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(A No. 151) Exploring the millets landscape: Insights into Area, Production and Sustainability in India with a focus on Rajasthan

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ABSTRACT

Millets comprise a group of small-seeded cereal crops that are well suited to cultivation across diverse tropical and subtropical regions and can be grown with minimal agricultural inputs. These crops are highly robust, thriving in arid and semi-arid conditions, and show strong tolerance to high temperatures and drought stress. Millets require significantly less water, around 350 mm, compared to nearly 1200 mm needed for rice cultivation. Owing to their exceptional nutritional profile, millets are often described as a "nutritional powerhouse." They are cost-effective and offer greater nutritional value than wheat and rice, as they are rich in protein, dietary fibre, essential vitamins, and minerals such as iron. Additionally, millets contain substantial amounts of calcium and magnesium. Their high iron content plays an important role in addressing the widespread problem of anaemia, particularly among women of reproductive age and infants in India.

The data highlights significant trends in millet cultivation in India, particularly in the states of Rajasthan, Maharashtra, and Karnataka. Rajasthan stands out as a leader in pearl millet cultivation during the 2021-22 season, with a substantial area dedicated to it and a high productivity rate of 989 kg/ha. Maharashtra takes the lead in sorghum cultivation during the same season, covering a substantial area and achieving a productivity rate of 787 kg/ha. Karnataka has excelled in finger millet cultivation, attaining an impressive productivity rate of 1,573 kg/ha.

Rajasthan's pearl millet cultivation in 2021-22 covered a vast area of 4,300,738 hectares, resulting in a production of 4,303,271 tonnes. Notably, Barmer had the largest area under pearl millet cultivation in Rajasthan, with 982,853 hectares and a significant production of 159,354 tonnes. Alwar recorded the highest production and productivity within the state.

Analyzing long-term trends in millet cultivation from 2010-11 to 2021-22, it is evident that both the production and the area under millet cultivation in India have shown negative compound annual growth rates (CAGRs) of -1.01% and -1.02%, respectively. The yield has also exhibited a negative growth trend with a CAGR of -0.98%, indicating an overall decline in millet cultivation at the national level.

When looking at pearl millet cultivation in Rajasthan over time (from 2001-02 to 2021-22), there is a shift in practices. Although the area under cultivation decreased, both production and productivity increased, suggesting potential improvements and efficiencies in pearl millet farming in the state.

In summary, the data emphasizes regional variations in millet cultivation, with some states excelling in specific millet varieties. However, the overall trend in India shows a decline in millet production and cultivation, indicating a need for interventions to promote and sustain millet farming as a crucial agricultural sector.

Table 1: Nutrient content of Millets (per 100 gram)

Crop	Protein(g)	Fibre(g)	Minerals(g)	Iron(mg)	Calcium(mg)
Pearl Millet	10.60	1.3	2.3	16.9	0.38

Finger Millet	7.30	3.6	2.7	3.9	344
Foxtail Millet	12.30	8.0	3.3	2.8	0.31
Proso Millet	12.50	2.2	1.9	0.8	0.14
Kodo Millet	8.30	9.0	2.6	0.5	0.27
Little Millet	7.70	7.6	1.5	9.3	0.17
Rice	6.80	0.2	0.6	0.7	0.10
Wheat	11.80	1.2	1.5	5.3	0.41

Millets scenario of India

Millets are cereal crops that are mainly grown in several states across India. In the 2021-22 agricultural year, the cultivation of millets was significant in the following states, and here is some detailed information about their production: In the 2021-22 season, Rajasthan led India in pearl millet cultivation, covering the largest area. The state produced a significant quantity of pearl millets with an impressive productivity rate. The area under pearl millets in Rajasthan was 41.58 thousand hectares, with a production of 41.12 thousand tonnes and a productivity rate of 989 kg/ha.

Meanwhile, Maharashtra held the top spot in sorghum cultivation across India during the same period. Sorghum, a type of millet, was cultivated over an area of 19.76 thousand hectares in Maharashtra, resulting in a production of 15.56 thousand tonnes and a productivity of 787 kg/ha. Additionally, Karnataka had a substantial area dedicated to finger millet cultivation and achieved high productivity in the production of this millet variety. The area under finger millets in Karnataka was 7.16 thousand hectares, yielding a production of 11.26 thousand tonnes and a productivity rate of 1573 kg/ha.

