iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 **Issue:** III **Month of publication:** March 2025

DOI: https://doi.org/10.22214/ijraset.2025.67472

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue III Mar 2025- Available at www.ijraset.com

The Agricultural Sector of India: Trends, Performance and Problems

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Abstract: ***Agriculture has always remained the lifeline for the Indian economy as it has provided work to a considerable section of the population and has also contributed highly to food security and economic development. The present study therefore is a direction on the trends in agricultural output, export, and import of major crops, as well as the challenges influencing agricultural growth in India. The research is completely based on secondary data for the period from 1950 to 2020, which is obtained from economic surveys, and agricultural statistics of India. Descriptive statistical tools such as trend analysis and compound annual growth rate (CAGR) calculations have been used to determine growth performance for selected crops that include rice, wheat, cotton, and jute. This study also examines the influence of several government initiatives, climate change and market forces on agricultural productivity. The findings of the study stress the need for reforms in the policy domain, sustainable farming practices, and better infrastructure for the agriculture sector to survive for a longer time.***
Keywords: Trends, Agricultural production, Food Crops, Non-Food Crops, A ricultural exports and imports

I. INTRODUCTION

For ages, agriculture has been the bedrock of India's economy, providing extensive employment, guaranteeing food security, and enabling economic stability. Even with the rapid growth of the industrial and service sectors, agriculture remains the principal source of livelihood for nearly 45% of the population in India, accounting for some 18% of Net National Product (Government of India, 2023; World Bank, 2023). India is among the leading world producers of rice, wheat, pulses, and sugarcane, and thus plays a pivotal role in the global food markets (FAO, 2022). The history of Indian agriculture has gone through radical transitions from traditional subsistence farming to the introduction of chemical fertilizers and mechanization in the 1960s-a period we now refer to as the Green Revolution (Pingali, 2012). Although the Green Revolution led to the rapid increase in food grain production-it has reduced territorial reliance on imports-it was also to set in motion long-term problems in the form of soil deterioration, scarcity of water, and regional disparities in agricultural development (Shiva, 1991).

There is an inextricable link between agriculture and other sectors of the economy such as industry, trade, and services. The coupling of industries like sugar, tea, jute, and cotton textile, among others, manufacturing pepper, food processing, and much more takes place upon raw materials sourced principally from agriculture or its allied sectors. However, at the same time, agriculture obtains inputs such as chemical fertilizers and pesticides, power, agricultural machinery such as tractors, harvesters, combines, and pump sets, etc., from the industrial sector. In this way, agriculture, industry, and trade derive mutual support from each other. In this way, the economic activities of the country are connected with agriculture directly or indirectly(Sharma, 2022).

In recent years, government initiatives pertaining to the Minimum Support Price (MSP) system, the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN), and the promotion of digital platforms such as the National Agriculture Market (e-NAM) were aimed at modernizing agriculture in India, improving market access (Government of India, 2023). Structural inefficiencies are still hampering agricultural productivity, which include small and fragmented landholdings, unpredictable monsoon rains, and fluctuating market prices (ICAR, 2020). Climate change has worsened these agricultural vulnerabilities, with erratic rainfall patterns prolonged droughts, and dwindling groundwater resources all threatening productivity and food security (ICAR, 2020). This need has increasingly drawn the attention of policymakers and researchers on techniques involving climate-resilient farming such as agroecology, conservation agriculture, and sustainable management of water resources (FAO, 2022).

This paper examines the trends of agricultural production, export and import of major food and non-food crops, ongoing challenges, and future opportunities confronted by India's agricultural sector and analyses in-depth these trends and its trajectory through time.

The main objectives of the study were as follows:

1) To analyse the trends of growth performance of major crops in India.
2) To analyse the trends of agricultural exports and imports of major crops in India.
3) To explore the issues that hinders agricultural growth in India.

II. DATA AND METHODOLOGY

The study primarily relies on secondary data from 1950 to 2020 and other information gathered from the relevant sources, depending on the areas covered in the study. The information was gathered from several sources, including the economic survey of India, the world Bank, minister of agriculture and farmers' welfare, agricultural statistics at a glance, etc. To analyze the overall development trends in agricultural sector in India, descriptive statistics such as histogram, trend line graph techniques have been used.The compound annual growth rate (CAGR) was also calculated as per the need.

