

# One Day National Seminar on **Millet: Miracle Food for Future**

**INTERNATIONAL YEAR OF MILLETS (IYoM) - 2023**

29<sup>th</sup> April 2023

**SOUVENIR**



Organized by

**Department of Botany**

**MVS Government Arts & Science College (A)**

**Mahabubnagar**

(Affiliated to Palamuru University)



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**“Millets: Miracle Food for Future”**

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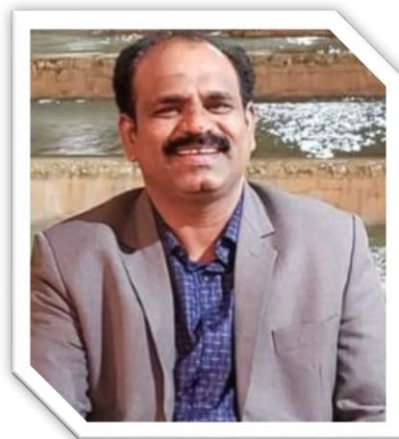


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**Prof. G. Yadagiri**



**Prof. DSR Rajender Singh**







### **MESSAGE**



I am happy to learn that the Department of Botany, MVS Govt. Arts & Science College, Mahabubnagar is organizing One Day National Seminar on "Millets: Miracle Food for Future" on 29<sup>th</sup> April, 2023.

I deeply appreciate the Principal, Staff and Students of the College for their initiative in organizing this Seminar. It is nice to know that this academic event is being organizing by Department of Botany, MVS College.

The theme you have chosen for the Seminar is of topical Significance and future relevance.

The United Nations General Assembly has declared the year 2023 'International Year of Millets'. It is the Prime Minister's vision and initiative that led to this United Nations Resolution being adopted with support from more than 70 nations across the globe. It will help in creating awareness throughout the world about the significant role of millets in sustainable agriculture and its benefits as a smart and superfood.

India is poised to become the global hub for millets with a production of more than 170 lakh tonnes which makes for more than 80 % of the millets produced in Asia. Millets are highly nutritious, containing a range of vitamins and minerals that are essential for good health. The seminar aims to create awareness about the nutritional value of millets and their potential to address malnutrition and related health issues.

I am sure this Seminar will deliberate on current developments to create awareness among the public, policymakers, and stakeholders about the importance of millets in the context of food security, health, and sustainable agriculture.

I wish the conference all success.

**[ Prof. L. B. Laxmikanth Rathod ]**

**Dr. K. Padmavathi**

**Principal**



**MVS Government Arts & Science College (A)**  
**(Accredited by NAAC with B++ Grade)**  
**Christian Pally, Mahabubnagar-509001**  
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### **MESSAGE**



**PRINCIPAL**

It is my great pleasure to welcome you all to this important event, organized by the Department of Botany, MVS Government Arts & Science College (A), Mahabubnagar, focusing on the miracle food for the future - Millets. As we celebrate the International Year of Millets in 2023, it is imperative that we take this opportunity to shed light on the immense nutritional and economic benefits of millets and their potential in contributing to a sustainable future.

Millets, once considered as the "poor man's grain", are now gaining recognition as a superfood due to their exceptional nutritional value, low carbon footprint, and adaptability to diverse climatic conditions. The need for sustainable and healthy food options is more critical than ever, especially in the face of climate change, and millets provide a viable solution to this global challenge.

This National Seminar aims to provide a platform for researchers, experts, and stakeholders to share their knowledge and experience on millets, and explore ways to promote their cultivation, processing, and marketing. It is my sincere hope that this event will serve as a catalyst for creating awareness and promoting the consumption of millets among the masses.

I would like to extend my heartfelt gratitude to the Department of Botany for organizing this event and to all the participants for their valuable contribution. Let us work together towards a sustainable future by embracing millets as a miracle food.

**Dr. K. Padmavathi**

**About The College:** An eminent freedom fighter, Sri Pallerla Hanumantha Rao, and other philanthropists of Mahabubnagar conceived the idea of incarnating Mahabubnagar Vidhya Samithi which led to the formation of MVS Arts & Science College in the year 1965. Initially, it commenced operations as a private college that had acquired 2(f) status on 01 July 1965 and 12 (b) status on 17 June 1972. The seamless public interest and local participation mooted the state government of Andhra Pradesh to take over the ownership of the College on 19 October 1979 and declared it as the Government Degree College. It was affiliated with Osmania University, Hyderabad in the beginning and the Government of Andhra Pradesh shifted the affiliation to Palamuru University with effect from June 2012. The College was accredited with a grade of B++ by NAAC in 2005, a Grade of B in 2013 and a Grade of B++ in 2022. The College is confirmed with autonomous status by UGC in the AY 2015-16. The College is situated in a lush, verdant, and serene atmosphere studded with elegance with a campus area of 37.6 acres.

**About Department:** The Department of Botany was established in 1965. M. Sc. Botany was introduced in the AY 2014-2015. The Department of Botany has completed two Minor Research Projects and published up to fifty Research articles in national & International journals. The Department of Botany is foremost in studying plants and their ecological significance. As we gather in this national seminar to discuss the latest developments in the field of botany, it is crucial to recognize the significant contributions made by this department to the scientific community and society as a whole. One of the significant contributions of the Department of Botany is its research on plant biodiversity and conservation. The department also researches plants' medicinal properties, which have important implications for human health. In addition to its research, the Department of Botany also plays a vital role in education. Its faculty members are dedicated to training the next generation of botanists, providing students with the knowledge and skills necessary to succeed in this field. The department also offers outreach programs to the more all-around community, enlightening the public about the importance of plant conservation and the vitalness of plants in our daily lives.

**About Mahabubnagar:** Mahabubnagar is the largest district in Telangana in terms of area (18432.00 sq. km) covered. It is also known as Palamoor. The name was changed to Mahabubnagar in honor of Mir Mahbub Ali Khan Asaf Jah VI, the Nizam of Hyderabad (1869-1911 AD). The district was situated between 77° 15' and 79° 15'E, of the eastern longitudes and 15° 55' and 17° 20'N, of northern latitudes.

**Pillalamarri:**

The most exciting place to visit in Mahabubnagar is the well-known banyan tree, Pillalamarri, about 4 km from the town. There is a tomb of a Muslim saint under the tree. It is a 700-year-old banyan tree, and its branches extend over 3 acres. There is also an aquarium, a small zoo, and an archaeological museum here.

### *About the Seminar:*

The National seminar on "Millets: Miracle Food for Future" is an important event that highlights the significance of millets as a potential food source for the future. Millets are small-grained, hardy cereal crops that have been grown for thousands of years, particularly in Asia and Africa. They are highly nutritious and have numerous health benefits.

The seminar aims to create awareness among the public, policymakers, and stakeholders about the importance of millets in the context of food security, health, and sustainable agriculture. The event brings together experts, researchers, farmers, and policymakers to discuss and deliberate on various aspects of millets, including their nutritional value, production, processing, marketing, and policy support.

The seminar includes keynote addresses, technical sessions, panel discussions, and exhibitions. The keynote addresses are delivered by eminent scientists and experts who provide an overview of the current status of millets, their potential, and challenges. The technical sessions focus on specific topics related to millets, such as the role of millets in addressing malnutrition, millet-based value-added products, millet-based farming systems, and millet-based entrepreneurship.

The panel discussions provide a platform for stakeholders to share their experiences, challenges, and success stories related to millets. The discussions cover a wide range of issues, such as the policy support for millets, the role of millets in sustainable agriculture, and the potential of millets for addressing food insecurity.

The exhibitions showcase the diversity of millets, their value-added products, and the innovations related to millets. The exhibitions provide an opportunity for farmers, entrepreneurs, and researchers to showcase their products and technologies related to millets.

The National seminar on "Millets: Miracle Food for Future" is an important event that highlights the potential of millets as a solution to various challenges faced by the world today, such as malnutrition, food insecurity, and climate change. The seminar aims to create awareness, build networks, and provide policy support for millets to emerge as a sustainable, healthy, and profitable crop for the future.

### *Objectives:*

1. To highlight the nutritional value of millets: Millets are highly nutritious, containing a range of vitamins and minerals that are essential for good health. The seminar aims to create awareness about the nutritional value of millets and their potential to address malnutrition and related health issues.
2. To promote the production and consumption of millets: Millets are hardy crops that require fewer inputs than other cereals such as wheat and rice. The seminar aims to promote millet cultivation as a sustainable and profitable option for farmers and encourage the consumption of millet-based foods among the general public.
3. To showcase the potential of millets in addressing food insecurity: Millets are versatile crops that can grow in diverse agro-climatic conditions. The seminar aims to showcase the potential of millets to address food insecurity by providing a reliable and nutritious food source, especially in regions prone to drought and other environmental stresses.
4. To encourage innovation and entrepreneurship in the millet sector: Millets offer numerous opportunities for innovation and entrepreneurship, from value-added products such as millet flour and millet-based snacks to millet-based farming systems. The seminar aims to encourage and promote such innovations and entrepreneurship in the millet sector.
5. To provide policy support for millets: Policy support is essential for the growth and development of the millet sector. The seminar aims to create awareness among policymakers about the potential of millets and the need for policy support to promote millet cultivation, research, and development.



