



Potential Impact of COVID-19 on the Cotton Sector in Major Cotton Producing Countries

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Cotton at harvest stage

A severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was first recognised in Wuhan in 2019 as a highly communicable virus whose origin is probably linked to the wet markets. SARS-CoV-2 causes Coronavirus disease of 2019 (COVID-19). The virus is related to the middle east respiratory syndrome (MERS) viruses, all of which belong to the family Coronaviridae. First limited to Wuhan, the disease spread across 188 countries across the globe affecting 7,690,708 people and causing 427,630 deaths as of 14 June 2020 (WHO, 2020); and the number is still growing. COVID-19 was declared a pandemic by the World Health Organisation on 11th March 2020.

Of the top 5 countries affected, USA was most severely affected with 2,032,524 confirmed cases followed by Brazil (828,810 confirmed cases), Russia (528,964), India (320,922) and UK (294,379 persons) as of 14 June 2020. Though Europe has been severely affected, the recent number of confirmed cases and deaths shows that the situation appears to have come under control, especially in Spain (243,605) Italy (236,651) where the number of new cases and deaths have reduced substantially. However, these numbers are directly impacted by the number of people being tested for the virus. It is also well known that asymptomatic persons also carry the virus.

Among the nine major countries that deal with 90% of global cotton (USA, Australia, Brazil, India, China, Pakistan, Burkina Faso, Uzbekistan, and Turkey), Brazil and Australia had to pick cotton during the pandemic peak, while other countries have completed sowing in April-May and are either planting now or preparing to sow cotton.

Death is one of the indicators of the severity of this pandemic. Amongst the major cotton growing countries, the following

have been worst hit with the highest number of deaths as on 14 June 2020: USA (114,456 deaths), UK (41,662), Brazil (41,828), Spain (27,136), Mexico (16,448), India (9,195), Iran (8,730), Russia (6,948), Turkey (4,792), China (4,645), Pakistan (2,632) and Egypt (1,484). Disease progression and deaths have flattened in most other countries at the time of writing this report.

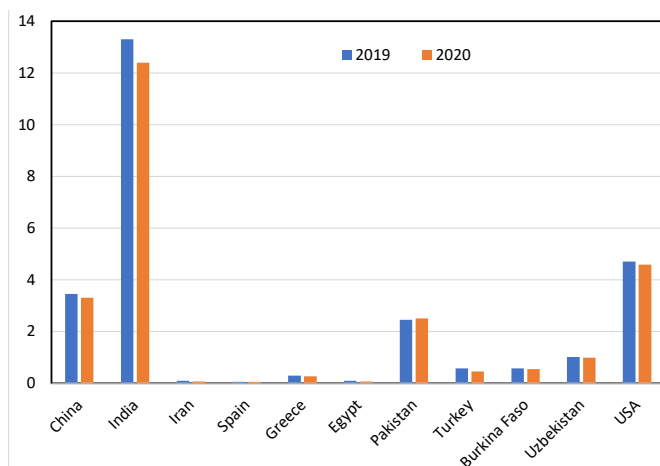
COVID-19 has affected the entire supply and value chains of cotton sales/procurement, trade, ginning, spinning, weaving, designing, apparel making, marketing and sowing for the next season. However, cotton production of the 2019-20 season has been least affected as more than 80.0% of cotton in India was harvested before the lockdown that was enforced on 24 May 2020. Countries in the southern hemisphere have just harvested cotton while countries in the northern hemisphere started sowing from April onwards. Inputs such as herbicides and fertilizers are crucial around sowing time. Many countries rely on import of inputs to meet their domestic needs in cotton farming. Imposition of lockdown and closure of airspace is expected to impact transportation of inputs. Cotton trade has been severely affected as brands are either cancelling or holding up orders. Cotton prices crashed to less than 55 cents a pound and this was associated with a crash in the prices of oil. On a positive note the demand for cotton masks increased and companies that manufacture personal protective equipment including face masks were able to continue their business operations during the pandemic.

It is important that governments devise policies and take responsible decisions for the welfare of the cotton producer and the textile sector, particularly in the poorer countries so that employment and livelihood are ensured.

