

PAKISTAN COTTON CROP CHALLENGES

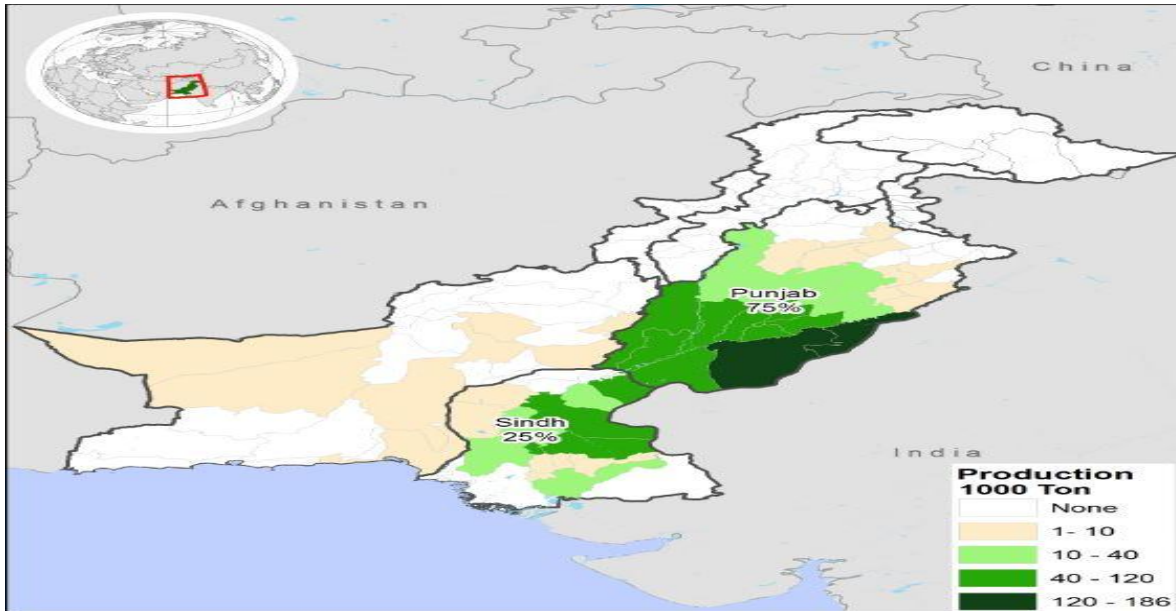
September 2020



Introduction

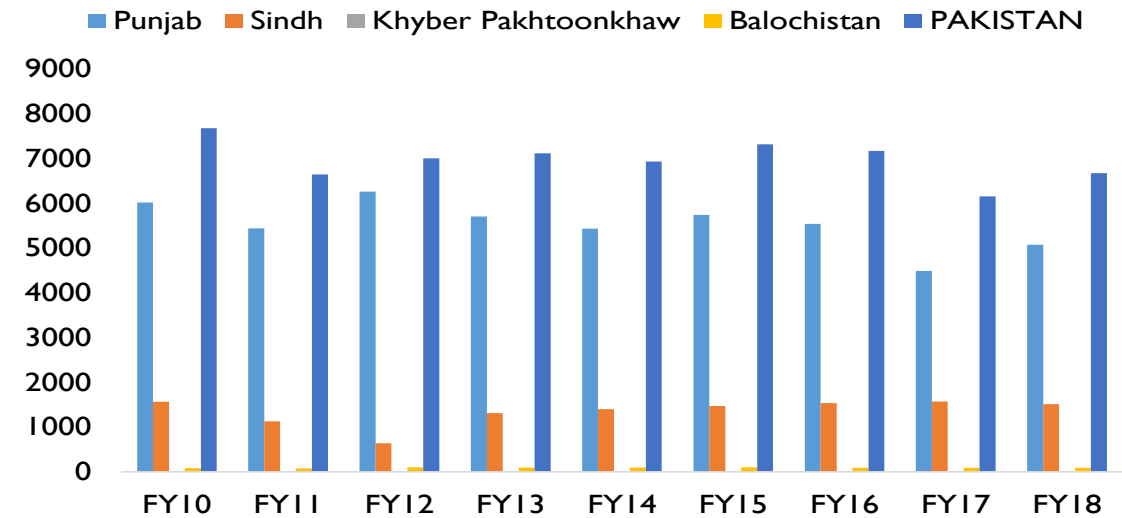
- Cotton is grown in subtropical and seasonally dry tropical areas in both the northern and southern hemispheres; however, most of the production takes place towards north of the equator.
- Cotton is grown for its fiber and seed. World cotton production currently stands at 26.4m tons of lint from harvested area of about 34.1m hectares.
- World's major cotton producing countries include India, China, United States, Brazil, and Pakistan. These countries account for more than three-fourth of global production.
- Pakistan is the fifth-largest cotton producer in the world, accounting for 6% market share in overall production in 2019.
- Cotton is a major crop of Pakistan after wheat and occupies the largest area compared to other crops, covering 15% of cultivated area in the country.
- The crop contributes about 0.8% to GDP and 4.1% of total value addition in agriculture.
- Cotton crop also helps earn the country largest export revenues as it is a direct raw material for textile sector.
- While the crop is primary grown for its fiber, cottonseed is used in manufacturing several other products such as edible oils, soap, margarine, cosmetics, emulsifiers, rubbers, plastics and pharmaceuticals.
- Cottonseed has about four-fifth share in the national production of oilseed, whereas cottonseed cake serves as one of the major sources of cattle feed to enhance milk production.

