



## Millet Production in India: Challenges and Opportunities

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### Abstract

Millet production in India is an important sector in the country's agricultural sector. Millet production has been steadily increasing in India over the past few decades, driven by increasing demand for the crop due to its growing popularity as a health food. However, despite its potential, millet production in India is still facing numerous challenges that need to be addressed in order to ensure its sustained growth. Despite the various challenges faced by millet production in India, there are also several opportunities that can be explored in order to ensure its sustained growth. These include the adoption of improved farming and post-harvest technologies, the development of new marketing strategies and the promotion of millet consumption through awareness campaigns. Furthermore, the government can also play a key role in providing financial and technical assistance to smallholder farmers to help them increase their production and productivity.

**Keywords:** Millets, Nutritional benefit, Production challenges, Production strategies

### Introduction

The world population is expected to reach 9.7 billion people by 2050, and the demand for food is expected to double in the same period. This increase in demand for food necessitates the need to develop sustainable agriculture practices that can support and sustain the global population (Chapke *et al.*, 2018). Millets have been identified as a promising crop for sustainable agriculture due to their ability to thrive in a variety of climates and soils, their resistance to pests and diseases, as well as their high nutritional value. Millets have been grown for thousands of years, particularly in the semi-arid regions of the world. They are resilient to drought and have a high nutritional value, making them an ideal crop for sustainable agriculture. They are low in fat, high in dietary fiber, and are a good source of protein, iron, zinc, magnesium, and other essential vitamins and minerals. Millets are also gluten-free, making them suitable for people with gluten intolerances or allergies. Additionally, millets have a low water requirement, making them suitable for

many arid and semi-arid regions. Furthermore, millets have a short growing season and can be harvested in as little as three months, allowing for multiple harvests in one season.

India is the biggest producer of millets worldwide, with a share of around 40% of the world's total production and second-largest supplier of millets, generating nine popularly known millets (Gowri and Shivakumar, 2020). India produces around 16 million MT of millets annually (Figure 1). The millets market is set to grow from its current market value of more than \$9 billion to over \$12 billion by 2025. In India, millet production is mainly concentrated in the northern and central parts of the country. The major millet producers are Uttar Pradesh, Madhya Pradesh, Haryana, Rajasthan, and Maharashtra. Millet is grown in India mainly as a rain-fed crop, although some farmers also practice irrigation. The crop is typically grown on small farms and is harvested once a year. Millet production in India is an important part of the country's agricultural economy. It contributes significantly to the national food security and provides employment to

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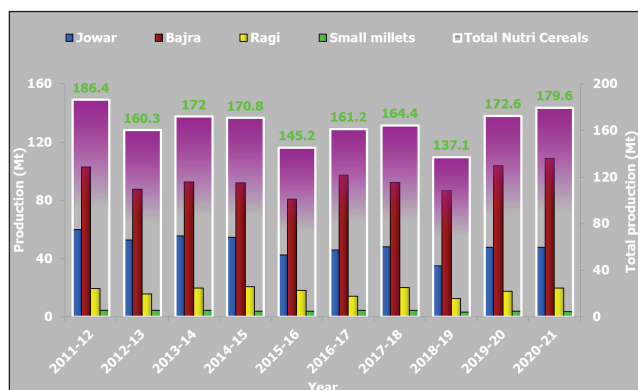


Figure 1: Indian scenario of different millets production year wise

millions of people in the country. Millet is a valuable crop as it is drought-tolerant and can be grown in marginal lands that are not suitable for other crops. This makes it an ideal crop for farmers in regions that are prone to climate extreme events. Millets are small grain crops that have been eaten for centuries in many parts of the world. There are many different types of millets, but the most common are pearl millet, proso millet, foxtail millet, etc.

### Nutritional Benefit of Millets

Millets are a group of highly nutritious and versatile grains that have been around for thousands of years and are still consumed in many parts of the world. They are known for their high nutritional value (Table 1), making them an excellent choice for people who are looking for a nutritious alternative to traditional grains (Figure 2). Millets are a good source of protein, dietary fiber, vitamins, minerals, and other important nutrients. They are high in B vitamins, which are essential for energy production, as well as magnesium, which helps to support healthy bones and muscles. They are also a good source of iron, zinc, potassium, and other minerals. Millets are highly digestible and contain a low glycemic index, making them a good choice for people with diabetes or those looking to maintain a healthy weight. They are also a good source of antioxidants, which can help to reduce inflammation and protect against chronic diseases. Millets are an excellent source of complex carbohydrates, which provide a slow and steady release of energy over a longer period of time. This makes them a more sustainable and lasting source of energy for athletes and active individuals. In addition, millets are gluten-free and can be consumed even by those with gluten sensitivity.

In addition to their nutritional benefits, millets can also be beneficial for people with food allergies and sensitivities. They are gluten-free and non-allergenic, making them an ideal choice for people with gluten intolerance or celiac disease. Additionally, millets have a low glycemic index, which can help to reduce the risk of developing diabetes and other chronic illnesses.