Cotton sowing from April to July 2020

Cotton sowing is one of the most labour-intensive processes particularly in the developing countries, where farmers resort to mechanised land preparation and manual or semi mechanised sowing. A delay in sowing, impacts the quantity and quality of final yield and also renders the crop susceptible to pests and diseases thereby increasing the cost of production.

China, India, Iran, Spain, Greece, Egypt, Pakistan, Turkey, Burkina Faso, Uzbekistan and USA sow cotton between March and May. With the restrictions of lockdown and social distancing, agriculture though considered an essential service by most governments across the world, is being affected to varying extent. This is particularly true of India, Pakistan, and China where availability of manual labour, timely availability of good quality seeds and other inputs such as insecticides, herbicides and fertilizers are crucial for cotton sowing.



Graph. 1. Estimated cotton planting (million hectares) in March-July* 2020

China

Area, production, productivity and input use

Cotton in China is cultivated in the Yellow river valley and the Yangtze river regions covering Xinjiang, Hebei, Shandong, Hubei, Huwan and in a few other provinces in the eastern region. Of this, Xinjiang region cultivates nearly 85% (1,960,000 Ha with a production of 5.10 million tonnes) of cotton grown in China. The area under cotton in the year 2020/21 is expected to decrease by 0.6%. The decline in area particularly in the Xinjiang region was attributed to increasing land rents and decline in seed-cotton prices by 14.5%. Cotton cultivation in the other regions of China is not very remunerative as labour required for handpicking of seed cotton is expensive. With an area of 3,230,000 Ha, China demonstrated seed cotton

productivity of 1,710 Kg/Ha of lint while the total production is 6,020,000 tonnes. China cultivates *Bt*-cotton and imports 12% of the cotton seeds that are sown. Planting is manual. China spends US\$ 755/ha on fertilizers, US\$ 250/ha on insecticides and US\$ 40/ha on herbicides (ICAC Cotton Data Book, 2020). China plans to import one million tons of cotton apart from other agricultural commodities like corn and soybean beginning October 2020 from the US as part of the trade agreements (He *et al.*, 2020). Interestingly, US contributed 54.3% of the share of cotton imports into China in 2017 first quarter as compared to 20.3% in the first quarter of 2020 (USDA, Gain Report CH2020-0047, 6 April 2020).

COVID-19 pandemic and cotton production in China

The Xinjiang Production and Construction Corps, known as XPCC or Bingtuan specialising in mechanised cotton harvesting, supports cotton production in the Xinjiang region. 'Dwarf, dense, early' is the core technology supported by film mulching and drip irrigation.

China's responses to support cotton production in the backdrop of COVID-19, as of the 20th April 2020 are as follows: The Government and the Industry expedited supply of inputs to farmers particularly in the Xinjiang region. In Hubei, farmers were encouraged to raise nurseries for transplanting in late May and early June.

The China crop protection industry association reported that pesticide production is back to 70% of its normal production in 1400 enterprises and this was facilitated due to the lifting of lockdown. Almost all the key seed enterprises have returned to work with a production capacity reaching 62%. Enterprises producing urea, diammonium phosphorous, potassium and compound fertilizers have reached operation of up to 69, 61, 88 and 51%, of their full capacity, respectively. A recent report from the World Bank, seems to indicate otherwise; fertilizer prices dropped 5% in the first quarter of 2020. Hubei accounts for nearly one fourth of China's capacity to produce DAP, suffered severe



production constraints due to paucity of labour, a direct effect of the lockdown. Production rates of DAP fell by 20-30% which resulted in a price gain of 7.5% in the first quarter of 2020. Urea and potassium fertilizers suffered price drops of 2.7 and 8% in the same quarter (Baffes, 2020). The Chinese government offered a tax rebate on companies manufacturing more than 370 pesticide variants, as an incentive. A tax rebate of up to 13% was given to companies on manufacture of exported chemistries (David, 2020).

