

## Millets: Cultivation, Adaptability, Unique Nutritional & Health Benefits

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### Introduction

In recent years, we have seen a dramatic shift in our knowledge and awareness regarding nutrition, health sustainability and the value of traditional foods in our dietary habits. As worldwide health concerns are rising day by day especially weight gain, diabetes and cardiovascular disorders, almost all individuals are looking for healthy, nutritious and more natural substitutes to processed food. Among the many dietary choices which are getting more popularity nowadays millets stand out as a promising solution to these rising concerns. Reviving and promoting millets is critical for the environmental benefits and human welfare.

### An Overview of Millets

Millets are small-seeded annual grasses or cereals from the Poaceae family that originated in Ethiopian region and have been successfully adopted by India, China, Australia, Africa, and some portions of the United States. In India, Millets have been grown since the time of the Indus Valley Civilization. A Kannada proverb claims, "A rice eater is constantly weightless like a bird; a jowar eater is strong like a wolf; a ragi eater is always remains disease-free". Both history and dietary trends confirms that millets were among one of the earliest food crops known to humans, having been grown for thousands of years. Various kinds of millets were cultivated and consumed which includes - pearl millet (bajra), sorghum (jowar), finger millet (ragi), foxtail millet (kangni) and barnyard millet (sawan). However, millet production in Haryana and throughout India decreased with the introduction of the green revolution as focus shifted on rice wheat cropping pattern. The necessity of going back to these traditional crops is becoming more widely recognized these days, especially since they are significantly more sustainable to farm than other main grains and have enormous health benefits.

### Nutritional and Health Benefits of Millets

Millets are highly nutritious; rich in protein, dietary fiber, essential fatty acids and various minerals including calcium, magnesium, zinc, potassium, iron



and vitamins, especially the B complex. Millets can help to combat diabetes, cardiovascular disease, blood pressure, thyroid, and celiac disease by regulating blood sugar levels. Having exceptionally high nutritional qualities, these are regarded as Nutri-cereals.

1. **Pearl millet (*Pennisetum glaucum*):** It is commonly known as Bajra. Its flour is used in a variety of bakery and traditional cuisine products. Its phytochemical ingredients aid to lower down bad cholesterol and maintain a healthy lipid profile. It contains high levels of folate, zinc, copper, iron, magnesium, calcium, vitamin B complex and unsaturated fatty acids. It's high folate content makes it a bio fortifier against anemic populations. The presence of magnesium can aid in the treatment of migraines and minimize respiratory problems in asthmatic patients. Bajra additionally have phytonutrients such as apigenin, flavonoids, lignin and myricetin, which help to prevent breast cancer, cardiovascular disease and anti-fungal & anti-ulcerative
2. **Foxtail millet (*Setaria italica*):** Foxtail millet, also known as Kangni, is the second most widely cultivated millet in India. These are typically grown in semi-arid regions and require little irrigation. Foxtail millets are high

in protein, fiber, calcium, vitamins, iron, copper, and contribute to disease resistance. It is non-glutinous and non-acid forming making it easily digestible. It promotes a steady release of carbohydrates in the body without disrupting metabolism. It contains catechin, apigenin, quercetin and kaempferol, which assist in regulation of diabetes, cardiovascular disease

3. **Barnyard millet (*Echinochloa spp.*):** Barnyard millet, sometimes known as Swank, is a crop that grows quickly and is harvested within 6 weeks. It has high levels of protein, fiber, soluble & insoluble fractions and is low in carbohydrates. It primarily contains three fatty acids: linoleic, palmitic, and oleic acid. Barnyard millet reduces blood sugar levels and is gluten-free, which protects against celiac disease. Its main components are luteolin, N-(p-coumaroyl), serotonin, and tricin, which have anti-cancer, anti-rheumatic, and anti-diabetic properties
4. **Little millet (*Panicum miliari*):** Gajrao is the popular name for little millet. It has a substantial amount of protein and roughly 37–38% dietary fiber. It can be used for processed foods, infant food and snacks. Those who are intolerant to wheat should also try this millet. Little millets contain a high concentration of

vitamin B, iron and phosphorus. It is best sources of  $\alpha$ -amylase.

