive oil supply and value chain in some of the poorest Districts of the country.</p> | <p>10. Political instability may be a potential threat to the prosperity of olive and olive oil sector</p> <p>11. The domestic crushing and distribution sectors find more attractive to import edible oil rather than crushing/distributing locally produced oil seeds.</p> <p>12. In 2005 the government facilitated imports by eliminating tariffs and duties on all oilseeds.</p> |
|---|---|

CHAPTER – 3

ANALYSIS OF THE AVAILABLE DATA ABOUT THE OLIVE CONSUMPTION & PRODUCTION

The development of the olive value chain, like other horticultural crops, may have various challenges during the flow of product from farm to consumer at different stages such as pre-planting, growing, post-harvesting, technology, processing, transportation, marketing and export (W. Rana et al., 2022). Rapid urbanization and rising income levels in developing countries, such as Pakistan, changing diet habits, information and communication technologies, structural transformation in retail markets, and export market opportunities catalyze dynamic change in value chains. This is causing a paradigm shift in how foods are produced, processed, and sold, both within domestic and export markets globally. The emergence of value chains is contributing to increasing engagement of the private sector to promote better quality, greater productivity, efficiency, and marketing, as well as consumers, demand for safety, quality, convenience and affordable prices, are underlining the role of the private sector in the efficacy of the value chains.

Fresh Olive Supply/Value Chain

The Olive value/supply chain's introductory module is the Olive farmers/ growers. From producers to consumers, it passes through various market players, i.e. pre-harvest contractors, commission agents, retailers, etc., and constitutes a marketing channel. In the case of Olives, it has been reported that the olive farmers/growers are availing/practicing marketing channels given in Table – 1:

| <i>Channels</i> | <i>Functioning Mechanism</i> |
|-----------------|--|
| Channel – 1 | The farmers sell fresh Olives to the pre-harvest contractor and the pre-harvest contractor sells the olive to the wholesaler who auctions and deducts his commission and the produce is sold to the retailer whereas the retailers sell fresh olives to the consumers. |
| Channel – 2 | The olive grower sells produce to the wholesaler who sells to the retailer and retailer sells the produce to the consumer |
| Channel – 3 | The olive produced is sold by the growers to the retailer and from the retailer the produce is sold to consumers. |
| Channel – 4 | The olive farmers sell olives to the pre-harvest contractor who directly sells produce to the olive consumers. |
| Channel – 5 | The consumer directly purchases the fresh olives from the farmers at farm gate. |

It is essential to mention that in each channel, the profit margins percentage from producers to consumers of various segments has not been investigated/calculated. However, it has been reported that the actual income of fresh olives begins from the 5-6-year-old plantation, and after

about 10-year olive plantation/orchard, the total cost and total revenue are equal. The olive orchards fetch a profit of about 25% per year after ten years of age based on variable costs.

Imported Olive Oil Supply/Value Chain

Currently, the bulk of olive oil is imported from several countries, mainly Spain, Italy, Turkey, Tunisia, UAE, Denmark, the European Union and China, in the category of branded and non-branded in the form of virgin and others (pomace, refined oil etc.). Pakistan imports edible oil worth USD 3.5 billion per annum (Umair Piracha, 2022). On average the annual olive oil imports are around 3,744 tons and olive oil supply chain operate as follows;



In addition to the above, non-branded olive oil is also blended with other oils such as canola by the local manufacturers. It is essential to mention that the imported olive oil prices do not have any price controlling mechanism, the profit margins percentage of importers, distributors, and retailers have not been studied/reported, and the consumer prices of imported olive oil vary across the country. Overall, during the last three years, Pakistan imported around four thousand tons of olive oil worth varying from US\$ nine thousand to 13.6 thousand. The details of Olive oil import during 2019 – 22 are given in Table – 2;

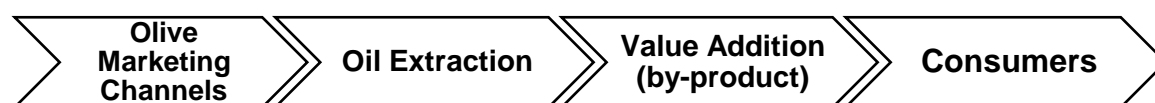
| Table – 2 Import of Olive Oil | | | | | | |
|--|------------|----------------|------------|----------------|------------|----------------|
| Country | 2019-20 | | 2020-21 | | 2021-22 | |
| | US\$ (000) | Quantity (Ton) | US\$ (000) | Quantity (Ton) | US\$ (000) | Quantity (Ton) |
| <i>Olive Oil (Others) HS Code 15099000</i> | | | | | | |
| Spain | 5989.1 | 2278.1 | 7813.8 | 2868.8 | 7516.1 | 2586.9 |
| Italy | 885.0 | 248.6 | 555.7 | 187.3 | 2170.9 | 404.0 |
| Turkey | 659.5 | 260.4 | 783.3 | 284.9 | 632.4 | 247.3 |
| Tunisia | 155.4 | 69.7 | 363.8 | 200.5 | 148.5 | 117.0 |
| UAE | 1.8 | 0.4 | 0.2 | 0.0 | 106.2 | 25.7 |
| Denmark | 0.0 | 0.0 | 0.0 | 0.0 | 44.0 | 18.5 |
| European Union | 24.9 | 99.8 | 0.0 | 0.0 | 35.0 | 6.0 |
| China | 0.0 | 0.0 | 0.0 | 0.0 | 31.1 | 7.5 |
| Portugal | 0.0 | 0.0 | 25.6 | 5.8 | 14.2 | 3.2 |
| Sweden | 0.0 | 0.0 | 0.0 | 0.0 | 5.1 | 0.7 |
| United Kingdom | 0.9 | 0.0 | 0.6 | 0.0 | 0.5 | 0.0 |
| Germany | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Greece | 0.6 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Malaysia | 0.3 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Sub Total | 7717.6 | 2957.4 | 9543.1 | 3547.4 | 10703.9 | 3416.8 |
| <i>Olive Oil (Virgin) HS Code 15091000</i> | | | | | | |

| | | | | | | |
|----------------------------------|--------|--------|---------|--------|---------|--------|
| Spain | 1637.5 | 419.8 | 2818.7 | 788.6 | 2471.6 | 593.2 |
| Italy | 34.0 | 8.8 | 198.6 | 39.5 | 185.3 | 33.6 |
| Tunisia | 47.8 | 13.0 | 227.2 | 59.3 | 116.9 | 28.0 |
| Turkey | 58.3 | 17.0 | 121.6 | 27.6 | 76.4 | 17.8 |
| European Union | 4.2 | 0.2 | 3.3 | 0.2 | 24.6 | 5.0 |
| China | 0.0 | 0.0 | 0.2 | 0.0 | 7.5 | 1.7 |
| United States | 7.9 | 2.0 | 0.1 | 0.0 | 4.9 | 1.2 |
| UAE | 0.1 | 0.0 | 6.2 | 1.1 | 2.7 | 0.3 |
| Sweden | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 0.1 |
| United Kingdom | 0.0 | 0.0 | 0.1 | 0.0 | 1.4 | 0.1 |
| Germany | 0.0 | 0.0 | 2.3 | 0.0 | 0.0 | 0.0 |
| Egypt | 0.0 | 0.0 | 8.4 | 2.1 | 0.0 | 0.0 |
| Sub Total | 1789.8 | 460.7 | 3386.8 | 918.5 | 2893.6 | 681.0 |
| Grand Total | 9507.4 | 3418.1 | 12929.8 | 4465.9 | 13597.6 | 4097.9 |
| Source: Federal Board of Revenue | | | | | | |

Locally Processed Olive Oil Supply/Value Chain

It is essential to mention that for more than a decade the focus of the public sector was on the promotion of olive cultivation in various agroecological zones of the country. Now a substantial amount of locally Olive produce is available for commercial processing into olive oil. The olive oil processing sector is in its developing phase, and efforts are being made to motivate the private sector to invest in this emerging enterprise as well, although till now the oil processing machinery/units are being made available to the olive growers, through imports mostly from Italy, the most renown manufacturers, by the federal or provincial public institutions. It may be mentioned that some efforts are also underway to fabricate oil processing units locally.

The locally operated olive oil supply/value chain segments are described as follows;



Most farmers use this extracted olive oil for their home consumption. It is important to note that the olive growers are willing to avail the facilities provided at various locations by the public sector projects for the extraction of the oil, generally free of cost, but it become often difficult in practical terms.

At the starting of the olive cultivation, several small extraction units having a capacity of 50kg per hour were procured by the public sector from Italy, and distributed in the country to: National Agricultural Research Centre (NARC), Islamabad; ARI Tarnab; Barani Agricultural Research Institute (BARI) at Chakwal; Loralai, Balochistan, and some other places. Nowadays, there are 20 oil extraction machines/units of different capacities in Pakistan in the public sector, while two are private and three units have been established through the Italian sponsored

Program for Poverty Reduction (PPR) (one in KP, Dir Lower, and two in Balochistan) by the communities with the support of PPAF, RSPs and NGO,

The bulk of the supply of the olive mills has been done through the federal project “Promotion of olive cultivation on a commercial scale in Pakistan – Phase I & II” of the Ministry of National Food Security & Research, implemented initially by the PARC and currently by the Pakistan Oilseed Department in collaboration and coordination with the provinces.