India

Cotton area, production, productivity and input use

Cotton is cultivated in 12 to 13 million Hectares with a production of about 6.5 million tonnes and a productivity of about 500 Kg lint/ha. Cotton is cultivated in 35% irrigated area and rest of the area under rainfed conditions. The crop is grown in 1.5 to 1.6 million hectares in north India under irrigated conditions. Cotton is planted in April-May in north, June-July in central region and July-September in southern India. Late sown cotton is often affected by the leaf curl virus disease in north India and sap-sucking pests and bollworms in other parts of the country that results in yield losses. Timely sowing of cotton in north India is facilitated by supply of irrigation water on time, availability of seeds and timely harvest of wheat. Timely sowing of cotton in rainfed regions depends on timely arrival of monsoon, availability of labour for land preparation and access to seeds and fertilizers.

Impact of COVID-19 on cotton production

Irrigation water for cotton sowing is supplied to farmers' fields through canals. These canals need to be de-silted on time, every year. Usually de-silting is carried out in February-March and was carried out before the lockdown. Rabi wheat needs to be harvested by mid-April as cotton sowing follows wheat harvest. With lockdown in place, wheat combine harvesters failed to move between states thereby causing a slight delay in wheat harvest, due to man



and machine crunch. Also, the extended winter season and off-season rains delayed wheat harvest by at least 2 weeks.

Due to an extreme crunch in the availability of rural labour due to the lockdown (Bhagat et.al., 2020) and implementation of standard operating procedures as social distancing at market yards, both harvesting and marketing of wheat was impacted which in turn delayed cotton sowing in a few parts of north India. Cotton in north India is also partly sown by machines while in central India, sowing is done manually. Cotton is sown after wheat or mustard in North India, the former being the dominant sequence covering about 11% of the cultivated area in just Punjab (Singh et al, 2019). While cotton sowing has been completed in time in fields where mustard was harvested, cotton sowing after wheat harvest in May was delayed. Seed production of hybrid *Bt*-cotton is carried out mostly in South India and the seeds are processed, packed and transported to north India. Working under constraints of labour shortage, seed companies managed to transport seeds to main locations in north India using special train services. Of the 1.27 million packets of *Bt*-cotton hybrid seeds, 0.33 million packets reached farmers directly through home delivery services.



To minimise the impact of the lockdown on cotton sowing, the Ministry of Agriculture and farmers welfare ensured the availability of *Bt*-cotton hybrid seeds in north India well in time. It is worth mentioning here that the Indian railways played a remarkable role in facilitating timely transport of seeds and fertilizers during the lockdown (Kulkarni 2020). Indian Railways operated 67 routes for Special Goods Trains for perishable commodities including fruits, vegetables, milk and dairy products and seeds for agricultural purposes. About 1.0 million migrant labourers from the north Indian states of Uttar Pradesh, and Bihar form the backbone of paddy transplanting in Haryana and Punjab. In order to circumvent labour shortages, the government of Punjab suggested diversification of crops from skilled labour-oriented crops such as rice to the cultivation of maize and cotton which can be managed with local labourers. By the mid-June 2020, cotton sowing was completed in 1.68 million hectares in north India with 0.49 million hectares in Punjab 0.47 in Rajasthan and 0.72 million hectares in Haryana.

The cotton corporation of India (CCI) procures seed-cotton at the minimum support price (MSP) as stipulated by the government of India. Despite the constraints imposed by the lockdown, the CCI procured seed cotton equivalent to 1.7 million tonnes of cotton lint during the period October 2019 and May 2020. It is unlikely that procurement process of the remaining harvest would be completed before monsoon sets in given that 44,000 farmers are enlisted to sell their cotton in just one district of Vidarbha. As a result, farmers are resorting to distress sales at less than 50% of the prevailing MSP (Balwant Dhage, 18 May 2020, Times of India).

The Indian government launched a virtual marketing facility, e-NAM (National Agricultural Marketing) to enable farmers to sell their produce online, ensuring minimal human contact during the process of transportation and selling of the produce thereby circumventing the need of physical market yards and the Agriculture Produce Marketing Committee, (<https://enam.gov.in/>)

Farmers preparing for kharif sowing have been hoarding fertilizers as per the reports of the Fertilizer Association of India. Data from the department of fertilizers confirm that the all India nutrient sales were 2.06 million tonnes in April 2020 as compared to 1.5 million tonnes in April 2019 and 1.3 million tonnes in April 2018. Fertilizer hoarding may have been a consequence of speculations of impending shortages and a possible price escalation.

