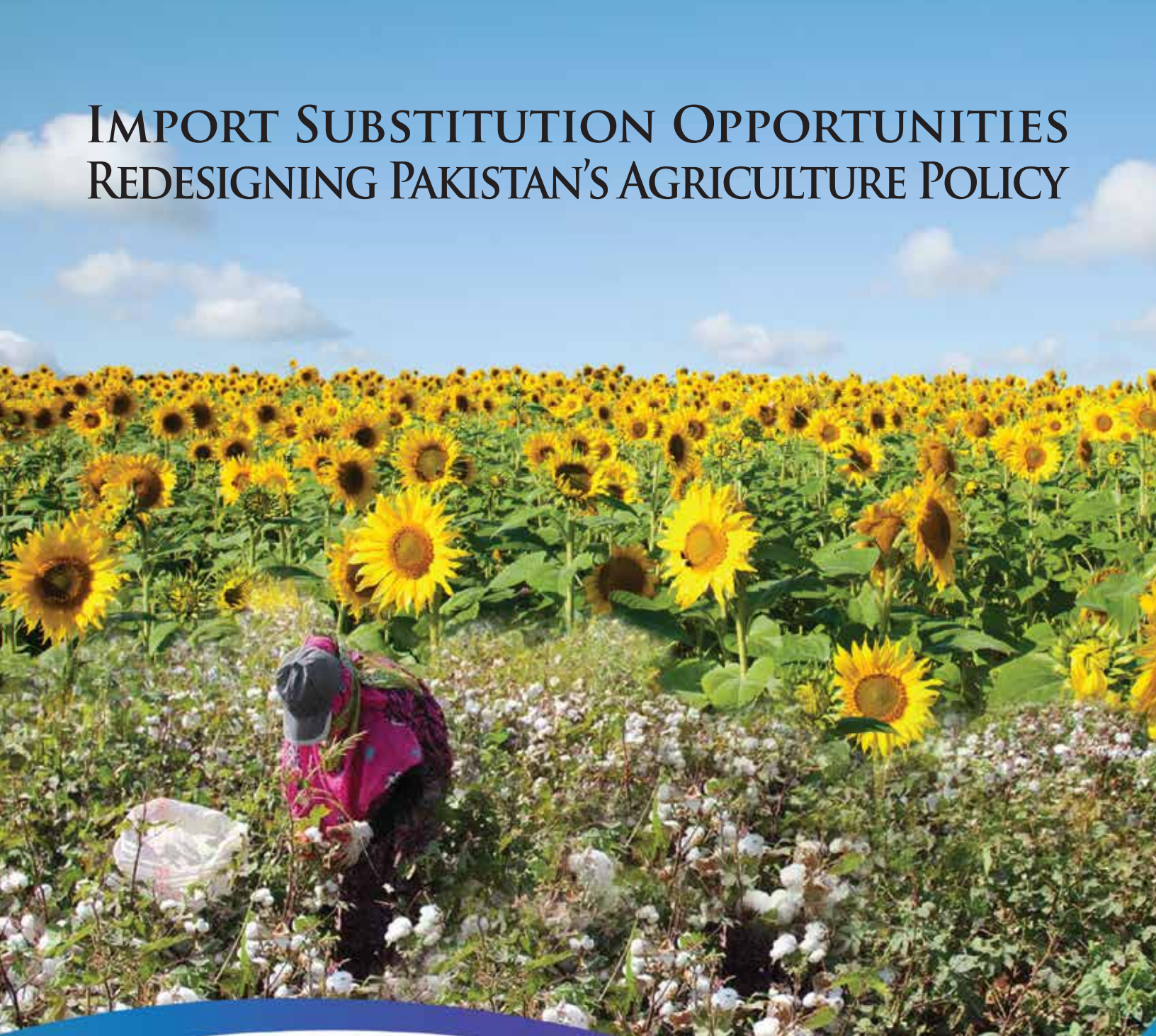
Import Substitution Opportunities
Redesigning Pakistan's Agriculture Policy



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Abbreviations

FAO	Food and Agriculture organization
IDR	Import Dependency Ratio
PBS	Pakistan Bureau of Statistics
PCCC	Pakistan Central Cotton Committee
GDP	Gross Domestic Product
KPK	Khyber Pakhtunkhwa
APTMA	All Pakistan Textile Mills Association
IPM	Integrated Pest Management
PMD	Pakistan Meteorological Department
GMO	Genetically Modified Organisms
G2G	Government to Government
IPP	International Parity Price
ZTBL	Zarai Taraqiati Bank Limited
ITC	International Trade Centre

Executive Summary

Protectionism and anti-globalization sentiments have picked momentum in the post Brexit and US-China trade war era. The disruption in the global supply chain in the recent pandemic has led countries to rethink more on regionalism and inward-looking trade policies. Pakistan is facing consistent balance of payment difficulties for the past few decades coupled with an increasing trade deficit and currency depreciation. Pakistan's tariff structure relative to the economic growth, manufacturing, industry, and agriculture value-added for the past four decades (1980-2020) has been analyzed in the report. Policy instruments used for tariff liberalization cushioned trade deficit. In the year 1999, Pakistan's weighted average tariff was 43 percent which declined to 17.5 in 2005 and to 8.95 percent in 2019. The graphical analysis also explains tariff liberalization has a detrimental effect on economic growth and key economic sectors while Pakistan's trade deficit tends to increase with tariff liberalization.

The present report highlights the opportunities for import substitution in key sectors to inhibit the pace of the outflow of dollars. We have selected sectors that constitute a significant share of our imports, and have domestic production but are unable to meet the domestic demand. Around 18.3 USD billion of annual imports are targeted to evaluate import substitution opportunities. We have considered petroleum, steel and iron scrap, raw cotton, and oilseeds for exploring import substitution opportunities in our series of reports. The combined savings of USD 10.5 billion can be achieved by adopting sector-wise import substitution policies. The report also purposes an import substitution cum export promotion model for industrialization in Pakistan.

The current series highlights import substitution opportunities in raw cotton and oilseeds cultivation. Also the benefit of palm trees plantation is discussed. Domestic cotton area and yield per hectare in Pakistan have declined over the past three years while domestic demand for cotton from the textile industry has increased considerably. Pakistan imports of raw cotton climbed to USD 1.4 billion in 2020-21. For the first half of the current fiscal year both the quantity and price of imported raw cotton have increased.

If we can even regain 2015-16 cotton cultivation area of 2.9 million hectares and increase yield from 766 kgs/hectare achieved in 2020-21 to 927 kgs/hectare, Pakistan can increase its domestic production of cotton to 2.6 million resulting in import savings of USD 1 billion with an additional net export surplus of USD 163 million. In the case where the land area under cotton cultivation was kept constant at 2.5 million hectares with an increase of 56 percent in yield, Pakistan can accommodate its entire domestic demand with a net export surplus of 303 million in the 4th year.

Pakistan's imports for oilseeds (soybeans, sunflower, and rape seed) stood at USD 1.1 billion in 2020 having a share of 2.6 percent of total imports. In addition to the oil seeds, Pakistan imports final product of oil seeds i.e., palm and soybean oil which consume foreign exchange of USD 2.1 billion making 4.8 percent of our total imports in 2020. The total outflow of USD from oilseeds and its final product is around USD 3.3 billion, a share of 7.3 percent in our total imports. Price and quantity percentage change also reveals that the price effect has been the dominant cause of the surge in the import value of palm oil and soybean oil.

With an increase in the area for rapeseed cultivation by 59 percent from 270.8 thousand hectares in 2020-21 to 430 thousand hectares with 125 percent increase in yield, Pakistan can save USD 448 million from rapeseed. If area under sunflower production is increased by 10 percent from 103.5 thousand hectares in 2020-21 combined with an increase in yield by 35 percent. Pakistan can save USD 20 million by import substitution from sunflower seed with an additional amount of USD 0.64 million can be earned through exports. If Sunflower cultivation is further enhanced from an average area of 95,000 hectares to 230,000 hectares combined with an increase in yield from average of 1,238 kgs/hectares to 4,756 kgs/hectares, palm oil imports can also be saved to the value of USD 1billion.

For palm tree cultivation if Pakistan designates 150-thousand-acre area with the cultivation of 350 thousand palm trees that can generate 2500 thousand tons of palm oil then Pakistan can reduce its import bill from USD 1.9 billion to USD 306 million. Import savings of USD 1.6 billion can be achieved by substituting for local cultivation and production of palm oil. The increase in yields and production mentioned in the report are based on international benchmarks and feasibility analysis conducted by professionals.

1. Introduction

Protectionism and anti-globalization sentiments have gained momentum in the world ever since the global financial crisis, the rise of the US and China trade war, Brexit, and the recent US-Mexico Canada (USMCA) agreement[1]. The disruption in the global supply chain in the recent pandemic has led countries to rethink more on regionalism and inward-looking trade policies. Besides this modern form of import substitution (IS), the idea was much popular in the post-world war era[2] when countries suffered from the shortage of foreign exchange and low availability of manufactured goods exports from industrialized countries. Thus, developing countries followed the dual policy objective of building their national industries and protecting national sovereignty. Developing countries such as East Asia, South East Asia, and Latin American economies adopted IS policies in the 1950s and 1960s with varying experiences. However, IS was soon lifted from the world with the emergence of the Washington consensus that favored trade and financial liberalization and a free-market economy.

Certain policy instruments have been devised to implement IS such as; tariff and non-tariff measures, quantitative restrictions, tax breaks, subsidies, and government loans. Other long-term measures include investment in education, infrastructure, and research for industries. Proponents of IS-based industrialization believe in the notion of "learning by doing" while those in favor of trade liberalization consider it a tool for technological and knowledge transfer. Raul Prebisch (1950) presented the import substitution theory based on countries that export primary (raw) products and import manufactured final goods. His study showed that developing countries' terms of trade will always be worsening if they keep on exporting raw materials in exchange for value-added goods. Productivity enhancement in primary products will only benefit those, producing final goods. Prebisch also emphasized the role of government in protecting the infant industries.

Rodrik (2016), highlights some of the reasons for premature de-industrialization experienced by developing countries in their transition from tariff protection to liberalization. Firstly, without building their manufacturing firms to have a comparative advantage in the world market they opened them to foreign competition. Thus, developing countries became a net importer of goods for which an import substitution process was initiated, reversing the process. Secondly, relative prices of manufactured goods declined because of developed countries' comparative advantage and relocation of manufacturing bases to other locations. Only those countries survived these low prices that were at a better stage of comparative advantage in their production.

1.1. Rise and Fall of Import Substitution in Pakistan

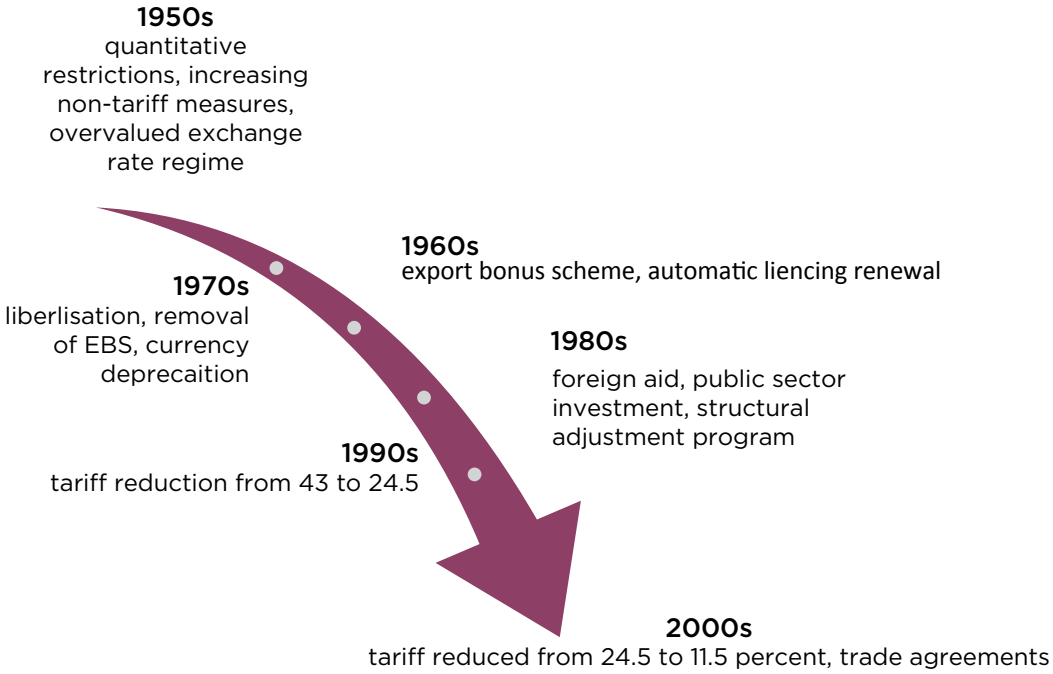
Pakistan adopted an import substitution policy in the 1950s by employing quantitative restrictions, increasing non-tariff measures, and by applying overvalued exchange rate regime. The basic objective was to promote industrialization and reduce the burden on the

[1]USMCA agreement aims to empower North Americans by increasing their reliance on their domestic industry instead of relying on other regions of the world. Only 10% of goods traded are allowed to be outsourced from other regions. Secondly, increasing labor wages to the level of the US as to restrict US companies' movement and maintaining the level playing field for all member parties.

[2]Most of the developed countries were colonizers with a strong industrial base, they used their colonies to extract raw material and made them dependent on their exports of final manufactured goods. This not only built colonizers' industrial base but also deteriorated the potential of their colonies' industrial structure. In the post-world war era, most of the developing countries adopted import substitution to promote industrialization and to protect their national sovereignty.

balance of payment. In the 1960s, Pakistan adopted an export growth strategy along with import substitution by initiating an export bonus scheme (EBS) for exporters. The policy favored a multiple exchange rate regime with controlled imports while incentivizing exporters through EBS, as they were allowed to import consumer goods, raw materials, and capital goods subsidized by Export Bonus Vouchers (EBV)[3]. Automatic renewal of import licensing[4] for raw material and consumer goods import was also a step towards trade liberalization. In the 1960s share of the manufacturing value-added contribution in the GDP and manufactured exports increased. The private sector and businesses were supported. Later in the 1970's trade liberalization, policies were applied by eliminating the EBS and promoting currency depreciation. Nationalization and public sector investment in large-scale manufacturing surged in this era. Cement, oil refineries, fertilizers, and other heavy industries were nationalized.

In the 1980s, public sector investment, foreign aid, tariff reduction, and structural adjustment program further added the trade liberalization measures. In the 1990s, Pakistan significantly reduced its maximum tariff rate to 45 percent from 225 (1986-87). While Pakistan's weighted average tariff was cut down to 16.5 percent in 2002.



In the subsequent sub-section, we have analyzed Pakistan's tariff structure relative to the economic growth, manufacturing, and industry value added for the past four decades.