## **Theme:**

### **"Millets: Miracle Food for Future"**

#### **Subthemes:**

- Nutritional value and health benefits of millets
- Millets in traditional and modern diets
- Climate change and the potential of millets for sustainability
- Millets in agro-ecological systems and natural resource management
- Millet production and processing technologies
- Millet-based value-added products and entrepreneurship opportunities
- Millet policies and governance frameworks
- Millet-based integrated farming systems
- Millet-based animal feed and livestock management
- Millets in the food & beverage industries: challenges and opportunities
- Millet-based nutrition programs and public health initiatives
- Millets and biodiversity conservation.
- Millets and Biofertilizers
- Role of Microbiology & Biotechnology in Millets
- Economic viability and market opportunities
- Millets- Disease Management

### **Program Schedule of one day National Seminar on Millets: Miracle Food for Nature on 29<sup>th</sup> April 2023**

<b>Spot Registrations:</b>	<b>9:00 - 10:00 AM</b>
<b>Inaugural Session:</b>	<b>10:00-10:45 AM</b>
<b>Tea Break:</b>	<b>10:45-11:00 AM</b>
<b>Technical Session-I:</b>	<b>11:00 - 1:00 PM</b>
<b>Lunch Break:</b>	<b>1:00-2:00 PM</b>
<b>Technical Session-II:</b>	<b>2:00 PM</b>
<b>Paper presentations:</b>	<b>2:00 - 3:30 PM</b>
<b>Poster presentations:</b>	<b>3:30 - 4:00 PM</b>
<b>Farmer's talk:</b>	<b>4:00 - 4:30 PM</b>
<b>Millets Exhibition:</b>	<b>4:30 - 4:50 PM</b>
<b>Tea Break:</b>	<b>4:50 - 5:00 PM</b>
<b>Valedictory:</b>	<b>5:00 - 5:30 PM</b>

**One Day National Seminar**

**on**

**“Millets: Miracle Food for Future”**

**INTERNATIONAL YEAR OF MILLETS (IYoM) - 2023**

**on**

**29<sup>th</sup> April 2023**

# **ABSTRACTS**

**Disclaimer:**

The authors hold complete responsibility for the contents of the abstracts and papers compiled in this book. The editors are not liable for any errors or omissions found in the content. Any mistakes, if present, are unintentional, and readers are requested to notify the editors of such errors to prevent discrepancies in future editions.

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## Mitigating Global Food Security: Relevance of Millets for a Healthy Society

Gunti Vinod Kumar<sup>1</sup> and Sreeramulu Gosikonda<sup>2\*</sup>

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### Abstract

Climate change posed a severe threat to sustainable crop production and global food security, particularly for those living in arid and semi-arid regions. To sustain the ever-expanding global population and meet future food demand, it is essential to strengthen food and nutrient security. Intensified cultivation of high-yielding cereals, such as wheat and rice, during the green revolution across the globe has increased the availability of food grains. But at the same time, it has decreased the chances to provide all nutrients due to diminishing the diversity of food basket. Millets are resilient nutri-cereals that offer a less expensive nutrient option and have the potential to address the current issues of global food and nutritional security. There are numerous examples of millets being consumed during the Indus Valley civilization, making it one of the first crops to be domesticated in India. Millets are currently grown in more than 130 countries and represent a staple diet for more than 500 million people in Asia and Africa. Even the United Nations General Assembly recognized the importance of millets and accordingly it has been declared 2023 (year) as the International Year of Millets. At this juncture, the purpose of this paper is to examine the recent research developments in nutritional quality and prospective health benefits of millets. In addition, the authors discuss the reduction of anti-nutritional properties to a safe level. The research relies on secondary sources. Finally, the authors discuss the potential of millet to improve nutritional and food security, as well as its future prospects. The study concludes that few of the United Nations' Sustainable Development Goals such as Goal – 1 (No Poverty), Goal – 2 (Zero Hunger), Goal -12 Responsible Consumption & Production) and Goal -13 (Climate Change) are directly addressing the problems associated with global food security whereas Goal – 3 is targeting to achieve good health and well-being among the human beings across the globe.

**Keywords:** Food Security, Millets, Nutritional Security and Sustainable Development Goals.

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## Arbuscular Mycorrhizal Fungal Association with Foxtail millet in Nagarkurnool District of Telangana State, India.

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### Abstract

This study aimed to investigate the arbuscular mycorrhizal (AM) fungal association in the rhizosphere soils of Foxtail millet [*Setaria italica* (L.) P. Beauv.] in 13 villages located in 2 Mandals of Nagarkurnool district, Telangana state, India. A significant number of AM fungi were identified in the present study, i.e., 42. Among the 42 AM fungi, *Glomus* was represented by 20 species, *Acaulospora* with 8, *Sclerocystis* with 1, *Scutellospora* with 5, *Gigaspora* with 4, and *Funneliformis* with 2, *Ambispora* and *Archaeospora* with 1 species. *Acaulospora scrobiculata* was the dominant species among the *Acaulospora* genera and *Glomus fasciculatum* was the dominant species among the *Glomus* genera isolated from the rhizosphere soil samples of 13 villages in Nagarkurnool district of Telangana State. The AM fungi spore density ranged from 74 to 239 per 100 gm soil (average 139), while the root colonization ranged from 50.67% to 90.67% (average 75.18%). This study provides valuable information on Arbuscular Mycorrhizal fungal association in *Setaria italica* (L.) P. Beauv. These findings demonstrate the potential of AM fungi as bio-fertilizers for improving crop yield and soil productivity. However, the majority of farmers in India are not aware of bio-fertilizers, and this study provides valuable information for enhancing agricultural practices, ecosystem management, and ecosystem restoration efforts.

**Keywords:** *Acaulospora scrobiculata*, *Glomus Fasciculatum*, *Setaria Italica*, Arbuscular Mycorrhizal Fungi, AM Fungal Spores, Root Colonization.

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## Arbuscular Mycorrhizal Fungal Association with Foxtail millet in Jogulamba Gadwal District of Telangana State, India.

Hari Prasad Kante<sup>\*1</sup>, Shafeen Khan<sup>2</sup>

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### Abstract

This study aimed to investigate the arbuscular mycorrhizal (AM) fungal association in the rhizosphere soils of Foxtail millet [*Setaria italica* (L.) P. Beauv.] in 20 villages located in 5 Mandals of Jogulamba Gadwal district, Telangana state, India. A significant number of AM fungi were identified in the present study, i.e., 46. Among the 46 AM fungi, *Glomus* was represented by 22 species, *Acaulospora* with 11, *Sclerocystis* with 5, *Scutellospora* with 3, *Gigaspora* with 2, and *Funnelformis* with 2, and *Archaeospora* with 1 species. *Acaulospora rehmii* was the dominant species among the *Acaulospora* genera and *Glomus fasciculatum* was the dominant species among the *Glomus* genera isolated from the rhizosphere soil samples of 20 villages in Jogulamba Gadwal district of Telangana State. The AM fungi spore density ranged from 75 to 270 per 100 gm soil (average 145), while the root colonization ranged from 53.33% to 93.33% (average 76.85%). This study provides valuable information on Arbuscular Mycorrhizal fungal association in *Setaria italica* (L.) P. Beauv. These findings demonstrate the potential of AM fungi as bio-fertilizers for improving crop yield and soil productivity. However, the majority of farmers in India are not aware of bio-fertilizers, and this study provides valuable information for enhancing agricultural practices, ecosystem management, and ecosystem restoration efforts.

**Keywords:** *Acaulospora rehmii*, *Glomus Fasciculatum*, *Setaria Italica*, Arbuscular Mycorrhizal Fungi, AM Fungal Spores, Root Colonization.

**MILLETS & SMALL INDIGENOUS FISH – A CASE STUDY OF TRADITIONAL  
HIGH NUTRITIONAL DIET OF TRIBES OF TELANGANA STATE**

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**Abstract**

Telangana state is home to 32 scheduled tribe classes, and their population accounts for 9% of the total population in the state (ETAR 2018-19). Based on their population and cultural trends in the state, tribes were categorized into three main groups namely Adivasi Communities (Andh, Gonds, Koya, and Pardhan), Particularly Vulnerable Tribal Groups (Chenchus, Kolams, Konda Reddis, and Thoti), and Dispersed Tribal Groups (Lambada, Yerukala, Nakkala, Kammara, and Yenadi, etc.). They had the knowledge gained over generations, referred traditional knowledge that includes biological, geographical, and genealogical that represents human relations to the environment, flora, and fauna (Singh & Singh 2002; Gurumayum & Choudhary 2009). Many studies have documented their traditional knowledge of wild plants, primarily in relation to their food and medicinal uses in the state (Kamalkishor & Kulkarni 2009; Murthy et al. 2010). We studied their traditional high-nutrient diet, mainly consisting of small indigenous fish with millet-based bread made from Sorghum (*Sorghum bicolor*), Finger Millet (*Eleusine coracana*), Pearl Millet (*Pennisetum glaucum*), and Foxtail Millet (*Setaria italica*) which rectifies their diet's high nutritional content. We identified a total of 72 small indigenous fish species belonging to 10 orders, and 20 families including two exotic species (*Oreochromis mossambicus* and *O. niloticus*) has been consumed by the tribes of the state. We compiled the nutritious value of millet and small indigenous fish species of their traditional diet. Overall the millets and small indigenous fish diet contain 35% carbohydrates, 11.8–16% protein, 1.3–5% fat, and 7.5–10% dietary fiber per 100 grams. Small indigenous fish are a good source of protein, fatty acids, and a lot of vitamins and minerals like calcium, fluorine, iodine, iron, phosphorus, selenium, and zinc. The vitamins A, D, and E, as well as thiamin (B1), riboflavin (B2), and niacin (B3) are abundant in them. In comparison to other small indigenous fish species, *Amhrypharyngodon mola* is a very rich source of vitamin A. Being the unhealthy eating habits of many people today, it is preferable to adhere to the traditional diet of the tribes in our state.

**Keywords:** Cattle Feed, Food fish, Freshwater fish, Malnutrition, Micronutrients, Native Fish.

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## Arbuscular Mycorrhizal Fungi Association with Foxtail Millet: A Comparison of Spore Production and Root Colonization in Red and Sandy Soils versus Black Soil

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This study compares the Arbuscular Mycorrhizal Fungi (AMF) association with Foxtail Millet in three different soil types: red, sandy, and black. The spore production and root colonization of AMF were assessed in each soil type. The results showed that red and sandy soils were more favorable for AMF spore production and root colonization compared to black soil. Specifically, the spore density ranged from 75 to 270 per 100 gm soil, with an average of 115 in red soil, 74 to 239 per 100 gm soil, with an average of 147 in sandy soil, and 86 to 212 per 100 gm soil, with an average of 136 in black soil. Similarly, root colonization ranged from 62.67% to 84%, with an average of 81.5% in red soil, 50.67% to 93.33%, with an average of 76.85% in sandy soil, and 53.33% to 89.33%, with an average of 70.33% in black soil. The findings suggest that red and sandy soils are more conducive to the growth of AMF, which can potentially enhance crop productivity and soil fertility.

**Keywords:** *Setaria Italica*, Arbuscular Mycorrhizal Fungi, AM Fungal Spores, Root Colonization, Red soil, Sandy soil, Black Soil.





