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Cotton in India: Production, Consumption and Trade Outlook

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Abstract : Cotton also termed as important commercial crop cultivated in various parts of India and provides livelihood to million cotton farmers and raw material to textile industry. The cotton is cultivated in three regions in India namely central, southern and northern regions. A recentdecadal analysis of the area and production revealed that Maharashtra, Gujarat, Telangana and Andhra Pradesh accounts for three quarters of the acreage under cotton cultivation. Other important states in terms of area are Madhya Pradesh, Karnataka, Haryana and Rajasthan. An increase in the acreage under cotton cultivation has been witnessed in all the cotton growing states except Punjab, Gujarat and Madhya Pradesh where the crop acreage was diverted towards other crops. In terms of production, Maharashtra, Gujarat and Andhra Pradesh contributed around 70 per cent of the total production of India. The cotton production showed negative growth except in Karnataka, Rajasthan, Andhra Pradesh and Odisha mainly because of severe incidence of insect-pests. The area under the cotton crop had shown a slight increase of 1.05 per cent but owing to decline in yield mainly because of weather vagaries and biotic stresses, the production had decreased by 1.70 per annum. The crop instability is highest in northern zone due to incidence of pest attacks while in central zone, it was found least. Cotton imports increased at a rate of24.26 per cent while the exports decreased at the rate of 8.91 per cent in the last decade.

Keywords: Cotton, consumption, instability, production, trade

Cotton generally referred as king of fibres is an important fibre crop of global importance and is grown in tropical and subtropical area of about 80 countries (Murthy *et al.*, 2015). It is regarded as a valuable cash crop and is also known as "White Gold." Cotton fibre is a well-known fibre that is used as an important raw ingredient in the textile industry. Of the 50 species of *Gossypium*, only four species *viz. Gossypium arboreum*, *G. herbaceum*, *G. hirsutum* and *G. barbadense* are cultivated for their spinnable fibre. *G. arboreum* and *G. herbaceum* are diploids and termed as Asiatic cotton. *G. hirsutum* (American cotton) and *G. barbadense* (Egyptian cotton) are tetraploids are termed as new world cotton. The remaining 46 species are not cultivated and are present in wild (Directorate of Cotton Development, 2017). However, *G. hirsutum* has shown broader adaptability due to its high yield potential with moderate fibre quality and accounts for 90 per cent of annual world cotton output, whereas *G. barbadense* produces exceptionally high quality fibres and confers a competitive advantage to specialty cotton textiles producers.

The cotton fibre has a yearly economic impact of $600 billion globally. Around 25million tonnes of global cotton is produced annually. The major countries in cotton cultivation are India, China, USA, Pakistan, Brazil, Australia etc. (Khan *et al.*, 2020). On a commercial basis, India is the only country that grows all four cultivable cotton species. Hybrids, upland cotton, and diploid species account for 45, 30, and 24.7 per cent, respectively, of India's cotton area. In India, cotton is an important commercial crop providing livelihood to around 60 million people in its production, processing and textile industry. It is cultivated over 12.65 million ha area in various agro climatic zones of the country which accounts for 37 per cent of world's area under cotton cultivation (CCI, 2022). The states of Gujarat, Andhra Pradesh, Maharashtra and Telangana are the major states in terms of both area and production under cotton crop. India produced around 25 per cent (6.66 MT) of world cotton production (26.44 MT). However, the average yield of cotton in India is 462 kg/ha which is still lower to the world's average productivity of 759 kg/ha (CCI, 2022).

About 1/3rd of cotton produced globally is traded in the international market. The major exporters are USA, Uzbekistan, Africa and Australia. China, India, Pakistan and Turkey which are termed as major producers are turned out to be net importers of cotton to supply their textile industry. China, being the largest textile producer also imports around a quarter of global output during 1990s. However, India is the largest consumer of cotton in the world in 2020-2021 and accounts for around 24 per cent (6.21 MT) of world's consumption *i.e.*, 25.52 MT (CCI, 2022). In 2020-2021, cotton yarn, made-ups and handloom constituted 3.37 per cent of total exported commodities amounting to $9.83 billion in India (Ministry of Commerce and Industry, 2022). Textile exports also accounted for 30 per cent of total exports and has weightage of 20 per cent in national production. The present study is restrained to production scenario, consumption and trade of cotton in India in recent decade with a view to elaborate present situation of cotton cultivation.

