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## Millets: Climate resilient, nutritious, marginal crop in today's era

**Piyusha Singh, Akanksha Tiwari, SC Vimal and NR Meena**

### Abstract

India with its diversified agricultural assets in terms of soil, rainfall and climate has abundant crop diversity. Owing to their several drought tolerance characteristics, their cultivation in drought prone areas for providing food for human consumption, feed & fodder for animal and poultry, use as fuel and industrial uses are in common. During drought condition, it helps in generating employment in low rainfall areas where other alternative crops are limited and these crops are used as a contingent crop. As an assured source of income, these coarse cereals offer a better role during distress environment. A variety of coarse cereals are grown throughout the country in different ecology, agro-climatic condition, but mostly as rainfed crop. Sorghum, pearl millet, maize, barley, finger millet and several small millets such as kodo millet, little millet, foxtail millet, proso millet and barnyard millet together called coarse cereals.

**Keywords:** Millets, agricultural assets, rainfall, fodder crops

### Introduction

Millets are ancient Super grains the reservoirs of nutrition for a better health. Millets (Sorghum, pearl millet and small millets) are the important food and fodder crops in semi-arid regions, and are predominantly gaining more importance in a world that is increasingly becoming populous, malnourished and facing large climatic uncertainties. These crops are adapted to wide range of temperatures, moisture-regimes and input conditions supplying food and feed to millions of dryland farmers, particularly in the developing world. Besides they also form important raw material for potable alcohol and starch production in industrialized countries. Millets are hardy and grow well in dry zones as rainfed crops, under marginal conditions of soil fertility and moisture and are stable yielders.

Millets were indeed one of the oldest foods known to humans but they were discarded in favor of wheat and rice with urbanization and industrialization. Other millets that need we will also be focusing also are Brown top Millet (*Brachiaria ramosa*), Crap grass (*Digitaria cruciata*). With diabetes, hypertension and cardiovascular disease running rampant, as gifts of newly acquired life-styles, millets have returned as a viable option to live healthy life without consuming loads of anti-diabetic and anti-hypertension medicines that are not only very expensive but also have serious side-effects in the long run. Indeed millets act as a prebiotic feeding micro-flora in our inner ecosystem (Ahmed *et al.* 2013) [2]. Millet will hydrate our colon to keep us from being constipated. The high levels of tryptophan in millet produce serotonin, which is calming to our moods. Magnesium in millet can help reduce the affects of migraines and heart attacks. Niacin (Vitamin B-3) in millet can help lower cholesterol. Millet consumption decreases Triglycerides and C-reactive protein, thereby preventing cardiovascular disease. All millet varieties show high antioxidant activity. Millet is gluten free and non-allergenic.

Millets are the super foods for the present and future., their short growing season - from planted seeds to mature, ready to harvest plants in as little as 65 days make them commercially sound. When properly stored, whole millets will keep for two or more years. The challenge is to food-process millet in to tasty and ready to eat foods like biscuits, noodles and pre baked roties and of course as Ready to eat and Ready to cook novel foods.

Millets are one of the cereals besides the major wheat, rice, and maize. Millets are grown mostly in marginal areas under agricultural conditions in which major cereals fail to give substantial yields (Adekunle, 2012) [1]. Millets are important foods in many under developed countries because of their ability to grow under adverse weather conditions like limited rainfall. In contrast, millet is the major source of energy and protein for millions of people in dry country. It has been reported that millet has many nutritious and medical functions (Obilana and Manyasa, 2002; Yang *et al.*, 2012) [7, 10]. The term “Millet” (A Nutritional Crop) is applied to various grass crops whose seeds are harvested for human food or animal feed. Millets include five species, *Panicum*, *Setaria*, *Echinochloa*, *Pennisetum*, and *Paspalum*, all of the tribe Paniceae; one genus, *Eleusine*, in the tribe Chlorideae; and one genus, *Eragrostis*, in the tribe Festuceae. Millets are a major food source in arid and semi-arid parts of the world. Millets are excellent sources of carbohydrates, protein, fatty acids, minerals, vitamins, dietary fiber and polyphenols. The four major types are Pearl millet (*Pennisetum glaucum*), which comprises 40% of the world production, Foxtail millet (*Setaria italica*) Proso millet or white millet (*Panicum miliaceum*), and Finger Millet (*Eleusine coracana*) (Yang *et al.*, 2012). Foxtail millet is an economically important crop grown and consumed all over the world, especially in India, China, and other parts of Asia, North Africa, and the

Americas. It is very nutritious, consumed as a whole grain, easily digested, naturally gluten free and is essentially organic.

