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MILLETS IN TELANGANA: TRADITIONAL WISDOM, NUTRITIONAL WEALTH AND CLIMATE RESILIENCE

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ABSTRACT

A varied group of small-seeded cereals, millets have long played a significant role in traditional cuisines and agriculture throughout the Indian subcontinent, including the Telangana region. Because of their ecological sustainability, climate resistance, and nutritional richness, their importance has grown again in recent years. Many major and minor millets, including finger millet (Raagulu), foxtail millet (Korralu) & sorghum (jonnalu) and pearl millet (Sajjalu), are cultivated in Telangana because of its semi-arid climate and primarily rainfed agriculture. This paper explores the ecological relevance, traditional culinary uses, nutritional value, and climate adaptability of millets in the Telangana region. The Telangana government's continuous efforts to revive the state through programmes like Rythu Bandhu and Rythu Bima, with assistance from NGOs and Farmer Producer Organizations (FPOs), are also highlighted. A push for the mainstreaming of millets at the policy level is seen in their inclusion in national nutrition programmes including the Public Distribution System (PDS), POSHAN Abhiyaan, and the Mid-Day Meal Scheme. Notwithstanding their promise, millets encounter obstacles pertaining to consumer knowledge, processing facilities, and market accessibility. To establish millets as a cornerstone of Telangana's sustainable agriculture, food security, and public health, existing challenges must be addressed through inclusive and integrated approaches.

***Key words*:** Millets, Telangana, Nutri-cereals, Climate-resilient crops and Sustainable agriculture.

Introduction

Millets are a group of small-seeded, nutrient-rich cereal grains that have been cultivated for thousands of years across Asia and Africa. Once the backbone of traditional farming systems and staple diets, millets are now regaining attention for their exceptional nutritional value, climate resilience, and ecological sustainability. Unlike water-intensive crops like rice and wheat, millets thrive in dry land conditions with minimal inputs, making them ideal for regions prone to drought and soil degradation.

In recent years, growing concerns over lifestyle diseases, environmental sustainability, and food security have sparked a renewed interest in millets as "smart foods" — foods that are good for people, the planet, and farmers. With their rich content of dietary fiber, proteins, vitamins, and minerals, millets offer a viable solution to contemporary nutritional challenges while supporting sustainable agriculture. As the world looks toward climate -smart and health-conscious food systems, millets are poised to play a pivotal role in reshaping the future of food.

- Millets have been cultivated in the Indian subcontinent for over 4,000 years.
- They were the staple grains of ancient Indian civilizations before rice and wheat became dominant post-Green Revolution.
- Found in Harappan sites and mentioned in Vedic texts.

Millets are a group of small-seeded grasses that

Table 1: List of recorded millets in Telangana region.

S.No	Scientific Name	Millet Type	Local Name (Telugu)	Family name
1	*Cenchrus americanus* (L.) Morrone	Pearl Millet	Sajjalu	Poaceae
2	*Echinochloa esculenta* (A.Braun) H.Scholz	Barnyard Millet	Udalu	poaceae
3	*Eleusine coracana* Gaertn.	Finger Millet	Raagulu	Poaceae
4	*Panicum miliaceum* L.	Proso Millet	Varigalu	Poaceae
5	*Panicum sumatrense* Roth ex Roem. & Schult.	Little Millet	Saamalu	Poaceae
6	*Paspalum scrobiculatum* L.	Kodo Millet	Arikalu	Poaceae
7	*Setaria italica*(L.) P. Beauvois	Foxtail Millet	Korralu	Poaceae
8	*Sorghum bicolor* (L.) Moench	Sorghum	Jonnalu	Poaceae

are cultivated as cereal crops for food and fodder. They are one of the oldest cultivated grains, known for their hardiness, nutritional richness, and ecological adaptability.

Classification of Millets

Millets are broadly classified into two categories:

1. **Major Millets:** Grown extensively and used widely in diets.

Examples:

- Sorghum (*Sorghum bicolor*) – Jonnalu
- Pearl Millet (*Cenchrus americanus*) – Sajjalu
- Finger Millet (*Eleusine coracana*) – Raagulu

2. **Minor Millets (or Small Millets):** Grown in smaller quantities but nutritionally dense.

