Millets

Future of Food & Farming

Millet Network of India - Deccan Development Society - FIAN, India

Our Millets

English : Great Millet/ Sorghum

Bengali	:	Jowar
Gujarati	:	Jowari, Juar
Hindi	:	Jowari, Juar
Kannada	:	Jola
Marathi	:	Jowari, Jondhala
Oriya	:	Juara
Punjabi	:	Jowar
Tamil	:	Cholam
Telugu	:	Jonna

English : Spiked Millet/ Pearl Millet

Bengali	:	Bajra
Gujarati	:	Bajri
Hindi	:	Bajra
Kannada	:	Sajje
Marathi	:	Bajri
Oriya	:	Bajra
Punjabi	:	Bajra
Tamil	:	Kambu
Telugu	:	Sajja

English : Finger Millet

Bengali	:	Marwa
Gujarati	:	Nagli, Bavto
Hindi	:	Ragi, Mandika, Marwah
Kannada	:	Ragi
Marathi	:	Nagli, Nachni
Oriya	:	Mandia
Punjabi	:	Mandhuka, Mandhal
Tamil	:	Keppai, Ragi, Kelvaragu
Telugu	:	Ragi Chodi

English : Italian Millet/ Foxtail Millet

Bengali	:	Kaon
Gujarati	:	Kang
Hindi	:	Kakum
Kannada	:	Navane
Marathi	:	Kang, Rala
Oriya	:	Kanghu, Kangam, Kora
Punjabi	:	Kangni
Tamil	:	Tenai
Telugu	:	Korra

English : Little Millet

Bengali	:	Sama
Gujarati	:	Gajro; Kuri
Hindi	:	Kutki, Shavan
Kannada	:	Same, Save
Marathi	:	Sava, Halvi, vari
Oriya	:	Suan
Punjabi	:	Swank
Tamil	:	Samai
Telugu	:	Samalu

English : Kodo Millet

Bengali	:	Kodo
Gujarati	:	Kodra
Hindi	:	Kodon
Kannada	:	Harka
Marathi	:	Kodra
Oriya	:	Kodua
Punjabi	:	Kodra
Tamil	:	Varagu
Telugu	:	Arikelu, Arika

English : Common Millet/ Proso Millet/

Bengali	:	Cheena
Gujarati	:	Cheno
Hindi	:	Chena; Barri
Kannada	:	Baragu
Marathi	:	Vari
Oriya	:	China Bachari bagmu
Punjabi	:	Cheena
Tamil	:	Pani varagu
Telugu	:	Variga

English : Barnyard Millet

Bengali	:	Shyama
Gujarati	:	....
Hindi	:	Sanwa
Kannada	:	Oodalu
Marathi	:	...
Oriya	:	Khira
Punjabi	:	Swank
Tamil	:	Kuthiraivolly
Telugu	:	Udalu, Kodisama

Millets

Future of Food & Farming

Millet Network of India
Deccan Development Society
FIAN, India

Understanding millets

Millets as Miracle Grains

In India, out of the total net sown area of 141.0 Mha, rainfed area accounts for 85.0 Mha spread over 177 districts. This constitutes approximately 60 percent of the total farming area in the country. 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 semi-arid 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.

About MINI

Millet Network of India (MINI) is an all India alliance of 65 institutions, individuals consisting of farmers, scientists, nutritionists, policy makers, civil society groups and food activists representing over 15 states of India. The network has had several 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 realises 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). Therefore they produce an extraordinary food system that can secure India's food and farming in future.That was why the MINI has refused to call millets as Coarse Cereals and renamed them as Nutri-cereals.

About Millets

Millets need very little water for their production. Compared to irrigated commodity crops currently promoted by policy measures, millets need no irrigation 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 adapted to a wide range of ecological conditions 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. 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 pest-free 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.

Millets as Climate Change Compliant Crops

All these qualities of millet farming system make them the climate change compliant crops. 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 green house gas, that severely threatens our environment.

Millets are all-season crops cultivated round the year whereas wheat is season specific.

While wheat and rice might provide only food security, millets produce multiple securities (food, fodder, health, nutrition, livelihood and ecological) making them the crops of agricultural security.

Disappearing Millet system

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.

