

A Study of Trends in Rice Production in India: Post Millennium

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Abstract: Food Grain refers to the sum total of all the major crops that are used as staple food items worldwide. These include grains like rice, wheat, maize (corn), barley, sorghum, millet, and various types of pulses or legumes such as lentils, beans, and peas. Rice holds immense significance as a staple food crop, sustaining over 60% of India's population. The cultivated area dedicated to rice has witnessed substantial growth, expanding from 30.81 million hectares in 1950-51 to 43.86 million hectares in 2014-15, marking a noteworthy increase of nearly 142%. Correspondingly, rice production has experienced a remarkable surge, escalating from 20.58 million tonnes in 1950-51 to 104.86 million tonnes in 2014-15, representing a nearly fivefold increase in output. This surge in productivity is further underscored by the rise in yield, which has climbed from 668 kg/ha to 2390 kg/ha during the same period. It's noteworthy that a significant proportion of rice production is concentrated during the Kharif season. This study is primarily dedicated to investigating the production of rice and the collective food grain yield in India. By scrutinizing this pivotal crop, we aim to gain insights into agricultural productivity dynamics, market trends, and their ramifications for both food security and economic development. Through a comprehensive examination of rice coupled with an evaluation of the overall food grain production, area and yield, this study endeavours to elucidate the agricultural output in terms of rice and foodgrains in total along with suggestions to broaden the food supply chain.

Keywords: Rice, Foodgrains, Area, Yield, Production, Food Security

1. Introduction

Agriculture stands as a foundational endeavour encompassing the cultivation of crops, fruits, vegetables, flowers, and the raising of livestock. Globally, approximately 50% of the population partakes in agricultural pursuits, underscoring its significance. In India, this sector holds even greater prominence, with two-thirds of the population reliant on it for sustenance and livelihood. This enduring dependency highlights the integral role agriculture plays in India's socio-economic fabric, shaping both its rural landscapes and urban economies.

Foodgrains encompass whole or broken kernels derived from cereals, millets, and pulses intended for human consumption, comprising a total of 26 commodities. This category comprises six types of cereals, eight varieties of millets, and twelve types of pulses, highlighting the diverse range of grains vital for nourishment. These essential food items form the backbone of diets worldwide, providing a significant source of carbohydrates, proteins, and essential nutrients critical for human health and well-being.

Rice cultivation in India traces back to approximately 1400 BC, originating in southern India after its domestication in the northern plains. From there, it gradually disseminated to the fertile alluvial plains irrigated by rivers across the subcontinent. Some scholars suggest that the term "rice" finds its roots in the Tamil word "Arisi," reflecting the linguistic influence of early rice cultivation in southern India. This linguistic connection underscores the significance of rice in the cultural and agricultural history of the region. Over time, rice became a staple crop in India, playing a vital role in sustaining populations and shaping agricultural practices across the country.

Objectives of the study

- 1) To Analyse the trend of agricultural production, yield and area under cultivation of total food grains in India from 2002-03 to 2022-23.
- 2) To Analyse the trend of agricultural production, yield and area under cultivation of Rice in India from 2002-03 to 2022-23.

2. Review of Literature

According to *Manohar Y., Jainuddin S.M., Dinesh T.M. and Reddy P.D.* in their paper "Growth and Instability of Rice Production in India", the study underscored the correlation between instability in rice production and fluctuations in market prices. It revealed a decline in production growth over the period 2011 to 2015, both nationally and in Karnataka. Despite fluctuations observed in all periods, they were less pronounced in certain period. This variability directly influenced market prices, consequently impacting farmers' incomes. In essence, fluctuations in rice production have significant implications for market stability and farmer livelihoods.

Wanjari R. H., Mandal K. G., Ghosh P. K. and Rao N. H., concluded in their paper "Rice in India: Present Status and Strategies to Boost Its Production Through Hybrids." that to meet the yearly increase of 2 million tons in rice production, adopting hybrid rice cultivation is essential. This involves disseminating knowledge on seed production practices, including maintaining isolation distances and optimal seeding rates. Large-scale hybrid rice production requires adherence to agronomic practices such as proper seed rates, planting density, and nutrient management. Due to the higher labour demands compared to traditional varieties, efficient management of labour is crucial. Overall, implementing these practices is vital for bridging the gap between projected demand and current production levels.

Lakshmi Prasanna P. A., Kumar Sant and Singh Aruna, observed in their research “**Rice Production in India — Implications of Land Inequity and Market Imperfections**” that how the small farmers used resources like fertilizer and water for rice farming. It found that smallholders increasingly adopt modern farming methods, supported by government policies. However, by 2001-02, a significant portion of smallholder land remained unfertilized, and many lacked accesses to credit. Unequal land ownership negatively impacted rice yields, highlighting the need to address structural inequities.