III. GROWTH PERFORMANCE OF MAJOR CROPS IN INDIA

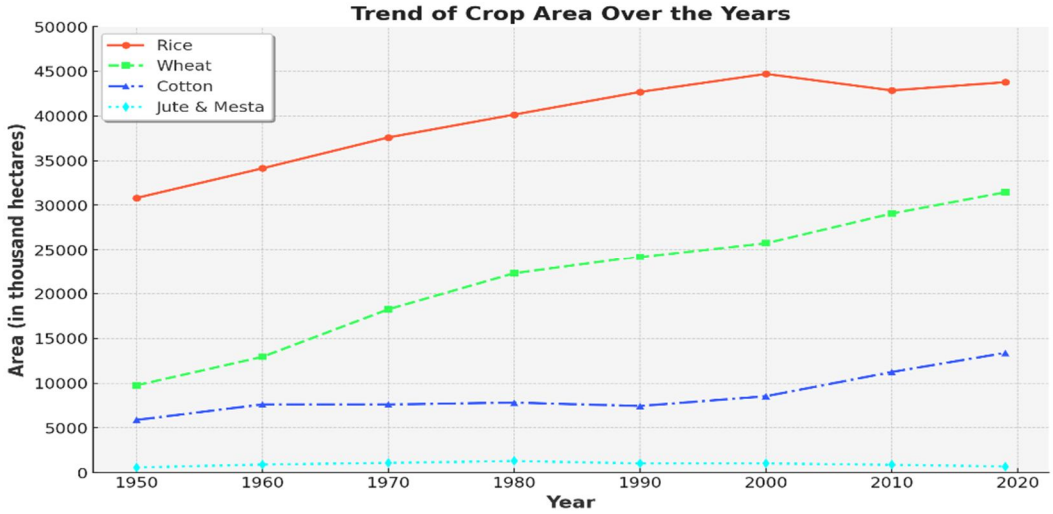
India has seen remarkable growth in agriculture and allied sectors for almost seven decades of planned economy.The food crops which dominate Indian farming are rice and wheat, whereas non-food crops are cotton, jute and mesta.

Table 1: Year-wise area under major crops production in India

	Area under Food Crops		Area under Non Food Crops	
Years	Rice (in thousand hectares)	Wheat (in thousand hectares)	Cotton (in thousand hectares)	Jute & Mesta (in thousand hectares)
1950-51	30810	9750	5880	570
1960-61	34130	12930	7610	900
1970-71	37590	18240	7610	1080
1980-81	40150	22280	7820	1300
1990-91	42690	24170	7440	1020
2000-01	44710	25730	8530	1020
2010-11	42860	29070	11240	870
2019-20(AE)	43780	31450	13370	680
CAGR (%)	0.50	1.69	1.18	0.25

Source: Agricultural statistics 2020.

Figure 1: Growth trends in area under major crops production in India

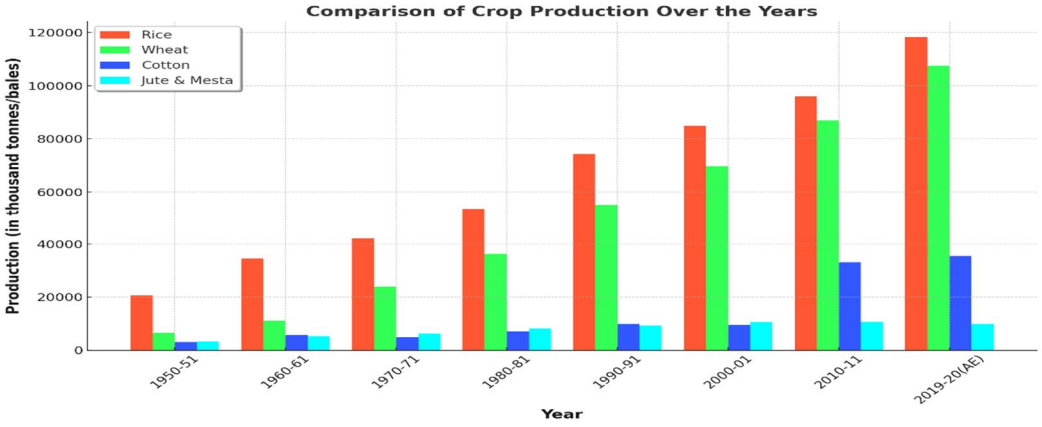


Source: Autor's own plot based on Agricultural statistics, 2020 data.

