Millets and Sustainable Farming

Akshyaika Jena[1]* and Akhilesh Kumar Gupta[2]

[1]M.Sc. Scholar, [2]Assitant Professor,
Department of Agricultural Statistics, College of Agriculture, OUAT, Bhubaneswar, Odisha-751003

Corresponding Author
Akshyaika Jena
Email: akshyaika02@gmail.com

OPEN ACCESS

Keywords

Biodiversity, Climate Resilience, Millets, Nutrition Security, Sustainable, Agriculture

How to cite this article:

Jena, A. and Gupta, A. K. 2025. Millets and Sustainable Farming. *Vigyan Varta* 6 (6): 30-33.

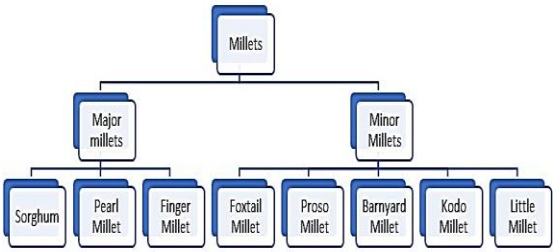
ABSTRACT

The global imperative of sustainable agriculture seeks to balance food systems, ecological preservation, and socioeconomic stability. Through rigorous analysis, this evaluation explores millet's multidimensional contributions to sustainable and climate-smart farming. Millets, a group of crops frequently overlooked despite its capacity to resolve various interconnected agricultural challenges. As a resilient botanical resource, millet demonstrates structural advantages that advance regenerative practices while supporting ecosystem equilibrium. Millets serve as catalysts for rural economic transformation, creating stable revenue streams through diversified applications. Processing into value-added products like flour unlocks market potential, elevating farm profitability while addressing food system needs. Millets support rural lives through low-cost, climate-resilient farming, increased revenue due to increased demand, and enhanced nutrition. They empower women, create jobs, and increase community resilience in drought-prone areas.

INTRODUCTION

Millets represent ancient cultivars valued for climate adaptability and mitigation capabilities against pressing issues including food insecurity, soil depletion, and hydrological stress (Kumari *et al*., 2024). Unlike conventional cereals such as rice and wheat, these grains flourish with minimal irrigation, fertilizers or pesticides, positioning them as optimal choices for arid regions and resource-constrained environments (Rathore *et al*., 2019). Their tolerance for marginal soils reduces dependence on groundwater extraction and synthetic inputs, a critical factor in sustainable

land management. A natural solution for soil preservation. Extensive root architectures enhance terrestrial integrity, combat erosion, and amplify carbon sequestration potential, establishing millets as foundational elements in agroecological resilience (Kumar *et al*., 2022). Nutritional Impact and Agricultural Value: Beyond Ecological Merits. These grains deliver substantive nutritional payloads alongside environmental benefits, containing elevated protein concentrations, essential amino acids, and microNutrients including iron and calcium. With low glycemic indices ideal for metabolic health management and fiber-rich compositions supporting gastrointestinal function, millet integration into dietary frameworks could alleviate malnutrition burdens in vulnerable populations (Tripathi *et al*., 2023). Strategic crop diversification initiatives leveraging millets may consequently address dual objectives



[Fig1: Classification of Millets]

Role of Millets in Sustainable Agriculture

1. **Climate Resilience:** Millets are important in climate resilience since they can endure extreme climatic conditions. They are resistant to drought, heat, and poor soil quality, making them ideal for cultivation in arid and semi-arid areas most vulnerable to climate change. Millets use less water and chemicals than other cereals like rice and wheat, which reduces the demand for natural resources.

Their short growth season also provides for greater planting and harvesting flexibility, which helps farmers adjust to unpredictable weather patterns. Increasing millet output can help agricultural systems become more sustainable and ready to deal with the effects of climate change. (Sharma *et.al*,2025)

2. **Biodiversity:** When integrated into polyculture systems, millets promote coexistence with complementary crops and maintain diverse insect ecosystems. This ecological balance improves natural pest resistance and reduces reliance on synthetic pesticides, which is beneficial for agricultural sustainability.

Millets include a variety of nutrients, promoting diverse and balanced diets. Promoting their consumption reduces reliance on a few key grains while increasing food system resilience. Millet fields frequently support a varied mix of flora and fauna, including pollinators, beneficial insects, and birds, resulting in a healthy ecology.

Millets have been preserved through traditional agricultural practices, conserving genetic diversity that could be important for future crop breeding and climate adaptation.

