

Value Chain of Maize for Commercialization- An Innovative model

D. Raghupathi¹, C. Umashanker², M.Venkatesh³ and T.A. Sreerama Setty⁴

1,2,3, & 4. Zonal Agricultural Research Station (UAS-B) ZARS, VC Farm Mandya, Karnataka

Corresponding author e-mail: raghupathidantapur@gmail.com

ABSTRACT

India contributes 2.5% of the global maize production (640 million tonnes). Karnataka and Andhra Pradesh are the corn belts from South where Karnataka alone occupies 12% of the total area (one million ha) and contributes nearly 16% of its total production. Nearly ¾ of the produce is being processed as animal feed and remaining for human consumption and industrial use. There is a huge demand for maize and maize products because, it is rich in lysine, tryptophan, amino acids and low fat content and it is a good product for diabetic and obese disorders. Now days there is a more demand for maize value added products in urban and peri-urban areas, indicating a vast scope for fortification as nutritional supplementation at all the stages right from farmer's field to consumer's plate. The rich nutri -maize is available in abundance to the consumers at relatively cheaper price (compared to other cereals) can be further commercially exploited for nutritive health foods by value addition and making available them at affordable price for the advantage of vulnerable groups and other consumers at large. The project "Value chain of maize for commercialization" aims to divert much of the grain towards human consumption through development of maize based value added health foods for nutritional supplementation for nutritional security by using QPM grains. The project is being implemented at Mandya district on pilot basis in 500 ac area. The project works in a consortium mode where the lead institute is UAS Bangalore. The other partners are NIANP, KMF, AWAKE (NGO) from Bangalore and the PDP and NIN Hyderabad. The GAP available in the laboratory will be disseminated to the Maize Growers Association (MGA) by establishing backward and forward linkages for production, processing and marketing. A common facility centre has been established for the benefit of the SHG's to prepare by products of maize like., vermicelli, papad, crunches etc., and selling in the local markets. Some of the unique innovative activities of this model are: New approaches for dissemination; innovative farming technologies to the growers; new approaches for production; cooperative type of farming; Contract farming; farmers Field Schools; new protocols of health products, from production to consumption. Thus generating employment to the rural women, increased productivity to the farmers and making available cheap nutritious maize value added products for the consumers.

Keywords: QPM, Consortium, Amino acids, Commercialization, Good agricultural practices.

In India Maize is grown mainly for animal feed because of its rich nutritional qualities. However, in limited occasions it also been used for human consumption. Recent technological innovation leads to the evolution of Quality Protein Maize (QPM) which is rich in lysine, tryptohan, low fat and high fiber thus better suitable for human diet.

In Karnataka state rice and ragi area is being diverted towards cultivation of maize due to its less cost involvement and better market facilities. In India the Maize crop occupied an area of 8.17 m.ha with a total production of 19.73 million tones. Where as in Karnataka

it occupied 12.0 laka ha with the annual production of 2.0 million tones (Anon., 2009). The ICAR, New Delhi, under National Agriculture Innovative Project sanctioned a consortium mode project to UAS, Bangalore entitled "Value chain on commercialization of maize product" with a outlay of 451.22lakh. The Project begins during the year 2008-09 in Mallavalli taluk of Mandya distinct, Karnataka state with the following objectives:

- i) Fine tuning of the existing agricultural practices for sustainable increased productivity and dissemination among the farmers

Table 1. Nutritional value of maize

Content	Percentage dry matter basis (%)
Starch	71 - 72
Protein	9 - 10
Fat	4 - 4.5
Fiber	9 - 10
Sugar	2 - 3
Minerals (ash)	1.4

Source 2004: DMR New Delhi.

- ii) To formulate innovative balanced nutritive foods from maize
- iii) To evaluate the nutritionally cooked recipes from maize for health benefits

- iv) Evaluation of maize by products for balanced animal feeds
- v) Strengthening entrepreneurship skills of SHGs and NGOs for capacity building

METHODOLOGY

Project is being implemented by UAS, Bangalore in consortium mode with partners' institutes like National Institute of Nutrition, Project Directorate on Poultry, Hyderabad (AP), Karnataka Milk Federation, National Institute of Animal Nutrition and Physiology, Agro-corn, AWAKE, Bangalore from the year 2009 in Malavalli taluk of Mandya district, Karnataka State.