India's total area under rice production was increased from 30810 thousand hectares during 1950-51 to 43780 thousand hectares during 2019-20 (Table 1). Total rice production increased from 20580 thousand tonnes in 1950-51 to 118430 thousand tonnes in 2019-20, a compound annual growth rate of 2.53 percent (Table 2).Rice and wheat are the main food crops grown in India.

While the total area under wheat production in the country increased from 9750 thousand hectares in 1950-51 to 31450 thousand hectares in 2019-20 (Table 1). Rice cultivation area in India moved up at an increasing rate from 1950-1951 to 2019-20(figure 1). The total wheat production increased from 6460 thousand tonnes in 1950-51 to 107590 thousand tonnes in 2019-20 (Table 2). The cropping area of cotton in India expanded from 5880 thousand hectares in 1950-51 to 13370 thousand hectares in 2019-20 (table 1). Cotton production in the country increased from 3040 thousand bales during 1950-51 to 35490 thousand bales during 2019-20. The area used for jute and mesta cultivation in India rose from 570 thousand hectares in 1950-51 to 680 hundred thousand hectares in 2019-20. With the increase in area, rice, wheat, cotton, jute, and mesta's output has thus increased at an increasing rate from 1950-51 to 2019-2020 (Table 2). The trend lines indicate that India's major crop production between the two dates noted above increased at an increasing rate in figure 3. In the period, rice production ranked highest, followed by wheat in the food crops category. Production of cotton in the category between 2010-11 and 2019-20 has really made a big gain while jute and mesta output has shown decline (figure 2).The CAGRs of area of rice,wheat,cotton and jute & mesta are 0.50, 1.69, 1.18 and 0.25 percent (table 1) respectively.While the CAGR of production of the above mentioned crops are 2.53, 4.10, 3.57 and 1.58 percent (table 2) respectively.

Figure 2: Growth Of Agricultural Production Of The Major Crops In India



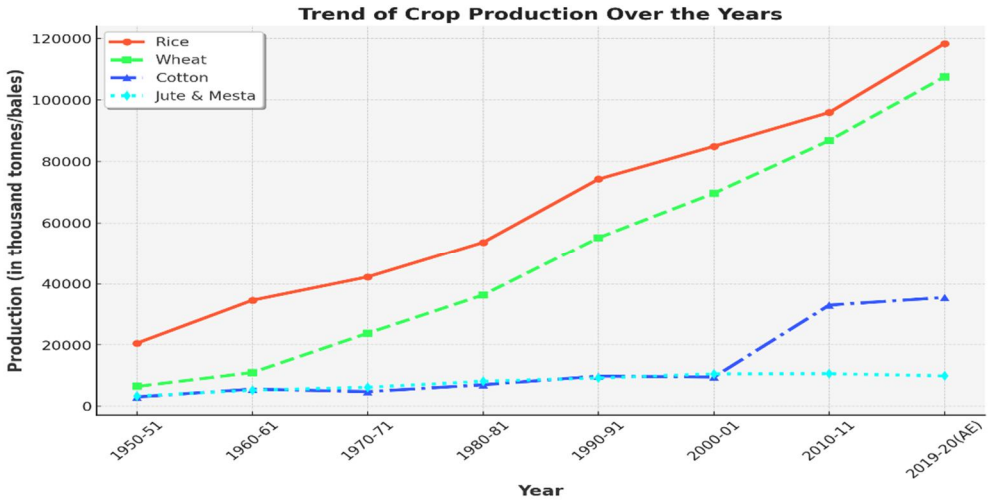
Source: Autor's own plot based on Agricultural statistics, 2020 data.

Table 2: Growth Of Agricultural Production Of The Major Crops

	Food Crops		Non Food Crops	
Years	Rice (in thousand tonnes)	Wheat (in thousand tonnes)	Cotton (in thousand bales)	Jute & Mesta (in thousand bales)
1950-51	20580	6460	3040	3310
1960-61	34580	11000	5600	5260
1970-71	42220	23830	4760	6190
1980-81	53630	36310	7010	8160
1990-91	74290	55140	9840	9230
2000-01	84980	69680	9520	10560
2010-11	95980	86870	33000	10620
2019-20(AE)	118430	107590	35490	9910
CAGR (%)	2.53	4.10	3.57	1.58

Note: *AE denotes Advance Estimates.
Source: Agricultural statistics 2020.