- Cotton belt in Pakistan extends over 1,200 km along with the Indus River.
- Punjab produces around 75% of country's cotton crop followed by Sindh 25%. Small quantities are also produced in Balochistan.
- Sindh dominates in per acre yield across the cotton belt while Punjab dominates in area cultivated and total annual production.
- Cotton is grown on an area of 5.1m acre in Punjab and 1.5m acre in Sindh, with annual production output of 1.4m tons and 0.64m tons, respectively.
- Major cotton growing districts in Punjab include Rahim Yar Khan, Bahawalnagar, Bahawalpur, Lodhran, Multan, Khanewal, Vehari, Sahiwal, Muzaffargarh, Rajanpur, D.G. Khan and Faisalabad.
- Major cotton growing districts in Sindh include Sanghar, Khairpur,, Benazirabad, Naushero Feroz, Badin, Ghotki, Jamshoro, Mirpur Khas, Sukkur and Umar Kot.



USDA, Foreign Agriculture Service

Pronvincial Area of Cotton (Area '000' Acres)

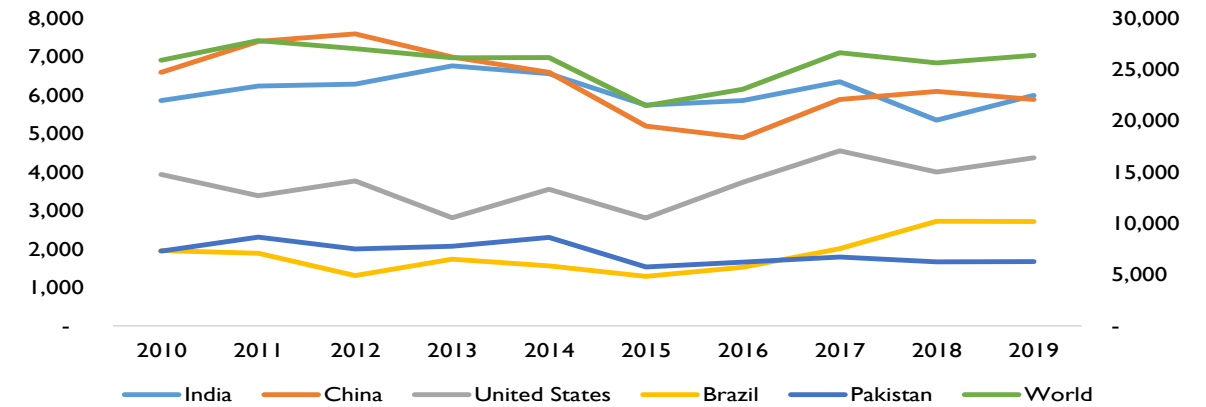


Agriculture Marketing Information Service, GoP

Cotton Crop Challenges

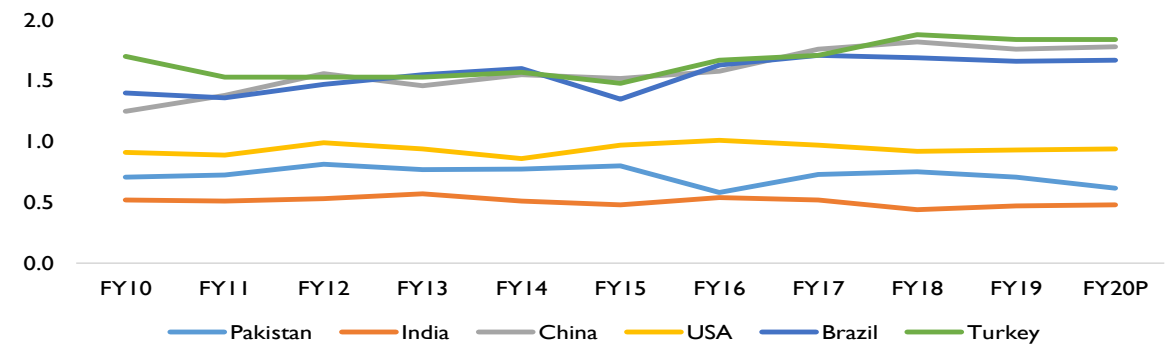
- World's cotton production has increased from 21.6m tons in FY01 to 26.4m tons in FY19, reflecting a compounded annual growth rate of 1.1%, mainly due to increase in cultivation area in India, China, and Brazil.
- Cotton production in Pakistan has steadily decreased to 1.83m tons in FY01 to 1.56m tons in FY19 due to a combination of stagnant cotton yield and shift towards more profitable crops.
- Cotton is most technical crop due to a wide range of diseases and pathological and entomological attacks, and small-to-medium scale farmers in the country find it difficult to manage. Hence, area under cotton cultivation has gradually been declining since FY10.
- Cotton yield in the country has declined to 0.62 tons per hectare in FY20. With some year-over-year fluctuation, the yield has remained largely stagnant since FY01.
- While Pakistan's yield fares well against Indian cotton yield of 0.47 tons per hectare, its significantly lower than 1.76 tons per hectare in China, 1.66 tons per hectare in Brazil, 0.93 tons per hectare in United States, 1.84 tons per hectare in Turkey and 0.79 tons per hectare in Egypt.

Global players in cotton markets ('000' tons)



Source: OECD-FAO Agriculture Outlook 2020-2029

Cotton Crop Yield of Major Producer (Tons per Hectare)