1.2. Pakistan's Economic Growth and Tariff Liberalization (1980-2020)

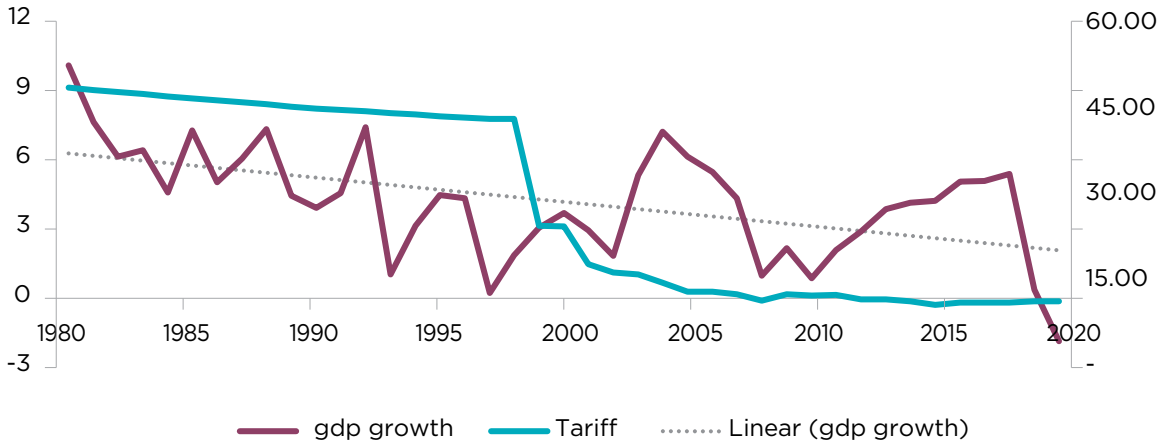
Pakistan's economic growth experienced fluctuating trend since the 1980s. A structural adjustment program was initiated in the 1988s that aimed to increase economic growth through trade liberalization. The figure explains the negative trend of Pakistan's economic growth as the weighted average tariff tends to decrease, indicating trade liberalization has a detrimental effect on economic growth. Pakistan's economic growth follows fluctuating

[3]EBV was used to obtain foreign exchange that can be used for importing goods, business travels and opening/ running their foreign commercial offices. EBV was transferable and priced according to market conditions

[4]Under the import licensing scheme selected industries were on the list of automatic renewal. This was essentially based on their export performance

trends since the 1980s. From 1980 to the 90s, Pakistan's average economic growth was recorded as 6.3 percent which narrowed to 3.9 percent in the next decade (1991-2000). From 2001 to 2010, Pakistan's economy grew on average at the rate of 4.2 percent with a reduction of 3.2 percent in the next decade.

Figure 1.1: Pakistan's Economic Growth and Tariff Liberalization (1980-2020)

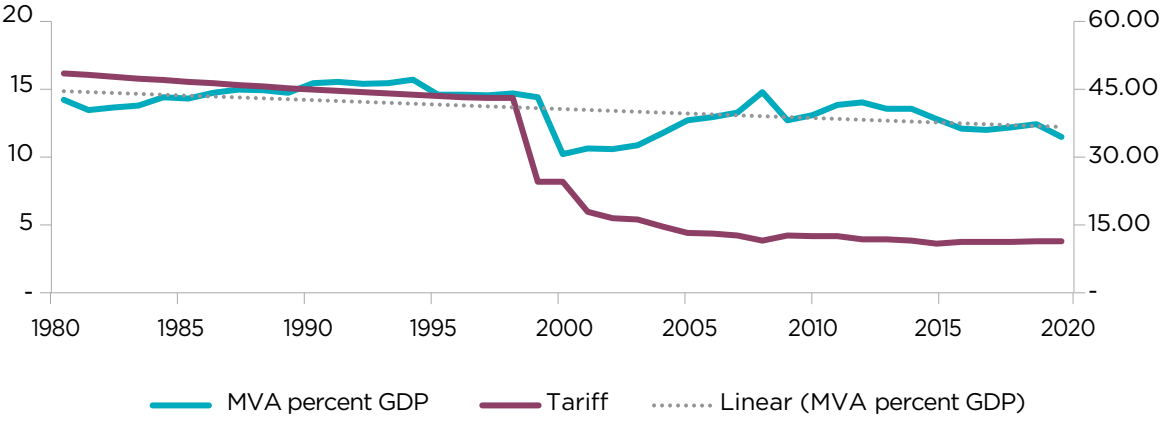


Source: World Bank, WITS database (2020) , Misc Sources

1.3. Pakistan's Manufacturing Value-Added and Tariff Liberalization (1980-2020)

Pakistan's manufacturing value added (MVA) share in GDP is negatively affected by trade liberalization. In 1980, MVA's contribution to the GDP was 14 percent which declined to 11 percent in 2020. CAGR for the past four decades shows that each year MVA declined by 0.5 percent. Tariff structure in Pakistan was reduced rapidly in the 1990s while the manufacturing industry's pace to restructure was slow. Tariff was an important source of revenue generation for the government. Reduction in the tariffs, added an additional burden for the government thus no proper financial support was granted to the manufacturing sector. The interest rate was also kept high to ease the fiscal burden on the government which also reduced the credit availability for manufacturing firms. All these measures led to de-industrialization in Pakistan.

Figure 1.2: Pakistan's Manufacturing Value Added (% of the GDP) and Tariff Liberalization (1980-2020)

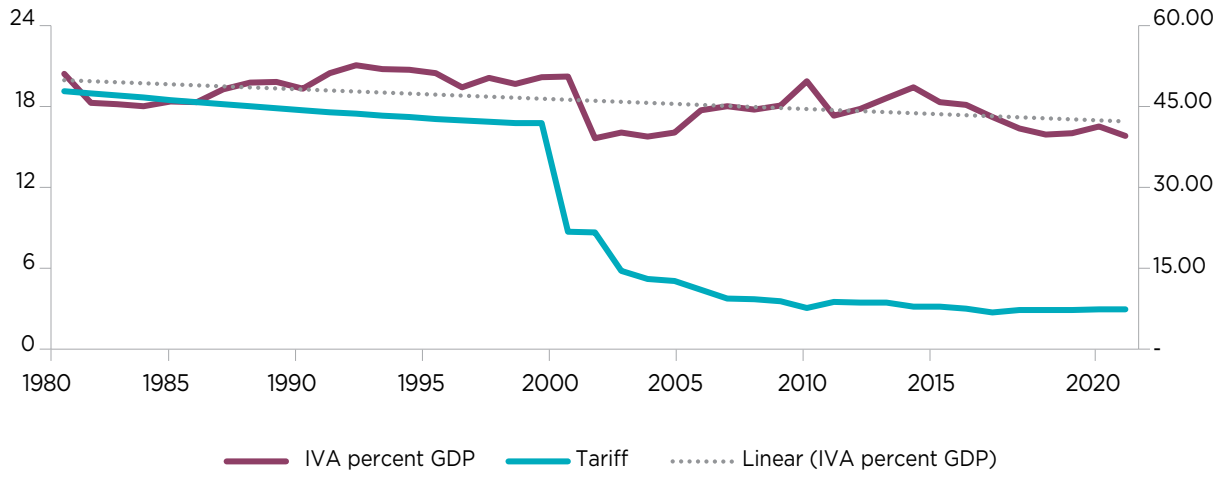


Source: World Bank, WITS database (2020), Misc Sources

1.4. Pakistan's Industry Value-added and Tariff Liberalization (1980-2020)

Industry value-added contribution to the GDP also declined amid rapid trade liberalization measures. In 1980, Pakistan's contribution to the industry stood at 22.3 percent while in 2020 industry value-added declined to 17.7 percent. During the last four decades, contribution to the GDP declined by a CAGR of 0.6 percent per year. The process of de-industrialization kicked off as trade liberalization gained momentum (see figure below: 1.3).

Figure 1.3: Pakistan's Industrial Value Added (% of the GDP) and Trade Liberalization (1980-2020)

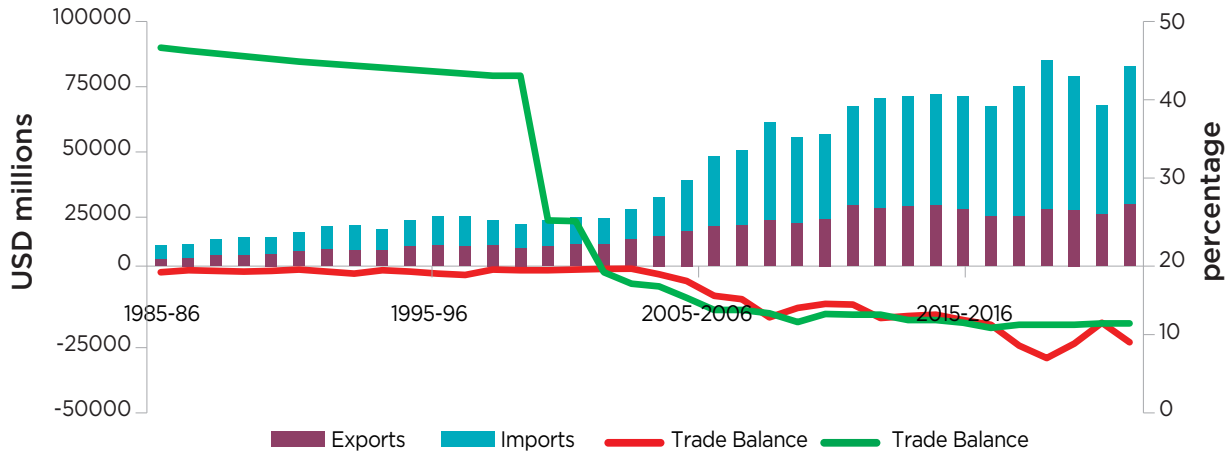


Source: World Bank, WITS database (2020), Misc Sources

1.5. Pakistan Global Trade Scenario (1985-2021)

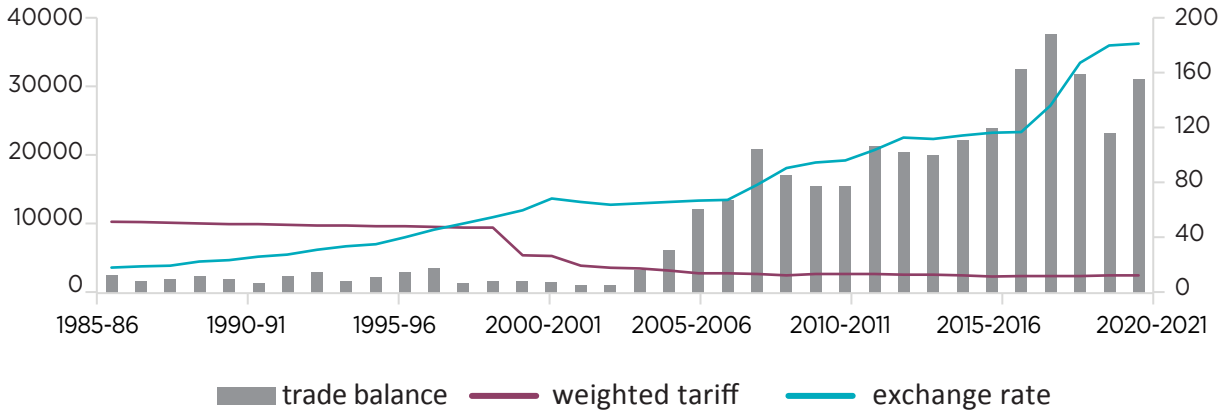
Pakistan's trade volume is increasing ever since 1985 but the negative trade balance is widening continuously since 2005. Policy instruments used for trade liberalization cushioned the increasing trade deficit (see figure: 1.4). In the year 1999, Pakistan's weighted average tariff was 43 percent which declined to 17.5 in 2005. Exchange rate devaluation also increased post-2006 (see figure: 1.5). For better market access and liberalization, Pakistan initiated various trade agreements post 2005. By implementing outward-looking policies such as tariff reduction, and exchange rate devaluation, growth in imports outpaced exports. A low tariff structure was conductive for imported inputs but exchange rate depreciation and market openness fuelled the cost of imported inputs for industries.

Figure 1.4: Pakistan Trade and Tariff Structure (1985-2021)



Source: Pakistan Bureau of Statistics (2020), Misc Sources

Figure 1.5: Pakistan Trade Balance, Exchange Rate, Weighted Tariff (1985-2021)



Source: Pakistan Bureau of Statistics (2020), Misc Sources

1.6. Comparative Analysis of Import and Tariff Structure of Pakistan and its Regional Competitors

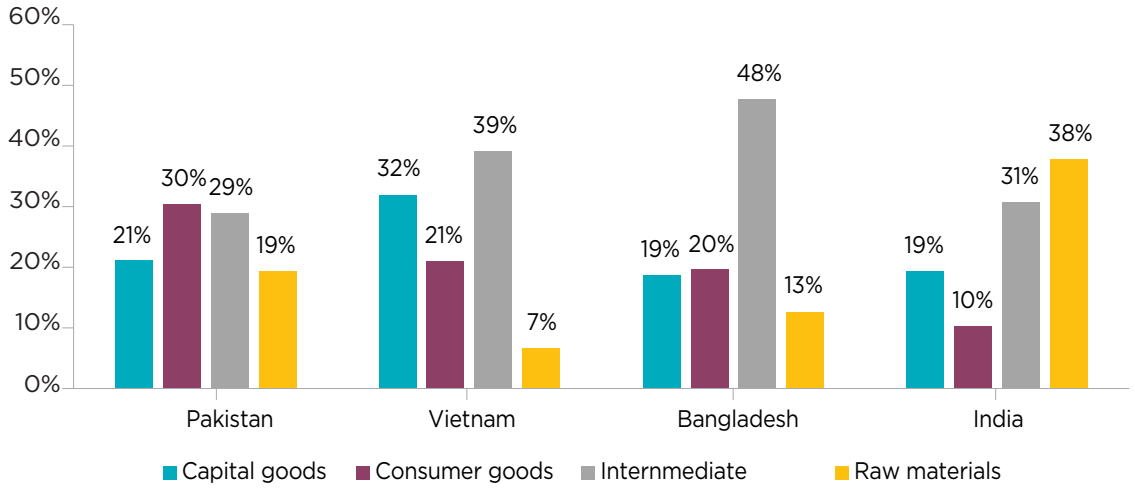
In the past five years, Pakistan's imports are mainly driven by consumer goods (30%) followed by intermediate (29%), capital (21%), and raw materials (19%). Accordingly, the tariff structure is defined as having more tariffs on consumer goods (13.1%) while less on capital, intermediate and raw material. However, this picture remains inconclusive if we overlook the import and tariff structures of other countries. India and Bangladesh in comparison to Pakistan, have less share of consumer goods in total imports. While Bangladesh's tariff on consumer goods is the highest, India has a tariff of 12.4% indicating the incentive for final goods produced in both countries.

For intermediate goods, both India and Bangladesh have a high share in imports than Pakistan however they have imposed high tariffs to develop their backward linkages for a sustainable industrial base.

For capital goods, the import share of Pakistan, India, and Bangladesh are quite similar yet the tariff structure for capital goods in both countries is less restrictive than in Pakistan.

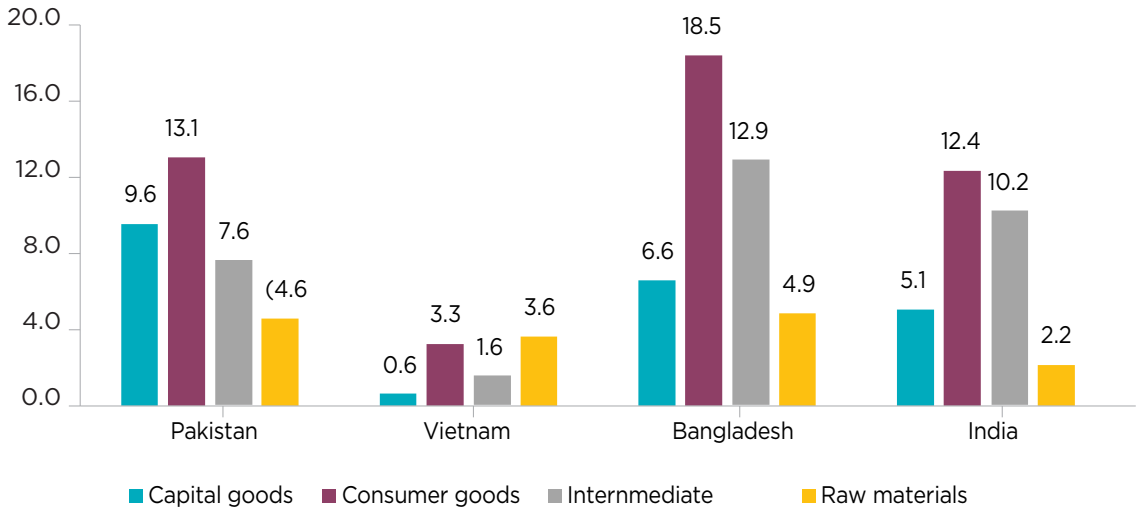
In nutshell, both countries have a high tariff on consumer goods (final goods) but their tariff on intermediate and raw materials is also high, indicating an inward policy to build their manufacturing base (see figure: 1.6 & 1.7).