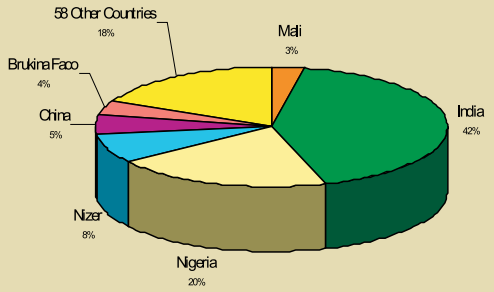
Declining state support in terms of crop loans and crop insurance has significantly contributed to this decline and fall of millets in Indian agriculture.

Unless this is halted urgently through a slew of policy and financial incentives,millets might disappear from the agrarian landscape of India over the next fifty years. This will not only be a loss to India's food and farming systems, but will also prove to be a civilisational and ecological disaster.

Therefore, there is an urgent need for Indian policy makers to refocus their attention towards millet farming systems and enact policies that create an enabling environment for millet farmers.

Global Pattern of Millet Consumption

India is the top consumer of millets in the world. Indian eat 42% of millets produced globally.



Top Millet Consumers in the world

(Five Year Average in Metric Tonnes)

country	5-year average
India	9,041,765
Nigeria	4,299,211
Niger	1,733,793
China	1,116,505
Burkina Faso	856,337
Mali	701,701
Sudan	560,548
Uganda	408,137
Senegal	347,989
Chad	296,119
Russian Federation	280,941
Ethiopia	259,490
Nepal	251,027
Myanmar	137,759
Tanzania	136,409
Ghana	117,955

Profile of millets

Securing food, securing climate

Millets are Foods of Future

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.

Comparison of Water requirements of Different crops (in mm)

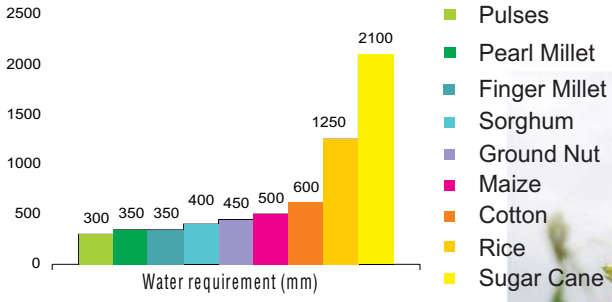


Table 1: Comparative rainfall requirement of various crops

Crop	Rainfall requirement (in mm)
Sugarcane	2000-2200
Banana	2000-2200
Rice	1200-1300
Chillies	600
Cotton	600-650
Maize	500-550
Groundnut	450-500
Sorghum	400-500
Bajra	350-400
Ragi	350-400
Pulses	300-350
Sesame (Til)	300-350