Figure 3: Trends Of Agricultural Production Of The Major Crops In India

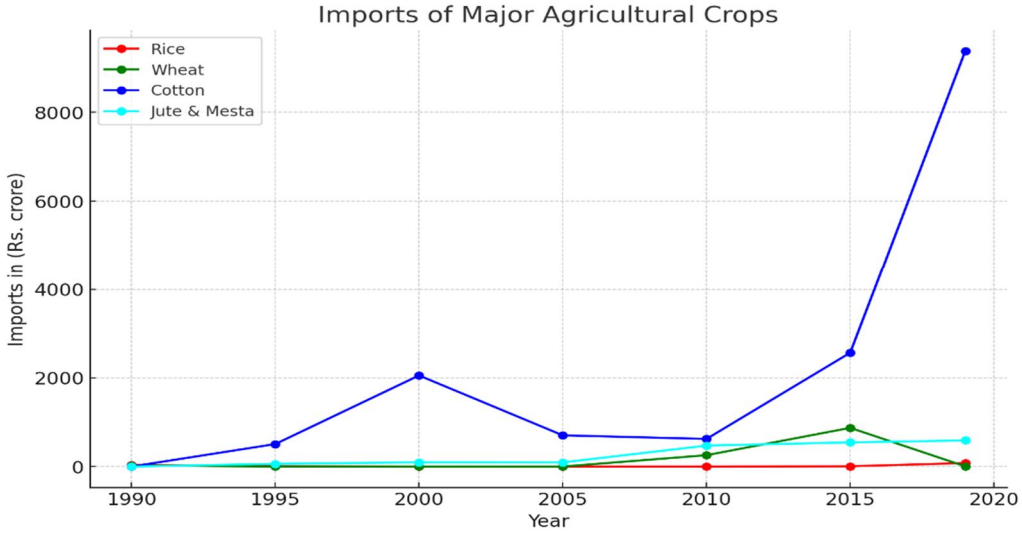


Source: Autor's own plot based on Agricultural statistics, 2020 data.

IV. AGRICULTURAL IMPORTS AND EXPORTS OF MAJOR CROPS IN INDIA

In 1990-91, rice imports totalled Rs 39.13 crore. In 1995-96, the figure stood at Rs 8.55 crore, further declining to Rs 0.07 crore in 2000-01, Rs 0.34 crore in 2005-06, and Rs 0.92 crore in 2010-11, before rising to Rs 5.91 crore in 2015-16, and further to Rs 78.75 crore in 2019-20. Over the last 30 years, rice imports have grown at a faster and steeper pace of more than 2.01 times, while with the compound annual growth rate (CAGR) is approximately at 2.36% (Table 3). In 1990-91, total wheat imports stood at Rs 24.19 crore, Rs 0.38 crore in 1995-96, Rs 0.84 crore in 2000-01, following an increase of Rs 255.84 crore in 2010-11, Rs 872.59 crore in 2015-16, and, very recently, Rs 4.63 crore in 2019-20. With respect to wheat, imports have grown at a much slower rate fielded by an annual growth rate of -5.36% (Table 3). In terms of total agricultural imports, cotton imports account for Rs 506.9 crore in 1995-96, Rs 2053.62 crore in 2000-01, Rs 703.66 crore in 2005-06, Rs 622.24 crore in 2010-11, Rs 2566.21 crore in 2015-16, and Rs 9371.21 crore in 2019-20. Over a period of 25 years, cotton imports have grown exponentially and steeply, by more than 18.49 times, with a compound annual growth rate of 10.21% (Table 3). Finally, jute and mesta showed imports of Rs 61.71 crore in 1995-96, Rs 95.68 crore in 2000-01, Rs 93.16 crore in 2005-06, Rs 471.92 crore in 2010-11, Rs 544.85 crore in 2015-16, and Rs 588.22 crore in 2019-20. Over the last 25 years, this commodity has shown imports increasing at a faster and sharper pace of more than 9.53 times. Meanwhile, their CAGR has been put at 7.81% (Table 3).

Figure 4: Trend of Imports of Major Agricultural crops over total Imports



Source: Author's own plot based on Ministry of Agriculture, and farmer Welfare, Agriculture Statistics at a Glance and Agricultural statistics 2020,data.