Figure 1.6: Imports Structure of Regional Competitors



Source: WITS (2020)

Figure 1.7: Tariff Structure of Regional Competitors



Source: WITS (2020)

2. Import Substitution Opportunities in Pakistan-Selection of Key Sectors

Pakistan's major import basket is dominated by petroleum (crude & refined) products that make-up 20 percent of the total imports in Pakistan. Machinery (mechanical & electrical) has a share of 18 percent while agriculture and other chemicals have a share of 16.4 percent. The food and chemical group constitute 14.7 and 8.6 percent respectively (see table: 2.1)

For the current analysis of import substitution, we have selected sectors that constitute a significant share of our imports, and have domestic production but are unable to meet the domestic demand. We have considered petroleum, steel and iron scrap, raw cotton, and oilseeds for exploring import substitution opportunities.

Table 2.1: Pakistan Import Structure and Sector-Wise Share

SECTORS	2018-2019	share %	2019-2020	share %	2020-2021	share %
			Values in USD million			
TOTAL	**55,169.3**		**41,347.3**		**56,580.9**	
Petroleum group	**14,441.5**	**26.2**	**9,396.3**	**22.7**	**11,342.7**	**20.0**
Machinery group	8,947.7	16.2	8,478.8	20.5	10,166	18.0
Agricultural and other chemicals	8,758.7	15.9	6,868.5	16.6	9,292.6	16.4
Food group	**5,665.2**	**10.3**	**4,999.2**	**12.1**	**8,337.6**	**14.7**
Metal group	**4,984.4**	**9.0**	**3,752.6**	**9.1**	**4,890.4**	**8.6**
Textile group	**3,221.1**	**5.8**	**2,227.6**	**5.4**	**3,864.6**	**6.8**
Transport group	3,179.9	5.8	1,436.1	3.5	2,993	5.3
Miscellaneous group	1,025.1	1.9	746.4	1.8	1,216.2	2.1

Source: Pakistan Bureau of Statistics, PBS

The report aims to target major sectors that constitute 32 percent of our total imports in 2020-21. Around 18.3 USD billion are targeted to evaluate import substitution opportunities. The impact of import substitution can bring foreign exchange savings which could lead to stability and growth. By adopting sector-wise import substitution policies savings of USD 2.1 billion in iron and steel, USD 1.1 billion in cotton production, 0.5 billion in oilseeds, 1.9 USD billion in palm oil, USD 3.8 billion, and USD 1.1 billion through oil refineries can be materialized. (See table below)

Table 2.2: Import Substitution Combine Benefits

Products					
Iron and Steel	Cotton	Oilseeds and Palm oil	Refinery	Petrochemicals	Total
Current Imports USD billion (2020-21)					
3.8	1.4	3.1	8	2	18.3 (32%)
Imports saved (USD billion)					
2.1	1.1	2.4 (0.5+1.9)	3.8	1.3	10.5 (18.7%)
Time Span					
1	4	6-7	5-6	1	-

Source: Author's own calculation. Data is taken from PBS

Detail analysis of each sector in terms of its import substitution opportunity has been discussed in the next section of the report. The total impact of import substitution can be combined to generate USD 10.5 billion of foreign exchange savings which make up 18.7 percent of the total imports in 2020-21.

The benefit of import substitution can be further extended by analyzing its impact on the trade balance. We assume if Pakistan increases its exports by 10 percent while imports increased by 3 percent annually coupled with a gradual import substitution of USD 1 billion each year then it can drive the trade balance to reach a surplus in the 12th year.

Table 2.3: Expected Outcomes of Import Substitution and Export Growth

Years	Exports	Imports	Revised import	Trade Balance
Values in USD billion				
FY-20-21	25.3	56.38		
Year 1	27.83	58.07	57.07	-29.24
Year 2	30.61	59.81	58.81	-28.2
Year 3	33.67	61.61	60.61	-26.94
Year 4	37.04	63.46	62.46	-25.42
Year 5	40.75	65.36	64.36	-23.61
Year 6	44.82	67.32	66.32	-21.5
Year 7	49.3	69.34	68.34	-19.04
Year 8	54.23	71.42	70.42	-16.19
Year 9	59.66	73.56	72.56	-12.9
Year 10	65.62	75.77	74.77	-9.15
Year 11	72.18	78.04	77.04	-4.86
Year 12	79.4	80.38	79.38	0.02
Year 13	87.34	82.8	81.8	5.54

Source: Author's calculations. Data for the analysis was taken from PBS

3. Import Substitution cum Export Promotion Model for Pakistan

Pakistan needs import substitution cum export promotion strategies to build its manufacturing base. In the first phase, it is suggested to incentivize foreign firms for building their assembling plants with zero duty on raw and intermediate goods imports. In this phase firms investing will realize their full potential of market size with maximum profits. It is important to engage foreign firms in knowledge transfers by linking universities with foreign firms. In the second phase, Pakistan should increase tariffs on raw materials and intermediate goods to develop its own market; should increase competition by inviting more foreign players; must fix the localization rate and rebate taxes with an increasing rate of localization for high technological processes. In the third phase, Pakistan needs to incentivize these firms in form of export subsidies or duty-free raw materials to export final products. A joint collaboration between local and foreign manufacturers for building the Pakistani brand name should be encouraged.

In addition to this, the government needs to rethink its policy of tariff liberalization and exchange rate depreciation for manufacturing firms as in Pakistan most of the industries are dependent on foreign inputs. Even if tariff concessions are granted on inputs its benefits are eroded by currency depreciation as the cost of production remains uncertain while output prices are constant. Further to improve the competitiveness of industries, it is important to strengthen backward linkages between sectors that ultimately reduces the dependence of industries on foreign input. FDI and gross capital formation need a more policy conducive environment that builds more sustainable industrial sector growth and productivity in Pakistan.

4. COTTON: A GLOBAL OUTLOOK

According to Food and Agriculture Organization (FAO), 11 percent (1.5 billion ha) of global land (13.4 billion ha) is used for crop production. It accounts for approximately 36 percent of total suitable land available for cultivation in the world. It is estimated that 72 percent of world crops are likely to be cultivated in developing countries by 2030 with major crops to be grown including maize (49%), rice (14%), and wheat (17%) while the area used for cotton harvest will be 2.2 percent in the world.

4.1. Global Cotton Production

Globally, India has the largest share of 23 percent in global cotton production followed by China and the USA with 22 percent and 15.5 percent share respectively. In 2020-21, Pakistan has a share of 4.9 percent which is quite low as compared to the 7.8 percent in 2015-16. Brazil has invested substantially in cotton production as its contribution to global cotton production increased from 6 percent (2015-16) to 9.69 percent (2020-21). Thus, the above-mentioned countries account for 80 percent of the global cotton production. (Table-4.1)

Table 4.1: Major Sources of World Cotton Production, 2015-2022 (Percent Share)

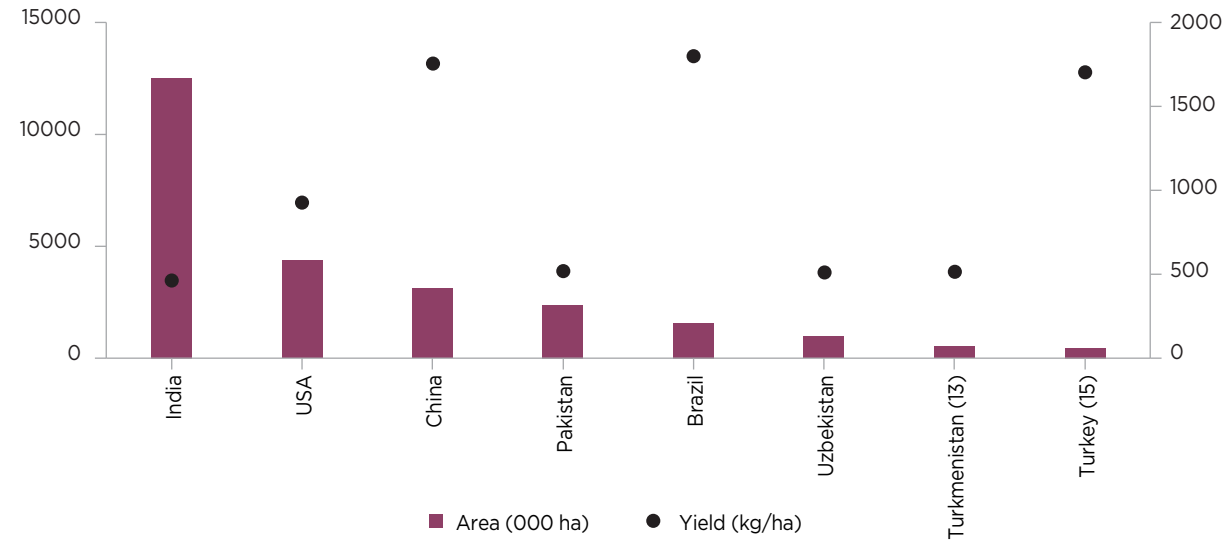
Years	India	China	USA	Brazil	Pakistan	Uzbekistan	Turkey	Total Share in World Production
2015-16	26.54	24.02	12.96	5.96	7.79	3.85	3.41	84.53
2016-17	25.09	20.96	15.99	6.54	7.76	4.11	3.23	83.68
2017-18	23.52	21.81	16.87	7.43	7.52	3.56	3.27	83.98
2018-19	21.79	23.25	15.39	10.69	6.45	2.45	3.76	83.78
2019-20	23.74	22.19	16.59	11.49	5.97	2.03	3.11	85.12
2020-21	24.71	24.32	13.09	9.69	4.94	4.23	2.70	83.68

Source: ICAC & PCCC

4.2. Global Area and Cotton Yield

Globally cotton production area constitutes around 33.18 million hectares while the average outcome per hectare is 775 kilograms (kgs). India is utilizing the highest area for cultivation of cotton which is around 12.6 million hectares while its yield per hectare is 466 kgs/hectare, which is the lowest among all the major cotton-producing countries. China is getting 1844 kgs/hectare yield, which is the highest per hectare yield among the major cotton-producing countries while USA harvests around 4.01 million hectares of land area. Pakistan's per hectare yield is 600 kilogram which is the lowest after India. Historically, from 2016 to 2019, Pakistan experienced per hectare yield of more than 700 kgs/per hectare, but it follows declining trends from 2018-19. Pakistan's cotton production area has decreased by 28 percent since 2016. Among world cotton producers, Brazil has shown enormous growth in cotton production with the production of around 1772 kilograms per hectare while its area cultivation is the lowest (1.1 million hectares) among the major cotton-producing countries. (See figure: 4.1)

Figure 4.1: Cotton Cultivation Area and Yield in the World (2019-20)



Source: International Cotton Advisory Committee

4.3. Global Cotton Trade Scenario

For cotton consumption, China holds a key position in the world market followed by India, Pakistan, and Bangladesh. All these countries are the major producers and exporters of value-added textile products in the world. (See table: 4.2)

USA is the largest exporter of cotton which exports around 33.2 percent of global exports in 2021-22 while Brazil jumps from 12.3 percent in 2015-16 to 20.3 percent in 2021-22 which makes it the second-largest exporter of cotton in the world. India and Australia's share in global cotton export is around 8 percent and 7.3 percent respectively.

China and Bangladesh are top importers of cotton in the world followed by Vietnam and Pakistan. Pakistan's increasing imports from 5.3 percent in 2015-16 to 8.5 percent in 2020-21 indicates the deteriorating performance of domestic cotton production. (See table: 4.3)

Table 4.2: Major Consumer of Cotton

Years	China	India	Pakistan	Bangladesh	Turkey
Values in Percentage					
2016-17	33.3	20.7	8.9	5.7	6.1
2017-18	32.3	20.6	9.5	6.3	6.0
2018-19	31.7	20.8	7.9	6.1	6.5
2019-20	31.9	19.6	8.3	6.6	6.5
2020-21	32.7	22.2	8.4	6.4	6.1

Table 4.3: Harvested Cotton Area and Yield (2015-2021)

	World		India		China		USA		Brazil		Pakistan	
Year	Harvested Area '000 ha	Yield kg/ha	Harvested Area '000 ha	Yield kg/ha	Harvested Area '000 ha	Yield kg/ha	Harvested Area '000 ha	Yield kg/ha	Harvested Area '000 ha	Yield kg/ha	Harvested Area '000 ha	Yield kg/ha
2015-16	30755	704	11877	484	3413	1524	3268	859	955	1350	2902	581
2016-17	29889	782	10845	541	3100	1581	3848	972	939	1629	2489	729
2017-18	33283	811	12235	519	3350	1758	4492	1014	1175	1707	2700	752
2018-19	33041	786	12614	449	3367	1794	4043	989	1618	1717	2373	706
2019-20	34495	758	13373	464	3300	1758	4654	931	1666	1802	2527	617
2020-21	31981	760	13477	446	3170	1864	3347	950	1371	1719	2000	578
Average (2015-21)		**767**		**484**		**1713**		**953**		**1654**		**661**

Source: ICAC & PCCC

Table 4.4: Major Exporters and Importers of Cotton (% Share)

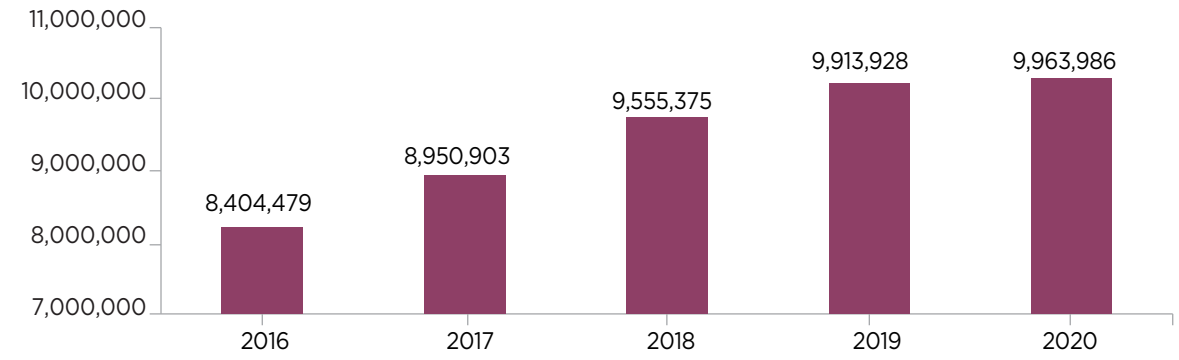
'000'Metric Tons

	COTTON MAJOR EXPORTER 2015-2022					COTTON MAJOR IMPORTERS 2015-2022						
	USA	Brazil	India	Australia	Benin	Greece	China	Bangladesh	Vietnam	Pakistan	Turkey	Indonesia
2015-16	26.25	12.37	16.57	8.11	1.42	2.75	12.25	17.60	12.78	5.33	12.47	8.18
2016-17	40.22	7.32	11.95	9.80	1.72	2.67	13.54	17.45	14.81	6.25	10.36	9.12
2017-18	39.82	9.95	12.39	9.33	2.15	2.56	14.60	18.48	16.82	6.63	10.57	8.47
2018-19	36.25	14.11	8.24	8.52	3.11	3.18	22.77	16.75	16.37	4.50	8.52	7.20
2019-20	37.69	21.16	7.57	3.22	3.32	3.47	18.44	17.28	16.23	5.44	11.72	6.30
2020-21	34.19	22.61	12.51	3.21	2.99	3.35	27.86	16.86	15.44	8.53	11.54	5.00

4.4. Case for Import Substitution

As mentioned earlier, domestic cotton area and yield per hectare in Pakistan have both declined over the past three years while domestic demand for cotton from the textile industry has increased considerably as Pakistan's exports in value-added textile items are increasing (see figure: 4.2). Pakistan imports in the same period followed an increasing trend thus our import dependency has increased over the years from 23.4 percent to 42 percent[5] (see figure: 4.2 & 4.3)