Table 2: State wise millets production 2021-22

State	Sorghum			Pearl millets			Finger millets			Smal millets		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y
AP	1.3	3.48	2689	0.31	0.6	1907	0.33	0.4	1233	0.18	0.15	804
Gujarat	0.6	0.81	1348	4.26	9.67	1970	0.11	0.12	1106	0.07	0.11	1535
Haryana	0.35	0.19	549	4.84	10.18	2103	0	0	0	0	0	0
Rajasthan	5.81	4.81	829	41.58	41.12	989	0	0	0	0.09	0.06	717
Maharashtra	19.76	15.56	787	6.57	5.29	805	0	0	0	0.42	0.2	466
UP	1.66	2.35	1416	9.06	18.95	2095	0	0	0	0.08	0.06	723
Tamil Nadu	4.05	4.54	112	0.61	1.53	2502	0.81	2.72	3346	0.24	0.31	1335

Karnataka	8.46	9.65	1141	0	0	620	7.16	11.26	1573	0.31	0.24	786
MP	1.38	2.67	1935	3.21	7.29	2075	0	0	0	0.98	0.85	867
Maharashtra	19.76	15.56	787	6.57	5.29	805	0	0	0	0.42	0.2	466
Others	1.5	1.24	1560	0.28	0.21	792	1.1	1.12	1450	0.86	0.75	993
All India	44.25	45.35	1025	72.97	97.45	1335	10.92	17.35	1589	4.65	3.73	802

Source: Ministry of Agriculture, Govt. of India, 2021-22

Millets scenario of Rajasthan

In the 2021-22 season, pearl millet cultivation in Rajasthan covered a total area of 4,300,738 hectares, yielding a production of 4,303,271 tonnes. Barmer had the highest pearl millet cultivation area in Rajasthan, spanning 982,853 hectares and producing 159,354 tonnes. Meanwhile, Alwar achieved the highest production and productivity, with 700,195 tonnes and 2,420 kg/ha, respectively, during the same period.

Table 3: Top Pearl Millet Producing Districts of Rajasthan (2021-22)

Crop	District	Area(ha)	Production (tonnes)	Yield (Kg/ha)
Bajra	Barmer	982823	159354	162
	Jodhpur	433765	258280	595
	Jalore	357237	113256	317
	Jaipur	309522	590664	1908
	Alwar	289394	700195	2420
	Sikar	254238	320867	1265
	All Rajasthan	**4300738**	**4303271**	**1001**

Source: Ministry of Agriculture, Govt. of India, 2021-22

Growth performance of area, production and yield

Compound annual growth rates (CAGR) were estimated for millet crops for the period from 2010–11 to 2021–22 to examine trends in area, production, and productivity in India. The results indicate that millet production registered a negative growth rate of –1.01 percent during the study period. Similarly, the area under millet cultivation declined, recording a negative CAGR of –1.02 percent. Although both area and production decreased, overall productivity also showed a marginal decline, with a CAGR of –0.98 percent. In contrast, the CAGR analysis for Rajasthan reveals a different pattern for pearl millet: while the cultivated area declined during 2001–02 to 2021–22, both production and yield exhibited positive growth over the same period.

