



A Joint Report of  
The Federation of Pakistan Chambers of  
Commerce & Industry – Policy Advisory Board  
and University of Agriculture Faisalabad (UAF)



# Exploring Value-Addition Opportunities and Export Potential: A Case of Citrus Industry





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# Contents

<b>1. Overview of Citrus Fruit.....</b>	<b>13</b>
1.1 Global Market Scenario .....	13
1.2 Pakistan's Trade Scenario .....	14
1.3 Raw and Value-Added Citrus Prices – Countries' Comparative Analysis ...	15
1.4 Citrus Fruit Composition and Varieties.....	16
1.5 Trends in Citrus Yield and Production.....	17
1.6 Yield of Countries – Comparative Analysis.....	18
<b>2. Mapping of Pakistan's Citrus Value Chain .....</b>	<b>19</b>
2.1 Constraints Evaluation.....	19
2.2 Value Chain Management of Countries – Highlighting Case Studies .....	21
<b>3. Value-Addition Opportunities: Citrus Juice .....</b>	<b>23</b>
3.1 Global and Domestic Market Outlook .....	23
3.2 World Average Tariff and Pakistan's Trade Pattern .....	24
<b>4. Value-Addition Opportunities: Citrus Jam, Jellies, Marmalade, Purees .....</b>	<b>29</b>
4.1 Global and Domestic Market Outlook .....	29
4.2 World Average Tariff and Pakistan's Trade Pattern .....	30
<b>5. Value-Addition Opportunities: Citrus Oils/Essential Oils .....</b>	<b>31</b>
5.1 Global and Domestic Market Outlook .....	31
5.2 World Average Tariff and Pakistan's Trade Pattern .....	32
<b>6. Value-Addition Opportunities: Citrus Peel, Pickles, and Pectin .....</b>	<b>36</b>
6.1 Global Market Outlook and Regional Insights.....	36
6.2 Potential Export Markets for Pakistan.....	38
6.3 Food Safety, Packaging, and Labeling .....	39
<b>7. Expected Export Potential with Production Capacity Utilization .....</b>	<b>40</b>
7.1 Estimation of Pakistan's Potential in Citrus Juices .....	40
7.2 Estimation of Pakistan's Potential in Citrus Jam, Jellies, Marmalade, Purees.....	41
7.3 Estimation of Pakistan's Potential in Oils of Sweet and Bitter Orange .....	41
<b>8. Stakeholder Responses on Pakistan's Citrus Industry.....</b>	<b>43</b>
<b>9. SWOT Analysis of Pakistan's Citrus Industry.....</b>	<b>47</b>
<b>10. Conclusion and Policy Recommendations .....</b>	<b>49</b>
<b>References.....</b>	<b>52</b>
<b>Appendix .....</b>	<b>54</b>

# List of Figures

Figure 1: Global Citrus Imports over the Last Ten Years .....	13
Figure 2: Top Ten Global Citrus Importers (2021) .....	14
Figure 3: Trade Value for Pakistan's Citrus over the Last Ten Years .....	14
Figure 4: Pakistan's Top Ten Citrus Export Destinations (2021) .....	15
Figure 5: Citrus Fruit Composition.....	16
Figure 6: Citrus Fruit Varieties in Pakistan .....	17
Figure 7: Variety-Wise Citrus Yield and Production in Pakistan.....	18
Figure 8: Pakistan's Citrus Yield Comparison with Countries.....	18
Figure 9: Global Citrus Juice Imports over the Last Ten Years .....	23
Figure 10: Pakistan's Export of Citrus Juices over the Last Ten Years .....	24
Figure 11: World Average Tariff Rates for Frozen Orange Juice .....	25
Figure 12: Market Growth in Pakistan's Frozen Orange Juice Exports (2011 to 2020).....	25
Figure 13: World Average Tariff Rates for Orange Juice (Not Frozen).....	27
Figure 14: Market Growth in Pakistan's Orange Juice (Not Frozen) Exports (2011 to 2020)....	27
Figure 15: Global Imports of Orange Juice with Brix value $\leq$ 20 over the Last Ten Years.....	28
Figure 16: Global Citrus Jam, Jellies, Marmalade, Purees Imports over the Years .....	29
Figure 17: Pakistan's Export of Citrus Jam, Jellies, Marmalade, Purees over the Years .....	29
Figure 18: World Average Tariff Rates for Citrus Jam, Jellies, Marmalade, Purees .....	30
Figure 19: Market Growth in Pakistan's Citrus Jams Jellies, Marmalade, Purees Exports (2011 to 2020) .....	30
Figure 20: Global Citrus Oils Imports over the Last Ten Years .....	31
Figure 21: Pakistan's Export of Citrus Oils and Essential Oils over the Last Ten Years .....	32
Figure 22: World Average Tariff Rates for Oils of Sweet and Bitter Orange.....	32
Figure 23: Market Growth in Pakistan Oils of Sweet & Bitter Orange Exports (2011 to 2020).....	33
Figure 24: World Average Tariff Rates for Oils of Lemon.....	33
Figure 25: Market Growth in Pakistan Oils of Lemon Exports (2011 to 2020).....	34
Figure 26: World Average Tariff Rates for Essential Oils of Citrus Fruit.....	34
Figure 27: Pakistan's Export Destinations of Essential Oils of Citrus Fruit (2011 to 2020) .....	35
Figure 28: Global Citrus Peel Market Analysis (2022-2032) .....	36
Figure 29: Pickles Market Size (%) by Global Regions (2021).....	37
Figure 30: Global Citrus Pectin Market Analysis 2022-2032 .....	38

## List of Tables

Table 1: Average Export Prices of Citrus Raw and Value-Added Categories (2021) .....	16
Table 2: Global Imports of Citrus Juice Categories (2021) .....	24
Table 3: Region-Wise Estimation of Pakistan’s Export Potential in Citrus Juices .....	40
Table 4: Region-Wise Estimation of Pakistan’s Export Potential in Citrus Jam, Jellies, Marmalade, Purees .....	41
Table 5: Region-Wise Estimation of Pakistan’s Export Potential in Oils of Sweet and Bitter Orange .....	42
Table 6: Region-Wise Estimated Overall Citrus Value-Added Export Potential .....	42
Table 7: Constraints of Pakistan’s Citrus Industry – Stakeholder’s Response Analysis .....	43
Table 8: List of Stakeholders in the Consultations .....	54

## List of Boxes

Box 1: Pakistan’s Citrus Exports Afflicted by Russia-Ukraine War .....	20
Box 2: Spain’s Citrus Industry .....	21
Box 3: China’s Citrus Industry .....	22
Box 4: Moroccan Citrus Industry .....	22
Box 5: Focus on Market Access – Seizing Citrus Value-Added Exports to China .....	26





# Acronyms


<b>ACIAR</b>	Australian Centre for International Agricultural Research
<b>BOI</b>	Board of Investment
<b>CABI</b>	Centre for Agriculture and Bioscience International
<b>CAGR</b>	Compound Annual Growth Rate
<b>CPEC</b>	China-Pakistan Economic Corridor
<b>CPFTA</b>	China-Pakistan Free Trade Agreement
<b>CPGC</b>	China-Pakistan Green Corridor
<b>CRI</b>	Citrus Research Institute
<b>e-forms</b>	Export Forms
<b>FAO</b>	Food and Agriculture Organization
<b>GAP</b>	Good Agricultural Practices
<b>GCC</b>	Gulf Cooperation Council
<b>GoP</b>	Government of Pakistan
<b>GSP</b>	Generalized System of Preferences
<b>ISO</b>	International Organization for Standardization
<b>ITC</b>	International Trade Centre
<b>MFN</b>	Most Favoured Nation
<b>MoC</b>	Ministry of Commerce
<b>MoI&amp;P</b>	Ministry of Industries & Production
<b>MoPD</b>	Ministry of Planning Development & Special Initiatives
<b>MoU</b>	Memorandum of Understanding
<b>NTMs</b>	Non-Tariff Measures
<b>OEC</b>	Observatory of Economic Complexity
<b>PBS</b>	Pakistan Bureau of Statistics
<b>PFVA</b>	All Pakistan Fruit & Vegetable Exporters, Importers & Merchants Association
<b>PHDEC</b>	Pakistan Horticulture Development and Export Company
<b>PSQCA</b>	Pakistan Standard & Quality Control Authority
<b>R&amp;D</b>	Research and Development
<b>SBP</b>	State Bank of Pakistan
<b>SMEDA</b>	Small and Medium Enterprise Development Authority
<b>SPS</b>	Sanitary and Phytosanitary
<b>TBT</b>	Technical Barriers to Trade
<b>TDAP</b>	Trade Development Authority of Pakistan
<b>UAE</b>	United Arab Emirates
<b>UK</b>	United Kingdom
<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>USA</b>	United States of America
<b>USD</b>	United States Dollar
<b>WITS</b>	World Integrated Trade Solution

## Executive Summary

Citrus fruits are some of the largest fruit crops in the world. The majority of citrus production around the world comes from oranges, which account for more than half of the global citrus production. The biggest citrus-producing countries in the world are China, Brazil and the USA. Over the last ten years, the global import volume of citrus products has increased at an average rate of 1.7 percent. This can be attributed to an increasing health consciousness globally, and a growing awareness of the nutritional benefits of citrus fruits and their by-products.

Pakistan ranks 12th among the leading global producers of citrus fruit. It exports citrus products in the form of fresh fruit as well as value-added products, worth around USD 185 million, to the world. Despite having a major share in citrus fruit production, the country is still challenged by improper practices on citrus orchards, natural calamities, post-harvest losses, fluctuation in the market prices, alongside geo-political factors such as the COVID pandemic and the current Russia-Ukraine conflict. The sector's trade performance is restricted by a lack of diversified varieties of locally grown citrus fruit. For instance, the mandarins cultivated locally do not meet the consumer preferences of the major importing markets. The yield of citrus produce on the field is low as the growing varieties are not adapted to the soil and climate change. The adoption of GAP in the citrus orchards is limited, and poor value chain infrastructure results in an estimated 35 to 40 percent of post-harvest losses. The low quality is another major limiting factor that tends to impact the price competitiveness of locally grown citrus in the international markets. In addition, consumer preferences towards seedless citrus varieties in the global markets, lack of proper grading mechanisms, and non-compliance with the quality standards like SPS measures, ISO, and the Global GAP certifications have led to the average unit price of Pakistan's raw citrus exports to be the lowest among leading global exporters.

The findings of the study suggest exploring the value-addition opportunities for citrus products and the potential for Pakistan to trade them in international markets. Citrus value-added categories include juices, jam, jellies, marmalade, purees and essential oils. The value-added citrus exports of the country currently stand at just around USD 14 million. However, considering the existing processing capacity, Pakistan's export potential of value-added citrus products is USD 895 million. If Pakistan could increase its existing capacity by 80% and 100%, it would be able to increase the export potential up to USD 1.1 billion and USD 1.3 billion respectively. Pakistan has the highest untapped potential for exports in the European market for value-added citrus products, followed by Asia, the Americas, Africa and Oceania respectively. In addition, a surge in global demand for citrus products, as well as increasing commodity prices, would help increase export earnings. The top destination for Pakistan's citrus exports includes Afghanistan, Russia, and the Philippines. This study has also identified the premium markets for



increasing the country's citrus export basket which mainly includes GCC countries (UAE, Saudi Arabia, Qatar and Oman), Central Asian states (Uzbekistan and Kazakhstan), China, South Africa, Turkiye and Norway. In addition, exports can also be increased in already established export markets such as the USA, Canada, Netherlands, and the UK. Currently, however, Pakistan is struggling to meet the stringent international food safety and export quality requirements.

Citrus waste processing is another way to potentially increase exports and reduce raw material imports. Citrus waste is disposed-off after juice processing despite its potential utilization for value addition. It consists of nearly 60 percent peels, 30 percent tissues, and 10 percent seeds. Citrus waste can be processed to produce several valuable by-products, such as peel powder, tea, candies (confectionery items), lemon pickles, pectin, animal feed, cosmetics, and pharmaceuticals.

Citrus value chain constraints at the production, processing, and export market side in the country have been identified through consultation with stakeholders. Production level issues are characterized by low-density citrus plantation, primitive management practices, disease infestations, lack of improved varieties of planting material and development of new citrus varieties/nurseries, and poor ties between research wings and citrus growers. Processing constraints include improper packaging and transportation, inadequate storage facilities, limited processing, and a lack of certification. In the export market, the issues include poor quality of both raw and value-added commodities, excessive seeds in raw fruit, citrus diseases like Canker, reliance on a single variety, limited market access, inadequate promotional activities, non-compliance with the import protocols, and high NTMs.

Policies are recommended to address challenges at different levels, ranging from citrus production to value-addition processing and market development. A few of these interventions include restoring orchards, strengthening R&D and promotional activities, and collaboration among government departments, agro-industrial experts, the private sector, research entities and academia. The formation of cold chain infrastructure, certifying production practices, and promoting trade in high-end markets are imperatives for Pakistan's citrus industry. In addition, through negotiations of trade agreements, enhancing processing capacity, and investing in value addition opportunities, Pakistan can diversify its citrus export basket.