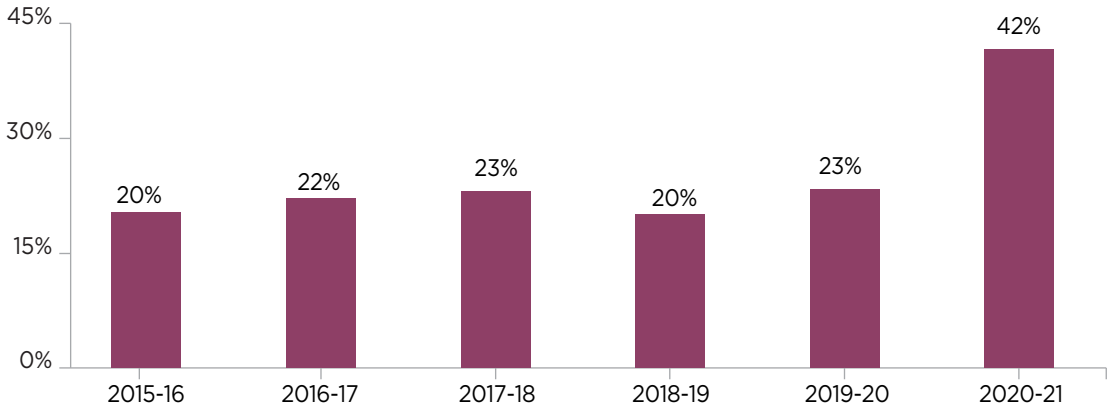
Figure 4.2: Value Added Textile Exports HS-61, 62, 63 (Values in USD 000)



Source: Trade map, ITC

[5]The formula used to calculate IDR is, $IDR = \frac{quantity\ of\ imports\ (MT)}{quantity\ of\ domestic\ production + quantity\ imported - quantity\ exported)}$

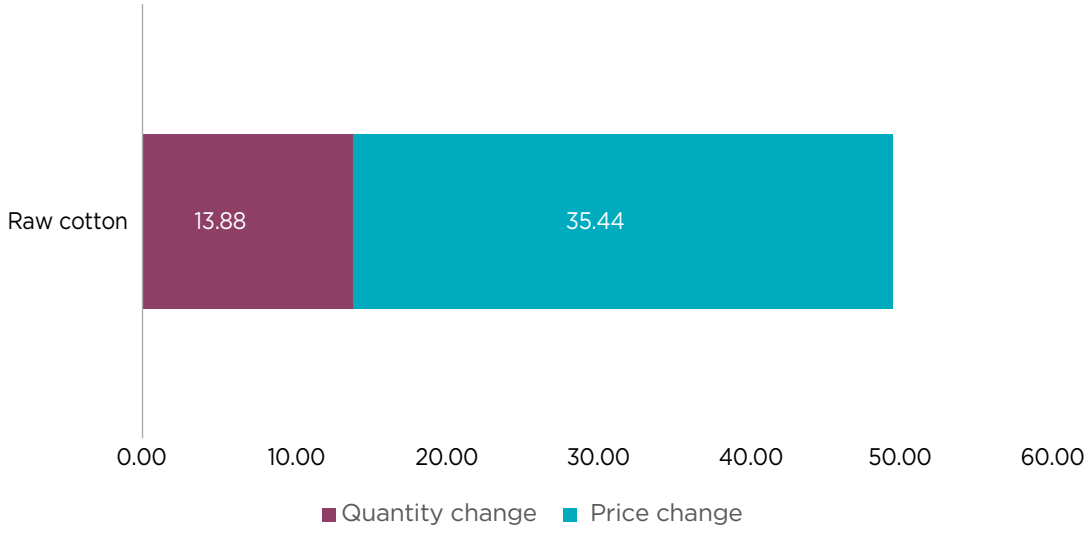
Figure 4.3: Pakistan Import Dependency Ratio - Cotton



Source: Trade map, ITC

In the first half of the current fiscal year (July-Dec 2021) import value of cotton increased to USD 821 million as compared to 532.06 in the same period of previous year. Price and quantity percentage change reveal that the price effect has been the dominant cause of surge in import value of cotton (See figure: 4.4). For cotton import value, prices represent 35.5 percent change in the value while quantity demanded cotton has also increased by 13.8 percent. Thus, international market price and quantity increase together drive the increasing value of imports.

Figure 4.4: Price And Quantity Change (Percentage) (July-Dec 2021) VS (July-Dec 2020)



Source: PBS (2020)

To decrease our reliance on imported cotton we need to increase our land area and adopt measures that can increase our per hectare yield. For this, Pakistan needs constructive measures for sustainable cotton growth as per the demand of the textile industry.

5. COTTON PRODUCTION: PAKISTAN'S OUTLOOK

Cotton is among the major cash crop in Pakistan and a major source of input to the country's largest agro-industrial sector (PBS, 2018-19). Pakistan is the fifth largest cotton-producing country in the world after India, China, USA, and Brazil (PCCC, 2020). Nearly 15 percent of cultivated area is devoted to the cotton crop while the primary production lies in two provinces Punjab and Sindh with a negligible area under cotton in Khyber Pakhtunkhwa and Baluchistan (Rana, Ejaz, & Shiko, 2020). Cotton contributes around 0.8 percent to GDP while its value addition is 4.5 percent (Razzaq, et al., 2021). Industrial sector, the ultimate user of raw cotton employs around 17 percent of the total labor force, earns 60 percent of foreign exchange, and contributes around 8.5 percent of the GDP.

5.1. Pakistan Area and Per Hectare Yield

Pakistan is the 4th largest country in terms of area under cultivation but its yield per hectare is low as compared to other countries in past five years. The key factors responsible are; reduction in the area under cultivation for cotton by 30 percent; production has declined by 33 percent while yield per hectare decreased by 4.5 percent (as compare to 2014-15) (see table: 5.1). In Pakistan, area for cotton cultivation is decreasing while area under rice cultivation is increasing (see figure: 5.1). In Punjab, the area under cultivation has declined predominately because of the tradeoff between cotton area and other crops such as sugarcane, maize, and rice. These crops are far better priced in the competitive export market while cotton provides less incentive for farmers to grow without support price. Moreover, cotton is a climate-sensitive crop that is often under pest attack. For preventive measures, farmers have used excessive pesticides which in turn has built the resilience of pests against pesticides[6]. In addition to this, over usage of fertilizers also deteriorates land fertility. All these factors magnify the cost of production for farmers while the output price of cotton is low as compared to other crops.

Table 5.1: Cotton Area, Production & Yield of Pakistan

Year	Area ('000' hectares)	Production (000 Metric tons)	Yield (kg per hectare)
2014-15	2,961	2373	802
2015-16	2,902	1686	581
2016-17	2,489	1814	729
2017-18	2,700	2030	752
2018-19	2,373	1676	706
2019-20	2,517	1560	617
2020-21	2,078	1593	766

Source: Pakistan Central Cotton Committee (PCCC)

[6]In Pakistan, more than 80% of the pesticides are being used in cotton related pests which costs almost USD 300 million

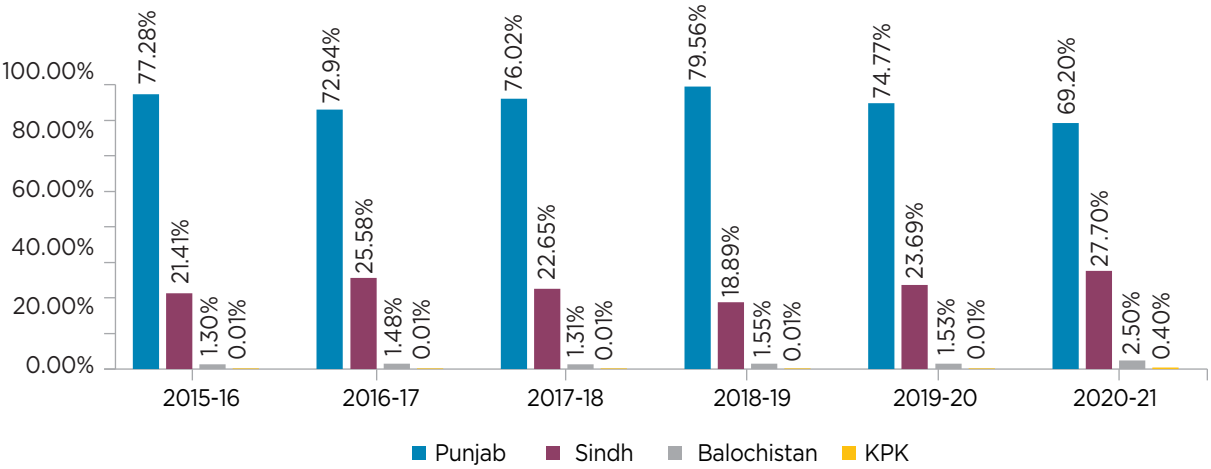
Figure 5.1: Area Under Cotton And Rice Cultivation (% of The Total Area Under Major Crops)

Source: Pakistan Bureau of Statistics (2021)

5.2. Province Wise Area and Per Hectare Yield

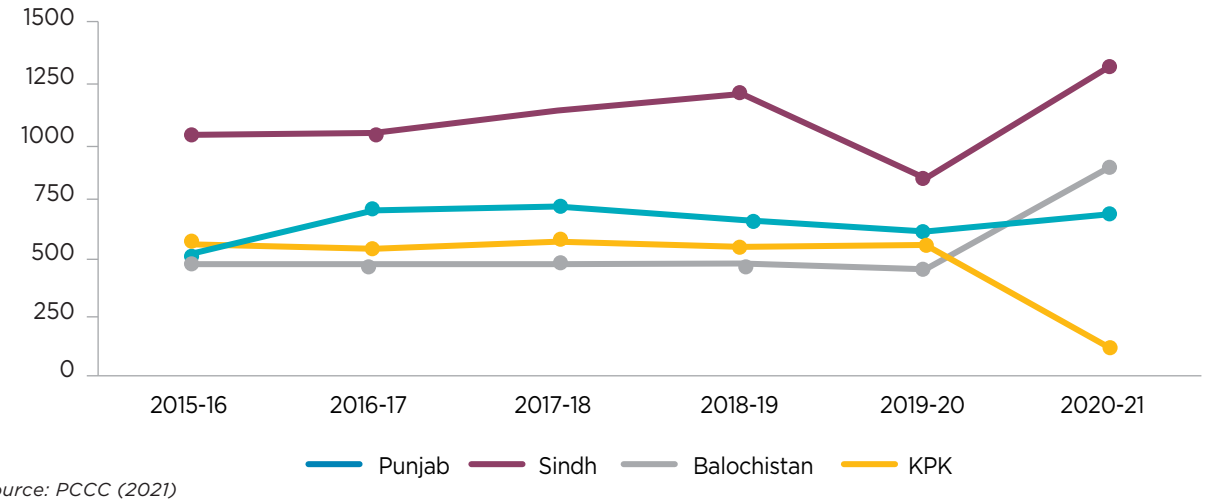
In Pakistan total area for cotton, cultivation stood at 2 million hectares in 2020-21. Out of the total land under cultivation for cotton, 69 percent area is devoted to cotton production in Punjab. Sindh has a share of 27.7 percent followed by Baluchistan having a share of 2.5 percent while KPK's share is 0.01 percent (see figure:5.2). Per hectare yield in Sindh is the highest among all provinces. Within provinces, Punjab has designated the largest area for cotton cultivation while Baluchistan has more potential to expand its land areas. In addition to this, yield per hectare in Baluchistan in 2020-21 is more than that of Punjab. This shows that the production capacity of cotton in Baluchistan is growing (see figure: 5.3).

Figure 5.2: Percentage of The Total Cotton Area (By Province)



Source: Trade map, ITC

Figure 5.3: Cross Province Comparison of Cotton Yield

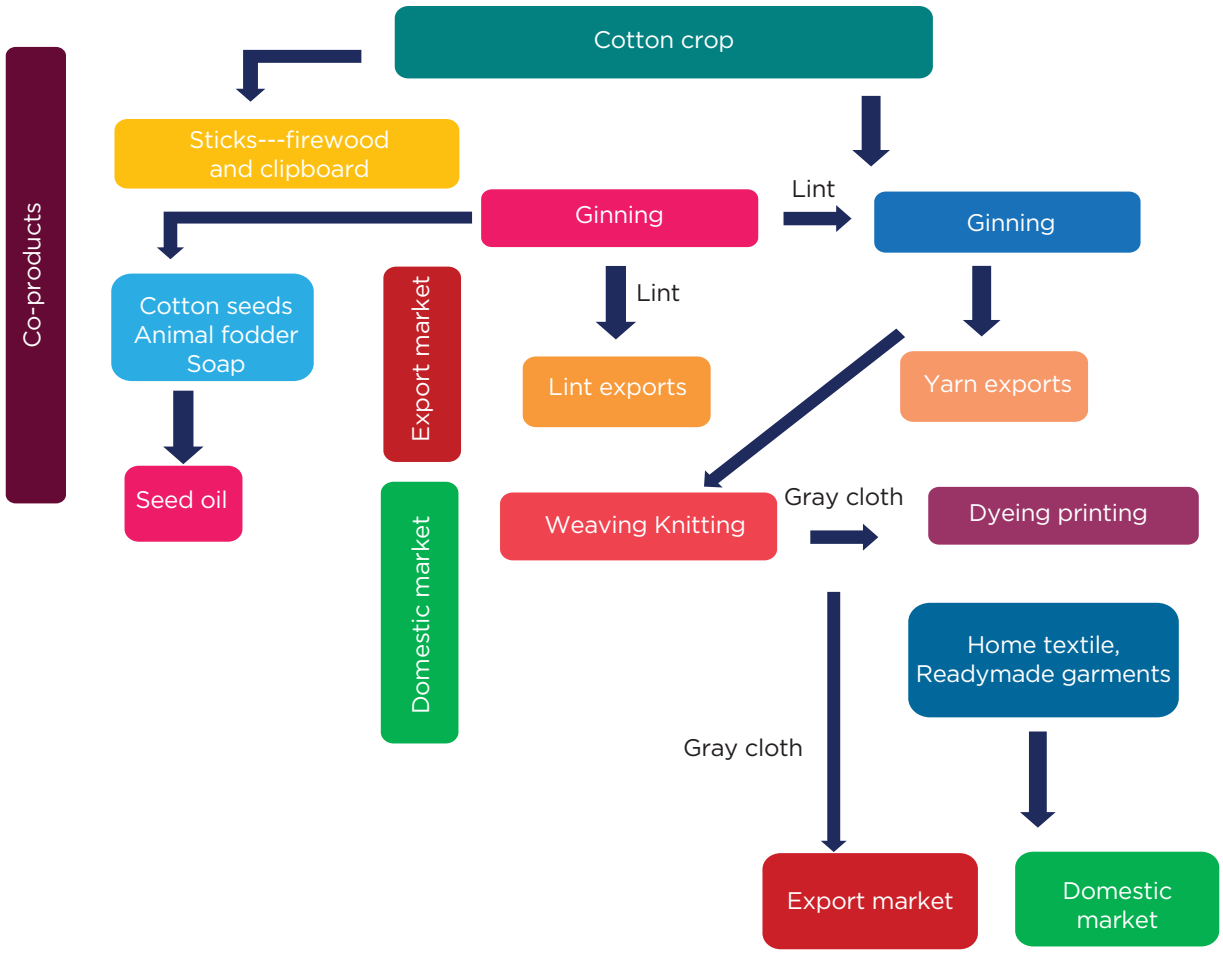


Source: PCCC (2021)

5.3. Value Chain of Cotton

Raw cotton needs ginning facility to convert it in to yarn that further takes the form of knitted grey cloth and end product. For details see figure: 5.4.