Examples:

- Foxtail Millet (*Setaria italica*) – Korralu
- Kodo Millet (*Paspalum scrobiculatum*) – Arikalu
- Barnyard Millet (*Echinochloa esculenta*) – Udalu
- Little Millet (*Panicum sumatrense*) – Saamalu
- Proso Millet (*Panicum miliaceum*)_ varigalu

Materials and Methods

The cultivation, classification, nutritional value, and socioeconomic relevance of millets in the Telangana region were all documented and examined in this study using a descriptive and observational research technique. A survey of the literature, field observations, and conversations with farmers, agricultural officials, and local stakeholders in several Telangana districts known for millet production were used to collect the data.

Standard botanical taxonomic procedures were used to identify and categorize millet species, consulting scientific literature and herbarium records. The purpose of the field visits was to document frequently grown millet species and traditional farming methods in a few chosen rainfed and semi-arid agroclimatic zones. Farmers and rural communities participated in semi-structured interviews to gather local names, usage trends, and vernacular knowledge.

Nutritional profiles were compiled from secondary data sources, including reports by the Indian Council of Agricultural Research (ICAR), Food Safety and Standards Authority of India (FSSAI), and peer-reviewed scientific literature. Policy analysis was conducted using official government documents, schemes, and reports related to millet promotion, including Rythu Bandhu, Rythu Bima, and POSHAN Abhiyaan. Descriptive statistics were used to summarize the data, while qualitative insights were synthesized to understand the socio-cultural and policy landscape affecting millet cultivation and consumption in Telangana.

Results and Discussions

Commonly cultivated Millets

Telangana's semi-arid climate and rainfed agricultural

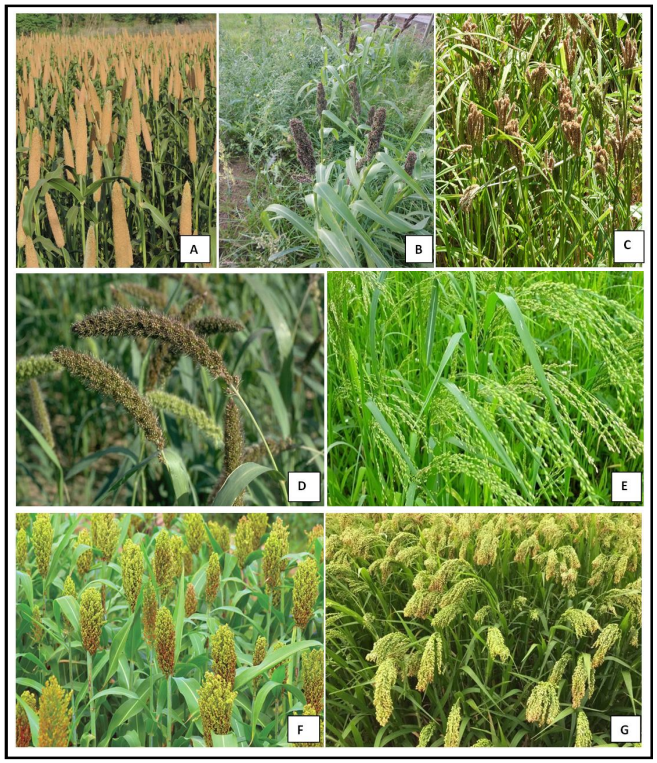

Fig. 1: **A.** *Cenchrus americanus*, **B.** *Echinochloa esculenta*, **C.** *Eleusine coracana*, **D.** *Setaria italic*, **E.** *Panicum sumatrense*, **F.** *Sorghum bicolor* and **G.** *Panicum miliaceum*.

Table 2: List of nutritional values for each millet, including their scientific names, types, Telugu names and key nutritional values per 100g (approximate).

