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Analysis of the Behavior of International Markets and Prospective Scenarios for Peruvian Table Olives to 2035

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Since time immemorial, olives and their derivatives have been considered products of very high value in the world agri-food market. In Peru, exports of this prepared or preserved product, whose production area of origin is concentrated in the department of Tacna, have as their main export destination the neighboring country of Brazil, which accounts for more than half of the demand, thus showing a high dependence on that market, despite the numerous periods of economic crisis in Brazil, so the objective was to identify possible adaptation scenarios for the prepared or preserved olive subsystem in Peru to 2035. To achieve this goal, a descriptive qualitative approach methodology was implemented, making use of Porter's diamond and the scenario method for prospective studies, considering as tools: the Matrix of Crossed Impacts-Multiplication Applied to a Classification (MICMAC) and the System of Crossed Impacts Matrices (SMIC). For this purpose, several interviews were conducted with the main actors of the subsystem, obtaining the following results: The main variables that determine the adaptation of the Peruvian olive subsystem are price, non-tariff measures and export cost. Three scenarios were identified for the adaptation of the olive subsystem to 2035: a pessimistic, unlikely scenario, with supply limited to the domestic market; a neutral scenario, with stable exports to Brazil; and a positive scenario, the most likely, which focuses on diversifying markets and by-products to reduce risks and improve Peruvian competitiveness.

Key words: Preserved olive, Subsystem, Crisis, MIC MAC and SMIC

**1. Introduction**

Free Trade Agreements, tariff reductions and standardization of norms have expanded unprecedented trade expansion. Companies now have access to a range of opportunities in international markets (Merizalde et al., 2024). Within these markets, table olives (olives harvested at peak ripeness for direct consumption or preparation) can be identified as an agri-food product with great commercial dynamism at the global level, differentiating it from olive oil (International Olive Council, 2024). Spain is the world's leading producer and exporter of table olives. In the same context, it has also been identified that the Brazilian olive market is one of the most important in South America and there are countries that depend on this market for exports of this product; the main countries that export table olives to Brazil are Argentina and Peru (Trade Map, 2023). Table olive production is mainly concentrated in Tacna and Arequipa, regions that have consolidated their participation in the international market (Mendoza Quispe & Velarde Molina, 2020). Currently, the high dependence on the Brazilian market represents a challenge for the sustainability of Peruvian exports, which has driven the need for trade diversification and adaptation to global trade trends (Arevalo et al., 2014). On the other hand, it is visualized that the international consumer of Peruvian olives is that buyer, whether individual or institutional, who acquires the product valuing aspects such as: quality, price, certification of origin and sustainability of the production process (Choque, 2016).

Prospective scenarios are not measured by the ability to make correct predictions, but by the way in which they will stimulate intuition, help to understand and lead to effective action (Roche et al., 2022).

However, the behavior of international markets is subject to complex dynamics linked to prices, changes in consumer habits, trade regulations and the challenges associated with climate change (Merizalde et al., 2024). Quality is the set of characteristics that a product or service possesses, as well as its ability to satisfy user requirements (Alvarez & Modesti, 2018). On the other hand, non-tariff measures in Latin American agroexports are fundamental to discern the areas in which countries could find opportunities for differentiation with respect to other exporters (Food and Agriculture Organization - FAO, 2024). And finally, the price in international trade is determined by the interaction between global supply and demand and associated costs such as tariffs and transportation (Krugman et al., 2012). For this reason, this article seeks to investigate the behavior of international table olive markets and identify three scenarios for the Peruvian olive sector in 2035.

**2. Materials and Methods**

This study used a qualitative-descriptive methodology to analyze the behavior of international markets and project scenarios for Peruvian table olives up to the year 2035. Primary and secondary data were analyzed. Statistical sources from international organizations such as FAO, TRADE MAP, Market Acess Map and the International Olive Council were used, as well as national databases from SUNAT, Exportemos.pe of PromPerú, the Ministry of Foreign Trade and Tourism and the Ministry of Agrarian Development and Irrigation of Peru (MIDAGRI).

To evaluate the competitive position of the Peruvian olive sector, the 1990 Porter's Diamond model was used to analyze resource conditions, domestic demand, firm structure and rivalry, and related and support sectors (Porter, 1990). Ancillary variables such as the role of government and fortuitous events that may affect the market were included (Davies & Ellis, 2000). For the construction of market scenarios up to the year 2035, the scenario methodology of (Godet, 1993) was used, which consists of two phases: In the first, the Matrix of Cross Impacts and Multiplication Applied to a Classification (MICMAC) method was used to identify the key variables influencing market dynamics (Godet, 1993, 2007). In the second phase, the Cross Impact Matrix System (CIMS) was applied to estimate the probability of occurrence of different scenarios, evaluating the feasibility of different possible futures, ranking the most probable scenarios based on information provided by experts and market data analysis (Godet, 1993). Interviews were conducted with experts in the olive sector, including representatives of the Pro-Olivo association, the largest association of olive producers in Peru (Superintendencia Nacional de Aduanas y de Administración Tributaria -SUNAT, 2024). For data analysis, computer tools such as MICMAC and SMIC-Prob-Expert software were used to facilitate the modeling of future scenarios.

