



Small Millets

Small millets, big potential: diverse, nutritious and climate smart

In India, lack of dietary diversity is one of the key factors behind malnutrition and the prevalence of non-communicable diseases such as diabetes. Small millets, grown as a complement to existing crops, could contribute to an answer. Performing well in marginal environments they have superior nutritional properties, including high micronutrient and dietary fibre content, and low glycemic index. However, there has been a drastic decline in production and consumption of small millets mainly due to limited productivity, high drudgery involved in their processing, negative perceptions of small millets as a food for the poor and policy neglect when compared to other crops. In response, farmer-led research, innovative promotional efforts and inclusion of small millets in public food programs – introduced under the Revalorising Small Millets in Rainfed Regions of South Asia project – have brought increases in their production and consumption. But integrated and focused public support is now needed for demand stimulation through large scale awareness programs and inclusion in government food schemes, increasing production through context-specific production technologies, creating decentralized processing infrastructure and local market development in order to bring back small millets to farms and food baskets on a wider scale.

What are the issues?

- Despite their superior nutritional qualities and climate resilience, cultivation of small millets in India declined from 7.22 million hectares to 2.29 million hectares between 1961 and 2009.

Did you know?

- Small millets include more than just finger millet (*Eleusine coracana*). Kodo millet (*Paspalum scrobiculatum*), little millet (*Panicum sumatrense*), foxtail millet (*Setaria italica*), proso millet (*Panicum miliaceum*), and barnyard millet (*Echinochloa colona*) are also in the small millet family and each of them has specific nutritional benefits.
- Small millet crops are called nutra-cereals and are known for both preventive and curative properties. Small millets are good for addressing constipation, other stomach disorders, heart problems and type 2 diabetes. Small millets give satiety with limited consumption making them suitable for addressing obesity.
- Small millet cropping systems offer many nutritious food crops like horsegram, field bean, niger, etc. and many nutritious uncultivated greens.
- Small millets are climate smart crops and can be grown in the most marginal area and can adapt to a wide range of growing environments. They are good contingency crops.
- Small millets also offer highly palatable fodder for cattle.

- Among the children under the age of five years in India, 48 percent have stunted growth, 43 percent are underweight and 19.8 percent are wasted. On the other hand chronic and non-communicable diseases like Type-II diabetes mellitus and impaired glucose tolerance are on the increase.
- Increasing research and epidemiological evidence link the lack of dietary diversity to these health issues – .
- Small millets are one of the important food groups that had been moved out of the food basket in recent time. While cereals provide a cheaper source of dietary calories, small millets provide vital micronutrients like vitamin B, calcium, iron, folic acid and sulfur, as well as dietary fiber making them a valuable tool in the fight against malnutrition.
- More than 80 % of the production of small millets, other than finger millet, moved out of the production regions to Central & North India.

Why the decline in small millets?

The primary factors responsible for the steep decline in the production and consumption of small millets in India are

1. Low productivity, high labour intensity, drudgery of agricultural operations and lack of attractive farm gate prices.
2. Easy availability of rice and wheat through the public distribution system, which led to a shift in food consumption away from small millets in the producing regions.
3. Drudgery related to dehulling of small millets other than finger millet.
4. Inadequate investment in product development and commercialization.
5. Low social status associated with small millet foods, resistance to change in dietary habits and lack of knowledge on the use of small millets in the daily diet.
6. Inadequate availability of small millets in local markets and high prices.
7. Inadequate policy support for small millets when compared to crops like rice and wheat.

Evidence of changes in lives of small millet farmers

The 'Revalorising small millets in rainfed regions of South Asia' (RESMISA) project has attempted to



address the mentioned constraints in an integrated way. It has adopted farmer-led, context specific technology development and innovative promotional approach through private and public channels in order to increase the production and consumption of millets in eight sites in India, Nepal and Sri Lanka. In India the project is lead by DHAN Foundation and the core partners are Tamil Nadu Agricultural University (TNAU), WASSAN, All India Coordinated Small Millets Improvement Project, ICAR and Canadian Mennonite University, Canada.

For addressing the production constraints 132 local varieties have been identified for conservation and 30 farmer-preferred varieties were identified through participatory varietal selection and are in the process of wider dissemination. Local production constraints were addressed through promotion of sustainable agriculture practices like plant population management and introduction of low cost implements like spike toothed harrow. It was found that the productivity could be increased by 10-25 % through these measures under farmers' management conditions.

