

## An Analysis of Trends and Patterns of Area, Production, and Yield of Millets in India

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**ABSTRACT:** The importance of Millets has been now well recognised not only by the nutritional experts but also by the policy makers. Hence, systematic efforts are now being made to increase the production of Millets. The year 2023 has been declared as the year of Millets. In this context, the paper tries to analyse the trends and patterns in the production of millets across the states in India based on the available secondary data. The paper finds that total area under millets and total production have been declining, but the yield has been increasing over the years in India.

### INTRODUCTION

Millet cultivation in India has a long history dating back thousands of years Michaelraj & Shanmugam, April (2013). Millets are small-seeded grasses that are grown for their nutritious grains, which are used as a staple food in many parts of the country. They are hardy crops that can adapt to various agro-climatic conditions and are particularly suitable for rain-fed areas with low fertility soils. There are several types of millets grown in India, including pearl millet (bajra), finger millet (ragi), foxtail millet (kangni), little millet (kutki), and barnyard millet (sanwa), among others. Each type has its own unique characteristics and is situated to different regions and growing conditions. Millet cultivation in India is widespread, with major production states including Rajasthan, Maharashtra, Gujarat, Uttar Pradesh, Karnataka, and Tamil Nadu (Das, 2019). These states have favourable climatic conditions, including hot and dry summers, which are ideal for millet cultivation. The cultivation of millets in India is often done as a rain-fed crop, relying on the monsoon rains for irrigation. However, in some regions, millets are also grown using irrigation methods, such as tube wells and small-scale water conservation structures. Millet crops are typically sown during the onset of the monsoon season, between June and July, when there is sufficient soil moisture. The crops require well-drained soils with good organic matter content. Millets are known for their ability to withstand drought conditions and can grow in areas with low rainfall (Malathi 2016). Farmers use traditional farming practices for millet cultivation, including ploughing the land, sowing the seeds either by broadcasting or using seed drills, and subsequent weeding and pest control measures. Millets are known for their ability to grow well in low-input farming systems, requiring minimal use of chemical fertilizers and pesticides. Harvesting of millet crops usually takes place around 70 to 100 days after sowing, depending on the variety and growing conditions. The crops are harvested by cutting the stalks close to the ground and then threshed to separate the grains from stalks. After threshing, the grains are further processed and stored for consumption or sold in the market. Millet cultivation plays a significant role in Indian agriculture, particularly in dryland regions. It provides food security for millions of people, especially in rural areas, and contributes to the livelihoods of small-scale farmers. Millets are highly nutritious, rich in dietary fiber, protein, and micronutrients, making them an important component of a healthy diet (Michealraj 2013).

In recent years, there has been a renewed interest in millets due to their nutritional value, resilience to climate change, and their potential to improve soil health. The government and various organizations have been promoting millet cultivation through awareness campaigns, research and development, and policy support to enhance their production and consumption in India. Overall millet cultivation in India has rich cultural and agricultural heritage and continues to be an important crop that contributes to food security, rural livelihoods, and sustainable agriculture practices in the country. In this context, the present paper tries to analyse the trends and patterns in the area, production and yield of millets.

The study used secondary data pertaining to area, production, and yield of millets in India during the last seven decades i.e., from 1950-51 to 2020-21, collected primarily from directorate of Economics and Statistics, government of India and Ministry of Agriculture, Government of India. The data was analysed taking percentages and averages to examine the changes in area, production, and yield of major millet crops, viz., sorghum, pearl millet, finger millet, and small millets.

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**Table No.1. Millets: All India Area (mln. ha.), Production (mln. Tns.) and Yield(Kg/ha).**

Year	Area (Mnl ha.)	Production (Mln. Tns.)	Yield (Kg/ha.)
1950-60	42.66	21.18	488.8
1960-70	45.34	25.35	554.1
1970-80	42.88	27.84	716.0
1980-90	39.22	30.22	772.4
1990-00	31.55	30.95	983.6
2000-10	28.60	35.62	1247.7
2010-20	24.84	43.94	1797.1

**Source: Directorate of Economics and Statistics, Agriculture Department**

Let's analyse the data on all India decadal area, production, and yield of millets from 1950 to 2020:

- **Area (in million ha):** The total cultivated area for millets in India has shown a declining trend over the decades. It was at its highest during 1960-70 with 45.34 mln ha. but decreased to 24.84 mln ha. during 2010-2020. The decline in millet cultivation area may be due to various factors such as changes in agricultural practises, increasing urbanisation, and a shift in focus towards other crops.
- **Production(in mln tns.):** The millet production has shown an overall increasing trend over the decades, with some fluctuations. It increased from 21.18 million tonnes in 1950-60 to 43.94 million tonnes in 2010-20. The growth in millet production can be attributed to improved agricultural practises, better seeds, increased use of fertilisers and technological advancements.
- **Yield(Kg/ha.):** The yield of millets has shown a consistent upward trend over the decades. It increased from 488.8 Kg/ha in a 1950-60 to 1797.1 Kg/ha in 2010-20. The increase in yield can be attributed to the adoption of high-yielding varieties, improved irrigation facilities, better crop management practises, and advancements in agricultural technology.
- **Reasons for the absorbed trends:** Shifting agricultural practises: As India's economy evolved, there was a shift towards commercial and cash crops, leading to a decrease in the area under traditional crops like millets. Government policies: Agricultural policies, subsidies, and support from the government may have influenced farmers choices in crop cultivation and impacted production and yields. Changing food habits: Changes in dietary habits and preferences of consumers could affect the demand for different crops, influencing farmers choices in crop cultivation. Market Demand: Demand for millets in the domestic and international markets, as well as their various users (e.g., as health foods, animal feed, and in the food processing industry), could impact cultivation decisions. Technological advancements: The adoption of improved seeds, irrigation facilities, fertilisers and modern agricultural machinery has contributed to increasing production and yields. Climate resilience: millets are known for their ability to withstand adverse climatic conditions, and in regions facing water scarcity or harsh environments, millets might continue to be cultivated despite changes in overall area.

In conclusion, the data shows a declining trend in the cultivated area of millets in India over the years, but there has been an overall increase in production and yield. The trends are influenced by a combination of factors, including changing agricultural practises, government policies, shifting food habits, market demand, and technological advancements. the rising yield per hectare indicates that despite the decreasing area, efforts have been made to enhance productivity and ensure food security through improved agricultural practises.

### AREA UNDER MILLETS

Let's analyse the data on the cultivated area of different millets in India from 1950 to 2020, focusing on the percentage distribution of each millet type during different decades:

**Table No.2 The Decadal Cultivated area in percentage of Jawar, Bazra, Maize, Ragi, and other millet in total area of millet cultivation in India since 1950-2020: (Area:In mln ha.)**

year	Jawar		Bazra		Maize		Ragi		Other millet	
	Area	percnt	Area	percnt	Area	percnt	Area	percnt	Area	prcnt
1950-60	17.18	40.29	12.04	28.11	3.78	8.86	2.36	5.53	8.37	5.99
1960-70	18.39	40.59	11.73	25.88	5.56	12.26	2.48	5.48	7.65	5.56
1970-80	16.19	37.78	11.58	26.99	5.85	13.66	2.51	5.87	6.69	4.77
1980-90	15.72	40.08	10.92	27.85	5.83	14.88	2.25	5.72	4.36	3.09
1990-00	11.3	35.77	9.73	30.87	6.17	19.61	1.81	5.71	2.51	1.77

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2000-10	8.51	29.68	9.29	32.51	7.65	26.78	1.43	4.99	1.55	1.1
2010-20	5.49	22.09	8.28	33.39	9.2	37.07	1.1	4.44	1.24	0.87

Source: Directorate of Economics and Statistics, Agriculture Department.

- **Jawar (Sorghum):** The percentage of cultivated area for Jawar has gradually declined over the decades. It was the most dominant millet crop in the 1950s, with 40.29% of the total millet cultivation area, but decreased to 22.09% in the 2010s. Possible reasons for the decline could be changes in food habits, shifting agricultural practises, and the preference for other crops with better economic returns.
- **Bajra (Pearl Millet):** The percentage of Bajra cultivated area has shown fluctuations over the decades but overall it has remained relatively stable. In the 1950s, Bajra accounted for 28.11% of the total millet cultivation area, and it maintained a similar share of around 33-34% in the 2000s and 2010s. Bajra's stable position could be attributed to its suitability for various agro-climatic conditions and traditional demand.
- **Maize:** The percentage of maize cultivated area has exhibited consistent growth throughout the decades. It was the least cultivated millet in the 1950s with 8.86% of the total area but grew to 37.07 percent in the 2010s. The rise in Maize cultivation can be attributed to its versatility, increasing demand from various industries, and higher yields compared to some other millets.
- **Ragi (Finger Millet):** The percentage of Ragi cultivated area has shown a declining trend over the decades. Ragi had a significant share of 5.53% in the 1950s, but it decreased to 4.44% in the 2010s. Possible reasons for the decline include limited suitability in certain regions, lower demand and competition from other staple crops.
- **Other Millets:** The percentage of cultivated area for other millets, apart from Jawar, Bajra, Maize and Ragi has a significantly decreased over the decades. In the 1950s, other millets accounted for 5.99% of the total millet cultivation area, which reduced to 0.87 percent in the 2010s. The decline in cultivation of the other millets can be attributed to their limited demand, lower yields and the preference for other cereal crops.