Millets are a group of highly variable small-seeded grasses, widely grown around the world as cereal crops or grains for fodder and human food. Millets are important crops in the semiarid tropics of Asia and Africa (Especially in India Mali Nigeria Niger), with 97% of millet production in developing countries the crop is favoured due to its productivity and short growing season under dry, high-temperature conditions. The most widely grown millet is pearl millet, which is an important crop in India and parts of Africa. Finger millet proso millet, and foxtail millet are also important crop species (Gopalan *et al.* 2004) [4]. The name “Millet” has been derived from the word “mil or thousand” is referring to the large number of grains that can be produced from a single seed. However, the Hindi word “*Kadann*” has come from a Sanskrit word “*Kadannam*”, which refers to food grains of the poor or “*Nindit Ann*”, which does not hold good in true sense, because, some of the millets like barnyard millets and Pseudo millet (*Amaranthus* and buck wheat) are used by the devotees during their fast and these commodities are rich in nutritive values. Millets is a group of several crops. The list of crops covered under millets along with their botanical and common names is given below in Table-1.

**Table 1:** Nomenclature of millets

Sl. No.	Common name	Botanical name	Local name (Hindi)
<b>(A) Millets under cultivation</b>			
1	Sorghum	<i>Sorghum bicolor</i> (L.)	<i>Jowar</i>
2	Pearl millet	<i>Pennisetum glaucum</i> (L.)	<i>Bajra</i>
3	Finger millet	<i>Eleusine coracana</i> (L.)	<i>Ragi/Mandu</i>
4	Barnyard millet	<i>Echinochloa frumentacea</i> (L.)	<i>Sanwa/Jhangora</i>
5	Proso millet	<i>Panicum miliaceum</i> (L.)	<i>Cheena</i>
6	Foxtail millet	<i>Setaria italica</i>	<i>Kakun/Kangni</i>
7	Kodo millet	<i>Paspalum scrobiculatum</i> (L.)	<i>Kodo</i>
8	Little millet	<i>Panicum sumatrense</i>	<i>Kutki</i>
<b>(B) Lesser known millets</b>			
1	Brown top millet	<i>Brachiaria ramosa</i> (L.)	-
2	Crap grass	<i>Digitaria cruciata</i>	-
<b>(C) Extinct millet</b>			
1	Jobs tear millet	<i>Coix lacryma</i> (L.)	-
<b>(D) Pseudo millet</b>			
1	Purple amaranththus	<i>Amaranthus cruentus</i>	<i>Chaulai</i>
2	Buck wheat	<i>Fagopyrum esculentum</i> & <i>F. tataricum</i> (L.)	<i>Kuttu</i>

**Nutritive values of millets**

The nutritive value of millets is given in Table-2. These crops contains substantially high amount of protein, fibre and minerals in comparison to fine cereals like wheat and rice. The protein content in millets like *Jowar* (10.4), *Bajra* (11.6), Proso millet (12.5), foxtail millet (12.5) and barnyard millet (11.6) is comparable with wheat (11.8) and much higher than rice (6.8). Though the finger millet contains lesser protein (7.3), but it is rich in mineral matter and calcium in

comparison to wheat and rice. Finger millet is the richest source of calcium (344 mg/100 gram grains). All the millets contain more fibre than fine cereals. Particularly, the small millets namely barnyard millet (14.7), *Kodo* millet (9) little millet (8.6) and foxtail millet (8.0) are the richest in fibre in comparison to wheat (1.2) and rice (0.2). Therefore, millets are now being pronounced as “Miracle grains/*Adbhut Anaj* and nutria-cereals”.