## CHAPTER 1:

# Overview of Citrus Fruit

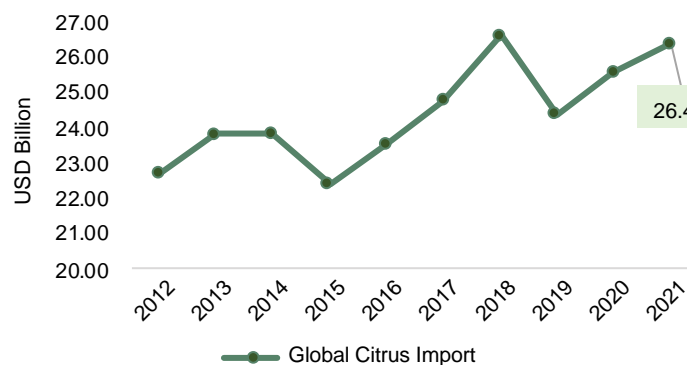
Citrus is one of the major fruit crops worldwide, grown in more than 140 countries. Oranges, lemons, and grapefruits are common varieties grown, traded, and consumed as fresh fruit or juice. Citrus fruit holds a prominent position due to its differentiated product nature, the scale of production, and economic activity generation. The following chapter provides insight into the global market and trade trends of Pakistan's citrus, both raw and value-added products.

### 1.1 Global Market Scenario

The global economy has continuously been evolving as a result of more liberalized trade practices, global demand, and market competition. According to the Global Trade Update (UNCTAD, 2022), worldwide trade has grown to USD 28.5 trillion in 2021, a rise of about 25 percent relative to 2020. The Triple C Crisis (Covid, Climate, Conflict) has disrupted the global supply chain and increased commodity prices by manifolds. Horticultural products are also in high demand with rising health awareness and food security concerns worldwide. The global imports of horticulture products posted unprecedented growth in the past two decades and reached USD 213 billion in 2020, out of which fruits account for around USD 138 billion i.e. two-thirds of the global import value (GoP, 2022).

The citrus fruit accounts for over half of the world's fruit production and is traded worldwide. In 2021, the world imported around USD 26.41 billion of all citrus categories (Figure 1). The import volume has increased at an average annual rate of 1.7 percent from 2012 to 2021 due to a shift in the consumption of value-added products. In 2015, European citrus exports posted a decline mainly as a result of the Russian food import ban (USDA, 2015). The robust growth in global citrus exports was noted in 2018 when imports increased by 6.9 percent before the decline in 2019. A decline in 2019 was partially due to the trade tensions between the US and China (UNCTAD, 2020) and the outbreak of the pandemic.

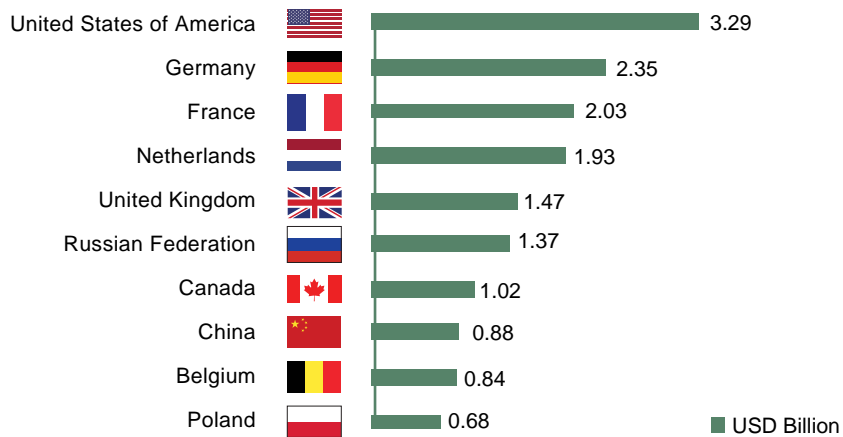
**Figure 1: Global Citrus Imports over the Last Ten Years**



Data Source: ITC, Trade Map

Figure 2 shows the top ten global importers of citrus raw and value-added products in 2021, which together account for nearly 61 percent of global imports. Though the USA and China are also major citrus-producing countries, they still import a large volume of value-added citrus products, such as citrus oils and juices.

**Figure 2: Top Ten Global Citrus Importers (2021)**



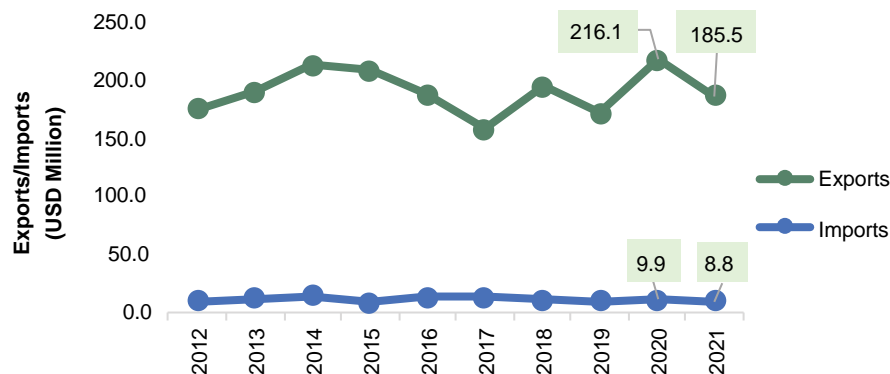
Data Source: ITC, Trade Map

### 1.2 Pakistan's Trade Scenario

A wide range of horticulture crops are grown in Pakistan. Among them, citrus fruit holds a leading position due to its robust domestic and global demand. It has a 40 percent share in total fruit production in Pakistan and ranks first among all fruits. Also, it ranks 21st among leading global citrus raw and value-added exporters. In 2021, Pakistan exported citrus products worth USD 185.5 million and imported the same for USD 8.8 million.

The overall trend of exports and imports is intermittent (Figure 3). As compared to 2020, the value of exports and imports declined by 14.1 percent and 11.1 percent respectively. Also, the quantities of export and import shrunk by 16.1 percent and 63.2 percent respectively. These differences arise due to low production and high import requirements after COVID pandemic.

**Figure 3: Trade Value for Pakistan's Citrus over the Last Ten Years**

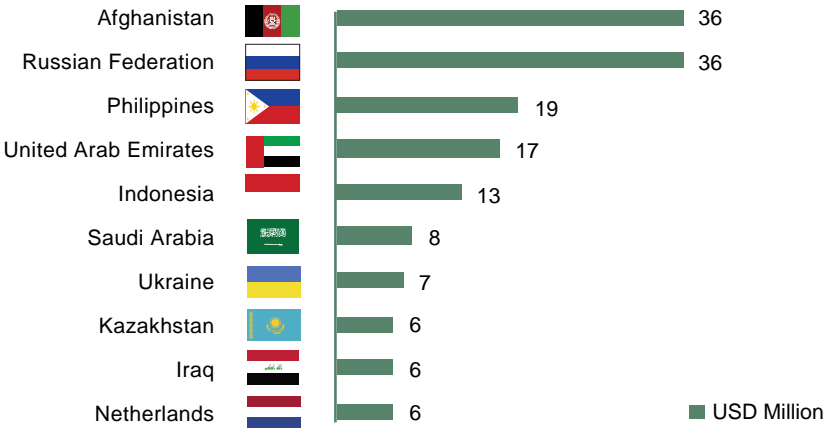


Data Source: ITC, Trade Map

In 2021, Pakistan exported USD 171.5 million worth of fresh and dried raw citrus, whereas imported the same for USD 20 thousand only. Despite ranking 12th in world production, Pakistan imports value-added products of citrus ranging from jams, jellies, pastes, and juices to citrus oil of different kinds. In 2021, the break-up of Pakistan’s total citrus exports included value-added products of USD 13.89 million and raw citrus worth USD 171.5 million. Pakistan’s imports of value-added citrus products were worth USD 8.81 million in 2021, mostly consisting of citrus juices and oils.

Although Pakistan has a small share of global exports of citrus fruit by-products, it holds an immense potential to further capitalize on global import demand by increasing exports. Figure 4 shows Pakistan’s top ten export destinations for citrus. It exports fresh raw citrus and juices to its regional neighboring countries. In 2021, Pakistan’s top export destination was Afghanistan with an export value of USD 36.43 million followed by Russia, Philippines, UAE, Indonesia and others. Low production capacity, significant post-harvest losses, and non-compliance with international regulations – primarily SPS measures - are major barriers to exporting quality food globally.

**Figure 4: Pakistan’s Top Ten Citrus Export Destinations (2021)**



Data Source: ITC, Trade Map

**1.3 Raw and Value-Added Citrus Prices – Countries’ Comparative Analysis**

From around 2.5 million tons of citrus production, Pakistan exports only 0.5 million tons to the world market in fresh and dried forms. However, the average prices differ significantly among citrus categories in the major exporting countries. In 2021, the country with the highest export price of citrus fruit in the raw form was China with 1,456 USD/ton whereas Pakistan has the lowest export price among notable citrus exporters i.e. 386 USD/ton. Among the global leaders, China has recorded the most notable rate of price growth in the last three years, while others showed more modest growth. Furthermore, in the citrus value-added categories, Pakistan has the second-lowest average price in citrus juices and the lowest in the oil category among notable exporters. The country, however, attracted the highest average unit export price for exporting citrus jam, jellies, marmalade, and purees category i.e. 3,342 USD/ton as shown in the table below.

**Table 1: Average Export Prices of Citrus Raw and Value-Added Categories (2021)**

Unit USD/ton

Exporters	Citrus Fruit, Fresh or Dried	Citrus Juices	Citrus Jam, Jellies, Marmalades, Purees	Citrus Oils
China	1,456	2,196	2,022	25,248
Egypt	868	1,699	2,747	41,539
India	390	1,241	1,019	23,270
Morocco	889	1,167	2,500	22,868
Netherlands	1,321	1,279	2,466	15,119
<b>Pakistan</b>	<b>386</b>	<b>1,060</b>	<b>3,342</b>	<b>6,147</b>
South Africa	708	2,440	2,145	6,636
Spain	1,142	997	2,270	14,669
Turkiye	477	1,382	1,763	8,970

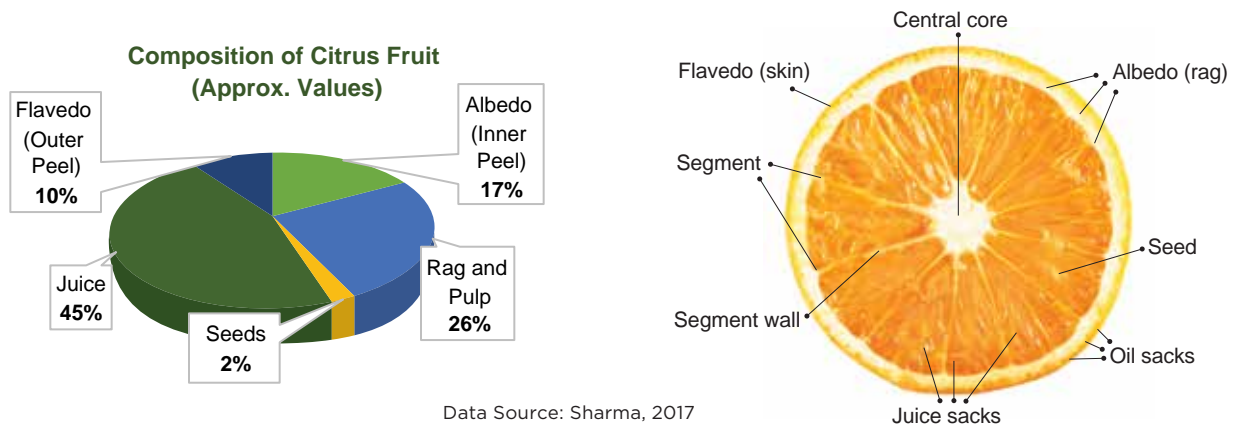
Data Source: ITC, Trade Map

Consumer preferences across the world have evolved towards seedless citrus varieties along with lower brix value and all the major exporters, with the exception of Pakistan, have aligned their production patterns well with the emerging trends in demand. This is one of the core reasons why Pakistani citrus varieties end up attracting lower prices. Another hurdle in Pakistan's quest to improve its competitiveness in terms of average prices of juices and essential oils, is the lack of grading mechanisms and non-compliance with quality standards i.e. SPS protocols.

#### 1.4 Citrus Fruit Composition and Varieties

The composition of the citrus fruit itself reflects value-addition opportunities. In general, citrus fruits have five main components (Figure 5). Among them, juice constitutes a portion of around 45 percent of the whole fruit. A fifth of the total citrus cultivars is subjected to industrial processes, primarily for the production of juices. The most consumed fruit juices in the world produce a large amount of processing waste i.e. about 120 million tons per year (Russo, 2021). However, only 45 percent of the total weight of the fruit is processed by industry, while the rest, such as flavedo (10 percent), albedo (17 percent), rag & pulp (26 percent), and seeds (2 percent), are disposed-off as waste.

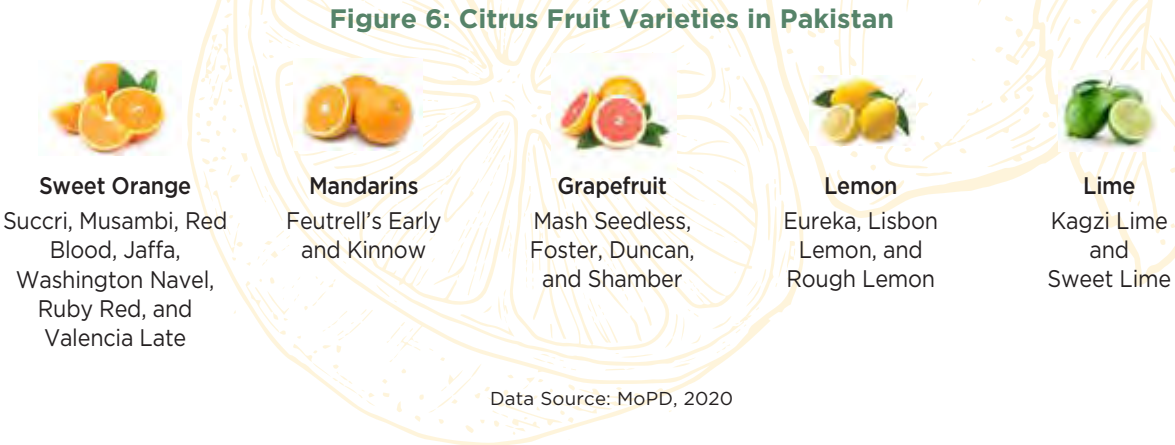
**Figure 5: Citrus Fruit Composition**



Data Source: Sharma, 2017



In Pakistan, among several citrus varieties (as presented in Figure 6), Mandarin (Kinnow) cultivation constitutes around 70 percent of the total cultivation. Kinnow exported from Pakistan is ranked 1st among other locally produced citrus varieties. It is mainly grown in the Sargodha district of Punjab province and is largely exported due to extensive demand internationally.