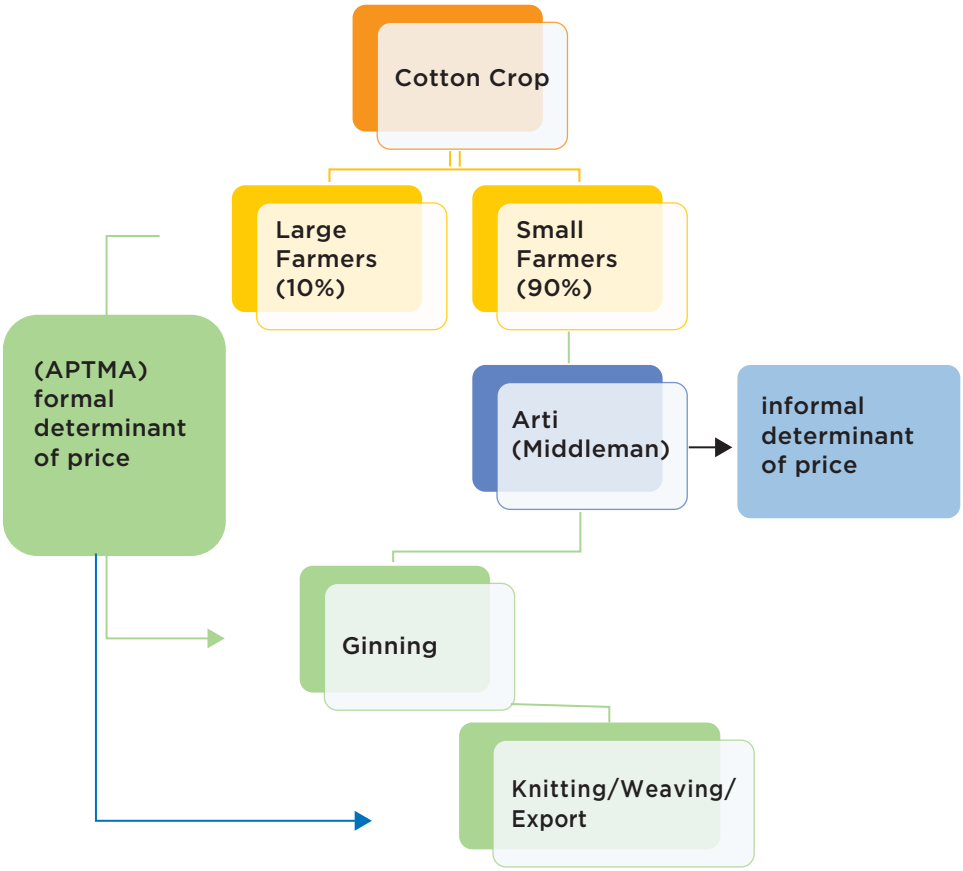
Figure 5.4: Value Chain of Raw Cotton to Textile Product



5.4. Price Mechanism of Cotton

Cotton crop price mechanism is less regulated as compared to other crops. Large farmers sell their raw cotton to ginning industry while small farmers sell their output to a middleman (arti). In the informal sector middleman (arti) determine the prices, while officially the price of cotton is set by All Pakistan Textile Association (APTMA), which is a single association of cotton buyers in Pakistan.

Figure-5.5: Cotton Price Mechanism Flowchart



5.5. Major Challenges for Sustainable Growth of Cotton Production and Way Forward

Cotton production in Pakistan is facing fluctuating trends for past few years. For sustainable crop production and import substitution, Pakistan needs a comprehensive strategy. The following table highlights the key issues, and way forward to increase and stabilize the cotton production in Pakistan.

Table 5.2: Challenges for Sustainable Growth of Cotton Production and Way Forward

Issue	Details/Reason	Way forward
Area reduction	In Pakistan from 2015-16, the cotton production area was reduced by 13% • Area reduced in Punjab was 15.8% • Area reduced in Sindh was 3.6% • Area increased in Baluchistan was 2.7% A major reason for crop area reduction was that farmer had substituted cotton area with oilseed and rice because of high prices for final good in market. In KPK, most of the land designated for cotton crops was used to cultivate sugar and new sugar mills were also being constructed in those land areas.	Government must designate land area for cotton production with proper monitoring and evaluation To incentivize, its production, government needs to introduce support prices for cotton keeping in view the international prices.
Yield reduction	In 2017-18, Pakistan had a yield of 752kg per hectare which continues to decline. In 2020, it was 617kg per hectare. • Regarding 2017-18, Punjab's yield decreased by 14.8% in 2019-20 • As compared to 2017-18 Sindh's yield decreased by 25.6% in 2019-20 • As compared to 2017-18, KPK and Baluchistan yield per hectare also declined by 2.5% and 4.8% Major reason for decrease in yield per hectare is locust attacks in past few years.	An integrated pest management system (IPM) should be implemented at a national level however IPM should be adjusted w.r.t to the area, weather, level, and type of insect attack. Government should also monitor and control the sale of unregistered and unlabeled pesticides in the market. Awareness programs about pest use for the farmer will also be helpful in understanding the use of pesticides.
Climate change/weather prediction	Changing patterns of climate change/weather also effects the crop. In 2020 unexpected rain in august and September deteriorated the crop production in Punjab. Absence of farmers' advisory services in Sindh, KPK, and Baluchistan. There is no mechanism and communication between Pakistan meteorological department (PMD) and agriculture departments. Absence of a centralized data management center to analyze and inform farmers and agriculture research center.	There should be strong communication between PMD and agriculture department. There should be a mobile alert system from PMD to update farmers directly regarding weather conditions through a mobile messaging system in all provinces

Sowing timing, crop window, and increase in insect attack	It is estimated that the cotton crop's window has been extended to 9 months in Pakistan. Sowing at different times will help insects, especially pink ball worms to grow and expand. • Multiple sowing windows could lead to the overlapping of pests. • It would also increase the cotton crop's susceptibility to weather adversities. In Punjab, sowing starts from May and will continue to till July which helps pests to shift from farm to farm. The unregulated pesticide also exists in the market	Punjab agriculture department experimented IPM in 3 districts in 2020 Results indicate that IPM can give higher yield as compared to non-IPM farms. • IPM practiced output is 35 mounds/acre • Non-IPM farm output is 15 mounds/acre Integrated Pest Management (IPM) practices are effective for the control of pest attacks. Especially for pink ball worm. • Knowledge about IPM to the farmers is necessary. • There should be a proper IPM practices syllabus that highlights the different situations and use of pesticides. • The concerned department should assign the focal persons to look after the IPM practices and ensure that farmers follow the prescribed pests and their use. Strict action against unregistered pesticides sellers needs to be initiated. Drone spray is comparatively effective, but it is still expensive practice in Pakistan. Joint investment is required to help farmers with this facility
Seed	There is no seed management in Pakistan. There is a lot of variation in seeds in Pakistan and many of them are unregistered seeds. No seed labeling mechanism in Pakistan and it makes it easier for unregistered seed sellers to get into the market. There is also a strong seed cartel in Pakistan which controls most of the seed market.	There should be seed management practices in Pakistan There must be a sowing of seed cotton which is specifically to get the desired seed suitable for the cotton cultivation in Pakistan. • It is estimated that to fulfill the requirement of seed, we need to sow the cotton seed on 1 lakh acres. There should be a strict seed testing mechanism and only those seeds should be approved which are suitable for cotton agriculture in Pakistan. • Only those GMO seeds should be allowed to use which give more output but least effect on land fertility. Government to Government (G2G) dialogue can also be an effective strategy to solve the seed issue

Support Price	Cotton is among the major cash crop in Pakistan but unfortunately, there is no government price (support price) for cotton which increases the risk for the farmer to cultivate cotton. • Specially in Punjab, farmers preferred oilseed and rice instead of growing cotton because of the high output prices	Government should make some mechanism to support the price for cotton which is based on the quality and staple length of the cotton. • Increasing the price of cotton equal to the international parity price (IPP) will encourage the farmer to grow cotton. Furthermore, the government needs to work on quality control so the industry will get standardized cotton.
Availability and Use of Fertilizer	The increasing cost of phosphatic fertilizer is a major concern instead of its availability. Awareness campaigns for farmers related to the use of the type of fertilizer for their crop is also making a difference. Only 3 to 4 percent of farmers in Pakistan are using a balanced quantity of fertilizer.	Government should give direct subsidies to the farmers on fertilizers and also ensure their availability of it. Awareness programs regarding the use of appropriate fertilizer can also be beneficial.

6. Expected Benefits of Import Substitution

The expected benefit of import substitution is assessed by assuming scenarios based on an increase in the production area and yield of raw cotton in Pakistan.

6.1. Increase in The Land Area and Yield for Cotton Production

We have considered the base year scenario by taking the average of the past 4 years i.e. FY 2016-17 to FY 2019-20.

In our first scenario we took the following assumptions;

Assumptions for Scenario 1

Area	**Increase by 7%**
Yield	Increase by 15%
Domestic Demand	Increase by 5%
Import Price of Raw Cotton	Increase by 5%

Scenario 1: Results

If yield and area per hectare in Pakistan is increased by 7 percent and 15 percent respectively every 2 years while demand for cotton in the domestic market increase by 5 percent then the import deficit can be turned into an export surplus in 4th year when the area under cotton production is increased by 2.8 million hectares while yield per hectare is increased to 927 kgs/hectare. Pakistan can save USD 1 billion from import substitution and can gain additional USD by exporting raw cotton for USD 163 million. Total increase in area from the base year in 4 years will be 0.36 million hectares while an increase in production is 0.905 million MT.

Increase in yield can be targeted by improving the farm management, and the availability of better-quality seeds, fertilizers, and pesticides at subsidized rates. Land area can be increased by reorganizing the land mix in Pakistan between competing crops. Furthermore, land area for cotton production can be fixed with proper monitoring and penalties for violation.

Table 6.1: Expected Benefit of Import Substitution (Scenario 1)

Years	Area 000 hectares (1)	Yield in MT/hectare (2)	Production 000 MT (3)	Demand 000 MT (4)	Demand deficit 000 MT (5)	Price of import/MT (6)	Quantity of import 000 (MT) (7)	Import savings US$ (Million) (8)
base year	2,519.9	0.701	1,770	2344	(573.54)	1747.2	573.5	(1,002)
year 2	2,696.3	0.806	2,174	2461	(287.12)	1724.0	287.1	(501)
year 4	2,885.0	0.927	2,675	2584	90.86	1810.2	90.9	163
year 6	3,087.0	1.066	3,291	2713	578.17	1900.7	578.2	1,098
year 8	3,303.0	1.226	4,050	2849	1,201.12	1995.7	1201.1	2,396

Author's own calculation. Data source: PCCC & PBS

6.2. Increase in The Land Area for Cotton Production Keeping Yield Constant

Assumptions for Scenario 2

In the present scenario, we have only increased the area by 15 percent keeping yield per hectare constant. Following assumptions are considered.

Area	Increase by 15%
Yield	constant
Domestic demand	Increase by 5%
Import price of raw cotton	Increase by 5%

Scenario 2: Results

Based on the above assumptions we have increased the area for cotton production by 15 percent every year as compared to the base year average of the past four years. Demand is accessed by domestic production and imports. If the yield in Pakistan is kept constant at 0.701 MT/hectare, then Pakistan can narrow down its deficit, but it will take 8 years to convert it into net export surplus.

Table 6.2: Expected Benefit of Import Substitution (Constant Yield) (Scenario 2)

Years	Area 000 Hectares (1)	Yield in MT/hectare (2)	Production 000 MT (3)	Demand 000 MT (4)	Demand deficit 000 MT (5)	Price of import/MT (6)	Quantity of import 000 (MT) (7)	Import savings US$ (Million) (8)
base year	2,519.9	0.701	1,770.00	2344	(573.54)	1747.2	574	(1,002)
year 2	2,897.9	0.701	2,031.40	2461	(429.32)	1724.0	429.32	(750)
year 4	3,332.5	0.701	2,336.11	2584	(247.64)	1810.2	247.64	(427)
year 6	3,832.4	0.701	2,686.52	2713	(26.42)	1900.7	26.42	(48)
year 8	4,407.3	0.701	3,089.50	2849	240.92	1995.7	240.92	456

Author's own calculation. Data source: PCCC

6.3. Increase in The Yield Keeping Area Constant

Assumptions for Scenario 3

In the present scenario, we have only increased the yield by 25 percent keeping area constant. Following assumptions are considered;

Area	Constant
Yield	Increase by 25%
Domestic Demand	Increase by 5%
Import Price of Raw Cotton	Increase by 5%

Scenario 3: Results

Based on the above assumptions we have increased the yield for cotton production by 25 percent every 2 years as compared to the base year. If an area in Pakistan is kept constant at 2519.9 hectares, then Pakistan can narrow down its deficit, but it will take 4 years to convert it into a net export surplus. With an area of 2.5 million hectares and a yield of 1095 kgs/hectare Pakistan can gain net export surplus of 303 million in 4th year.

Table 6.3: Expected Benefit of Import Substitution (Constant Area) (Scenario 3)

Years	Area 000 hectares (1)	Yield in MT/hectare (2)	Production 000 MT (3)	Demand 000 MT (4)	Demand deficit 000 MT (5)	Price of import/MT (6)	Quantity of import 000 (MT) (7)	Import savings US$ (Million) (8)
base year	2,519.9	0.701	1,770.00	2344	(573.54)	1747.2	574	(1,002)
base year	2,519.9	0.701	1,770.00	2344	(573.54)	1747.2	574	(1,002)
year 2	2,519.9	0.876	2,208.04	2461	(252.67)	1724.0	252.67	(441)
year 4	2,519.9	1.095	2,760.05	2584	176.30	1810.2	176.30	303
year 6	2,519.9	1.369	3,450.06	2713	737.12	1900.7	737.12	1,334
year 8	2,519.9	1.711	4,312.58	2849	1,463.99	1995.7	1,463.99	2,782

Author's calculation. Data source: PCCC

6.4. Expected Benefit from Conversion from Rice to Cotton

Assuming that the area under rice cultivation is decreased by 19 percent and area under cotton cultivation is increased by 22.5 percent it is likely to be beneficial for the economy. An increase in cotton production can save USD 1 billion in imports, however reduction in rice production may only give a loss in exports of USD 857.2 million. The net savings would be USD 189 million. This proves that an increase in cotton production can outweigh the loss in rice exports.

Table 6.4: Expected Benefit from Conversion of The Area From Rice to Cotton

	Area ('000 hectares)									
Products	Current	Increase/ decrease hectares (000)	Increase/ decrease %	Production in 000 MT	Domestic demand 000 MT	Exports US$ 000	Revised exports US$ 000	Loss US$ 000	Import savings US$ 000	Net savings US$ 000
	Hectares (000)			Value in MT		Value in USD (000)				
Cotton	2517	3083.8	22.5	2,355.52	2306					
Rice	3020	2453.2	-19	5,991*	3400	2,422,040	1,564,791	(857,249)	1,046,596**	189,347

**Production with decrease in area by 19%*

***based on scenario 1. It can be achieved in 6th year*

7. IMPORT SUBSTITUTION STRATEGIES (SHORT TERM, MEDIUM-TERM AND LONG TERM)

Some of the initiatives that need to be taken to sustain cotton production and aid its import substitution process are listed below.