S. No	Scientific Name	Millet Type	Local Name (Telugu)	E	P	F	I	C	GI
1	*Cenchrus americanus* (L.) Morrone	Pearl Millet	Sajjalu	361	10.6	1.3	8.0	42	Low
2	*Echinochloa esculenta* (A.Braun) H.Scholz	Barnyard Millet	Udalu	342	11.2	10.1	15.2	11	Low
3	*Eleusine coracana* Gaertn.	Finger Millet	Raagulu	336	7.3	3.6	3.9	344	Low
4	*Panicum miliaceum* L.	Proso Millet	Varigalu	341	12.5	2.2	0.8	8	Low
5	*Panicum sumatrense* Roth ex Roem. & Schult.	Little Millet	Saamalu	341	9.7	7.6	9.3	17	Low
6	*Paspalum scrobiculatum* L.	Kodo Millet	Arikalu	309	8.3	9.0	0.5	27	Low
7	*Setaria italica* (L.) P. Beauvois	Foxtail Millet	Korralu	331	12.3	8.0	2.8	31	Low
8	*Sorghum bicolor* (L.) Moench	Sorghum	Jonnalu	349	10.4	6.7	4.1	25	Low to medium
E: Energy (kcal); **P:** Protein (g); **F:** Fiber (g); **I:** Iron ; **C:** Calcium (mg); **GI:** Glycemic Index									

systems are well-suited for millet cultivation. Key millets grown include:

Agro-Climatic Suitability

Millets are drought-resistant and ideal for rainfed conditions, which dominate Telangana's agricultural landscape. Cultivated mostly in *kharif* season (June to September), though some millets are also grown during rabi. Thrive on poor soils and require minimal external inputs, making them ecologically sustainable.

Nutritional Significance

The table provides a comparative summary of the main millets that are historically grown and eaten in Telangana. Every millet has a different nutritional profile, making a distinctive contribution to dietary variety and health advantages:

- **High Protein Content**: Proso millet (*Panicum miliaceum*), foxtail millet (*Setaria italica*), and barnyard millet (*Echinochloa esculenta*) all have higher protein contents (over 11 g/100 g), which helps meet dietary protein requirements, especially for vegetarian diets.
- **Rich dietary fiber** (over 8 g/100g) is provided by barnyard millet, foxtail millet, and Kodo millet (*Paspalum scrobiculatum*), which are exceptional sources of fiber that support satiety and digestive health.
- **Rich in Iron and Calcium**: Barnyard millet and Little millet (*Panicum sumatrense*) are great sources of iron (more than 9 mg/100g), which is helpful in the fight against iron-deficiency anemia, while Finger millet (*Eleusine coracana*) is notable for having a very high calcium content (344 mg/100g), which is essential for bone health.
- **Low Glycemic Index**: All of the millets on this list have a low glycemic index, which helps improve blood glucose control and makes them appropriate for managing diabetes and metabolic syndrome.
- **Climatic Suitability**: These millets thrive with few water and input requirements, confirming their significance in climate-resilient agriculture. They are naturally drought-resistant and well-suited to Telangana's semi-arid climate.

This diversity highlights the potential of millets in tackling current issues with nutrition security, lifestyle diseases, and environmental sustainability in addition to reflecting the region's historic agricultural knowledge. Millets are often referred to as nutri-cereals due to their superior nutritional profile.

The graph is comparing average nutrient levels of millets versus rice/wheat per 100 grams. It clearly highlights the superior protein, fiber, iron, and calcium content of millets, along with their lower glycemic index making them a more nutritious and diabetes-friendly choice.

Culinary Heritage

- Traditional foods include Korra Annam (foxtail millet rice), Ragi Sangati/sankati (finger millet dumplings), Sajja Roti (pearl millet flatbread), andKoozh (fermented millet porridge).
- Millets were historically staple foods before the Green Revolution introduced high-yielding rice and wheat varieties.
- Now making a comeback due to growing health consciousness and government promotion.

Agronomic and Environmental Benefits

A variety of agronomic and ecological benefits are offered by millets:

Table 3: Comparative Nutritional Profile of Millets and Rice/Wheat.

S. No	Nutrient	Millets (avg.)	Comparison with Rice/Wheat
1	Protein	7–11%	Comparable to or more than rice
2	Dietary Fiber	8–12%	Higher
3	Iron	3–10 mg/100g	Higher
4	Calcium	Up to 344 mg/100g (Ragi)	Much higher than rice/wheat
5	Glycemic Index	Low	Helps in diabetes management

- 60–70% less water is needed than with paddy.
- Help improve soil fertility and lessen erosion.
- By improving climate resilience, farms will be better equipped to handle unpredictable rains and harsh temperatures.
- Encourage biodiversity while maintaining conventional agricultural practices.