Pakistan

Cotton area, production, productivity and input use

Cotton cultivation is carried out over an area of 2.4 to 3.0 million hectares with a production of 1.4 to 2.4 million

tonnes at a productivity of 600 to 800 Kg/ha. Sindh and Punjab together cultivate about 2,400,000 ha, with the latter accounting for 70% of Pakistan's cotton. The area under cotton in Pakistan was 2.45 million hectares in 2019-20. This year, the government encouraged cotton acreage and the area increased to 2.6 million hectares. Inputs such as seed, fertilizer, pesticide costs are 27, 104, 104 US\$ per hectare, respectively. The cost of cultivation is US\$ 855/ha and production cost is US\$ 1.22/Kg of lint (seed value included) and US\$ 0.32/Kg of seed-cotton. (ICAC Cotton Data Book 2020).

COVID pandemic and cotton production

The Government of Pakistan fixes the support price for cotton (Rana, et. al., 2020) which has been fixed recently at Rs. 4,224 per 40 Kg seed-cotton (US\$ 64 per 100 Kg) for this season as a result of which cotton area increased slightly to reach 2.6 million hectares despite the lockdown which impacted the availability of *Bt* varieties in the form of acid de-linted-pesticide treated seeds. The government arranged for certified fuzzy seed bags of 20 Kg, at Rs.4300 (US\$ 27) instead of Rs.6,500 (US\$ 41.6). Similarly, certified acid de-linted 10 Kg seed bags were available at Rs.3,300 (US\$ 20.6) instead of Rs. 5,250 (US\$ 32.8). Good quality seeds were provided by the Punjab Seed Corporation and Central Cotton Research Institute, Multan.

Several committees with representatives from all stakeholders including farmers were set up to ensure quick approval of new varieties, bring about reforms in the seed sector, strengthen research in the cotton sector so as to revive the cotton economy in Pakistan. In addition, the government continues to provide subsidies on power, seeds, inputs and irrigation for cotton. Spinning mills have not been



operating to full capacity as a consequence of the lockdown; the cotton sector was affected due to cancellation of orders by leading apparel brands and ginning activity was low.

The government has also provided access to subsidised loans and liquidity through the banking sector at low interest rates. However, textile mills urge the deferring of electricity bills for 3 months and for providing tax holidays as short-term measures to tide over the pandemic. A recent book chapter (Rana et.al., 2020) suggested policies, which if implemented by the government, could have positive impacts on cotton cultivation and pricing in Pakistan. These include announcement of a minimum support price which could in turn motivate farmers to plant cotton on larger area and government subsidies toward targeted inputs thereby ensuring farmer's profits. Unrelated to this, farmers have been alerted about an impending attack of locusts (Chohan, 2019). Assistance for locust management has been sought from China in the form of pesticides and training for its management. A recent report suggests that germinated cotton seedlings in Multan and many other parts of Pakistan have been devastated by a locust swarm.

Turkey

Area, production, productivity and input use

Turkey is an important producer and consumer of cotton. The textile industry employs about 1.3 million persons including unregistered workers in manufacturing, distribution and marketing. It is a significant exporter of cotton to Europe and Bangladesh and cotton products to Europe. It also imports fine cotton from USA, Brazil and Greece. Cotton is exported at 1.1% of the total exports amounting to US\$ 1.83 billion (2018) while it imports cotton up to US\$ 2.51 billion. Turkey also exported 40,000 tonnes of hydrophilic cotton for medical purposes. Turkey produces 10,000 tonnes of organic cotton which was expected to increase to 15,000 tonnes in the current 2020-21 season. Turkey does not permit cultivation of *Bt*-cotton or permit aerial sprays of pesticides.