**Table 2:** Proximate composition of Millets, Coarse cereals and fine cereals (Per 100 g)

Commodity	Protein (g)	Carbohydrates (g)	Fat (g)	Crude fibre (g)	Mineral matter (g)	Calcium (mg)	Phosphorus (mg)
Sorghum	10.4	72.6	1.9	1.6	1.6	25	222
Pearl millet	11.6	67.5	5.0	1.2	2.3	42	296
Finger millet	7.3	72.0	1.3	3.6	2.7	344	283
Proso millet	12.5	70.4	1.1	2.2	1.9	14	206
Foxtail millet	12.3	60.9	4.3	8.0	3.3	31	290
Kodo millet	8.3	65.9	1.4	9.0	2.6	27	188
Little millet	8.7	75.7	5.3	8.6	1.7	17	220

Barnyard millet	11.6	74.3	5.8	14.7	4.7	14	121
Barley	11.5	69.6	1.3	3.9	1.2	26	215
Maize	11.5	66.2	3.6	2.7	1.5	20	348
Wheat	11.8	71.2	1.5	1.2	1.5	41	306
Rice	6.8	78.2	0.5	0.2	0.6	10	160

Source: National Institute of Nutrition (NIN), Hyderabad

A perusal of the above table indicates that these cereals are nutritionally superior to wheat & rice owing to their higher levels of protein with more balanced amino acid profile, crude fibre & minerals (Iron, Zinc, Phosphorous).

**Promotion of coarse cereals**

In our country, coarse cereal crops are grown in areas where fine cereals like wheat and rice cannot be grown profitably. Coarse cereals except maize, are adapted to low or no purchased inputs and to harsh environment of the semi-arid tropics, and therefore forms the backbone for dry land agriculture. Coarse cereals are traditionally grown in resource poor agro-climatic regions of the country and are photo-insensitive & resilient to climate change.

Millions of people around the world suffer from ‘hidden hunger’ of micronutrient. They do not get enough micronutrients required to lead healthy productive lives from the foods that they eat. Malnutrition in India, especially among children and women, is widespread, acute and even alarming. More than 70% of Indian women and kids have serious nutritional deficiencies. Most commonly observed deficiencies in unbalanced diet are iron (Fe), zinc (Zn), calcium (Ca), etc.

Traditionally we consume various varieties of coarse grain. The urban way of life cuts down the meaning of balanced diet by excluding the coarse grain combination in our daily meal plan.

Coarse cereals have been dubbed as poor man’s crops for long, have remained neglected with respect to their appropriate position in the commercialized food system, and investment in development. With increasing concerns about adverse changes in environmental quality and its consequent effects on food and nutritional security and perceived need for increasing food production per unit resource investment for an ever increasing population, these coarse cereals have good prospects of penetrating the food baskets of a wider range of consumers, both rural & urban and poor & rich, in the country. Coarse cereals have larger stake in household food security specifically nutritional both for human food, feed and fodder for livestock. Further, these crops have low water requirement being C<sub>4</sub> plant, wider adaptability to varied ecologists/climate; environment friendly with low consumption of pesticides, best suited for contingency planning with larger stake of small, marginal and farmers. Therefore, to overcome the targeted hunger and mitigate the effect of climate change in long run, there is a need to accelerate the production of coarse cereals in the country.

**Table 3:** State-wise & crop-wise varieties released and popular varieties of Small millets

Crop	State	Varieties released/ recommended during last 15 years.	Varieties popular in the State
Kodo (9)	A.P.	JK-13 and JK-48.	None
	Chhattisgarh	JK-13 and JK-48.	JK-41, JK-76 and JPUK-3
	Gujarat	GK-2, JK-48 and JK-65.	GK-1 and GK-2.
	Karnataka	JK-13, JK-48 and JK-155.	GPUK-3, RBK-155 and DPS-48.
	M.P.	JK-13, JK-48, JK-65, JK-106 and JK-439.	JK-21, JK-48, JK-155, K-106 & JK-76.
	Tamilnadu	Vamban and JK-13.	K-1, CO-2, CO-3, APK-1 and Vamban.
	U.P.	KK-2, JK-13 and JK-65	-
Little millet (6)	A.P.	Tarini	-
	Bihar	Tarini and Kolab.	-
	Chhattisgarh	Kolab and Sabara.	JK-1, VG-1 and TNAU-63
	Gujarat	Kolab and TNAU-63.	-
	Jharkhand	Tarini.	-
	Karnataka	Tarini, Kolab and TNAU-63.	TNAU-63, OLM-20, OLM-3 and OLM-203.
	MP	Kolab, Sabara and Jawahar Kutki-36.	JK-8, JK-36, CO,2, PRC-3.
	Orissa	Tarini, Kolab and Sabara.	-
Tamilnadu	TNAU-63 and CO-3.	K-1, CO-2, CO-3, CO-4, Paiyur-1 and Paiyur-2.	
Foxtail millet (5)	A.P.	Krishna devaraya and Pant Setaria-4.	-
	Chhattisgarh	Pant setaria-4.	-
	Karnataka	Pant setaria-4 and HMT-100-1	SIA-326, PS-4 and TNAU-186.
	MP	Pant Setaria-4.	-
	Maharashtra	Pant Setaria-4.	-
	Orissa	Pant Setaria-4.	-
	Tamilnadu	TNAU-43 and CO (Te)-7.	K-2, K-3, CO-4, CO-5, CO-6 and CO (Te)-7.
	UP	Pant setaria-4	-
West Bengal	Pant setaria-4	-	
Barnyard millet (6)	Bihar	VL-Madira-181 and VL-Madira-2007.	-
	Gujarat	VL-Madira-172	-
	Jharkhand	VL-Madira-181 and VL-Madira-2007.	-
	Karnataka	VL-Madira-172, VL-Madira-181 and VL-Madira-2007.	VLM-181, VLM-172 and VLM-29.
	MP	VL-Madira-181.	-
	Rajasthan	Pratap sanwa-1 and VL-Madira-2007.	-
	Tamilnadu	VL-Madira-181	CO-1, K-1 and K-2.
	UP	Kanchan and VL-Madira-172	-
Uttrakhnad	Kanchan, VL-Madira-172, VL-Madira-2007 and PRJ-1	VLM-172, VLM-29, VLM-2007 and PRJ-1.	