According to the Impact Assessment Study conducted in 2022 by the federal project, about 40% of farmers have access to these olive oil extractions units. Some of the units, namely BARI Chakwal (Punjab), ARI Tarnab (KPK), and ARI Quetta, Baluchistan are equipped with labs for the analysis of the oil and value-added products. Mobile facilities to test the oil have also been furnished. Undoubtedly, most of the products will be consumed locally as import substitutes and the efforts undertaken would firstly guarantee the local consumers, then will help in reducing olive oil imports and make the country proficient in future on exporting and entering the global olive oil value chain.

It is very difficult to assess the quantity of olive oil currently produced in the country, also because the current harvest season is not yet over. However, an estimate foresees approximately a production of 1,400 tons of oil for 2022, which appears underestimated, whereas the government has set an ambitious target of increasing olive oil production up to 20,000 tons annually by 2027.

It is worth to mention that due to the market dynamics and commercial global trade, Pakistan already export olive oil (about 19 Tons in 2021-2022) due to imported oil that is re-exported, as shown in Table -3, which describes the current export of olive oil to world markets:

:

| Table – 3 Olive Oil Exports from Pakistan | | | | | | |
|--|------------|----------------|------------|----------------|------------|----------------|
| | 2019-20 | | 2020-21 | | 2021-22 | |
| Countries | US\$ (000) | Quantity (Ton) | US\$ (000) | Quantity (Ton) | US\$ (000) | Quantity (Ton) |
| Olive Oil (Virgin) HS Code 15091000 | | | | | | |
| Malaysia | - | - | - | - | 0.56 | 0.06 |
| Trinidad and Tobago | - | - | - | - | 0.45 | 0.04 |
| United Arab Emirates | - | - | - | - | 0.34 | 0.04 |
| United States | 0.38 | 0.01 | - | - | 3.40 | 0.39 |
| Sub Total | 0.38 | 0.01 | - | - | 4.75 | 0.53 |
| Olive Oil other Fractions HS Code 15099000 | | | | | | |
| Canada | 0.68 | 0.04 | 5.16 | 0.98 | - | - |
| Hong Kong, China | 0.12 | 0.01 | - | - | - | - |
| Mozambique | 4.78 | 3.85 | 11.43 | 7.33 | 50.16 | 17.98 |
| Oman | 19.09 | 0.31 | - | - | - | - |
| South Africa | 1.26 | 0.21 | - | - | - | - |
| United Arab Emirates | 0.22 | 0.04 | - | - | - | - |
| | 2019-20 | | 2020-21 | | 2021-22 | |

| Countries | US\$ (000) | Quantity (Ton) | US\$ (000) | Quantity (Ton) | US\$ (000) | Quantity (Ton) |
|---|---------------|-------------------|---------------|-------------------|---------------|-------------------|
| United Kingdom | - | - | 0.22 | 0.12 | - | - |
| United States | 0.81 | 0.49 | 0.96 | 0.05 | - | - |
| Sub Total | 26.96 | 4.95 | 17.77 | 8.48 | 50.16 | 17.98 |
| Grand Total | 27.35 | 4.96 | 17.77 | 8.48 | 54.91 | 18.51 |
| Source: Federal Board of Revenue. https://www.fbr.gov.pk/ . | | | | | | |

To corroborate the principle of apparent inconsistency between import and export, are herewith reported the data from the world market, which shows that the biggest olive oil producer and exporter, Spain, also import almost 1/3 and Italy almost 90%. It is also link to provide more value to the product that has been imported.

Imports 2020: Spain (\$49.8M), Italy (\$35.3M)

Exports: Spain (\$167M), Italy (\$60.2M), Grece (\$38.7M)

It is worth mentioning that in 2016 Italy supported the Study “*Market Analysis for Value Chain and Olive Oil Consumption in Pakistan*” conducted by the Punjab Economic Research Institute (PERI), with the aim to investigate the dynamics of the market of olive products within the edible oil sector in the country, focusing on the “product development, supply chain, consumer preferences and uses, demand and marketing prospects for local and regional markets”. Leading to the “missing links for product development and market integration for local olive production”. In that Study it was estimated that about 5 tons of the locally produced olive oil is consumed.

On the grounds of all above, the OliveCulture Project has deemed essential to update the Study of 2016, which is expected to portrays significant changes on the consumption trend. The outcomes will also guide the marketing strategy to adopt.

Regarding the value addition of olives, substantial efforts have been made by the public sector projects at the federal and provincial levels to develop and promote recipes for certain value-added products such as: Olive Pickle, Jam, Biscuits, Cake, Olive Syrup, Olive Vinegar, Olive tea, Olive Sweets and Cosmetics (POCCSP, 2022). These recipes technology have been transferred to the local community and private processors/investors who have developed small-scale businesses and are marketing their products locally on a limited scale. It is essential to mention that the production of table olives has not gained significant commercial momentum due to a lack of interest/investment from commercial players and the non-availability of technology and machinery. Generally, small farmers/processors are de-pitting and slicing olives manually. Moreover, the aspect of food safety and hygienic regulatory measures, i.e. HACCP, prevailing at oil processing units and value-added products have not been thoroughly studied and reported.

CHAPTER – 4

PUBLIC SECTOR (FEDERAL AND PROVINCIAL) SERVICES AND FACILITIES TO DEVELOP OLIVE VALUE CHAIN

In this chapter of the Report, an effort is being made to assess the current status of resources, structures, equipment and inputs used to implement the olive value chain. It will be useful to integrate the reading of this document with the Report on the “*State of the art of olive sector in Pakistan: a Review report*” which is providing diversified information on the status of the projects focused on olive actually implemented.

In order to portrays the services and facilities currently available to develop the olive value chain, it is useful to know the distribution of the olive orchards actually planted. The presence of olive trees planted in the Country is given in Table – 4.

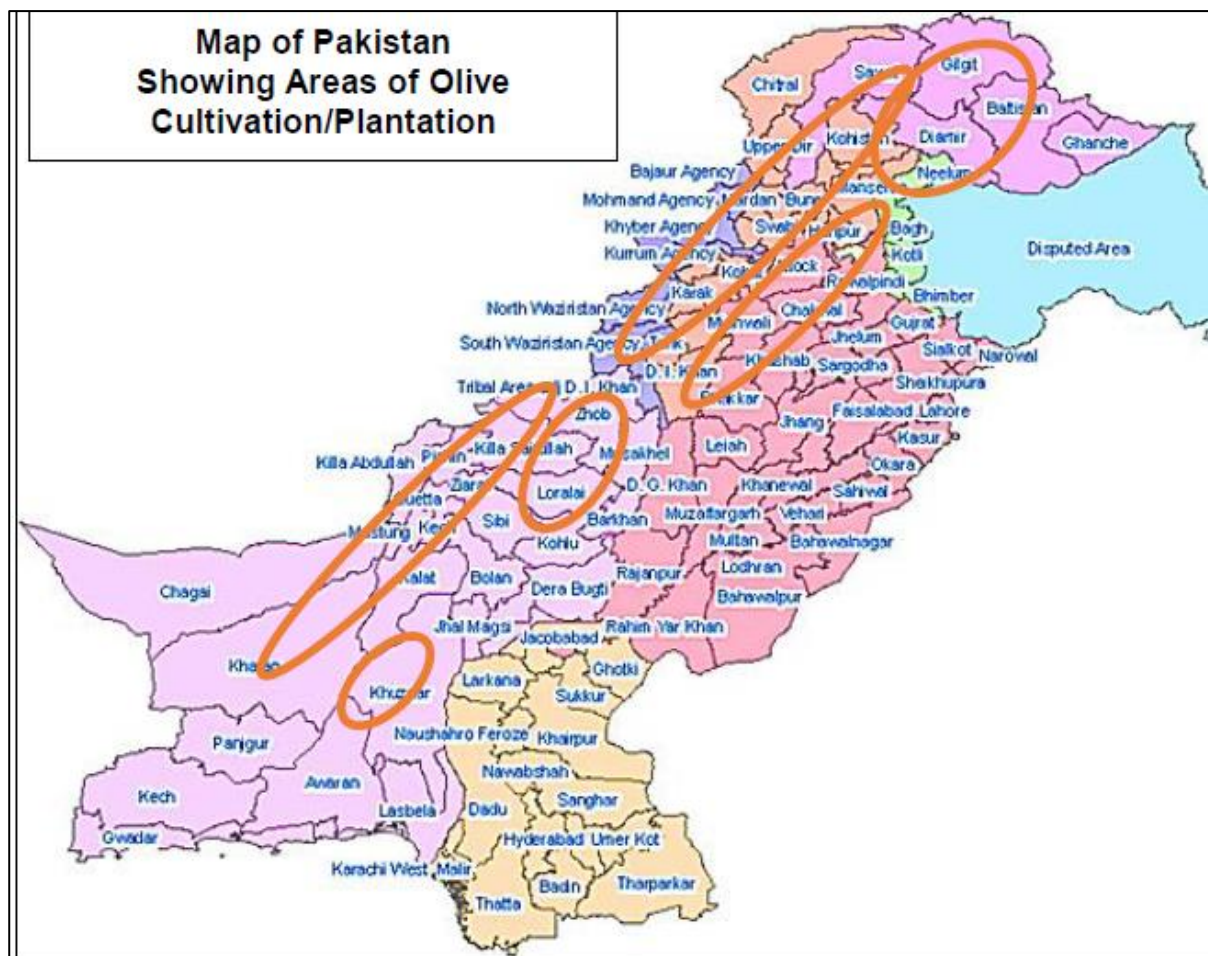
| Table – 4 The Plantation of Olive Trees in Pakistan by Public and Private Sector (in number of plants) | | | | | | |
|---|----------------------------|---------------------------|---------------------------------------|--|--|------------------------------|
| Provinces/ Territories | PIDSA (2012-16) | PSDP (2014-20) | Olive Valley (2015-20) | 5 million Olive (2013-19) | Private Sector Plantation | Total Plantation |
| Baluchistan | 159,379 | 865,447 | - | - | 2,500 | 1,027,326 8,381acres |
| Khyber Pakhtunkhwa | 265,273 | 431,465 | - | 590,000 | 2,500 | 1,289,238 12,134 acres |
| Punjab | 116,772 | 316,527 | 1,210,411 | - | 10,000 | 1,653,710 12,687acres |
| Islamabad Capital Territory | 35,768 | 48,465 | - | - | - | 84,233 726 acres |
| Azad Jammu & Kashmir | 421 | 36,624 | - | - | - | 37,045 291acre |
| Gilgit Baltistan | 2,545 | 14,207 | - | - | - | 16,752 131acre |
| Total | 580,158 5,802 acres | 1,712,735 13,306 acres | 1,210,411 8,966 acres | 590,000 5,900 acres | 15,000 375acre | 4,108,304 34,349 acres |