Because of these advantages, millets are essential for Telangana's climate-adaptive farming, which is in line with the ideas of sustainable agriculture.

Health Benefits

- Gluten-free, suitable for people with celiac disease.
- Helps in managing diabetes, obesity, and cardiovascular diseases.
- Promotes gut health due to high fiber content.
- Strengthens bones and muscles (especially Ragi due to high calcium).

Revival Efforts and Policies

By providing financial assistance and crop insurance through programmes like Rythu Bandhu and Rythu Bima, the Telangana government has been aggressively pushing millet production. Farmer Producer Organizations (FPOs) and non-governmental organizations (NGOs) are supporting organic millet growing and promoting value addition through millet-based flour and snacks. Since India had already designated 2018 as the National Year of Millets, the United Nations' designation of 2023 as the International Year of Millets has greatly increased interest in and knowledge of millet production and consumption throughout the nation, especially in Telangana. In light of growing worries about health, climate resilience, and food security, millets are becoming more and more well-known as a wholesome and sustainable substitute.

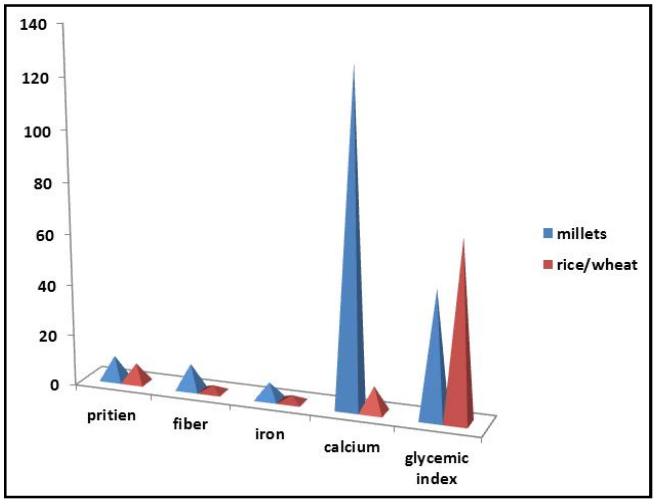

Fig. 2: Comparing nutrient levels of millets vs. rice/wheat.

The government has been integrating millets into public nutrition initiatives like the POSHAN Abhiyaan, Mid-Day Meal Scheme, and Public Distribution System (PDS) after realizing their advantages.

Challenges

Despite their promise, millets have several obstacles:

- Inadequate processing infrastructure, including immature technology for milling, dehulling, and packaging
- Farmers' profitability is constrained by the continued weakness of market ties.
- Long-term impact requires policy continuity and departmental coordination (agricultural, health, and education); consumer knowledge is low, especially among urban youth who are not familiar with traditional millet foods.

Conclusion

Many of the issues affecting Telangana's agricultural and public health can be strategically resolved by using millets, which have a long history and exceptional nutritional, ecological, and agronomic features. Because they require few inputs to flourish in semi-arid, rainfed environments, they are ideal for the agroclimatic conditions of the area. With their high fiber content, vital minerals, and low glycemic index, millets are nutri-cereals that offer great nutritional advantages, making them the perfect crop to combat diabetes, malnutrition, and lifestyle diseases.

Government initiatives like Rythu Bandhu and Rythu Bima, as well as the incorporation of millets into major national programmes like POSHAN Abhiyaan, the Mid-Day Meal Scheme, and the Public Distribution System (PDS), are all actively promoting the resurgence of millets in Telangana. The participation of academic institutes, NGOs, and Farmer Producer Organizations (FPOs) strengthens these efforts even more.

The millet sector still faces obstacles like poor market connections, low consumer knowledge, and inadequate processing facilities, despite its benefits. Farmers, academics, entrepreneurs, and consumers must be connected through inclusive, interdisciplinary, and policy-driven ways to address these obstacles.

It is essential to mainstream millet-based agricultural and food systems in order to make millets a pillar of Telangana's sustainable agriculture, food security, and public health. It will be essential to improve market access, promote millet goods with added value, and combine traditional wisdom with contemporary innovation. Millets will do this, reviving historic food systems and paving the way for a future that is both nutritionally secure and climate resilient.

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