Data Sources and Research Methodology

This study relies heavily on empirical data collected from various secondary sources. These sources include book chapters, journal articles, newspaper articles, published reports, official documents such as those from the Economic Survey of India, reports from the National Statistical Survey Organization, bulletins and annual reports from the Reserve Bank of India (RBI), speeches and publications by RBI governors, records from the Labor Bureau of the Government of India, Ministry of Agriculture, and the World Bank. Additionally, information has been gathered from various informative websites. Specific data regarding area, yield, and production have been sourced from the official website of the Reserve Bank of India (RBI). With the help of data tables and graphs, the true picture of India’s total foodgrain’s and rice in terms of their area, yield and production has been analysed.

Total Food Grains

The total food grain production refers to the total production of the food grains in a year. Total food grains as the sum total of all the major crops that are used as staple food items worldwide. These include grains like rice, wheat, maize (corn), barley, sorghum, millet, and various types of pulses or legumes such as lentils, beans, and peas.

When we talk about total food grains, we're essentially considering the collective production or availability of these essential food crops. It's a way of assessing how much food is being grown or imported within a region or country. This information is vital for understanding food security – ensuring that there's enough food to meet the needs of the population – and for making informed decisions about agricultural policies and interventions to address any potential shortages or surpluses.

If we talk about the recent production The Final Estimates for the 2022-23 period indicate that the total food grain production in the country reached a record level of 3296.87 lakh tonnes. This figure represents a significant increase of 140.71 lakh tonnes compared to the previous year's production of 3156.16 lakh tonnes in 2021-22.

This substantial increase in food grain production suggests a positive trend in agricultural output for the country during the specified period. Several factors could contribute to this rise in production, including favourable weather conditions, increased adoption of advanced agricultural practices and technologies, government support through policies and initiatives, and investments in agricultural infrastructure.

Such growth in food grain production is noteworthy as it indicates an improvement in food security and availability within the country. With higher production levels, there is a better chance of meeting the dietary needs of the population and potentially reducing dependency on imports so that it can fulfil the food requirements. Additionally, surplus production can also contribute to building reserves for addressing any future fluctuations in production or unexpected emergencies, thereby enhancing overall food resilience.

Table 1: Total Foodgrains: Area, Yield and Production from 2002-03 to 2022-23.

Year	Area (Lakh Hectare)	Yeild (KG/Hectare)	Production (Lakh Tonnes)
2002-03	1139	1535	1748.0
2003-04	1235	1727	2132.0
2004-05	1201	1652	1984.0
2005-06	1216	1715	2086.0
2006-07	1237	1756	2173.0
2007-08	1241	1860	2308.0
2008-09	1228	1909	2345.0
2009-10	1213	1798	2181.0
2010-11	1267	1930	2445.0
2011-12	1248	2078	2593.0
2012-13	1207	2129	2571.0
2013-14	1260	2101	2650.0
2014-15	1220	2070	2520.0
2015-16	1232	2056	2515.0
2016-17	1292	2129	2751.0
2017-18	1275	2235	2850.0
2018-19	1248	2286	2852.0
2019-20	1270	2343	2975.0
2020-21	1298	2394	3107.0
2021-22	1302	2425	3156.2
2022-23	1322	2500	3305.4

Source: Reserve Bank of India

The above table 1. shows the highest and the lowest area of cultivation (lakh hectare), yield (kg/hectare) and the of the total production (lakh tonnes). The lowest cultivation of area was in year 2002-03, which was 1139 lakh hectare and the reason for the low productivity was the demographic factor and the population pressure on the land. It was observed that the highest total foodgrains area under cultivation was 1322 lakh hectares, in the year 2022-23 and the reason of this growth and increase was the good climatic condition and the advanced technology which were being used in the process of the production.

The yield for the total foodgrains was at the lowest in the year 2002-03 at 1535 kg/hectare. The yield was low due to the less area under cultivation and the lack of other essential facilities. The highest yield for the total foodgrains was in the year 2022-23 with 2500 kg/ hectare. This extreme growth was due to the usage of latest technology and proper facilities.

The lowest total foodgrains production was in the year 2002-03 with 1748.0 lakh tonnes. The main reason was the low area of cultivation and the low yield. The highest total foodgrains production was observed in the year 2022-23 with 3305.4 lakh tonnes. This was all possible because of the growth of the yield and the area of cultivation in the past years.