## Millets are ancient grains for a healthy future

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### Abstract

The celebration of the International Year of Millets 2023, which has been driven by India's persistent efforts, due to their enormous potential and connection with the UN Sustainable Development Goals as crops that are climate change resistant, nutrient-rich, and water-efficient, millets have received special attention from the Indian government. Millets have earned the right to be designated as Nutri-Cereals by the Government of India due to their nutritional superiority when compared to common staples like wheat and rice. The main crops that are most suited to the dry land agro ecological conditions of the arid and semi-arid tropics are millets. The majority of the states in India with low to moderate precipitation produce millets. In order to address the food and health challenges brought on by an unbalanced diet of high-calorie fast foods. Today's population places a great priority on being healthy. Millets are among the healthiest foods to eat because of their great nutritional value. Millets are considered to be a significant source of nutrition due to their powerful antioxidant, anti-aging, antibacterial, and anti-carcinogenic properties as well as a number of essential vitamins like beta carotene (found in yellow pearl millets), niacin, riboflavin, thiamine, and minerals. (Ca, Zn, Mg, Fe, and Cu). Millets have been found to have numerous health benefits and to be effective in treating a number of ailments, such as today's "general diseases" include problems with malnutrition, obesity, Celiac disease, diabetes mellitus, cardiovascular disease (CVD) porous bones, depression, and gastrointestinal issues.

**Key word:** *Millets, nutritional value, health benefits*



## Wild relatives of millets in Amrabad Tiger Reserve, Telangana.

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### Abstract

Amrabad Tiger Reserve is situated in Nagar Kurnool and Nalgonda districts of Telangana state with an area of 2800km<sup>2</sup>. The area is with steep hills, comprising of dry deciduous, scrub forests and the patches of moist deciduous forests. The present study area is rich in having good genetic resource potential species for millets. A total of 39 genetic resource potential species for millets belonging to Poaceae family were recorded in the study area. *Oryza officinalis*, *Oryza meyeriana*, *Oryza rufipogon* are relatives of rice. Of the three *Oryza* species, *Oryza rufipogon* is the very close relative to cultivated *Oryza sativa* and belongs to primary gene pool. *Coix lacryma-jobi* is the tertiary gene pool for Maize. *Sorghum nitidum* is wild relative to *Sorghum bicolor*. *Pennisetum hohenackeri* is one of the relatives of Pearl millet distributed in the study area. *Eleusine indica* is the only wild relative of *E. coracana* available in moist localities, where human interference has occurred. *Panicum psilopodium*, *Panicum repens* are the wild relative species for Proso millet; *Panicum sumatrense* and *Panicum miliaceum* are also occurred in study area. *Echinochloa colona*, *Echinochloa crus-galli* and *Echinochloa picta* are main genetic source for Barnyard millet. All the three species are available near marshy areas. The Kodo millet, *Paspalum scrobilatum* is commonly found near marshy areas. *Saccharum spontaneum* is the ancestor of Sugar cane, found in riverine areas. *Brachiaria eruciformis*, *Brachiaria reptans* are the close relative of *Brachiaria ramosa*. *Digitaria abludens*, *Digitaria stricta* and *Digitaria ternata* are the ancestors of *Digitaria exilis* (Fonio millet) the smallest millet. The relatives of Teff is an important grain in Ethiopia and is also present in the study area. A total of 10 species of genus *Eragrostis* were recorded in the present study. The present papers dealt with the distribution and population structure of wild relatives of Millets occurred in Amrabad Tiger Reserve.

**Key words:** Amrabad Tiger Reserve, Wild relatives, Primary Gene pool.



## A Review on Dietary values of Foxtail Millet in controlling Diabetes type 2 and Obesity.

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### Abstract

The most crucial factor in preserving human health and whole physical well-being is the nutritional value of food. Dietary quality of food should be taken into consideration for preserving overall maximization of human health and fitness to address the issue of pervasive malnutrition because nutritional well-being is the driving force for development and maximization of human genetic potential. Numerous nutritive and therapeutic benefits of millets have been noted. Millets are a significant food crop in underdeveloped nations but are underutilized and neglected due to poor knowledge among the population and serious issues with the cooking quality, flavour, and bioavailability of millets. Millets are remarkably rich in both major and minor nutrients. This study focused on millet, which is a high-energy, nutrient-rich grain that can help with weight loss and keep diabetes in control.

Diabetes prevalence is rising globally as a result of urbanization, ageing populations, population growth, and trends in obesity and physical inactivity. The rapid epidemiological transformation linked to altered food habits and decreased physical activity is the main cause of the epidemic. Before the discovery of insulin, dieting was the only option and, for a short while, it worked to the point of almost starvation.

By consuming 80 grams of foxtail millet per day, diabetic patients saw improvements in their HbA1c (19.14%), fasting glucose (13.5%), homocysteine (0.85%), and insulin (1-9%) levels. In addition, there was a reduction in the plasma lipid parameters in the type 2 diabetes patients, including a 13.25 percent decrease in total cholesterol, a 13.51 percent decrease in triglycerides, and a 4.5 percent decrease in very-low-density lipoprotein cholesterol. Patients with type 2 diabetes who consumed a lot of millet-based dietary fibre experienced better glycemic control, lessened hyperinsulinemia, and had lower plasma lipid contents.

**Keywords:** *Foxtail millet, Dietary values, Diabetes type 2, Obesity.*

## A review on microbial association with millets: Productive and Commercial approach.

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### Abstract

Arbuscular mycorrhizal fungi (AMF) plays significant role in enhancing the production and productivity of millets in a sustainable manner. Some of the identified AMF such as *Glomus*, *Gigaspora*, *Claroideoglomus*, *Rhizophagus*, *Funnelformis*, *Paraglomus*, *Entrophosphora*, *Acaulospora*, *Ambispora*, *Septoglomus* and *Scutellospora* can positively affect the growth and yield of millets. *Glomus fasciculatum*, is a predominant AM fungal species found in Foxtail millet. The potentially beneficial bacteria identified in the rhizoplane and rhizosphere is positively correlated with grain size and panicle width. The composition of the rhizoplane microbiota is mainly driven by variations in plant genes related to immunity, metabolites, hormone signaling and nutrient uptake. This highlights the importance of understanding the plant-microbe interactions in order to optimize agricultural productivity. Some rhizobacteria have also been found to inhibit or suppress the growth of pathogenic fungi by producing secondary metabolites work against spore germination and even hyphal destruction. Metagenomic DNA extraction and sequencing have revealed the presence of diversified microflora in the rhizobiome that enhances plant growth in stressed and nutrient-deprived soil conditions. This finding provides a potential avenue for developing microbial-based solutions for improving crop production in challenging environments. Lastly, it is interesting to note that microbes and their associations with specific sites and stages are involved in the production of fermented millet drinks. This highlights the potential of harnessing the microbiota for developing value-added products in the food industry.

**Keywords:** *Arbuscular mycorrhizal fungi, rhizoplane, rhizosphere, rhizobiome, productivity, value-added products.*

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## Nutritional benefits of multi-grain millet food recipes with special reference to roti.

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### Abstract:

As life started on the earth, food played an important role in survival. Nature is the source of enormous crude materials like plants and animal origin. Agriculture is the milestone in the evolution to produce sufficient food for the community. In the modern age, hidden hunger is a major problem. On the other hand, people are suffering from various health issues like cancer, diabetes, cardiovascular diseases etc. These issues are due to changes in their diet, lifestyle etc. Millets are nutritionally superior to any other diet. The multi-grain millet roti contains the following grains: Wheat, Jowar, Finger millet, Pearl millet, Foxtail millet, Green millet, Kodo millet, Barnyard millet, and Fenugreek. These grains are rich in proteins and dietary fibres and poor in carbohydrate content. Several minerals and trace elements like calcium, copper, and iron are present. Water soluble vitamins like Thiamine – B1, Riboflavin – B2, Niacin-B3, Pantothenic Acid – B5, B6 Biotin -B7, Folate - B9, Total Ascorbic acid, and fat-soluble vitamins like Ergocalciferols- Alpha, Beta types, Tocopherols- Delta, Alpha, Gamma, delta type of Tocotrienols, Phyloquinones – K1, the Carotenoids- Lutein, Zeaxanthin,  $\beta$ -Carotene are also present. These nutritional elements will boost the immune system. A diet including these multi-grain millet roties may help to reduce the hidden hunger to some extent and the risk of health issues.

**Keywords:** *hidden hunger, health issues, multi-grain millet, nutritional elements.*





## **Resource management and cultivation of millets.**

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### **Abstract**

Generally a farmer cultivates traditional crops like maize, wheat and other commercial crops. But Indian farmers are not aware of cultivation of nutritious food. Hence, the Government of India has focused on the crops related to millets. Because the millets includes rich nutritious which help the human beings for healthy life. Millets such as Jowar (sorghum), ragi (finger millet), samalu (little millet), sajjalu (pearl millet) and korralu (foxtail millet) were cultivated in India. While the government is ready to buy back jowar and sajjalu offering a minimum support price. There is huge demand for minor millets like korralu and samalu in the open market also. Generally in India the cultivation of millets undertaken in the Kharif period, i.e., during the monsoon season where in areas sufficient rain fall will be recorded. In some areas in India the millets can be cultivated in the second season, i.e., as a Rabi crop (during the post monsoon, early winter months). It is observed that, if the government supports the Small and Mid-level Farmers, they can look in to cultivate millets by drip method where there is low ground water levels. It will help the small and mid-level farmers to get addition income source also. Millet consumption is slowly catching up with people in urban areas as well as rural. The present paper reveals that, the extent of millet cultivation in Telangana state particularly in Nirmal District and their challenges in cultivation.

**Keywords-** *Kharif, Rabi, Minimum support price, Cultivation, Nutritious food, Drip method.*





## Mighty millets the smart food for healthy India.

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### Abstract

Millets are smart foods of the 21st century because millet grains have substantial benefits as a draught resistant crop, yield good productivity in the areas with water scarcity, possesses remarkable edible & nutritive values, and ease of processing & food manufacturing. The return of traditional foods to modern plates where globally, billions of people are experiencing food insecurity and malnutrition. Millets are termed as “yesterday’s coarse grains and today’s Nutri-cereals.” Nutri-cereals are an abundant source of essential macro- and micronutrients, carbohydrates, protein, dietary fiber, lipids, and phytochemicals. Millet oil could be a good source of linoleic acid and tocopherols. Millet is an alkaline forming grain that is gluten-free. Millets have nutraceutical properties in the form of antioxidants which prevent deterioration of human health such as lowering blood pressure, risk of heart disease, prevention of cancer and cardiovascular diseases, diabetes, decreasing tumor cases etc. Other health benefits are increasing the time span of gastric emptying, provides roughage to gastro intestine. Millet is an alkaline forming food. Alkaline based diet is often recommended to achieve optimal health. With increasing water shortage, land unavailability for cultivation, and increasing heat due to global warming, millets are a fantastic opportunity for a populated country like India. Recently introduced millets fetch higher market value (than even major cereals) and hence help in uplifting the socioeconomic status of the marginal farmers under dry land conditions.