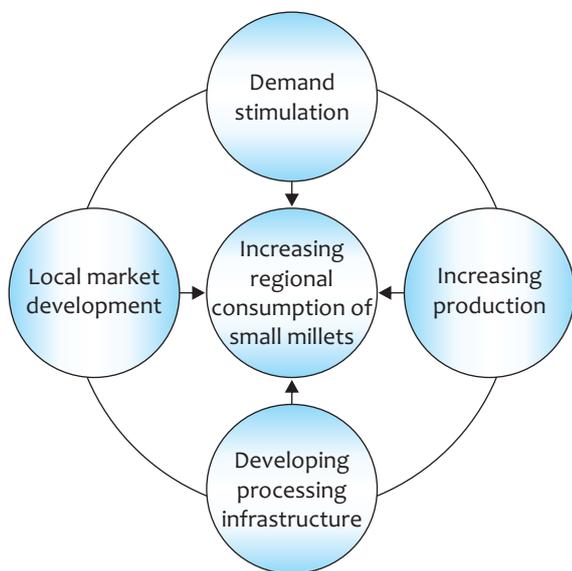
For addressing dehulling constraint TNAU has developed two improved centrifugal dehuller prototypes, which has reduced the drudgery of women related to dehulling by 70 %. Similarly, improvising the existing harvester for small millets led to a reduction in drudgery levels between 35-60 % and avoiding reduction in quality of the grains. For enhancing demand, University of Guelph along with TNAU did research to provide evidence for the health benefits and developed 36 small millet products. Targeted specific consumption promotion activities in the working sites, namely recipe demonstration, cultural programs and school campaigns along with placement of dehullers resulted in increase in awareness and consumption among producing communities. Outside the working sites, the project was able to reach over 100 thousand people, including students and women, to create awareness on the

importance of inclusion of small millets in their diets through large scale awareness events like Walkathon.

Innovative approaches are adopted for intervening in the value chain to make small millet products available in the local area at affordable prices. Strengthening pushcart porridge vendor channels and marketing through women federations were taken up by DHAN Foundation to reach poor families on a large scale. In addition, small millets recipes have been promoted in the Integrated Child Development Scheme and schools by WASSAN.

What are the policy options?

Small millet consumption is currently limited by the multiple constraints which are reinforced by low technology application and poorly developed markets. What is needed is a comprehensive and integrated development strategy aiming at demand stimulation, increasing production, developing local processing infrastructure and local market development on an extensive yet location-sensitive scale. Such a development strategy should at least include the following general objectives:



Integrated approach needed for small millets promotion

1. Increasing local demand for consumption of all small millets, starting with reducing the drain out of the producing regions.
2. Increasing production and productivity of all small millets in a sustainable way, starting by reversing the decline in cultivated area.

3. Multi-stakeholder participatory research needed to act as a catalyst for realizing this development strategy. The state needs to create a level playing field for small millets when compared to other food grains and other sectors. Only then it is possible to jump start the small millets economy to a threshold level where the market can play a significant role. While there are some policies for production support and for inclusion of small millets in public food schemes, there are currently no policies for creating local processing infrastructure and for local market development.

Supporting programs/ projects in place

- Initiative for Nutritional Security through Intensive Millet Promotion (INSIMP) Project- Later merged with NFSM
- National Food Security Mission
- National Mission on Sustainable Agriculture
- Rainfed Area Development Project (RADP)
- National Food Security Act

I. Production enhancement

The existing policies need to be refined to make them more comprehensive and effective and for better convergence. Differentiated support for production enhancement should be given for current production clusters and for erstwhile production areas. In the former the main aim of production support has to be to retain area and to increase competitiveness, and in the later to introduce small millets as food and contingency crops.

1. Policy support needed for production clusters

- Placing small millets development within the wider development issue of neglect of rainfed areas and considering their neglect for long time, various initiatives taken to address this inequality like watershed schemes, fallow land development projects, convergence with NREGS, etc. need to prioritize small millet production clusters.
- Bringing back INSIMP, a production schemes focused on millets, instead of merging it with National Food Security Mission.
- Support for establishing community-based conservation projects that effectively integrate on-farm conservation, varietal improvement and varietal distribution

