SWITCH ON FOUNDATION

Millet Cultivation in Maharashtra & Water needs

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Introduction

Agriculture is the backbone of the Indian economy. It is considered a traditional occupation in India. Different irrigation techniques, like intensive farming, crop rotation, and mixed farming, are used to produce both Kharif and Rabi crops. Rice, wheat, jute, and maize are considered major crops in this country. India is the largest producer of millet as of 2021, with a total share of 41% all over the world (IDR, 2023). It is considered a 12th country for producing high yields of millet. Due to its high health benefits and low water requirements, numerous parts of India produce millet. In India, Rajasthan (35.5%), Maharashtra (20%), Karnataka (13.3%) Uttar Pradesh (8.8%) are the fastest millet-growing states (NABARD, 2023). India has witnessed a rising trend in finger millet cultivation from 1991 to the present (Meena *et al.,* 2021). Based on the available data, a secondary research has been carried out to understand the status of millet cultivation in Maharashtra. The water requirement for cultivating millets and the state's water availability have also been a focus of this research.

Climatic condition & Millet production in Maharashtra

Maharashtra has a variety of climates owing to its natural geography. Apart from the Konkan and Sahyadri regions, most parts of the Maharashtra state **belong to semi-arid regions.** Drought is a common thing that usually occurs in the regions of Marathwada and Vidarbha. Also, these two districts often face frequent droughts and lower rainfall with a drastic drop in groundwater levels resulting in loss of crops during the kharif and rabi seasons. In this place, mainly 70 to 100 mm of rainfall is commonly found. In the case of surface water availability, Amaravati division and Aurangabad division have the lowest percentages at 6% and 9%, respectively (Nivrutti & Mahavidyalaya, 2021). Apart from low rainfall, total water availability is also low in the Amaravati division, Nashik division, and Aurangabad division.

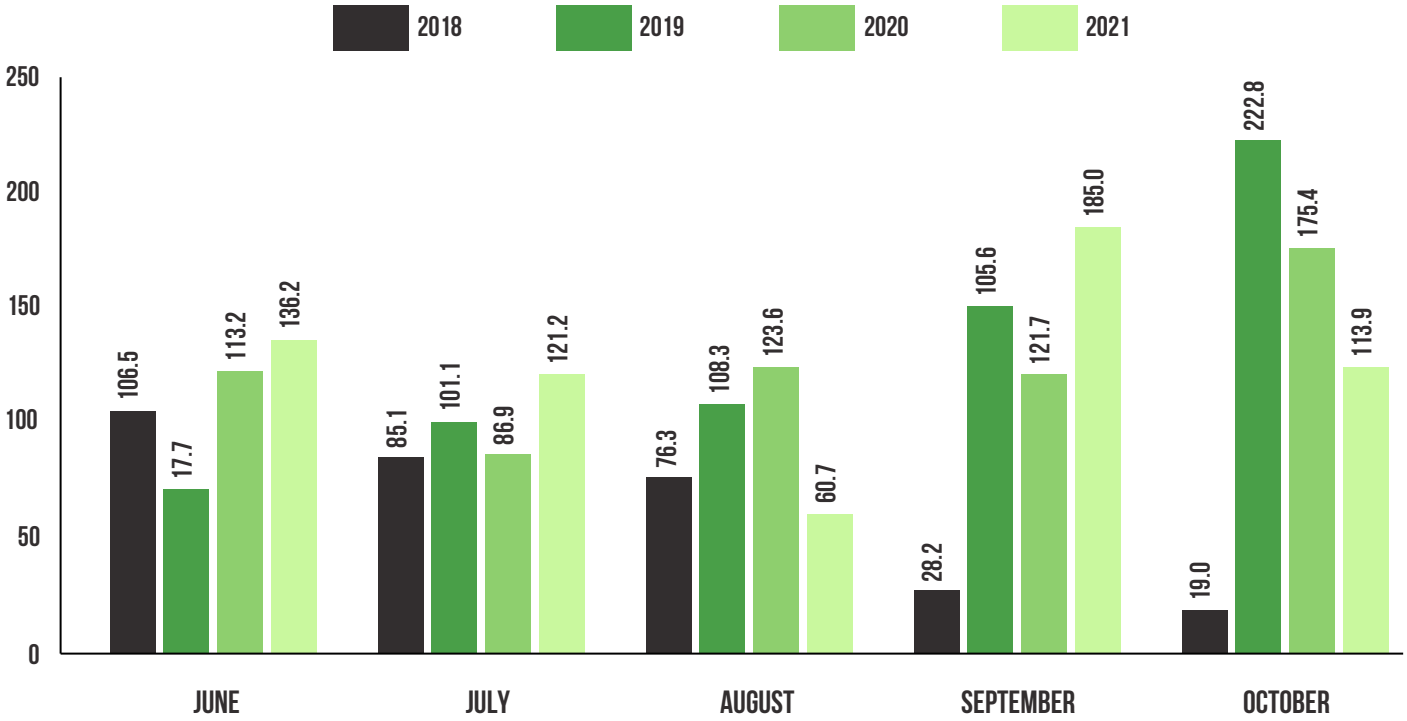

FIGURE 1: RAINFALL IN PERCENTAGE IN **MAHARASHTRA**

(SOURCE: BANK OF MAHARASHTRA, 2022)

In the year 2021, during June, July, August, September and October, the State received 136.2 per cent, 121.2 percent, 60.7 per cent, 185.0 percent and 113.9 per cent rainfall respectively as compared to the normal (Fig.1) (Bank of Maharashtra 2022).