**Keywords:** *Nutritional composition, Health, Phytochemicals, global warming, sustainable agriculture.*





## **The consumer behavior towards the millets food consumption in Telangana state.**

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### **Abstract**

Milletts are familiar for their resilience, capability to survive under high temperatures and in degraded soils, and least necessities of water, pesticides, and fertilizers. In India and other Asian and African countries, millets usually consist of sorghum, pearl millet, and a range of small millets. The word "milletts" in this paper mentions to all of these crops. Milletts offer abundant nutrients like carbohydrates, essential amino acids, and vitamins like beta-carotene and B-Complex, mineral like iron, calcium, phosphorus and potassium etc., which are being consumed like pharmaceutical pills in current day. All the millets are amazingly greater with photochemical and are therefore, the solution for the malnutrition and obesity that affects a vast majority of the Indian inhabitants. They are a good source of vitamin B, magnesium, antioxidants, manganese, and phosphorus and also iron. They are excellent source of essential amino acids except for lysine and threonine but are relatively high in Sulphur comprising amino acids methionine and cysteine. This research study is carried out with these objectives to study the consumer behavior with reference to the food consumption hobbies, to the study the Milletts production and consumption in Telangana and to Study the consumer behavior towards the Milletts consumption in Telangana. For the study data have been collected from both primary and secondary sources. Necessary secondary data also collected from published and unpublished records of the selected organization. The nutritional benefits of millets have brought millets to the center stage as a major provider to the nutritional security of the households. It was discovered that the subjects were aware of benefits of millets and its consumption, but the respondents were not actually practicing the millets consumption.

**Keywords:** *Milletts, Health, nutrition, consumer behavior, consumption hobbies, production.*





## Nutrients and health benefits of millet

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### Abstract

Millet is a general term for small grains. They are mainly grown in developing countries and are particularly hardy as they can withstand high temperatures and drought. Overall, the macro- and micronutrient composition of millet is similar to other grains. However, the underlying compositional data are incomplete. It is now a proven fact that the whole world faces many health problems due to fiber-free foods. It is clear to thousands of patients that simply eliminating refined foods such as processed meats, refined oils, etc., can eliminate all civilization diseases. Millet has several health benefits to include seeds like these ancient and valuable grains in regular diet. Most civilized people have never heard of millet, much less understand its nutritional benefits. Still, millet is one of the best-kept secrets of our ancient ancestors. The origin of millet can be traced back to China and has been used in many countries for centuries. Millet has important health benefits. They are gluten-free and particularly rich in phenolic phytochemicals. Millet is processed into many traditional and modern foods and beverages around the world. Milling, fermentation, malting, and heat treatment are applied. and can have a significant impact on food composition, both positively and negatively. Studies show that millet contains high levels of flavonoid phenols, so regular consumption of millet foods may help prevent type 2 diabetes and cardiovascular disease. Agricultural and food technology developments are also needed to improve the palatability and availability of millet foods. All millet foods are rich in nutrients such as dietary fiber, which helps with metabolic disorders such as diabetes, obesity and cardiovascular disease. Excellent protein content, which helps in the growth and development of children and bone health in both children and the elderly. Rich in iron to help with anemia, gluten-free properties to help celiac disease and gluten sensitivity. Phytosterols and policosanols are cardio protective compounds present in the waxy layer of millet. When this millet is ground unpeeled, it offers several benefits. Millet contains antioxidants, substances that protect cells from the effects of free radicals.

**Keywords:** *Millet, Nutrients, Health Benefit.*



## Nutritional Composition and Health Benefits of Millets

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### Abstract

Millet grains have a lot of benefits: they are drought-resistant, grow well in places with little water, are delicious and good for you, and are easy to process and make into food. Agriculture and food security policymakers in developing countries should support research and projects to learn more about how millet grains can be processed and made into food, how their nutritional value can be improved, and what health benefits they might have. This will help millet grains be used as food in those countries. Most developing countries have already started to work on improving millet grains' ability to be eaten. Linoleic acid and tocopherols could be found in good amounts in millet oil. Millet is a grain that turns alkaline and doesn't have gluten. Millets are also full of phytochemicals and micronutrients, which are important for the immune system and do a lot of different things in the body. Millets have health benefits in the form of antioxidants that keep the body from getting worse, like lowering blood pressure, lowering the risk of heart disease, preventing cancer and heart disease, diabetes, and reducing the number of tumors. Other health benefits include lengthening the time it takes for the stomach to empty and giving the digestive tract roughage. Millet is an alkaline forming food. A diet high in alkaline foods is often recommended for the best health. In developing countries, cereal-based foods are low in minerals like iron and zinc, which can be a big problem for babies and young kids. Food processing techniques are used to improve the nutritional value of food, make it easier to digest and make nutrients more bioavailable while reducing the amount of anti-nutrients. This study aims to find out about and make plans for these crops, which need to be seen as important foods.

**Keywords:** *Phytochemicals, Anti-nutrients, Probiotic & prebiotic, Gluten-free*







## Millet and biofertilizers

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### Abstract

In recent years, we are facing many problems like food security, water security, environmental protection, soil health and human health. When food demand was increased during 1960s 'the Green Revolution' was introduced. To increase the yielding of the crops, the chemical fertilizers and pesticides were used. The Chemical fertilizers and pesticides are costly and the farmers are using more than required quantity. As a result, the soil health is being disturbed. Biofertilizers are natural and contain microorganisms such as bacteria, fungi, algae that help to enhance soil fertility and nutrient uptake by plants. Biofertilizers are the sustainable alternative to chemical fertilizers and more over they are eco-friendly. Bio fertilizers have major impact on the soil health and plant growth. Inoculation of Biofertilizers reduces the requirement of chemical fertilizers and increases the soil health and productivity. Fertilizers such as Nitrogen fixing microorganisms, PSB (Phosphorus soluble bacteria), Bacteria releasing K, and mobilizers are being used. Millets are the group of small seeded annual grasses that are grown as the grown crops which grow in dry areas of temperate, subtropical and tropical regions. Millets are highly nutritious, gluten-free, and have a low glycemic index, making them an excellent choice of the people for healthy food options. Hence using Bio fertilizers in cultivation of millets lead to soil health and human health. Overall, millet cultivation can be good by using Biofertilizers as they help to promote sustainability of farming practices, enhancement of soil fertility and improvement of crop yields.

**Keywords:** *Millets, Chemical Fertilizers, Bio-fertilizers, Soil health and sustainable farming practices.*





## Essentiality of Millets Cultivation – Preservation of Soil health & Human health

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In the race of enormous production of crop yielding, the modern diversified methods in the increase of food production propelled the farmers community to resort to the abundant use of chemical fertilizers. Prior to Green Revolution, the conventional and traditional agricultural cultivation was evident across the world with the abundant or with the available Bio-fertilizers in the process of getting the crop yielding though not adequate. Industrial Revolution succeeded by Green Revolution in almost all parts of the world. The Green Revolution which advanced rapidly into the lives of farmers allowed them to switch over to the usage of Chemical Fertilizers enormously and limitlessly. Every Country's Gross Crop Production was increased very vastly and drastically because of the impact of Green Revolution channelizing for huge production. In the hasty and rapid movement towards Green Revolution, the Soil health was unevenly affected and slowly the productivity started drooping down. Based on these reasons the cultivation of Millets and use of millets would be a strategic solution for the preservation of soil health and people health. It is the time to think seriously and specifically to go back to the conventional growth of Millets which safeguards the health of soil and people.

**Keywords:** *Millets, Soil Health, Human Health.*





## Millet: Food for Future

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### Abstract

Millet is an important crop in relation to health/nutritional security and climate change and is well adopted in the farming system of most of farmers with small land holdings. The higher water use efficiency and lesser input requirements of millets for its cultivation again make them a wonderful crop for ecological balance/sustainability as compared to other cereals. The health benefits of millets are one of the reasons for increasing demand of millets in today's scenario. Being a short duration crop (Most millets), they also act as a contingent crop in the situation of natural calamities like drought and flood and are also one of the important climate resilient crops. Millets are one of the oldest foods known to humans and possibly the first cereal grain to be used for domestic purposes. Millets have been main staples of the people of semi-arid tropics of Asia and Africa for centuries where other crops do not grow well. Since ancient times, millet has been widely consumed in Asia and India as well. The Indian flatbread roti is made from ground millet seeds. The tiny "grain" is gluten-free and packed with vitamins and minerals. Millet grain is highly nutritious with good quality protein, rich in minerals, dietary fibre, phyto-chemicals and vitamins. The nutritional composition of the millets is compared with that of rice and wheat. The protein content of foxtail millet, proso millet and pearl millet are comparatively higher than the protein content in wheat. The fibre content of kodo, little, foxtail and barnyard millet is higher. Finger millet has a remarkable amount of calcium 344.00mg / 100g. Cereal based food products are supplemented with millets and have become increasingly popular due to nutritional and economic advantages. Value added products from millet have the potential to add value to business and has a large potential for growth as consumers believe that millets and millet based foods contribute directly to their health.

**Keywords:** *Millets, Millet Types, Food.*





## “Wonder grains” millets

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### Abstract

In modern living style people are busy with their daily chores and life became unnatural, the food habits are so harmful. It leads to imbalance of proteins, minerals and other essential of body requirements, due to this it results in ill health like high Blood pressure, diabetes, amnesia, and constipation and more. Millets play a miracle role in maintaining a wonderful and healthy life. Millets are rich source of proteins, minerals, fibre and key vitamins. Millets significantly contribute to human diets owing to their high levels of energy, calcium, iron, zinc, lipids and high quality proteins. In addition, they are also rich sources of dietary fibre and micro nutrients. That is why they called as wonder grains. These millets are traditional food of our ancient ancestors. There are known as “chiru dhanyalu” in Telugu. So millets are gluten free and healthier alternative rice and wheat, as it contains low glycemic index are glutton free. Millets protect our internal organs in more than one way. They can grow in any conditions of whether and soil. It takes least percentage of water and it can grow even in low fertility lands and heavy temperature areas. That is why they called wonder grains or miracle cereals.