5. **Sorghum (*Sorghum vulgare*):** Sorghum, also known as jowar, is a staple food that has long been consumed by people living in arid regions of the world. Sorghum is rich in condensed tannins, flavonoids and phenolic acids. Its antioxidant and pigments level are competitive to vegetables and fruits. Sorghum is anti-carcinogenic and lowers oesophageal cancer.
6. **Kodo millet (*Paspalum scrobiculatum*):** Kodo millet is commonly known as Kodra. Kodo millet has the highest dietary fibres as compared to other millets and an ideal food for diabetic patients. It contains a high amount of protein, low fat content, a considerable number of vitamins like folic acid (B9), niacin (B3), pyridoxine (B6) and some minerals like calcium, iron, magnesium, potassium, zinc, etc. Kodo millets also contain lecithin which is good for strengthening the nervous system
7. **Proso millet (*Panicum miliacearum*):** Proso millet, often known as Cheena, Proso millet exhibit stronger anti-proliferative action against human liver cancer cells. It contains approximately 65% phenolic compounds and bioactive phytochemicals such as caffeic acid, chlorogenic acid, ferulic acid and syringic acid, all of which are good to human health

**Table 1** Cultivation Practices of Different Millets

Millets	Sowing time	Seed rate (kg/ha)	Spacing (cm)	Irrigation
Finger Millet (Ragi)	Kharif (June-July)	08-10	25 x 10	Germination & Flowering
Pearl Millet (Bajra)	Kharif (June-July)	04-05	45 x 15	Tillering, Flowering & Grain Formation
Foxtail Millet	Kharif & Summer	04-05	30 x 10	Tillering & Flowering
Sorghum (Jowar)	Kharif (June-July)	10-12	45 x 15	Flowering & Grain Filling Stage
Proso Millet	Kharif (June-July)	08-10	25 x 10	Germination & Flowering
Little Millet	Kharif (June-July)	06-08	25 x 10	Tillering & Flowering
Kodo Millet	Kharif (June-July)	08-10	30 x 10	Flowering & Grain Filling Stage
Barnyard Millet	Kharif (June-July)	04-05	25 x 10	Flowering & Grain Formation

### Millets: An Adaptive Crop for Haryana's Climate

In addition to having an excellent nutritional profile, millets are sustainable plants, especially in areas like Haryana, where they can be very helpful in addressing environmental issues. Farmers are faced with the task of cultivating crops in more severe and unpredictable conditions as climate change continues to disrupt agriculture. On the other hand, millets are specially adapted to flourish in these conditions.

- 1. Drought Resistance:** One of millets' most amazing qualities is their capacity to flourish in dry and semi-arid environments with little water. This makes them an excellent crop for Haryana, where a large number of people are experiencing water scarcity. Millets are great option for farmers in water-stressed areas since they can flourish with very little water, unlike rice, which needs a lot.
- 2. Low Carbon Footprint:** Millets have a lower carbon footprint than rice and wheat. As Haryana faces the simultaneous problems of climate change and dwindling natural resources, boosting millet cultivation can help minimize agriculture's environmental effect while also assisting local farmers.
- 3. Promoting Biodiversity:** The emphasis on monoculture farming has resulted in a decrease in crop diversity, making agricultural systems more susceptible to pests, diseases and climate change. By returning millets into Haryana's agricultural landscape, we can increase biodiversity and resilience in the farming system.
- 4. Resilient to poor soil fertility:** Millets are resistant to poor soil conditions, allowing them to flourish

in areas where other crops cannot. They are hardy plants that require fewer chemical inputs like fertilizers and pesticides, making them a more environmentally responsible choice for farmers. Millets provide a viable option in areas where soil fertility is deteriorating owing to intensive cultivation.

### Conclusion

Millets are much more than an old grain; they represent a road to better health, sustainability, and the preservation of Haryana's rich agricultural heritage. Their outstanding nutritional profile, which includes high fiber content, critical vitamins and a low glycaemic index, makes them an important complement to modern diets, especially in areas such as Haryana where lifestyle-related health disorders are on the rise. Beyond their health benefits, millets provide a sustainable alternative for farmers by surviving in low-water environments and requiring fewer inputs than other staple crops such as rice and wheat. Reintroducing millets into everyday meals and farming techniques in Haryana is not just a nod to traditional knowledge, but also a proactive way to dealing with modern concerns like as climate change, water scarcity and soil degradation. As people become more aware of millet's environmental and health benefits, it is obvious that these little grains may help shape a better, more resilient future for both individuals and communities. By incorporating millets into our kitchens and fields we not only promote a better lifestyle, but also contribute to a more sustainable and secure food supply.

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