Table 4: Compound growth rates of millets in India and Rajasthan

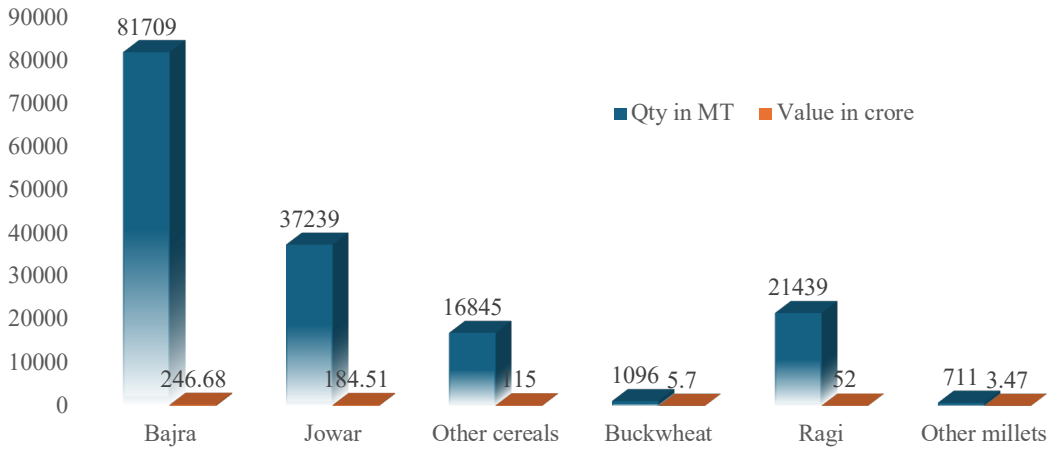
	Crop	Year	Area (lakh ha)	Production (lakhT)	Yield (Kg/ha)
India	**Bajra**	2010-22	-0.98	-0.99	-0.98
	sorghum	2010-22	-1.03	-0.99	-1.02
	Finger Millet	2010-22	-1.01	-1.01	-1
	Small Millets	2010-22	-1.05	-1.02	-0.96
	Total	**2010-22**	**-1.02**	**-1.01**	**-0.98**
Rajasthan	**Bajra**	2001-22	**-0.008**	**0.028**	**0.036**

The decline in millet cultivation can be attributed to the policy emphasis on rice and wheat compared to millets, along with the absence of adequate institutional support and targeted initiatives for millet development. Lower profit margins from millet cultivation, relative to competing crops, have acted as a disincentive for farmers. Additionally, the relatively short shelf life of millets poses storage challenges and increases the risk of post-harvest losses. Changes in consumer preferences and lifestyles, coupled with the limited availability of processed and ready-to-eat millet-based products, have further contributed to the reduction in demand..

Export scenario

In the fiscal year 2022-23, India exported a total of 169,049.11 metric tonnes of millets, valued at Rs. 608.12 crore. Notably, the largest share of this export was attributed to pearl millet, accounting for 81,709 metric tonnes valued at Rs. 246.68 crore. Additionally, jowar constituted the second largest export, with 37,239 metric tonnes valued at Rs. 184.51 crore.

Fig.1: Millets Export from India



Source: APEDA

Conclusion

The data reveals several interesting trends and observations regarding millet cultivation in India, with a particular focus on Rajasthan, Maharashtra, and Karnataka.

Rajasthan's Dominance in Pearl Millet: Rajasthan established its supremacy in pearl millet cultivation during the 2021-22 season. It covered an extensive area, resulting in a significant production of pearl millets. The state's remarkable productivity rate of 989 kg/ha underscores its expertise in this particular millet variety.

Maharashtra's Lead in Sorghum Cultivation: Maharashtra emerged as the top state for sorghum cultivation during the same season. The state cultivated sorghum over a substantial area, producing a considerable quantity with a productivity rate of 787 kg/ha.

Karnataka's Success with Finger Millets: Karnataka dedicated a considerable area to finger millet cultivation and achieved high productivity in the production of this millet variety. The state's 1,573 kg/ha productivity rate is commendable.

Pearl Millet in Rajasthan - 2021-22: During the 2021-22 season, Rajasthan's pearl millet cultivation saw a vast area of 4,300,738 hectares, resulting in a production of 4,303,271 tonnes. Barmer, in particular, boasted the highest area under pearl millet cultivation in Rajasthan, with 982,853 hectares and a significant production of 159,354 tonnes. Alwar achieved the highest production and productivity within the state, further highlighting regional variations.

Long-term Trends in Millet Cultivation: The compound annual growth rate (CAGR) analysis over the decade from 2010-11 to 2021-22 reflects some noteworthy trends. While the overall production and area under millet cultivation in India showed negative CAGRs of -1.01% and -1.02%, respectively, the yield exhibited a negative growth trend with a CAGR of - 0.98%. These numbers indicate a decline in millet cultivation at the national level.

Pearl Millet Cultivation in Rajasthan Over Time: In Rajasthan, the analysis suggests a shift in pearl millet cultivation practices over the period from 2001-02 to 2021-22. Although the area under cultivation decreased, both production and productivity increased, indicating potential improvements and efficiencies in pearl millet farming in the state.

In conclusion, the data indicates that while there are fluctuations in millet cultivation over time, some regions, like Rajasthan, continue to excel in pearl millet cultivation. Additionally, the decline in overall millet production and cultivation in India suggests the need for interventions to promote and sustain millet farming as a vital agricultural sector.

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