Proso millet (8)	AP	TNAU-151 and TNAU-164.	-
	Bihar	TNAU-151 and TNAU-164.	-
	Karnataka	GPUP-8, GPUP-21, TNAU-145, TNAU-151 and TNAU-164.	GPUP-8 and GPUP-21.
	Maharashtra	TNAU-164.	-
	Rajasthan	Pratap chena-1.	-
	Tamilnadu	GPUP-21, CO (Pv)-5, TNAU-145, TNAU-151 and TNAU-164.	K-1, K-2, CO-2, CO-3, CO-4 and CO (Pv)-5.
	Uttarakhand	PRC-1 and TNAU-164.	-

Rainfed agriculture contributes 44% of the total food grain production of the country and produces 75% of pulses and more than 90% of sorghum, millet and groundnut from arid and semiarid regions. Even after half a century of neglect, the rainfed regions provide livelihood to nearly 50% of the total rural workforce and sustain 60% of cattle population of the country.

National consultations and has articulated that millet farming is not just about production of a narrow array of crops but is a brilliant concept that realizes biodiversity, ecological production systems as well as food sovereignty to farming populations. For thousands of years, millet farms have been growing a range of millets such as Sorghum, Pearl millet, Foxtail millet, Little millet, Kodo millet, Proso millet, Barnyard millet alongside pulses (red gram, cowpea, beans, green gram, black gram, lentils) and oilseeds (sesame, niger, amaranth, safflower, mustard).

Millets need very little water for their production. Compared to irrigated commodity crops currently promoted by policy measures, millets and require just around 25% of the rainfall regime demanded by crops such as sugarcane and banana. Thus, they do not burden the state with demands for irrigation or power. Millets are often growing on skeletal soils that are less than 15 cm deep. It does not demand rich soils for their survival and growth. Hence, for the vast dryland area, they are a boon. Millet production is not dependent on the use of synthetic fertilizers. Most millet farmers therefore use farmyard manures and in recent times, household produced biofertilisers (Desai *et al.* 2010) <sup>[3]</sup>. Therefore, they can significantly reduce the huge burden of fertilizer subsidy borne by the government. Grown under traditional methods, no millet attracts any pest. They can be termed as crops. A majority of them are not affected by storage pests either. Therefore, their need for pesticides is close to nil. Thus, they are a great boon to the agricultural environment. Millets are amazing in their nutrition content. Each of the millets is three to five times nutritionally superior to the widely promoted rice and wheat in terms of proteins, minerals and vitamins.

India's food and farming in future need no irrigation adapted to a wide range of ecological conditions pest-free Millets as Miracle Grains Millets as Climate Change Compliant Crops Disappearing Millet system All these qualities of millet farming system make them the Climate change portends less rain, more heat, reduced water availability and increased malnutrition. If there is any cropping system that can withstand these challenges, survive and flourish, it is the millet system. It is important to note that with the projected 2 degree celsius temperature rise, wheat might disappear from our midst, since it is an extremely thermal sensitive crop. Similarly, the way rice is grown under standing water makes it a dangerous crop under climate change conditions. Methane emanating from water-drenched rice fields, is a greenhouse gas, that severely threatens our environment. Millets are all-season crops whereas wheat is season specific. In spite of all these extraordinary qualities and capacities of millet farming systems, the area under millet production has been shrinking over the last five decades and rapidly, since the Green Revolution period. Between 1966 and 2006, 44% of millet

cultivation areas were occupied by other crops signifying an extraordinary loss to India's food and farming systems.

