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Unlocking the Potential: A review of Millet marketing through farmer producer organizations (FPOs) for sustainable agricultural development

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Abstract

This review paper provides a comprehensive analysis of the marketing of millets through Farmer Producer Organizations (FPOs) as a strategy for sustainable agricultural development. Millets are small-seeded cereals that retain excellent nutritional qualities which grows easily in dry climate, have smaller harvesting period and require minimal water quantity, Photo-insensitive & resilient to climate change, millets are hardy crops that have a low carbon and water footprint, can withstand high temperatures and grow on poor soils with little or no external inputs. Millets are also known as "Miracle crops" or "Poor man's crops". Increasing interest in reviving the consumption of millets across various countries is favouring the growth prospects of this market in recent years. The imperfect market conditions, inaccessibility to credit, suboptimal investment decisions, unskilled human resource base, inadequate access to extension services and poor technological knowhow are some of the major problems confronting small and marginal farmers in this era of competitive and unstable environment emphasising the need for collaboration, trust-building, and alignment of goals and objectives between FPO and Producer making them benefit from economies of scale and enable better bargaining capacity. It also discusses the role of FPOs in facilitating quality assurance, certification, and compliance with food safety standards, which are crucial for enhancing millet farmers' collective marketing and bargaining power. FPO operations include procurement of inputs, market linkages, networking, facilitating finance, processing and quality control, trainings, technical advice. Lack of awareness among customers, poor infrastructure, insufficient access to markets, and a lack of farmer knowledge and ability regarding value addition and production with a focus on the market are some of the challenges faced by FPO. Opportunities for millet marketing through FPOs are explored through emerging trends, including increasing consumer demand for healthy and sustainable food, the rise of specialty and niche markets, and the growing popularity of traditional and indigenous grains we need to highlight the importance of market research, segmentation, and understanding consumer preferences to effectively target and capture these opportunities.

Keywords: Farmer producer organization, millets, marketing strategies, climate change, nutrition

Introduction

Millet has been originated from Latin word "Milum" meaning Grains belonging to family Poaceae which is a group of small seeded grass. It has been grown widely all over the world for food and fodder purpose. They are renowned for their resilience and capacity to flourish in a range of environments, including dry and semi-arid climates. In India, millets have been mentioned in some of the oldest Yajurveda texts, identifying Foxtail millet (priyangava), Barnyard millet (aanava), and Black finger millet (shyaamaka), thus indicating that millet consumption was very common in India (ICRISAT). Millets are sturdy, resilient crops that can endure high temperatures, have a low carbon and water footprint, grow on poor soils with little to no external inputs, and are photo-insensitive and climate change resistant.

Significance of Millets: United Nation has declared 2023 as "International Year of Millets".

1. Nutritional Value and Food Security: The cereal millet is very healthy and filled with nutrients. It contains a lot of vital nutrients, such as protein, fibre, B-complex vitamins, and minerals including iron, magnesium, and phosphorus.

People with gluten intolerance can consume as it is gluten-free. Millet is a low-input crop that provides an affordable way to improve diets and fight malnutrition, particularly in areas with high rates of food insecurity and nutrient deficiencies.

Sr. No	Common name	Botanical Name	Nutrient	Health benefits	Reference
1	Finger Millet	<i>Eleusine coracana</i>	Calcium, Dietary fiber, Phytates, Protein, Minerals, and Phenolics.	Anti-Diabetic, Anti-Diarrhoeal, Antiulcer, anti-inflammatory, Antitumorogenic, Atherosclerogenic effects, Antimicrobial and Antioxidant Properties	Chandra <i>et al.</i> , (2016) ^[5] .
2	Pearl millet	<i>Pennisetum glaucum</i>	Tryptophan, Threonine, Calcium, Iron, Zinc	Lowering Cholesterol, diabetes, Cancer, Cardiovascular and Neurodegenerative	Rani <i>et al.</i> , (2018) ^[21] & Jukanti <i>et al.</i> , (2016) ^[11] .
3	Sorghum	<i>Sorghum Bicolour</i>	Phenolic acids, Flavonoids, Condensed tannins, Polycosanols, Phytosterols, Stilbenes, and Phenol amides	diabetes, obesity, cancer, and cardiovascular disease	Xu <i>et al.</i> , (2021) ^[28] .
4	Foxtail millet	<i>Setaria italica</i>	Setarins, Lysine, Tryptophan, Glutamic acid	Coeliac & Gastrointestinal Digestion	Sachdev <i>et al.</i> , (2021) ^[23]

2. Climate Resilience and Adaptability

Millet's outstanding resilience shines out in the face of irregular weather patterns and climate change. It has been praised for withstanding drought, sweltering heat, and low soil fertility, making it a good fit for areas with harsh environmental conditions. Sustainable agriculture can be advanced by lowering the susceptibility of farming communities to dangers brought on by the climate.

3. Biodiversity Conservation

Because it is frequently planted in mixed cropping systems with other crops and because local communities cultivate traditional types of millet, its production helps to preserve biodiversity. Maintaining a variety of crop species and landraces helps to strengthen ecosystem resilience and protect genetic resources, which supports sustainable agriculture.