Cotton planting is carried out between mid- March and mid- May. The private sector today provides almost all the hybrid cotton seeds in Turkey. Cotton is cultivated in 3 regions (GAP region, Cukurova region and Aegean region) and the most dominant region is the GAP region that accounts for about 60.0% of the cotton acreage. For some time now, several steps were taken by the Government to benefit cotton production in Turkey. In the GAP region, dams and irrigation channels were constructed that were expected to facilitate an irrigated area of 650,000 hectares of land. Open canal system of irrigation was replaced with closed systems. Financial assistance and technical guidance for drip irrigation was provided by the government. Government incentivised cotton production by giving a bonus of 0.8 lira (US 12 cents) for every kilogram of cotton

that was produced. In order to step up domestic consumption, licensed storage facilities were set up in GAP and Izmir for 15,000 tonnes and 10,000 tonnes respectively. Turkey has about 1,297 harvesters and cotton is machine picked. It also has about 550 roller gins that are privately owned. Better cotton initiative has facilitated 29% higher yields over the previous year through sustainable practices and has helped Turkey meet its domestic textile industry demands.

Turkey spends US\$ 77, US\$ 400, US\$ 546 and US\$ 26 per hectare on seeds, fertilizers, pesticides and manpower. The cost of cultivation is US\$ 413 per hectare and the production cost is US\$ 1.55 per kg of lint (including seed value) and US\$ 0.59 per kg of seed-cotton (ICAC Cotton Data Book 2020). Turkey imports fertilizers from Iran.

COVID-19 pandemic and cotton production

COVID-19 remedial measures have recognised agriculture as an essential activity in Turkey. Despite supportive policies enacted by the government, the COVID-19 crisis led to a 21.0% decline in the sown acreage to reach about 0.44 million hectares compared to 0.57 million hectares in 2019. Aging farmers (65+) are restricted by law from doing farm work. In addition, farmers have requested for interest deferral on loan payments for 3 months and extra financial assistance to overcome inflation. Prices of agricultural inputs that are largely imported by Turkey have increased—seed prices increased by 19%, fertilizers by 18% and pesticide prices by 8%. On the other hand, price of cotton in Turkey has fallen 29.02% as compared to last year largely due to COVID-19. The Government promotes crop rotation every three years to protect soil quality and incentivises the practice through financial support. Incidentally 2020-21 is the year for a farmer to rotate crops in order to get government support. Turkey imports wheat, corn, barley, cotton,



lentils, paddy, chickpea, soybean and sunflower. With the pandemic, Turkey realised the need to become self-reliant (Mustafa, 24 April 2020, Al-Monitor). Low yields and low cotton prices, better returns from alternate crops and the rotation rule are the major reasons for the decrease in planting area in this year.

Uzbekistan

Cotton area, production, productivity and input use

Cotton and wheat continue to account for 70 percent of the total agricultural area, the same as ten years ago (Petrick and Djanibekov (2016)). Uzbekistan cultivates cotton in 1.0 million hectares or more with a production of 0.7 to 0.8 million tonnes of lint. Cotton seeds are sourced locally and are manually planted. The country uses 351 Kg/Ha of nitrogen, 70.4 Kg/Ha of phosphorous and 20.2 Kg/ha of potash. Uzbekistan developed a new concept of cotton textile cluster, that are privately owned, where advanced technologies such as use of high-quality seeds, drip irrigation, installation of high-end gins were expected to increase yields. These clusters were meant to facilitate the integration of supply and value chain for attractive foreign investments and enable the utilisation of domestic good quality cotton to produce yarn and fabric. Fifty-eight clusters were set in 2019-20 to cover 30% of the cotton area in the country. It is now proposed to expand such facilities to 80 clusters with 43 new gins. Foreign investors in these clusters have been given a tax-rebate, customs benefits and land to cultivate and convert superior quality cotton into value-added products. According to a World Bank report, Uzbekistan proposed value addition to all of its domestically produced cotton by 2025.

The area under cotton in these clusters has been projected to reach 1.1 million ha, an increase by 13.3% as compared to 2015. Land is being diverted to food, fodder and oil-seeds. Any decrease in cotton area is expected to be compensated by an increase in yield through the adoption of high-end technologies.