### Reasons for the observed trends:

- **Changing food habits:** Shifts in a dietary preference and the consumption of other staple foods might have led to changes in Millet cultivation patterns.
- **Technological advancements:** The adoption of modern agricultural practises and technologies might have favoured certain crops, leading to changes in cultivation areas.
- **Market Demand:** The demand for specific millet crops in domestic and international markets can influence farmers' decisions on crop cultivation.
- **Climate and Soil conditions:** Different millet crops have varying adaptabilities to different agro-climatic regions, affecting their cultivation patterns.
- **Government Policies:** Agricultural policies, subsidies and incentives could influence farmers' choices in crop cultivation.

In conclusion, the data reveals dynamic shifts in the cultivation areas of various millet crops in India over the decades. These changes are driven by a combination of factors, including changing food habits, market demand, technological advancements and government policies. Understanding these trends can assist in developing effective strategies to promote sustainable and diversified agricultural practises in India.

Table No:3 Millets: Area, Production and Yield during 2020-21 in major producing states.

State	Area (mln ha.)	% to All-India	Production (mln. Tns.)	% to All-India	Yield (Kg/ha)
Rajasthan	6.15	25.81	8.33	16.3	1355
Karnataka	3.45	14.47	7.73	15.11	2243
Maharashtra	3.89	16.33	6	11.72	1540
Madhya Pradesh	2.01	8.42	4.63	9.06	2309
Uttara Pradesh	2.02	8.49	4.59	8.97	2266
Tamil Nadu	0.99	4.14	3.67	7.17	3721
West Bengal	0.37	1.57	2.46	4.81	6563
Andhra Pradesh	0.51	2.14	2.45	4.78	4805
Bihar	0.67	2.8	2.25	4.39	3367
Telangana	0.37	1.57	1.95	3.81	5212
Gujarat	0.91	3.8	1.73	3.38	1906
Haryana	0.62	2.59	1.42	2.77	2300

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Others	1.88	7.87	3.95	7.73	2108
All India	23.83	100	51.15	100	2146

Source: Directorate of Economics and Statistics and Agricultural Department

Let's analyse the data table representing the area, production and yield of millets in major producing states during the year 2020-21:

- 1. Area Distribution:** Rajasthan has the largest area under millet cultivation, accounting for 25.81% of the total millet cultivation in India. Karnataka and Maharashtra follow, contributing 14.47% and 16.33% respectively, to the overall millet cultivation area in the country. The top five millet producing states (Rajasthan, Karnataka, Maharashtra, Madhya Pradesh and Uttar Pradesh) collectively contribute around 73% of the total millet cultivation area in India.
- 2. Production Distribution:** Rajasthan is the largest millet producer, contributing 16.3% of the total millet production in India during 2020-21. Karnataka, Maharashtra, Madhya Pradesh and Uttar Pradesh are the next major contributors to millet production in the country, together accounting for approximately 48% of total production. Tamil Nadu, West Bengal, Andhra Pradesh, Bihar and Telangana also play significant roles in millet production, contributing around 27% of the total millet production in India.
- 3. Yield:** West Bengal has the highest yield of Millets among the major producing states, with 6563 kg/ha. This indicates that millet cultivation in West Bengal is highly productive, yielding a large quantity of millets per unit of the land. Tamil Nadu, Andhra Pradesh and Telangana also have relatively high yields, indicating good agricultural practises and favourable environmental conditions. Rajasthan, despite having a large area under cultivation, has a lower yield compared to other states. this may indicate potential for improving agricultural practises in the state to increase productivity.
- 4. Reasons for Variations:** Climate and Soil Conditions: States like West Bengal, Tamil Nadu, Andhra Pradesh and Telangana might have favourable climate and soil conditions for millet cultivation, leading to higher yields. Agricultural Practises: States with higher yields may be implementing better agricultural practises, including modern techniques, improved seeds, and efficient water management, resulting in higher productivity. Government Support: States with higher yields and production may have benefited from government initiatives, subsidies and support for millet cultivation. Crop Preference: The variation in area and production might also be influenced by farmers' preferences for certain crops based on market demand and price fluctuations. Overall, the data suggests that while certain states are leading in millet cultivation and production, there is still room for improvement in yield in some regions. Encouraging and promoting efficient and sustainable agricultural practices can further boost millet production in India, contributing to food security and better agricultural outcomes.

### MAJOR FINDINGS AND CONCLUSIONS

The decline in millet cultivation has a percentage of the total agricultural area can be attributed to changing dietary preferences, market dynamics, government policies, input costs, farm mechanisation and the impact of the Green Revolution. Recognising the nutritional and environmental benefits of millets, there has been a recent effort to promote and revive millet cultivation in some regions to ensure food security and sustainable agriculture.

The data shows that despite a decrease in the area under cultivation advancements in agricultural technology and practises have resulted in increased yields and higher production of cereals and millets in India however it is essential to monitor these trends continuously and ensure sustainable agricultural practises to meet the growing food demand of the country's population overall, the data suggests that while certain states are leading in millet cultivation and production there is still room for improvement in yield in some regions encouraging and promoting efficient and sustainable agricultural practises can further boost millet production in India contributing to food security and better agricultural outcomes.

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