MATERIALS AND METHODS

The data pertains to area, production and yield in major cotton producing states as well as country as whole for last decade (2010-2011 to 2019-2020) were scanned from various issues of Agricultural Statistics at a Glance and Status Paper of Indian Cotton, 2017 published by Ministry of Agriculture and Farmers Welfare, New Delhi, Ministry of Textiles, Govt. of India, New Delhi, Cotton Corporation of India (CCI), Mumbai and Central Institute for Cotton Research, Nagpur. The material related to consumption and trade of cotton was mined from website of CCI. The analytical techniques like compound annual growth rate (CAGR) and co-efficient of variation were used to draw meaningful implications.

RESULTS AND DISCUSSION

Production of cotton- Cotton, a predominantly monsoon season or *kharif* crop cultivated in northern, central and southern zones of the country and is providing livelihood to millions of farmers. It is cultivated both in rainfed and irrigated conditions and it is planted in April in north India while in southern and central regions, its planting time starts in June-July. Around 66 per cent of area under cotton cultivation in India is rainfed and is subjected to weather vagaries such as heavy monsoon rains and biotic stress etc. However, 25 per cent of cotton acreage in India is insured from production risk. In India, there are over 166 insects (categorized as sucking insects, boll feeders and foliar and stem feeders) recorded as pests on cotton crop. Cotton is the only genetically engineered crop grown widely in India as introduced in 2002. The transgenic variety is resistant against lepidopteran insect pests and is promoted as an alternative to reduce pesticide use with possibility to reduce high input costs and to prevent crop losses. The incessant increase in area under *Bt* cotton was recorded as requirement of seed touched to 17940 tonnes in 2019-2020. The major cotton producing states include Madhya Pradesh, Maharashtra and Gujarat (Central zone), Andhra Pradesh Telangana, Karnataka (Southern zone), Haryana, Punjab and Rajasthan (Northern zone). However, cotton cultivation is also confined to states like Odisha, West Bengal, Assam, Tripura etc. contributing 2.8 per cent of total cotton production in the country in 2019-2020. Presently, cotton is cultivated in India on an area of 13.37 million ha (34% irrigated area) of which 68.89 per cent is constituted by the states of

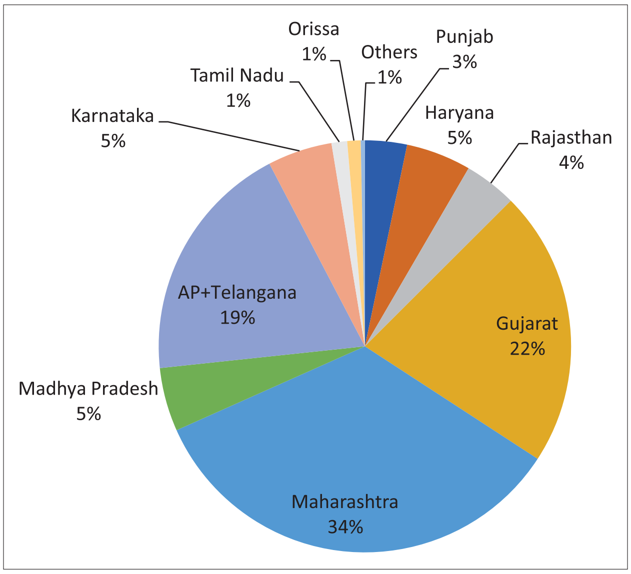

Fig. 1. State-wise Average decadal cotton area in India

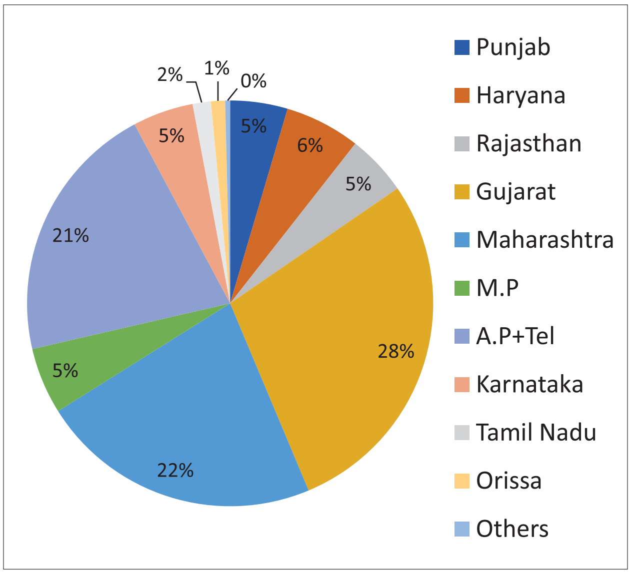

Fig. 2. State-wise Average decadal share in cotton production in India

Gujarat (19.84%), Telangana (15.91%) and Maharashtra (33.14%).