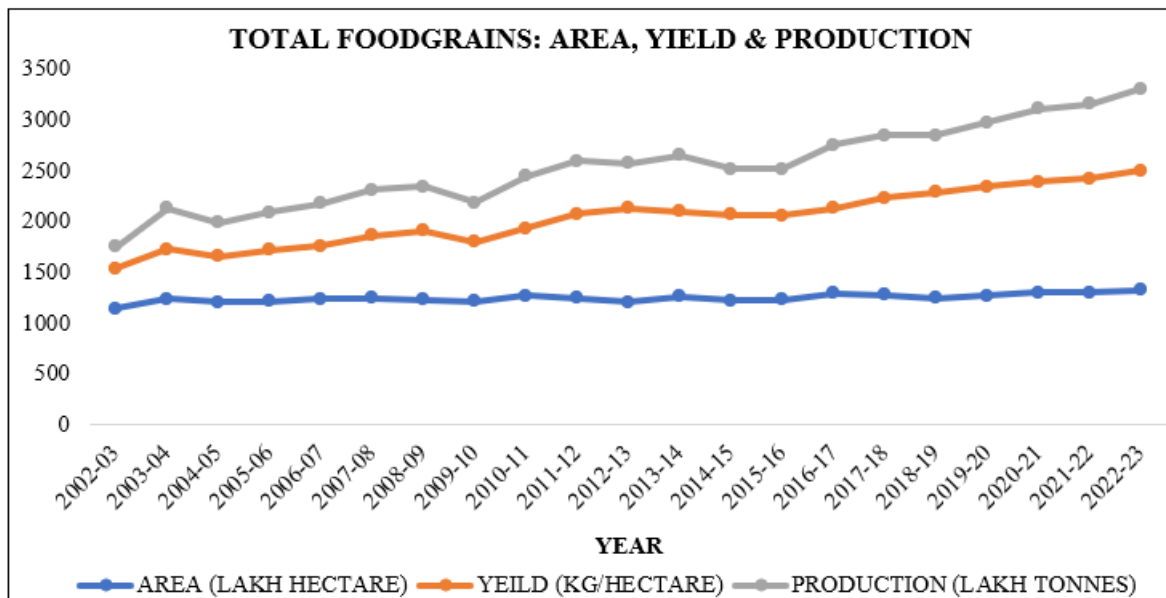


Figure 1

Source: Author's own calculation.

The Figure 1. is the graphical representation of Pulses and its area under cultivation (lakh hectare), its yield (kg/hectare) and its production (lakh tonnes) in India since 2002-03 to 2022-23. It is clearly visible from the graph that area of the total production has been increasing every year due to land on which the cultivation is done is growing. Yield and Production of foodgrains has been showing a fluctuating trend till 2022-23, as it being an agricultural commodity depends on the prevailing weather conditions and the allied facilities.

Rice

Oryza sativa, commonly known as rice, is the primary species referred to as rice in English. Rice cultivation began over 9,400 years ago in China, as evidenced by archaeological findings. Around 10,000 years ago, hunter-gatherer groups near the Yangtze River transitioned to agricultural practices. This shift marked the dawn of agriculture, with rice cultivation playing a pivotal role. The adoption of rice farming led to the establishment of settled communities and laid the foundation for modern agriculture. This early agricultural revolution reshaped human societies and laid the groundwork for sustained food production.

Table 2: Rice: Area, Yield and Production from 2002-03 to 2022-23

Year	Area (Lakh Hectare)	Yield (KG/Hectare)	Production (Lakh Tonnes)
2002-03	412	1744	718.2
2003-04	426	2077	885.3
2004-05	419	1984	831.3
2005-06	437	2102	917.9
2006-07	438	2131	933.6
2007-08	439	2202	966.9
2008-09	455	2178	991.8
2009-10	419	2125	890.9

2010-11	429	2239	959.8
2011-12	440	2393	1053.0
2012-13	428	2461	1052.4
2013-14	440	2424	1066.5
2014-15	439	2390	1054.8
2015-16	435	2400	1044.1
2016-17	440	2494	1097.0
2017-18	438	2576	1127.6
2018-19	442	2638	1164.8
2019-20	437	2722	1188.7
2020-21	458	2717	1243.7
2021-22	463	2798	1294.7
2022-23	477	2844	1355.4

Source: Reserve Bank of India

The Table 2. above shows the Rice area under cultivation was the lowest in the year 2002-03 it was 412 lakh hectares, indicating less land was used for growing this crop as the soil became less fertile due to over irrigation. The highest cultivation area of rice was in the year 2022-23 as it reached its peak due to the good cropping season and good soil health.

The yield of Rice per hectare was the lowest in the year 2002-03, it was 1744 kg/hectare due to the monsoon rainfall deficiency. The yield of Rice per hectare was observed to be the highest in the year 2022-23, because the rain fall during this period was good and the monsoon's timely arrival which made the weather conditions supportive for Rice.

The lowest production of Rice was observed in the year 2002-03 which was 718.2 lakh tonnes due to the low area of cultivation and the low yield. The highest production of rice was observed in the year 2022-23 which was 1355 lakh tonnes due to the high yield and large area of cultivation.