TABLE 1: RAINFALL REQUIREMENTS FOR DIFFERENT TYPES OF CROPS

CROPS	RAINFALL REQUIREMENTS
Sugarcane	2000-2200
Rice	1200-1300
Wheat	300-450
Maize	500-550
Sorghum	400-500
Bajra	350-400
Ragi	350-400

(SOURCE: MILLET NETWORK OF INDIA)

Millets are mainly adapted to a wide range of ecological conditions, such as hard soils, low rainfall, and low irrigation requirements. Millets can be easily cultivated with household fertilizers. Many parts of Maharashtra falls in to this category and hence has great potential for millet cultivation.

TABLE 2: MILLETS PRODUCTION RATES IN DIFFERENT DIVISIONS OF MAHARASHTRA

DIVISIONS NAME	JOWAR (KG/HA)	BAJRA (KG/HA)	RAGI (KG/HA)
Nasik	1630	1441	715
Pune	617	1319	786
Kolhapur	1449	941	1747
Aurangabad	696	150	0
Latur	611	472	786
Amravati	707	472	0
Konkan	0	0	0

(SOURCE: KRISHI, 2021)

As per recent research records, in the Nasik division, Jowar, and Bajra Millet, the productivity rates are high (Table 2). In the Pune division, the Bajra productivity rate is high. In Kolhapur division Jowar, Bajra Ragi three millets productivity rates are high. Approximately 18.9% of cultivated lands are used for millet cultivation (Statista, 2022).

Agriculture and Millet production in Maharashtra

Agriculture employed more than 51% of the workforce and contributed 11.9% of the GDP in Maharashtra. From 2010–11, the gross cropped area increased and the area sown more than once also increased in Maharashtra (Patil, 2022). In the Kharif periods of 2021–2022, approximately 155.15 lakh ha of land will be used for cultivation.

TABLE 3: BRIEF PRINCIPLE KHARIF CROPS AND MILLETS

CROPS	AREA ('000 HA)		PRODUCTION ('000 MT)	
Cereals	**2020-21**	**2021-22**	**2020-21**	**2021-22**
Rice	1,473	1,549	3,027	3,237
Jowar	379	209	381	173
Bajra	687	504	906	458
Ragi	82	73	94	94
Pulse	**2020-21**	**2021-22**	**2020-21**	**2021-22**
Tur	1340	1335	1450	963
Moong	401	377	207	183
Oilseed	**2020-21**	**2021-22**	**2020-21**	**2021-22**
Tur	1340	1335	1450	963
Moong	401	377	207	183

(SOURCE: BANK OF MAHARASHTRA, 2022)

In addition to rice, jowar, bajra, and ragi stand out as significant cereals grown in the region (Table 3). In Maharashtra, bajra production is usually higher than other millets. The soybean production rate is majorly high in this state, which is 6,264 MT in 2020–21. In cereal groups, millet production rates are dominant in Maharashtra.

TABLE 4: TOTAL AREA, PRODUCTION, AND PER HA PRODUCTIVITY RATE IN MAHARASHTRA

CROPS	TOTAL CEREALS			PULSES			OILSEEDS		
	Area	Yield	Production	Area	Yield	Production	Area	Yield	Production
2015-16	7667	899	6896	7667	899	6896	7667	899	6896
2016-17	7165	NA	12646	7165	NA	12646	7165	NA	12646
2017-18	6273	1171	9977	6273	1171	9977	6273	1171	9977

(SOURCE: PATIL, 2022)

There is high potential for cereal production in the state (Table 4). Besides rice production, soybean is a significant oilseed that is highly cultivated in Maharashtra. It is also considered a major challenge in Maharashtra.

Present issues regarding Millet production

In 2022–23, the UN and India both have 2023 as the International Year of Millets (Tembhekar, 2023). However, the major millet cereal rates have decreased since 2016. From that year on, staple millets like jowar and bajra were replaced by soybeans. From 2021 to 2022, the major Jowar production rate declined by 31% (Khapre, 2023). From 2016 to 2020, the total average jowar cultivation land was 3.16 lakhs, and in 2022, this land area was 1.42 lakhs (Khapre, 2023). Not only Jowar, but Bajra sowing trends also decreased from 2016. The millet production for the current year marks a significant achievement in Maharashtra (TOI 2023).

Conclusion

Maharashtra has a promising future for sustainable agriculture with its millet cultivation. Recognising the state's diverse climatic zones, there is an opportunity to leverage these conditions to further enhance millet production. When it comes to training farmers about the advantages of millet production and introducing them to contemporary farming methods, agricultural extension services can be extremely helpful. Government agencies, academic institutions, and regional farmers can work together strategically to promote innovation in millet growing methods. The establishment of a strong market environment for millets, encompassing marketing and value-adding programs, is vital to guarantee the financial sustainability of farmers. Accepting millet as a sustainable and resilient farming method can improve food security and be in line with larger sustainability objectives.

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