COVID-19 pandemic and cotton production

Despite the strict restrictions imposed due to COVID-19, cotton planting was almost near normal with a slight decrease of 2-3% compared to 1.0 million hectares in 2019. The cotton pledge with 300 signatories from the industry had decided not to source cotton from Uzbek cotton fields until the govt ended the practise of forced labour in the cotton sector. Almost one third of adult population is involved in harvesting cotton manually in Uzbekistan (ILO 2017). The use of forced labour in cotton picking has declined by 40% in 2019 over the previous years (Shaku, 15 May 2020 Intellinews.com). COVID-19 has resulted in problems of unemployment and migration coupled with

huge costs associated with health and economic losses. The lifting of the cotton pledge to support the economy was requested by the Government, as the pandemic swept through countries. This request was made in light of the roadmap to end forced labour in cotton fields. Cotton and wheat quotas were requested to be abolished, to permit the "freedom to farm" to raise the profitability of the sector (Petrick and Djanibekov, 2019).

Brazil

Area, production, productivity and input use

The cotton area in Brazil expanded from 975,000 hectares in 2014-15 to 1.68 million ha in 2019-20 and was predicted to cross 1.7 million Ha in 2020-21. The increase in cotton area is attributed to an increase in agricultural land, investment in costly equipment with enhanced capacities which was associated with increased global consumption of cotton, despite high prices. Mato Grosso and Bahia cultivate about 90% of Brazil's cotton.

Studies carried out by the Institute of Agricultural economics revealed that production costs were expected to decrease in 2020-21. This decline was attributed to reduced use of pesticides including herbicides and fungicides associated with a decline in global prices. More than 95% of cotton sown in Brazil is genetically engineered with approval of 23 genetically modified (GM) events. Drought tolerance and insect pest tolerance traits in a few crops have demonstrated higher yields particularly under unfavourable conditions. A production of 2.88 million tonnes was possible due to various technological interventions such as the use of genetically engineered cotton and 7.0% increased use of fertilizers. Incidentally, 77% of fertilizers used domestically in Brazil are imported. Brazil is the largest importer of fertilizers, importing 4.65 million tonnes of N, 3.20 million tonnes of P and 6.03 million tonnes of K (FAOSTAT, 2020). In cotton fields, Brazil uses about 0.16 million tonnes of N, 0.17 million tonnes of P and 0.14 million tonnes of K (ICAC Cotton Data Book 2020).

COVID 19 pandemic and its impact on cotton production

Cotton production in Brazil was least affected directly by the COVID-19 pandemic because harvesting for the season was completed. By the time the pandemic hit Brazil, the cotton meant for export filled ports beyond capacity as strong demand and excessive rain were expected to impact harvest and transport of cotton. In fact, exports were less affected too with Brazil exporting the highest amount of cotton in its history in a single month just before the pandemic. By the end of May 2020, Brazil had already exported 1.6 million tonnes of cotton, about 60.0% more than the quantity exported in 2018-19 before the pandemic unfolded.

Despite turbulence in cotton prices to less than 50 cents a pound of cotton, Brazil was less affected because the value of its currency was less affected. China and US inked a Trade deal in mid-January that mandated China to procure cotton from US, thereby impacting Brazil adversely. Brazil was ahead in the use of drones and digital technologies in their production and agribusinesses. (Seleiman et.al., 2020).

Also, negotiations on cotton marketing are made by merchants with the producers even before the planting season, thus minimising losses to the producer at the end of the season in face of unexpected eventualities. Whether such negotiations are affected remains to be seen as Brazil becomes the 2nd worst hit country by the pandemic in terms of number of positive cases and mortality.

Egypt

Cotton area, production, productivity and input use

Cotton acreage in Egypt was expected to decrease by 35 % in the year 2020-21 from 100,000 ha to 65,000 ha. Egypt was expecting to harvest 337,000 tonnes in 2019-20 but reduced the estimate to 305,000 tonnes. The reduction was due to whitefly infestation on account of growing cotton and tomato together. Low quality seeds also impacted yields.

The seed, fertilizer and pesticide costs in Egypt are US\$ 43, US\$ 265 and US\$ 434 per hectare respectively. The cost of cultivation is US\$ 1,991 /ha while the cost of producing 1 Kg of lint is US\$ 0.59 per Kg seed-cotton (ICAC Cotton Data Book, 2020). Egypt cultivates extra-long staple (ELS) and long staple cotton under irrigation where planting and harvesting is manual. To improve cotton quality, the government of Egypt took over the production and distribution of seed in 2017. The choice of the variety and where it is grown within the country is determined by the government to prevent admixtures of seed. Giza 96 is the best quality ELS variety while Giza 94 is the most popular long staple cotton that occupies about 60% of the area.