### Challenges in Millet Production

Despite the various advantages of millets for sustainable agriculture, there are several challenges that need to be addressed before millets can be a viable option. Mostly,

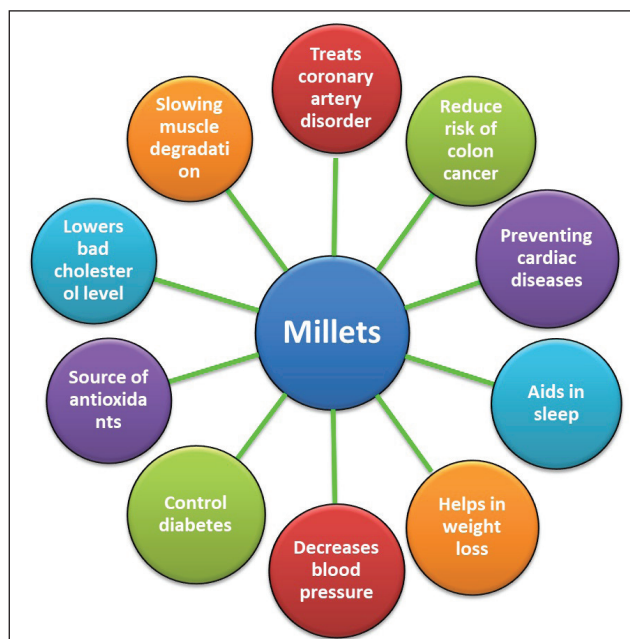


Figure 2: Health benefits of millets

millets require specialized farming techniques and require more labor than other crops (Yadav et al., 2012). Additionally, millets are not as widely available as other crops, and thus farmers may not have access to the necessary inputs and resources required to grow them. Furthermore, millets have a low market value, which makes it difficult for farmers to make a profit. The challenges are listed point wise as below.

- **Unfavorable weather conditions:** Adverse weather conditions, such as droughts and floods, can have a significant impact on the yield of millet crops. This can lead to reduced production and lower incomes for farmers.
- **Limited availability of quality seed:** One of the major challenges faced by millet producers in India is the limited availability of quality seeds. The seeds available in the market are often of inferior quality or contaminated with weeds or disease. This makes it difficult for farmers to get the desired yield from their crops.
- **Pest and disease pressure:** Pests and diseases can have a significant impact on the yield of millet crops. This can lead to reduced production and lower incomes for farmers.
- **Soil degradation:** Soil degradation can have a negative impact on the productivity of millet crops. This can lead to reduced yields and lower incomes for farmers.
- **High cost of production:** Millet production is a labor-intensive process, and the cost of inputs, such as seed, labor, and fertilizers, can be expensive. This can make it difficult for farmers to make a profit from the crop.
- **Low productivity:** Low productivity is another challenge faced by millet producers in India. Low productivity can lead to reduced incomes and reduced profits for farmers.
- **Lack of adequate storage facilities:** Poor storage facilities are another challenge faced by millet producers in India. Poor storage facilities can lead to the premature spoilage of the crop and reduced incomes for farmers.

Table 1: Nutritional benefits of millets (Indian Food Composition Table 2017 - National Institute of Nutrition)

Millets	Carbohydrates (g)	Protein (g)	Fat (g)	Energy (Kcal)	Dietary Fibre (g)	Ca (mg)	P (mg)
Sorghum	67.7	9.97	1.7	334	10.2	27.6	274
Pearl millet	61.8	10.9	5.4	347	11.5	27.4	289
Finger millet	66.8	7.2	1.9	320	11.2	36.4	210
Kodo millet	66.2	8.9	2.6	331	6.4	15.3	101
Proso millet	70.4	12.5	1.1	341	-	14.0	206
Foxtail millet	60.1	12.3	4.3	331	-	31.0	188
Little millet	65.5	10.1	3.9	346	7.7	16.1	130
Barnyard millet	65.5	6.2	2.2	307	-	20.0	280

Table 1: Continue...

Millets	Mg (mg)	Zn (mg)	Fe (mg)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)	Folic Acid (mg)
Sorghum	133	1.9	3.9	0.4	0.1	2.1	39.4
Pearl millet	124	2.8	6.4	0.3	0.2	0.9	36.1
Finger millet	146	2.5	4.6	0.4	0.2	1.3	34.7
Kodo millet	122	1.6	2.3	0.3	0.2	1.5	40.0
Proso millet	153	1.4	0.8	0.4	0.3	4.5	-
Foxtail millet	81.0	2.4	2.8	0.6	0.1	3.2	15.0
Little millet	91.4	1.8	1.3	0.3	0.1	1.3	36.2
Barnyard millet	82.0	3.0	5.0	0.3	0.1	4.2	-

(Source: Longvah *et al.*, 2020)

- **Poor infrastructure:** Poor infrastructure, such as roads and transport services, can make it difficult for farmers to access markets and buyers. This can lead to reduced incomes for farmers.
- **Poor market access:** Poor market access is another constrain.
- **Low prices:** The low prices offered by buyers for millet can make it difficult for farmers to make a profit from their crops. This can lead to a lack of motivation to produce millet.
- **Unfavorable government policies:** Unfavorable government policies, such as high taxes and subsidies, can have a negative impact on millet production. This can make it difficult for farmers to make a profit from their crops.
- **Lack of extension services:** Extension services are essential for farmers to access the latest information and advice on millet production, but these services are often inadequate in India. This can lead to poor crop management and reduced yields.

