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Millets: A Solution to Food and Nutritional Security in India

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Abstract

Millets are future crop for food and nutritional security under climate change situations. These crops are grown under arid and semi-arid regions with adverse soil and extreme climatic conditions. Nevertheless, areas under these crops are declining over the years and these crops are replaced by the fine cereal crops like rice and wheat. The demand and consumption of millets increased in recent time due to awareness created among public about its enormous health benefits. Hence, there is need to enhance the area and the production of millets for ensuring food and nutritional security in the country. In addition to these, millets are to be recognized as climate change compliant crops to promote their farming and consumption which make them India's food for the future.

Introduction

Millets are an agronomic (as opposed to taxonomic) group of grasses that are widely grown for food and fodder. In India, millets crop includes a number of small-grained cereal grasses capable of growing in adverse soil and harsh climatic condition or some millets crop also grown in opposite environments. These crops are highly drought tolerant and capable to withstand extreme weather variation and grow with minimal resources and several of their cultivars are of short duration (60-80 days) producing about 0.5 t/ha which is better than no crop. They are mainly cultivated in arid, semi-arid or mountain zones as rainfed crops in marginal and sub-marginal soils. Millets are abiotic (drought, temperature and salinity) and biotic (pest and disease) stress tolerant and hence are grains for the future in an era of climate change. These crops are broadly categorized based on size of grain, millets are grouped as major millets like sorghum and pearl millet and small millets including finger millet (Ragi), foxtail millet (Kangni), kodo millet (kodo), proso millet (Cheena), barnyard millet (Sawan) and little millet (Kutki). Millets are staple food for vast majority of rural poor in arid and semi-arid regions of India and also have a high feed value for livestock, poultry and fish (Meena and Meena, 2018). They also play critical role in the food and nutrition security of developing countries especially Asia and Africa, especially in India, Nigeria and Niger. Apart from various agronomic advantages, millets can offer other benefits in ecological, nutritional, and socioeconomic areas as they are many health benefits and are rich in beneficial nutrients and are therefore reduce the malnutrition problems. Despite these potential benefits, however, in India overall production of millets has increased over the past few decades, from 7.7 MT in 1961 to 10.7 MT in 2012, but the area dedicated to minor millets has fallen (Stefano Padulosi, 2015). Most terrible part in case of millets is that area under millet production is dwindling over the last

decades. Between 1966 and 2006, 44% of millet cultivation areas were occupied by other crops indicated loss to India's food and farming systems. Therefore, there is an urgent need for Indian policy makers and scientific community to refocus their attention towards millets and enact policies that create an enabling environment for millet cultivation imperative for food and nutritional security.

Millets Production Scenario in India

In India, millets are cultivated in an area of 15.48 million hectare producing 17.2 million tonnes with a yield of 1111 kg/ha (Directorate of Economics and Statistics, 2015). Maharashtra, Rajasthan and Karnataka are the top most states of millets cultivation in India. Contribution of millets in total foodgrain production of India reduced from 22.17 to 6.94 % over the last six decades from 1950-51 to 2011-12 (Malathi *et al.*, 2016). The area under millet crops has been shrinking over the last five decades and almost 50% of area under the millets crops has been diverted largely to fine grain cereals, soybean, maize, cotton, sugarcane and sunflower. A combination of factors like low remuneration as compared to other food crops, lack of price incentives and dietary changes have led to shift from production of millets to other competing crops. In addition, continuous decline in area of these crops since Green Revolution period was due to relentless promotion of other crops such as rice and wheat for intensive farming in select few resource rich areas under irrigated conditions.

Nutritional and Food Security Importance of Millets

The major health issues like malnutrition, under-nutrition, obesity and chronic diseases such as diabetes, cardiovascular diseases, cancer etc. are serious problems faced since from many years and continue to plague in India. This grim situation was partly due to change in food habit and also due to absence of millets from the food diet being one of them. These millets has substantially higher amount of protein, fiber and minerals in comparison to fine cereals like rice and wheat so they can fight against the malnutrition problem. They are useful for diabetes patents as they low in glycemic index (by releasing glucose slowly over long period). Millets also contain lecithin which strengthen nervous system. Being a rich source of dietary fiber, they provide health benefits like good bowel movement, and reduction in blood cholesterol and sugar level. Besides these, millets are also rich in health promoting phytochemicals viz. polyphenols, lignans, phytosterols, phytoestrogens, phycocyanins. The protein content in millets for every hundred gram was like Jowar (10.4 g), Bajra (11.6 g), Proso millet (12.5 g), foxtail millet (12.3 g) and barnyard millet (11.6 g) is comparable with wheat (11.8 g) and much higher than rice (6.8 g). Though the finger millet contains lesser protein (7.3 g), but it is rich in mineral matter and calcium in comparison to wheat and rice. All the millets contain more fiber than the fine cereals (Table 1).