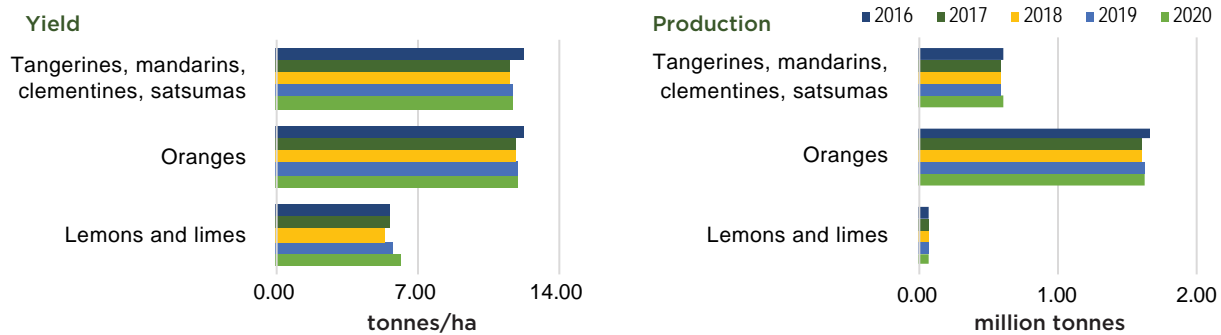


**1.5 Trends in Citrus Yield and Production**

Fruits are a primary contributor to the total agricultural exports. Among them, citrus products hold a major position and are grown in almost 140 countries. As per FAO Statistics Bulletin 2020, the global production of citrus fruit was 143.7 million tons in 2019. China was the largest producer of citrus, while Pakistan was the 12th largest citrus fruit-producing country globally in 2019. The production of citrus fruit takes place in all provinces of Pakistan. Reportedly, Punjab province is the leading region in citrus production and accounts for around 97 percent of the total citrus production of Pakistan.

According to FAO, the total production and yield of citrus fruits in Pakistan were 2.3 million tonnes and 29.8 tonnes per ha in 2020 respectively. The trend analysis shows that in all varieties of citrus fruit, the country faced an overall decline in yield in the last five years after a visible increase in 2016. Pakistan's citrus production decreased from 2.34 million tonnes in 2016 to 2.30 million tonnes in 2020 (as presented in figure 7). The variations are quite high during the last four years, which is believed to be due to changing weather conditions in the growing areas. Also, the cultivators reported that the citrus quality was afflicted by intense production risks like disease outbreaks, such as Citrus Canker and Fruit Flies, during the last couple of years.

**Figure 7: Variety-Wise Citrus Yield and Production in Pakistan**



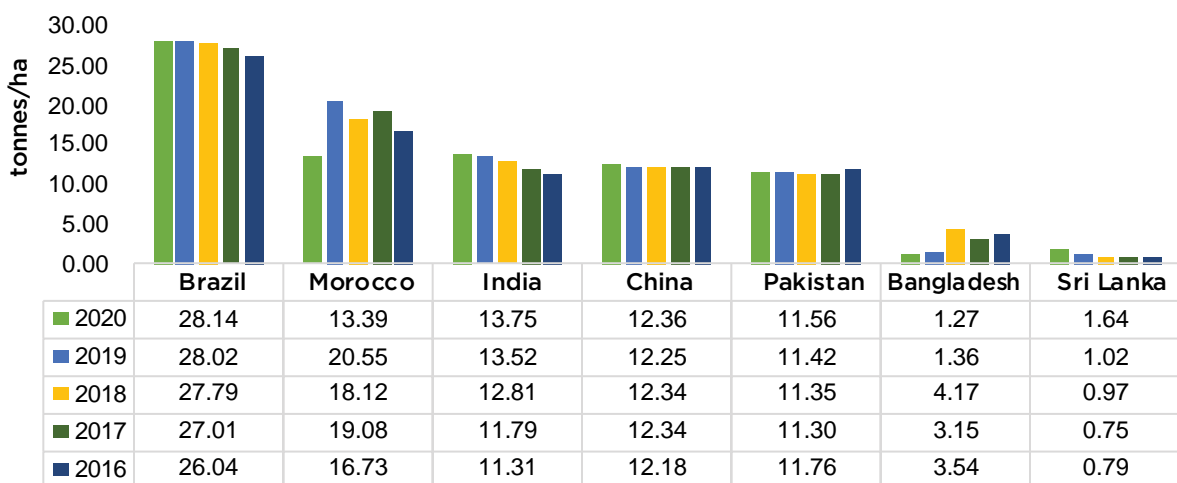
Data Source: FAO

### 1.6 Yield of Countries - Comparative Analysis

The yield is a key component of any agricultural activity as it determines relative competitiveness and profitability of the producer. Among the top citrus exporting countries as well as peer countries, the following are the key trends and the source of competitiveness:

- Brazil, being one of the top exporters, produces all varieties and witnessed a remarkable increase in yield over the last couple of years. This was due to the increase in the use of irrigation per acre (which can also increase fruit size) and better nutrition practices.
- China drives its competitive advantage in the production of Oranges and Mandarins from the rise in orchards and the adoption of modern tools on the farm field.
- The yield of Morocco declined in 2020 as compared to the previous years, due to the rise of hot spells i.e., high temperatures in the growing season and water shortages.
- Pakistan is way ahead in citrus yields in all varieties as compared to Bangladesh and Sri Lanka. The yield of India in producing citrus fruits is higher than that of Pakistan (Figure 8).

**Figure 8: Pakistan's Citrus Yield Comparison with Countries**



Data Source: FAO

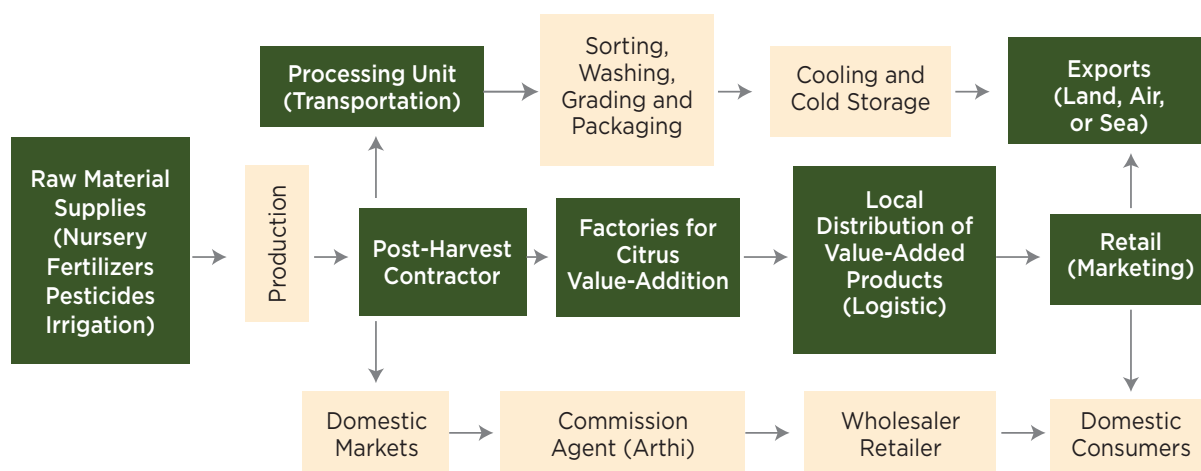


## CHAPTER 2:

# Mapping of Pakistan's Citrus Value Chain

The citrus value chain in Pakistan is diverse and covers both processed and unprocessed products (raw fruit). The step-by-step process from production to local and international supply is shown in the image below. The value chain is primarily controlled by the private sector whereas the government plays the role of facilitator by regulating services for trade activities, business, and transport infrastructure. Actors in the value chain include citrus growers, farmers, commission agents (Arthis), wholesalers, retailers, value-addition factories, and exporters.

### Map of Pakistan's Citrus Value Chain



### 2.1 Constraints Evaluation

Over the years, the quality of citrus produce is declining due to various reasons. This study adopted a bottom-up approach to carefully assess the issues at different levels of the value chain.

#### Raw Material Procurement

- Citrus growers are facing issues with fertilizer procurement and application due to black marketing, unavailability, dealers' monopoly, and high prices (Usman, 2018). This majorly affects cultivation due to the elongated cost of production and lowers the output.
- In Pakistan, citrus farming is commonly affected by insects, pests and disease attacks, yet only a few agronomic options are available for citrus farmers to control pests.

#### Harvesting Practices

- More than 60 percent of farmers do pruning but not on scientific grounds. Technical knowledge about modern practices for citrus orchards is not so common among farmers. Likewise, they usually lack the resources to use high-efficiency tools for harvesting.

- Severe weather settings like extreme temperatures, heavy rainfalls in summer, and fog in winter affect citrus quality. The abrupt temperature rise can affect cultivation setting of fruits.

### Processing and Logistics

- Raw citrus produce is transported traditionally in open trucks without refrigeration facilities.
- Wooden crates are used for raw product packaging to minimize fruit damage during local supply.
- In Pakistan, 35 to 40 percent of citrus produce is lost during the process of transporting from one place to another (Usman, 2018). These losses result in the wastage of resources and low profitability for the stakeholders.

### Export Markets

- The citrus fruit export of Pakistan faces severe shortcomings in high-end markets due to their perishable nature, and non-compliance with international standards, such as quality checking, SPS certification requirements, cold storage, and preservation facilities.
- Pakistan’s raw citrus exports are concentrated in a few large markets like Afghanistan and Russia, among others. This makes them vulnerable to instabilities in those markets. Most exporters have reported a decline in export demand due to the Russia-Ukraine war (See Box 1 below).
- The frequent price instabilities in fresh fruit & processed food markets and currency exchange rates affect export earnings and supply-demand conditions.

#### Box 1: Pakistan’s Citrus Exports Afflicted by Russia-Ukraine War

- In the wake of the Russia-Ukrainian war, financial sanctions have begun to affect the global economy and are consequently impacting Pakistan’s exports.
- The table below shows Pakistan’s export of Kinnow (fresh) & Mandarins (tangerines and satsumas) to Russian Federation and Ukraine for the last 5 years. A severe decline in exports of both citrus categories is evident in the last 2 years. Due to this, citrus exporters have been severely hit who export these two main categories to Russia and Ukraine.

Unit: USD Thousand

Category/Country	2017-18	2018-19	2019-20	2020-21	2021-22
<b>Kinnow (fresh)</b>	<b>16,074</b>	<b>25,294</b>	<b>29,346</b>	<b>27,141</b>	<b>17,908</b>
Russian Federation	15,396	23,101	27,912	25,324	17,020
Ukraine	678	2,192	1,435	1,817	888
<b>Mandarins (tangerines and satsumas)</b>	<b>24,395</b>	<b>23,518</b>	<b>20,022</b>	<b>25,761</b>	<b>11,992</b>
Russian Federation	23,401	22,698	16,002	19,801	7,555
Ukraine	994	820	4,021	5,961	4,437

Data Source: PBS

## 2.2 Value Chain Management of Countries - Highlighting Case Studies

To analyze Pakistan's value chain in the citrus (raw and value-added) industry, it is vital to understand the value chains of the leading markets worldwide. This study discusses the top citrus exporters, i.e., Spain, China, and Morocco. The idea was to identify how they overcome pre & post-harvest losses and disease attacks in order to boost productivity and exports.

Spain's citrus industry has benefited from modern raw material procurements and proper harvesting practices, efficient handling of fruits, and modern packaging to meet the global market demand (Box 2). The analysis shows that Pakistan should focus on expanding citrus orchards through horizontal and vertical integration to increase production from growing fruit to its marketing. Clipping should be adopted on the farm levels, while on the processing side, value should be added to products by analyzing consumer preferences and demand.

### Box 2: Spain's Citrus Industry



- Spain is a leading producer and exporter worldwide of citrus fresh fruit and value-added products. From all production, 75 percent is marketed fresh, whereas 25 percent is processed into juices due to efficient, modern technological system of production, with managed packaging houses as per the global standards, mainly good transportation and access to the markets.
- Fruits are harvested individually from stems by clipping (a practicing way to improve the shelf life and eliminate some diseases) and pruning is done for color development. The highest quality citrus harvest sends to the market, in the final stage, fruit is sent for processing into juice to industries. The rates of skilled labor' are quite high and vary with regulatory costs.

Data Source: Ministry of Agriculture, Nature and Food Quality, 2020

The production of citrus fruit in China has increased due to the extensive advancement of varieties through R&D and giving raw inputs to citrus processing industries for value-addition (Box 3). According to the Citrus Cluster Report 2020, Pakistan has to learn from China to upgrade and advance the value chain mechanism as per global standards. The possibility is to invest in research activities that help Pakistan develop new varieties and value-added products from citrus waste. It will benefit local and foreign earnings.

