



ENTREPRENEURSHIP DEVELOPMENT PROMOTION THROUGH MILLET PROCESSING IN RAICHUR DISTRICT OF KARNATAKA STATE, INDIA

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Twenty first century challenges like climate changes, water scarcity, increasing world population, rising food prices and other socioeconomic impacts are expected to generate a great threat to agriculture and food security worldwide, especially for the poorest people, who live in arid and sub-arid regions (Saleh *et al.*, 2013). Typical grain texture and hard seed coat of millets increases their keeping quality but makes them difficult to process as well as cook in convenient form. Absence of appropriate primary processing technologies to prepare ready-to-use or ready-to-cook (RTC) products and also secondary as well as tertiary processing to prepare ready-to-eat value added products have been the major limiting factors for their diversified food uses and better economic status (Malleshi, 2014). Millets have relatively poor digestibility and low bio-availability of minerals due to presence of inherent anti-nutritional factors. An increasingly important determinant in food choice is the growing consumer concern about nutrition and health (Nehir and Simsek, 2012). The difficulties in millet grain processing present a challenge but nutritional as well as health benefits and consumer demand for health foods provide opportunities in processing, development of suitable technology for newer products and process mechanization. This change in technology and consumer food preference would help in increasing the area under millets, maintaining ecological balance, ensuring food security, prevent malnutrition and increase the scope for utilization of millet grains on industrial scale. Different studies on processing of millets.

Sustainably improving rural livelihoods is a complex endeavour. Coping with greater competition for natural resources, urbanization and climate change will require a broader portfolio of crops to meet new environmental

conditions and new markets. Some key resources to meet these challenges are already in the hands of the rural poor in the form of the wide range of neglected crop species that they use on a regular basis to meet household needs. Another important factor is processing as an income generating activity for the women to lead sustainable life. Since the women's groups are stepping towards the economic development of their family through income generating activity, there needs to be wide range of opportunities for undertaking entrepreneurial activity. Processing of millets provides an opportunity for income generation and also ensures food security to the family as well as to the animals through fodder.

On the basis of research carried out, there are several problems in the area of millets which need to be addressed. These include lack of knowledge of uses, constraints and opportunities for the target neglected and underutilized species, limited income generation, market commercialization and demand limitations, lack of research and development activities and weak national capacities, lack of links across conservation and production to consumption "*filières*". Few answers to overcome these problems could be Focusing on the local value, indigenous knowledge and uses of the crops, in order to link and promote cooperation among stakeholders, Develop value adding strategies (through processing, marketing, commercialization, etc.); investigate and identify improved agronomic and production procedures. And organize planning workshops for all stakeholders; establish and strengthen operational links between stakeholders.

Research to increase the value of these crops and make them more widely available would broaden the resource

base and increase the livelihood options for rural communities. Keeping these points into cognizance, ICAR-KVK Raichur under the jurisdiction of UAS, Raichur, Karnataka had undertaken demonstrations on Entrepreneurship development through millet processing for the self help groups of Raichur district.

This paper explains the efforts made by KVK Raichur and AEEC Lingasugur in promoting the entrepreneurship development through primary and secondary processing and value addition of millets and their role in income enhancement of farmers. It was found that, the farmers whose lands do not possess the irrigation facility and have very poor fertility status had undertaken cultivation of millets and the KVK had linked them up to processing unit of Department of Processing and Food Engineering department for primary and secondary processing. The major activities in promoting yield and value addition to millets are classified as under.

1. Promotion of high yielding variety of foxtail millet

HMT-100-1 and Variety-SIA-2644 both released by University of Agricultural Sciences, Dharwad were demonstrated to the farmers in two villages namely Yaklasapur and Turakandoni of Raichur taluka. The results revealed that both these varieties performed better even under moisture stress during the 2013-14 and 2014-15. The seeds thus produced were taken to the millet processing unit of KVK Raichur.

Similarly, the performance of HMT-100-1 variety performed better over the local variety, where in farmers realized a net returns of about Rs. 15654/ha over the local check with a B:C ratio of 1:2.69. Thus, the introduction

of high yielding varieties was proved to be effective in enhancing the farmers income. Increase in productivity achieved over traditional practices (TP), which used local varieties (LV) by improved agronomic practices (IP) using High Yielding Varieties (HYV) and their quality seeds resulted in either improved availability of nutritious millet grain for home consumption or marketable surplus.

2. Development of value chains of nutritious millets

The produce of millet was taken to the processing and food engineering laboratory where a millet processing unit sponsored to Krishi Vigyan Kendra Raichur under INSIMP was established. The processing included sorting, dehulling, polishing and sealing and branding the processed produce in the name of KVK along with coordinating groups. The groups were facilitated with sealing machine, printing label and information about the nutritional importance of millets. There was about 60-65% recovery of millets after processing. Meantime a group by name Nagar Yellamma SHG from Deosugur, Raichur was trained to produce a sweet from millet in the form of pedha, a local name to the sweet which is prepared with the roasted millet flour, ghee and sugar powder. There was demand created for this product. This in turn enhanced their income as well as self confidence.

