Role of Millets in Nutrition-Sensitive Agriculture: A Pathway to Better Health and Sustainable Futures

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The concept of nutrition-sensitive agriculture has gained traction in recent years, as the world grapples with the dual challenge of malnutrition and environmental degradation. The simple yet powerful question that motivates this approach is: How do you not just produce food through agriculture, but feed people? One answer, and a promising one, is an ancient group of crops, the millets.

Millets, once called "poor man's crops", are coming back as smart foods because of their outstanding nutritional, environmental and economic advantages. These small-seeded cereals like Pearl Millet (bajra), Finger Millet (ragi) and Sorghum (jowar) are rich sources of essential nutrients like dietary fibre, protein, iron, calcium, zinc and antioxidants and are thus often referred to as "nutritious cereals". Millets have an important role to play in the context of nutrition sensitive agriculture, which aims at producing a variety of nutrient rich foods to improve overall dietary quality and nutritional outcomes. They help to increase dietary diversity, address micronutrient deficiencies, promote climate-resilient and sustainable farming systems and strengthen local food systems and livelihoods. Millets are gaining importance as an important component of sustainable food and nutrition security as they are adaptable to harsh climatic conditions and require low inputs. The Indian Millets are nutritionally superior to wheat and rice as they are rich in dietary fibre, protein and important micronutrients such as iron, calcium, zinc and B vitamins. For example, finger millet is high in calcium and hence is valuable for children, women and the elderly. They are also gluten free, and low glycaemic index so are suitable for people with coeliac disease, or diabetes. India is the largest producer of millets with a share of 42.75% of the world's production (FAO, 2023). Among all the states, Rajasthan has covered largest area under millets cultivation followed by Maharashtra, Karnataka, Uttar Pradesh, Gujarat, Haryana, Madhya Pradesh, Tamil Nadu, Andhra Pradesh, Telangana and Uttarakhand.

Table 1: Production of various types of millets in India

		Production in Lakh Tonnes					
Types of millets	**Season**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25**	**2025-26**
Small Millets	Kharif	3.47	3.67	3.84	4.49	4.56	3.69
	Total	3.47	3.67	3.84	4.49	4.56	3.69
Maize	Kharif	215.55	226.81	236.74	222.45	248.08	302.47
	Rabi	100.92	110.49	116.90	120.28	147.53	159.03
	Summer			27.21	33.92	38.47	
	Total	316.47	337.30	380.85	376.65	434.09	461.49
Barley	Rabi	16.56	13.71	19.13	16.99	19.19	23.40
	Total	16.56	13.71	19.13	16.99	19.19	23.40
Jowar	Kharif	19.86	15.98	14.80	15.09	17.37	11.30
	Rabi	28.26	25.52	23.22	31.89	31.87	30.98
	Summer			0.13	0.40	0.30	
	Total	48.12	41.51	38.14	47.37	49.55	42.28
Bajra	Kharif	108.63	97.81	103.49	96.63	99.78	88.36
	Summer			10.82	10.53	12.27	
	Total	108.63	97.81	114.31	107.16	112.05	88.36
Ragi	Kharif	19.98	17.01	16.91	16.70	19.77	20.07
	Total	19.98	17.01	16.91	16.70	19.77	20.07

Millets have emerged as a potential nutritional and agrarian solution to meet the challenges of food production. One of the strongest reasons for promoting millets is their adaptability to harsh climatic conditions (Singh et al., 2024). Millets require less water, grow well even in poor soils and are highly resistant to drought and pests. These characteristics make them a dependable crop for small and marginal farmers especially in rain-fed and vulnerable regions in the face of climate change. Millets are also a good step towards environmentally sustainable agriculture as growing millets will reduce dependence on water intensive crops and chemical inputs. Millets are not just nutritionally beneficial but also economical for farmers.

Nutritional and Medicinal value of Millets

Millets are nutritionally comparable to common cereals, if not more so in terms of calories, protein and macronutrient concentrations. Millets have been reported for high amount of protein, fat, fibre, minerals and vitamins in a recent study (Table 1). Millets are also rich in micronutrients including vitamin A, B, D, E, niacin, pyridoxine, antioxidants, iron and zinc, in addition to being rich in calories and important nutrients like protein, unlike rice and wheat. Millets have higher protein contents (10–12.6 g/100 g), fat contents (1%–5%), iron contents (0.5–19.0 mg) and calcium contents (10–410 mg) than rice and wheat (Sangappa, *et al.*, 2024).

During the COVID-19 pandemic, people began to replace their diet with millets such as finger millet, barnyard millet, pearl millet, etc. to boost their immune response which would help in speedy recovery (Babele *et al.*, 2022). The consumption of finger millets can cure problems such as weak bones or loss of bone density. Millets also reduce the risk of cancer and high blood pressure and boost immunity in the human body because of the presence of tannins, polyphenols, phytosterols and polycains. Also millets have other properties like antioxidant and detoxifying system that reduce the chance of degenerative diseases (Pandey *et al*, 2025). These many beneficial properties make millets the right solution for sustainable agriculture (Fig:1).

Fig. 1. Various functions of millets with respect to sustainable agriculture.

Table 2. Proximate composition of various millets

Millet	Protein (g)	Fat (g)	Crude fiber (g)	Carbohydrate (g)	Calcium (mg)	Phosphorus (mg)	Thiamine (mg)	Riboflavin (mg)
Sorghum	10.4	1.9	1.6	70.7	35.2	266	0.28	0.15
Pearl millet	11.6	5	1.2	67	35	339	0.30	1.4
Finger millet	7.3	1.3	3.6	72.6	34.8	250	0.40	0.6
Barnyard millet	6.2	2.2	9.8	55	18.3	280	0.33	4.2
Foxtail millet	12.3	4.3	8	63.2	31	300	0.60	1.6
Kodo millet	8.3	1.4	9	66.6	32.3	300	0.15	2.0
Proso millet	12.6	1.1	2.2	63.8	10	200	0.41	0.2
Little millet	7.7	4.7	7.6	60.9	17	220	0.3	0.09

Source: (Pandey *et al*, 2025)

With the increasing awareness of health and nutrition among consumers, millets are becoming useful functional foods with increasing market potential. Various government initiatives such as the Public Distribution System (PDS), Mid-Day Meal schemes and promotional campaigns like International Year of Millets have immensely increased their production, accessibility and consumption. Further, the inclusion of millets in sustainable cropping systems, kitchen gardens and community based nutrition programmes can establish a strong linkage between agriculture, food security and improved nutritional outcomes. Hence, comprehensive and targeted strategies are required to enhance the production, consumption, and utilization of millets. Such strategies should focus on promoting nutrition education

and public awareness, encouraging the development of diversified value-added millet-based products, strengthening processing technologies and supply chain systems, improving market opportunities, and implementing supportive policies for their integration into food and nutrition security initiatives. Together, these efforts have the potential to support sustainable agricultural practices, improve dietary diversity, and address the burden of micronutrient deficiencies.

Conclusion

Millets offer a unique opportunity to bridge the gap between agriculture and nutrition. As we move towards more sustainable and inclusive food systems, these ancient grains can play a transformative role in ensuring food and nutrition security. By bringing millets back to our plates and fields, we are not just reviving a tradition, we are investing in a healthier future for both people and the planet.

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