The Egyptian textile industry consumes 40,000 tonnes of domestic grown cotton in addition to importing of 23,000 tonnes of lint. In previous years the government of Egypt paid textile industries in advance so that they could buy cotton at a government announced price, from the growers. This practise was discontinued, and the government announced an indicative price expecting the textile industry to procure cotton from growers at the indicative price. Last year the Government did not announce an indicative price, and this is expected to have a negative impact on the 2020-21 season.

Egypt was expecting to install 3 ginning factories and had given guidelines to industries to continue with the work following all the precautions.

Greece

Cotton area, production, productivity and input use

Cotton is cultivated in 4 major locations- Thessaly, Makedonia, Thraki and Stereo Ellada that together cultivate cotton over an area of about 0.28 million hectares, with a production of 0.34 million tonnes. More than 90% of the cotton area in Greece is irrigated. Compared to 2018-19, cotton area increased by 16.3 % in the year 2019-20. The seed is locally sourced (95%) and seed cost incurred by the farmer is US\$ 100 per hectare that is less than half of the global average US\$ 200-344 per hectare. The cultivation cost is US\$ 1,826 per hectare with fertilizer cost at US\$ 222 per hectare and pesticide cost at US\$ 441 per hectare. Incidentally, a few herbicides and acaricides were granted special exemption by the government for use in cotton recently. The production cost is US\$ 0.56 per kilogram of seed-cotton. Greece consumes 16,000 tonnes and exports 303,000 tonnes of lint to Turkey, Egypt, China and Indonesia. Cotton sowing takes place during March and April, while it is harvested during October to November. Reports indicate that sowing operations were near normal and cotton was sown in about 0.28 million hectares as usual.

Iran

Cotton area, production, productivity and input use

Cotton is cultivated in about 90,000 hectares in Iran to produce about 80,000 tonnes of lint. The cost of cultivation is US\$ 1,610 per hectare with US\$ 75 per ha on seeds, US\$ 36 per ha on fertilisers, US\$ 279 per ha on pesticides and US\$ 581 per ha on manpower (ICAC Cotton Data Book 2020). The costs incurred for producing one Kg of seed cotton is US\$ 0.57 per kilogram of seed-cotton. Cotton is almost completely irrigated in Iran. The textile sector consumes 116,000 tonnes of cotton it produces domestically in addition to lint imports of 65,000 tonnes.

Iran was affected by 180,176 positive cases of COVID-19 with 8,584 deaths as on 12 June 2020. In addition, rising flood waters in northern Iran and locust invasions are impacting the agriculture sector, 90% of which is owned and run by the private sector. Import of ultralow volume pesticides for locust management has also become difficult owing to the lockdown. Agriculture in Iran accounts for 10% of the country's production and provides 18% of its employment. Iran also employs 300,000 persons in the textile and apparel industry with 9,800 apparel factories. Cotton sowing operations were affected due to the lockdown with a 15% decrease in the net sown area. (Dahan et al., 7 May 2020 reuters.com; Financial Tribune 24 April 2020; Glinski, 6 May 2020, Thenewhumanitarian.com)

Australia

Cotton area, production, productivity and input use

Australia cultivated cotton in 600,000 hectares in 2011, that got reduced to 82,000 hectares in 2019. According to the ICAC Databook 2020, The cost of cultivation in furrow-irrigated and overhead irrigated cotton ranges from US\$ 2,594 to US\$ 2,716 per hectare, whereas in semi-irrigated and skip-row dry regions cost of cultivation ranges from US\$ 829 to US\$ 1,489 per hectare. Because of the high input-use-efficiency, the production cost is low at US\$ 0.29 to US\$ 0.37 per Kg seed-cotton. Australia uses 421:108:54 Kg of N:P:K per hectare.