**Keywords:** wonder, chores, minerals, fibre, proteins, gluten, glycemic.





## Role of millets in conservation of biodiversity

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### Abstract

The term “Millets” is used to represent many small-grained cereals. Millets crops comprise of pearl millet, sorghum, finger millet and small millets namely foxtail, Kodo, Proso, barnyard, brown top and little millet. Millets are rich in nutritional properties and considered as ‘Nutri-cereal’ having more resistance biotic and abiotic stresses. Millets are one of the oldest cultivated food grains known to humans and have been a staple food in India for thousands of years prior to popularity of fine cereals like rice and wheat. These crops have a long history of cultivation of more than 5000 years and grown in many states. As in past 10 years there has been ignorance towards these crops. Tremendous decrease in area and production is directly or indirectly resulted in the loss of agro biodiversity of these crops as these crops are grown on marginal or rain fed areas without any fertilizers. Agro biodiversity is the interaction between the environment, genetic resources, management systems and practices used by culturally diverse peoples. Therefore, more emphasis should be given for maintaining bio diversity of these highly rich crops by increasing area under these minor millets and developing proper agro techniques for increasing its productivity. Production and consumption ecosystem of millets faces certain challenges that need to be overcome to further improve adoption and consumption of millets. Although previously neglected, the value of small millets in modern agricultural stability has begun to be identified. Much work has been accomplished toward the development of modern varieties with the goal of better directing existing diversity toward agricultural challenges of the new millennium. There is need to preserve these crops and utilize the diversity within these species to maintain bio diversity.

**Keywords:** *Millet, Biodiversity, Conservation.*

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## Millet based value added products and Entrepreneurship opportunities

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### Abstract

Millet is small-seeded cereal crops. They are all members of the Poaceae family. The varieties of millets include little millets, proso millets, pearl millets, foxtail millets, etc. Millets are nutritious and very easy to digest. They are rich in niacin, have a low glycemic index, and are also rich in dietary fiber, potassium, phosphorus, vitamin A, vitamin B, calcium, iron, antioxidants, and more. We should widely publicize the health benefits of millets in both urban and rural areas. To encourage small-scale industries to produce different millet powders in rural and urban areas, it would be helpful for people and new entrepreneurs. We should also encourage the production of different types of millet food products by SHG (self-help groups, Dwakra groups) in rural and urban areas and supply these products to Sarwa Sikshya Abhiyan/anganwadi schools, government schools, and college hostels. Encouragement and subsidies should be given for the establishment of new millet food hotels, which will be helpful to new entrepreneurs. In these hotels, millet food like Ragi java, Korra payasam, Jonna gataka, Ragi laddu, Korra idli, etc., can be provided. Open millet-based franchise food companies to encourage new entrepreneurs, like Ragi Rajasam, Jonna Josh, Healthy Milet, etc. In public places like parks, bus stands, railway stations, and airports, millet-based shops should be established, which will be useful to entrepreneurs and the public.

**Keywords:** *Millets, Value added products, Entrepreneurship opportunities.*





## Nutritional value and Health benefits of Millets

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### Abstract:

Millet is a type of cereal that is part of the grass family Poaceae. Millet food can be easily digested. There are multiple types of millets, with the most common varieties including finger millet, foxtail millet, pearl millet, proso millet, little millet, and sorghum millets. Millet is loaded with nutritional value, and that is why many dietitians and doctors recommend it as a breakfast food that you must include in your diet. Millet is a good source of protein, fiber, key vitamins, and minerals. The potential health benefits of millets include protecting cardiovascular health, preventing the onset of diabetes, helping people achieve and maintain a healthy weight, and managing inflammation in the gut.

Millet is an adaptable grain."

**Keywords:** *Millet, Poaceae, Nutritional value.*





## Role of Microbiology in Millets

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Microorganisms play a crucial role in agriculture, including millet production. *Rhizobia*, Mycorrhizae, *Azospirillum*, *Bacillus*, *Pseudomonas*, *Trichoderma*, *Streptomyces* species, and other microorganisms act as biofertilizers and help increase soil fertility. In addition, some microorganisms such as bacteria are excellent decomposers, decomposing dead organic matter, which when mixed with the soil makes it fertile. Millets are a group of nutri-cereals that are gaining popularity globally for their health benefits, including their ability to act as a natural probiotic treatment for diarrhea, their rich fiber content, and their supply of vitamins, nutrients, and amino acids. Millets also help control blood sugar levels, lower cholesterol, and promote skin and hair growth. In this polluted world, a healthy diet that includes millets can help individuals lead a healthy life and prevent frequent visits to doctors.

**Keywords:** *Microorganisms, agriculture, Millets, Decomposers, Nutri-cereals, bio-fertilizers.*



## A Historical Study of Millets

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### Abstract

Millets are a group of highly variable small-seeded grasses that are widely grown around the world as cereal crops or grains for human food and as fodder. There is evidence of the cultivation of millets in the Korean peninsula dating back to the middle Jeulmun pottery period around 3500-2000 BC. 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), indicating that millet consumption was very common, pre-dating the Indian Bronze age (4500 BC). Millets were once major grains in India. Modern urban consumers look down on them as "coarse grains," lacking nutrients. Mesopotamia was home to one of the most plentiful agricultural systems in the ancient world. India is the largest producer of pearl millet. Rajasthan is the highest-producing state in India. The Harappa civilization or Indian earliest civilization cultivated and found at Harappan sites include wheat, barley, lentil, chickpea, and sesame. Millets are found from sites in Gujarat. Millets were among the first crops to be domesticated. There is evidence for consumption of millets by the Indus Valley people, and several varieties that are now grown around the world were first cultivated in India. West Africa, China, and Japan are home to indigenous varieties of the crop. Among the millets, sorghum millets from the early Harappan level (3000-2500 BC) at Kuna (3%) and Banawali (3%), mature Harappan level (2500-2000 BC) at Banwali (3%) & Rohira (20%) and late Harappan level (2000-1400 BC) at Mahorana (6%), Hulas (5%), Sanghol (2%), and Pirak (1%), and little millet from the early Harappan. India is the largest producer of millets in the world. India's two varieties of millets, namely pearl millet and sorghum, together contribute approximately 19% to world production in 2020.

**Keywords:** *Millets, Harappa civilization, Rajasthan, Mesopotamia, peninsula, Banwali.*





## The Importance and Use of Millets (Nutri cereals)

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### Abstract

Millet is a good source of protein, fiber, key vitamins, and minerals. The potential health benefits of millet include protecting cardiovascular health, preventing the onset of diabetes, helping people achieve and maintain a healthy weight, and managing inflammation in the gut. Millets are nutri cereals comprising sorghum, pearl millet, finger millet (major millets), foxtail, little, kodo, proso, and barnyard millet (minor millets). These are some of the oldest foods known to humanity and belong to the Poaceae family, cultivated for their small edible seeds. Pseudo millets are so called because they are not part of the Poaceae botanical family to which 'true' grains belong; however, they are nutritionally similar and used in similar ways to 'true' grains. Millets are highly nutritious, non-glutinous, and nonacid-forming foods, with many nutraceutical and health-promoting properties, especially high fiber content. Millets act as a probiotic feeding for micro-flora in our inner ecosystem, hydrating our colon to prevent constipation. Niacin in millet can help lower cholesterol. Millets contain major and minor nutrients in good amounts, along with dietary fiber. They are gluten-free and can be a substitute for wheat or gluten-containing grains for celiac patients.

**Keywords:** *Nutrition, Major Millets, Minor Millets, Diet Complimentary, Alternative Medicine.*





## **Advancement of entrepreneurship opportunities through millet based value added products for farmers of Wanaparthi district.**

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### **Abstract**

This abstract focuses on the advancement of entrepreneurship opportunities through millet-based value-added products for farmers in Wanaparthi District. Millets are a nutrient-rich cereal crop that can be used to create a wide range of value-added products. These products have the potential to not only improve the nutritional value of the local diet but also create employment opportunities for farmers in the region. The literature suggests that entrepreneurship can play a crucial role in promoting the adoption of sustainable agriculture practices and creating employment opportunities in the millet value chain. However, there are several challenges that need to be addressed, such as the lack of awareness and marketing channels for millet-based products, the development of a sustainable supply chain, and the adoption of innovative marketing strategies. The key to promoting entrepreneurship opportunities through millet-based value-added products in Wanaparthi District lies in the development of a conducive environment for entrepreneurs to invest in the industry, creating awareness among farmers about the potential benefits of millet-based value-added products, and providing them with the necessary training and support to produce and market these products effectively. This abstract highlights the significance of millet-based value-added products in promoting entrepreneurship opportunities and sustainable agriculture practices, particularly in Wanaparthi District, and emphasizes the need for entrepreneurs to address the challenges and critical factors highlighted in the literature to realize the industry's full potential.

**Keywords:** *Millet-based value-added products, entrepreneurship opportunities, sustainable agriculture practices, Wanaparthi District, nutrient-rich cereal crop, employment opportunities, conducive environment, awareness, training and support, marketing strategies.*



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## SATTVA RAJO TAMO – The role of millets in inducing Thrigunas

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### Abstract

According to Ayurveda and the yogic way of life, every individual is an amalgamation of three gunas, and these gunas are present in their respective ratios in each individual. According to yogic diet theory, an individual's character depends on what they eat because what they eat influences the nature of the related thought process in the individual. The thought process created thus influences individual character and builds up their personality. Therefore, the food we eat not only fulfills our need for energy but also shapes our character and way of thinking. According to yoga physiology, there are five sheaths an individual is made up of, known as koshas. These are Annamaya kosha, Pranamaya kosha, Manomaya kosha, Vignanamaya kosha, and Anandamaya kosha. The kosha theory implies that from the gross existence in the physical body, there is a journey destined to reach the bliss body, which is the Anandamaya kosha. At the peripheral level, the craving for food and the nature of food we take influences the Annamaya kosha. However, to reach the ultimate Anandamaya kosha, the journey begins with the Annamaya kosha itself, which means even the spiritual toddling steps begin with our food. Therefore, much emphasis is laid in yogic sciences on the food we eat. Among the three gunas, Sattva guna is hailed as the epitome of noble characteristics present in any individual. The combination of Sattva and Rajo guna is observed as desirable in any person to achieve success in life and to lead a meaningful life. Among the food materials, millets are considered the most suitable staple food to cultivate the combination of Sattva and Rajo guna in individuals so that their journey towards the bliss body shall become devoid of any obstacle. My paper focuses on the importance of millets in yogic diet and its implications on human character that are envisaged in Ayurveda and Yogic physiology.