In addition, pearl millet which grown in large area under Lingasugur taluk was also selected for value addition. Wherein, sprouting of pearl millet was tried and malt preparation was carried out. This malt was fortified with malted ragi flour, popped rajkeera, soya flour and condensed milk powder. Developed malt powder utilized in preparation of porridge. Demonstration of this beverage

Table 1 : Nutrient composition of sorghum, millets and other cereals (per 100 g edible portion : 12 per cent moisture).

| Food | Proteina (g) | Fat (g) | Ash (g) | Crude fibre (g) | Carbohydrate (g) | Energy (kcal) | Ca (mg) | Fe (mg) | Thiamin (mg) | Riboflavan (mg) | Niacin (mg) |
|-----------------|--------------|---------|---------|-----------------|------------------|---------------|---------|---------|--------------|-----------------|-------------|
| Rice (brown) | 7.9 | 2.7 | 1.3 | 1.0 | 76.0 | 362 | 33 | 1.8 | 0.41 | 0.04 | 4.3 |
| Wheat | 11.6 | 2.0 | 1.6 | 2.0 | 71.0 | 348 | 30 | 3.5 | 0.41 | 0.10 | 5.1 |
| Maize | 9.2 | 4.6 | 1.2 | 2.8 | 73.0 | 358 | 26 | 2.7 | 0.38 | 0.20 | 3.6 |
| Sorghum | 10.4 | 3.1 | 1.6 | 2.0 | 70.7 | 329 | 25 | 5.4 | 0.38 | 0.15 | 4.3 |
| Pearl millet | 11.8 | 4.8 | 2.2 | 2.3 | 67.0 | 363 | 42 | 11.0 | 0.38 | 0.21 | 2.8 |
| Finger millet | 7.7 | 1.5 | 2.6 | 3.6 | 72.6 | 336 | 350 | 3.9 | 0.42 | 0.19 | 1.1 |
| Foxtail millet | 11.2 | 4.0 | 3.3 | 6.7 | 63.2 | 351 | 31 | 2.8 | 0.59 | 0.11 | 3.2 |
| Common millet | 12.5 | 3.5 | 3.1 | 5.2 | 63.8 | 364 | 8 | 2.9 | 0.41 | 0.28 | 4.5 |
| Little millet | 9.7 | 5.2 | 5.4 | 7.6 | 00.0 | 329 | 17 | 9.3 | 0.30 | 0.09 | 3.2 |
| Barnyard millet | 11.0 | 3.9 | 4.5 | 13.6 | 55.0 | 300 | 22 | 18.6 | 0.33 | 0.10 | 4.2 |
| Kodo millet | 9.8 | 3.6 | 3.3 | 5.2 | 66.6 | 353 | 35 | 1.7 | 0.15 | 0.09 | 2.0 |

*All values except protein are expressed on dry weight basis; protein = N x 6.25

Sources: Hulse, Laing and Pearson (1980); United States National Research Council/National Academy of Sciences (1982); USDA/HNIS (1984); FAO (1995).

Table 2 : Performance of SIA-2644 over the local check.

| Parameter | Demo | Check |
|-----------------------|-------|-------|
| Plant height (cm) | 103 | 98 |
| No. of tillers/plant | 10-12 | - |
| Fodder yield (t/ha) | 2.5 | 1.75 |
| Grain yield (q/ha) | 9.32 | 7.99 |
| Gross cost (Rs./ha) | 3500 | 35 00 |
| Gross return (Rs./ha) | 21436 | 18377 |
| Net income (Rs./ha) | 19436 | 16377 |

Table 3 : Cost of processing and returns/ q of millet.

| | |
|-----------------------------------|---------------|
| Price of unprocessed millets (Rs) | 1800 |
| Cost of processing (Rs/q) | 700 |
| Cost of packaging (Rs/q) | 200 |
| Total | 2700 |
| Price of processed millets (Rs) | 50 |
| Recovery rate | 68% |
| Cost of processed millet | Rs. 58 |
| Gross returns/q | 3400 |
| Net returns/q | 3400-2700=700 |

preparation was carried out for Asha workers at government hospital, Mudugal to enhance their knowledge which in turn they can disseminate to many farm women at villages.

3. Training women members of SHGs on value addition

A series of three trainings were conducted to popularize the value added products from millets. Under the banner of vocational training a six weeks training programme for the upcoming entrepreneurs was organized to demonstrate various products of millets. This training provided them a hands-on-experience in preparing the sweets, and bakery products with the incorporation of millet flour.

4. Establishing marketing linkages for the processed produce

Marketing of value added products was done either directly by the members of the same SHG, which produced the products or by another SHG which undertook specialized task in packaging and marketing the products. The processed produce were taken for marketing at the

Melas, Organic markets at Bengaluru, Sahaja Samridhhi, Bangalore, Other KVKs of UAS, Raichur, hospitals in local area, organic farmers for further marketing. At KVK for the public, who visits KVK, Krishi Bharath, Organic producers mela.

Conclusion

Thus, it may be inferred that, small millets are important for the food security, good health and income of poor farmers in certain agro climatic regions. Awareness programmes, trainings and demonstrations of millets and millet value addition techniques improved their knowledge on millets and areas of enterprises. However, these crops have not received adequate attention of the policy makers for the purpose of investment on their research and development, mainstreaming these grains in developmental programmes, in public procurement and distribution system is much in need.

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