### Strategies for Enhancing Millet Production

In order to make millets a viable option for sustainable agriculture, various initiatives need to be implemented. Efforts should be made to increase the availability of millets and to raise awareness about their benefits (Sher *et al.*, 2019). Additionally, research should be conducted to develop better farming techniques and technologies for millet cultivation. Furthermore, measures should be taken to increase the market value of millets, such as through the development of new products and the promotion of millet-

based diets. The strategies are listed point wise as below.

- **Improve quality seed availability:** Quality seeds are essential for millet production, and farmers should be encouraged to use certified seeds for their crops. This will ensure higher yields and better quality produce.
- **Enhance water and soil management:** Water and soil management practices should be improved in order to ensure optimal growth and yield of millet crops. This includes the use of proper irrigation methods and the use of organic fertilizers.
- **Adopt sustainable practices:** Sustainable agricultural practices should be adopted in order to reduce environmental pollution and ensure the long-term sustainability of millet production. This includes the use of organic fertilizers and on-farm inputs.
- **Encourage intercropping:** Intercropping should be encouraged in order to increase the productivity and profitability of millet production. This will help to improve the soil fertility and reduce the risk of crop failure.
- **Increase investment in research:** The government should invest in research to develop improved varieties of millet that are more resistant to diseases and climate change. This will help to increase productivity and yields.
- **Enhance storage facilities:** Adequate and improved storage facilities should be developed in order to reduce post-harvest losses and increase the shelf-life of millet products.
- **Improve processing facilities:** Processing facilities should

be improved in order to reduce post-harvest losses, increase the shelf-life of millet products, and improve their quality.

- **Promote millet products:** The government should promote millet products in order to increase their demand in the market. This will help to increase the profitability of millet production.
- **Enhance market access:** Access to markets should be improved in order to increase the profitability of millet production. This includes the development of better infrastructure, the promotion of millet products, and the creation of new markets.
- **Increase credit and insurance:** Financial assistance in the form of credit and insurance should be provided to millet producers in order to reduce the risks associated with production and increase profitability.
- **Educate farmers:** Farmers should be provided with training and awareness about the importance of millet production. This will help to increase their knowledge and skills, and make them more efficient in their production.

### Conclusion

In conclusion, millets have the potential to be a viable option for sustainable agriculture due to their resilience to drought and their high nutritional value. However, various challenges need to be addressed before millets can become a viable option. With the right initiatives and support, millets could become an important part of sustainable agriculture practices and help to meet the increasing demand for food. In India, millet production is a significant sector that has the potential to provide significant economic benefits to millions of smallholder farmers. However, in order to ensure its sustained growth, it is important that the challenges

faced by millet production in India are addressed. This can be achieved through the adoption of improved farming technologies, the promotion of millet consumption and the provision of financial and technical assistance to smallholder farmers.

### References

- Chapke, R.R., Shyamprasad, G., Das, I.K., Tonapi, V.A., 2018. Improved millets production technologies and their impact. *Technology Bulletin, ICAR-Indian Institute of Millet Research, Rajendranagar, Hyderabad, India.* pp. 1-4.
- Gowri, M.U., Shivakumar, K.M., 2020. Millet scenario in India. *Economic Affairs* 65(3), 363-370. DOI: <https://doi.org/10.46852/0424-2513.3.2020.7>.
- Longvah, T., Anantan, I., Bhaskarachary, K., Venkaiah, K., Longvah, T., 2017. Indian food composition tables. National Institute of Nutrition, Indian Council of Medical Research, Hyderabad, India. pp. 33-113.
- Sher, A., Nawaz, A., Sarfraz, M., Ijaz, M., Ul-Allah, S., Sattar, A., Hussain, S., Ahmad, S., 2019. Advanced production technologies of millets. In: *Agronomic Crops: Volume 1: Production Technologies*. (Ed.) Hasanuzzaman, M. Springer, Singapore. pp. 273-296. DOI: [https://doi.org/10.1007/978-981-32-9151-5\\_15](https://doi.org/10.1007/978-981-32-9151-5_15).
- Yadav, O.P., Rai, K.N., Rajpurohit, B.S., Hash, C.T., Mahala, R.S., Gupta, S.K., Shetty, H.S., Bishnoi, H.R., Rathore, M.S., Kumar, A., Sehgal, S., Raghvani, K.L., 2012. Twenty-five years of pearl millet improvement in India. ICAR- All India Coordinated Pearl Millet Improvement Project (AICPMIP), Jodhpur, Rajasthan. pp. 53-55. Available at: <http://oar.icrisat.org/10887/>.