**Keywords:** *Sattva guna, Tamo guna, Raja guna, Pancha koshas, Yogic physiology, Bliss body, Gross body.*





## Cultivation of Millets and Its Importance

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### Abstract:

Millets are indigenous crops commonly known as "Poor Man's food." They are highly rich in fibrous content, vitamins and nutrients. Which are used as food and fodder in rural areas. During last decade Rice, Wheat and other food materials occupies millets place due to civilization. In modern life human beings getting too much work pressure, stress and people change their life style suffering with several diseases like nutritional deficiency, Diabetes, BP fluctuations and Cardiovascular diseases. Millets have great nutritional values intake of millets as a food in daily life replace of rice we get great energy, healthy and as well as gradually reduce or at least control the above said diseases. Common consumed millets in India are Finger millets, Foxtail millets, Pearl millets and Sorghum. Millets are grown in drought conditions even they are well growing in less water sources. Compare to the Rice 1Kg of millets yield requires only 300 Litres while Rice takes 8000 litres. Cultivation of commercial crops like Rice, Wheat and Cotton fields we use large amount of Pesticides and water resources we need large amount of electricity. These are intertwining with increase of pollution and Green house effects. Since the last 50 years Millet cultivation has been much dwindling, due to Green Revolution, farmers turned to Commercial crops and disincentive of Government policies. Over the last decade people have much knowledge and awareness on consume of millets. Millets production is lesser than the actual requirements. So, Governments should initiates and encourage the Millet cultivation and also give the incentives to farmers.

**Keywords:** *Millets, Cultivation, Importance, Production.*



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## Nutritional and Health benefits of Millets

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### Abstract

Millets have a significant role in the traditional diets across various regions of the country. Millets have various advantageous properties, such as being drought-resistant, yielding well in areas where water is limited, and possessing good nutritional values. Millets are rich with phytochemicals; however, the types and amounts present vary greatly between and within different species. The processing techniques used for the grains, such as malting and dehulling, fermentation, thermal processing, etc., have an effect on the quantity of phenols present and mostly help in reducing them. As a result, the phytochemical levels in millet foods and beverages are considerably lower than those in other cereal grains. There is evidence showing that millet foods and beverages have functional and health-promoting effects, specifically anti-diabetic effects. These are rich in fiber; they suppress hunger pangs and help stave off problems related to obesity, as well as reducing low-density lipoprotein cholesterol (also known as "bad" cholesterol) and increasing high-density lipoprotein cholesterol (the "good cholesterol") as a result of these phytochemicals' actions, which also play a role in the body's immune system. However, direct evidence of health-enhancing effects is lacking, as most studies have been carried out on grains and their extracts and not particularly on food and beverage products, and most of the research work has been conducted in vitro or ex vivo and not in vivo. With the given nutritional profile and phytochemical contribution of millets, nutritionists and dieticians should encourage the public to consume more millets, in general and in particular.

**Keywords:** *Millets, Phyto-chemicals, Phenolics, Immune System, Anti-Diabetic, Obesity, Cholesterol, Cardiovascular disease.*



## Millet: The Super Crop of the 21<sup>st</sup> Century

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### Abstract

This article argues that millets, a group of small-seeded grains, are the super crop of the 21<sup>st</sup> century for India. They have advantages over rice and wheat due to their low water requirements, high nutritional value, and positive impact on the environment and farmer welfare. Millets are resilient to drought, pests, and diseases and can grow in dry and marginal lands with little or no irrigation. They can provide nutritional security, diversify diets, enhance soil health, and mitigate the effects of climate change. Additionally, millets can provide income and livelihood opportunities for small and marginal farmers who grow them. The article highlights the drawbacks of the rice-wheat system, including high water consumption, soil fertility depletion, and environmental impact. Rice and wheat require large amounts of water, leading to stress on surface and groundwater resources, and their continuous cultivation depletes soil health and productivity. Excessive use of chemical fertilizers and pesticides pollutes soil and water resources and affects biodiversity, causing environmental degradation and farmer distress. The rice-wheat system is not sustainable in the long run as it causes water scarcity and conflicts.

The article also discusses the reasons behind the implementation and limitations of the Green Revolution, which promoted the rice-wheat system in India. The Green Revolution aimed to increase food production and reduce hunger and poverty in India. It involved the introduction of high-yielding varieties of rice and wheat, along with chemical fertilizers, pesticides, irrigation, and mechanization. The main reason behind the implementation of the Green Revolution was to achieve food security and self-sufficiency in India. However, the rice-wheat system is not sustainable in the long run due to changes in health aspect (obesity, BP, diabetes, etc.), production problems, and overexploitation of groundwater. Therefore, the article suggests that millets should replace rice and wheat in India and become the super crop of the 21<sup>st</sup> century.

**Keywords:** *Millets, crop, 21<sup>st</sup> Century, Green revolution.*





## Millet Mission: Vision for Health in India

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### Abstract

The food habits of a nation play a significant role in determining the health and well-being of its citizens. India has a rich history of diverse food cultures, and millets have been an integral part of traditional Indian cuisine for centuries. Millets are a group of small-seeded grasses that have been cultivated in India for thousands of years due to their drought-resistant power and resilience to climate change, making them an ideal crop for sustainable agriculture. Additionally, millets are rich in essential nutrients like fiber, protein, and minerals, and are gluten-free, making them suitable for people with gluten intolerance and beneficial for health in many ways. However, with the advent of modernization, traditional food cultures have slowly disappeared, and modern food habits are making humans unhealthy. To promote traditional Indian practices and customs to the world, the Indian government has launched several schemes through public distribution systems to increase the production and consumption of millets in the country, as well as campaigns to create awareness among the people about the health benefits of millet. The government has also increased the procurement price of millets to encourage farmers to grow them. The proclamation of World Yoga Day by the United Nations and the International Year of Millets in 2023 are significant steps taken by the Indian government. It is crucial for people to recognize the importance of traditional food cultures and include them in their diet to lead a healthy and happy life.

**Keywords:** *Millets, Mission, Vision, Health, India.*





## Techniques and Best Practices for Increasing the Consumption of Nutritional Small Grains: A Perspective

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### Abstract

Little millets, known as nutri-cereals, are expected to dominate the food industry and diets due to their nutritional benefits and climate resilience. These crops, which were previously the main source of food and fodder, were displaced by the Green Revolution's focus on staple crops. However, small millets are abundant in micro-nutrients and essential amino acids, making them ideal for achieving nutritional security. National and international organizations are now focusing on reintroducing these crops and promoting their benefits through awareness campaigns, support programs for farmers, and the development of post-harvest and processing technologies. The decline in agricultural productivity since the 1950s is attributed to several factors, including a lack of improved varieties and cultivation practices, poor extension systems, and poorly organized value chains. Efforts are underway to overcome these challenges and increase the production and consumption of millets to improve food security and promote sustainable agriculture. The United Nations designated 2023 as the "International Year of the Millet" upon India's proposal. India wants to take use of its G20 Presidency this year to promote the advantages of millets to the globe and develop the markets for them. The major goal is reintroduction of millets as 21<sup>st</sup> smart food to build a global healthy society. A robust millets ecosystem requires a comprehensive 360<sup>o</sup> production strategy, the provision of high-quality seeds, input support, social safety nets for millets, women as a driving force, decentralized processing, value chain development, market support, household consumption promotion, innovations, welfare schemes (ICDS, Mid-Day Meal and PDS), procurement support, and other policy incentives for overcoming the initial inertia and imbalance surrounding millets.

**Keywords:** *Small Millets, Nutritional Security, Green revolution, Value Addition, Crop Promotion, Welfare Schemes.*





## Consumption of Millets as a Solution to Ailments and Illnesses

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### Abstract

Soon after Independence in 1950's the Government introduced planning system. The five year plan gave priority and objective is agriculture. In 1951 the India's Population was 36 crores and country has faced shortage of food grains. With this reason India had negotiated with USA under PL 480, imported Wheat. Indian government introduced agricultural scheme is IADP in 1960 as a pilot project in seven districts in India for achieving the self-sufficiency in the food grains. Soon after in 1965 another program introduced called IAAP in 1965, then after in 1966 in kharif season Govt. introduce new agricultural strategy in the country, but another side the population growth was alarmed staged in the country. In spite of all the schemes have not controlled famines, droughts, Due to the reasons many of people were died of shortage of food grains in the country, and also country crops had long gestation period. Foxtail millets, with a gestation period of only 70 days, were introduced to many Indian villages. Despite the lack of knowledge regarding its hygiene, it was consumed as a low-carbohydrate, high-fiber food that controls blood pressure and diabetes. To combat food shortages, the Indian government established the Food Corporation of India (FCI) in 1965 to collect 22 crops at a minimum support price. However, the FCI's focus on maintaining buffer stocks led to a preference for high-carbohydrate, low-fiber rice and wheat, instead of the more nutritious millets. There is common usage whoever had taken rice were called rich and poorer have taken rice in occasionally is called sacred morsel. Now Government supply rice and wheat through the price shops to the poor, due to this in the country many of them are sufferers with comfortable diseases. For them solution is the government has to encourage the peasants by giving minimum support price to millets like foxtail, finger, sorghum, pearl, buckwheat, amaranth, little, barnyard, broomcorn, codo millets which are low carbohydrate and high fiber hygienic foods. With this only India will become non-ailments and non-illness country. Which helps for producing healthy human resource is enriching the economy.

