

Farmers' Perceptions on Performance and Utilization of Improved Sorghum Cultivars

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Introduction

India is the second largest producer of sorghum in the world, production being 7.8 million tons in 2001-02 (CMIE 2004). Sorghum in India is grown in the rainy season (June-October in around 4.5 million ha) and in the post-rainy season (September-January in around 5.4 million ha). In Andhra Pradesh rainy season sorghum is grown on 0.30 million ha producing 0.29 million tons of grain while the post-rainy season sorghum accounts for 0.34 million ha and 0.35 million tons of grain (GOAP 2003). Generally, resource-poor small-scale farmers with poor and marginal soil, where other crops cannot perform in the semi-arid regions of Andhra Pradesh, grow sorghum to meet household requirements of food and fodder with a small marketable surplus. During the last two decades the food demand for rainy-season sorghum grain has declined in India, while at the same time, new alternative markets for sorghum grain uses are emerging in poultry feed, livestock feed, alcohol manufacturing etc, (Kleih et al. 2000). However, owing to scattered and small-scale production farmers are unable to take advantage of the industrial demand since industries need the grain in bulk quantities with uniform quality. The existing marketing channels are not geared to meet industrial requirements of sorghum (Marsland and Parthasarathy Rao 2000).

To address the above issues a DFID-funded project on "Exploring marketing opportunities through a research, industry and users coalition:

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sorghum for poultry feed” was implemented in Andhra Pradesh. The research program followed a Coalition Approach wherein all the partners work together from conception stage till the end of the project. The coalition partners included Poultry Experimental Station, Acharya N.G. Ranga Agricultural University (ANGRAU), Hyderabad; Federation of Farmers Associations (FFA), Hyderabad; Andhra Pradesh Poultry Federation (APPF), Hyderabad; and Janaki Feeds (Poultry Feed Manufacturer), Hyderabad, and International Crops Research Institute for the Semi Arid Tropics (ICRISAT) as the Project Executing Agency. Under the project improved sorghum cultivars were supplied to farmers to enhance the productivity of rainy-season sorghum and bring down unit cost of production and secondly, create a sustainable marketing linkage between sorghum growers and poultry feed industry through innovative institutional/marketing arrangements. This paper presents the farmers’ perceptions on sorghum production and consumption, preferred traits of improved sorghum cultivars and collective (bulk) marketing of sorghum grain through Farmers’ Association.

Methodology

Study Area

Mahabubnagar and Ranga Reddy districts of Andhra Pradesh, India, where rainy season sorghum cultivation is predominant were selected for project implementation at field level. After a thorough study of district profiles, four mandals (two from each district) namely Jadcherla, Balanagar from Mahabubnagar district and Chevella and Shabad from Ranga Reddy district were selected based on area under rainy season sorghum cultivation. Four villages (one from each mandal) Gangapur, Udityal, Kandawada and Manmarry were selected for the study. Almost all the sorghum farmers in the selected villages cultivate traditional yellow sorghum variety, locally called as ‘*patcha jonna*’ intercropped with pigeonpea. Village selection was based on the response from the farmers to participate in project activities, nearness of villages to regulated market yards, existence of farmers’ clubs/associations and accessibility of villages in all seasons. The characteristics of the villages chosen for the trial were broadly on the lines suggested by Ray et al. (1989).

Selection of Farmers

In each village, meetings were held with the farmers to explain the objectives and methodology of the project being implemented and farmers' perception on production and marketing of coarse grains were discussed. Farmer participation was solicited on a voluntary basis. Efforts were also made to encourage female farmers to participate in the project. During the 2003 rainy season, 74 sorghum growers from the four villages were selected. Farmers selected to participate in these trials broadly possessed the following characteristics, as guided by Ray et al. (1989).

- ◆ They were willing to accept the innovations (such as high-yielding and moderately mold resistant sorghum cultivars).
- ◆ They were traditional sorghum farmers using normal agronomic practices.
- ◆ They were willing to be guided by research staff and to carry out operations as prescribed.
- ◆ They all agreed to cooperate without any financial incentives other than subsidized seed.

Improved Cultivars and Design of Experiment

Under the project, four improved high-yielding sorghum cultivars, CSH 16, CSV 15, PSV 16 and S 35 were supplied to the 74 farmers spread across the four villages. Each farmer was provided with sorghum seeds sufficient to plant 0.4 ha area. The participating farmers planted improved sorghum intercropped with pigeonpea (local variety) with a row arrangement of 5:1. The cultivars were grown by the farmers in different soils i.e. Black, Barka, Chalka, Red (*Barka* - light black in colour with low fertility and low moisture retention capacity, *Chalka* - red coloured with bigger pebbles and low fertility). An information leaflet printed in the local language was also supplied along with the seed bag to enable the farmers to follow the recommended production practices. The project staff monitored the crop frequently and the farmers were advised appropriately to follow recommended production practices.