Source: GOP. 2022. Ministry of National Food Security and Research.

The suitable areas for olive cultivation till now identified are listed in Table – 5 and shown in the below map:

| Olive Cultivation Ecologies | Administrative Region/Districts |
|------------------------------------|---|
| Islamabad Capital Territory | Islamabad, Rawalpindi |
| Punjab | (Olive Valley) Chakwal, Attock, Jhelum, Soon Valley, Mianwali and Khushab |

| | |
|---|--|
| KhyberPakhtunkhwa and Newly Merged Districts | Peshawar, Mardan, Swabi, Swat, Karak, Dir, Bajur, Mohmand, Kurram , South Waziristan, North Waziristan, Abbotabad, Haripur, Mardan, Battagram, Kohat, D.I.Khan, Mansehra, Noshera, Laki Marwat, Wana |
| Olive Cultivation Ecologies | Administrative Region/Districts |
| Balochistan | Quetta, Loralai, Qila SaifUllah, Zhob, Musa Khel, BarKhan, Zhob, Khuzdar, Makhlar, Barkan, Dukki, Pashin, Sherani, |
| Azad Jammu & Kashmir (AJK) | Bagh, Poonch, Kotli, Jhelum Valley, Muzafarabad, Bhimber, Mirpur, Rawala Kot, Neelam Valley, Sudhanoti |
| Gilgit Baltistan (GB) | All GB |
| Source: Various reports published by national/international Projects and internet | |



It is necessary to highlight that the provision of resources, structures, equipment and implements are fundamentally essential to develop state of an art olive value chain on a leading-edge basis; following criteria need to be considered as an integral part of the value chain;

- Olive cultivation using research-based modern technologies and an agronomic tactical management support system
- Development of qualified human resources in the value chain perspective
- Provision of technical assistance to value chain clients
- Ensure quality, sanitary and phytosanitary (SPS) safety standards
- Establish reference laboratories for oil quality certification

- Promotion of establishing modern oil extraction units on a public-private partnership as well as encouraging private sector alone/independently availing SME approach.
- A vibrant marketing system in place enables the provision of essential services and facilities.
- Feasible financial assistance, particularly to stakeholders having a meagre resource

The megaproject financed by the Government of Pakistan “*Promotion of Olive Cultivation on Commercial Scale in Pakistan*” (POCCSP, 2021), with Phase-I (from 2014 to 2021) that has established the basis for the value chain, and Phase-II (from 2022 to 2024) that will consolidate and expand what has been undertaken, possess the resources to support the establishment of the olive value chain from the public sector side. Being the project implemented by Pakistan Oilseed Department (POD) of MNFSR in the provinces through the nine (9) components already established at Federal, Baluchistan, KPK, Punjab GB and AJK level.

Each province is also implementing specific olive projects; therefore, they are providing support to the growers. Another donor funded project “GRASP” is being implemented in Balochistan (for the olive) that is specifically designed for the SMEs.

These projects intend to involve all stakeholders of the olive value chain (production to processing) through coordination at national, provincial and international levels in research endeavors, planning and monitoring of the project events. The main objectives of these interpolations are to develop and establish the state of the art of the resources needed to strengthen the olive value chain. In Pakistan, the concerted efforts to promote olive in its value chain perspective result from technological solid and commercial cooperation from international partners, especially the government of Italy, as well as public sector development programme investment and coordinated efforts at the national level and provincial level.

The situation of the provinces is given hereunder.

- CHAPTER – 5

MAPPING PROVINCIAL GOVERNMENT INITIATIVES FOR SERVICES AND FACILITIES TO DEVELOP OLIVE VALUE CHAIN

Balochistan

The scientists are considering Balochistan the most suited province for olive growing, in suited areas, as well as it provides an economic opening for farmers to switch from traditional water-consuming crops to a smart-climate plant, and opens new opportunities to capitalize on an untapped market. As a result, the cultivation of olives and the subsequent high returns could reduce poverty. Olive cultivation also allows the growers to enjoy other benefits; these include improvement in environment, development of village entrepreneurship, employment generation, improvement in livelihood due to value addition, and import substitution of oilseeds (GRASP-Pakistan). However, the government intervention is required to promote the olives value chain as olive trees take time to bear fruit in a lucrative manner.

The Board of Investment & Trade (BIT, 2020) has pragmatically analyzed that olives produced in Balochistan are of high nutritious quality and oil content. The high oil content of olive fruit produced in Balochistan is an assurance of increased financial returns to the investor, thus, making it a fruit crop which can be used for corporate farming.

The country has plenty of potential for olive production, with 3.6 million trees covering 12,500 hectares already, and foresees to plant 10 million more on an additional 30,400 hectares, with an estimated increase of additional 3,800 hectares by 2024. The Loralai area is the largest olive oil producer in the province, having more than one million olive trees, mainly Spanish and Italian varieties.

The Governor of Balochistan, addressing the inaugural ceremony of the Olive Oil Processing plant/Unit at BARDC in Quetta on January 25, 2022, said that Balochistan is the largest surface on olive of the country.

According to Balochistan Forest Department statistics, wild olive forests cover 41,000 hectares of the Sherani district, of which the Forest Department owns 6,000 hectares, whereas the rest are local community possessed. According to various experts' opinion's, Quetta, Pishin, Loralai, Killa Saifullah, Khuzdar, Zhob, Musakhel, Barkhan, Harnai, Mastung, and Qalat are most suitable for Olive production in quantity and quality as for high nutritious and oil content.

The Government of Balochistan visualized incentivizing the promotion of olive cultivation as it is a drought-resistant, low delta plant with high value, well suited for the province where groundwater is exhausting rapidly. Balochistan is considered a highly promising province for olive tree cultivation and is planning new plantation on 3,800 hectares by 2024. During the last two decades, the Balochistan Government strived to initiate several ventures in collaboration with the Federal Government and international donors to provide services, resources, structures, equipment and inputs facilities for the olive cultivation and development of the Olive value

chain in its various suitable ecologies. The status of these research and development endeavors are being mapped as follows:

- a) A project named “Development of Olive Production & Processing in Balochistan” was executed with a cost of PKR: 190.00 million for three years. The Project introduced olives as a low delta crop to improve the vegetative cover by increasing the olive area under cultivation. Standardized the propagation and cultivation techniques for mass production of olive plantations/orchards to increase the farmers’ income. The Project also raised a nursery of about 675,000 olive plants and almost 6,000 acres of plantation of olive trees on farmer’s fields. It also developed three mother plant collection blocks.
- b) The federal project captioned “Promotion of Olive Cultivation for Economic Development and Poverty Alleviation” had a significant component for Balochistan. Financed under the Pakistan Italian Debt Swap Agreement (PIDSA), was executed in five districts of Loralai, Zhob, Musakhail, Barkhan and Killa Saifulah in the period from 2012-15. The overall activities of the Project were to promote olive cultivation and extend oil processing facilities to increase olive oil production.
 - i. The Project aimed at utilizing culturable wastelands, forest lands and sub-mountainous areas for large-scale cultivation of olives which will create job opportunities and result in poverty alleviation.
 - ii. To strengthen partnerships with the private sector for olive cultivation and oil extraction.
 - iii. The plantation of the new orchards, as well as providing oil extraction units under Public Private Partnership to be arranged between the project and local Community-Based Organizations (CBO’S), NGOs or small farmer groups.
 - iv. To set up several new olive processing facilities with supporting infrastructures and equipment.
 - v. Promote olive cultivation through different means (media, internet, school, food exhibitions, seminars etc.).
 - vi. Provide training, conduct technical studies and assistance to farmers.
- c) In parallel, the AFNEPAK Project supported the PIDSA’s project with technical assistance and training.
- d) Promotion of Olive Cultivation on a Commercial Scale in Pakistan. The federal project financed by the PSDP, and implemented by the Pakistan Oilseed Department (POD), Ministry of National Food Security & Research, Government of Pakistan from 2014 – 21, under the Balochistan component provided services, resources, structures, equipment and inputs facilities for the promotion of olive cultivation and development of the Olive value chain in various ecologies of Balochistan as a significant component of the Project. The Project accomplished the following achievements in the province:
 - Provision of Certified, True to Type Olive Plants (56%) of the total provided in the country.