Source: OECD-FAO Agriculture Outlook 2020-2029

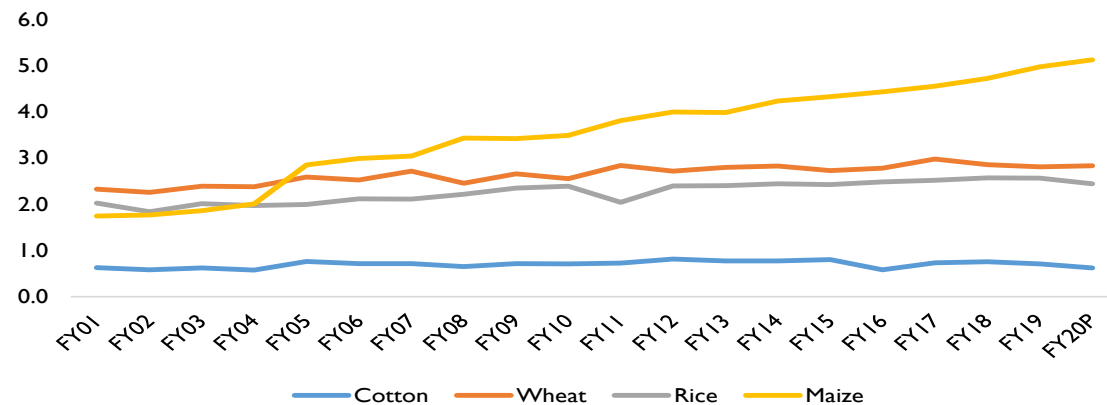
Cotton Crop Challenges

- Cotton crop in Pakistan faces many challenges, including a wide range of pest diseases, very hot weather, and shortage of irrigation water from Indus river in recent years.
- Several factors have contributed towards stagnant cotton yield, including outdated seed varieties, excessive rain at the time of sowing and high temperature at flowering stage, late wheat harvesting leading to lower area available for cultivation, and increased pest attacks.
- Cotton seed quality is a perpetual issue in Pakistan with low germination rates and weak certification.
- Transgenic cotton with genes from *Bacillus thuringiensis* (Bt) produces endospore which protects the plant against Lepidopteran insect pests.
- Genetically modified *Bacillus thuringiensis* (Bt) cotton is the most commonly used cottonseed in the world. Since its first trial in Sindh in 2002, Pakistani farmers have widely adapted the Bt cotton, covering 95% of the area.
- Pakistan is still using first-generation Bt cotton (Bt-1), while rest of the world has shifted to the third-generation (Bt-3).
- While Bt-1 positively impacted the yield in initial years, it has become fragile and less resilient to pest attacks, such as pink bollworm, American bollworm, spotted bollworm, whitefly and mealy bugs, due to excessive use of pesticides and chemicals.
- Cotton crop is highly vulnerable to Cotton Leaf Curl Virus (CLCuV) which can cause up to 80% yield loss as it significantly deteriorates the fiber values. CLCuV has remained a consistent threat for cotton crop since the last two decades as the virus mutated in 2002 and has become resistant to most of pesticides.