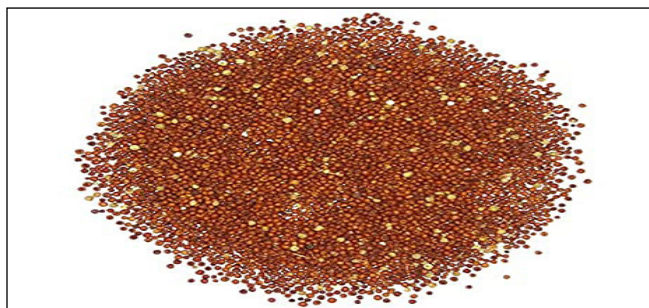
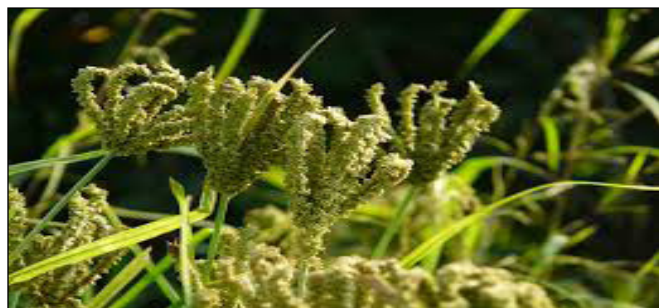
Table 1: Nutritional value of millets (per 100 g)

Crop	Protein (g)	Carbohydrate (g)	Fat (g)	Crude oil (g)	Mineral matter (g)	Calcium (mg)	Prosperous (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

Source: National Institute of Nutrition (NIN), Hyderabad

In achieving food and nutritional security, the government schemes like National Food Security Act (NFSA) and Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) played a significant role in alleviating poverty and hunger issue in India. The increase in demand for millets was also due to recent inclusion of these grains under public distribution system with implementation of food security bill coupled with increased awareness of people about inclusion of millets in

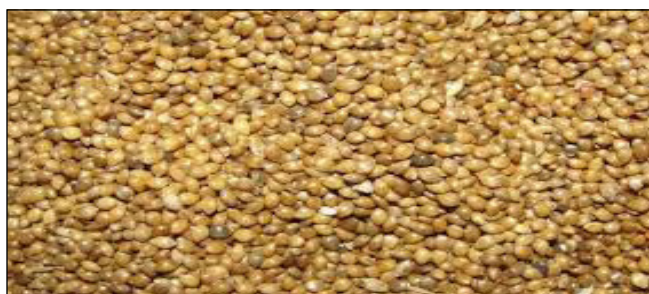
daily meals for healthy living. Nevertheless, the poverty and nutritional status of the country is still alarming. Therefore, in order to ensure both food and nutritional security, it is imperative to enhance the production of these crops. Simultaneously, there is a need to revert the control of production, distribution and consumption back to the people. Most of the millets are grown in arid, semi-arid or marginal conditions with poor resource base, government support and



Finger Millet



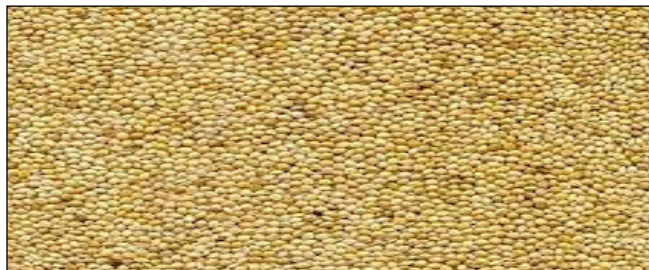
Barnyard Millet



Little Millet



Kodo Millet



Proso Millet

Figure 1: Image of different millets

incentives required for protecting bio-diverse millet based mixed farming system. The focus need to make to bring the fallow and waste land under millets cultivation for increasing the production. Revisiting the existing research and breeding program for developing new varieties and production technology in order to reduce yield gap exist between the potential and yield arrived at farmers fields.

Major Issues or Problems Associated with Millets

- Low productivity and profitability.
- Lesser bio-availability.
- Less attractive colour.
- More processing needed.
- Marketing problems involved.
- Lack of availability of quality seeds.
- Ignorance on the part of researcher, government and policy makers.

Conclusion

Millets are highly nutritive, hardy and less input intensive crops that have potential to address food and nutritional security problems in the country. These crops also have high potential to withstand the extreme

climatic and weather variations. However, area under these crops is declining over years and also diverted the area of these crops for the production of major cereals. The demand and supply of these crops need to be addressed in order to achieve the food and nutritional security. The demand side was achieved through value addition through processing, nutritional labeling and alternative industrial utilization so as to make this millet cultivation more remunerative. The supply side was achieved through use of high yielding varieties, improved cultivars, and nutrient and pest management. In addition to these, strategies needed to bring the fallow and waste land under millets cultivation to address burning issues of malnutrition and food security in the country.

References

Malathi, B., Chari, A., Rajender Reddy, G., Dattatri, K., Sudhakar, N., 2006. Growth patterns of millets in India. *Indian Journal of Agricultural Research*, 50(4), 382-386.

Meena, P.C., Meena, P.C., 2018. Millets crop role in food and nutritional security of India. *International Journal of Food Science and Nutrition*, 3(6), 216-218.

Padulosi, S., Mal, B., King, O.I., Gotor, E., 2015. Minor millets as a central element for sustainably enhanced incomes, empowerment, and nutrition in rural India. *Sustainability*, 7, 8904–8933.