- Installation of Drip Irrigation System to 45% of the farmers in Balochistan out of a total of 124 in the country.
- Provision of Double Shaded Nursery Tunnels, two in BARDC Quetta, two in sub-station Loralai, one in ARI sub-station Khuzdar, and one in ARI Quetta.
- Organized 17 Training programs for 1,462 Olive Value Chain Stakeholders that received hands-on training on olive farm best practices, pruning, nursery establishment, fruit processing, packing, and marketing.
- Upgradation of Olive Value-addition Lab at ARI Quetta Baluchistan.
- Installation of Weather Stations at ARI Quetta, UET Khuzdar and in Loralai, and technical resource persons provide data and information on the changing weather to the farmers.

e) The Growth for Rural Advancement and Sustainable Progress (GRASP) project is funded by the European Union and implemented by the International Trade Centre. The objective is poverty reduction and sustainable, inclusive growth through development of rural small and medium-sized enterprises in selected districts of Sindh and Balochistan provinces. The project's outcome aims to enhance the productivity and profitability of SMEs (Small Medium Enterprises) involved in primary production, service provision, and value addition in and around selected clusters of production. The project (2019 – 2024) will create gender-inclusive employment and income opportunities in rural areas through targeted support to both the public and private sectors.

Olive value chain has been included in the activities; ten districts were selected in the province of Balochistan, namely Zhob, Pishin, Quetta, Nushki, Kharan, Khuzdar, Panjgur, Kech and Lasbela where livestock (poultry, sheep, and goat), onion, date, grapes and olive will be developed.

Regarding olive, selected also as a climate-smart crop, the project will follow an integrated approach to extend the capacities of rural SMEs and agribusiness support services focused on productivity and quality compliance. This will include enhancing agriculture practices and technologies, as well as building up capacities to add value through processing, with an emphasis on improving SME food safety culture. Tailored interventions will be developed to increase the capacities of women to engage in economic opportunities in farming and processing. Developing SMEs by building supply chains, improving market linkages through private sector-led alliances, and improving the dissemination of market information. Special focus to develop collaboration with financial institutions to enable rural SMEs to acquire technologies to improve sustainability

In addition to the projects mentioned above, throughout the years some other national and international organizations extended services, resources, structures, equipment and inputs facilities for the olive cultivation and development of the Olive value chain in Balochistan.

It has been found track of the following activities, done and planned, from different sources:

- Twelve acres of natural olive forest were grafted with the help of the World Wildlife Fund and the UK-Aid funds using Italian and Spanish varieties.
- Some drip irrigation systems have been installed in olive fields with the help of the United Nations Development Program and the Agriculture and Water Management Department.
- 50,000 olive saplings had been planted in different parts of Zhob in recent years.
- 3,000 Olive Plants were handed over to the Balochistan University of Engineering and Technology, Khuzdar (BUETK by Secretary Forest in the framework of the 10 Billion Tsunami Tree Project. Moreover, the Secretary agreed to provide two imported Shades along with a Nursery, Plants and the Installation of a Weather Station (Early Warning System) at the institute.
- Zarai Taraqati Bank Limited (ZTBL) Balochistan, keeping in view the situation of Olives in Balochistan, has considered olives as an agri-business. ZTBL is introducing olives as a low delta crop and providing loans to the farmers for developing Olive Orchards and its drip irrigation facility. The ZTBL is also striving to increase the farmers' income by cultivating olive plants on the farmers' fields and planning to impart olive awareness and maintenance training to the farmers. In addition, capacity building on the value addition of olives and providing loans. ZTBL has considered olive oil extraction machines loanable items (the US \$5,000-10,000) for interested stakeholders/farmers.

Punjab

The Government of Punjab envisages that the Olive value chain development sector owes excellent potential for contributing to the socio-economic uplift and employment generation in rural economies of the Potohar Region. Currently, no dedicated olive research facility exists in Punjab; a small team of researchers at BARI Chakwal has been conducting olive research since 1991 and has mentionable achievements. The olive sector has received, from 2011 onward, Government's transformed attention and declared this region as the 'Olive Valley' adopting the 'Sector Development Approach', implemented to give the sector an enabling environment to develop in line with the global standard. The project provided services, resources, structures, equipment and inputs facilities for the promotion of olive cultivation in various ecologies of the provinces.

The salient achievements and current status of the project are summarized as follows;

- More than 1000 farmers are registered by BARI and are beneficiaries of the olive projects. This number is expected to increase to 2000 over the project duration.
- Around 750 participating farmers have been provided true-to-type and disease-free olive nursery plants free of cost to make olive plantations on 7,888 acres (till April 2019).
- Provided various other incentives included subsidies and technical support for water source development for supplemental irrigation and installation of drip irrigations system.
- A pilot scale technical assistance (TA) program is being implemented under the olive valley project, but that needs strengthening through the engagement of multi-disciplinary professionals. The management is provided through a national private sector service provider.

- Procured 30 tractor-driven post-hole diggers of 2.5ft diameter and provided to the farmers on a loan basis, free of cost, to facilitate mechanized pit digging.
- Certified plants provided with subsidy. Either directly or through a private corporate grower, Izhar Farm.
- Less than 5% of the total harvest is being processed and packaged in the form of pickles, preserves, etc. Recently, Unique Value has established the first commercial olive food processing unit in Chakwal.
- No marketing network; at present, the marketing entities Unique Value Pakistan, Baghe-Zaitoon, Izhar Farms, and Olive Foundation Pakistan are marketing domestically produced olive oil and table olives.
- Only one olive oil extraction facility has been located at BARI, Chakwal, since 2017, providing services free of cost to farmers. The facility has adequate capacity to process all the olive fruit for the next 2 to 3 years.

The gaps analysis of the project indicates the following concerns;

- Most of the farmers are small to medium, and on average, olive plants take up to 9 years to full fruiting, and these farmers do not have spare funds or resources to invest for such a long time.
- Non-Availability of Quality Nurseries. In fact, there are private sector nurseries that supply olive plants, but they are not certified. It is a common problem in the country, as the Seed Certification Department that should provide certification cover as a regulatory body has not been able, since the PIDSA project imported the exotic varieties, to enable and facilitate the growing of a local nursery industry, that would have allowed to stop the imports of the true-to-type germplasm.
- Production problems, mainly at the stage of flowering and fruit formation, presence of pest and diseases with serious damages such as the Anthracnose in 2022.
- Insufficient Olive Oil Extraction mills and processing businesses in Value Chain
- For Table olive, there is only one system of processing that has been installed in 2022,
- The packaging and bottling technology is needed for oil and table products to meet international quality/standards.

The Government of Punjab has realized that the research and development (R&D) arena of olive value chain expansion is not moving at its real potential due to several above-identified gaps and challenges that need to be addressed in future endeavors for improvement. Hence, launched a project for 2019-23, allocating total funds of PKR 283.121 million (Agriculture Department, 2019). The primary emphasis is establishing the Centre of Excellence for olive Research and Training (CEFORT) at Barani Agriculture Research Institute, Chakwal, to study olive adaptability in Potohar, Thal and Southern Punjab, including the Cholistan.

The project's primary guiding principle is to strengthen institutions within the department for olive research and training to generate indigenous datasets to support R&D developments in the province on a sustainable basis with a focus on the entire olive value chain. The project is operating to accomplish the following objectives;

1. Develop capabilities & capacities for olive cultivation, management, post-harvest, processing and value addition/product development.
2. Develop and adapt technologies for the development of the olive sector through on-station and farmer-participatory research.
3. Act as a repository of olive genetic resources and their management.
4. Undertake socio-economic research in olive crop

To achieve these objectives, the project target is to provide the following services, resources, structures, equipment and inputs facilities, ensuring high standards of research, training, innovation and learning, transversely entire olive value chain. The project execution is to deliver services, resources, structures, equipment and inputs facilities for the promotion of olive cultivation in designated ecologies of Punjab with the following interventions;

1. Establish 03 states of the art research labs, namely the Olive Oil Quality Lab, Value Addition / Product Development Lab and Disease Diagnostic / IPM Lab.
2. Conduct a diagnostic field survey (04) to identify issues of olive growers and other stakeholders.
3. Conduct 05 olive adaptability trials in Thal and Southern Punjab, including the Cholistan.
4. Develop and implement a demand-driven research program with provision for regular review by relevant experts (20 Research Experiments/Trials)
5. Establish linkages with relevant National & International R&D organizations.
6. Establishment of 03 olive multiplication blocks in the private sector with technical support.
7. Import of promising exotic olive Germplasm (10 genotypes) with DNA fingerprint/genetic profile.
8. Organize training of trainers in olive culture (100 master trainers/Olive Service Providers/Extension agents).
9. Organize four national olive festivals.
10. Organize three conferences/workshops/seminars for knowledge sharing and dissemination
11. Extend advisory services to farmers and stakeholders, including ICT tools

The olive value chain development component is planned to be implemented later in consultation with stakeholders and as per guidelines of the Olive Advisory Board proposed in this project, and it will play its role in the commercialization and adoption of technology as well as incorporate market information into R&D system and make it more responsive to private sector needs.