**3. Results and discussion**

**3.1 Analysis of international market behavior**

The Food and Agriculture Organization of the United Nations (FAO) highlights the economic and social importance of olive growing, on which millions of families around the world depend. This crop boosts the consumption of derived products and strengthens the global economy. Spain, Italy, Greece, Turkey and Morocco lead world production, with Spain being the largest producer and exporter of table olives, accounting for 62% of production in the European Union (EU) and 17% globally, with production concentrated in Andalusia, especially in Seville (Ministry of Agriculture, Fisheries and Food, 2024). Global table olive production in the 2023/2024 season was 2,828,500 t, reflecting a 12% drop from the previous year, mainly due to a 33% reduction in Turkey. In contrast, Egypt increased its share to 23% of the market, with a growth of 8% (International Olive Council, 2024).

In Latin America, Argentina is the main producer and exporter, ranking among the ten largest global producers. In Peru, production is concentrated in the Tacna region, although it has suffered a drastic 90% drop due to climatic factors and the “El Niño” phenomenon (PromPerú, 2024). However, a recovery is expected in 2025 with better weather conditions.

The international market has evolved, driven by growing awareness of the benefits of olives and olive oil. FAO establishes the Codex Standard for Table Olives (CXS 66-1981), which regulates quality and defines that table olives must be sound fruits of Olea europaea L., with a degree of ripeness suitable for consumption (Food and Agriculture Organization - FAO, 2024).

In 2023, the global table olive market reached US$ 2,485.4 million. The USA was the main importer (20.9% of the total), followed by France (7.4%) and Germany (6.9%). Spain led exports with US$877.6 million, followed by Greece (US$607.3 million FOB) and Turkey (US$174.5 million). Peru ranked 10th in global exports (TRADE MAP, 2024).

In Latin America, the market was US$169.5 million, with Brazil as the main buyer (US$99.9 million, 4% of the total), followed by Mexico (US$24.01 million) and Chile (US$12.01 million). In exports, Argentina led with US$63.59 million, followed by Peru (US$40.41 million) and Guatemala (US$945,000) (TRADE MAP, 2024).

Peruvian exports showed fluctuations between 2019 and 2024. In 2019, they grew 63.3%, but after declines in 2021 (-7.3%) and 2023 (-16.3%), in 2024 they experienced a slight recovery of 5.8% (PromPerú, 2024). There was also a contraction in the number of exporters, with a reduction of 26.7% in 2024.

Regarding destinations, Brazil continues to be the main buyer of Peruvian olives, albeit with a 4.5% drop. In contrast, the USA grew 43.4%, Venezuela 21.1%, and Mexico and Australia increased by more than 20%. Chile recorded the largest drop (-24.7%) (SUNAT, 2024).

Among Peruvian exporting companies, in 2024, Agroindustrias Nobex S.A. led with US$ 17 million, growing 54.2%. It was followed by Fundo La Noria S.A. (US$ 6 million, +42.6%) and Corporación Costa Verde E.I.R.L. (US$ 2 million, +46.4%). In contrast, Nobex Agroindustrial S.A. reduced its exports by 49.6%, reflecting a reconfiguration in the sector (PromPerú, 2024).

**3.2 Relationship of Porter's Diamond to the Table Olive Market**

Porter's Diamond model analyzes the competitiveness of the table olive sector, considering factors such as factor conditions, demand, related industries, and inter-firm rivalry. It also includes variables such as the role of government and fortuitous events affecting the market (Porter, 1990).

(a) Factor conditions: Olive growing is a key resource in countries such as Spain, Italy and Greece. The specialization of regions such as Andalusia in Spain and Tacna in Peru demonstrates the advantage of certain territories in the production of table olives.

(b) Demand conditions: The growth of the international table olive market, driven by interest in healthy foods, has generated an increasingly demanding market. The United States, France, and Germany are major buyers, forcing producers to maintain high quality standards.