The trend in cotton imports exhibits a marked increase followed by jute and mesta. On the other hand, the trend in rice imports showed lesser growth(figure 4), owing to the fact that India lies among the largest producers of rice in the world.

Table 3: Imports of Principal Agricultural crops over Total Imports (Rs. Crore)

Years	Rice	Wheat	Cotton	Jute & Mesta	Total Agricultural Imports
1990-91	39.13	24.19	*	*	1205.86
	(3.24)	(2.01)			
1995-96	8.55	0.38	506.9	61.71	5890.1
	(0.15)	(0.01)	(8.61)	(1.05)	
2000-01	0.07	0.84	2053.62	95.68	12086.23
	(0.001)	(0.01)	(16.99)	(0.79)	
2005-06	0.34	*	703.66	93.16	15977.75
	(0.002)		(4.4)	(0.58)	
2010-11	0.92	255.84	622.24	471.92	51073.97
	(0.002)	(0.50)	(1.22)	(0.92)	
2015-16	5.91	872.59	2566.21	544.85	140289.22
	(0.004)	(0.62)	(1.83)	(0.39)	
2019-20 (P)	78.75	4.63	9371.21	588.22	147445.81
	(0.05)	(0.003)	(6.36)	(0.4)	
CAGR (%)	2.36	-5.36	10.21	7.81	17.38

Note: P denotes Provisional

*Commodity not reported

Share of total agricultural imports in parenthesis.

Source: Ministry of Agriculture, and farmer Welfare, Agriculture Statistics at a Glance and Agricultural statistics 2020.

The total rice exports from India increased from Rs 439.95 crore in 1990-91 to Rs 1286.72 crore in 1995-96, Rs 3174.14 crore in 2000-01, Rs 6221.27 crore in 2005-06, Rs 11585.92 crore in 2010-11, Rs 38201.99 crore in 2015-16, and Rs 45426.65 crore in 2019-20. The rice exports increased with a compound annual growth rate of 16.72% (Table 4). Total wheat exports were Rs 29.23 crore in 1990-91, Rs 0.21 crore in 1995-96, Rs 1330.21 crore in 2000-01, Rs 557.53 crore in 2005-06, Rs 0.70 crore in 2010-11, Rs 1061.77 crore in 2015-16, and Rs 444.2 crore in 2019-20. Wheat exports have increased in the last 30 decades, with a compound annual growth rate of 9.49% (Table 4). Total cotton exports were Rs 854.72 crore in 1990-91, Rs 653.59 crore in 1995-96, Rs 42.69 crore in 2000-01, Rs 2904.35 crore in 2005-06, Rs 13162.42 crore in 2010-11, Rs 12821.13 crore in 2015-16, and Rs 7539.53 crore in 2019-20. Cotton exports have increased with a compound annual growth rate of 7.53%. Total Jute and Mesta exports were Rs 186.22 crore in 2000-01, Rs 490.9 crore in 2005-06, Rs 851.2 crore in 2010-11, Rs 938.47 crore in 2015-16, and Rs 833.02 crore in 2019-20. The jute and mesta exports have increased with a compound annual growth rate of 5.12% (Table 4).

Table 4: India's Exports of Principal Agricultural crops over total Agricultural Exports (in Rs. Crore)

Years	Rice	Wheat	Cotton	Jute & Mesta	Total Agricultural Exports
1990-91	439.95	29.23	854.72	*	6012.76
	(7.32)	(0.49)	(14.22)		
1995-96	1286.72	0.21	653.59	*	20397.74
	(6.31)	(0.001)	(3.2)		
2000-01	3174.14	1330.21	42.69	186.22	28657.37
	(11.08)	(4.64)	(0.15)	(0.65)	
2005-06	6221.27	557.53	2904.35	490.9	45710.97
	(13.61)	(1.22)	(6.35)	(1.07)	
2010-11	11585.92	0.7	13162.42	851.2	113046.58
	(10.25)	(0.001)	(11.64)	(0.75)	
2015-16	38201.99	1061.77	12821.13	938.47	215396.32
	(17.74)	(0.49)	(5.95)	(0.44)	
2019-20 (P)	45426.65	444.2	7539.53	833.02	252976.06
	(17.96)	(0.18)	(2.98)	(0.33)	
CAGR (%)	16.72	9.49	7.53	5.12	13.27

Note: P denotes Provisional

Share of total agricultural exports in parenthesis.