Based on decadal acreage average, Maharashtra (34%) and Gujarat (22%) states accounted about 56 per cent of total cotton area lagged by Andhra Pradesh including Telangana (19%). The states of Madhya Pradesh, Karnataka and Haryana each constituted 5 per cent of total cotton acreage while Rajasthan contributed 4 per cent to the cotton acreage (Fig. 1). These states occupied 94 per cent of cotton cropped area in the country. On decadal cotton production average (341.14 million bales), Maharashtra (22%) and Gujarat (28%) had leading place in the country contributing half of total cotton production followed by Andhra Pradesh (21%). The other states like Madhya Pradesh (5%), Karnataka (5%), Haryana (6%) and Rajasthan (5%) backed 21 per cent of total cotton production and rest of production (8%) came from states of Tamilnadu, Odisha, Punjab, West Bengal, Uttar Pradesh Assam and Tripura (Fig.2).

The Central zone comprising of Maharashtra, Madhya Pradesh and Gujarat was established main cotton growing region constituting 60.81 and 56.73 per cent of total area and production, respectively (Table 1). The Southern zone consisting of Andhra Pradesh, Telangana, Karnataka and TamilNadu ranked second position after Central zone sharing 26.18 per cent and 27.47 per cent of total area and production, respectively. Among zones, the contribution of Northern zone comprising of Haryana, Rajasthan and Punjab was found lowest as this zone shared one fifth area of Central zone and half of southern zone. In term of production, Northern zone occupied 12.51 and 15.63 per cent of Central and Southern zones, respectively. The higher productivity level of cotton was witnessed in northern zone (Fig.3 and Table 1) as around 98 per cent area under irrigated condition, higher coverage of area under *Bt* cotton, better adoption of production technologies etc.

The growth analysis of area in major cotton growing states revealed positive signal in last ten years except Punjab, Gujarat and Madhya Pradesh. The area in three states was diverted towards other remunerative crops like soybean and pulses in Madhya Pradesh, paddy in Punjab and ground nut, soybean and castor in Gujarat owing severe incidence of whitefly in Punjab and pink bollworm in Gujarat in last decade. As concerned to cotton production, except Karnataka, Rajasthan, Andhra Pradesh