- Pakistan is still dependent on a back-crossed 16-year-old biotechnology which has become less virulent against bollworms and other diseases.
- Concerns about the regulatory system have prevented private companies from introducing new biotechnology products, including better quality high-yield seeds and more effective pesticides. The enforcement of the Plant Breeders' Rights Act and amendments in Seed Act may help introduce new biotech products.

Cotton Crop Challenges

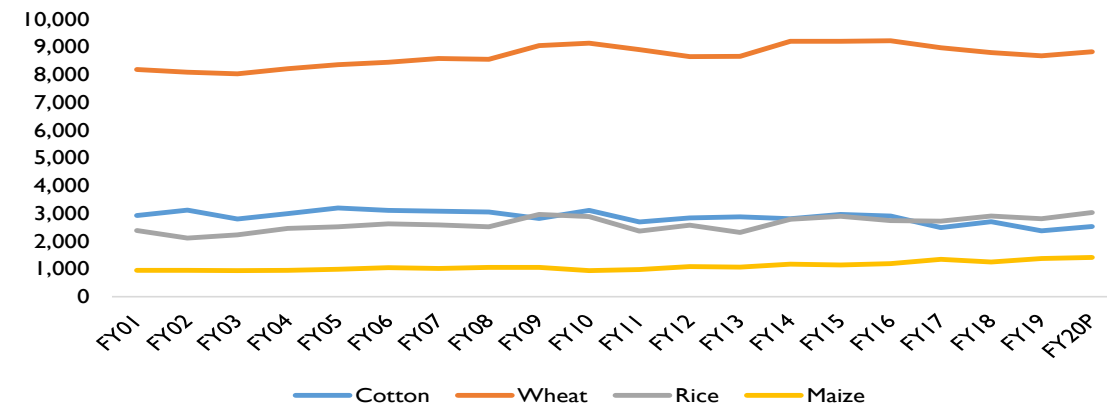
- Inefficient production methods, which create water shortage and degrade the soil, have also negatively impacted the cotton production. Providing trainings about modern production and irrigation techniques is another major challenge as there are millions of small-sized cotton farmers in the country.
- The decline in cotton production has been caused by higher cost of inputs and low returns to farmers. These factor have pushed the farmers towards more profitable crops, especially maize, wheat and rice.
- Maize is also one of the important crops in Pakistan. Area under Maize crop cultivation has increased at a compounded annual rate of 2.1% per annum over the past two decades on account of improving productivity, driven largely by the introduction of high-performing hybrid seeds. Investment in farmer education and agronomic research coupled with newer and improved germplasm contributed towards sustained increase in yield to 5,121 tons per hectare in FY2020 compared to 1,740 tons per hectare in FY2001.