*Commodity not reported

Source: Ministry of Agriculture, and farmer Welfare, Agriculture Statistics at a Glance and Agricultural statistics 2020.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
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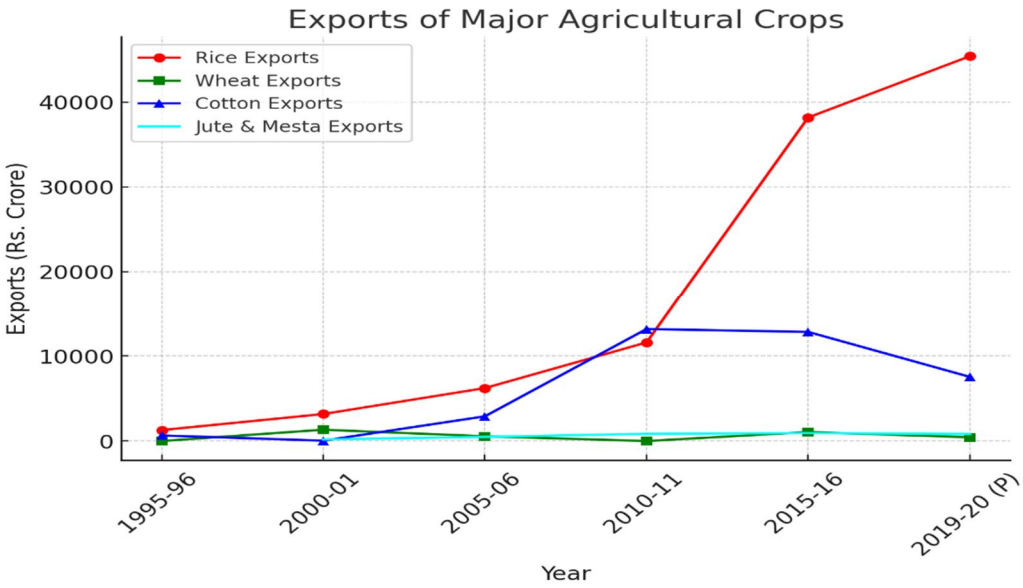
Figure 5: Trend of India's Exports of major Agricultural crops



Source: Author's own plot based on Ministry of Agriculture, and farmer Welfare, Agriculture Statistics at a Glance and Agricultural statistics 2020, data.

In terms of rice imports as a share of total agricultural imports, their value was 3.24% in 1990-91, 0.15% in 1995-96, 0.001% in 2000-01, 0.002% in 2005-06, 0.002% in 2010-11, 0.004% in 2015-16, and 0.05% in 2019-20. Wheat imports as a share of total agricultural imports accounted for 2.01% in 1990-91, 0.01% in 1995-96, 0.01% in 2000-01, 0.5% in 2010-11, 0.62% in 2015-16, and 0.003% in 2019-20. The share of cotton imports in total agricultural imports was given as 8.61% in 1995-96, 16.99% in 2000-01, 4.4% in 2005-06, 1.22% in 2010-11, 1.83% in 2015-16, and 6.36% in 2019-20. The Jute and Mesta imports as a share of total agricultural imports accounted for 1.05% in 1995-96, 0.79% in 2000-01, 0.58% in 2005-06, 0.92% in 2010-11, 0.39% in 2015-16, and 0.40% in 2019-20(Table 3).

Rice exports constituted 7.32 percent of total agricultural exports in 1990-91, 6.31 percent in 1995-96, 11.08 percent in 2000-01, 13.61 percent in 2005-06, 10.25 percent in 2010-11, 17.74 percent in 2015-16, and 17.96 percent in 2019-20.Wheat exports made a contribution of 0.49 percent of total agricultural exports in 1990-91, 0.001 percent in 1995-96, 4.64 percent in 2000-01, 1.22 percent in 2005-06, 0.001 percent in 2010-11, 0.49 percent in 2015-16, and 0.18 percent in 2019-20.Cotton contributions to total agricultural exports were 14.22 percent in 1990-91, 3.2 percent in 1995-96, 0.15 percent in 2000-01, 6.35 percent in 2005-06, 11.64 percent in 2010-11, 5.95 percent in 2015-16, and 2.98 percent in 2019-20.Jute and mesta exports accounted for 0.65 percent of total agricultural exports in 2000-01, 1.07 percent in 2005-06, 0.75 percent in 2010-11, 0.44 percent in 2015-16, and 0.33 percent in 2019-20 (Table 4). The trend of rice exports sharply increased during the study period,while that of cotton exports showed a decline(figure 5).