Khyber Pakhtunkhwa (KPK)

Large area of Khyber Pakhtunkhwa, including merged areas, have a suitable climate and better soil, especially Malakand Division, Peshawar Valley, merged areas of erstwhile FATA, and the right side of River Indus is most ideal for olive cultivation. The KPK province has about 880,000 hectares of cultivable wasteland, which is suitable for olive cultivation. The Government of

KPK, foreseeing the huge ecologies suitability for olive cultivation and olive potentials for attribute to the socio-economic elevation and employment generation in rural economies, initiated a pragmatic approach by executing several projects in collaboration with federal and international organizations.

Following projects either are still active or may be mentioned in the history of the Province in olive development,

- a) In 2008, with a cost of Rs 39.185 million, it was financed the project “*Promotion of the production and marketing of olive oil in Pakistan*” by the Italian Government and implemented by the Istituto Agronomico per L’Oltremare (IAO), Florence, a scientific and technical branch of the Italian Ministry of Foreign Affairs, embarked on a project in collaboration with the Pakistan Oilseed Development Board (PODB) component at Tarnab. The project provided technical services, resources, structures, equipment and inputs facilities to promote olive cultivation in Charsadda, Bajaur, Bannu, Buner, Lower Dir, Malakand, Mardan, Swabi, Swat, Kurram, North and South Waziristan, Tank and Khyber Agency. The salient achievements were as follows;
 - Trained about 1,000 small farmers on olive cultivation and grafting techniques.
 - Assisted orchards in Malakand and Sungbhati (Mardan), which produced respectively 85 litres of olive oil from 889kg fruits, and 183 litres from 733 kilograms.
 - Installed in Tarnab an olive oil extraction unit with the capacity of 500kg per hour, which would be in working condition for many more years.
 - About 30 employees were trained under the project by the Pakistan Chemical and Industrial Research Laboratory (PCSIR).
- b) The Khyber Pakhtunkhwa (KP) Agriculture Department has distributed 9,300 olive saplings free of cost among farmers of Bajaur tribal districts to increase olive production.
- c) Provision of oil extraction machines to the olive-producing districts of Bajaur, Dir, Mardan, Nowshera, and Abbottabad, which will facilitate farmers to extract oil from olives produced in their areas.
- d) Fifty per cent of the tribal districts, including Bajaur, Kurram, North and South Waziristan, are suitable for olive cultivation. Currently, the crop is being cultivated in Dir, Swat, Abbottabad, Mardan, Peshawar and Nowshera, and the southern districts. As a result, demand for olive cultivation in KPK increased, and the fresh olives are being purchased from farmers at a rate varying from PKR: 20 to 100 per kg.
- e) Under the federal project POCCSP, the provincial component has been implemented with the Department of Agriculture Research. The project aimed to provide services, resources, structures, equipment and inputs facilities for the promotion of the olive value chain in various ecologies of the KPK. According to details, following activities have been implemented in Phase I:
 - Planted 431,465 olive trees over an area of about on 12,000 acres, at Dir, Nowshera, Swat, Abbottabad, Mardan and other tribal districts.
 - Started a drip irrigation project across the province, which will make millions more acres of land cultivable in KPK.

- Agriculture Research Institute Tarnab (ARI), Peshawar, has been declared a Center of Excellence for research on olives and Sangbatti in Mardan as Olive Valley.
 - Extraction units have been established.
 - The phase-wise registration process of four private olive nurseries started.
 - Established model olive orchards at Manki Sharif Nowshera, Bajaur, Dir Lower, and Malakand.
 - Supported farmers in the establishment of Infrastructure for olive nurseries on an equally shared matching grant basis, besides setting up fruit processing units for olive and oil extraction units.
- f) Under the "Ten Billion Tree Tsunami Programme, Phase-I", a four-year (2019-2023) project of the Government of Pakistan with the total cost of 125.1843 billion implemented by the Ministry of Climate Change along with Provincial and territorial Forest and Wildlife departments, according to the Divisional Forest Office Peshawar, responsible for the implementation in the province, following are the outbreaks of this project;
- n. 8,000 olive trees, all sourced from the local nursery of the forest department, had been planted on 27ha of land suitable for olive growing.
 - More than 95% of the olive trees had grown successfully during the last two years.
 - About 112,000 liters of olive oil will be produced annually from this area after all the plants start fruit production.
 - The forestry department till 2021 had planted around 8,000 olive trees in Amangarh, a vast country area with little agricultural activity around 40km northeast of the historic city of Peshawar.
 - Over 70 million plants of wild olive trees were discovered, out of which Forest and Agriculture departments have joined hands for grafting the wild olive trees in accordance with the approved plans and budget.
- g) The Agriculture and Livestock Departments have proposed a five years olive cultivation project worth Rs 2,000 million allocated in ADP 2021-22 for olive plantation in all seven tribal districts, in three phases, under the landmark Prime Minister National Agriculture Emergency Programme.
- h) In the first phase, olive cultivation on a large scale would be started in the Bajaur district and later extended to South Waziristan, North Waziristan, Khurram, Orakzai, Khyber and Mohmand districts. The government would spend Rs 80 million on its first phase during 2021-22 financial year.

Azad Jammu and Kashmir (AJK)

Azad Jammu and Kashmir (AJK) Minister for Agriculture and Livestock has urged that the AJK farmers should be encouraged to cultivate olive trees as commercial cultivation of olives would play a significant role in the prosperity of the farmers and the state. According to Director General Agriculture AJK, the department has been assisting farmers under the federal project POCCSP, Phases I & II, in providing services, resources, structures, equipment and inputs

facilities for the promotion of olive cultivation and development of Olive value chain in its various ecologies of AJK on a commercial scale. Interested farmers are being provided with olive plants. Training and awareness sessions are being held on olive cultivation techniques and post-plantation care and protection to produce saplings and seedlings of different plants in their nurseries as per demand to do away with dependence on private nurseries in the neighboring provinces. The status of the achievements and establishments to date is given as follows:

- Under phase I, n. 44676 olive saplings were distributed among the farmers free of cost.
- Under the second phase, the department received a demand for 30,000 saplings from across the state, distributed among the farmers at a 33% cost-sharing basis.
- A survey of wild olive trees has been conducted in Muzaffarabad, Bagh, Poonch, Sudhnoti and Kotli districts.
- 400 acres have been planted across the AJK.
- Provision of support for adaptability trials of new exotic varieties at Ghathor Muzaffarabad and Danna Muzaffarabad.
- Support in the establishment of olive mother blocks, GPUs.
- Conducted training sessions, providing hands-on training on olive farm best practices, pruning, nursery establishment, fruit processing, packing, and marketing.

Shortcomings:

- There is no olive oil extraction unit provision as public sector established facilities.
- There is no installation of any drip irrigation system by the project.
- No step has been taken for plant propagation locally in the nurseries with the assistance of any project.
- There is no provision for any up-gradation of olive value-addition labs and installation of Weather Stations for providing the services to stakeholders.

Gilgit-Baltistan (GB)

A vast scope exists for olive cultivation in the areas covering districts of Diamir, Gilgit Ghizar, Darel/Tangir and Chilas sub-divisions. Considering the prevailing potential for olive cultivation, some significant activity on olive cultivation have been carried out by the federal project POOCCSP, through which were provided services, resources, structures, equipment and inputs facilities for the promotion of olive cultivation and development of the Olive value chain. The prevailing status regarding facilities for the promotion of olive cultivation provided by the project are briefed as follows:

- Developed 267 acres of olives planted across the GB.
- Adaptability trials of new exotic varieties established at the Mountain Agricultural Research Centre (MARC), Juglot & Paen Nagar.
- Supported the establishment of Olive mother blocks – GPUs. in GB, but there is no plant propagation facility locally in the nurseries.
- Organized training sessions for about 222 farmers/stakeholders, that received hands-on training on olive farm best practices, pruning, nursery establishment, fruit processing, packing, and marketing.
- In GB, no facility prevails for the up-gradation of olive value-addition labs and weather stations to benefit the stakeholders of the olive value chain

Shortcomings:

- There is no olive oil extraction unit provision as public sector established facilities.
- There is no installation of any drip irrigation system by the project.
- No step has been taken for plant propagation locally in the nurseries with the assistance of any project.
- There is no provision for any up-gradation of olive value-addition labs and installation of Weather Stations for providing the services to stakeholders.