**Keywords:** *agricultural schemes, different millets, ailments and causes for illness.*







## Millet: The Sustainable and Nutritious Grain for the Future

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### Abstract

This abstract discusses the importance of millets as a dietary staple in most developing countries. Millet is the sixth most cultivated grain worldwide, and it is highly suited to drought conditions with great natural biodiversity. It is one of the oldest foods known to humans, and it is possibly the first cereal grain used for domestic purposes. Millets are primarily grown in arid regions of Asia, Africa, and Latin America because they require less water than other grains. India is the largest producer of many kinds of millets, often referred to as coarse cereals, and other leading producers include Nigeria, China, Mali, and Burkina Faso. Millets are highly valuable small-seeded grasses widely grown as cereal crops or grains for human food and fodder. They are an excellent source of fiber and protein compared to white rice and rich in nutrients such as iron, copper, manganese, calcium, phosphorus, magnesium, and B vitamins. Millets also contain antioxidants, flavonoids, certain amino acids, and tryptophan. Furthermore, millets provide numerous health benefits. They help to keep blood pressure low, control cholesterol levels, prevent diabetes, improve digestive health, prevent cancer, and help with weight management. Overall, millets are a sustainable and nutritious grain that can play an important role in future food security, particularly in arid regions.

**Keywords:** *Millets, sustainable, Grain.*





## The Importance of Production & the Processing of the Millets with reference to India

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### Abstract

Millets are important crops in the semiarid tropics of Asia and Africa, especially in South India, Mali, Nigeria, and Niger, with 97% of millet production in developing countries. This crop is favored due to its productivity and short growing season under dry, high-temperature conditions. Generally, finger millet is pulverized into flour for the preparation of food products. First, it is cleaned to remove foreign materials such as stones, chaffs, stalks, etc. Then, it is passed through abrasive or friction mills to separate out glumes (non-edible cellulosic tissue) before being pulverized. Primary processing of cereals includes cleaning, grading, hulling, milling, pounding, grinding, tempering, parboiling, soaking, drying, and sieving. Perfura Destoner is suitable for removing stones and other impurities from grains. The grains are separated based on their weight. This machine can be used for multiple grains by adjusting the air flow and the operating angle of the destoning deck. Hydrothermal processing involves steeping the millet to its equilibrium moisture content, steaming at atmospheric or elevated pressure followed by drying. During drying, the gelatinized starch undergoes retrogradation, imparting hardness to the kernels. This paper focuses on P.V. Satheesh, the visionary founder of Deccan Development Society in India, who not only promoted millets but also worked for agro-biodiversity, women's empowerment, Dalit rights, social justice and local knowledge systems. Millets are widely produced in India, with Rajasthan, Karnataka, Maharashtra, Uttar Pradesh, Haryana, Gujarat, Madhya Pradesh, Tamil Nadu, Andhra Pradesh and Uttarakhand contributing to 98% of the country's production in 2020-21. India is not only the largest producer, but also the largest consumer of millets in the world. Millets are also an important food source in Africa, particularly in the Sahel region, where it is used as a staple food. India, Sudan, and Nigeria are the leading producers of millets in the world.

**Keywords:** *millets, production techniques, processing techniques*





## **Pollen Morphological Studies of Millets from Mahabubnagar District of Telangana State, South India.**

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### **Abstract**

Palynological observations were conducted using light microscopy (LM) on four genera of Poaceae collected from different localities in Mahabubnagar District. The pollen types were identified based on polarity, size, shape, apertural pattern, and exine ornamentation. The diversity of apertures, including mostly spheroidal, peroblate, oblate, prolate, and suboblate exine ornamentation, makes comparative studies of pollen grains highly useful in systematic considerations. These phenomena are the most important criteria for research dealing with both extant and extinct pollen grains. The pollen types exhibit diversity in their morphological characters and form a significant tool for the taxonomic study as well as the systematics of plant taxa.

**Keywords:** *Millets, pollen morphology, Mahabubnagar district; Telangana state.*



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## **A Study of the Possibilities for Small Entrepreneurs and Farmers to Meet the Growing Demand for Millet in National and International Markets**

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### **Abstract**

The demand for millets in the national as well as in the global markets is increasing due to the consumption pattern of health-conscious people has been shifted to millets and its allied products from junk and non-nutritional food, because millets are gluten-free for high blood sugar people, and excellent and cost-effective source of iron, fibre, calcium etc. In India, millets are primarily a Kharif crop mostly grown in rain-fed conditions, requiring less water and agricultural inputs, and less investment than other staple crops. Millets are a collective group of small-seeded annual grasses that are grown as grain crops, primarily on marginal land in dry areas of temperate, sub-tropical and tropical regions. Millets were called poor man's food grain in the past and they have been cheaper when compared to other food grains. But, nowadays, especially after Covid19, health-conscious people recognized the importance of millets in getting good nutrition by consuming millets and its related products. The government of India has been prioritizing millet. They are important food and nutritional security all over the world. Year 2018, the government also declared as the National Year of Millets to raise awareness about its health benefits and boost millet production. The United Nations also recognized the importance of millets and declared the year 2023 as the International Year of Millets as part of sustainable development goals. According to the Director General of Commercial Intelligence & Statistics (DGCI & S), the millet exports in India rose by 8% to 159,332.16 metric tons in 2021-22 against 147,501.08 metric tons valued 479.56 crores (64.28 million US\$) in 2020-21, it has attained an all-time high mark for the first time in the history of millets exports. It is anticipated to boost local millet production. Furthermore, the Government of India is promoting the export of millet due to rising demand in the global market. The UAE, Saudi Arabia, and Nepal the top three countries in the world are importing millet from our country. The demand for millet is increasing at a very fast rate in the world. With the growing demand, it is creating more business opportunities for food processing units and boost to small entrepreneurs, and farmers, which could boost the added value of millet along the grain value chain and consequently provide more income opportunities for producers.

**Keywords:** Demand, health, national and international markets, consumption structure, incomes, entrepreneurs, food processing units, smallholders, farmers, DGCI etc.



## The Nutritional Value and Versatility of Millets

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### Abstract:

Millets are a group of small-seeded grasses that have been cultivated for thousands of years, primarily in arid regions of Asia, Africa, and Latin America. They are highly nutritious, rich in protein, fiber, vitamins, and minerals. Millets have great natural biodiversity and can be grown in a variety of soils, making them a sustainable and versatile crop. They can be used as both food and fodder and are often considered a staple in the diets of some of the world's poorest and marginalized communities. Millets have numerous health benefits, including reducing the risk of heart disease, stroke, and diabetes. They are also an excellent source of energy, making them ideal for athletes and people with active lifestyles. In recent years, millets have gained popularity as a gluten-free alternative to wheat, making them a valuable addition to the diets of people with celiac disease or gluten intolerance. This article explores the nutritional value and versatility of millets, highlighting their potential as a superfood of the future.

**Keywords:** *Millets, Nutritional Value, Health.*





## A Nutritious and Versatile Solution for Global Food Security

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### Abstract

Millets are a group of small-seeded grasses that have been cultivated for thousands of years in regions where water is scarce and climate is unpredictable. They are highly nutritious, rich in minerals like iron, calcium, and phosphorus, and have a low glycemic index, making them an ideal food for people with diabetes or those looking to manage their blood sugar levels. Millets can be used in a variety of ways, including as a staple food, in bread and porridge, and even as animal feed. They also have many health benefits and are rich in antioxidants, which can help protect the body against chronic diseases like cancer, heart disease, and diabetes. Despite their many benefits, the cultivation of millets has declined in recent years due to the popularity of other grains like wheat and rice. However, there has been renewed interest in millets in recent years, as more people become aware of their nutritional and environmental benefits. Millets are an important source of income for small farmers, particularly in developing countries where they are grown on a small scale. The government's Price Support Scheme (PSS) provides financial assistance to farmers for the cultivation of millets, and the development of value-added products encourages the production of value-added millet-based products to increase the demand and consumption of millets. This article explores the exceptional nutritional value and hardiness of millets, their role as an important crop for small farmers, and their potential to be a sustainable and nutritious crop for the future.

**Keywords:** *millets, cultivation, farmers, diabetes, PSS, antioxidants, consumption, value-added, and environmental.*





## Importance of Millets in our daily life

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### Abstract

Millets are natural grains found in South Asia and Sub-Saharan Africa. They are one of the oldest foods known to humans and may have been the first cereal grain utilized for domestic uses. Millets are gluten free and naturally rich in protein, iron, fibre, calcium, vitamins, and minerals. They are a better alternative to rice and wheat since they have a low glycemic index and are gluten free. Millets safeguard our inside organs in a variety of ways. Millet crops include foxtail millet (*Setaria italica*), proso millet (*Panicum miliaceum*), kodo millet (*Paspalum scrobiculatum*), little millet (*Panicum sumatrense*), and barnyard millet (*Echinochloa frumentacea*). Millet is a nutritional staple and the primary source of protein in most underdeveloped countries. Millet is the sixth most grown grain in the world, following corn, rice, wheat, barley and sorghum. It thrives in drought circumstances and has a high level of natural biodiversity. It can be grown in a range of environments. Millet has the ability to protect cardiovascular health, reduce the onset of diabetes, assist people achieve and maintain a healthy weight, and manage gastrointestinal inflammation. Millet is a versatile grain. It is necessary for heart health, neurological system function, and skin and hair growth. With the United Nations declaring 2023 the International Year of Millets, a growing number of people are realizing the benefits of these miracle grains, which are nutritionally dense, climate smart, and have the potential to empower farmers while assuring food and water security.

**Keywords:** *Millets, Importance, Daily life.*



## Different Types of Millets and Their Benefits and Nutrition

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### Abstract

The article "Different Types of Millets and their Benefits, Nutrition" provides a comprehensive overview of the various types of millets and their health benefits. Pearl millets, also known as bajra, are rich in minerals, proteins, fibre and starch, and contain vitamins and minerals such as iron, magnesium, calcium, phosphorus, manganese, potassium, copper, zinc, and chromium. Finger millets, commonly known as ragi, are packed with calcium, good carbs, fibre, amino acids, iron and Vitamin D. Barnyard millets, also called sanwa, are low in calories but power packed with protein and fibre, which helps in preventing bloating, constipation, cramping and acidity. Little millets, also known as kutki, are nutritious, gluten-free, non-sticky and non-acid-forming grains. Sorghum, fondly known as jowar, is an excellent source of dietary fiber, high in potassium and low in sodium, promoting healthy blood pressure. Kodo millets, commonly known as kodra in Hindi, help in reducing fasting blood glucose levels and promotes a significant increase in serum insulin level. Foxtail millets, also known as kagni or kakum, have numerous benefits like regulating blood pressure, controlling diabetes, preventing ageing, and lowering bad cholesterol. By incorporating these types of millets into our daily diet, we can enjoy the various nutritional benefits they offer.