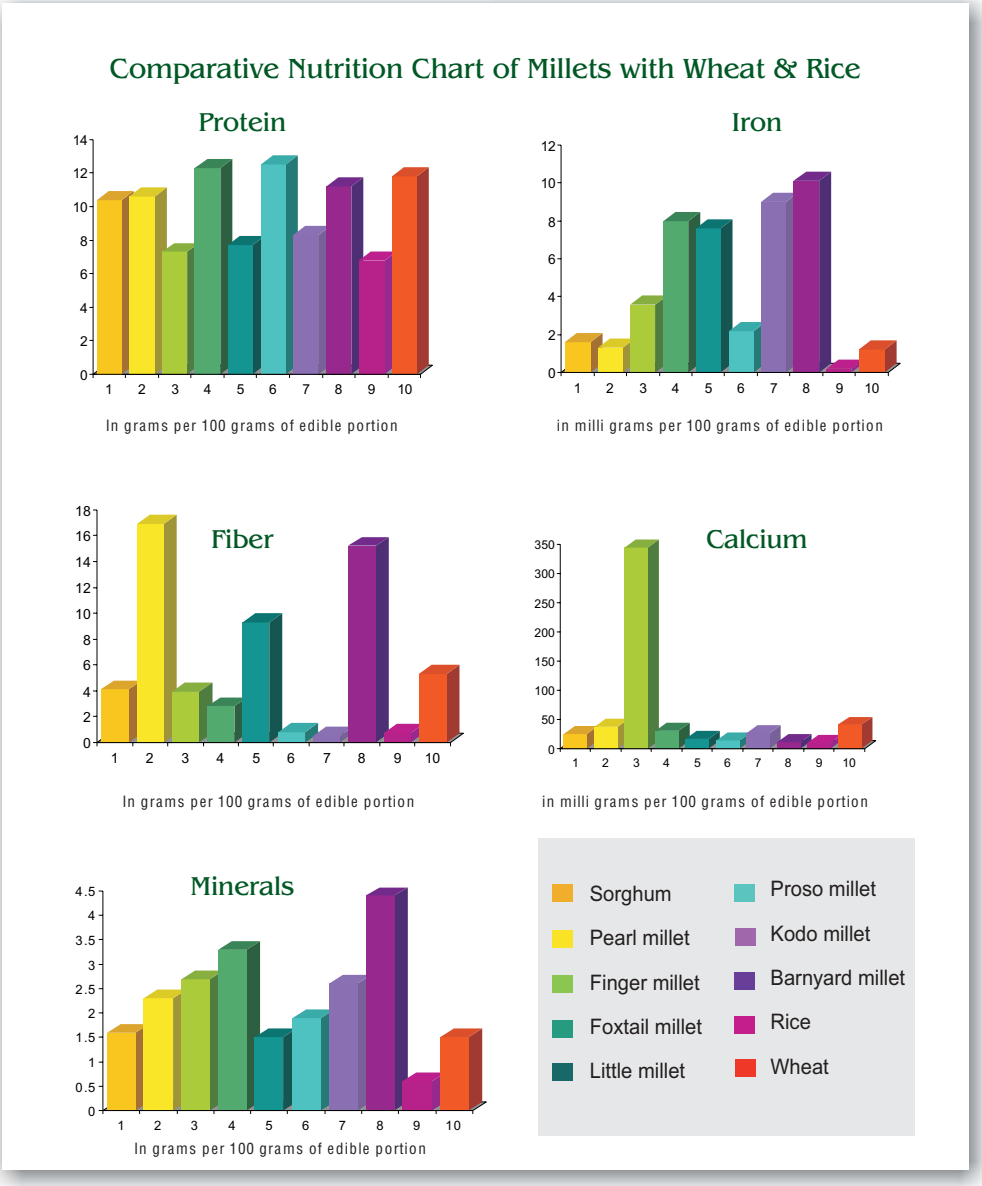
Millets are store-houses of nutrition

By any nutritional parameter, millets are miles ahead of rice and wheat In terms of their mineral content, compared to rice and wheat. 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.

Table 2: Nutrient Content of Millets

Crop / Nutrient	Protein(g)	Fiber(g)	Minerals(g)	Iron(mg)	Calcium(mg)
Pearl millet	10.6	1.3	2.3	16.9	38
Finger millet	7.3	3.6	2.7	3.9	344
Foxtail millet	12.3	8	3.3	2.8	31
Proso millet	12.5	2.2	1.9	0.8	14
Kodo millet	8.3	9	2.6	0.5	27
Little millet	7.7	7.6	1.5	9.3	17
Barnyard millet	11.2	10.1	4.4	15.2	11
Rice	6.8	0.2	0.6	0.7	10
Wheat	11.8	1.2	1.5	5.3	41



Millets grow on the poorest of soils

Most millets can be grown on low fertility soils. Some in acidic soils, some on saline soils. Millets such as Pearl millet can also be grown on sandy soils, as is done in Rajasthan. 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. Much of the cultivable fallows and low fertility farms have been handed to them through the process of land reforms and the

Jajamani system of Inam lands. The only crops that sustain agriculture and food security on these lands are millets.

In fact, the capacity of millets to grow on poor soils can be gauged from the fact that they grow in Sahelian soil conditions in West Africa which produces 74% of all the millets grown in Africa and 28% of the world production. 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. That is why millets can withstand drought like conditions in the Deccan and Rajasthan and produce food and fodder for people and livestock, respectively.

Millets do not demand synthetic fertilisers

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 biofertilisers such as vermicompost produced in their backyard and growth promoters such as panchagavya, amrit pani 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. And hence do not need any pesticides. 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 are not just crops but a cropping system

Most millets grown under traditional practices are a Farming System and not just a crop. Most millet fields are inherently biodiverse. This is the tradition of millet farming in the country. Six to twenty crops are planted on the same space at the same time.

The famous Baranaja cropping systems in the Himalayas are a testimony to this. In this millet led system are embedded 12 different crop varieties. Saat Dhan in Rajasthan also is a host to a large variety of millets. The Pannendu Pantalu system of the South, grow millets in combination with pulses and oilseeds, thus making it a holistic farming system.

8

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 shedders. 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

Only millets have the capacity to meet this challenge:

- 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.

In view of all these features that they so amazingly combine, millets can only be called as Miracle Grains.