This will not only be a loss to India's food and farming systems, but will also prove to be a civilizational and ecological disaster. Millets are astonishingly low water consuming crops. The rainfall needed for Sorghum, Pearl Millet and Finger Millet is less than 25% of sugarcane and banana, and 30% that of rice. We use 4000 litres of water to grow one kg of rice while all millets grow without irrigation. This can turn out to be a tremendous national gain especially in the ensuing decades of climate crisis. In a future, where water and food crisis stares us in the face, millets can become the food of security Millets are store-houses of nutrition By any nutritional parameter, millets are miles ahead of rice and wheat In terms of their mineral content, compared to rice and wheat (Obilana *et al.* 2002) <sup>[7]</sup>.

Each one of the millets has more fibre than rice and wheat. Some as much as fifty times that of rice. Finger millet has thirty times more Calcium than rice while every other millet has at least twice the amount of Calcium compared to rice. In their Iron content, foxtail and little millet are so rich that rice is nowhere in the race. While most of us seek a micronutrient such as Beta Carotene in pharmaceutical pills and capsules, millets offer it in abundant quantities. The much privileged rice, ironically, has zero quantity of this precious micronutrient. In this fashion, nutrient to nutrient, every single millet is extraordinarily superior to rice and wheat and therefore is the solution for the malnutrition that affects a vast majority of the Indian population.

Millets grow on the poorest of soils Proso millet Kodo millet Barnyard millet Rice Wheat Most millets can be grown on low fertility soils. Some in acidic soils, some on saline soils. In fact, finger millet grows well in saline soils. Barnyard millet too thrives in problem soils, where other crops like rice, struggle to grow in such soils. Many of them are also grown to reclaim soils. Poor farmers especially in dryland India are owners of very poor lands. The only crops that sustain agriculture and food security on these lands are millets. If they flourish in such ecological zones where average rainfall can be less than 500 mm using soils that are sandy and slightly acid, it is a testimony for their, hardiness and extraordinary capacity to survive very harsh conditions. Food uses of millets have, however, been confined only to traditional consumers; limited especially to areas of their cultivation, and still have remained underutilized. Processing them using traditional as well as contemporary methods for preparation of value added and convenience products would certainly diversify their food uses. Their exploitation for preparation of ready-to-use or ready-to-cook products would help in increasing the consumption of millets among non-millet consumers and thereby nutritional security. Finger millet (*ragi*) is rich in protein, iron, calcium, phosphorus, fibre and vitamin content. The calcium content is higher than all the cereals and iodine content is said to be highest among all the food grains (Desai *et al.*, 2010) <sup>[3]</sup>. *Ragi* has best quality protein along with the presence of essential amino acids, vitamin A, vitamin B and phosphorus (Gopalan *et al.*, 2004) <sup>[4]</sup>. Finger millet (*ragi*) provides highest of level of

calcium, antioxidants properties, phytochemicals, which make it easily and slowly digestible. Hence it helps to control blood glucose levels in diabetic patients very efficiently.

#### **Millets do not demand synthetic fertilizers**

Millets do not demand chemical fertilizers. In fact, under dry land conditions, millets grow better in the absence of chemical fertilizers. Therefore, most millet farmers grow them using farmyard manure under purely ecofriendly conditions. In recent years farmers have also started using biofertilizers such as vermicompost produced in their backyard and growth promoters such as panchagavya, amritpani etc. These practices make millet production not only ecofriendly but stays under the control of farmers.

#### **Millets are pest free crops**

Growing traditional local landraces and under ecological conditions, most millets such as foxtail are totally pest free. Even in storage conditions, most millets such as foxtail not only not need any fumigants, but act as anti pest agents to store delicate pulses such as green gram.