- **A package of support on a cluster basis covering the following is needed:**
 - **Promoting small millets as cropping systems (SMCS) rather than as mono-crops**, as the SMCS offers comprehensive nutrition and fodder security and offers various ecological benefits.
 - **Support for timely availability of quality seed** through a two-pronged approach stressing, on the one hand, large scale organized seed channels for proven released varieties and on the other hand, local seed production for well-performing local varieties grown in specific areas.
 - **Large scale capacity building to farmers on location specific improved production practices.**
 - **Support for high cost inputs**, mainly organic matter addition and small implements like spike tooth harrow and thinner. Karnataka model of supporting Rs. 1000 per acre for organic matter addition can be adopted.
 - **Developing policies for reducing the damage by wild animals** like allowing hunting for a specified period and support for solar fencing.
- **Creating post-harvest infrastructure** covering village wise threshing yards and storage godowns, and custom hiring services for harvesters and threshers for groups of villages. This intervention will have great positive impact on improving the quality of the produce and food products, as separation of extraneous matter is a serious problem for processors and food product manufacturers.
- **Procurement** of small millets based on a relevant intervention price (MSP).
- **Marketing initiatives** which aim to provide small millet farmers with a higher income share for their produce, like value chain integration, regulated markets, stock based credit, establishment of production cooperatives and various value addition initiatives should receive support on a case-by-case basis.

2. Policy support for non- production clusters

Here the focus is reintroduction as a food crop and as a contingency or alternate crop given the current climate change related issues faced by the rainfed regions. Crop(s) to be selected based on food preference. Besides generic support for production as mentioned above to individual

farmers, specific support is needed for nutritious varieties as in Nutri-Farms policy.

II. Consumption enhancement

Differentiation should be made between consumption in the producing areas by small millet cultivating households, market-based consumption, and public food program-based consumption and attention needs to be given at all three levels. A twin strategy of promoting affordable bulk products and high cost value added small millet products to be implemented, with more emphasis on the former. Promoting bulk products with or without value addition at affordable prices for general population can only make a difference in the nutritional status of the consumers. Promoting high cost value added products for the elites or patients will help in improving the profile of the small millets as a food category.

- **Consumption promotion in production areas:** No specific policies exist as of now and the policies are needed to
 - **Support for intensive awareness raising and skill building on use of small millets, building on their local culture**
 - **Support for establishment of small processing units within a radius of five kilometers from the village:** Investment support should be provided to local entrepreneurs. Preference can be given for small mill owners, as they have the
 - necessary infrastructure and clientele in place and well running women SHGs.
- **Consumption promotion through markets:** Here too no specific policies exist as of now and the policies are needed to support:
 - **Agencies involved in bulk products:** Includes rice, grits and flour. This value chain involves a large number of actors starting from small scale aggregators in the villages, large aggregators, processing mills, wholesalers and retailers. Policy support needed for local aggregators and processors are
 - a. Creation of common drying yards, godowns, cold storage and packaging facilities.
 - b. Making available stock based credit.
 - c. Support for medium scale units for processing and marketing bulk products

in the production clusters in terms of capital subsidy, easy access to credit and tax exemption for five years.

An innovative way of bringing millets to the urban poor

In the context of rising urban poverty, pushcart porridge vendors (PPV) play a significant role in meeting the food requirements of the urban poor by selling nutritious millet food. A study in Madurai, Tamil Nadu found that on average, each PPV reaches 48-95 consumers per day, of whom 73% are casual labourers. The general perception is that food served by PPVs is not hygienic. RESMISA project provided training in hygienic food handling practices and facilitated 80 PPVs in getting license from the Food Safety and Standards Authority of India (FSSAI). This has led to a 30-35% increase in customer numbers. Investing in this market channel would be a way to reach a large number of people; the model could also be replicated in other cities.

- **Agencies involved in value added products:** These entrepreneurs will increase market visibility for millets and introduce new products more acceptable to contemporary tastes. Given their heterogeneity, here too a differential approach is needed for three products categories and customized support needs to be given to actors in each category.
 - 1) **Low cost value added products:** These are products mostly handled by street vendors and micro enterprises through home production like porridge and patronized by large segments of the poor population. The main issues are 1) Perceived as less hygienic and low quality, 2) Do not have legitimacy and so face harassment and 3) Limited millets product portfolio. Giving due recognition of their role in meeting the nutrition requirements of poor, policy support is needed for
 - a. Capacity building on hygienic handling practices and recipes preparation
 - b. Legal permission from FSSAI and city authorities
 - c. Allocating legitimate space and other infrastructure.
 - 2) **Medium to high cost value added products:** These are handled by small to

medium size enterprises using specialized equipments of moderate cost. The main issues are 1) High cost of the products, 2) Difficulty in accessing credit facilities, 3) High cost and low quality of raw materials & 4) Limited capacity to invest in general awareness on small millets. Support need to be given for

- a. Capacity building
- b. Capital subsidy and easy access to working capital credit
- c. Tax incentives for five years
- d. Creation of common infrastructure for production and marketing. Madurai food court model of common infrastructure in Tamil Nadu can be tried in other places.