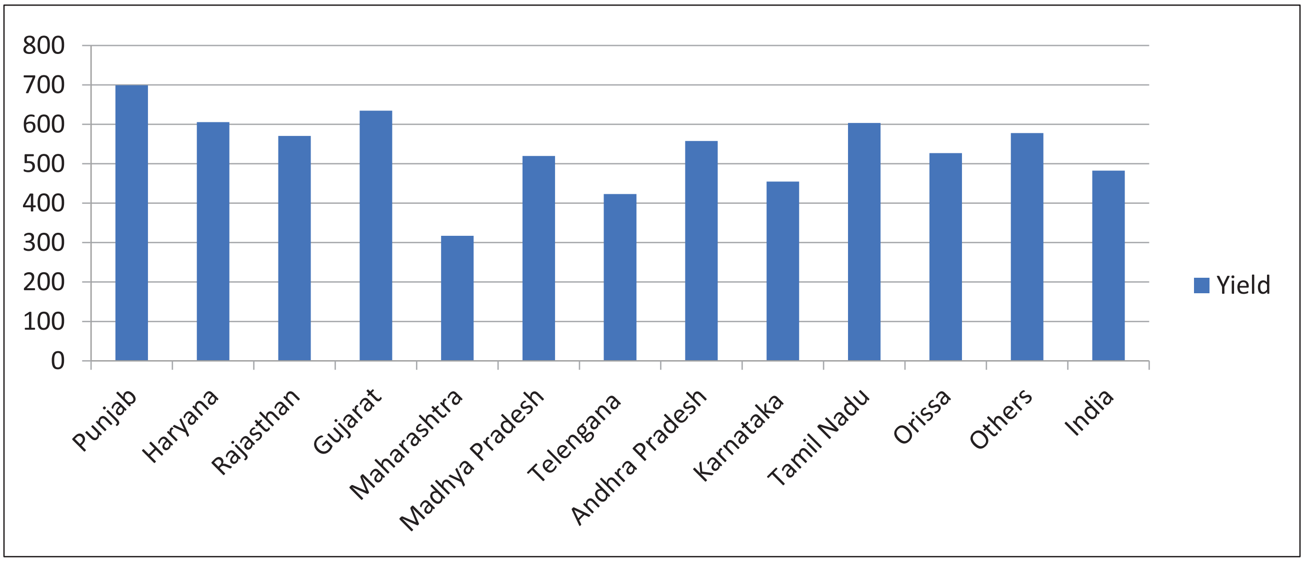

Fig. 3. State-wise average decadal cotton yield in India

and Odisha, the major cotton states unveiled negative sign owing to occurrence of insect pests like whitefly in northern India and pink bollworm in central India. The growth rate of cotton production in India during last ten years declined at rate of 1.70 per cent/annum even with slight increase in acreage growth of 1.05 per cent owing to sharp decline in yield (2.65%). This might be due to outbreak of insect pests and diseases, long dry spell, drought conditions, excessive rainfall at boll formation stage etc. (Niranjan *et al.*, 2017).

The instability in cotton area in northern zone was noticed highest because of fluctuations in cotton acreage due to incidence of pink bollworm, jassids and whitefly which resulted into low productivity and ultimately reduced cotton production in this region. The variation in area of cotton in central zone was noticed reasonably less as compared to other zones. However, the instability in production and yield was observed as large area is under rainfed situation and frequent occurrence of drought and long dry spell during crop season. In southern zone, variation in acreage, production and yield of cotton was observed to certain extent because of shifting in area, rainfed cultivation and long dry spell during crop season. Cotton being long duration crop was severely affected by biotic (host of large number of insect pests) and abiotic stresses (long dry spell, drought condition and untimely rains Sharma and Singh, 2014 and Sanjay *et al.*, 2018.

Cotton trade in India: India being third largest producer of cotton in the world also imports large quantity of cotton from Pakistan, USA, Australia, West Africa, CIS Countries and Egypt to meet domestic consumption of textile industries and other purposes. At the same time, India also exported cotton yarn to nations like Japan, United States, United Kingdom, Russia, France, Nepal, Singapore, Sri Lanka etc. Cotton export portioned 2.98 per cent of total agricultural products (Rs. 2.53 lakh crores) shipped aboard while cotton import shared 6.35 per cent of total agricultural products (Rs. 1.48 lakh crores) brought in India in 2019-2020. The export of cotton from India in the year 2010-2011 was only 76.50 lakh bales with value of Rs. 13162.42 crores which increased significantly in succeeding years up to 2013-2014 (Rs. 22337.84 crores) and after that a sharp decline in export was noticed touching to the level of 50 lakh bales in 2019-2020 (Rs. 7539.53 crores). However, in case of cotton import, the inclining trend was

Table 1. State-wise average, CV and growth rates of area, production and yield of cotton in India

State/Zone	Area			Production			Yield		
	Average	CV	CAGR	**Average**	CV	CAGR	**Average**	CV	CAGR
Punjab	**4.01**	25.98	-6.98	**15.80**	30.42	-5.15	**699.00**	12.15	2.31
Haryana	**6.21**	11.71	2.88	**20.76**	24.84	-1.23	**605.60**	17.07	-3.54
Rajasthan	**5.03**	24.59	7.02	**16.76**	29.85	6.43	**570.60**	9.56	-0.46
Northern zone	**15.25**	**11.10**	**1.47**	**53.32**	**22.67**	**-0.13**	**591.57**	**17.69**	**-1.58**
Gujarat	**26.43**	6.06	-0.38	**97.74**	18.82	-4.53	**634.70**	17.79	-4.13
Maharashtra	**41.60**	4.36	0.71	**77.46**	16.94	-2.37	**317.10**	21.99	-3.09
M.P	**6.08**	8.72	-0.35	**18.33**	13.35	-0.47	**519.60**	16.97	-0.14
Central zone	**74.11**	**4.02**	**0.22**	**193.53**	**12.32**	**-3.17**	**445.56**	**14.68**	**-3.38**
Andhra Pradesh	**24.23**	14.37	4.29	**71.98**	17.03	2.61	**526.40**	7.75	-0.85
Karnataka	**6.18**	18.91	1.67	**16.73**	26.81	0.22	**454.80**	22.60	-1.52
Tamil Nadu	**1.49**	15.53	2.64	**5.01**	30.97	-8.31	**603.70**	35.87	-10.47
Southern zone	**31.90**	**13.25**	**2.75**	**93.72**	**18.95**	**0.01**	**491.96**	**15.27**	**-2.66**
Orissa	**1.28**	21.26	7.38	**3.88**	24.98	6.8	**527.10**	8.35	-0.37
Others	**0.4**	40.07	-16.25	**1.36**	48.1	-28.59	**578.00**	49.53	-14.68
Total	**121.86**	**6.12**	**1.05**	**341.14**	**10.14**	**-1.70**	**482.40**	**11.09**	**-2.65**