#### **Millets produce multiple security**

While single crops such as rice and wheat can succeed in producing food security for India millets produce multiple securities. They include securities of food, nutrition, fodder, fibre, health, livelihood and ecology. Most millets have edible stalks which are the most favoured fodder for cattle. Many a time, crops such as sorghum and pearl millet are grown only for their fodder value. Besides fodder, millets are storehouses of nutrition and hence produce nutrition security. Being hosts to diverse crops such as red gram, millet fields also produce fuelwood and fibre through amaranth. The legume crops that are companion crops for millets are also prolific leaf shredders. This leaf fall acts as natural manure and maintains soil fertility. Thus, millet farms not just use soil fertility for their growth but also return this fertility to the soil

#### **Millets are climate change compliant crops**

Due to all the qualities mentioned above, Millets remain our agricultural answer to the climate crisis that the world is facing. Climate Change is expected to confront us with three challenges. Increase in temperature upto 2-5 degree Celsius Increasing water stress Severe malnutrition. Since they are already capable of growing under drought conditions, they can withstand higher heat regimes. Millets grow under non-irrigated conditions in such low rainfall regimes as between 200 mm and 500 mm. Thus, they can also face the water stress and grow. Each of the millets is a storehouse of dozens of nutrients in large quantities. They include major and micro nutrients needed by the human body. Hence they can help people withstand malnutrition.

#### **Recognizing and retrieving millets**

Millets are water saving, drought tolerant crops. Therefore they must be viewed as climate change compliant crops. This quality makes them India's food and farming future. This is the perspective from which the millet cultivation and its promotion must be regarded. Every millet farmer of India must be given a climate change bonus, biodiversity bonus, water conservation bonus.

The urgent and immediate need is to Different parts of India grow diverse kinds of millets. Rajasthan is home to Pearl Millet (Bajra). Deccan plateau (Marathwada in Maharashtra, Telangana in Andhra Pradesh and North Karnataka in

Karnataka) is well known for sorghum. Southern Andhra Pradesh, Tamil Nadu, Orissa and Southern Karnataka are the home of Finger millet. Uttarakhand and other hill and tribal areas cultivate a range of small millets such as Foxtail, Proso, Kodo and Barnyard. Compared to rice, they have 30 to 300% more nutritional elements such as Calcium, Minerals, Iron, Fibre, Beta Carotene and many other micronutrients. Therefore based on the principle of local production, local storage and local distribution. This must be supported by the government, both in procurement and in storage. This will resolve the question of availability and keeping quality.

This will overcome the problem of malnutrition of young children a problem where India fares worse than the sub Saharan region, the poorest in the world. All these actions, together will open up new markets for millet farmers and revitalize them. There are a number of institutional mechanisms that needs to be created, nurtured and developed. Millets need a number of enabling conditions. The principal among these is to Urgent attention must be given to the productivity enhancement of the rainfed lands where millets are grown.

A nutritive analysis of millets vis a vis the major grains such as rice and wheat prove that nutrient to nutrient, millets score highly over the other grains. Increase livestock which are local breeds and adapted to local ecosystems this will create a symbiotic relationship between farming and pastoralism, such as increased organic manure, fodder availability, milk production and increased incomes for farmers. Special watersheds on millet lands and dovetailing government's employment programmes such as NREGA to support millet cultivation from sowing to harvesting Therefore farming system development should become the aim and no single crop development. This amazing capacity of this production system must be honoured through offering socio-ecological bonus to millet growing farmers. Institutional finance and insurance which is offered generously to farmers who cultivate preferred grains such as rice and wheat and non-food crops must be extended to millet farmers also.

#### **Conclusion**

Millet farms are intrinsically biodiverse. The monitoring, evaluation and research on millet cultivation must be tailored to this special quality of millet farming system. Millets can be cultivated without using groundwater or surface irrigation. Their energy requirement from sources such as chemical fertilizers, pesticides, water and power can be near zero. With the advancement of post-harvest processing and value addition technologies, it has become possible to process and prepare value added products which are acceptable by both rural and urban consumers. This will not only help in increasing the profitability of its cultivators but will also help in providing income and employment opportunities in rural area.

In view of numerous benefits conferred by the millets, our farmers should aim at growing more and more of the millets; and we as consumers, should include millets in our daily food basket. Apart from increasing the production and consumption, in today's era of modernization, industrialization and urbanization, we need to adequately process the millets to create a variety of value added nutritious products as per the taste, texture, flavour of the consumers. Further, the public needs to be made aware of the benefits conferred by millets and their role in combating the ill effects of westernized sedentary lifestyle so that they can lead a healthy life.

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