3) **Therapeutic products:** These are targeted towards the elites and patients and need intensive efforts for quality maintenance. Issues and support required are very similar to that of medium cost value added products, but the additional issue is the limited capacity for conducting bioavailability and other studies for proving the health benefits of small millet products. Support need to be given for customised research.

- **Consumption promotion through public support:** While there is a positive policy environment for promoting consumption through public food programs due to recent Food Security Act, which recommends inclusion of millets in PDS, creating operational models is needed for:

Supplying ready to cook small millet products in PDS: Small millet rice, flour and grits ought to be included in the public distribution system (PDS), based on regional production and consumption patterns, capitalizing on the National Food Security Act. This intervention should be accompanied by necessary awareness raising and skill development. Already existing pilots and the Karnataka model can be looked at for evolving necessary procedures.

Children enjoying millets

India is running the world's largest supplementary nutrition programme, Integrated Child Development Services (ICDS), to address malnutrition in children. To create a

model for effective integration of small millets in the menu of ICDS, a pilot was initiated in Srikakulam district of Andhra Pradesh with the Department of Women Development and Child Welfare. The pilot serves small millets-based foods to 160 children in 10 feeding centers for 16 days out of the total 26 feeding days in a month. The modified menu supplies 14 times more fiber, 5 times more iron, 2.6 times more calcium, 1.5 times more phosphorus, 1.4 times more protein, 5 times more thiamine and 1 to 1.5 times more magnesium and zinc per month when compared to the regular rice based menu. The majority of mothers are very happy with the change in menu; some elders are happy that this brings back millets into their regular farming and food systems.

Including ready-to-eat small millet products in public food schemes and Government canteens:

Well accepted small millet products should be included in the menus of various food-based welfare schemes implemented at state level and in Government canteens and hostels. Necessary learning can be taken from existing models and pilot in Srikakulam, Andhra Pradesh.

The above two crucial interventions will act as demand pull and will go a long way for enhancing production.

III. Awareness-raising

Awareness-raising should be given high priority and various means of awareness raising like cultural program, Walkathon and engaging media to be supported. On the long term, efforts should be taken for inclusion of small millets and local food systems subject in school curricula. This support will help the private sector to improve their penetration.

IV. Institutional facilitation

- Promoting an innovation platform covering all the stakeholders for structured interfacing among them to address many serious constraints (Eg. low shelf life of processed produce) and to promote nutrition related standards (Eg. optimum level of polishing).
- Allocation of adequate funds and strengthening the research institutions for the mandate of carrying out broad based participatory evaluation of varieties and other technologies in the remote areas where small millets are increasingly confined to, with a focus for small millet crops other than finger millet and

customized participatory research for & with different stakeholders.

Moving forward

- Integrated intervention pilots at taluk level in small millets predominant states: In the large production clusters pilots can be taken up integrating production support, processing, marketing and introduction in public food schemes to get necessary hands-on experience.

References

- DHAN/WASSAN. (2012). Supporting millets in India: Policy review and suggestions for action. India: DHAN Foundation and Watershed Support Services and Activities Network.
- Foote, J. A., Murphy, S. P., Wilkens, L. R., Basiotis, P. P., & Carlson, A. (2004). Dietary variety increases the probability of nutrient adequacy among adults. *The Journal of nutrition*, 134(7), 1779-1785.
- Khoury, C. K., Bjorkman, A. D., Dempewolf, H., Ramirez-Villegas, J., Guarino, L., Jarvis, A. & Struik, P. C. (2014). Increasing homogeneity in global food supplies and the implications for food security. *Proceedings of the National Academy of Sciences*. doi: 10.1073/pnas.1313490111
- Ugare, R., Chimmad, B., Naik, R., Bharati, P. & Itagi, S. (2014). Glycemic index and significance of barnyard millet (*Echinochloa frumentacea*) in type II diabetics. *Journal of Food Science and Technology -Mysore* -02/2014; DOI:10.1007/s13197-011-0516-8
- Seburn, R.A., Guenther, D., Patel, K. & Wiebe, K. (2014). Opportunities and constraints for women promoting food security through the informal sector, Presented at the International Food Security Dialogue, University of Alberta, Canada.
- Itagi, S., Naik, R. & Yenagi, N. (2013). Versatile little millet therapeutic mix for diabetic and non diabetics. *Asian Journal of Science and Technology*, 4(10):33-35.

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