Millets have been supporting millions of poor farmers struggling with degraded soils

Millets and Markets

Need for networking and integration

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There is a growing interest in reviving millets in the country owing to their ability to survive in changing climatic conditions while providing high nutrition and better health. A number of initiatives are being promoted by various agencies towards enhancing millet cultivation and marketing. Integrated approaches and networking among key players are found to be crucial for wider impact.

Minor millets, a group of small-grained grass cereals, are of importance as food and fodder in the semi-arid regions of the world. In India, minor millets have traditionally been cultivated in the drylands, predominantly by poor and marginal farmers and in many cases by tribal communities, but the area under their cultivation is decreasing. Growing interest to revive millet cultivation in this country is driven by nutrition, health and resilience considerations. These cereals grow well in drylands and at high temperatures; they have been supporting millions of poor and marginal women and men farmers struggling with poor soil, low moisture and scarce external inputs. Thanks to their hardiness and good nutritional profile they are in fact, important assets for adapting to climate change.

In order to better understand trends and obstacles faced in the use enhancement of minor millets, the M.S. Swaminathan Research Foundation, Action for Social Advancement and Bioversity International carried out a study in 2016 and 2017, involving value chain actors in Tamil Nadu and Madhya Pradesh. Key stakeholders engaged in both research and development of these crops were interviewed through an iterative process, involving Internet searches and a snowball sampling approaches.

Why millet cultivation is not picking up?

Key factors behind the declining trend of millet production include low crop productivity, high labour intensity, difficult

post-harvest operations and lack of attractive farm gate prices. Easy availability of rice and wheat through the Public Distribution System (PDS) has contributed to a shift in food consumption patterns in millet producing regions. With the exception of finger millet—for which technology has made faster advances—drudgery related to hulling of small millets is still discouraging local producers. Other disabling factors include, inadequate investment in product development and commercialization, and the persisting perception of low social status associated with their consumption. Lack of knowledge on ways to use small millets in the daily diet is widespread, in spite of the great array of dishes that can be made with them. The poor availability of millet foodstuffs in local markets, coupled with high prices for their products are also limiting their popularization. Following is a summary of specific R&D interventions that our study has identified as most strategic, to further the use of these resilient and nutritious crops in India.

The big challenge of processing

Difficult processing is the key challenge that hinders consumer demand and upscaling potential for minor millets. Several interventions can be made to facilitate access by value chain actors to processing plants on the one end and by consumers to processed millet products on the other. The lack of suitable processing units close to millet fields, forces local producers to take their produce to distant places. For instance, raw grains of little millets and Kodo millets produced in Dharmapuri (Tamil Nadu), Koraput (Odisha) or Dindori and Mandla districts (Madhya Pradesh) need to be transported as far as Nasik (Maharashtra) for processing.

Minor millets like Kodomillet, lack proper processing facilities

This causes price increases across the value chain, including for consumers, who have to pay higher amounts for millet foods as compared with paddy and wheat products. In this regard, it is interesting to note that the establishment of large-scale regional processing units by the private sector in Southern India (e.g. Theni district in Tamil Nadu) and more recently in Raipur (Chhattisgarh) is having a very positive effect, by shortening the value chains and favouring local and regional consumption through cheaper products. Similar interventions in other millet growing regions of the country would bear beneficial effects.

A policy measure to allow sales of millet processing equipment across the country, accompanied by a possible exemption/reduced tax on their purchase, would encourage development of the millet value chain. Removing restrictions for transportation of processing equipment would also help spreading the technology across states. The Government's "Initiative for Nutritional Security through Intensive Millet Promotion" has supplied small-scale millet processing mills from Tamil Nadu (Salem, Erode, Coimbatore) to Northern states of India (viz. Madhya Pradesh, Uttarakhand, Odisha, Chhattisgarh), which has made a robust contribution in this direction. Optimal performance of supplied machines through this programme requires follow up attention, and to that regard, we believe that training youth in equipment maintenance could well generate new employment opportunities, besides enhancing the use of existing mills.

More specifically, there is a critical need to optimise technology for de-hulling of different small millet species, which have different seed sizes. More research is needed for improving the separation mechanism in hullers to reduce removal of grits and other usable materials along with the husk. Improving the sieving efficiency of graders is also needed. Large-scale equipment is available for this operation but equipment tailored for the community level and the small and medium enterprise level is needed and would be most relevant for supporting development of farmer enterprises.