**Box 3: China's Citrus Industry**

- China's citrus varieties are of good quality due to various improvements in cultivation. There has been a continuous expansion of area, plantation, and annual harvest production. While the abundant raw materials from citrus production is provided to processing industry for value-addition.
- With proper utilization of advance technologies and modern devices/equipment, value-added industry is growing. Chinese citrus exporters have large packing houses for grading & maintaining quality. They use infra-red (NIR) grading for brix & acidic citrus juices to meet import & consumers demand.
- China has also established citrus breeding system by focusing on R&D to upgrade and develop new & competitive citrus varieties.

Data Source: NSW DPI, 2020

Similarly, Morocco is one of Pakistan's competitors in the citrus export market. It has been keeping up with shifting modern practices by adopting new agricultural practices in fields and R&D, and exploring worldwide trends and consumer demands, mainly of citrus juices, to enrich its export market and exporting value-added products to the European region (Box 4). Pakistan, in this respect, should focus on importing good quality equipment to enhance productivity.

**Box 4: Moroccan Citrus Industry**

- Morocco has led towards expansion of large-scale and private irrigation system development as 47 percent of farmers are equipped to enhance citrus farming. The citrus industry is dominated by the export groups that take account of overall value chain from farm to market. While the citrus growers have all access to new imported equipment, technology, well-trained domestic workers, logistics and marketing management.
- They have almost 51 packing and processing houses to maintain SPS & quality issues. In Morocco, new varieties with new citrus plantation is focused concerning orchards upgradation and rehabilitation.

Data Source: Ahmed, 2017 and Ait Hou, 2013

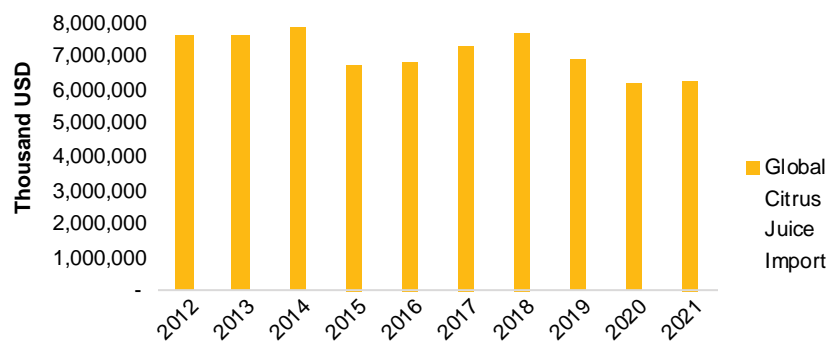
# Value-Addition Opportunities: Citrus Juice

Value addition is a vital component of production, especially when it comes to exports. It determines the value and returns on a product, as well as provides a more product-complex basket for the country's exports. In the following chapter, we analyze citrus global market outlook and trends and identify major destinations for Pakistan's citrus juice export.

## 3.1 Global and Domestic Market Outlook

Citrus juices are the most common value-added product in this industry, having high demand in both global and domestic markets. In 2021, global citrus juice imports were USD 6.3 billion as compared to USD 6.2 billion in 2020 and USD 6.93 billion in 2019 (Figure 9). The last ten years' trade statistics for citrus juices show an overall decline in value. This is due to an overall decrease in production because of adverse weather conditions and a change in consumer preference for low sugar content in juices. The value for 2020 is low due to the COVID pandemic, which caused an overall decline in global trade.

**Figure 9: Global Citrus Juice Imports over the Last Ten Years**



Data Source: ITC, Trade Map

Among all citrus varieties, orange juices hold the leading share in production and exports. The orange juice varieties are among the top three citrus export tariff lines (Table 2). The most preferred orange juice is with lowest Brix value level which refers to lower sugar concentration.

**Table 2: Global Imports of Citrus Juice Categories (2021)**

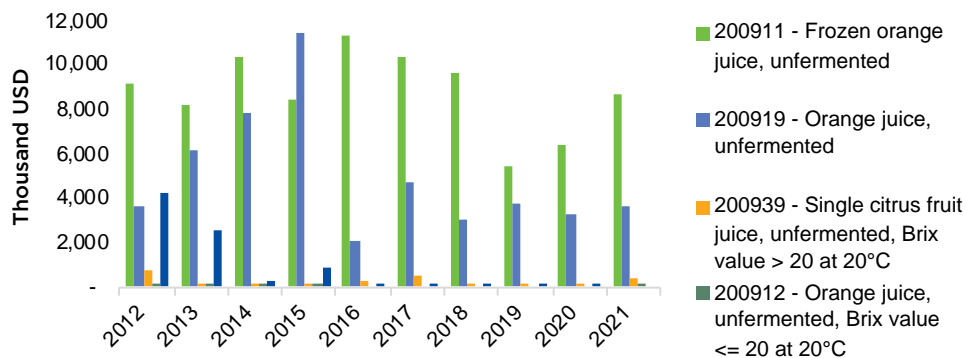
Unit: Million USD

Code	Product Label	Import
	<b>Total Global Imports</b>	<b>6,293</b>
200912	Orange juice, unfermented, Brix value <= 20	2,224
200919	Orange juice, unfermented	1,580
200911	Frozen orange juice, unfermented	1,234
200939	Single citrus fruit juice, unfermented, Brix value > 20	565
200931	Single citrus fruit juice, unfermented, Brix value <= 20	427
200929	Grapefruit juice, unfermented, Brix value > 20	158
200921	Grapefruit juice, unfermented, Brix value <= 20	101

Data Source: ITC, Trade Map

In 2021, Pakistan exported USD 12.93 million in citrus juices to the world market. Among all varieties of citrus juice, Pakistan has exported two categories, frozen orange juice and unfermented orange juice, over the last ten years (Figure 10). On the other hand, the export of grapefruit juice has declined over the years as its annual production is only 0.5 percent of the total citrus fruit production (Rana, 2020).

**Figure 10: Pakistan's Export of Citrus Juices over the Last Ten Years**



Data Source: ITC, Trade Map

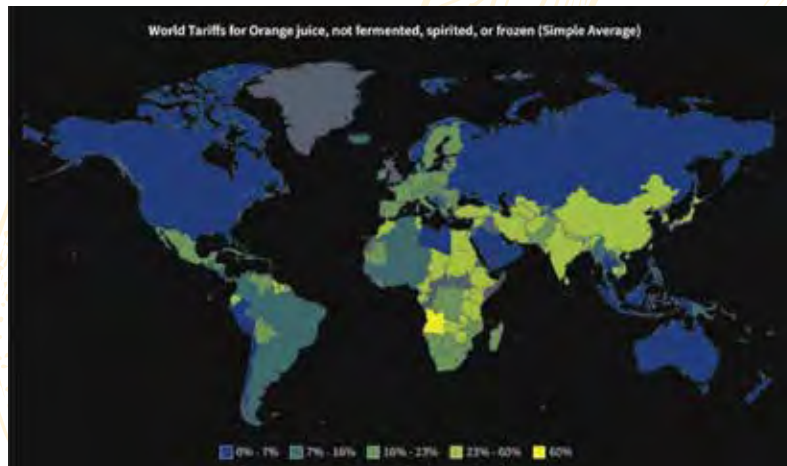
### 3.2 World Average Tariff and Pakistan's Trade Pattern

#### Frozen Orange Juice (HS Code: 200911)

The global trade value of frozen orange juice has reached USD 1.27 billion in 2020, while the average worldwide tariff rate was 20.8 percent (2018). Belgium is the top importer with an import value of USD 196 million (2020). Figure 11 illustrates the average import tariff rates across the world, with Mauritius, Hong Kong, Singapore, and Switzerland having lowest rates of 0 percent. Pakistan can target these countries to expand its market for this category.



**Figure 11: World Average Tariff Rates for Frozen Orange Juice**



Data Source: WITS & Illustration Source: OEC

Pakistan ranked 16th on a global scale as a prominent exporter of frozen orange juice, with an export value of USD 5.9 million in 2020. Pakistan is exporting this category to various countries; in particular, the Netherlands, China, Thailand, Spain, and Sri Lanka are major destinations for Pakistan’s exports. Market growth for Pakistan is depicted in Figure 12 from 2011 to 2020, showcasing a positive trend in value over the ten-year period. However, Pakistan has witnessed a decline in exports to certain countries, including Sri Lanka, Spain, and China (See Box 5). Conversely, the Netherlands, Slovenia, and Italy have emerged as the fastest-growing export markets for exports from Pakistan.

**Figure 12: Market Growth in Pakistan’s Frozen Orange Juice Exports (2011 to 2020)**



Data Source: WITS & Illustration Source: OEC

### Box 5: Focus on Market Access – Seizing Citrus Value-Added Exports to China

Pakistan exported citrus value-added products worth USD 13.89 million around the world (2021) but faces unfavorable tariff duties for most of the value-added products under CPFTA Phase II except frozen orange juice with a tariff as low as 2 percent. Pakistan's current exports of citrus raw products to China is negligible despite having duty-free access for some categories. Strict NTMs as well as higher tariffs for citrus value-added are among major factors limiting Pakistan's citrus value-added exports to China.

Product Code	Product label	Pakistan's Export to the World (2021)	Pakistan's Export to China (2021)	China's Imports from the World (2021)	Tariff Rate		No. of NTMs*
		USD Million	USD Million	USD Million	CPFTA-Phase II	MFN	
200791	Citrus fruit jams, jellies, marmalades, purées or pastes	0.39	0	2.96	C2	5%	63
200830	Citrus, prepared or preserved	0.005	0	63.24	C2	5%	72
200911	Frozen orange juice	8.74	0.49	128.94	2%	-	68
200919	Orange juice	3.7	0	0.19	C2	30%	NA
200929	Grapefruit juice, BV > 20	0	0	16.58	C1	5%	74
200939	Citrus fruit juice, BV > 20	0.42	0	12.26	C1	5%	74
330112	Oils of sweet and bitter orange	0.03	0	30.52	C2	20%	34
330113	Oils of lemon	0.36	0	20.56	C2	20%	34
330119	Essential oils of citrus fruit	0.22	0	26.31	C2	20%	34
	<b>Total</b>	<b>13.89</b>	<b>0.49</b>	<b>301.61</b>			

Note: C1 = Tariff remains at 2013 base rate, C2 = No Concession, BV= Brix Value, NA = No Data Available

\*Major NTMs include labelling, packaging, testing, inspection, certification, quarantine, storage and transport, post-production requirements, and conformity assessments.

Data Source: ITC and MoC

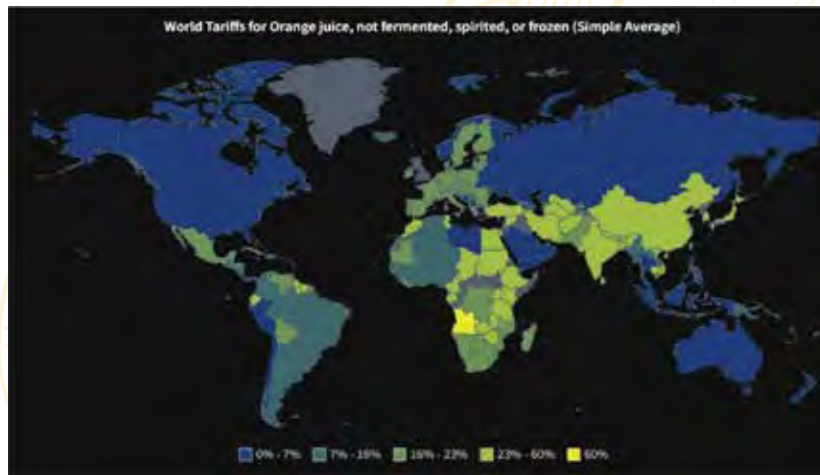
Pakistan can enhance its citrus exports by re-negotiating favorable terms with China such as rationalization custom tariffs and reduce trade barriers under the existing CPFTA-II. To address regulatory barriers, Pakistan can collaborate with Chinese regulatory authorities to obtain necessary certifications and licenses for citrus value-added products. Technology transfer from China can help Pakistan improve its citrus processing industry through the joint ventures, training programs and government-to-government cooperation on exchanging technical experts, forming R&D centers and providing financial support.

\* Citrus fruit (fresh or dried) falls under A-0 (tariff immediately reduced to 0) with a base tariff rate of 0 percent.

### Orange Juice (Not Frozen) with Brix value =>20 (HS Code: 200919)

The citrus juice category, i.e. without containing spirit, frozen, and of a Brix value  $\leq 20$ , faces tariffs in a range of 0-7 percent for most of the countries. However, average import tariffs are substantially higher for most of the Asian and Middle Eastern economies. The global trade value of this product reached USD 2.8 billion in 2020, and the average worldwide tariff rate was 20 percent in 2018. In 2020, the Netherlands was the top importer with an import value of USD 465 million. Figure 13 depicts the average import tariff rates globally, with Mauritius, Hong Kong, Singapore, Switzerland, and North Macedonia offering the lowest rates of 0 percent. Pakistan can potentially expand its market for this category by targeting these countries.

**Figure 13: World Average Tariff Rates for Orange Juice (Not Frozen)**



Data Source: WITS & Illustration Source: OEC

Pakistan ranked 39th among top global exporters with an export value of USD 2.75 million (2020) for orange juice (not frozen). The country's exports within this category are being sent to several nations worldwide, including the USA, Canada, Sweden, Norway, Netherlands, UK, Afghanistan, Oman, Somalia, and UAE. Figure 14 reflects that Pakistan's exports of Orange Juice posted robust growth from 2011 to 2020 in the USA, Canada, Afghanistan and others. Pakistan's exports have experienced a decline in some countries, including Saudi Arabia, UAE, and Germany.