Table 1. Fine tuned Good Agricultural Practices for maize production

S. No	Critical gaps identified in base line survey	Interventions executed	Dissemination approaches	Outcome /output
1	Growers were using costly private hybrids (Rs. 80- 90/kg). Higher seed rate and seed cost	Introduced UAS (B), hybrids Nityahsree and Hema @ Rs. 40/kg	General meetings, Exhibitions. Facilitated seed availability	Saving in the seed cost Rs 30 to 40/kg Farmers were convinced about
2	QPM hybrids for cultivation and their role in preparation of health value added products	Introduced QPM hybrids in 12.0 acres	Field visits Result Demonstrations	the benefits of new hybrids
3	Used excess seed rate ranging from 7 to 9 kgs/ac	Introduced 6kgs/ac	Method Demonstrations	Saved 1-2 kgs seed/ac, saving seed cost Rs. 140-160/ac
4	Close spacing between rows and plants – 1x 0.5ft or	Introduced 2x1ft	Method demonstrations	Increased stem girth and cob size and weight lead to 1.5x0.75 ft increased yield
5	Indiscriminate use of Fertilizers: More of Urea and less of Potash than recommended	Introduced 40:20:10 NPK/ acre as per PoP of UAS(B)	Method demonstrations	Soil fertility maintained and realized in increased yield
6	Not aware of Zinc Sulphate	Introduced Zinc sulphate 4kgs/ac	Method demonstrations	Farmers realized the importance of zinc sulphate
7	Not aware of right chemical and other integrated methods for Stem borer (Rabi) management	Introduced preventive methods and undertaken filed trials	Field testing and training programs	Growers became aware of Chemicals and other preventive measures. Many farmers started adopting the same
8	Used traditional implements which required more time and physical drudgery	Introduced Seed cum Fertilizer drill Cycle weeder and tools like manual hand Sheller chaff cutter, etc.	Exhibitions, Method Demonstrations, Field testing	Farmers became aware of improved implements and tools for cultivation and post harvest activities.
9	Incurred more cost for maize shelling through custom hiring	Introduced improved Maize Sheller from the private companies, which reduced the cost of maize shelling	Demonstrations	Farmers became aware of improved machinery and benefited by saving the shelling cost
10	Lack of knowledge on silage making and Azolla cultivation	Introduced the technologies	Demonstration and Training programmes	People realized the importance of silage making during lean periods and azolla feeding to the milch animals for increased milk production

The Cost of production of maize and its returns by transfer of technologies were calculated. It is found that the cost of production per acre is Rs. 8150 and the CB ratio was 1: 1.55 (Table 2,3 and 4).

The UAS, Bangalore conducted station and field trials to refine the production technologies and adopted the different extension approaches (demonstrations, street play, exhibition etc.) to disseminated refined technologies to the farmers. The laboratory studies were initiated by Department of Food Science and Nutrition, UAS, Bangalore, National Institute of Nutrition, Hyderabad and Agro-corn, Bangalore formulate the nutritious maize value added products such as vermicelli, noodles, papad, crunches, corn curls and cheese balls, etc. The National Institute of Nutrition, Hyderabad has conducted laboratory and field studies on the maize value added products such as roti, upma for the beneficial effects for the diabetic and obesity disorders among the human beings. The National Institute of Animal Nutrition and Physiology (NIANP), Bangalore has conducted laboratory and field studies on the utility of maize byproducts in developing complete feed blocks and total mixed ration as animals' feeds. Similarly, the Project Directorate of Poultry, Hyderabad conducted laboratory and field study to develop QPM based broiler and layer feeds protocol. AWAKE, the NGO has developed EDP capsule protocol to build the capacity of SHG women to undertake production of maize value added products by making use of Common Facility Centre at Malavalli. The Maize Growers Federation was registered with membership strength of 480 farmers of 10 villages of the project area.

RESULTS AND DISCUSSION

By fine tuning the maize production technologies and dissemination of the same to the farmers there was increase in yield 4qtl /ha (Table1).

