

## Empowerment of Women Farmers through Value Addition on Minor Millets Genetic Resources: A Case Study in Karnataka

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Finger millet is an important dryland crop valued for food grain and straw. One of the striking features of finger millet is its resilience and ability to adjust to marginal agro-climatic conditions in terms of soil fertility, rainfall and other weather parameters. The grain is nutritious with balanced protein, higher calcium and iron and dietary fibre. This offers ample opportunities for developing and promoting nutritious utility products from finger millet. In view of this, a study was undertaken to enhance the income of finger millet growing farmers by increasing productivity and strengthening the capacity of farming community for value addition and marketing of value added products. The process involved selection of two improved varieties by farmer participatory approach, organizing several field enhancement trials in farmers' fields for three years, empowering farmers in quality seed production and supply conservation using village seed bank approach and leveraging Self Help Groups (SHGs) of farm women for value addition of grain and its marketing. The crop management, also involving the developmental departments, resulted in 30-35 per cent increase in yield. On-farm intercrop trials of finger millet with field bean or pigeonpea during three years indicated higher monetary returns in comparison with the farmers' practice.

The rural mobilization under this study focused on SHGs constituted by small and landless farmers of villages in Doddabomanahalli and B.R. Hills of southern Karnataka. The nutritional status of women of these villages revealed 60-70% nutrient adequacy with low Hb levels in 50% of them. The pattern of group savings and lending showed that most of the credit was used for improving the sustainability of their agriculture and subsidiary activities. Empowerment of women was undertaken through trainings based on the need assessment carried out in a participatory mode. The training was imparted for preparation of value added products of finger millet (malt and energy dense mix) quality control, labeling, marketing of the produce with attractive cost benefit ratio. Empowerment of SHG women through training and nutrition education had positive impact on leadership qualities, enhanced self confidence, skills to undertake value added products and their marketing, domestic consumption, income generation and all converging to improved nutrition and economic status.

**Key Words:** Women empowerment, Small millets, Genetic resources, Value addition, Self help groups, Nutrient intake, Dietary pattern, Socio-demographic profile

### Introduction

The social and economic status of women is a reliable indicator of their empowerment in a society. There is an exhaustive list of goals to be achieved through self-help programme which empower women with respect to saving habits, credit for production and commercial purposes, opportunities for entrepreneurship, functional literacy, developing leadership qualities, gender sensitivity and awareness about the socio-political, economic and cultural issues. The empowerment of women through self-help groups (SHGs), a non formal cooperative organization would benefit not only the individual women but also the family and community as a whole through collective action for development (Holvoet 2005, Tesoriero 2006).

Empowering women needs a holistic approach to participate in decision making in the household, community

and local domestic sector and prepare women to take up leadership position in agricultural activities. SHGs in rural India are bringing a silent revolution not only in terms of providing access to micro credit to communities but also in contributing towards a greater sustainability in agriculture in various ways, including a better use of marginalized local agrobiodiversity. In this backdrop, the present work aimed at empowering SHGs through improved processing and value addition of finger millet, a species of high nutritional value but suffering from a status of neglect for research and development. The specific objectives of this study were i) to understand the social and economic empowerment of the women members of SHGs, ii) to assess the dietary pattern with reference to small millets and iii) to empower the women through interventions in training and value addition.

## Materials and Methods

The methodology involved quantitative as well as qualitative assessment conducted in two villages of Kolar District in Karnataka State, namely, Doddabommanahalli and Seegenahalli from Chintamani Taluk and the work was carried out during 2008-2009 in the framework of a global project funded by the International Fund for Agriculture Development (IFAD) on neglected and underutilized species (Padulosi 2007). The work encompassed 8 SHGs, each group comprising of 19-20 women. The quantitative data was collected with the help of semi-structured interviews. The interviews' format included questions relating to the family income, savings and loan schemes available to SHG members. Secondary information was collected from books, ledger and registers maintained by SHGs. The data on socioeconomic status included the age, education level of family, family size, occupation, land holdings and family income. Dietary pattern was assessed by 24 hour recall method for 7 days. Sets of pre-standard vessels were used to obtain estimates of raw and cooked foods consumed by the subjects. Subsequently, the individual consumption of nutrients like energy, protein, fat, iron, calcium, thiamine, riboflavin and niacin were calculated using food consumption table and compared with the recommended dietary allowance (Gopalan *et al.*, 1996) and the adequacy of nutrients was calculated as per the method suggested by Thimmayamma (1987).