Pakistan Major Crops Yeild Trend (Tons/Hectare)



Source: Pakistan Economic Survey – 2019-2020

Pakistan Major Crops Area Under Cultivation ('000' Hectare)



Source: Pakistan Economic Survey – 2019-2020

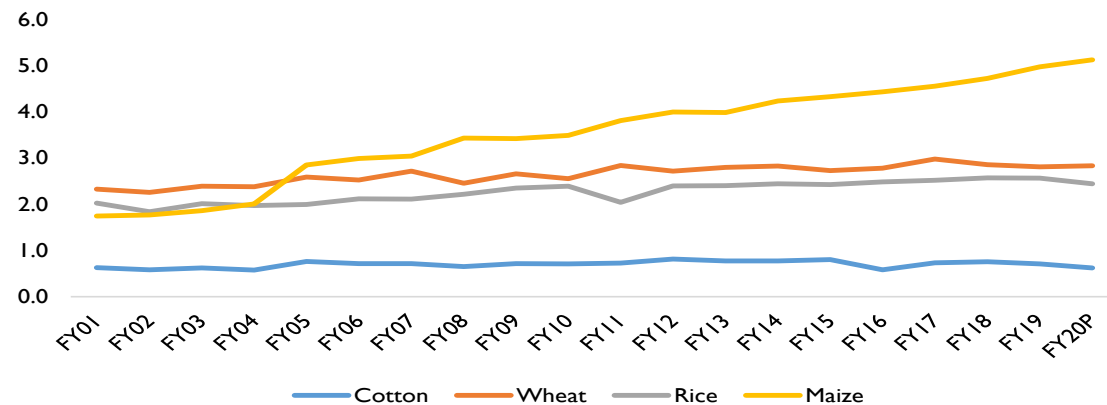
Cotton Quality Challenges

- Cotton quality is measured on four key parameters, namely Fiber Length, Strength, Micronaire – a measure of fineness, and Color Grade. Fiber length is one of the most important factors of cotton quality as both fiber strength and fineness are directly linked to its length.
- Fiber lengths are divided into; I) short-staple which is less than 24.6 mm, II) medium-staple is 24.6 – 30.9 mm, III) long-staple is more than 30.9 mm, and IV) extra-long-staple fiber is more than 33.4 mm.
- Pakistan Cotton Standards Institute is responsible for categorizing seed cotton into six grades, namely Super, Grade 1, Grade 2, Grade 3, Grade 4, and Grade 5.
- Grade Super is fully mature and healthy seed cotton which free from yellow spots and has maximum brightness. Its resulting lint cotton should have an average 77.58% degree of reflectance (Rd) and 2.39% non-lint content (NLC).
- Grade 5 is the lowest grade having large number of immature and diseased cotton seed of dull color with many yellow spots. Its resulting lint cotton should have an average 63.89% Rd and 8.65% NLC.
- Grade 3 is the base quality in Pakistan, having staple length of 26.99mm (1-1/16") and Micronaire value of 3.8 to 4.9 NCL.
- Cotton produced in Pakistan is of average quality with medium staple length while other major producers grow long staple cotton.
- The U.S.-grown American Pima cotton is considered the world's finest and extra-long staple cotton, having length of 34.93mm or above and an average of more than 38.10mm.
- Chinese cotton varieties have staple length of 29 – 31mm while staple length in India averages between 28mm and 30mm.
- Pakistan Central Cotton Committee (PCCC) is responsible for development and improvement of cotton crop. It has developed and approved around 100 cotton varieties of both Bt and local. Recently developed cotton variety Bt.CIM-775 has staple length of 28.6mm with 4.3 micronaire value.
- However, cotton quality and yield has not improved much so far due to inconsistent research and continued usage of outdated Bt-1 variety. Thereby, even newly developed cotton varieties show sub-par resistance against diseases and pest attacks.