Table 2. Fixed and variable cost per acre (N=36)

S. No.	Particulars	Total costs	Average cost
1	Depreciation	4320	120.00
2	Land revenue	504	14.00
3	Rent on owned land	24012	667.00
4	Interest on working capital	23220	645.00
5	Variable cost	241344	6704.00
6	Total cost of production	293400	8150.00

Table 3. Returns per acre

S. No.	Particulars	Total yield	Mean yield (Qtl)
1	Main yield (Qtls)	504	14.00
2	By-product yield (Qtls)	108	3.00

Table 4. Rate of returns over different cost components (Rs/ acre) n=36

S.No.	Items	Values
1	Gross returns	12700
2	Net Returns	4550
3	C:B ratio	1:1.55
4	Cost of production per quintal	582.14

Table 5. Income earned by selling the maize value added products during April- August-11

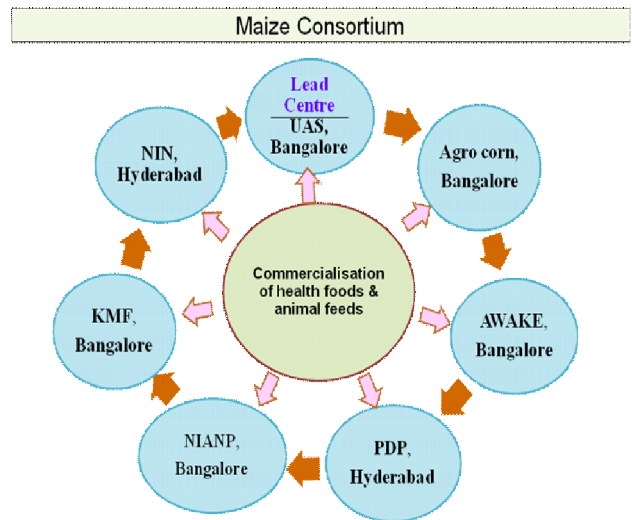
S. No	Month of usage	Name of User	Product name	Quantity produced (no. of Packs)	Rate/ pack (Rs.)	Amount earned (Rs).
1	April 2011	Srilakshmi SHG , Malavalli 2. Saraswathi SHG, Ugramanapuradoddi 3.Cauvery SHG ,Nelur	MAIZY Flour	48	13.00	624.00
			Rava	63	13.00	630.00
			Vermicelli	62	10.00	620.00
			Papad	85	10.00	740.00
			Chakuli	74	10.00	800.00
			Nippattu	80	10.00	800.00
						Total : Rs. 4264.00
2	May 2011	Srilakshmi SHG, malavalli. 2.SaraswathiSHG, Ugr. Doddi 3.Cauvery shg , Nelur	MAIZY Flour	78	13.00	1014.00
			Rava	63	13.00	630.00
			Vermicelli	50	10.00	500.00
			Papad	85	10.00	850.00
			Chakuli	85	10.00	800.00
			Nippattu	80	10.00	800.00
						Total : Rs.4644.00
3	June 2011	Srilakshmi SHG, malavalli. 2.Saraswathi SHG, Ugr. Doddi 3.Cauvery SHG, Nelur	MAIZY Flour	100	15.00	1500.00
			Rava	85	15.00	1275.00
			Vermicelli	80	10.00	800.00
			Papad	85	10.00	850.00
			Chakuli	85	10.00	850.00
			Nippattu	80	10.00	800.00
						Total: Rs.6075.00

4	July 2011	Srilakshmi SHG, malavalli. 2.Saraswathi SHG, Ugr. Doddi 3.Cauvery SHG, Nelur	MAIZY Flour	85	15.00	1275.00
			Rava	44	15.00	660.00
			Vermicelli	50	10.00	500.00
			Papad	100	10.00	1000.00
			Chakuli	65	10.00	650.00
			Nippattu	74	10.00	740.00
5	August 2011	Ms. Shobha Ms. Shalini	Maizy papad	100	10.00	Rs.1000.00
			Flour	46	13.00	Rs.598.00
					Total: Rs. 1598.00	
Grand Tota						116581.00

The SHG women entrepreneurs of this project prepared the different maize value added products during their leisure time by making use of Common Facility Centre, Malavalli project area. During the period of April-August 2011 the total amount earned by marketing the maize value added products amounts to Rs.16,581 (Table 5)

CONCLUSION

The innovative consortium model study revealed that each partner has come out with new technologies and their effective dissemination to the target groups led to adoption of new cultivar/hybrids, production technologies, value added products there by enhanced their income and nutritional security.



REFERENCES

Anonymous, (2004). Annual Progress Report, Directorate of Maize Research, New Delhi.
 Anonymous, (2010), Package of Practices, University of Agriculture Sciences, Bangalore.