V. MAJOR ISSUES THAT HINDERS GROWTH IN THE AGRICULTURAL SECTOR OF INDIA

Many challenges hinder the growth and sustainability of the agricultural sector in India, which employs nearly half of the country's people. Among the most important is low agricultural productivity, due to continued reliance on traditional farming methods with scant adoption of modern technology, rest a great distance from high-yield seeds and support services for irrigation, and so forth (Chand, 2020). The Green Revolution substantially improved productivity in certain regions of the country; however, vast tracts of the nation, especially rain-fed areas, have low yields (Pingali, 2012). Besides, the fragmented land holdings resulting from inheritance laws created very small farms in terms of economies of scale, which made the mechanization difficult, lowering overall efficiency (Birthal et al., 2015).

Another important issue is depending on the monsoon and water management challenges that a good part of Indian agriculture is rain-fed, thus making farmers vulnerable to erratic patterns of the monsoon, drought, and flood-given impacts on crop production (Gadgil and Gadgil, 2006). Although irrigation infrastructure has improved, in states like Punjab and Haryana, the extraction of groundwater for irrigation has become a serious threat to long-term agricultural sustainability due to depletion (Shah, 2009).

Besides, the overuse of chemical fertilizers, pesticides, and intensive cropping have caused soil degradation and the decline of soil fertility, thus leading to the reduction of productivity (Lal, 2020). Such environmental concerns amplify the troubles besetting Indian farmers-the first step to making sustainable agricultural practices the need of the hour.

Post-harvest losses constitute another area of significant concern in the wake of inadequate storage and transportation. Due to insufficient cold storage and uncoordinated supply chain management, high quantities of croplands lose their worth and perish, particularly fruits and vegetables (Parwez, 2016). The loss of food security does not, however, come without some financial loss on the part of the farmer. Market inefficiencies and price fluctuations, besides that, lead to instability in the economy: middlemen stall the available price further, besides farmers dealing with unreasonable competition; lack of access to transparent markets and abrupt price crashes due to oversupply or weak demand (Chand, 2016). The monopoly of the Agricultural Produce Market Committee (APMC), which was supposed to protect farmers, has generally been caught upon criticism for its trying inefficiencies and prohibitive trading policies (Acharya, 2004).

Among the most worrisome problems in Indian agriculture is the financial distress and subsequent indebtedness of farmers. Many small and marginal farmers depend on informal credit sources where the interest rates are high, driving them into debt cycles often leading to severe distress (NABARD, 2018). In extreme cases, this financial burden has often led to increased farmer suicides, which shows an urgent need for effective credit and insurance mechanisms (Mishra, 2006). Climate change and extreme weather events create other vulnerabilities, such as rising temperatures, erratic rainfall, and frequent droughts from affected agricultural yield (Rao et al., 2019). Hence, it has become very important to develop climate-resilient crop varieties and promote sustainable farming practices to mitigate such risks (Aggarwal, 2008). Besides, the policy and bureaucratic hurdles are big impediments in the growth of the sector. The MSP policy poses questions, to provide financial security; however, inefficient implementation and delays in the procurement of agricultural produce seem to frustrate a farmer to sell it at a fair price (Chand, 2016). The repeal of recent farm laws in 2021 also demonstrated the challenges regarding agricultural policy reform in India (Gulati, 2021). On top of that, the lack of agricultural diversification also deprives farmers from venturing into high-value crops, horticulture, and organic farming so as to increase their income and food security (Joshi et al., 2004).

To overcome these problems, multifaceted approaches are badly needed: advocacy for wise agricultural practices, investments in irrigation infrastructure, and the creation of value-chain market linkages to ramp up productivity and economic resilience. Also, increasing financial support systems, promoting climate-resilient agriculture, and taking up revitalizing policy reforms are important to secure a long-term sustainability route in agriculture in India. The challenges are surmountable, and a multi-pronged strategy can help India secure the viability of farming communities in the future.