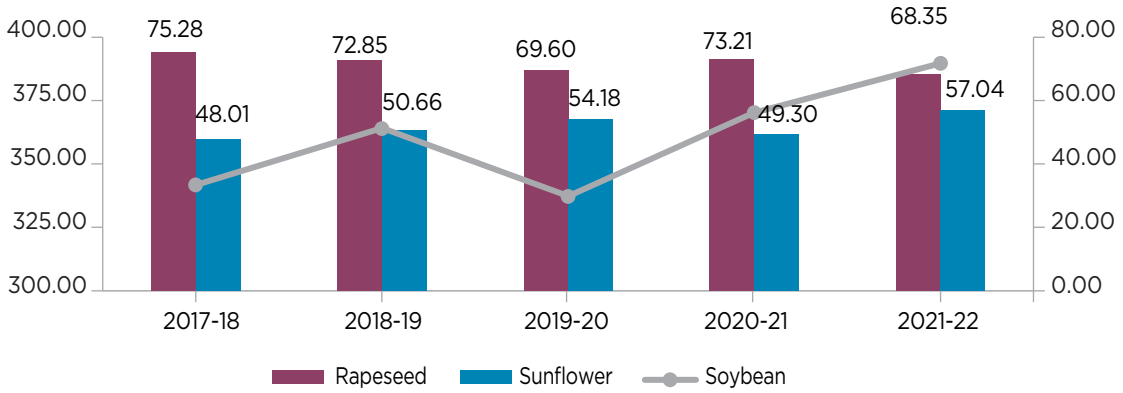
Short to Medium-term	Long term
Ensure the availability of quality seeds and fertilizer in each province keeping in view the nature of the land.	Expansion of land for cotton cultivation particularly in the areas of Cholistan and Baluchistan that are suitable for long-staple cotton.
In order to ensure quality of seed, proper labeling with complete traceability should be ensured	Farmer service centers in Baluchistan need to be equipped with cotton-related machinery, seeds, and fertilizers for farmers.
Support Price of Cotton can be given according to the quality and type of staple	APTMA and other private sector organizations need to invest in expansion of land under cotton cultivation and the establishment of ginning industries in Baluchistan.
Robust, result-oriented R&D in seed development must be ensured	Agriculture departments/institutions and other authorities should train the people to spread awareness to the farmers regarding sowing, pesticide, and other practices.
Need to initiate a mechanism to grow cotton seeds used for crop cultivation by province itself	Enhancing agriculture credit with emphasis on small & medium-sized farmers. ZTBL and other micro-finance organizations like Akhuwat Foundation should initiate schemes for farmers in terms of sharing/renting agriculture machinery at subsidized rates.
Fix land for crop cultivation in provinces with proper monitoring and penalties for violation	Farmer's service centers can be equipped with drone sprays and other technologies that can be used on a rental basis.
Tax breaks for the establishment of ginning factories in Baluchistan. Crop insurance to mitigate risks of failure	
Using technology for capacity building of farmers, updates on weather forecasts and pest attacks should be ensured in all provinces in their local languages. The damage assessments on crops should be done through remote sensing, for which the technology is available with SUPARCO	
Fast track the approval of available seeds and pesticides which are suitable to resist pink ball worm and whitefly attacks.	

8. Oilseeds and Palm oil

8. Oilseeds: A Global Perspective

Edible oil derived from plant sources such as palm, sunflower, soybean, olive, coconut, and cottonseed are the key crops cultivated for edible oil extraction. As demand for edible oil is increasing with global population, global production of oil seeds in past 5 years is also increasing particularly soybeans seeds (see figure: 8.1). Brazil, USA and Argentina are world top producers of soybean seeds with 60 percent share in global production. Around 40 percent of rapeseed is cultivated in Canada and China. Sunflower seed is mostly cultivated in Ukraine and Russia. In FY 2021-22, approximately both the countries jointly contributed 60 percent in the global production of sunflower oilseeds

Figure 8.1: World Oilseed Production (Product-Wise MMT)



Source: Food and Agriculture Organization

Table 8.1: Global Oilseeds Producers and their Contribution in World Market

Year	Brazil soybean	U.S.A	Argentina	Canada rapeseed	E.U	China	Ukraine sunflower	Russia	E.U
				Values in percentage					
2019-20	37.8	28.4	14.4	28.6	21.9	19.3	34.9	26.9	17.2
2020-21	37.6	31.3	12.6	26.6	22.2	19.1	30.9	26.8	18.2
2021-22	37.7	31.5	12.9	18.1	25.0	20.2	32.9	26.4	17.7

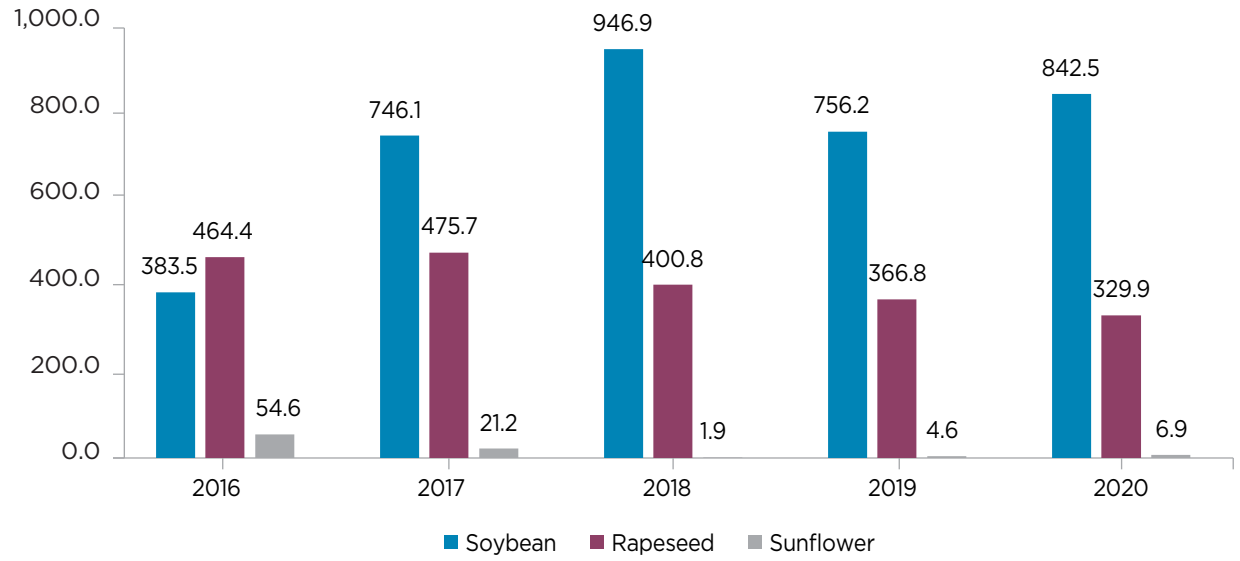
Source: Food and Agriculture Organization

8.1. Case for Import Substitution

In 2020, Pakistan imports for oil seeds (soybeans, sunflower, and rape seed) stood at USD 1.1 billion having share of 2.6[7] percent in total imports. Soybean seed imports is experiencing upward trend followed by rapeseed while sunflower seed imports are declining since 2016 as domestic production and yield per hectare for sunflower has surged in Punjab and Baluchistan.

[7]Trade map, ITC

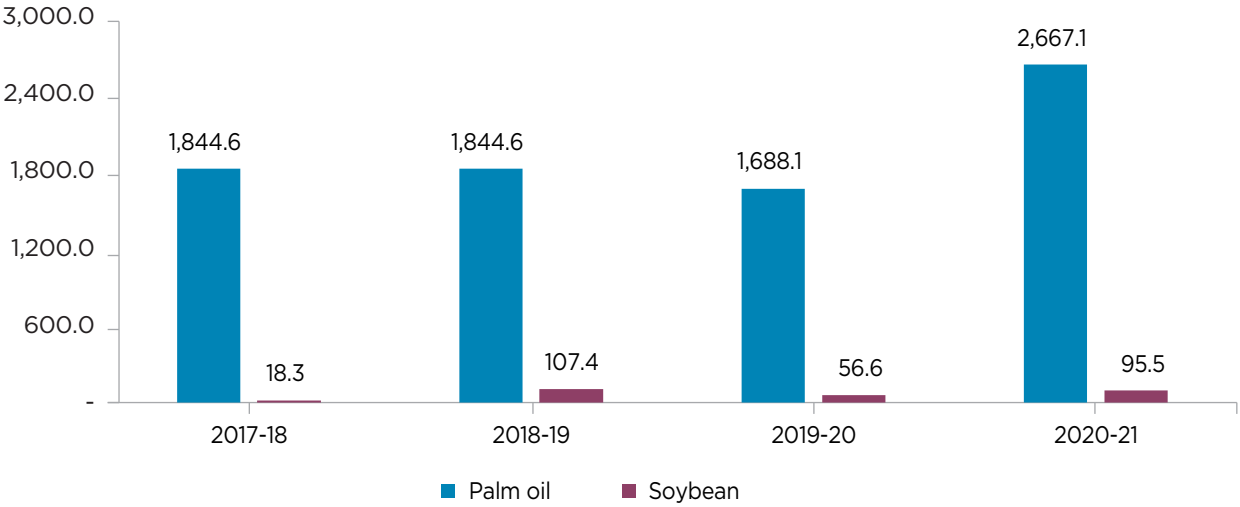
Figure 8.2: Major Oil Seeds Imports (Values In USD Millions)



Source: Trade map, ITC (2020)

In addition to the oil seeds, Pakistan imports for the final product of oil seeds i.e. palm and soybean oil consumes foreign exchange of USD 2.1 billion which makes 4.8 percent of our total imports in 2020 (Trade map, ITC). The total outflow of USD from oil seeds and its final product is around USD 3.3 billion projecting a share of 7.3 percent in our total imports.

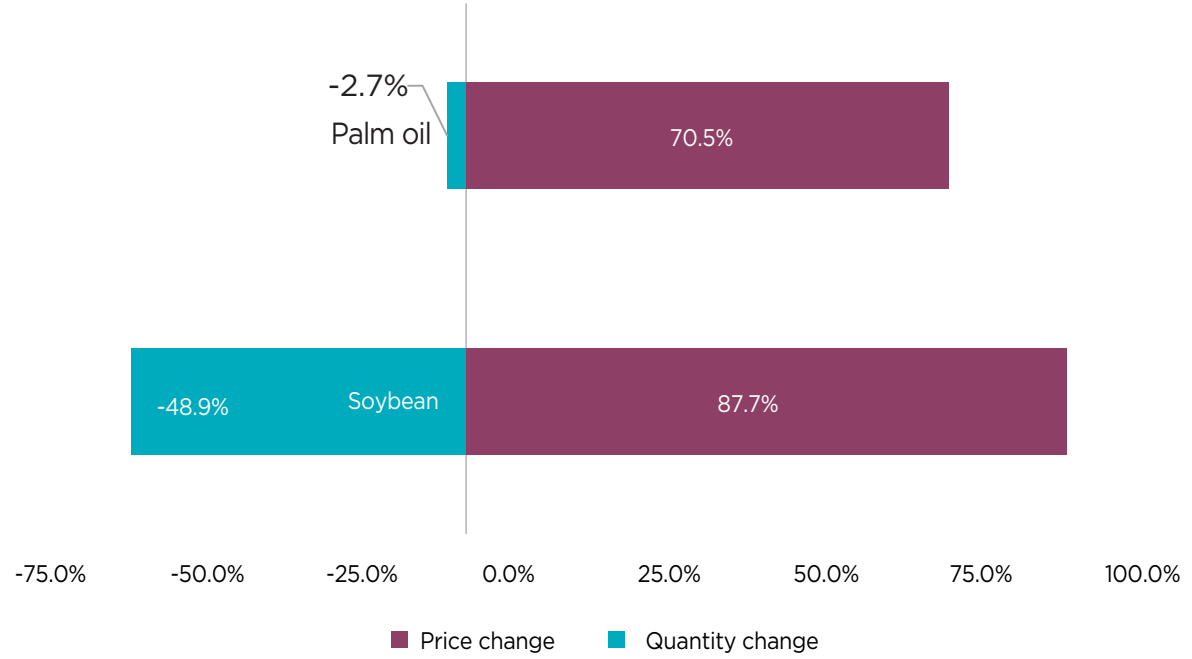
Figure 8.3: Pakistan Edible Oil Imports, (Values in USD Millions)



Source: Pakistan bureau of Statistics, PBS

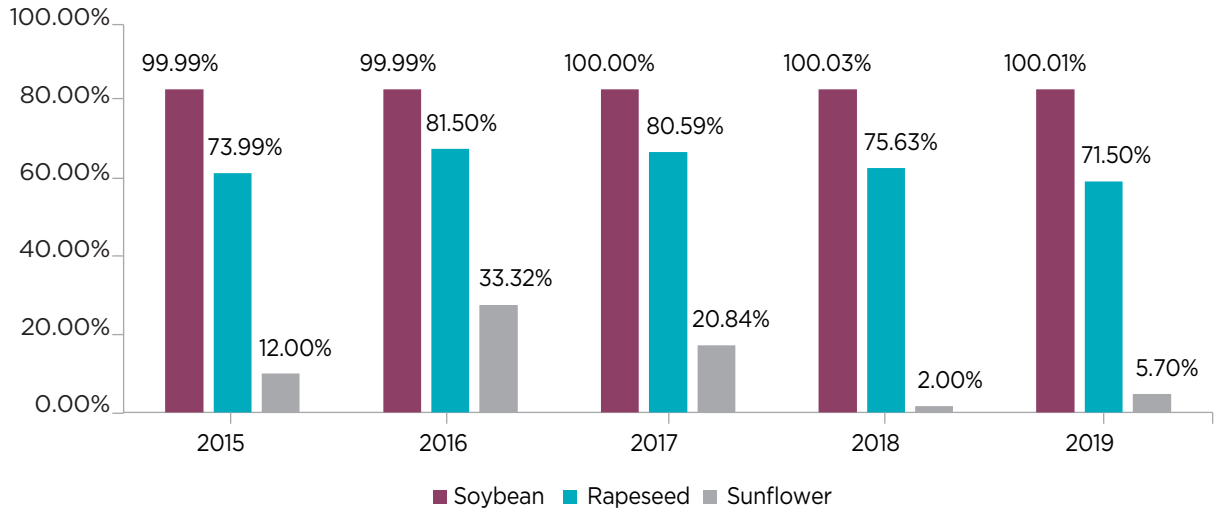
In the first half of the current fiscal year (July-Dec) import bill of palm has increased to USD 1.8 billion while value of soybean oil import has decreased as compared to USD 46.3 million in the same period of previous year. Price and quantity percentage change reveal that the price effect has been the dominant cause of surge in import value of palm oil and soybean oil (See figure: 8.4). For palm oil import value, prices represent 70.5 percent change in the value while the quantity demanded decreased by 2.7 percent. Soybean prices have increased 87.7 percent while the quantity demanded has decreased by 48.9 percent. Thus, an increase in international prices creates an additional burden on our import bill even if we import less in terms of quantity.

Figure 8.4: Price and Quantity Change (Percentage) (July-Dec 2021) VS (July-Dec 2020)



Pakistan domestic production of oil seeds especially in case of sunflower and rape seed is increasing. However, for soybean Pakistan imports dependency is 100 percent as domestic production is soybean is near to none (see figure: 8.5)

Figure 8.5: Import Dependency Ratio



Source: Food and Agriculture Organization, FAO

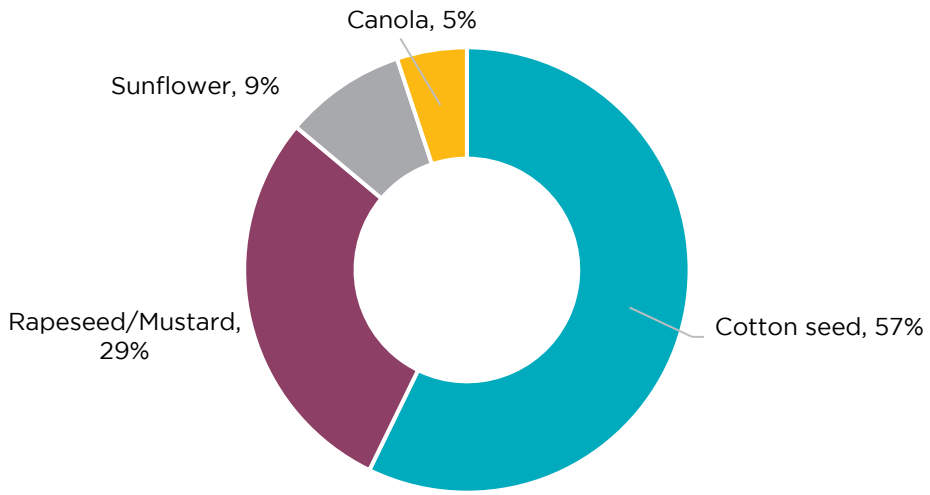
The present section highlights the need for expansion of oil seeds cultivation in Pakistan to reduce the pace of USD outflow. Pakistan import dependency ratio along with the outflow of USD 3.3 billion highlights the need for import substitution via domestic cultivation of oilseeds and changing the consumption mix by balancing palm oil and other edible oil such as sunflower oil and rapeseed (canola) oil.