Data Collection and Statistical Analysis

A survey of all the participating farmers was conducted through structured schedules, to assess perceptions of farmers on production, consumption performance of improved sorghum cultivars supplied under the project and collective marketing. At the time of data collection five farmers were not available, making the sample size sixty-nine. The investigator interviewed each of the selected respondents personally and the schedule of each respondent was filled directly with the relevant data. It was ensured that the questions in the schedule were correctly understood by the respondents by repeating the questions whenever necessary.

The data collected through interview schedule was coded, classified, tabulated and analysed. In order to make the findings meaningful, simple non-parametric statistics like frequency, percentage and ranking were used. The findings emerged out of the analysis of data were interpreted and necessary conclusions and inferences were drawn.

Findings

1. Changes in Food Use of Sorghum

There has been a continuous decline in the consumption of sorghum as food over the last two decades. This in turn led to decline in sorghum price in the market. Increase in availability of rice due to higher production and availability of subsidized rice through Public Distribution System (PDS) (77%), change in food habits (71.6%), Govt. programmes supplying rice or rice-based products under various schemes (45.9%) were the main reasons revealed by the farmers for decline in sorghum consumption for food purposes (Table 1).

2. Product Utilization and Marketing

Sample farmers did not realize good productivity of improved sorghum during rainy season 2003, primarily due to unfavourable climatic conditions (late onset of monsoon, prolonged dry spells and continuous heavy rains during ear head emergence to grain development stages). However, the yield of

Table 1. Reasons for decrease in sorghum consumption over time

| S.No | Reason(s) | Per cent to total farmers |
|------|---|---------------------------|
| 1 | Availability of more rice through expanded irrigation facilities and at subsidized prices through Public Distribution System (PDS). | 76.8 |
| 2 | Change in food habits | 71.6 |
| 3 | Sorghum roti or bhath preparation is more time consuming | 55.4 |
| 4 | Government programmes like mid-day meal to school children, Antyodaya scheme, Annapurna, Public fair price shops etc. are more oriented towards rice and rice products. | 45.9 |
| 5 | More fuel requirement to prepare sorghum roti than rice | 27.0 |
| 6 | Younger generation do not know the preparation of sorghum foods | 21.6 |
| 7 | Sometimes availability of cheaper rice than traditional sorghum in the open market | 21.6 |
| 8 | Periodic grain mold problem in sorghum | 14.9 |
| 9 | Decrease in area and production under sorghum cultivation | 9.5 |
| 10 | Decrease in the family size | 9.5 |

Table 2. District-wise sorghum utilization by sample farmers during rainy season 2003

| District | No of farmers | | Main Product-Grain (100kg) | | | | | | | By-product-Stover (100kg) | | | |
|--------------|---------------|----------|----------------------------|-------------|-------------------------|----------|-----------------------|---------------------|----------------|---------------------------|----------|------|---------------------|
| | Not marketed | Marketed | Production | Consumption | Other uses ¹ | Marketed | Quantity Marketed (%) | Price (Rs./ 100 kg) | Type of market | Production | Utilized | Sold | Price (Rs./ 100 kg) |
| Mahabubnagar | 34 | 11 | 175 | 118 | 3.5 | 38 | 22.00 | 419 | RM | 406 | 406 | - | - |
| Ranga Reddy | 35 | 8 | 60 | 42 | 4 | 14 | 23.33 | 463 | WM | 238 | 210 | 28 | 15 |

¹ The payment in kind made to the hired casual labour (for harvesting and threshing operations) RM- Regulated Market; WM - Weekly market

improved cultivars (weighted average of all four improved cultivars) was higher than local cultivars by about 348 per cent and 350 per cent, in project villages of Mahabubnagar and Ranga Reddy districts, respectively (Parthasarathy Rao et al. 2004). Although, the performance of improved cultivars was superior to local varieties, due to shortfall in over all sorghum production, sample farmers in both the districts marketed only 22-23% of sorghum retaining a lion's share to meet household consumption (Table 2). Households in both the districts utilized almost the entire stover produced to feed their animals.

3. Performance of improved sorghum cultivars

The performance of improved sorghum cultivars with respect to different traits for the 2003 *rainy season* crop as perceived by the sample farmers are presented in Table 3. The performance of improved cultivars was more appreciated by the farmers due to higher grain yield, superior quality of grain and resistance to drought. This was followed by traits related to fodder and suitability to soil etc. Thus, the apprehensions of the farmers on grain quality of improved cultivars for home consumption and fodder quality for livestock feed were cleared to a large extent.