Decline and fall of millets

After the Green Revolution

Post Green Revolution, there has been a systematic decline in the production of millets. This can be understood from the production trends of millets vis a vis other crops such as rice and wheat that were relentlessly promoted for intensive farming in select few resource rich areas under irrigated conditions.

Declining Production of Millets in Comparison to Rice and Wheat from 1956-2006

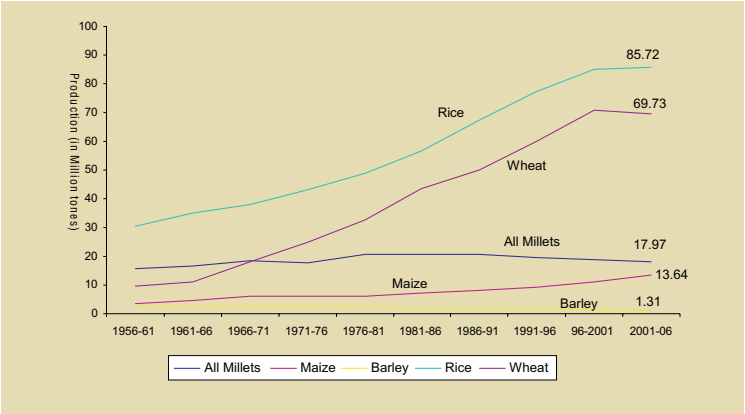


Table-3 Post Green Revolution: millets vis-a-vis Other Crops in India

(Production in Million tonnes)

Crops	1966-71	1971-76	1976-81	1981-86	1986-91	1991-96	1996-01	2001-06	%
All Millets	18.41	17.87	20.7	20.89	20.78	19.69	18.68	17.97	[-] 2.4
Rice	38.09	42.94	48.86	56.53	67.15	77.33	85	85.72	[+] 125
Wheat	18.1	25.17	32.88	43.37	49.92	60.12	70.61	69.73	[+] 285

Agriculturally, nutritionally and environmentally, it is quite tragic that we promoted wheat and rice to register a whopping increase of 285 and 125 percentage points respectively, state policies also allowed millets to suffer a decline of (-)2.4% after the Green Revolution in agriculture.

10
Shrinking Millet Area

Much of the decline in production can be attributed to the way millet cultivation areas have shrunk over the last fifty years. As the chart below shows, the area in which millets are cultivated have shown a steep decline between 1956 and 2006. During the same period, wheat and rice which were cultivated in less area than millets in 1955-56, have steadily climbed to overtake millets.

Declining Area of Millets in Comparision to Rice and Wheat from 1956-2006

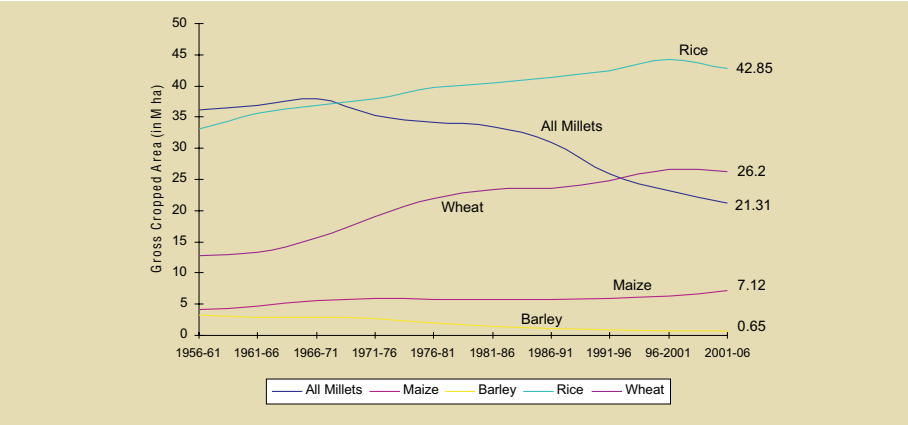


Table-4: Fifty years of cultivation of millets vis a vis other crops in India

(Area in Million ha)

Crops	Years									
	1956-61	1961-66	1966-71	1971-76	1976-81	1981-86	1986-91	1991-96	96-2001	2001-06
Millets	36.2	36.81	37.89	35.27	34.16	33.39	30.88	25.9	23.17	21.31
Rice	33.14	35.63	36.79	38.02	39.77	40.5	41.31	42.53	44.31	42.85
Wheat	12.84	13.33	15.73	19.13	21.89	23.39	23.59	24.74	26.67	26.2
Cereals	89.65	93.29	98.89	100.95	103.58	104.54	102.7	100.04	101.29	98.13
Gross Cropped Area	150.51	156.89	161.73	166.54	171.32	176.77	179.49	186.01	189.67	185.71

All the figures are average of respective 5 years data

Table 4 describes how wheat dramatically climbed from 12.8 Mha to 26.2 Mha to double its area of cultivation, millets have suffered a 42% loss of their cultivated area, dropping from 36.2 Mha (1956) to 21.31 Mha (2006).