9. OILSEEDS: PAKISTAN OUTLOOK

Pakistan's per capita edible oil consumption has reached to 24[8] kgs .Domestic production of oil is dependent on local produced sunflower, rapeseed (canola), cottonseed and imported seeds. The total edible oil demand of the country is around 2.7 million tons[9] of which 0.194 million tons is domestically produced while rest is being imported.

Domestic production of edible oilseed is dependent on cotton seeds, rapeseed and mustard, sunflower and canola (see figure: 9.1)

Figure 9.1: Domestic Edible Oil Production from Major Oil Seeds (% of Total Seed Production)

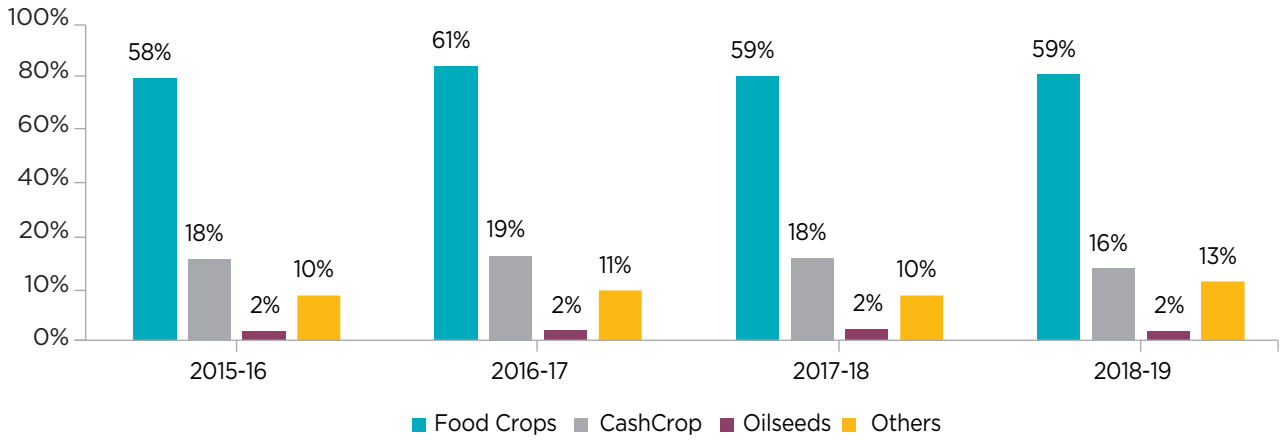


Source: Pakistan Economic Survey (2020-21)

Pakistan's distribution of agriculture land mix indicates that major share of land is devoted to food crops (59%) cultivation followed by cash crops (16%) while oilseeds have only share of 2 percent in total area under cultivation (see figure: 9.2). Cropping system in Pakistan relies on major crops such as wheat, cotton, rice and sugarcane while other crops such as oil seeds have to adjust in these crop areas. Rapeseed and sunflower are the Rabi crops while soybean is the Kharif crop. Among the major crops, wheat is the Rabi crop while rice, cotton and sugarcane are Kharif crops. Thus, farmers have to tradeoff between rapeseed, sunflower and wheat crop cultivation.

[8]Oilseeds and Products Annual, 2020. United States Department of Agriculture.
[9]Rapeseed and Mustard Cluster Feasibility and Transformation Study. Planning Commission of Pakistan, 2020

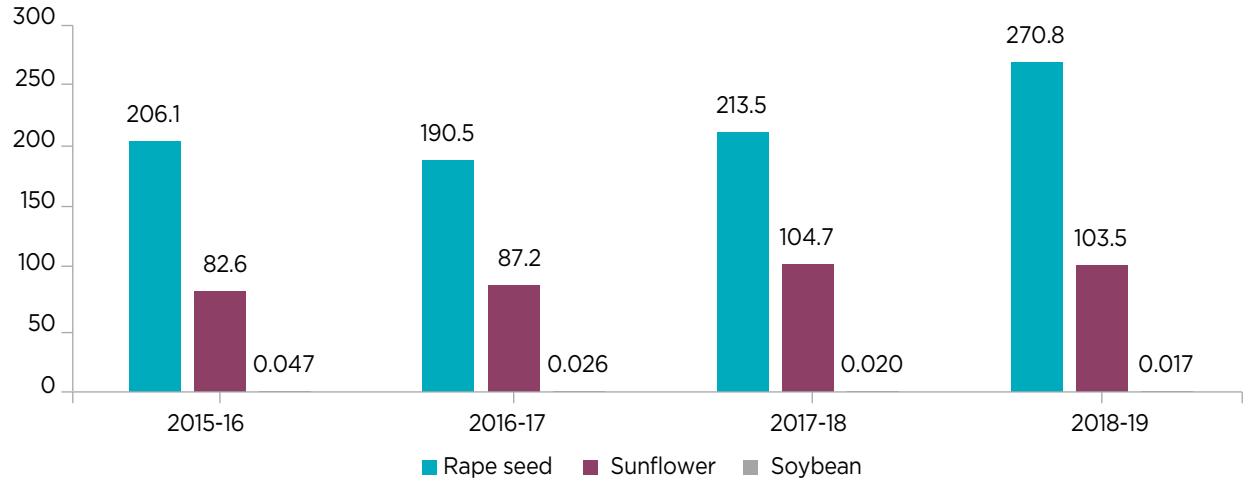
Figure 9.2: Distribution of Cropped Area (Percentage Of Total Area)



Source: Agricultural Statistics of Pakistan, 2018-19

Pakistan's total area for oilseed[10] cultivation is 0.374 million hectares. Rapeseed and mustard including canola cultivation has captured 74 percent of the total oilseed cultivated area followed by sunflower (27.7%), and soybean (0.005%).[11] (See figure: 9.3).

Figure 9.3: Oilseeds Area in Pakistan (000 Hectares)



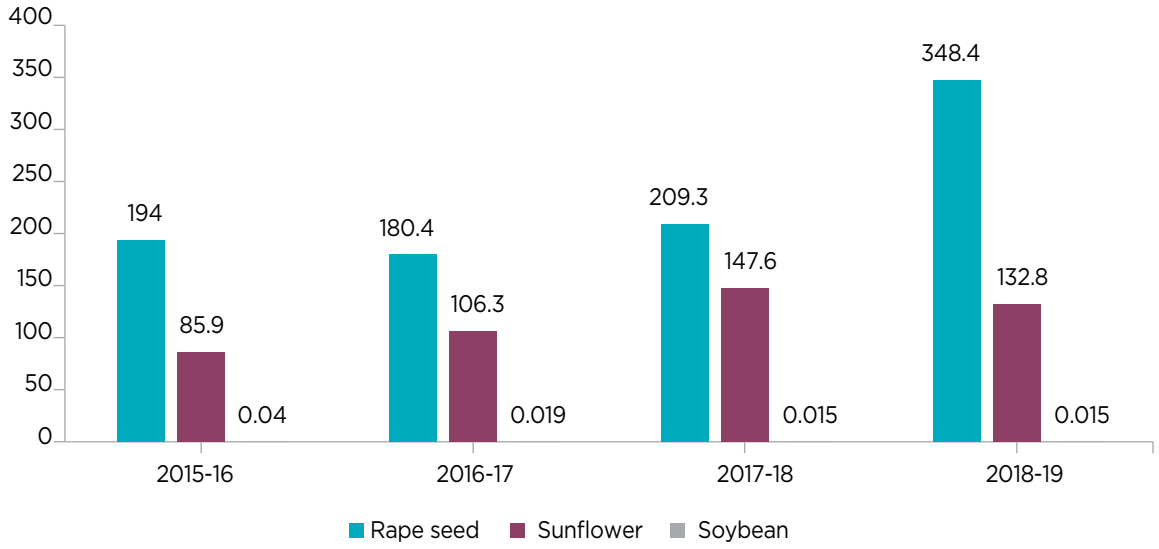
Source: Agricultural Statistics of Pakistan, 2018-19

Oilseeds production as well as yield per hectare in Pakistan is increasing in case of rapeseed and soybean while area and yield for sunflower both deceased in the 2018-19. Federal and provincial governments initiated *"national oil seeds enhancement program"* of Rs 10,176 million with provinces contribution around 40-60 percent. The subsidy amount of Rs 5000 per acres will be granted to registered farmers who grow up to 20 acres.

Despite marginal production area of soybean its yield per hectare is increasing. In case of other seeds such as rape seed and sunflower yield per hectare is above 1000 kgs/hectare (see table: 9.5) which is better than cotton crop yield per hectare.

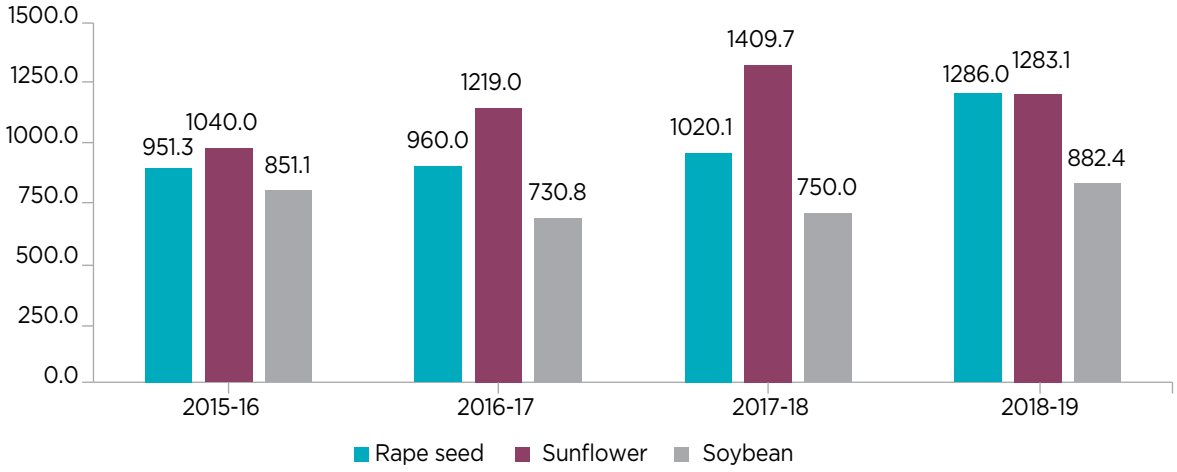
[10]Oilseeds cultivation here forth refers to rapeseed, sunflower and soybean
[11]Agricultural Statistics of Pakistan, 2018-19. Ministry of national food security and agriculture research

Figure 9.4: Oil Seeds Production in Pakistan (Thousands Tonnes)



Source: Agricultural Statistics of Pakistan, 2018-19

Figure 9.5: Oilseeds Yield in Pakistan (kgs/Hectare)



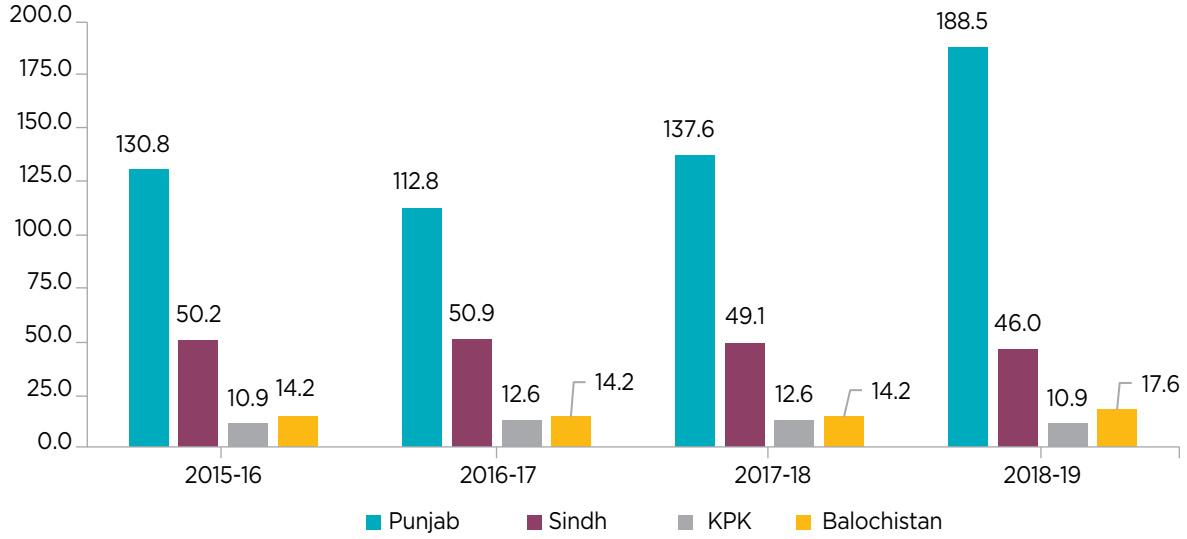
Source: Agricultural Statistics of Pakistan, 2018-19

9.1. Province-Wise Yield (Kgs/Per Hectare)

9.1.1. Rapeseed

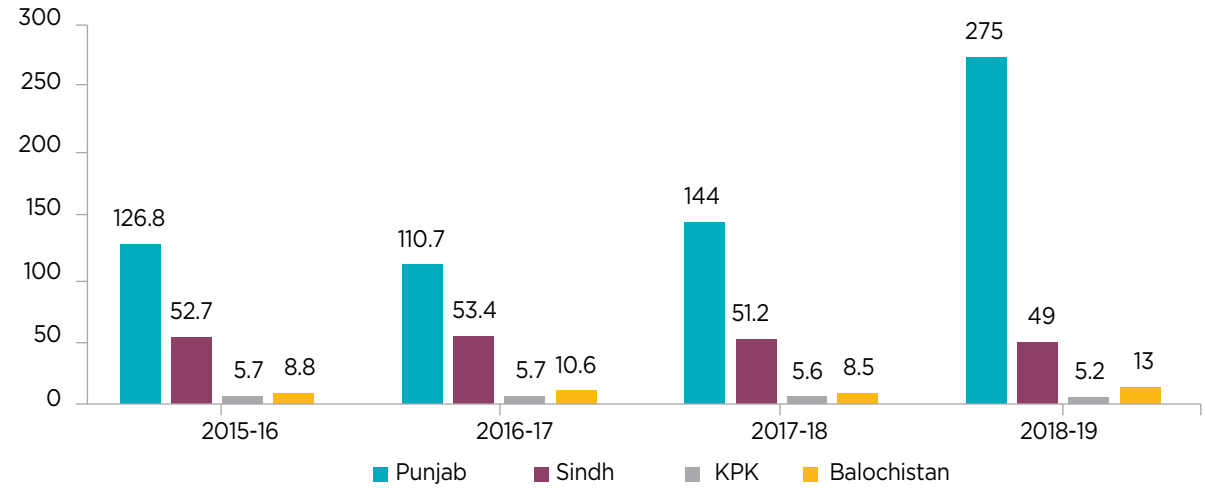
For rape seed cultivation, Punjab has the dominant share by cultivating 70 percent of total area of rape seed. Sindh cultivates 17 percent while KPK and Baluchistan have the share of 4 percent and 6.5 percent respectively in 2018-19. Rapeseed of canola type is of better quality and healthy for human consumption while its meal is also considered as better quality feed for animals. Rape seed can be substitute for palm oil as it is better in terms of quality.