Technologies and standards for quality products

Increasing access to processed products is key to stimulate consumer demand for minor millets. But, it is essential that the quality of these products is assured. There is a need for standards and food technology development of millets for a higher quality and consumer appeal. Appropriate technologies for increasing shelf life of millet rice, semolina and flour; and value added products, that do not compromise the quality and nutrition of the product, is an area calling for research focus and would strengthen the small millet market significantly in the short and long term. Additional research is needed to increase the bioavailability of

Women sell millet at a mandi in Dindori

micronutrients in small millet products. For example, soaking of grains helps reducing anti-nutritional compounds like phytic acid and phytase activity, which inhibit bioavailability of minerals. In Maharashtra, Madhya Pradesh and other neighboring states, polished small millet rice (labeled as '*Bhagar Food*' and used as fast food) is being marketed in different brand names without considering the loss of nutrients due to cone polish processing and 'Colour Sorting' technology. On the other hand, unpolished and parboiled small millet rice products have started emerging in periurban and urban markets and more research is required to guide their production: while CODEX standards are available for rice and wheat, currently, there are no standards for millets that processors have to adhere to, in terms of level of bran retention and presence of broken or shattered rice kernels and rice from semi filled grains. It is common to get rice in the market with un-hulled grains, weed seeds, small stones, pest infestation, or fungal contamination. Product standards have to be urgently developed, with a focus on product identity and composition, nutritional facts and food safety for ensuring quality and good product differentiation.

Enhancing use through public welfare programmes

Public procurement programmes present a valuable opportunity for enhancing the use of millets and leveraging their nutrition and sustainability benefits. Following the Food Security Bill (2013), the procurement policy of the Public Distribution System (PDS) for each state needs to be revisited to include millets (defined as 'coarse cereals'). Decentralised procurement and local level processing and supply to the block level PDS is needed to include diversified millets in Fair Price shops. Successful stories exist for the effective inclusion of sorghum and finger millet in the PDS by the Karnataka Government in northern and southern districts respectively. In these districts, both sorghum and finger millets are made available in the PDS as whole grain. Consumers can pulverise these grains in the local flour mill for direct consumption. Little millet, foxtail millet, barnyard millet, and proso millet are not yet included in the PDS. To facilitate their consumption, dehulling would need to be done before grains reach the PDS or access to small scale processing technology should ideally be provided, at least at the Block level. In addition to the PDS, millet-based ready-to-eat foods can be promoted through the Mid-Day Meal Schemes and Integrated Child Development Schemes to enhance zinc and iron intake among children. For example, the Watershed Support Services and Activities Network (WASSAN) has successfully piloted introduction of millets in the noon meals in Government Welfare schools in the three blocks of Malkengiri districts of Odisha, setting an example for many more similar interventions elsewhere.

> Decentralised procurement and local level processing are needed to include diversified millets in Fair Price shops.

Improving seed quality

While acknowledging the important contributions made by the Indian National Agricultural Research System in crop

improvement, there is a need to further evaluate millet germplasm focusing on both improved varieties and landraces. This research is warranted especially with regard to assessing their performance under climate change. Opportunities to deliver high quality seed through enhancing capacities of farmers and community-based institutions is also a very promising avenue as experienced through the Farmers Producer Organizations (FPOs) established by Action for Social Advancement (ASA) in Madhya Pradesh. Further attention is required to better link such community-based seed production to public seed market systems for improving availability of better quality millet seeds.

Integrating efforts across India for wider impact

Presently a number of non-profit organizations, community-based collectives and farmers' producer organisations are working towards achieving greater cultivation and marketing of minor millets in India. The Government of India is also engaged at different levels in the promotion of small millets. Some of the key governmental programs and projects for promotion of small millets include: Initiative for Nutritional Security through Intensive Millet Promotion (INSIMP) Project (recently merged with NFSM); National Food Security Mission (NFSM); National Mission on Sustainable Agriculture; Rainfed Area Development Project (RADP); National Food Security Act 2013 and the Rashtriya Krishi Vikas Yojana (RKVY) etc. Also, ICAR institutes and State Agricultural Universities have developed technologies for making several products from millets. It would be desirable to upscale these technologies and make these products more widely and readily available on a commercial scale.

These many efforts are albeit not being carried out in an integrated manner and this is limiting the ultimate overall impact. Building on the insights from this study, future actions should strengthen the networking among key players of minor millets value chains. Integrated approaches and interventions such as provision of high quality seeds, development of decentralised processing infrastructure in support of small-scale local entrepreneurs are key actions to promote consumption and cultivation of minor millets.

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Kodo millets travel long distances before reaching the market

References

King EDIO., **Impact of Reduced drudgery of women in production and post-harvest processing of small millets**, MSSRF Working paper. No.9, *2017, Chennai.M.S.Swaminathan Research Foundation.*

Mondal A., I. O. King, S. Roy, S. Priyam, G. Meldrum, S. Padulosi, and S. Mishra, **Making millets matter in Madhya Pradesh**, *2016, Farming Matters 06; 32.2,* 10-13 pp. http://www.agriculturesnetwork.org/farmingmatters

Padulosi S., Bhag Mal, O. I. King and E. Gotor, **Minor Millets as a Central Element for Sustainably Enhanced Incomes, Empowerment, and Nutrition in Rural India**, *2015, Sustainability 7(7), 8904-8933;* doi:10.3390/su7078904http://www.mdpi.com/2071-1050/7/7/8904

Rajshekar S.C. and S. Raju, **Introduction of millets in PDS-Lessons from Karnataka**, *2017, Internal Report of the M.S. Swaminathan Research Foundation. Chennai, India.*

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