ASSESSMENT AND SAMPLING OF WILD OLIVES WITH AGRONOMIC INTERESTS IN THE SUITABLE PROVINCES

The olives have been identified as one of the best options for promotion of its cultivation, as it is a low delta plant and suits a wide range of ecologies that even have limited water resources. In different ecological zones of Pakistan various morphological and ecological types of wild olive are extensively present since immemorial time. Wild olive could be firstly differentiated from cultivated olive based on morphological differences as wild olive has smaller fruit size with low quantity of oil, or not at all oil. In Pakistan, and in entire world, meager efforts have been carried out to explore the diversity and divergence in cultivated and indigenous wild olives. The genetic diversity of wild olives could be particularly thought-provoking for the introgression of agronomic traits and resistance to biotic and abiotic stresses in breeding programs. Naz et. al. (2019) estimated the diversity and divergence between cultivated and wild olive collection, and observed that it could be useful for exploitation of local and exotic olive genetic resources. The wild olive clearly diverges from the cultivated olive genotypes. Overall, there is a high diversity in the germplasm; assessment and exploitation of indigenous wild olive genetic heritage could be interesting for developing olive cultivars through genetic manipulations and helpful for breeding programs, and transformation of wild olive into cultivars. However, for this purpose it is necessary an extensive sampling and more powerful genotyping tools to further expound the wild olive population structure in Pakistan.

Till the 1980s, there were no concerted efforts to utilize these wild olives for research purposes and as commercial resources. However, in 1986, a pragmatic approach to olive cultivation and grafting wild olives was initiated by Pakistan Oilseed Development Board (PODB), and about 5.5 million wild olive plants were grafted with unknown olive varieties and the results were not markedly encouraging.

The government's efforts continued from 2000 onward to convert wild olives into productive trees through grafting on scientific lines. The researchers found that grafting wild olives using the "T-Grafting" technique resulted in an 80-90% success rate (POD, 2021). A. Mukhtar (2001) compared T and Bark grafting methods fortnightly round the year. The highest mean success (100%) was achieved irrespective of the grafting techniques from August to middle September. There was no success through any method used in the other months of the year.

Hence, the government have launched a pilot project of wild olive tree grafting from 2004-2008 captioned as "Rapid conversion of wild olives into bearing species" in different areas of Khyber Pakhtunkhwa, FATA, Balochistan, Azad Jammu & Kashmir region and providing proper grafting training to the farmers of those areas. According to the PERI report, the country can earn worth US\$1 billion annually by grafting and converting eight million wild olive trees into productive olive trees.

Most farmers have adopted the methods of "budding" and "T- grafting" because they have found this method most successful and starting bearing fruits in 3-4 years (Shoaib and Shehbaz, 2022). The details of data available from POD on grafting wild olive in various provinces is given in Table – 1.

| Province | No. of Trees Grafted |
|---|----------------------|
| Khyber Pakhtunkhwa | 3.50 million |
| Baluchistan | 2.70 million |
| Punjab (Potohar) | 1.80 million |
| Total | 8.00 million |
| Source: Pakistan Oilseed Department (POD) | |

The public and private sector investment, planning and farmers' participatory execution approach, including training programs, technology transfer through media, documentaries, meetings and workshops during the last two decades, have started fetching tangible results. The data and information on wild olive grafting show that about eight million wild trees have been converted into productive trees and have attracted the interest of the farmers in Punjab, Baluchistan, KPK, tribal areas, GB and AJK. Regarding the agro-economic aspect of raising wild olives through the grafting, the farmers have highlighted that the olive trees encompass minimum cost for land preparation and entail minimum water for irrigation, fertilizer and pesticides use.

The available details of work done by various public and private stakeholders to enhance the wild olive trees grafting to convert them into productive trees are given in [Table – 2](#).

| Sr. No | Province/ Agro- Ecology | Organization/ Project | Wild Olive Trees Found and Grafted |
|--------|--|---|---|
| 1 | Khyber Pakhtunkhwa (KPK) | Forest & Agriculture Departments 10 Billion Trees Afforestation Project (10 BTAP) | <ul style="list-style-type: none"> • 70 million wild olive trees found in the province • 40 million wild olive trees being grafted |
| 2 | Bajaur, Kurrum, Khyber, Orajzai and Waziristan districts | 10 Billion Trees Afforestation Project (10 BTAP) | <ul style="list-style-type: none"> • 35 million wild olive trees found • 500,000 wild olive trees grafted |
| 4 | Punjab, Baluchistan, KPK | Rapid conversion of wild olives into bearing species 2004 – 2008 PODB | <ul style="list-style-type: none"> • About eight million wild olive plants would be converted into oil bearing species by 2008. • 3.5 million olive trees had been converted. • More than 4,000 trees had started bearing fruits since 2004-05 |
| 5 | Bajaur District | DAO, Agriculture Extension Department Bajaur (GOP funded) | <ul style="list-style-type: none"> • 400,000 wild olive trees grafted • 30,000 wild olive trees grafted are bearing fruits |

| | | | |
|---|---|--|--|
| 6 | Tribal Areas | Shah Khalid, a tribal elder and farmer | 36,000 million wild olive trees growing in mountainous tribal areas |
| 7 | Bajaur | Director Agriculture Bajaur (GOP funded) | <ul style="list-style-type: none"> • 400,000 wild olive trees grafted |
| 13 | Different provinces | Greenfield project | 8 million wild olive trees are grafted |
| 14 | Punjab Balochistan KPK, Sindh, AJK, GB and ICT | Olive Promotion Cultivation on Commercial Scale in Pakistan M/o NFS&R | Pilot intervention for conversion of 05 million wild olive plants |
| 17 | AJK | Al-Khidmat Foundation | <ul style="list-style-type: none"> • 114,000 wild olive plants grafted • 22,000 are bearing fruits |
| Source: Various published project reports of POD, articles and internet | | | |

Wild olive plants grow in millions in various regions, and about two decades ago, these fantastic plants had little commercial value and were mainly used for timber and firewood. The government's initiative to launch various project implementation activities provided technological backstopping and training regarding wild olive grafting and converting these into the economically productive entity. It has been reported that now the fruits of these grafted olives are being processed for oil extraction and other value-added products.

CHAPTER – 7

MAPPING OF EXISTING SERVICES AND FACILITIES

Mapping of Registered Olive Plant Nurseries and Registered Olive Varieties

Overall, regarding olive plant nurseries that shall supply the plantlets to the growers, eight (08) are registered with Federal Seed Certification and Registration Department (FSC&RD) whereas four are under the process of registration (Table - 4).

The POCCSP project has installed eleven (11) double shaded nursery tunnels in different components of the project i.e., two in BARI Chakwal, two in ARI Tarnab, one in NTHRI Mansehra, two in BARDC Quetta, two in sub-station Loralai, one in ARI sub-station Baghbana Khuzdar, and one in ARI Quetta. These nurseries have in built irrigation system, heating, and cooling system (temperature control) and all other facilities to produce olive saplings at mass scale.

The FSC&RD has registered BARI Chakwal as olive mother orchards of 86 varieties, and Izhar Farms with 38 varieties, Kallar Kahar. The olive varieties registered by FSC&RD for commercial cultivation are: Gemlik, Koroneiki, Hamdi, Pendolino, Jerboui, Ascolana, Manzanilla, Picual, Hojibalanca, BARI Zaitoon-I, BARI Zaitoon-II, ZAR Bratica, Tarnab Picual, Cherat Zaitoon.

| Sr. No | Name of the Nursery | Status |
|---------------|---|---------------|
| 1 | Barani Agricultural Research Institute, Chakwal | Registered |
| 2 | Izhar Farms Pvt. Ltd., Kallar Kahar, Chakwal | Registered |
| 3 | Al Atta Farm, Bikhari Kalan, Chakwal | Registered |
| 4 | The Farms Nursery, Neela Dhulla, Chakwal | Registered |
| 5 | Sehgal Farms, Kallar Kahar, Chakwal | Registered |
| 6 | Agricultural Research Institute, Peshawar | (in process) |
| 7 | Shah Gulab Nursery, Nowshera | Registered |
| 8 | Munawar Afreedi Nursery, Khyber Agency | (in process) |
| 9 | Zaitoonkhwa Nursery Farm, Talash, Lower Dir | Registered |
| 10 | Zaikor olive nursery, Kohat | Registered |
| 11 | Balochistan Agri. Res. & Dev. Centre, Quetta | (in process) |
| 12 | Agriculture Research Institute, Loralai | (in process) |

Source: Pakistan Oilseed Department, Ministry of National Food Security and Research

Mapping of Olive Oil Extraction Units

The Olive oil extraction facilities have been established in the provinces through the POCCSP project, as well as by the provinces themselves under their development projects throughout the last years. Overall, twenty-five (25) olive oil extraction units have been operationalized in the clusters of olive plantations (Table 5). Usually, for their operation these units apply different

schemes of costs for providing the service to the farmers; some of them are free of costs, while others keep 10% of the extracted oil. For the harvesting season of 2022 the POCCSP project has instructed the units to process the olives free of cost, due to the exceptional circumstances suffered by the farmers from flood. Accordingly, the project has borne the operational costs. It is important to mention that for the time being the industry/processors has not shown a real interest to enter in the business, but it is hoped and expected that shortly they will progressively be attracted once the volume of the harvest increases, as well as the consumers.