Similarly, while they occupied a pride place of 40% of “all cereal” cultivated area in 1956, they dropped to a dismal 21% in 2006. In terms of their percentage in Gross Cropped Area of the country, this is even more appalling, while in 1956. nearly a quarter of the Gross Cropped Area sported millets, year 2006 saw millets surviving in barely 11% of India’s Gross Cropped Area.

Recognising and retrieving millets

Policy matters

1. 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.
2. The urgent and immediate need is to put millets into the Public Distribution System. 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. The Indian PDS system will be enriched with the high nutritive quality of these millets if they are included in it.
3. 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. Compared to rice, they have 30 to 300% more nutritional elements such as Calcium, Minerals, Iron, Fibre, Beta Carotine and many other micronutrients. Therefore the inclusion of millets in PDS will make PDS a food and nutritional security programme.
4. The pro millet PDS paradigm must depend on a completely decentralized approach 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.
5. Government must urgently provide space for millet based foods in the ICDS, school meals and welfare hostel programmes. 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.
6. All these actions, together will open up new markets for millet farmers and revitalize them.
7. 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 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.
8. Urgent attention must be given to the productivity enhancement of the rainfed lands where millets are grown. This could be achieved through special watersheds on millet lands and

dovetailing government's employment programmes such as NREGA to support millet cultivation from sowing to harvesting.

9. Millet farms are intrinsically biodiverse. **Therefore farming system development should become the aim and not single crop development.** The monitoring, evaluation and research on millet cultivation must be tailored to this special quality of millet farming system. Policy makers must take note of the fact that millets make way for a dynamic diversity on farmers fields.
10. 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. **This amazing capacity of this production system must be honoured through offering socio-ecological bonus to millet growing farmers.** Appropriate institutional mechanisms must be developed to assess this.
11. **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.**
12. Research institutions must give a new thrust on millet areas and issues. But such **research initiatives must be led by farmers since they offer exciting perspectives for the research** which has to be people-centered and people directed.