The training programmes of the project concentrated on processing and value addition methods for finger millet. Altogether, 120 SHG members were trained of which 40 were selected for detailed skill development in processing of value added products. Secondly, intensive value added product trials both on and off the campus were conducted to select the suitable products having commercial potential for income generation activities and to facilitate enterprise building by the SHG women. Further training was also imparted to these women on nutrition education, importance of value addition in food products, Hazard Analysis and Critical Control Point (HACCP), handling of milling unit, labeling and marketing of the product. The impact of the training programme on the empowerment of women was also assessed.

## Results and Discussion

### *Socio-demographic Profile of Women Members of SHGs*

The socio-demographic profile of the members of SHGs is presented in Table 1. The age profile indicated that the SHG members belonging to the age group of 26-35 years

formed the largest class (60%) followed by that of 36-40 years (26%). With regard to literacy, 24% of members were illiterate, 60% had primary school level literacy and only 2% had high school education. The occupation pattern indicated that majority of them were labours, largely involved in dairy and sericulture activities. Majority of the rural women were having two children (70%) and the family size was 2-4 members in 90% of the samples. The results also showed that 90% of families were nuclear.

**Table 1. Socio-demographic profile of women members of SHGs**

Variables	Category	Respondents	
		Number	Percentage
Age	21-25 Years	7	14
	26-35 Years	30	60
	36-40 Years	13	26
Education	Illiterate	12	24
	Primary	30	60
	Secondary	7	14
	High School	1	2
Occupation	Housewife	2	4
	Laborer	48	96
Type of family	Nuclear	45	90
	Joint	5	10
Family size	2-4 members	45	90
	5-7 members	5	10
Number of children	One	10	20
	Two	35	70
	Three and above	5	10

### *Dietary Pattern of SHG Families*

The assessment of dietary pattern of SHG members showed that all the families were non vegetarian by habit. The food from animal sources was consumed twice in a week by 45.3% of the families. The common meal of the family was cereal for breakfast and finger millet dumpling with *dhal* (pulse) and vegetables for lunch and dinner. The commonly consumed fruits were banana, papaya and guava. Milk and milk product were used only for tea and coffee and not for consumption as such by children / pregnant/lactating women as they sell the most part of milk to dairy cooperatives.

### *Nutrient Intake*

The mean intake of nutrients by SHG women, viz. energy, protein, fat, iron, thiamine, riboflavin and niacin, were below the recommended dietary allowances (RDA), except for calcium (Table 2). The statistical analysis of the difference in mean values of RDA and actual intake by t-test showed that the inadequacy was highly significant (1% level of probability). The inadequacy of micronutrients is attributed to inadequate intake of protective foods. The

adequacy of calcium is attributed to consumption of finger millet which has high calcium intake. The share of millets in the dietary energy and protein was 50%.

**Table 2. Mean dietary pattern of SHG women**

Nutrients	RDA	Nutrient intake		% Adequacy	't' value
		Mean	SD		
Energy (kcal)	2225	1600	219	72	32.72**
Protein (g)	50	34	7.7	68	21.02**
Fat (g)	20	10.8	8.4	54	7.58**
Iron (mg)	30	19	4.2	63	17.23**
Thiamine (mg)	1.1	0.77	0.3	70	9.39**
Riboflavin (mg)	1.3	0.88	0.4	68	12.86**
Niacin (mg)	14	9.3	3.3	65	17.44**
Vitamin A (mg)	600	378	343	63	7.93**

\*\* Highly significant

### Empowerment of SHG Members through Training

After analyzing the socioeconomic and dietary intake of SHG members, interventions were undertaken by the team of the University of Agricultural Sciences (UAS), Dharwad aimed at empowering these groups through enhancement of their capacities in value addition and nutrition. The different training methods employed in these efforts and their degree of preference by SHGs are presented in Table 3.