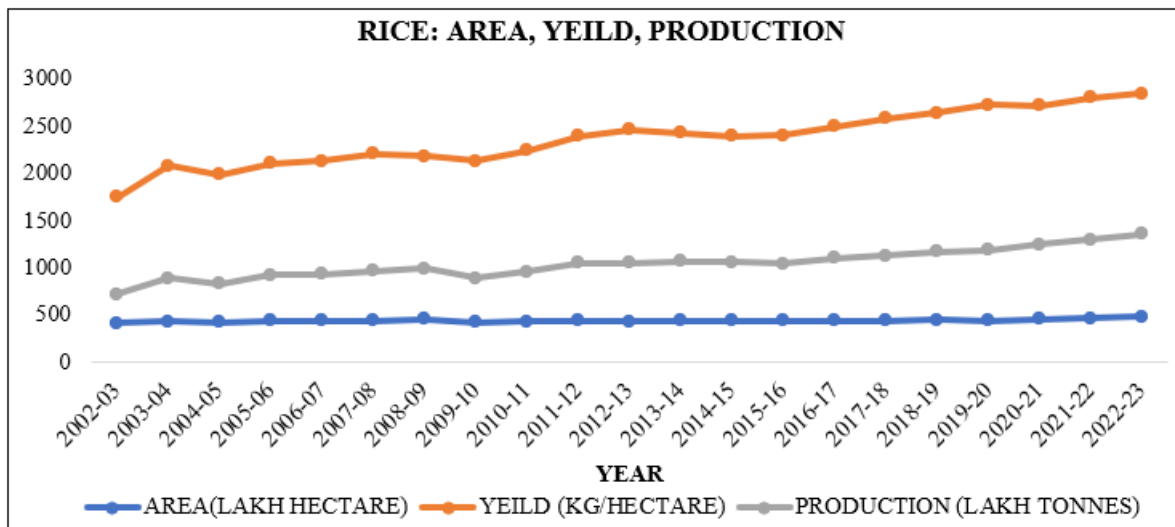


Figure 2

Source: Author's own calculation.

The Figure 2 is the graphical representation of the area under rice cultivation, its yield and the rice production in India since 2002-03 to 2022-23. It is clearly visible from the graph that area under rice cultivation has been almost constant (identical to parallel line) due to water facilities as rice needs a lot of water for cultivation and in India West Bengal is the highest producer of rice.

While the rice production has been increasing steadily since 2002-03 in India due to almost all the parts of India are suitable for raising rice during the summer seasons provided that the ample amount of water is available. Yield of rice has been showing a fluctuating trend till 2022-23, as it being an agricultural commodity depends on the prevailing weather conditions and the allied facilities.

Findings and Suggestions

The data in the study illustrates the dynamic relationship between rice cultivation area, yield, and production in India from 2002-03 to 2022-23. Despite the area under rice cultivation remaining relatively constant, the country has seen a steady increase in rice production over the years. This can be attributed to favourable conditions for rice cultivation across various regions of India, coupled with sufficient water availability, especially in states like West Bengal, which emerges as a significant contributor to rice production.

In contrast, the yield of rice has shown a fluctuating trend, likely influenced by various factors such as weather conditions, agricultural practices, and technological advancements. Despite these fluctuations, the overall upward trajectory in rice production signifies the resilience and adaptability of India's agricultural sector.

Overall, the data suggests a promising outlook for rice production in India, underpinned by consistent cultivation practices and favourable geographical conditions, while also highlighting the challenges and opportunities inherent in agricultural production, particularly in the context of climate variability. Following are a few suggestions for painting a positive picture of Rice and Total foodgrains in India:

- 1) Optimizing rice and foodgrains production in India requires a multifaceted approach. Firstly, efficient water management strategies must be prioritized, given rice's heavy reliance on water. Implementing techniques like drip irrigation and rainwater harvesting can ensure sustainable irrigation practices. Additionally, promoting the adoption of modern agricultural technologies and practices, such as precision farming and mechanization, can enhance productivity while reducing labour dependency.
- 2) Investments in research and development are crucial for developing drought-resistant rice varieties and resilient foodgrains strains. By mitigating the impact of climate change on crop yields, India can stabilize production levels despite fluctuating weather conditions. Moreover, improving rural infrastructure, including storage facilities and market access, facilitates efficient transportation of produce, reducing post-harvest losses.
- 3) Extension services play a vital role in disseminating information and training farmers on best practices in crop management and pest control. Government should support through subsidies, insurance schemes, and price support mechanisms incentivizes farmers to adopt sustainable practices and invest in productivity-enhancing technologies.
- 4) Encouraging crop diversification alongside rice and foodgrain cultivation can enhance resilience and market opportunities. Promoting alternative crops suited to local agro-climatic conditions can reduce monoculture risks while meeting diverse consumer demands.

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