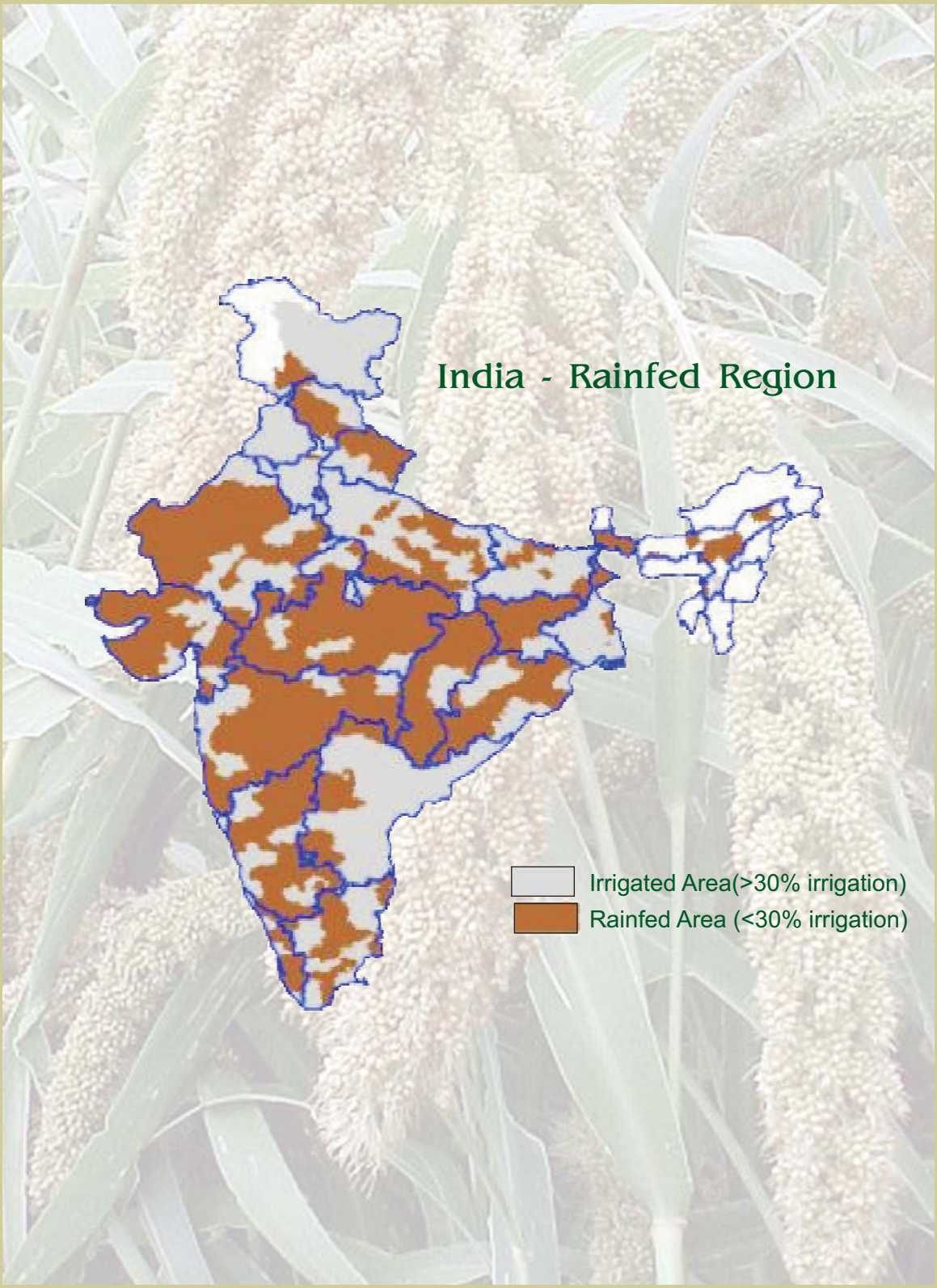
Millet Meal

References:

CSE (2007), "Rainfed Areas of India-Center for Science and environment", downloaded on 29th July 2009 from http://www.cseindia.org/programme/nrml/rainfed_specials.htm

DoMD, "Area and Production analysis of millets in India", Directorate of Millets Development (DoMD), Ministry of Agriculture and Cooperation, Government of India, downloaded on 25th July 2009 from http://dacnet.nic.in/millets/all_india_apy_trend.htm

Sharma.J (2007), "National Conference on Argiculture for Rabi Campaign 2007" Presentation by Dr, J.S. Sharma, CEO, National Rainfed Agriculture Authority", downloaded on 29th July 2009 from http://agricoop.nic.in/Rabi%20Conference 2007/Dr.%20Samra.ppt#257,2,Rationale



For Deccan Development Society, designed and produced by Supriya Bhalerao of ***Booksline,*** A unit of SRAS Publications, B-45, Maheswari Towers, Road No.1, Banjara Hills,Hyderabad -500 034. Tel: 040-66618506, 98490 08016, 98661 08574, website: www.bookslineindia.com, E-mail: supriyabha@yahoo.com

About Us

Millet Network of India is an alliance of over 70 persons representing over 50 farmer organizations, scientists, nutritionists, civil society groups, media persons, women. They represent over 15 rainfed states of India. The MINI sees millets not just as crops but as a concept embedded in people's food cultures, agricultural practices and above all its ability to help the millet farmer make her / his agriculture autonomous. The Millet Network of India invites everyone who welcomes 'the concept that is millet' to engage in this action.

Deccan Development Society [DDS] is a two and half decades old grassroots organization primarily working with over 5000 dalit women farmers from the semi arid belts of Medak District in Andhra Pradesh. At the heart of DDS activities is the fundamental principle of access and control which leads to the autonomy of local communities. This autonomy manifests in community food and seed sovereignty, autonomous healthcare systems, autonomous market and autonomous community media. DDS is the founder convenor of a number of networks which include AP Alliance for Food Sovereignty, AP Coalition in Defence of Diversity, South Against Genetic Engineering, Alliance Food Sovereignty South Asia, Alliance for Democratisation of Agricultural Research in South Asia.

FoodFirst Information and Action Network [FIAN], a grassroots oriented organisation without political or religious affiliations. FIAN India is a part of FIAN International, an human rights organization working for progressive realization of the right to adequate food, a human right as described in the International Covenant on Economic, Social and Cultural Rights.