Australia is a major producer and exporter of cotton with 1,500 cotton farmers, (that varies depending on the area cultivated) producing 80 percent of the total crop. Cotton is a summer crop sown in the last quarter of the year and harvested in the first quarter of the next year. This period of the pandemic coincided with cotton picking in March-April. However, harvesting was least affected because it is machine driven. Advanced drought management techniques, soil moisture management, recycling of runoff water and introduction of varieties with drought tolerance have helped in improving cotton production despite prolonged repetitive droughts. In a typical season approximately 90 percent of cotton production is irrigated (where the irrigation water is sourced from irrigation schemes that have their own water storage dams) and 10 percent is dryland. Production in Australia is expected to increase from 0.14 million tonnes in 2019-20 season to 0.38 million tonnes in 2020-21 with a possible increase in area under cotton to cover 180,000 ha (Biki and Flake, USDA, 2020). With irrigation facilities that have been developed in the drought prone areas, even an above average rainfall could stimulate the increase in area from 82,000 ha in 2019/20 to 180,000 hectares in 2020-21.

COVID-19 pandemic and impact on cotton production

Of the 11 agricultural commodity groups analysed, seafood and meat exports are the only sectors that have been affected by COVID-19 in the early part of 2020 (Greenville et.al., 2020). The area and production in 2019-20 being small, cotton harvesting, was not affected by the COVID-19 pandemic in Australia. Coming to its impact on trade, COVID-19 did not affect the internal consumption of cotton as the domestic internal stocks were low. Cotton exports usually peak between April and August (as mapped over 10 years) and China is the dominant country importing cotton from Australia. Exports are expected to fall to 0.25 million tonnes as the domestic stocks were low. It is clear that the pandemic may not have impacted trade of cotton between April and June of 2020. Recent data indicates that

import of important inputs into the Australian agriculture sector has been unaffected by COVID-19. Chemicals and fertilizers have lower input values in Jan-March 2020 as the demand was low as a consequence of drought. Reduction in costs, particularly of fertilizers has also impacted the import value (Greenville et.al., 2020). Australia has also been successful in managing the pandemic with reports of fewer positive cases and deaths as compared to the rest of the globe.

United States of America

Cotton area, production, productivity and input use

USA is one of the countries that cultivates both, *G. hirsutum* and *G. barbadense*. GM cotton is grown over 90% of the country's cotton growing area and the seeds are locally sourced. Fertiliser usage of N:P:K on cotton is 63:24:32 Kg/ha. Because planting is completely mechanised and does not require a large number of labourers as in developing countries, sowing has not been affected directly by COVID-19. However, trade implications do exist in the backdrop of Covid 19 and US-China agreements.

With an unsteady cotton price cotton, growers in the US are averse to taking risks and in Texas are likely to shift to corn to a small extent (Tasker and Clark, 2020). Cotton harvested area in 2020 is forecasted at 4.59 million hectares; and the figures are likely to be updated by 30th June 2020. The Southwest region (parts of Arizona, California and New Mexico) which is irrigated, is expected to cultivate upland cotton over 3.3 million hectares and is expected to contribute to 61% of the total yield. The South East and the delta region are expected to cultivate about 17% of the total upland area. Cotton area in the West is expected to be 97,166 hectares of which 92,308 hectares would be extra-long staple (ELS) cotton. Moisture conditions appear suitable for cotton sowing across the cotton belt except in South Texas.

Impact of COVID-19 pandemic on cotton production

In a podcast (Tasker and Clark, 2020) it was revealed that a strong purchase of cotton by China from the US was being made with the intent of building up reserves and the US-China trade agreement was expected to support the cotton supply chain despite the backdrop of COVID-19. Availability of inputs was not limiting for cotton production and social distancing was not an issue as most of the operations in cotton are mechanised.

Conclusion

The COVID-19 pandemic has been affecting agriculture in 2020. At the time of ending the article it was hoped that the infection curve was flattening out causing economies to

reopen, lockdowns to end, transport bans to lift, amongst others. Contrary to expectations, COVID-19 has continued its damage in regions despite lockdowns and also in countries that have exercised a limited unlock of their economies- where livelihood and employment mattered. Unfortunately, many of these countries grow cotton. Agricultural activities are timebound and any hindrance will cause shortages of food, feed and fibre; therefore agriculture cannot wait. This would be the first season where cotton is being produced in the backdrop of the pandemic, at a cost, that remains to be seen.



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