Cotton Crop Challenges

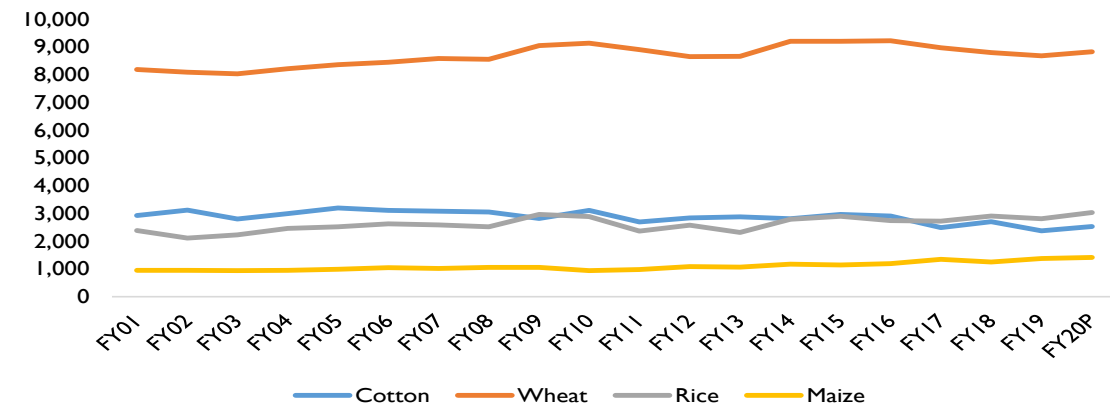
- Inefficient production methods, which create water shortage and degrade the soil, have also negatively impacted the cotton production. Providing trainings about modern production and irrigation techniques is another major challenge as there are millions of small-sized cotton farmers in the country.
- The decline in cotton production has been caused by higher cost of inputs and low returns to farmers. These factor have pushed the farmers towards more profitable crops, especially maize, wheat and rice.
- Maize is also one of the important crops in Pakistan. Area under Maize crop cultivation has increased at a compounded annual rate of 2.1% per annum over the past two decades on account of improving productivity, driven largely by the introduction of high-performing hybrid seeds. Investment in farmer education and agronomic research coupled with newer and improved germplasm contributed towards sustained increase in yield to 5,121 tons per hectare in FY2020 compared to 1,740 tons per hectare in FY2001.

Pakistan Major Crops Yeild Trend (Tons/Hectare)



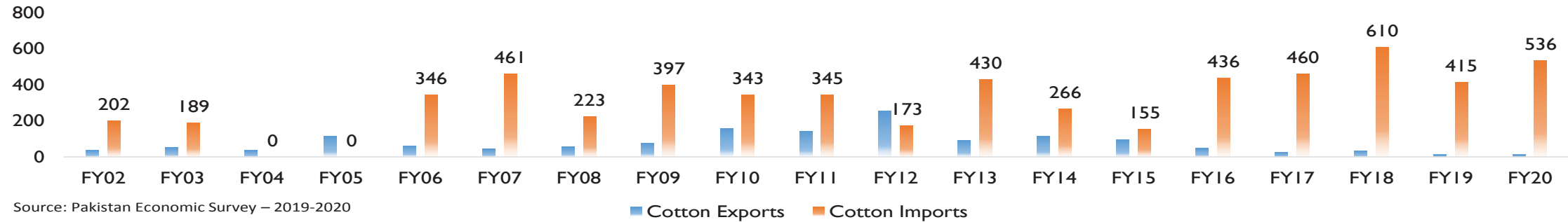
Source: Pakistan Economic Survey – 2019-2020

Pakistan Major Crops Area Under Cultivation ('000' Hectare)