VI. CONCLUSION

There has been a very considerable change in India's agriculture, with lift in production and trade, though the sector has been beset with some persistent problems. More importantly, despite government initiatives such as MSP, PM-KISAN, etc., and certain digital platforms that tried to make things cheaper and accessible, they still confront various challenges, including fragmentation of landholdings, erratic pattern of monsoons, and volatile markets. Given that the climate change is aggravating these issues, climate-resilient mitigation measures must be put in place. For agriculture growth that fosters food security to be sustainable, policy reform, coupled with investment back into technology solutions and rural infrastructure, is a must. If these aspects are addressed, it will channel toward better production, enhanced farmer income/profiles, and bolster the economy of the agricultural sector in India.

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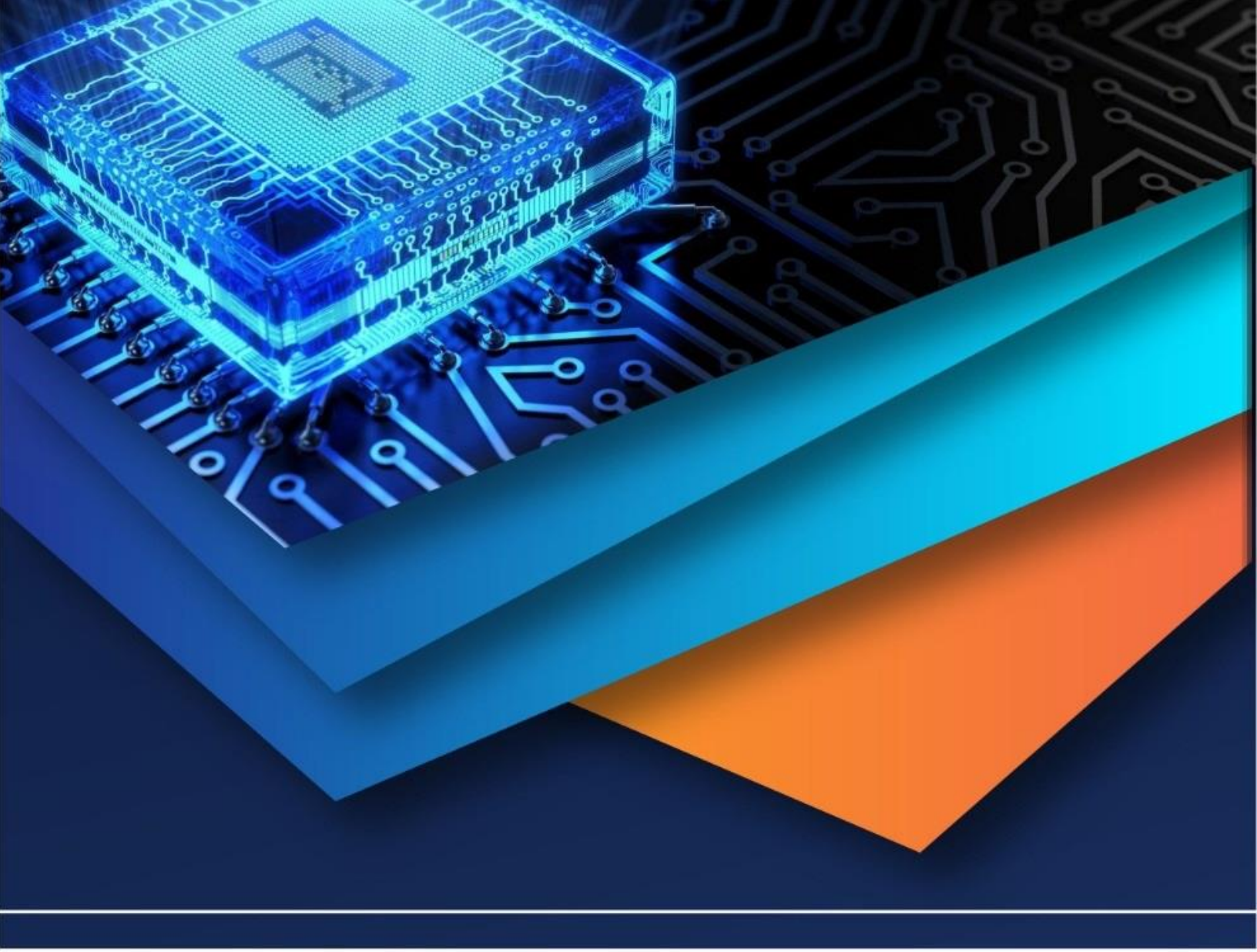

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