Figure 9.6: Province-Wise Rapeseed Area - (000 Hectares)



Source: Agricultural Statistics of Pakistan, 2018-19

Figure 9.7: Province-Wise Rapeseed Yield (Kgs/Hectares)

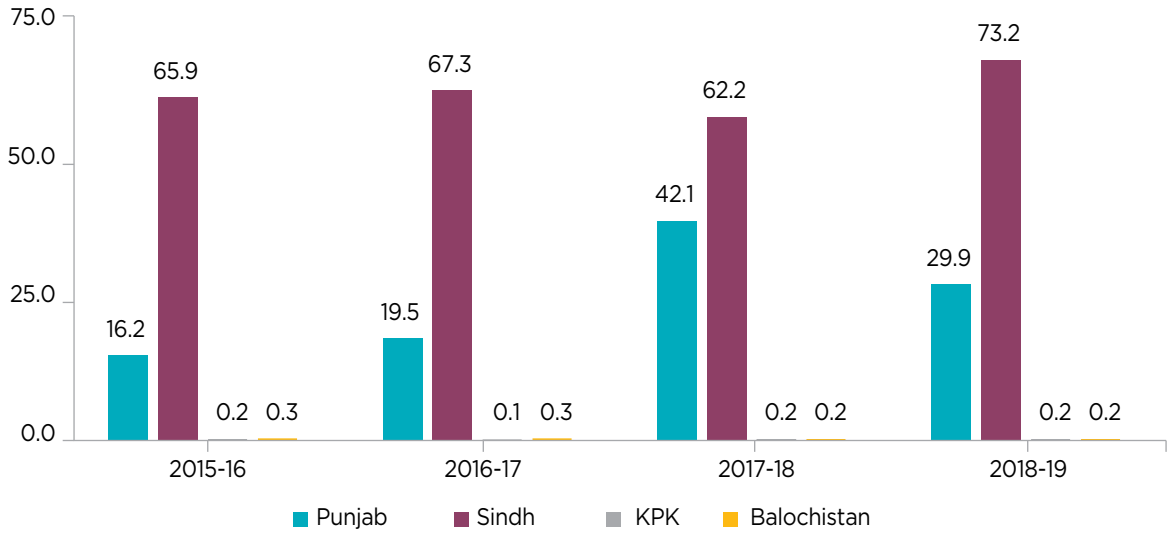


Source: Agricultural Statistics of Pakistan, 2018-19

9.1.2. Sunflower Seed

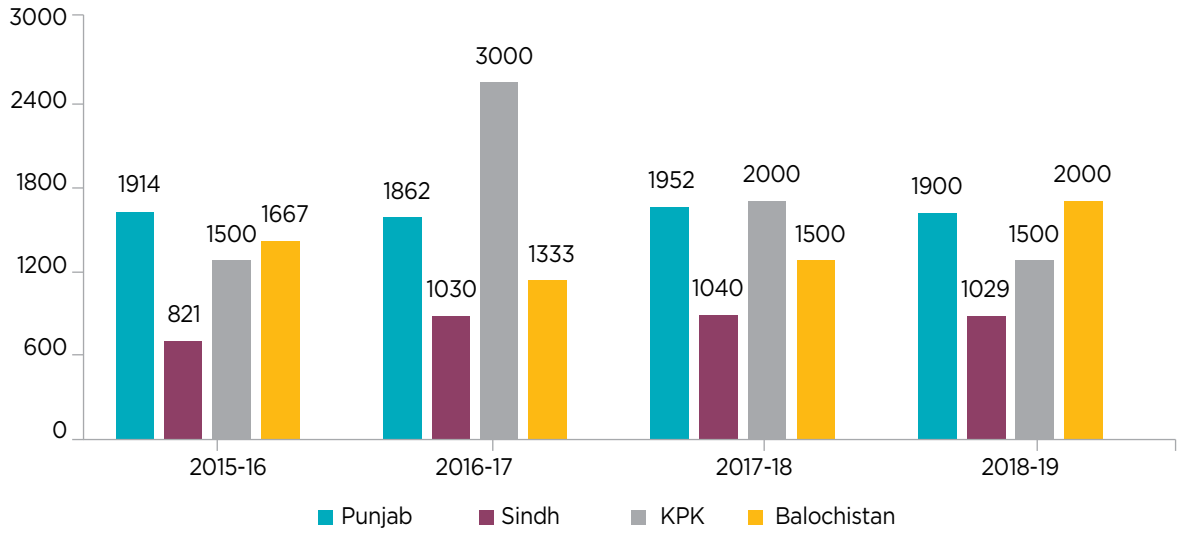
For sunflower cultivation, Sindh has the dominant share by cultivating 71 percent of total area of sunflower. Punjab cultivates 28 percent while KPK and Baluchistan have the share of 0.1 percent in 2018-19. However, yield per hectare in Baluchistan and Punjab is the highest in 2018-19 followed by KPK and Sindh.

Figure 9.8: Province-Wise Sunflower Area (000 Hectare)



Source: Agricultural Statistics of Pakistan, 2018-19

Figure 9.9: Province-Wise Sunflower Yield (Kgs/Hectare)

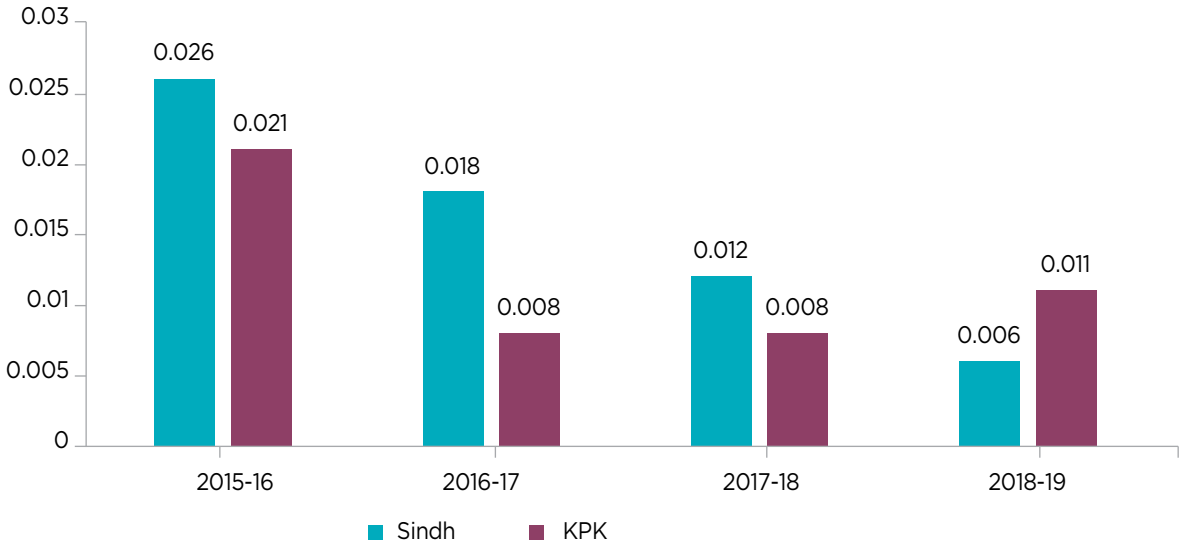


Source: Agricultural Statistics of Pakistan, 2018-19

9.1.3. Soybean Seed

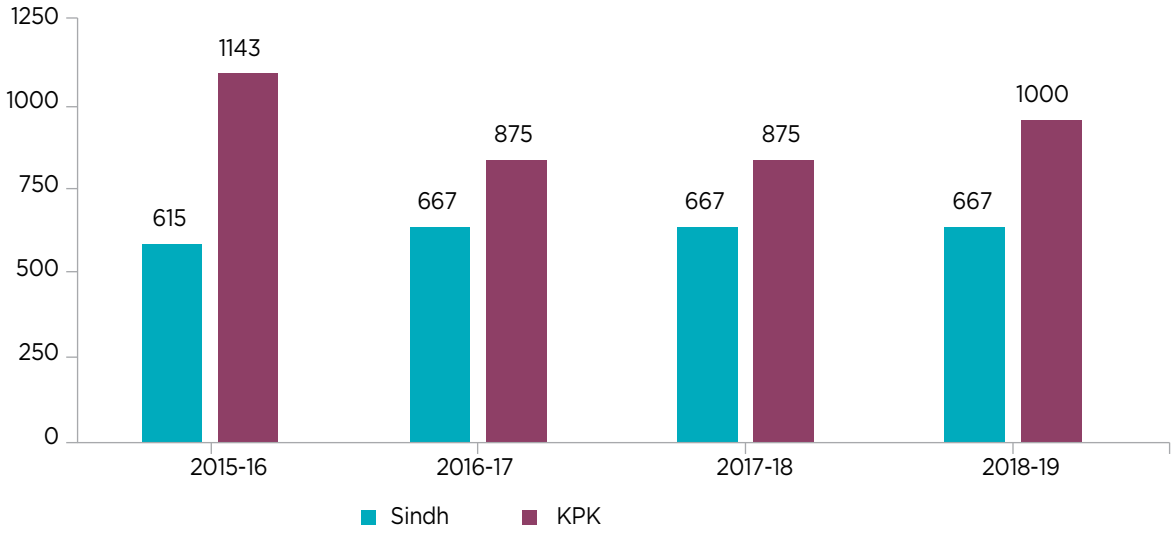
For soybean seed, only Sindh and KPK land areas are cultivated. Sindh cultivates 6 hectares while KPK cultivates 12 hectares only. For soybean yield per hectare is better and is increasing in KPK as compare to Sindh. With the given yield per hectare and by increasing land area for soybean in Sindh and KPK, soybean production can be increased.

Figure 9.10: Province-Wise Soybean Area (000 Hectare)



Source: Agricultural Statistics of Pakistan, 2018-19

Figure 9.11: Province-Wise Soybean Yield (Kgs/Hectare)



Source: Agricultural Statistics of Pakistan, 2018-19

10. EXPECTED BENEFIT OF IMPORT SUBSTITUTION

10.1. Increase in Area and Yield: Rapeseed and Mustard

We have considered the base year scenario by taking the average of past 3 years i.e. FY 2016-17 to FY 2018-19.

In our scenario we took the following assumptions;

Assumptions

Area	**Increase by 25%**
Yield	Increase by 40%
Domestic demand	Increase by 5 %
Import price of oilseeds	Increase by 5%

Results

If yield and area per hectare in Pakistan is increased by 40 percent and 25 percent respectively in every 2 years' time while demand for rapeseed (canola) of domestic market increase by 5 percent then import deficit can be turned to export surplus in 6th year when area under rapeseed production is increased to 430 thousand hectares while yield per hectare is increased to 2893 kgs/hectare[12]. Pakistan can save USD 448 million by import substitution from rapeseed. Further benefits can be reaped if palm oil is substituted for canola quality rapeseed. Total increase in area from the base year in 6 years will be 209 thousand hectares while increase in production is 1.2 million ton.

Yield can be increased by improving quality of seeds; proper use of fertilizer; use of specific seed drills and harvesting machines; instead of cultivating on small and marginal lands proper intercropping land utilization needs be ensured.

Table 10.1: Expected Benefit from Rapeseed

Years	Area 000 hectares	Yield in MT/HA	Production "000 ton"	Demand 000 ton	Demand deficit 000 ton	Price of import USD/ton	Quantity of import 000 ton	Import savings million
base year	220.2	1.054	232.19	1024	(792.1)	564.9	792.1	(447.5)
year 2	275.3	1.476	406.34	1075	(669.2)	593.1	(669.3)	(396.9)
year 4	344.1	2.067	711.10	1129	(418.2)	622.8	(418.2)	(260.5)
year 6	430.1	2.893	1,244.42	1185	58	653.9	58.5	38
year 8	537.7	4.050	2,177.73	1245	932	686.6	932.5	640.3

[12]Potential yield kgs/ hectare for rapeseed is 3500kgs/hectare (source: oilseed crops of Pakistan, Pakistan Agricultural Research Council, 2014.

10.2. Increase in Area and Yield: Sunflower Seed

For sunflower we have considered the following assumptions;

Area	**Increase by 15%**
Yield	Increase by 20%
Domestic demand	Increase by 5 %
Import price of oilseeds	Increase by 5%

Results

If yield and area per hectare in Pakistan is increased by 20 percent and 15 percent respectively in every 2 years' time while demand for sunflower of domestic market increases by 5 percent then import deficit can be turned to export surplus in 2nd year when area under sunflower production is increased to 118 thousand hectares while yield is increased to 1733 kgs/hectare[13]. Pakistan can save USD 20 million by import substitution from sunflower seed with additional amount of USD 64 million can be earned through exports. Further benefits can be reaped if palm oil is substituted for sunflower seed

Table 10.2: Expected Benefit of Import Substitution Sunflower

Years	Area 000 hectares	Yield in MT/HA	Production "000 ton"	Demand 000 ton	Demand deficit 000 ton	Price of import USD/ton	Quantity of import 000 ton	Import savings million
base year	94.5	1.238	118.15	137	(19.7)	1028	19.7	(20)
year 2	118.1	1.733	204.73	144	59.9	1079	59.9	64.7
year 4	147.7	2.426	358.3	152	206.2	1133	206.2	233.8
year 6	184.6	3.397	626.9	159	467.3	1190	467.3	556.3
year 8	230.7	4.756	1,097	167	929.5	1249	929.5	1,161

10.3. Expected Benefit of Palm Oil

Assumption:

Our analysis is based on feasibility study on Palm oil cultivation in Pakistan.[14] As per the study, in our base line scenario we assume 30 acres can grow 70 trees which can produce 500 tons of oil.

Results

If Pakistan designates 150 thousand acre area with the cultivation of 350 thousand palm trees that can generate 2500 thousand tons of palm oil then Pakistan can reduce its import bill from USD 1.9 billion to USD 306 million. Import savings of USD 1.6 billion can be achieved by substituting palm oil.

The total cost of cultivating palm tree and its extraction is round PKR 354,632.6 per acre. If Pakistan cultivates 150,000 acres it will cost USD 286 million[15]

[13]Potential yield kgs/ hectare for sunflower is 4000kgs/hectare (source: oilseed crops of Pakistan, Pakistan Agricultural Research Council, 2014.
[14]Oil-palm plantation and crude palm-oil extraction plant - feasibility study, IBA, Karachi
[15]As per study 313 acres cost PKR 111 million. The payback period of the project is 3 years with ROI of 28% in first year which increases to 130% in the 7th year.

Table 10.3: Expected Benefit of Import Substitution Palm Oil

Area (Acre)	Area (hectares)	Number of trees	Oil extraction tons	Price of import USD	Quantity of imports tons	Import savings USD
30	12	70	500	660	2,892,000	(1,909,000,000)
150	61	350	2,500	660	2,889,500	(1,907,070,000)
200	81	467	3,333	660	2,886,167	(1,904,870,000)
1000	405	2,333	16,667	660	2,869,500	(1,893,870,000)
50,000	20,234	116,667	833,333	660	2,036,167	(1,343,870,000)
150,000	**40,469**	**350,000**	**2,500,000**	**660**	**463,833**	**(306,130,000)**

11. Strategies for import substitution-oilseeds & palm oil

Short term	Medium term	Long term
Provision of high-quality seeds at subsidized rate for farmers	Procurement mechanism for oilseeds through edible oil refineries needs to be initiated	New seed varieties registration mechanism should be fast and efficient
Support price for farmers in case for oil seeds	Edible oil refineries need to invest in cultivating oilseeds on large farms	
Government to ensure access to credit specific to oil seeds for farmers	Tax breaks for oilseeds refineries for encouraging use of better technology	Crude palm oil refineries should be installed in the vicinity of oil palm plantations
Oil seeds crop insurance mechanism need to initiated to encourage farmers	Small loans to women and small, medium sized farmers in the rural areas to establish reserves to grow oil palm saplings from seeds and sell the saplings to farmers	
Sales tax on oil produced by domestic seeds need to be decreased to encourage use of domestic seeds.	Training programs for farmers to grow palm oil trees	
Need to increase the storage facilities for solvent extractors.	Government should develop model farms to demonstrate that such farms ensure payback period of 3 years with ROI of 28% in first year	

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