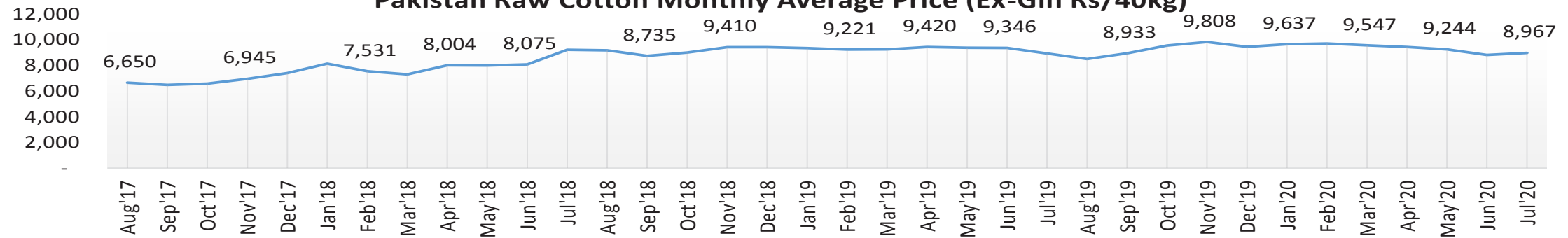
Source: Pakistan Economic Survey – 2019-2020

PAKISTAN COTTON TRADE STATISTICS (THOUSAND TONS)



Pakistan has been a net importer since mid-1990s despite indigenous cotton cultivation. Long staple is imported from the U.S., India, Egypt, Brazil, Greece and Spain for manufacturing of high quality textile products for the export markets.

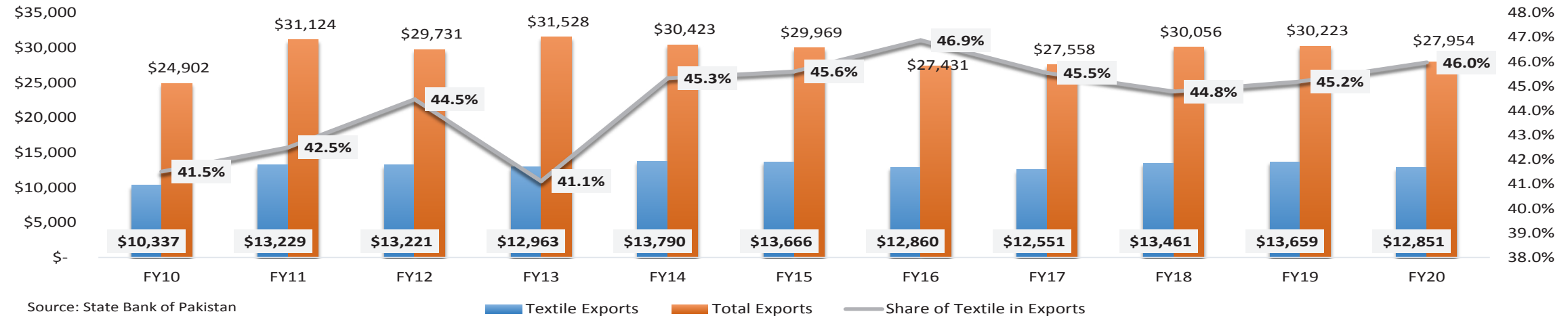
Pakistan Raw Cotton Monthly Average Price (Ex-Gin Rs/40kg)



Cotton sector is completely de-regulated in a since that there are no subsidies available in the form of support prices. Spot rates are determined in the open market on daily basis. Cotton prices normally move in tandem with the demand-supply situation.

Importance of Cotton Crop

Share of Textile Sector in Export Revenue (US\$ Million)



- Cotton crop is the lifeline of Pakistan's textile sector and plays an important role in economic activity.
- An estimated 1.6 million farmers are associated with cotton crop while textile sector, the largest industrial sector in the country, accounts for 40% of the industrial labor force and employees 10 million people.
- The cotton crop supports the manufacturing operations of 1,050 ginneries, 430 textile mills and 350 cottonseed crushers and edible oil refineries.
- The sector generates 8% of the total Gross Domestic Product (GDP) and over 50% of the foreign exchange income, which is the largest of any product. During FY20, the sector generated US\$12.9b in export revenue out of total exports of US\$ 28b.
- Inadequate technical and financial support to farmers, lack of investments in new seed technologies, declining area under cultivation and poor cotton crop yield have contributed chiefly towards stagnation of textile export revenues over the past decade.

Analyst Contact

Fahim Haider

Assistant Manager

fahim.haider@vis.com.pk