Note: Andhra Pradesh also included Telangana

observed during last ten years (Fig.4). The value of raw cotton including waste imported in India was Rs. 1241.37 crores in 2009-2010 augmented to Rs. 9371.21 crores in 2019-2020. The cotton import was increased up to six times within last ten years which can be attributed to increase in domestic demand, decline in production of cotton and low price in international markets. Even with bumper crop, the import was made to meet requirement of particularly extra long staple cotton (ELS) to yield world's class yarn in the superfine countgroup. The variation in import of cotton was observed 57.49 per cent with growth rate of 24.26 per cent while cotton export exhibited less variation (37.91%) and negative growth rate (-8.91%) during 2009-2010 to 2019-2020. Similar trends are reported by Landes*et al.*, 2005 and Niranjan *et al.*, 2017.

Net availability and consumption of cotton in India: The availability of cotton depends upon production level, quantum of import and export. The consumption of cotton indicates requirement of raw material for textile industries,

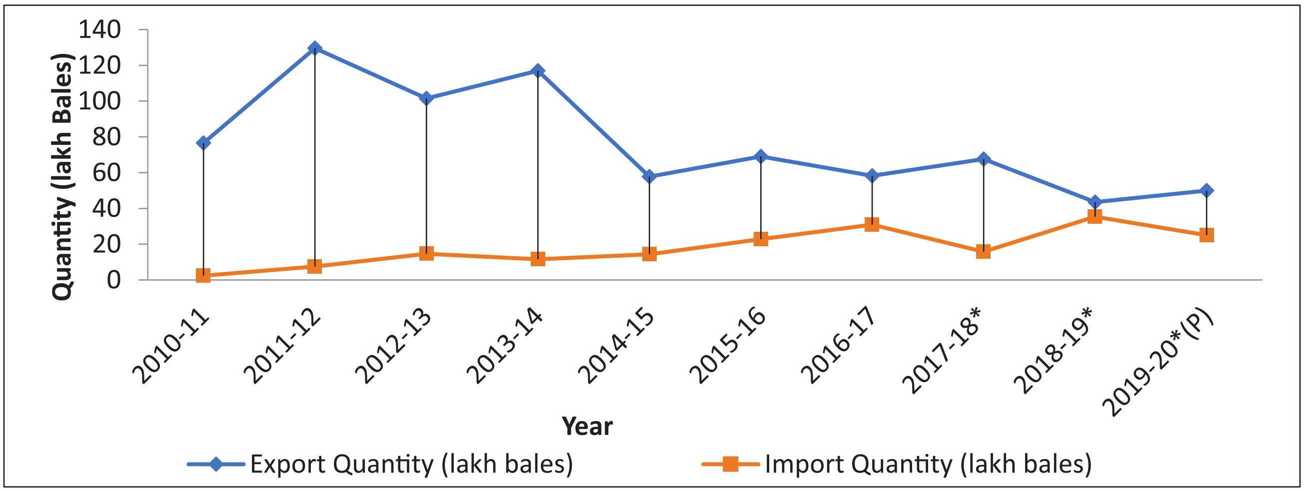

Fig. 4. Decadal average cotton trade in India

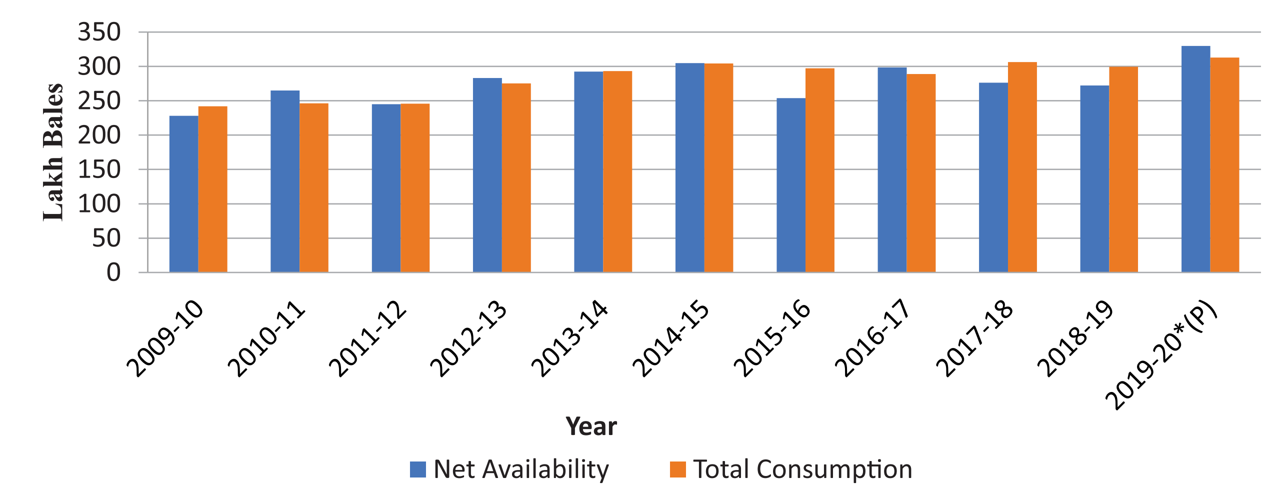

Fig. 5. Net availabilty and consumption of cotton in India

medical use and other usages. India is having a large domestic textile industry; the mill consumption of cotton in the country in organized sector, textile mills and small scale spinning units had been incessantly augmented since 1990s. The textile industry in India is presently the second largest in the world with a presence of 1900 large scale mills in 2013 of which about 80 per cent are in the private sector, the rest in the public and cooperative sector. India has the second largest installed capacity of spindles (43.13 million in 2011) after China in the world. The cotton consumption in India exceeded the net availability of cotton in year 2009-10 indicating gap of 14 lakh bales. But in subsequent years, consumption of cotton was almost equal to net availability except 2015-2016, 2017-2018 and 2018-2019 (Fig.5) owing to reasonable drop in cotton production. The decline in cotton production might be attributed due to severe incidence of whitefly, pink bollworm, long dry spell and drought conditions in central and southern regions. In recent year *i.e.*, 2019-2020 there was excess availability of cotton over consumption with tremendous increase in most cotton growing states (Sood, 2018).