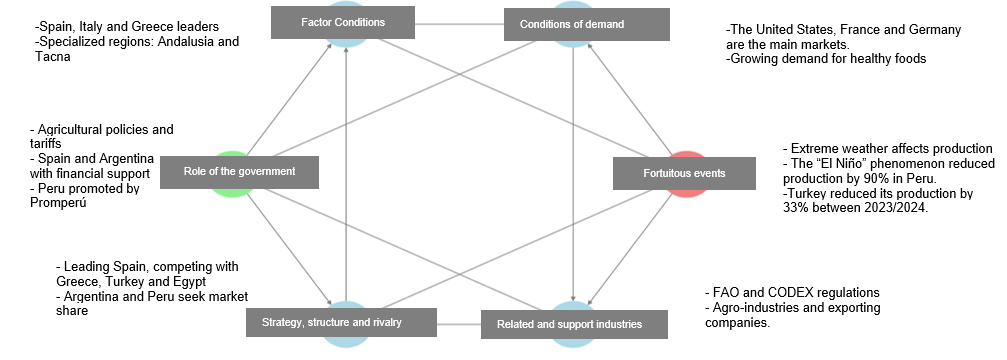
(c) Related and support industries: The existence of organizations such as the FAO and the IOC, as well as regulations such as the Codex Standard for Table Olives, is evidence of the presence of regulations and entities that strengthen the competitiveness of the sector. In addition, the presence of agroindustries and exporting companies facilitates the marketing and expansion of the product.

(d) Company strategy, structure and rivalry: Spain, as an export leader, faces competition from countries such as Greece, Turkey and Egypt. In Latin America, Argentina and Peru compete for a larger market share, with fluctuations in exports and companies. The decline of some companies and the growth of others indicate a competitive dynamic that influences the structure of the sector.

(e) The role of government. The government influences the competitiveness of the olive sector through agricultural policies, export incentives and quality regulations. International regulations, such as those of the FAO and the Codex Alimentarius, set standards that affect producers. Spain and Argentina encourage production with financial support, while in Peru, entities such as Promperú promote exports. In addition, tariff policies and trade agreements benefit EU countries, such as Spain and Greece, while Peru and Argentina depend on international treaties to expand their market.

(f) Fortuitous events. Extreme weather conditions significantly affect olive production and exports, as evidenced in Peru, where the “El Niño” phenomenon caused a 90% reduction in production. Globally, variations in supply also have an impact on the market, such as the 33% drop in Turkey's production during the 2023/2024 season, which could influence international prices. In addition, economic crises and market fluctuations have affected the stability of the sector, reflected in the reduction in the number of exporting companies in Peru in 2023 and 2024. However, changes in global demand have made it possible to offset some declines, with growth in markets such as the U.S. and diversification to destinations such as Mexico and Australia, demonstrating the sector's capacity to adapt to the challenges of the environment.

Figure 1 shows the relationship between Porter's Diamond and the Table Olive Market. In conclusion, the analysis of the olive sector using Porter's Diamond reveals that competitiveness depends on production factors, global demand, business rivalry and government support.



*Figure 1: Relationship of Porter's Diamond to the Table Olive Market.*

**3.3. Factors of change in Peru's exports to its main markets**

Figure 2 shows that of the 15 relevant factors in the sector, 03 key factors have the greatest impact on exports, being olive productivity and quality, non-tariff measures and destination price. Productivity and quality are the most influential factors in the olive sector. Peruvian table olives are recognized in the international market for their good size, firm texture and characteristic flavor, attributes that make them competitive with other global producers (León-Mendoza et al., 2024). One of the key factors in the quality of Peruvian olives is their production and processing method. Productivity guarantees sustainable export volumes, essential for maintaining a presence in international markets (León-Mendoza et al., 2024). However, the effects of the “El Niño” phenomenon have generated a contraction in production, which has also had an impact on product quality, since extreme weather conditions have affected the texture, size and essential oil content of the olives, critical factors for their positioning in demanding international markets (León-Mendoza et al., 2024; Market Access Map, 2024; PromPerú, 2024). The ravages of climate change in the olive sector have not only affected Peru, but globally (one of the largest in recent times), as it slowed exports, excessively raised market prices and also affected quality. However, various olive growing practices have been tested in the fields with positive results, through various training sessions organized by Pro Olivo with great participation of olive growers from Tacna, Moquegua, Arequipa, Ica and Lima, with national and foreign exhibitors through international olive growing forums in 2024, among others, where businessmen have been able to learn agronomic tools, because higher productivity ensures lower unit production costs and, therefore, price.

The final price at destination is one of the most influential factors in the export of Peruvian olives, with a strong dependence on the values set by competitors such as Spain and Argentina (TRADE MAP, 2024).Data indicate that the CIF import price of Peruvian product is higher than that of these countries, which limits its competitiveness (Superintendencia Nacional de Aduanas y de Administración Tributaria - SUNAT, 2024).Another relevant factor is non-tariff barriers, as import regulations are stricter in markets such as the European Union and the United States (Market Access Map, 2024). Peruvian exporters must comply with sanitary regulations and certifications required by international markets. However, only large exporters have managed to obtain all the required certifications, while small producers face difficulties in complying with these requirements (Choque,2016).