| Table – 5 Mapping of Olive Oil Extraction Units | | | | |
|--|-------------------|-----------------|--|--------------------------|
| Khyber Pakhtunkhwa | | | | |
| No. | Unit Model | Capacity | Location | Working Condition |
| 1 | ALFA LAVAL | 500kg/hr. | Agriculture Research Institute Tarnab, Peshawar | No |
| 2 | OLIMIOGOLD | 100kg/hr. | Model Farm Service Center, Lower Dir | Yes |
| 3 | MoriTem FORMA | 250kg/hr. | PPAF Associated Community, Lower Dir | Yes |
| 4 | KOCAKMAZ | 200kg/hr. | Israr Farm, Dherai Thalash, Lower Dir | Yes |
| 5 | KOCAKMAZ | 200kg/hr. | Agriculture Research Institute, Mingorra, SWAT | Yes |
| 6 | MoriTem FORMA | 250kg/hr. | ARS - Kohat | Yes |
| 7 | OLIMIOGOLD | 100kg/hr. | Model Farm Service Center Bajaur | Yes |
| 8 | OLIMIOGOLD | 100kg/hr. | Agriculture Extension Orakzai | NIL |
| 9 | MoriTem FORMA | 500kg/hr. | CCRI – Pir Sabak, Nowshera | YES |
| 10 | MoriTem FORMA | 500kg/hr. | Olive Model Farm Sangbatti, Mardan | YES |
| 11 | OLIMIOGOLD | 100kg/hr. | National Tea & High Value Crops Research Institute, Mansehra | YES |
| 12 | MoriTem FORMA | 250kg/hr. | HARS - Abbottabad | NIL |
| Balochistan | | | | |
| No. | Unit Model | Capacity | Location | Working Condition |
| 13 | PIERALISI | 600kg/hr. | Balochistan Agricultural Research and Development Centre, Quetta | Yes |
| 14 | PIERALISI | 600kg/hr. | Agriculture Research Institute, Loralai | Yes |
| 15 | MoriTem FORMA | 250kg/hr. | PPAF Associated Community, Zhob | NIL |
| 16 | OLIMIOGOLD | 100kg/hr. | Agriculture Officer, Zhob | YES |
| 17 | MoriTem FORMA | 250kg/hr. | PPAF Associated Community, Muslim Bagh | NIL |
| 18 | OLIMIOGOLD | 100kg/hr. | Agri. Res. Station, Khuzdar | YES |
| 19 | OLIMIOGOLD | 100kg/hr. | Panjgoor | NIL |
| Punjab | | | | |
| No. | Unit Model | Capacity | Location | Working Condition |
| 20 | OLIMIOGOLD | 100kg/hr. | National Agriculture Research Centre, Islamabad | No |
| 21 | OLIMIOGOLD | 100kg/hr. | Barani Agriculture Research Institute, Chakwal | Yes |
| 22 | PIERALISI | 600kg/hr. | Barani Agriculture Research Institute, Chakwal | No |
| 23 | Alfa Laval | 500kg/hr. | Allah Ditta Unique Values, Chakwal | NIL |
| 24 | PIERALISI | 600kg/hr. | Barani Agriculture Research Institute, Attock | Yes |
| 25 | NIL | NIL | Zahid Iqbal Allied Foods, Faisalabad | NIL |
| <i>Source: OliveCulture – POCCSP</i> | | | | |

Mapping of Olive Processing / Table Olive Value Addition Units

Many added value products are increasingly made in the word from the olive fruit, olive oil and pomace, therefore separately from the olives for oil and from olive for table. As well known, the characteristics of the fruits are different, although for some of the varieties the double use is possible and, above all, the olive is a versatile fruit.

Nevertheless, the olive for table represents for the world and Pakistani market the major product for value addition. To this end, the POCCSP project has installed three (03) new units for Table olive in its components located at BARI Chakwal, ARI Quetta, and ARI Tarnab, where the value addition is being carried out under the supervision of specialized manpower. In addition to this, a lab has also been established to standardize the recipes of various value-added products. As a result of these efforts a number of value-added products have been developed, standardized, and are being marketed, although to a limited extent, which include: Olive Soap, Pickle, Biscuits (Cookies), Murabba, Olive Chatni, Olive Syrup, Olive Liquid Handwash, Olive Balm (Shea Butter, Coca Butter, Bee's Wax), Olive Dry Leaf Tea, Olive Pomace Pellets (Anti-Cancer), Olive Medicated Oil and Olive palettes.

Regarding the Table Olive, which possess a significant market potential, the OliveCulture Project has organized in October 2022, in coordination with the counterparts, a Training on "Table Olive and Value Addition Processing Protocols and Hygiene Safety" conducted by an Italian Expert, which was delivered at the three sites of the provinces, and was meant to operationalize the processes of the three new units, and to rationalize the treatment of the olives in all the steps and conditions, from the semi-industrial to the home made. The target beneficiaries included: plant managers, plant operators, food technologists, lab technicians, farmers, processors, youth and women, and government officials. In addition, a session was conducted at the plant owned and managed by the civil society and PPAF in Lower Dir (KPK).

It maybe added that most of the table varieties that are currently grown in Pakistan are only used for oil extraction. The focus of the government and the farmers, at present, is not on table olives as a viable domestic opportunity, instead, most olive farmers are extracting oil from the olives produced. This is because oil extraction is subsidized by the Government and no such subsidy is available for the production of table olives.

Mapping of Research and Development Institutes involved in Olive Promotion

A number of public-private organizations, firms/companies and agriculture institutes/universities are engaged in research, focusing on the socio-economic and environmental benefits of olive cultivation. List is given in table – 6 below:

| Table – 6 Mapping of R & D Institutes involved in Olive Promotion | | |
|--|--|--|
| | Name of Institute/Organization | Activity Focus |
| | Pakistan Oilseed Department, Islamabad | At national and international level; <ul style="list-style-type: none"> • Policy formulation • Coordination • Research • Project Development • Data compilation at National and Provincial level |
| | National Agricultural Research Centre, Islamabad | Research on varieties; <ul style="list-style-type: none"> • Development • Selection • Evaluation • Genetic Markers |
| | Barani Agricultural Research Institute, Chakwal and CEFORT | <ul style="list-style-type: none"> • Diagnostic Field Survey • Adaptability Trials • Stakeholder Consultations • Research Experiments /Trials • Establishment of olive multiplication blocks in private sector • Collection and Import of Olive Germplasm • Organize Training of Trainers • Olive Festival, • Conference • workshops/seminars • Olive advisory services to olive stakeholders |
| | Mountain Agriculture Research Center GB | <ul style="list-style-type: none"> • Promotion of olive plantation • Olive orchards development and management |
| | Agricultural Research Institute, Tarnab (ARI), Peshawar | <ul style="list-style-type: none"> • Diagnostic Field Survey • Adaptability Trials • Stakeholder Consultations • Research Experiments /Trials • Establishment of olive multiplication blocks in private sector |

| | | |
|--|--|---|
| | | <ul style="list-style-type: none"> • Collection and Import of Olive Germplasm • Organize Trainings • Olive Festival, Conference, workshops/seminars • Olive advisory services to olive stakeholders |
| | National Tea & High-value Crops Research Institute, Mansehra | |
| | Agricultural Research Institute (ARI), Sariab, Quetta | <ul style="list-style-type: none"> • Olive Cultivar Adaptability study • Promotion of olive plantation • Olive orchards development and management |
| | Baluchistan Agricultural Research & Development Centre, Quetta | <ul style="list-style-type: none"> • Olive Cultivar Adaptability study • Promotion of olive plantation • Olive orchards development and management |
| | Agriculture Extension Department, Muzaffarabad, AJK | <ul style="list-style-type: none"> • Promotion of olive plantation • Olive orchards development and management |
| | Institute of Biotechnology and Genetic Engineering, The University of Agriculture, Peshawar Khyber Pakhtunkhwa | Molecular Diversity and associated Phenotypic and Biochemical divergence in olive gene pool |
| | University of Agriculture Peshawar | <ul style="list-style-type: none"> • Evaluation of olive cultivars in varied environments • Olive oil quality • Molecular divergence |
| | Pir Mehr Ali Shah Arid Agriculture University Rawalpindi | <ul style="list-style-type: none"> • Morphological characterization, • Phenological characterization • Adaptability of Olive Cultivars |

CHAPTER – 8

CONSIDERATIONS

The available information regarding efforts/activities carried out by various public, private and other national and international organizations to develop the state of the art of resources used and those needed to strengthen the olive value chain in Pakistan, have been thoroughly reviewed. The current status assessing the resources, structures, equipment and inputs used to implement olive activities has been substantiated through an extensive review of various reports, published articles, internet and interactive meetings with multiple stakeholders to compile this report.

It is vital to mention that olive cultivation activities by the provincial governments before 2000 have not been accomplished in a quantifiable mode except for the work on olive plantations that started in collaboration with the Italian government during the mid-80s. Virtually the development of the olive sector was initiated in 2000, and a lot of emphasis has been given for a decade to the promotion of olive plantations in the form of orchards through new agricultural practices on a massive scale throughout the country using exotic/imported olive varieties, as well as to the grafting of wild olive trees.

The pragmatic approach to strengthening the olive value chain in the country was started in 2012 thanks to the project called "Promotion of olive cultivation for economic development and poverty alleviation". This project was financially supported by the Govt. of Italy through the PIDSA (Pakistan Italian Debt Swap Agreement) in which (2012-14) olive was planted on more than 2,000 hectares.