Conclusion and policy implications

Based on decadal average, Maharashtra and Gujarat shared around 56 per cent of cotton area. Other major cotton cultivating states are Madhya Pradesh, Karnataka and Haryana which contribute 5 per cent each to cotton acreage. As far as cotton production, Gujarat, Maharashtra and Andhra Pradesh contributed around 71 per cent of entire production in India. The cotton production has declined at the pace of 1.70 per cent somewhat recently notwithstanding the increase of 1.05 per cent in acreage because of sharp reduction in yield. All the major cotton cultivating states showed a positive growth in area in the last decade except Punjab, Gujarat and Madhya Pradesh, where crop area declined due to diversion of area to other remunerative crops. Karnataka, Rajasthan, Andhra Pradesh exposed negative growth in cotton production because of high pest infestation. In addition, the cotton is primarily cultivated under rainfed conditions which render its production and yield unstable owing to frequent droughts and long dry spell during crop season. Northern zone is deemed as most unstable region while southern and central zones indicated least instability in cotton cultivation. Future growth in cotton production is more likely to come from higher yield rather than area expansion as research is being focussed on higher plant population. Further, creation of irrigation structures, proper placement of nutrients, adoption of integrated pests and disease management practices also improve yield.

The cotton import increased six times in the last decade because of domestic demand for textile industry, reduced domestic production and low prices in international market. The cotton import augmented at a rate of 24.26 per cent while the export declined by 8.91 per cent in the last decade. Govt. of India has ratified a variety of trade policies to ensure competitively-priced and ample supplies of cotton are available to the textile industry. Cotton and cotton yarn exports are permitted under an Open General License (OGL) without any quantitative restrictions.

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