**Figure 14: Market Growth in Pakistan's Orange Juice (Not Frozen) Exports (2011 to 2020)**

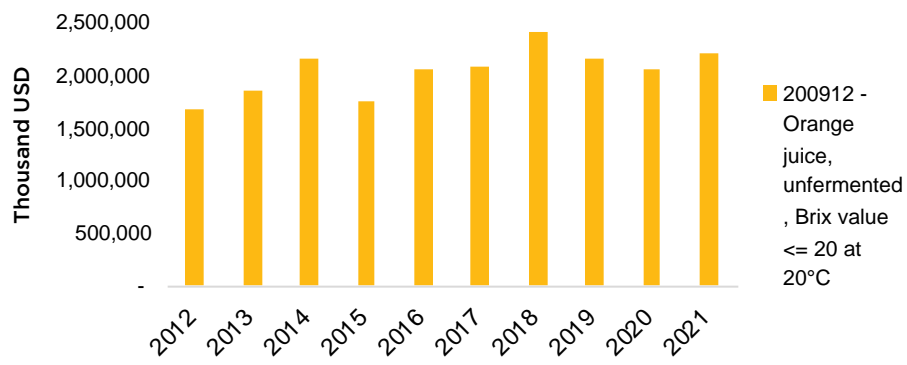


Data Source: WITS & Illustration Source: OEC

### Orange Juice, Brix value <= 20 (HS Code: 200912)

The global inclination towards healthier dietary choices has meant that consumer preferences have evolved significantly. The orange juice with a brix value <= 20 accounts for the highest global import and has also been increasing, as presented in Figure below. It indicates an opportunity for Pakistan to secure a share in global markets. Furthermore, countries such as Singapore, Canada, Malaysia, Mauritius, and Hong Kong offer duty-free market access for this product.

**Figure 15: Global Imports of Orange Juice with Brix value <= 20 over the Last Ten Years**



Data Source: ITC, Trade Map



## CHAPTER 4:

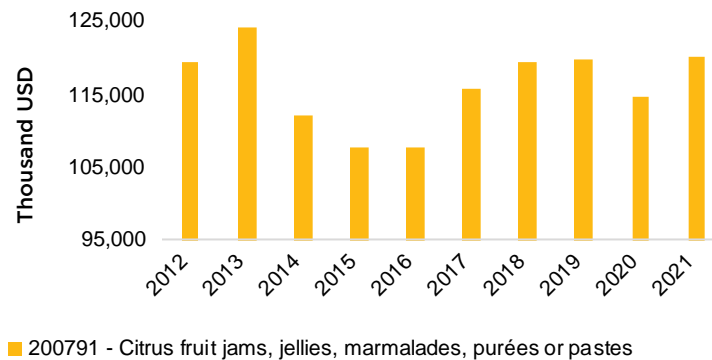
# Value-Addition Opportunities: Citrus Jam, Jellies, Marmalade, Purees

In the following chapter, we analyze the citrus global market outlook and trends and identify major destinations for Pakistan's citrus jam, jellies, marmalade, and purees exports.

### 4.1 Global and Domestic Market Outlook

In 2021, global citrus jam, jellies, marmalade and purees imports were USD 120.1 million as compared to USD 114.6 million in 2020. The figure below presents the overall mix trends with the lowest level of global imports in 2016 during the last decade. Even though, in 2020, there was a decline in global imports amid the pandemic, the trend picked up again in 2021.

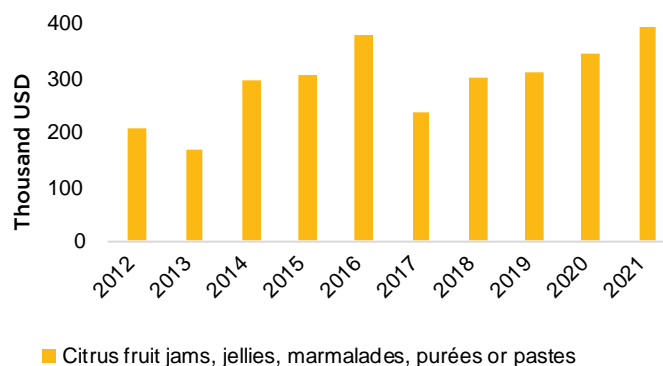
**Figure 16: Global Citrus Jam, Jellies, Marmalade, Purees Imports over the Years**



Data Source: ITC, Trade Map

Pakistan's exports of citrus-based jam, jellies, marmalade, and puree are mainly directed towards the USA, Canada, UK, Mauritius, Norway, and Australia, with export value worth USD 388 thousand - making it the 29th largest exporter globally. The country's overall export of citrus jam, jellies, marmalade and purees posted an upward trend in the last couple of years as illustrated in Figure 17. Market diversification can further boost the exports of these products.

**Figure 17: Pakistan's Export of Citrus Jam, Jellies, Marmalade, Purees over the Years**

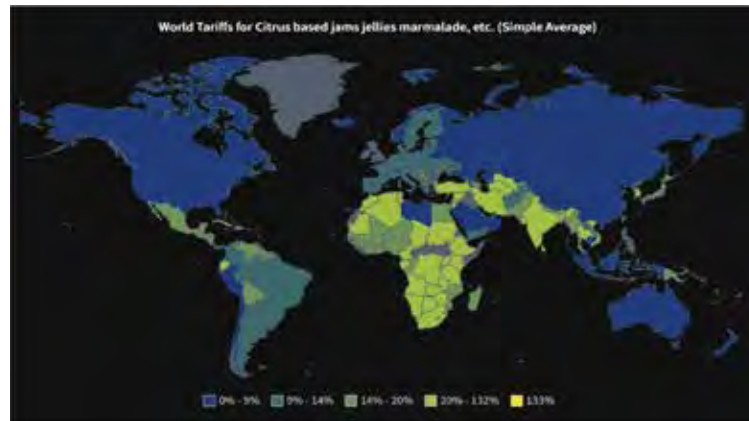


Data Source: ITC, Trade Map

#### 4.2 World Average Tariff and Pakistan's Trade Pattern

The global trade value of citrus jam, jellies, marmalade, and purees has reached USD 115 million USD in 2020, while the average worldwide tariff rate was 23.4 percent (2018). The UK is the top importer, with import value worth USD 11 million (2020). Figure 18 illustrated the average import tariff rates across the world, with Mauritius, Hong Kong, Maldives, Singapore, and Switzerland having the lowest rates of 0 percent. Pakistan can target these countries to expand its market for this category.

**Figure 18: World Average Tariff Rates for Citrus Jam, Jellies, Marmalade, Purees**



Data Source: WITS & Illustration Source: OEC

Pakistan ranked 38th on a global scale as a prominent exporter of citrus jam, jellies, marmalade, and purees with an export value of USD 256 thousand in 2020. Pakistan is exporting this category to various countries, however, USA, UK, Norway, Mauritius, and Australia are major destinations for Pakistan's exports. Market growth for Pakistan is depicted in Figure 19 from 2011 to 2020, showcasing a positive trend in value over the ten-year period. However, Pakistan has witnessed a decline in exports to certain countries, including UAE, Afghanistan, and France. Conversely, Saudi Arabia, Norway, and USA have emerged as the fastest-growing export markets for exports from Pakistan.

**Figure 19: Market Growth in Pakistan's Citrus Jams Jellies, Marmalade, Purees Exports (2011 to 2020)**



Data Source: WITS & Illustration Source: OEC

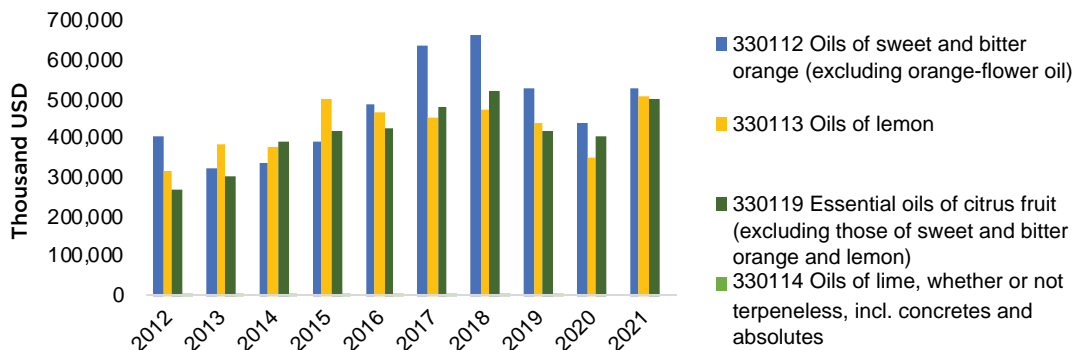
# Value-Addition Opportunities: Citrus Oils/Essential Oils

In the following chapter, we analyze citrus global market outlook and trends and identify major destinations for Pakistan’s citrus oils or essential oils exports.

## 5.1 Global and Domestic Market Outlook

Citrus oil is another value-added category of raw citrus. There are various types of citrus and essential oils produced globally depending on citrus fruit varieties (Orange, Lime & Lemon); having high demand both in global markets. In 2021, the global citrus oil imports were USD 1.53 billion as compared to USD 1.20 billion in 2020 and USD 1.38 billion in 2019 (Figure 20). The last ten years’ trade values for citrus oils have shown an upward trend, mainly for oils of lemon and essential oils. Figures for 2020 are low due to the COVID pandemic.

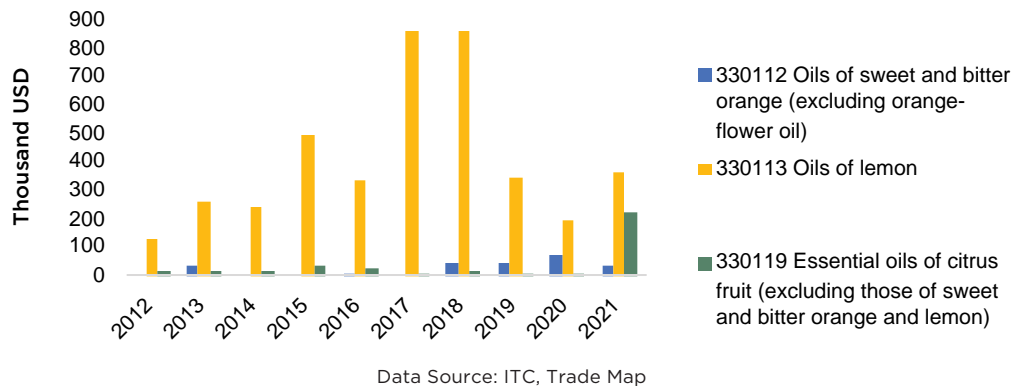
**Figure 20: Global Citrus Oils Imports over the Last Ten Years**



Data Source: ITC, Trade Map

In 2021, Pakistan exported USD 627 thousand citrus oils and essential oils to the world. Among all the citrus oil categories, Pakistan has mainly exported two categories - oils of lemon and oils of bitter orange - for the last four years. Encouragingly, the export of essential oils of citrus fruit has drastically increased in 2021. The overall trend in exports of citrus oils exhibits an erratic pattern as shown in Figure 21. The analysis shows that there is a lack of market identification and product diversification in Pakistan, limiting the country’s export base. There is a dire need for citrus oils’ value-addition as it will benefit local manufacturers.

**Figure 21: Pakistan's Export of Citrus Oils and Essential Oils over the Last Ten Years**



## 5.2 World Average Tariff and Pakistan's Trade Pattern

### Oils of Sweet and Bitter Orange (HS Code: 330112)

The global trade value of oils of sweet and bitter oranges has reached USD 440 million in 2020, while the average worldwide tariff rate was 6.56 percent (2018). USA is the top importer, valued at USD 103 million (2020). Figure 22 illustrates the average import tariff rates across the world, with Kenya, Mauritius, Rwanda, Tanzania, and Uganda having lowest rates of 0 percent, showing that Pakistan can potentially expand its market for this category by targeting these countries.

**Figure 22: World Average Tariff Rates for Oils of Sweet and Bitter Orange**

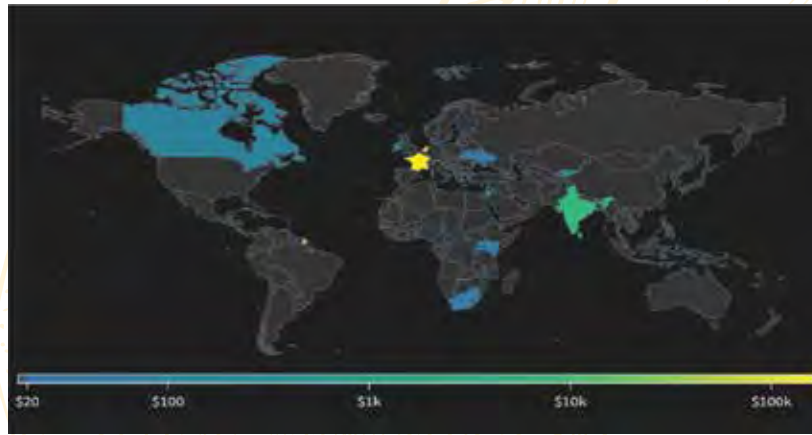


Data Source: WITS & Illustration Source: OEC

Pakistan ranked 51st on a global scale as a prominent exporter of oils of sweet and bitter orange with an export value of USD 77.7 thousand in 2020. Pakistan exports this category to various countries, with Canada, France, Ireland, Netherlands, Ukraine, South Africa, and Kyrgyzstan being major destinations for Pakistan's export. Market growth for Pakistan is depicted in Figure 23 from 2011 to 2020, showcasing a positive trend in value over the ten-year period. However, Pakistan has witnessed a decline in exports to Sri Lanka and Bahrain. Conversely, the Netherlands and Ireland have emerged as the fastest-growing export markets for exports from Pakistan.