**Keywords:** *Millet types, Benefits, Nutrition.*





## Milletts are the traditional and future crops in SDG Era

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### Abstract

Milletts are an ancient crop and first cultivated crops of the mankind. Milletts were consumed in the Indus-Sarasvati civilization, according to research (3,300 to 1300 BCE). Milletts are the traditional grains consumed by half of the population of Asia and Africa. There are about 6,000 varieties of millet found across the world. Some of them are sorghum (jowar), pearl millet (bajra), finger millet (ragi or nachni), brown top (sama), kodu (arke), proso (chena/barr), barnyard (sanwa) and foxtail millet (kora). . Millet was extensively cultivated till around 50 years back, before Green Revolution, the milletts are 40 percent of total grain production but after the Green revolution had a negative impact on the production of millet and increased production of Rice and Wheat. In this International year of Milletts (IYM) The All India Milletts Sisters (AIMS) Network proposed that we should move away from their tradition of preferring nonfood-crops such as cotton and heavily irrigation-dependent crops such as rice, sugar cane etc., and give priority to milletts. To achieve Sustainable Development Goal (SDG) 2 aims “zero hunger” by the UN in 2015, milletts are the most suitable crop for dry land agriculture as our 40% of dry land surface of the globe. Milletts can grow as rainfed crops in low fertile soils, a low water requirement and can be grown even under extremely high temperatures and less rainfall, resistant to drought, resistant to most diseases and pests, and need minimum care. These are C4 plants that can convert CO<sub>2</sub> into carbohydrates with higher photosynthetic efficiency than C3 plants with low carbon footprint, good for health, and good for cultivation, beneficial for farmers hence milletts are miracle grains and gain the status of future agriculture. Millet farming can play a crucial role in sustainable agriculture and make farmers prosperous with potential cultivation of millet crops.

**Keywords:** *Ancient, Agriculture, Crops, Cultivation, Milletts, SDG.*





## Entrepreneurship Development through Millets Processing: Prospects and Challenges

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### Abstract

Post Covid Scenario, the world facing a problem of food security, and climate changes impact on production of food grains becoming a vital aspect, Processing of millets provides an opportunity for income generation and also ensures food security to the family as well as to the animals through fodder. Millet refers to several varieties of small-seeded grasses that are cultivated as grain crops. Amongst these, pearl millet (bajra), finger millet (ragi) and sorghum (jowar) are the most popular. Minor millets include foxtail, barnyard, proso and others. These crops are grown in marginal and dry lands in several countries in Asia and Africa, with India being the world's largest millet producer. There are plenty of opportunities for entrepreneurship development through millets food processing. The present paper explores the opportunities of the millets processing as an income generating opportunity to women groups, to identify the challenges arising in the marketing and logistic related issues of millets business in the local areas, to know the government support for promotion of millets as an IGA of new entrepreneurs. The present study is based on the secondary data available in the reports, records, journals and magazines.

**Keywords:** *Millets, Entrepreneurship Development, Processing, Prospects, Challenges.*





## RICE to MILLETS: Issues of Environment and Health

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### Abstract

This paper illustrates the impacts of rice cultivation on Environment and climate change as a result millets have become substitute to rice in view of health conscious ness and environmental concerns. Millets are a high variety group of small seeded grasses is a cereal crop or grains grown all over the world for human food and fodder some of the health benefits of millets are helpful to lose weight, millets keep blood sugar levels low, boost immunity, reduces cardiovascular risks, reduces asthma, helps the digestion and acts as antioxidants. Thus in recent years the awareness on health has forced the shifting of food habits from rice to millets. Because millets are healthy and some of the high protein millets are sorghum, pearl millet, finger millet, foxtail millet, proso millet, and Fonio millet. So the Indian farmers should think of cultivating millets more and more in view of climate change and environmental hazards. The present scenario of rice cultivation as Rice is cultivated both in alkaline and acidic soils. As per as rice farming technique is concerned, most of Indian farmers use nursery bed farming approach. India ranks to China in rice cultivation and consumption in Asia. It is cultivated in India in kharif and rabi seasons. Top rice-producing states in India are west Bengal Uttar Pradesh, Punjab, Tamilnadu, Andhra Pradesh and Telangana. Rice is very important food in almost all countries on globe, the third highest global product after maize and sugarcane. It is a very important agricultural product in the world .It mostly cultivated in hot and humid areas and requires sunshine and heavy water. Particularly, in Asia and Africa rice is part of the lunch and dinner menu.

**Keywords:** *Rice, Millets, Health, Environment, Issues.*





## The Essentiality of the English Language for the Promotion of Millets on the International Platform- A Study.

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### Abstract

This study examines the indispensable role of the English language in promoting millets on the international platform. Millets are a group of cereal crops that are rich in nutrients and have great potential to combat malnutrition and food insecurity, especially in developing countries. However, despite their many miracles, millets remain underutilized and unknown in many parts of the world. English is widely recognized as the language of international communication and commerce, and its significance in promoting products and ideas on the global stage cannot be overstated. This study argues that English language proficiency is essential for individuals and organizations involved in promoting millets to effectively communicate their message and raise awareness about the benefits of millets. The study explores how the English language can be utilized to promote millets, such as through academic publications, marketing campaigns, and social media outreach. It also examines the challenges non-native English speakers face in effectively communicating their message in English and proposes strategies to overcome these barriers. The study concludes that English language proficiency is vital in successfully promoting millets on the international platform. By effectively communicating the benefits of millets in English, individuals and organizations can help raise awareness about this underutilized crop and contribute to international efforts to combat malnutrition and food insecurity.

**Keywords:** *English Language, Promotion of Millets, International platform, Social Media.*





## Poshan Abhiyaan: Improving Nutrition and Health in India

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### Abstract

Poshan Abhiyaan, also known as the National Nutrition Mission, is a flagship program launched by the Government of India in 2018 to address the critical issue of malnutrition among children, adolescents, and pregnant women. Poshan Abhiyan program has promoted the cultivation and consumption of millets as a nutritious food source, contributing to the reduction of malnutrition among children, adolescents, and pregnant women in India. The program aims to reduce stunting, undernutrition, anemia among children, as well as low birth weight, and improve the overall health and wellbeing of women. This research article provides a comprehensive overview of the key components of Poshan Abhiyaan, including information, education, and communication campaigns, screening and early detection of malnutrition, targeted interventions for malnourished children and pregnant women, and convergence with other government schemes to address the underlying causes of malnutrition. Additionally, the article discusses the challenges and opportunities of implementing Poshan Abhiyaan and its impact on the health and wellbeing of the Indian population. The research article presents empirical evidence on the effectiveness of Poshan Abhiyaan in improving nutrition and health outcomes in India. It analyses data from multiple sources, including government reports, surveys, and academic literature, to assess the progress of the program and identify areas for improvement. The article also explores the role of community participation and behavior change communication in achieving the program's objectives, and highlights the potential for scaling up Poshan Abhiyaan to reach even more beneficiaries in the future. Overall, this research article provides a valuable contribution to the existing literature on Poshan Abhiyaan and its impact on the health and wellbeing of the Indian population. It offers insights into the program's strengths and weaknesses, identifies opportunities for improvement, and provides recommendations for policymakers, practitioners, and researchers working in the field of nutrition and health.

**Keywords:** *Millets, Poshan Abhiyan, Nutrition, Health.*







## Finger millet recipes of Telangana- a rich source of Nutritional values and Health Benefits

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### Abstract

India is the second-largest country in terms of population in the world, and its population rate is rapidly growing every year. This presents a huge challenge in supplying enough high-quality food and reducing nutritional insecurity, which is one of the major problems for our nation. In India, more than 60% of the population depends heavily on rice as their primary source of sustenance. However, there are some underutilized crops, such as minor cereals, that contain high nutritive values and can be used as potential food to increase the quality of food security. Finger millet is one such cereal that is widely used in preparing food and snacks. We found that most Telangana people prefer to consume various millets as supplementary foods to get essential minerals and nutrients in their day-to-day life, and its nutritional values have fulfilled the nutritional security of the population. The present study reviews the quality of high nutritional values and health benefits of recipes prepared by finger millets in comparison with major cereals such as rice, as well as methods of preparing various recipes and snacks.

**Keywords:** *finger millet, Nutritional values, health benefits*



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## Millets in the food & beverage industries: challenges and opportunities

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### Abstract

Millet is a common term to categorize small-seeded grasses that are often termed nutriceals or dryland-cereals, and includes sorghum, pearl millet, ragi, small millet, foxtail millet, proso millet, barnyard millet, kodo millet and other millets. Millets are the cereal crops generally small-seeded and known for high nutritive value. Increasing interest in reviving the consumption of millets across various countries is favouring the growth prospects of this market in recent years. 2023 is the International Year of Millets. With an annual global output of 25 million tons, millet has been one of the basic nutrients of humans for 4 thousand years in Africa and Asia and for Europe until the end of the Middle Age. The global millet consumption has declined at a rate of 0.9% and expected to witness positive movement during 2019-2024. The urban lifestyle choices and related food habits have given rise to number of diseases such as diabetes, obesity and cardiovascular problems such as heart attack, coronary artery disease, arrhythmias etc. It also contains calcium, iron and fibers which help to fortify essential nutrients for the healthy growth in children. The usage of millets in infant food and nutrition products is increasing and many manufacturers are expanding their business operations by acquiring smaller firms. . The support of government initiatives and inclusion of millets in various food and beverage products are likely to enhance its industry size. Lack of product recognition by various government agencies is expected to be a major challenge for business expansion in the projected time period. Further, use of the product for treating chronic diseases is not recognized by government agencies such as the FDA. However, they are water intensive and are likely to be unsustainable, as freshwater resources are depleting around the globe. Millet grows easily in dry climate, have smaller harvesting period and require minimal water quantity. They can be a sustainable alternative to rice and wheat, as a new staple food. It can also help in providing food security to large population in the coming years. This research paper is to be discussed

**Keywords:** *Agricultural crops, Millets, Water Consumption, Beverages, Nutrition, International Year, Population, Food Security, Industry, Climate Change.*

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One Day National Seminar on

**“Millets: Miracle Food for Future”**

INTERNATIONAL YEAR OF MILLETS (IYoM) - 2023

**29<sup>th</sup> April 2023**

ISBN NO. 978-93-5895-781-5