Pakistan integrated the cultivation of olives into its planning vision for 2025 and has given a flagship status to the olive sector. A mega project captioned "Promotion of olive cultivation at commercial scale in Pakistan" was approved in 2014 for five years with a cost of 2444.545 million from the Public Sector Development Project (PSDP) to replicate the model of PIDSA in developing state-of-the-art resources to strengthen the olive sector from a value chain perspective. The project components were set up in Baluchistan, KPK, Punjab, AJK and GB, with the implementation entrusted to PARC in its first phase, due to the devolution process that excluded PODB. The project's first phase has been closed, while Phase 2 started in 2021-22 and will be completed by 2024. The project implementation had been tasked to the Pakistan Oilseed Department (POD) of the M/o National Food Security and Research (MNFSR).

The current status of achievement to promote the expansion of the olive value chain depicts that more than 4 million saplings have been planted over an estimated area of 15,000 hectares in various provinces and ecologies of Pakistan. Extensive training of multiple stakeholders in the olive value chain perspective has been conducted, enriched by the participation of the OliveCulture Project. Several indigenous plant nurseries and specialized international standard nurseries have been established. Substantial olive oil extraction units have been installed in various provinces, and value-addition laboratories are functional to facilitate farmers' processing

of their produce. The public-private partnership to sustain these activities in future has been encouraged.

Based on comprehensive GIS information by PARC, the following areas of the country have been identified as suitable for olive cultivation and olive value chain promotion, although more adaptive research is needed to validate the current findings as well as to further extend the potential of the olive crop in the Country.

| Province | Suitable Areas |
|------------------------------------|--|
| Balochistan | Barkhan, Harnai, Loralai, Killa Saifullah, Zhob, Musa Khail, Khuzdar, Quetta, Mastung, Kharan, Panjgor, and some parts of Kalat, Noshki, Chagi and Washuk |
| Khyber Pakhtunkhwa | Chitral, Upper Dir, Lower Dir, Swat, Kohistan, Shangla, Bagram, Mansehra, Bonair, Mardan, Sawabi, Peshawar, Haripur, Hangu, Nowshehra and some parts of D.I. Khan, Karak, Bannu and Laki Marwat. |
| FATA | FATA |
| Punjab | Pothwar region declared as Olive Valley |
| Islamabad Capital Territory | Islamabad Capital Territory |

In light of the current scenario and state of affairs, it could be anticipated that provision of extended services, resources, structures, equipment and inputs facilities in future are a dire need to boost the olive value chain paradigm in the state-of-the-art mode. The adoption of drip irrigation systems is imperative to mitigate the water scarcity faced by olive growers. The various studies have pronounced deliberation that because most of the olive value chain stakeholders are pioneers and resource-poor, financial support by the government in the form of subsidy is inevitable. For the sustainable development of the olive value chain in the future, the stakeholders require comprehensive training and awareness on good agriculture practices at the farm level, sound processing and product manufacturing practices in the value addition, and oil extraction segment to comply with international standards.

Optimistically these public and private sector interferences will help to develop the Olive industry, which will employ thousands of people directly and indirectly. It is predicted that oil production from the olive plantation areas achieved so far, after 4-5 years, 12.0 million liters of olive oil valuing PKR: 18.0 billion/year will be possibly produced; however, it is conditioned to the fact that if fruit productivity of 20-50 Kg is yielded from one tree and it will largely depend upon good management practices of all the segments of the value chain.

So far, the discussions and the interactive meetings with various stakeholders, researchers and farmer's field visits have indicated that the public sector investment and technological efforts to boost the olive value chain are commendable. However, based on the deliberations of the stakeholders, the following **recommendations** are synthesized for future consideration to facilitate the olive and olive oil sector in the country;

1. A National Olive and Olive Oil Policy is of prime importance to address sector-specific producers, processors, consumers and trade-oriented policy reform measures. Over time, the government has adopted project-oriented measures to uplift the olive sector. After project tenure is over, it may fail to produce a long-term sustainable impact. It is inevitable to shift from short-term project/need-based interventions to develop an inclusive policy framework in consultation with provincial and industrial stakeholders to address policy, institutional, production and market constraints within the olive value chain. The coherent national policy on the olive sector must chalk out provincial and industrial implementation roadmaps and action plans. Policy, financial and infrastructure support strategies should be devised to organize farmers into cooperative arrangements to consolidate produce and extract the olive oil and market locally.
2. In corroboration with National Olive and Olive Oil Policy, the initiatives by the provincial governments in their respective provinces should also be taken akin to Federal Government initiatives. The provincial governments must supplement the activities done by national and international organizations. To sustain the current status of the progress made, the provincial governments should include it in their core budget and core activities of the allied institutions for future endeavors.
3. In the Olive sector, for sustainable olive plantation intensification to meet national requirements, an integrated approach is needed for horizontal expansion of olive cultivation, high yielding and multiple stress tolerant cultivars based on well threshed out through conducting adaptability trials formatted in a uniform format at the national level. In the current olive field information scenario, the cultivars' yield varies from 5 to 15 kg per plant, and the occurrence of various pests and diseases seems to be crossing the threshold level. Climate change events such as heat waves, drought, etc., are impacting olive flowering and, ultimately, its productivity. There is a dire need to promote integrated crop management technologies which need to be adopted by the farmers through an effective transfer of technology.
4. It has been illustrated by the stakeholders that there is an incoherent atmosphere of coordination and collaboration among various stakeholders at the level of federal, provinces, universities, private sector, farmers and NGOs involved in developing the olive value chain sector. A regulatory framework and high-level advisory body/group to plan with federal and provincial stakeholders deemed to be inexorable to establish and implements plans, data collection, precisely calculate national demands for olive sector expansion and determine a common strategy within the framework of the developments in the olive and olive oil sector. This national-level advisory body/group will contribute to the determination and implementation of the necessary policies for the realization of high-quality production, standardization and certification, monitoring of the market and development of quality control systems through research backstopping in the olive sector. It will also strengthen the coordination and collaboration with other allied Ministries and International organizations to carry out subject-related activities beneficial

to the public and the Olive sectors. This will also foster strong linkages with oil extraction and solvent industry producing edible oil and the olive producers to prioritize and channel locally produced olives for oil extraction.

5. It was found in the interactive discussions that small-holding farmers constitute more than 70% of the total olive cultivation landscape. Facilitation of credit on easy terms through formal financial institutions to incentivize olive cultivation and processing will yield far-reaching impacts on promoting oilseeds as a sustainable and profitable crop. Olive sector promotion incentives under producer-oriented policy decisions of federal and provincial governments to provide subsidy incentives for Olive cultivation along with market stability will prove effective in bringing behavioral change among farmers to adopt olive cultivation as a viable alternative oil and cash crop. The financial incentive in the form of a subsidy is still needed to be made accessible across all olive-producing agroecology's of the country. However, the aggregation of small holders in whatever form be devised and suited to the different provinces will remain a major challenge to overcome, in order to develop a sound and sustainable value chain.
6. Cluster-based agricultural transformation has been a priority of the M/o Planning Development & Special Initiatives. Hence, the sustainable and long-term impacts of promoting Olive sector enhancement can be gained by identifying and developing agro-ecological clusters. These clusters should be facilitated with extensive market linkages, public and private investments for value chain development and specialized agronomic technology packages to maximize the benefits. Targeted subsidy regimes can be extended to such clusters, and consolidating small-holding farmers at the village level and consolidating villages at a regional cluster level will significantly impact the olive sector intensification efforts. Involvement of Civil Society will be an asset.
7. Efforts are also needed to establish Olive Oil extraction units in the declared olive valleys of Potohar and Sangbhatti, covering a vast area under olive cultivation. These regions have been identified as suitable for olive production, where millions of olive saplings have been planted under the projects. SMEDA (2017) has developed pre-feasibility to facilitate potential investors in Olive Oil Extraction Unit by providing them with a general understanding of the business with the intention of supporting potential investors in crucial investment decisions and to facilitate potential entrepreneurs in project identification for investment
8. The registered olive plant nurseries have been identified as a major constraint by the stakeholders. There are a number of unregistered nurseries around big cities of the country producing flower, fruit and ornamental plants. However, Pattoki in Kasur District and around Peshawar and Mardan are identified two major clusters having mostly registered and developed nurseries (Qureshi. et.al. 2020). Hence these cluster may be focused to develop and provide registered olive nursery plants in olive cultivation respective areas. It is suggested that the efforts should be carried out to utilize the expertise of the cluster nurseries to promote olive nursery plants.

Hence, it is inferred from the deliberations of the stakeholders and emphasized that ***OliveCulture*** promotion and cultivation of olive as an alternate oil-producing crop is potentially viable in Pakistan. The agro-ecological conditions across the country, main areas not under the cash crops, and marginal regions are highly suitable for olive cultivation. Above mentioned recommendations, along with policy support and extensive awareness, are required for producers, processors, consumers and industry cohorts to adopt olive oils as a potential replacement for other oil sources or as an alternative healthier choice – ***Olive Oil***.

CHAPTER – 9

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Note: To compile this report various reports published by national, national and international organizations were studied. Additionally, the various projects on olive, internet, newspapers, and interactive meetings/discussion with stakeholders were considered. The details of the references consulted is given as below;

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