**Table 3. Training methods preferred by SHG women**

Training method	Percentage of preference
Demonstration	98
Lecture with projected aids	91
Video film	90
Exhibition	80
Field visit	75

The training activities organized through the project included lecture-cum-demonstration related to value added products of finger millet involving also fruits and vegetables processing for home consumption. Finger millet is a dominant grain crop in the target areas. Major portion of the grain harvested is marketed without value addition and the rest is kept for domestic consumption. The training on value addition of finger millet in the village was aimed at enhancing the income from the marketed grain through value addition. The different SHGs identified finger millet malt and energy dense mix (*Hurihittu*) as the products for value addition and marketing. The nutrient content of the products which were promoted through these interventions ranged from 327-364 kcal of energy, 4-13 g protein, 1-12 g fat, 65-300 mg calcium and 1-5 mg iron, values that are on par with several products available in the market but costing about three times more.

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### Sale of the Value-added Products

The value added products, were first commercialized by the SHGs during the *Krishi Mela* (farmers' fair) festival held on 16-19 November, 2008 at the UAS Campus, Bangalore and then at Chintamani, where an event organized on 4 December 2008, by the University witnessed a large participation of both rural and urban people. As a result of increasing demand of the products, these are now sold in retail outlets of Chintamani, general stores and health care centers under the brand name established by the SHG (Shrinidhi Balaji and Seekal).

### Economics of Value Addition in Finger Millet

The SHGs were trained in processing of finger millet, cleaning, milling, packaging and labeling. The University team provided the necessary technical and certification support as well as the market linkages. These products are being marketed at Rs.100 per kg. At this price, on an average, the net income generated by the SHG is substantial as shown in Table 4 for finger millet malt and Table 5 for finger millet based '*Hirihittu*'. The calculation of cost of production and income was made for 2400 kg final products in both the cases. This model was found scalable provided market demand is expanded with consistency in quality, timely delivery and suitable market promotion.

**Table 4. Economics of ragi malt production**

Particulars	Amount (Rs.)
Variable cost (raw material+ fuel+ labour + 10% interest)	126,000
Fixed cost (depreciation of equipment+interest)	1,846
Space rental (500/month)	6,000
Total cost of production 2400 kg/annum	133,846
	<b>134,000</b> (rounded amount)
Gross income = 100 × 2400 =	Rs. 240,000
Net income = Gross income – total expenditure = Rs. 240,000 – 135,000 =	100,000
B/C ratio (benefit/cost) = 240,000/135,000 =	1.7 (benefit of one rupee 70 paise for every rupee spent)

From these data, it is evident that as a result of the interventions, the skills, self confidence and leadership enhanced through the training courses played an important role in boosting the income generating activities pursued by their women members.

**Table 5. Economics of ragi energy mix production**

Particulars	Amount (Rs.)
Variable cost (raw material+ fuel+ labour + 10%interest)	138,000
Fixed cost (depreciation of equipment+interest)	1,850
Space (500/month)	6,000
Total cost of production 2400kg/annum	145,850
	<b>1,46,000</b> (rounded amount)
Gross income = 120 × 2400 =	Rs. 288,000
Net income = Gross income – total expenditure = Rs. 288,000 – 146,000 =	142,000
<b>B/C ratio</b> (benefit/cost) = 240,000/ 140,000 =	<b>1.97</b> (benefit of one rupee 97 paisa for every rupee spent)

### Conclusions

The study shed more light on the role played by SHGs in promoting socio-economic empowerment of women in India through a more effective use of local biodiversity and its products. The analyses has confirmed the strategic role that such types of interventions can play in rural and urban situations where women are too often marginalized in income generation activities and decision making processes. As a result of capacity building interventions to enhance local skills in value addition, SHG women were able to generate substantial income and use this towards their own family welfare developments. The training interventions by the University played a strategic role by increasing self confidence of SHGs in undertaking small scale food processing of value added products of finger millet at the village and city level.

The ultimate empowerment of target groups, was the result of a larger multi-stakeholder effort which involved several players, such as Bioversity International, the M.S. Swaminathan Research Foundation and the University of Agricultural Sciences of Bangalore in participatory variety selection, provision of high quality seed, dissemination of best cultivating practices, supplying of processing/milling units, training and education courses on nutrition and food technology, public awareness campaigns which altogether contributed to substantial benefits by SHG women members in pilot areas. The other important message of these results was that it is indeed possible to improve peoples' livelihood using local crops, such as small millets, which have the potential to contribute to enhance both incomes as well as nutrition security of people, particularly in poor and marginal areas where they have recognized advantages in terms of higher adaptation and resilience.

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