3. **Water Conservation:** Millets play a significant role in conserving water due to their adaptability to dry climates. Millets require 70-80% less water than rice and wheat. For example, pearl millet requires only 250-300mm of water, whereas rice requires over 1,000 mm.

Millets flourish in rainfed circumstances without irrigation, making them ideal for drylands and water-scarce areas. Millets develop quickly (60-90 days), lowering the amount of water needed throughout the growing season.

Millets have deep roots that retain moisture and require less frequent watering. Millet farming reduces groundwater over-extraction as it does not rely largely on irrigation.

4. **Soil Health:** Millets play a valuable role in improving and maintaining soil health due to their unique agricultural characteristics.

Millets offer significant benefits for soil health due to their low input requirements and resilient root systems. They require less chemical fertilizer and pesticide compared to conventional crops, which reduces the chemical load on the soil and helps preserve its natural microbial diversity. The deep and fibrous roots of millets enhance soil structure by improving aeration and porosity, while also binding the soil to prevent erosion. These roots facilitate better water infiltration and retention, helping to minimize salinization and nutrient leaching—common problems associated with overwatering in other crops. Millets are also ideal for crop rotation and intercropping, as they prevent soil nutrient depletion and interrupt insect and disease cycles, reducing reliance on hazardous treatments. After harvest, the remaining plant residues enrich the soil with organic matter. Furthermore, the robust biomass and extensive root systems of millets contribute to carbon sequestration, gradually increasing the soil's organic carbon content.

5. **Economic and Social Benefits:** The primary advantage of millet production is its monetary value, which benefits both the farming community and the national economy. Millets immediately assist farmers by increasing revenue, providing jobs, and opening up new markets, all of which have a favorable impact on the overall rural economy.

Millet, on the other hand, can be used to create healthful meals as well as more productive workforces. This recognition of millet as a driver of economic growth and human capital development is equally notable, especially in light of fast-developing lifestyle-related diseases. Millets have a low glycemic index, which offers them an edge in fighting these illnesses and promoting overall health.

6. **Nutrition Security:** Millets, being nutrient-dense staples, directly address nutritional issues. Their implementation improves public health outcomes by providing patients with demonstrated treatment options. (Babulal., 2024)

CONCLUSION:

Millets possess great potential for promoting sustainable agriculture as they can withstand drought and adapt well to shifting climate patterns. They require minimal inputs, support sustainable farming practices, and promote agricultural biodiversity. As a result, millets offer a more sustainable and nutritious alternative to staple grains like rice and wheat. In areas like Africa and Asia, millets have the potential to enhance nutrition for underserved communities. Their contribution to enhancing drought resistance, conserving biodiversity, and promoting gut health through prebiotics underscores their significance in sustainable farming practices. Promoting millet cultivation can revitalize rural economies by preserving traditional farming methods, boosting farmer earnings, and fostering self-reliance. To facilitate this transition, governments should assist in the form of subsidies, crop insurance, and the development of infrastructure for millet processing. Additionally, integrating millet into the public distribution system (PDS) can contribute to improving food security for economically disadvantaged communities.

REFERENCES:

Babulal, K. S. (2024). Millets: a sustainable approach to nutritional security. ISBN: 978-81-968830-2-7.

Kumar, H., Thakur, A.K., Pradhan, A., Sharma G.K. and Singh D.P. 2022.

Evaluation of millet based intercropping system under rainfed international upland Journal of situation. Current Microbiology and Applied Sciences 11: 412-417

Kumari N., Kumari M. and Kusum A. 2024. Millets: Background, need and importance in climate resilient cropping systems. Pp 1-10 (https://www.kdpublications.in)

Rathore,V.S., Tanwar,S.P. and Yadav O.P. 2019. Integrated farming system: Key to sustainability in arid and semi-arid regions. The Indian Journal Agricultural Sciences 89: 181-192

Sharma,A. Ceasar,s.a. Himanshu,P. Devadas,v.s. Kesavan,A.k. Heisnam,p. Vashishth,A. Misras,v. Mall,A.k 2025. Millets:Nutrient-rich and climate resilient crops for sustainable agriculture and diverse culinary aoolications. Journal Of Food Composition and Analysis, ISSN 0889-1575.

Tripathi G., Jitendrakumar P.H., Borah A., Nath D., Das H., Bansal S. and Singh B.V. 2023. A review on nutritional and health benefits of millets. International Journal of Plant & Soil Science 35: 1736-1743.