4. Production-related problems

Farmers revealed a few production-related problems in the cultivation of sorghum and in particular with respect to improved cultivars (Table 4). Untimely rain at seed setting and grain development stage leading to grain mold attack was a major problem both in local and improved sorghum (68.1%). With respect to improved cultivars about one-third of the farmers did not follow the recommended package of practices suggested due to insufficient financial resources, long dry spells which made the farmer reluctant to use recommended inputs etc. Poor quality of soil leading to sub-optimal yields was another problem mentioned by 25 per cent of the farmers.

Collective Marketing of Sorghum Grain

One of the objectives of the project is to link the sorghum growers with

Table 3. Farmers' perception on performance of improved sorghum cultivars supplied under the project: *Rainy season 2003*

| S.No | Characteristics | Rank assigned by farmers |
|------|--|--------------------------|
| 1 | High grain yield | 1 |
| 2 | Superior grain quality (bold/ lustrous/ tasty/ color etc) | 2 |
| 3 | Grain suitability for roti/ bhath preparations | 3 |
| 4 | Drought resistant | 4 |
| 5 | High fodder yield | 5 |
| 6 | Superior fodder quality (sweeter/ palatable/ smooth/ more girth etc) | 6 |
| 7 | Fodder suitability for animal feed/ fodder intake by animals | 7 |
| 8 | Suitability to the soil | 8 |
| 9 | Resistant to pests and diseases | 9 |
| 10 | Impact on milk productivity | 10 |

Table 4. Production related problems of sorghum

| S. No | Problem(s) | No. of Farmers |
|-------|---|----------------|
| 1 | Untimely rains affected the flowering, seed setting and grain development leading to lower yields than expected. | 47 (68.1) |
| 2 | Labor shortage in the peak agricultural operations period. | 32 (46.3) |
| 3 | Did not follow the recommended package of practices suggested under the project (weeding, thinning, fertilization etc.) | 24 (34.8) |
| 4 | Grain mold attack (a periodic problem for sorghum cultivation) | 20 (29.0) |
| 5 | Soil related problems | 18 (26.1) |
| 6 | Brittleness of fodder compared to fodder from traditional varieties | 11 (15.9) |
| 7 | Threshability is lower than traditional varieties (grain attached to ear head is very tight) | 08 (11.6) |

Figures in parentheses indicate percent of farmers to total surveyed.

the poultry feed industry through innovative institutional linkages. In this context farmers were asked about the current marketing channels for sorghum and their perceptions on collective/ group marketing of surplus sorghum production. Majority of the farmers' felt that they could obtain higher prices through collective marketing and also save on marketing and transport cost (Table 5).

Table 5. Farmers' response on collective (bulk) marketing of sorghum grain

| S. No | Factors | No. of Farmers |
|-------|---|----------------|
| 1 | Better price through bargaining | 38 (55.1) |
| 2 | Collective marketing will always be better than individual marketing in terms of price bargaining, marketing costs and time | 36 (52.2) |
| 3 | Saving of marketing costs and transport charges | 31 (44.9) |
| 4 | Time saving (travel, waiting in the market yards etc.) | 27 (39.1) |
| 5 | Better than present marketing through village trader. | 21 (30.4) |
| 6 | Collective marketing will grow with more farmers joining the group leading to a better marketing channel for sorghum | 05 (07.2) |

Figures in parentheses indicate percent of farmers to total surveyed.

The project succeeded in its preliminary attempts to link groups of farmers with surplus sorghum to poultry feed manufacturers who were willing to buy bulk quantities from a few sources. Despite being very simplistic this first attempt was an important leap since it opened the doors to experiment with innovative marketing linkages distinct from the traditional channels. These innovative channels would provide marketing outlets for the producers and ensure assured supplies to the industry

Conclusion

Though not the most profitable crop, sorghum production underpins

the livelihood of poor farmers in low rainfall, drought prone marginal areas. It meets their twin objectives of food and fodder requirements for the household and livestock. During the last two decades the utilization of sorghum grain for food use has been declining due to policy-induced factors and change in consumer tastes and preferences. At the same time alternative uses for the crop (poultry feed, alcohol manufacture etc) are on the increase albeit from a low initial base.

The traditional market channels for sorghum grain are not geared to meet the bulk requirements of industries for sorghum grain. Under the project, improved sorghum cultivars were introduced to reduce per unit cost of production and an innovative method of linking sorghum producers to the end user (in this case poultry feed industry) was implemented. Farmers engaged in the project perceived that improved cultivars were higher yielding and collective marketing would increase their overall bargaining capacity.

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