**Figure 23: Market Growth in Pakistan Oils of Sweet & Bitter Orange Exports (2011 to 2020)**

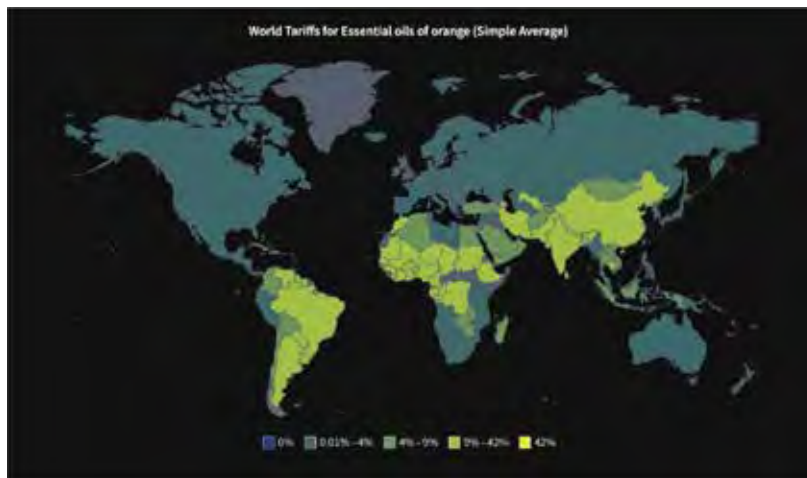


Data Source: WITS & Illustration Source: OEC

### Oils of Lemon (HS Code: 330113)

The global trade value of oils of lemon has reached USD 454 million in 2020, while the average worldwide tariff rate was 5.54 percent (2018). Ireland is the top importer, valued at USD 174 million (2020). Figure 24 illustrates the average import tariff rates across the world, with Kenya, Mauritius, Rwanda, Tanzania, and Uganda having the lowest rates of 0 percent. By focusing on these nations, Pakistan has the opportunity to broaden its market in this category.

**Figure 24: World Average Tariff Rates for Oils of Lemon**



Data Source: WITS & Illustration Source: OEC

Pakistan ranked 33rd on a global scale as a prominent exporter of oils of lemon with an export value of USD 193 thousand in 2020. Pakistan is exporting this category to various countries, with the USA, Canada, Uruguay, France and Ireland being major destinations for Pakistan’s export. Market growth for Pakistan is depicted in Figure 25 from 2011 to 2020, showcasing a positive trend in value over a ten-year period. However, Pakistan has witnessed a decline in exports to Ireland. Conversely, Uruguay and France have emerged as the fastest-growing export markets for exports from Pakistan.

**Figure 25: Market Growth in Pakistan Oils of Lemon Exports (2011 to 2020)**



Data Source: WITS & Illustration Source: OEC

### Essential Oils of Citrus Fruit (HS Code: 330119)

The global trade value of essential oils of citrus fruit has reached USD 443 million in 2020, while the average worldwide tariff rate was 7.47 percent (2018). The USA is the top importer, valued at USD 96.1 million (2020). Figure 26 illustrates average import tariff rates across the world, with Canada, Georgia, Malaysia, Maldives, Mauritius, Norway, South Africa, and UK having the lowest rates of 0 percent. Pakistan has an opportunity to broaden its market share by targeting these countries.

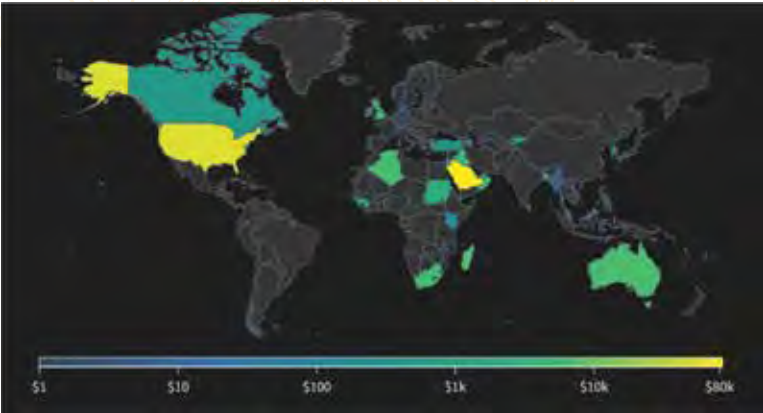
**Figure 26: World Average Tariff Rates for Essential Oils of Citrus Fruit**



Data Source: WITS & Illustration Source: OEC

Pakistan ranked 87th on a global scale as a prominent exporter of essential oils of citrus fruit with an export value of USD 8.08 thousand in 2020. Pakistan is exporting this category to various countries, with the USA, Canada, UK, Ireland, Germany, Turkiye, South Africa, Saudi Arabia, Qatar, UAE, Oman, Kyrgyzstan, and Malaysia identified as major destinations for Pakistan’s export. Market growth for Pakistan is depicted in Figure 27 from 2011 to 2020, showcasing a positive trend in value over the ten-year period. However, Pakistan has witnessed a decline in exports to certain countries, including the USA, Belize and Burma. Conversely, South Africa, Canada and UAE have emerged as the fastest-growing export markets for exports from Pakistan.

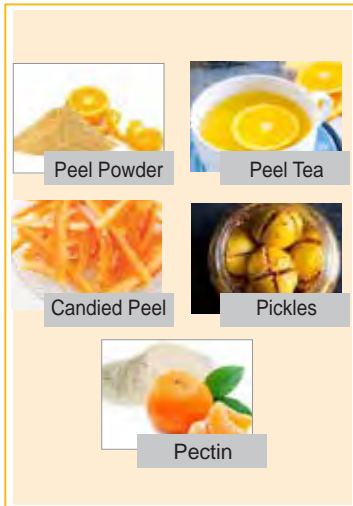
**Figure 27: Pakistan’s Export Destinations of Essential Oils of Citrus Fruit (2011 to 2020)**



Data Source: WITS & Illustration Source: OEC

CHAPTER 6:

# Value-Addition Opportunities: Citrus Peel, Pickles, and Pectin



After the extraction of citrus juice, the waste is disposed-off, regardless of its utility in several ways for economic gains. Citrus fruit waste contains almost 60 percent of peels, 30 percent of tissues, and leftovers 10 percent covers seeds (Ali, 2016). The waste is rich in organic acids, essential oils, and vitamins. Many valuable by-products can be made from citrus wastes i.e., peel powder, tea, candies, lemon pickles, pectin, animal feed, cosmetics, and the pharmaceutical sector. High-quality citrus waste processing can increase exports and reduce the import of raw materials.

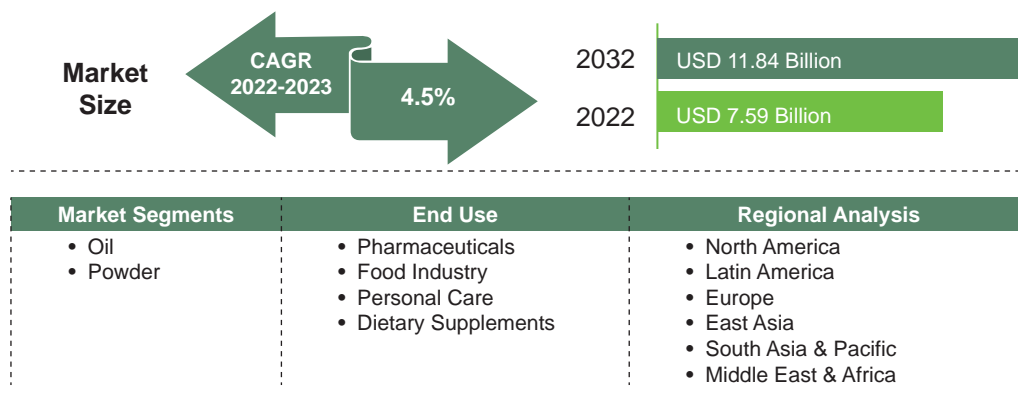
In the following chapter, value-addition opportunities for citrus products - in the form of citrus peel, pickles, and pectin are analyzed. The possible international markets for Pakistan have also been identified.

## 6.1 Global Market Outlook and Regional Insights

### Citrus Peel Market

The citrus market has expanded due to changes in consumer preferences and an increasing focus on health and nutrition. Because of that, the natural extract demand has increased primarily in the food, pharmaceutical, and confectionery sector. According to Citrus Peel Extract Market Report by Fact.MR, the global citrus peel extract market will have a major expansion at a predicted growth rate of 4.5 percent by 2023 with a market value of almost USD 11.84 billion (Figure 28).

Figure 28: Global Citrus Peel Market Analysis (2022-2032)



Data Source: FactMR, 2022

In North America and Europe, a rapid growth has been seen in the baking and confectionery sector due to the use of lemon peel extract for flavouring cakes, sweets, and pastries. In 2022, these regions are likely to account for 33.1 percent and 27.4 percent of the market share globally. In the future, South Asia and the Pacific region i.e., China, Japan, and India will grow profitable peel extract markets, as compared to the Middle East and Africa, due to their favourable climate for producing citrus, and high consumption of personal and health care products. Pakistan, in this respect, has the potential to make lemon and orange extracts, and candies by local processing from waste, and proper supply chain management.

**Citrus Pickle Market**

Pickles are mainly prepared to add flavour and spice to foods. Health experts advise consuming it in moderate quantities to evade muscle pain. Packed pickles, particularly those made from citrus produce, have gained popularity globally and are estimated to grow with a CAGR of 4.51 percent during 2022-2027. A growing preference is being seen from local consumers, so several countries are evolving this market locally and globally by developing flavours and varieties of lemon pickles domestically.

As compared to other regions, South Asia & Pacific region remains the largest market to lead pickles processing in 2021 as presented in Figure 29. This is due to increased commercialization and distribution channels (grocery stores), especially in India; the preferences and traditional ways of home-made products - commonly Mix Pickle and Lemon Pickle. Pakistan also produces this product but it needs to develop brand credibility and a recognition of its products in global markets.

**Figure 29: Pickles Market Size (%) by Global Regions (2021)**

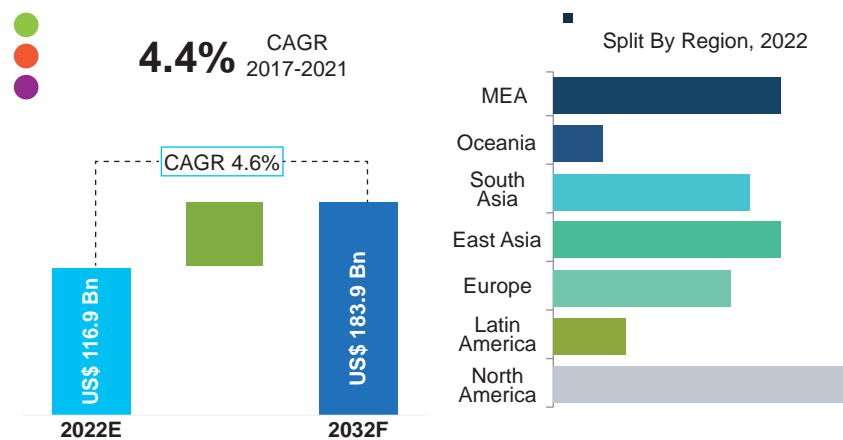


Source: Mordor Intelligence, 2021

## Citrus Pectin Market

Citrus pectin is one of the major products used to enhance the texture of food products in jams, jellies, and desserts. The market is projected to experience a CAGR of almost 4.6 percent (Figure 30) from a worth of USD 116.9 billion in 2022 to sales of USD 183.9 billion in 2032 (Future Market Insights, 2022). The food and pharmaceutical industries are making products due to the witnessing demand to further capitalize on the industrial sector growth.

**Figure 30: Global Citrus Pectin Market Analysis 2022-2032**



Source: Future Market Insights, 2022

The variations in the region-wise growth rate are due to the expansion of the population and improvement in end-consumer demands. Additionally, in major economies, such as the USA, China and Middle East Asia, the citrus pectin's high demand is predicted due to the adoption of modern consumption patterns. Whereas, the industries of Pakistan are mostly importing pectin to integrate into other processing options.

## 6.2 Potential Export Markets for Pakistan

The potential export markets for the country are identified by analyzing the consumer preferences, high-demand importers globally, products' growth rate in the regions and Pakistan's trade relations with the respective countries.



### Citrus Peel

Pakistan has great potential to develop new markets for the peel of citrus fruit majorly in **Germany, Spain, Japan, USA, Italy, and China** due to changing consumer preferences and high demands.



### Citrus Pickle

Due to the diverse culture, end-consumers demand for flavours and spices, and close trading relations, Pakistan can approach **GCC Countries, mainly, UAE**.



### Citrus Pectin

Pakistan can also export citrus pectin to **Russia, Ukraine, the Philippines, the USA, and China**. Pakistan also has a competitive advantage as already exporting citrus raw fruit and value-added products to these countries.

### 6.3 Food Safety, Packaging, and Labeling

In trade and investment, the role of PSQCA is significant for policy support for the fruit and vegetable sectors. The role of PSQCA was designated by MoC to promote high-quality standards, food safety, and conformity assessments (GoP, 2022) to deal with TBT. It assists exporters and provides relevant standard specifications, accredited labs, and certifications. On one side, raw citrus produce or their value-added products, are not being targeted separately. However, products prepared from citrus fruit, commonly referred to as marmalade, jams & jellies, juice, essential oils and pickles are covered by the Pakistan Standard Specifications under Agriculture and Food Division, PSQCA<sup>1</sup>.

Food safety and standards can be upheld by proper testing methods, sampling, and inspection, as documented nationally. It is also individually targeted in Food Authority Regulations by provincial governments. However, the provisions of labeling and packaging should be updated in line with the global import requirements.