4. Water Conservation

When compared to other major cereals like rice and wheat, millet is a water-efficient crop and requires less irrigation. It is a great choice for areas with scarce water supplies because of its capacity to grow in such conditions. It is possible to encourage sustainable agricultural practises, which will result in responsible water management and lessened water stress on ecosystems, by promoting millet planting.

5. Soil health and Carbon Sequestration

The risk of soil deterioration and contamination is decreased by millet's low requirement for external inputs like synthetic fertilisers and pesticides. Its deep root system also contributes

to better soil structure, boosting water infiltration and nutrient cycling. Additionally, millet participates in carbon sequestration, which helps to slow down climate change by absorbing and storing carbon dioxide from the atmosphere in the soil.

6. Crop Diversity and Resilience

Agro-biodiversity and the agricultural system's resilience are both improved by encouraging the production of a variety of crops, including millet, in a given area. By introducing millet into cropping systems, farmers are able to diversify their sources of income, reduce their reliance on a single crop, and lower their risk of crop failure.

7. Sustainable livelihood for small holder farmer

Smallholder farmers, who make up a sizable section of the world's agricultural population, are well suited to millet cultivation. Farmers can produce food with less financial strain thanks to its low input needs and versatility. By integrating millet into the agricultural system, smallholders are given more control over their lives, their income rises, and their socioeconomic standing improves-all of which eventually promote sustainable rural development.

8. Market Diversification

The growth of millet farming encourages market and food production diversification. By reducing reliance on a few dominating crops, integrating millet into mainstream markets can help create resilient and sustainable food systems.



Source: APEDA

Systematic Literature Review

1. Millet Production and Global Significance

- The Indian millet industry contributes 19% of the world's millet crop production, which makes it a major player in millet cultivation around the world. The production of pearl millet is expected to account for 40.51% of the global millet production by 2020, followed by sorghum with 8.09% (Rathod *et al.*, 2016) ^[22].
- Six Indian states are growing a variety of millets in their rural areas, including sorghum, pearl millet, finger millet, foxtail, kodo, proso, barnyard, and little millet (APEDA).

2. Challenges in Millet Cultivation and Marketing

- There is evidence that the farming of millet is unprofitable for small-scale farmers, which is leading to a significant reduction in millet plantings and production. For millet farmers in rural areas, price fluctuations and low returns are a result of fragmented marketing structures and traditional marketing strategies that create fragmented marketing strategies (Rathod *et al.*, 2016) ^[22].
- In order to offer farmers, hope for the future, Farmer Producer Organizations (FPOs) have been developed to facilitate collective marketing, aggregation, and market access for millet farmers (Ponnusamy, 2015) ^[18].

3. Climate-Smart Agriculture and Millets

- With the advent of climate change, millets are becoming increasingly valuable crops in terms of their drought resistance and water efficiency. Besides being a rich source of essential nutrients, millets are also an important source of protein and micronutrients in rural communities, which makes them an important source of food security. In addition, millets are easily adaptable to different climates and soil conditions. Diversifying households' production portfolios with millets can thus reduce the households' exposure to climate risks (Fischer *et al.*, 2016) ^[6].

4. Potential of Millets for Nutrition and Livelihoods

- The benefits of consuming millets have been proven to be significant nutritionally (Padulosi *et al.*, 2015) ^[18], with an abundance of phytochemicals, vitamins, and fiber.
- Adding value to millet products increases income opportunities and livelihood options for communities while improving their health and nutrition (Jahan *et al.*, 2020) ^[9].
- In regions like Gammawa, Nigeria, millets are an economically viable crop option for small and marginal farmers (Adebayo *et al.*, 2008) ^[1].

5. Enhancing Millet Value Chains and Sustainability

- By intercropping millets with vegetables and other crops, it improves the yield of the crops and the soil health, thus making millets an essential component of sustainable agriculture in drylands (Maitra, 2020) ^[16].
- There is evidence that developing a market for minor millets can enhance its diversity within a farm, especially when it comes to less fertile areas in the drylands (Takeshima *et al.*, 2012) ^[25].
- In the Malian Sahel, farmers are faced with challenges in adopting certified seed due to the challenges of accessing certified seed (Smale *et al.*, 2012) ^[24].

Conclusion

The systematic literature review on millet cultivation in India reveals the multifaceted significance of these resilient crops. Millets contribute not only to global food security, but also to addressing pressing challenges. This review highlights the need to address fragmented marketing structures and traditional marketing strategies that hinder smallholder farmers' access to official markets. As farmer producer organizations (FPOs) pool resources and foster collaboration across the agricultural value chain, they are emerging as beacons of hope.

The climate-resilient nature of millets makes them indispensable in the context of climate change, offering a means to reduce households' exposure to climate risks. In addition, millets provide essential nutrition, are economically viable for small farmers, and are potentially valuable as a source of value-added products.

A variety of challenges and opportunities are presented by millet cultivation in different parts of India. Maharashtra's FPOs serve as exemplars for empowering small and marginal farmers. Due to their robust attributes, millets offer a sustainable and nutritious approach to addressing the world's nutritional and agricultural challenges. A comprehensive policy support and strategic campaign are essential to unleash millets' full potential in India.

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