Diagrama

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*Figure 2: Key factors of Peruvian table olive exports to its main destination markets.*

**3.4 Adaptation Scenarios for Table Olives in Peru**

Figure 3 shows the results of the SMIC, where 8 tentative scenarios emerged, with 3 scenarios having the highest probability: An Optimistic Scenario called “Expansion and Consolidation in International Markets by 2035”, with a 57% occurrence rate, in which greater investments, improvements in crop management, positive government support and new Free Trade Agreements are projected. The Peruvian olive industry achieved significant growth and diversification in export markets. Companies successfully implement advanced international certifications and adapt to stricter regulations, allowing access to higher value markets, such as Europe and Asia. The number of exporting companies recovers to pre-2023 levels, thanks to government policies that encourage the formalization and competitiveness of the sector. The destination price of olives improves, driven by quality differentiation strategies and greater market diversification. Dependence on Brazil and the U.S. is significantly reduced, with the incursion into new destinations such as China, Germany and Japan. At the same time, olive quality and productivity increased substantially. The adoption of new technologies and sustainable agricultural practices allows for the recovery of pre-crisis production levels, ensuring a constant and competitive supply for export. As a result, Peru consolidates its presence in the global olive market, reducing its vulnerability to climatic crises and demand fluctuations in specific markets. In this type of scenario, it can increase profitability and reduce dependence on a single market. Faced with possible natural phenomena, entrepreneurs will use agricultural technologies to reduce impacts (Dias et al., 2016; Roche et al., 2022). They also use new olive varieties that are more resistant to climate change. This is consistent with the study by (Choque, 2016), where the optimistic scenario of the Peruvian table olive sector from 2015 towards 2025 was fulfilled.

On the other hand, a Neutral Scenario called “Gradual Recovery with Moderate Diversification”, had a 19% occurrence, in a context of moderate recovery, Peruvian olive exports experience limited growth. While some companies achieve international certifications, regulatory barriers remain an obstacle to significant expansion into higher value markets. The destination price remains stable, although with fluctuations due to the high dependence on Brazil and the U.S. There is moderate diversification in secondary markets, but no structural changes in the export matrix. On the other hand, olive quality and productivity show signs of partial recovery. Domestic production reaches levels close to pre-2023 levels, but the lack of investment in innovation and training limits growth potential. As a consequence, the number of exporting companies stabilizes at around 100, without reaching pre-crisis levels. In this scenario, the sector manages to recover, but its competitiveness is still compromised by dependence on a few markets and the slow adoption of structural improvements. Dependence on this market would mean a continuation of low prices and lower profitability for exporters, which would limit opportunities for market expansion and diversification (Godet, 1993).

And finally, a Pessimistic Scenario, called “Contraction and Loss of Markets”, had a 12% occurrence rate, in the worst case scenario, the Peruvian olive industry faces a sustained contraction in its exports. Companies are unable to adapt to new international regulations, losing access to strategic markets. The lack of incentives for certification and growing competition from other producing countries aggravate the situation. Destination price is negatively affected due to greater concentration in the Brazilian and U.S. markets, which impose stricter conditions and less favorable prices. At the same time, olive quality and productivity remain at low levels. The absence of investments in technology and better agricultural practices prevents the full recovery of production, limiting the supply capacity for export. As a result, the number of exporting companies continues to decline, falling below 80. In this context, the Peruvian olive sector becomes highly vulnerable to future crises, reducing its competitiveness and capacity to adapt to the demands of global trade. Such a situation would generate a drastic reduction in the sector's competitiveness and a drop in producers' profitability (Dias et al., 2016). The lack of investment and the increase in export costs would reduce growth opportunities.

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*Figure 3: Probability histogram of the scenarios (set of experts) for Peruvian table olives.*

**4. Conclusions**

The prospective analysis carried out identified possible scenarios for the adaptation of the prepared or preserved olive subsystem in Peru by 2035. The results show a 57% probability of an optimistic scenario, driven by investments in technology, sustainable agricultural practices, varietal improvements, and diversification toward higher value-added markets such as Europe and Asia. This scenario also envisages an environment with strengthened public policies, adequate certifications, and greater inclusion of small producers, which would favor the sustainable growth of the sector. The partial recovery in 2024 and the increase in exports to the United States, Mexico, and Australia validate the viability of this projection.

However, the study also identifies vulnerability factors that could limit the sector's competitiveness, such as high dependence on the Brazilian market, low investment in innovation, and the effects of climate change, exemplified by the sharp drop in production in the Tacna region. These risks create less favorable scenarios, underscoring the need to design resilient adaptation strategies focused on innovation, commercial diversification, and institutional strengthening. In this context, prospective scenarios provide a useful basis for guiding strategic decision-making that ensures the long-term sustainability of the olive-growing subsystem.

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