<sup>1</sup>PSQCA. Pakistan Standard Specifications. Available at:  
A) [http://www.puntofocal.gov.ar/notific\\_otros\\_miembros/pak27\\_t.pdf](http://www.puntofocal.gov.ar/notific_otros_miembros/pak27_t.pdf)  
B) [http://www.puntofocal.gov.ar/notific\\_otros\\_miembros/pak37\\_t.pdf](http://www.puntofocal.gov.ar/notific_otros_miembros/pak37_t.pdf)

## CHAPTER 7:

# Expected Export Potential with Production Capacity Utilization

In this section, various scenarios are developed and analyses are performed to estimate the potential increase in exports by increasing utilization of the production capacity of the citrus value-added industry. These scenarios are based on the formula for export potential presented in Annexure I.

## 7.1 Estimation of Pakistan's Potential in Citrus Juices

Pakistan exports approximately USD 13 million in citrus juices to Asia, Europe, Africa, America, and Oceania. Europe dominates demand for imported citrus juice exports due to a strong demand driven by their perceived health benefits. Pakistan's overall exports of citrus juice are substantially lower than the potential due to limited processing capacity and infrastructure, political complexities, and inadequate export promotions. Moreover, it encounters substantial tariffs, and stringent NTMs, leading to an adverse effects on exports<sup>2</sup>.

The export value of citrus juices can be maximized by enhancing existing local production capacity. The table below shows the region-wise estimates of the potential increase in exports of citrus juices which is possible with the percentage utilization in the current status of juice processing plants. In 2021, Pakistan's overall citrus juice export potential, considering the existing processing capacity of 60% (scenario 1), is USD 865 million. However, if Pakistan enhances its existing capacity further in citrus juices by 80% and 100%, the country's citrus exports could increase to USD 1 billion and USD 1.2 billion respectively.

**Table 3: Region-Wise Estimation of Pakistan's Export Potential in Citrus Juices**

Unit: Thousand USD

Region	Scenario 1	Scenario 2	Scenario 3
	Current export potential with 60% utilization of production capacity	Export potential with 80% utilization of production capacity	Export potential with 100% utilization of production capacity
Asia	241,124	278,838	313,281
Europe	361,842	475,652	576,949
Africa	84,057	84,057	84,057
America	141,760	162,384	183,007
Oceania	36,591	42,429	47,585
<b>Total</b>	<b>865,374</b>	<b>1,043,360</b>	<b>1,204,879</b>

Source: Author's Estimation  
Methodology for Export Potential is shown in Appendix I

<sup>2</sup>Confirmed by ITC NTM survey conducted in Pakistan in 2019. Available at <https://fpcci.org.pk/wp-content/uploads/2022/11/Evaluation-of-Pakistans-Horticulture-Export-Potential-An-Application-of-the-Gravity-Model.pdf>  
\* Current production capacity estimates of Citrus Juice, Jam, Jellies and Orange Oil are taken from various sources.



## 7.2 Estimation of Pakistan's Potential in Citrus Jam, Jellies, Marmalade, Purees

Pakistan's export revenue from citrus jam, jellies, marmalade, puree is only USD 393 thousand due to limited processing scale, market diversification challenges, high tariffs, low product coverage in trade agreements, and stringent NTMs that impede exports. As a result, the country's export potential in this category remains largely untapped. While overcoming the NTMs, the export value can be maximized with the help of enhancing the overall existing production capacity at the local level.

Table 4 shows the region-wise estimates of the potential increase in exports of this category which is possible by increasing utilization rate using the existing production capacity. In 2021, Pakistan's overall export potential for citrus jam, jellies, marmalade, and purees, keeping in mind the existing processing capacity of 60% (scenario 1), is USD 26 million. However, if Pakistan could further enhance its existing capacity in citrus jam, jellies, marmalade, and purees by 80% and 100%, it could increase the exports to USD 73.6 million and USD 86.5 million respectively.

**Table 4: Region-Wise Estimation of Pakistan's Export Potential in Citrus Jam, Jellies, Marmalade, Purees**

Unit: Thousand USD

Region	Scenario 1	Scenario 2	Scenario 3
	Current export potential with 60% utilization of production capacity	Export potential with 80% utilization of production capacity	Export potential with 100% utilization of production capacity
Asia	9,262	25,732	28,618
Europe	10,115	33,155	37,795
Africa	2,821	4,850	6,187
America	3,251	7,261	9,935
Oceania	642	2,647	3,984
<b>Total</b>	<b>26,091</b>	<b>73,645</b>	<b>86,519</b>

Source: Author's Estimation  
Methodology for Export Potential is shown in Appendix I

## 7.3 Estimation of Pakistan's Potential in Oils of Sweet and Bitter Orange

Pakistan's exports of orange citrus oils are worth only USD 3.6 million because of the limited processing capacity and lack of exposure towards value addition opportunities. The export value can be maximized with the help of enhancing the overall existing production capacity at the domestic level.

The table below shows the region-wise estimates of the potential increase in exports of this category, which is possible with the percentage utilization in the current status of processing plants. In 2021, Pakistan's overall orange oil export potential as per an existing processing capacity of 60% (scenario 1) is USD 3.6 million. However, if Pakistan could further enhance its existing capacity in orange oil by 80% and 100%, it would boost the country's exports to USD 41 million and USD 67 million respectively.

**Table 5: Region-Wise Estimation of Pakistan's Export Potential in Oils of Sweet and Bitter Orange**

Unit: Thousand USD

Region	Scenario 1	Scenario 2	Scenario 3
	Current export potential with 60% utilization of production capacity	Export potential with 80% utilization of production capacity	Export potential with 100% utilization of production capacity
Asia	1,097	13,215	21,833
Europe	1,204	15,136	24,378
Africa	537	3,550	5,073
America	767	7,759	13,366
Oceania	77	1,469	2,197
<b>Total</b>	<b>3,682</b>	<b>41,129</b>	<b>66,847</b>

Source: Author's Estimation  
Methodology for Export Potential is shown in Appendix I

In summary, these results suggest that in 2021 Pakistan's overall citrus value-added export potential as per existing processing capacity of 60% (scenario 1) was USD 895 million. However, if Pakistan could enhance its existing capacity by 80% and 100%, it would increase the country's export earnings up to USD 1.1 billion and USD 1.3 billion respectively, as shown in Table 6. The European region covers the highest untapped potential for citrus value-added products, followed by Asia, America, Africa and Oceania respectively.

**Table 6: Region-Wise Estimated Overall Citrus Value-Added Export Potential**

Unit: Thousand USD

Region	Scenario 1	Scenario 2	Scenario 3
	60% Current Export Potential	80% Potential Status	100% Potential Status
Asia	251,483	317,785	363,732
Europe	373,161	523,943	639,122
Africa	87,415	93,980	95,317
America	145,778	177,404	206,308
Oceania	37,310	46,545	53,766
<b>Total</b>	<b>895,147</b>	<b>1,159,657</b>	<b>1,358,245</b>

Source: Author's Estimation  
Methodology for Export Potential is shown in Appendix I

## CHAPTER 8:

# Stakeholder Responses on Pakistan's Citrus Industry

Interviews, meetings, and consultative sessions were held with the major stakeholders of Pakistan's citrus industry. The respondents mainly included citrus growers, farmers, Kinnow exporters, value-added manufacturers, citrus scientists, horticulturists, agri-business, and value chain management experts from academia as well as from the think-tanks. A set of questions organized to address the current concerns faced by the industry at its production, processing, and logistics edges, apprehend the abilities of the sector to examine export potential of value-added citrus products, identify new by-products from citrus waste, and highlight the strategy inadequacies along with the suitable policy recommendations. To better analyze the effectiveness of the citrus industry, the authors in-lined the responses by the qualitative research technique of thematic analysis by coding the common factors within the industry. Table 7 covers the findings of a series of stakeholder consultation sessions.

**Table 7: Constraints of Pakistan's Citrus Industry – Stakeholder's Response Analysis**

Improper Citrus Harvesting Practices	<ul style="list-style-type: none"> <li>The extension programs and agriculture experts are not able to revive the harvesting practice at the orchards.</li> </ul>
	<ul style="list-style-type: none"> <li>The farmers are practicing the traditional ways of harvesting up till now, and do not have enough knowledge about the latest agricultural practices.</li> </ul>
	<ul style="list-style-type: none"> <li>The country is also going through issues on the plantation side as well.</li> </ul>
	<ul style="list-style-type: none"> <li>Pakistan has only 0.5 percent of organic matter on the land, as compared to the standard i.e., 2 percent<sup>3</sup>, which is affecting the production growth and continuously weakening the production base.</li> </ul>
	<ul style="list-style-type: none"> <li>Farm management is very necessary for harvesting. In Pakistan, there is a lack of proper training among laborers for utilizing modern farm tools such as cutters for Mandarins similar to India and Bangladesh. The country is relying on old-decade agricultural practices.</li> </ul>
Citrus Diseases Affecting Exports & Lack of Awareness Among Farmers	<ul style="list-style-type: none"> <li>Citrus diseases cause a large share of export-quality fruit to be rejected each year.</li> </ul>
	<ul style="list-style-type: none"> <li>Due to the two main hurdles in citrus exports; diseases of Canker &amp; Fruit Fly, countries with citrus demand are not importing Pakistan's Kinnow.</li> </ul>

	<ul style="list-style-type: none"> <li>• There is no cure for Citrus Canker on the field, however, the growers can somehow save the fruit by spraying copper hydroxide on trees in proper quantities.</li> <li>• Farmers are unaware of the benefits of balanced chemical fertilizers on fields.</li> <li>• Extension agents failed to provide awareness and timely assistance to the farmers regarding GAP in citrus orchards.</li> <li>• Also, CRI, Sargodha developed a citrus-conditioned nursery in the screen house. They are canker free, but when this nursery would set off in the open field, citrus can get canker; as it is an airborne disease, transmitted through the air.</li> </ul>
<p><b>Issues at the Processing and Logistics Stage</b></p>	<ul style="list-style-type: none"> <li>• Sargodha district has about 250 Kinnow processing factories containing washers, dryers, graders, packaging in nine different sizes, performing pre-cooling, and refilling/loading 40 ft. containers to reach Karachi port. In the previous year, 35 to 40 percent of factories were closed due to inflation (hike in fertilizer prices and shipping rents) and the restrictions amid Covid-19. The owners experienced a drastic loss in business. It declined economic activity and increased unemployment - majorly in Sargodha, as it is the hub of citrus production, processing and exports.</li> <li>• Pakistan has post-harvest losses at the processing stage in the packaging (wooden, jute gunny bags, belly packing means overly packed) for local and international markets. Handling, loading, and unloading from the open trucks also affect the condition of the fruits.</li> <li>• Moreover, collaboration and information sharing are absent among all the citrus value chain actors. It is advised that the cooperation between these actors should be monitored and sustained.</li> </ul>
<p><b>Poor Road Infrastructure</b></p>	<ul style="list-style-type: none"> <li>• Pakistan is having an issue with scant market infrastructure i.e., mainly poor condition of the roads from farms to markets (Mandi or processing factories) affecting products' quality, especially Mandarins.</li> <li>• The meagre postharvest handling and logistics severely restrict products' yield outcomes and exports, leading to low prices and high wastage.</li> </ul>

	<ul style="list-style-type: none"> <li>• The existing warehouses are not in good condition. The mobility of the containers is nearly 10,000 of raw citrus in the season, but heavy traffic on poor roads, limited cold storage chains, and improper and insufficient transport facilities have lessened the value of the perishable goods.</li> <li>• Also, the shortage of reefer containers and high rents is one of the major problems. The drivers usually switch off the refrigeration to save diesel which hampers the quality of fruits, especially Mandarins.</li> <li>• The concern of high freight charges of shipping companies is also causing issues for the exporters.</li> </ul>
<p><b>Need of Developing New Citrus Varieties – R&amp;D Activities</b></p>	<ul style="list-style-type: none"> <li>• The current variety of Kinnow is growing for the last 60 years in Pakistan, this should now be dismissed, and new citrus varieties could be developed, as worldwide it is kept only for 25 years, then the countries focus on growing other varieties to meet the changing patterns and preferences.</li> <li>•  CRI has imported 150 varieties from different countries, and currently working on it. They have 52 orange varieties - having seedless varieties, 17 varieties of Mandarins (Kinnow), 14 varieties of Grapefruit, and 11 varieties of lemon and limes. Also, they have developed almost 20,000 plants of seedless Kinnow and provided them to the growers for testing. But for testing, a concern is the absence of soil and land analysis of the orchards and whether they can grow in Pakistan's fields or not. It is imperative to check the intensity of the land to grow new varieties. <small>Source: CRI, Sargodha</small></li> <li>• Yet, the citrus farmers claimed that they do not know about research or model testing of the new citrus varieties by the research institutes. It is, thus, assessed that there exists a huge gap in the linkage between the local research wings and the farmers.</li> </ul>
<p><b>Inadequate Local Citrus Value-Addition Industries</b></p>	<ul style="list-style-type: none"> <li>• Mandarin (Kinnow) is mostly used to prepare concentrated juices. In Punjab, 04 processing facilities are producing juices from Kinnow. The capacity is 15,000 tons and is utilized by companies for preparing concentrated nectars. In this way, 50 percent of the fresh Kinnow is utilized locally, 20 percent is exported, 10 percent to concentrated juice plants, and the rest of the 20 percent goes into losses known as post-harvest losses.</li> </ul>

	<ul style="list-style-type: none"> <li>● For citrus value addition, Pakistan does not have proper infrastructure and processing facilities.</li> </ul>
	<ul style="list-style-type: none"> <li>● The value-added products, which are supplied in the local market, are of low quality and contain less pulp content due to not implementing the existing quality standards.</li> </ul>
	<ul style="list-style-type: none"> <li>● Pakistan has limited citrus value-addition processing industries; thus, infrastructure development and investment promotion are needed to attract investors.</li> </ul>
<p><b>Barriers to Trade and Global Factors</b></p>	<ul style="list-style-type: none"> <li>● In several countries tariff duties are higher in comparison and the high freight charges for exporting Kinnow in the Central Asian region.</li> </ul>
	<ul style="list-style-type: none"> <li>● Pakistani exporters have also faced hitches due to the outburst of the COVID pandemic. During the pandemic, the Philippines and some other countries banned imports due to which the fruits were rotten, and the containers were reversed.</li> </ul>
	<ul style="list-style-type: none"> <li>● Moreover, in the previous exporting season of citrus raw, the exporters faced losses due to quality issues, 35 percent to 40 percent of the factories were closed, and the scares and blemishes can be seen in Mandarin (Kinnow).</li> </ul>
	<ul style="list-style-type: none"> <li>● Pakistani Mandarin is banned in the European region due to concerned citrus disease. Since 2014, it is not exported to Europe.</li> </ul>
	<ul style="list-style-type: none"> <li>● In terms of raw citrus exports, exporters see Russia and Central Asia as the most lucrative markets.</li> </ul>
	<ul style="list-style-type: none"> <li>● The exporters faced issues exporting raw citrus in March last year due to the Russia-Ukraine war. Also, payments were not cleared by the commercial banks.</li> </ul>
	<ul style="list-style-type: none"> <li>● Currently, citrus exporters are not receiving e-forms for exporting their products to Russia. The market is therefore affected, and for now, exports are halted.</li> </ul>
	<ul style="list-style-type: none"> <li>● The cost of shipping to Russia will remain a concern for citrus exporters once exports begin again.</li> </ul>
	<ul style="list-style-type: none"> <li>● Pakistan is also facing stiff competition in citrus exports to Russia as countries such as Turkiye, Egypt, and Morocco, are quite closer and still able to trade with Russia irrespective of war.</li> </ul>



## CHAPTER 9:

# SWOT Analysis of Pakistan's Citrus Industry

The country's citrus industry is a vital contributor to the economy, providing employment to thousands of people and earning significant foreign exchange through exports. The raw segment is more established whereas the value-added sector has been growing steadily in recent years, with increasing demand from both the domestic and international markets. The industry faces various challenges, including climate change, competition from established players, and inefficient supply chains but it has the potential for significant growth and expansion with the right policies and investments. A SWOT analysis can help in identifying strengths, weaknesses, opportunities, and threats facing the industry.

<p><b>Strengths</b></p>	<ul style="list-style-type: none"> <li>● Pakistan's citrus fruit production is dominated by the variety known as 'Kinnow' (Mandarin). It is mostly demanded by foreign consumers. From the global export of citrus raw fruit, Kinnow has been a major product comprising a dominant share.</li> <li>● Punjab province has a competitive advantage due to favorable climatic conditions for citrus production</li> <li>● The Sargodha district independently owns almost 250 raw citrus processing and grading plants.</li> <li>● The citrus fruit produced in Pakistan has a number of nutritional benefits, including vitamins and minerals, which are favorable for the manufacturing of agro-industrial quality products.</li> <li>● Pakistan's raw citrus is competitively priced as compared to most of the top exporting countries.</li> </ul>
<p><b>Weaknesses</b></p>	<ul style="list-style-type: none"> <li>● International demand for the Pakistani Kinnow (Mandarin) is always high, especially in the European region, but consumers generally prefer seedless citrus.</li> <li>● The relatively short shelf life of Kinnow of Pakistani origin limits its exportability.</li> <li>● There is an unavailability of certified nursery plants. The high costs and informal market for raw materials are also causes of concern for citrus growers and exporters.</li> <li>● In Pakistan, decades-old traditional crop management practices and manual harvesting at several orchards are still visible. The new and appealing modern practices are not adopted at the government level.</li> <li>● Poor post-harvest management during harvesting, packaging materials, transportation (farm-to-market roads and high-fared vehicles), limited modern storage facilities, and lack of mechanical logistics supply.</li> <li>● Poor harvesting practices are also due to unskilled labor having less technical knowledge of soil fertility and organic matter.</li> </ul>

	<ul style="list-style-type: none"> <li>● The citrus value-added industry is premature, with a lack of competitiveness to meet quality standards.</li> </ul>
<p><b>Opportunities</b></p>	<ul style="list-style-type: none"> <li>● The quality of citrus fruit has deteriorated due to inadequate R&amp;D activities, and limited access to internationally accredited labs.</li> <li>● By using wax technology, the shelf life of the fruits, especially Kinnow, could be extended up to 50 percent for almost 30 days (SMEDA and MoI&amp;P, 2019).</li> <li>● The rapid development of seedless citrus varieties, especially for Kinnow, could increase exports substantially.</li> <li>● The value-addition of citrus by developing by-products, particularly from waste management of peel, oil &amp; pectin.</li> <li>● In addition, local production of citrus value-added categories including juices, jams, jellies, marmalades &amp; pickles can be enhanced further which will help increase participation in global exports.</li> <li>● Overcoming tariffs as well as non-tariff barriers in trade agreements could also help enhance global participation of citrus products.</li> <li>● Foreign or local investments in citrus processing industries and R&amp;D activities could also be an opportunity to increase citrus production catering the local and worldwide demand.</li> </ul>
<p><b>Threats</b></p>	<ul style="list-style-type: none"> <li>● An increase in citrus diseases, especially canker, has been deteriorating the quality of citrus fruit, which has put the exports of citrus and related products at risk.</li> <li>● The citrus processing industry is labor-intensive. More than five hundred thousand people are employed in this sector, and the economy of Bhalwal, Sargodha district of Punjab is dependent on this sector.</li> <li>● A declining trend in citrus production, as well as a stagnant share in exports, pose threat to the employability of the major pool of labour working in the citrus industry.</li> <li>● Current geopolitical factor i.e., the Russia-Ukraine war is hampering the global markets. Pakistan is a major exporter and used to export a significant share of citrus fruits to Russia and Ukraine.</li> <li>● Stiff competition among Pakistan, Turkiye, Morocco, and Egypt for exporting citrus raw and value-added products, especially juices, also jeopardizes the market share.</li> <li>● The changing severity of climatic conditions and floods have also become a threat to enhancing the yield of citrus fruit.</li> <li>● The volatile prices of raw materials, hoarding, informal market, and inconsistent tariff regimes could negatively impact the production and export market of citrus products.</li> </ul>





## CHAPTER 10:

# Conclusion and Policy Recommendations

Pakistan is one of the prominent citrus fruit producers globally with strategic geographical locations. However, the industry has the ability to boost productivity to realize its export potential by utilizing overall production capacity at the local level. However, as per the existing processing capacity, Pakistan's export potential of value-added citrus products is USD 895 million. If Pakistan could enhance its existing capacity by 80% and 100%, it would increase the country's export earnings up to USD 1.1 billion and USD 1.3 billion respectively. The current level of exports of value-added citrus products stands at merely USD 13.9 million, reflecting a significant exporting portion of the citrus processed products that remains untapped. As a result, a major limiting factor to realizing this untapped potential is the low scalability of citrus value-addition in Pakistan. Thus, an increase in citrus processing activities could gear up exports and help attract better monetary returns. Europe covers the highest untapped potential for citrus value-added products, followed by Asia, America, Africa and Oceania respectively.

Supply-side disruptions, poor handling, and crop management practices have increased the post-harvest losses up to almost 40 percent, hampering the yield of Pakistan's citrus. In addition, there is low yield of citrus fruits per acre due to poor practices on farms, old farming tools, and inadequate farm-to-market linkage. Moreover, consumption patterns and demands of raw and value-added products have evolved over time, particularly in Europe where consumers prefer seedless varieties and less sugar content in juices. Pakistan can raise the export volume and target high-end markets through negotiations of trade agreements, enhancing the production capacity and investing in opportunities for value addition. The following recommendations are proposed to harness the true potential of citrus products in Pakistan:

### Increasing Local Citrus Processing Units

- Due to high monetary investments, only a few private industries are making value-added products from citrus leftovers. The expansion or modernization of agro-processing units related to juices, beverages, confectioneries and pharmaceuticals can be financed through credit schemes. The government can also set up citrus processing common facilities with modern technology and infrastructure similar to the Agro-Food Processing plant in Multan.
- SMEDA can assist the government with feasibility studies for value-addition in collaboration with BOI, Provincial Agriculture Departments, TDAP and agro-industrial experts.

### Implementation of the Citrus Cluster Framework

- In line with the Citrus Cluster Feasibility and Transformation Study, provincial governments must develop clusters for citrus production and processing.

### R&D and Export Promotions

- The varieties grown locally do not meet the quality standards or features demanded by global citrus consumers. Climate-resilient indigenous citrus varieties should be introduced to better cater to the global demand. Creating a high-tech platform must be the focus of the government's policy. Research can be piloted with academia, industry, and local and international research institutes like CRI, ACIAR and CABI.
- Pakistan's citrus exports are suffering due to inadequate marketing strategy, requiring PHDEC and TDAP to re-focus their approach to showcase new citrus varieties to the commercial partners and address trade and development challenges of the raw and value-added citrus commodities.

### Improving Citrus Farm Practices

- It is suggested to plant citrus trees at high density, i.e., for every acre of land, 500 trees can be planted and pruned scientifically to double yield. Extension departments can implement, monitor and disseminate this among citrus growers. Government campaigns and promotional activities are necessary along with the feasibility studies or model tests.
- To control pests, it is advised to remove damaged fruit and foliage in winter and droughts. Traps can be used to monitor the population of fruit flies in orchards. The susceptible citrus cultivars must be replaced with resistant cultivars. copper-based bactericides should be sprayed for citrus disease (Citrus Canker) prevention. Likewise, infected trees must be destroyed within an appropriate radius.
- Provincial agriculture departments need to create Model Citrus Training Farms with modern technology in different areas to test citrus varieties and cultivation methods and provide training programs that meet global standards. This will enable a link between research wings and citrus growers.

### Enhancing Cold Storage Facilities

- Cold storage facilities must be developed through public-private partnerships in selected regions. The government can offer financial incentives like tax concessions and grants to reduce initial capital costs for investors and provide infrastructure support such as transport, electricity, and water access to ensure efficient operations.

### Citrus Corridor under CPGC

- CPGC under the CPEC is reportedly a major source of growth for Pakistan's agriculture sector. Pakistan needs to diversify its citrus varieties and export destinations. China is a profitable market due to its high demand for raw and value-added citrus products. The two countries already have healthy trade relations. MoU between Pakistan and China will ease both countries' citrus production, trade, and other areas. Here are a few areas to focus on:
  - establishing Citrus Disease-Free Zone(s)
  - training of citrus growers
  - setting a high-tech citrus variety research institution
  - creating Model Industrial Unit(s) for citrus value-addition
  - in-depth negotiation on NTMs
  - ensuring that quality standards are imparted and certified
  - organizing joint trade fairs, exhibitions, and conferences

### Bilateral Areas of Cooperation

- In the wake of the Russia-Ukraine war and the sanctions being imposed on Russia, Pakistani commercial banks are no longer issuing e-forms to export to Russia. To safeguard citrus exporters against further losses, the SBP should facilitate access to e-forms for raw citrus exporters, considering Pakistan's high volume of export of oranges to Russia.
- The Pakistani government should collaborate with commercial consulates in countries such as the USA, Canada, South Korea, Saudi Arabia, UAE, Qatar, and Kazakhstan to address NTMs that impede the export of Pakistan's raw and value-added citrus products. Negotiations should be made to decrease or eliminate these barriers, with support provided through technical assistance and capacity building. In addition, existing and future trade agreements should incorporate the tariff lines related to value-added citrus products for duty-free access in potential markets.



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# Appendix

## I- Pakistan's Export Potential Methodology

This study identifies the region-wise export potential of Pakistan's citrus value-added products for increasing exports to the world. Pakistan, being a traditional market, has immense potential to introduce new and diverse citrus markets as well as to boost exports of citrus value-added products already being exported to the world. However, the formula has been adjusted by replacing the total exports of Pakistan with the total potential exports of Pakistan after the utilization of production capacity. The export potential is calculated using the following formula:

$$\text{Export Potential} = \text{Minimum (Total Potential Citrus Exports of Pakistan After the Utilization of Production Capacity, Countries' Citrus Imports from the World) - Pakistan's Exports to the Specific Country}$$

## II- List of Stakeholder Consultations

**Table 8: List of Stakeholders in the Consultations**

S.No	Name	Designation	Association
1	Dr. Hammad Badar	Assistant Professor, Faculty of Social Sciences, Institute of Business Management Sciences	The University of Agriculture Faisalabad (UAF)
2	Waheed Ahmed	Patron-in-Chief Owner	All Pakistan Fruit & Vegetable Exporters, Importers & Merchants Association (PFVA) Iftekhhar Ahmed & Co.
3	Abdul Rehman	Senior Scientist	Citrus Research Institute (CRI) Sargodha
4	Dr. Aman Ullah Malik	Retired Professor, Faculty of Agriculture, Institute of Horticultural Sciences Horticulture Expert	The University of Agriculture Faisalabad (UAF)
5	Dr. Rajendra Adhikari	Lecturer Agribusiness, School of Agriculture and Food Sciences	The University of Queensland Australia
6	Shahid Sultan	Director	Zahid Kinnow Grading & Processing Plant
7	M. Umair Mushtaq	Business Development Manager	Mahmood Group - Agri Foods (Pvt) Ltd.
8	Mir Owais Alam	Head of Sales - International Division	National Foods Limited
9	Nasir Mehboob	General Manager	Popular Juice Industries (Pvt) Ltd.
10	Naila Bhatti	MD/CEO	Mitchell's Fruit Farms Limited



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