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Research Paper

Economic Aspects of Sugarcane Cultivation in Nellore District of Andhra Pradesh

Agriculture

KEYWORDS : Sugarcane, Andhra Pradesh, Labour utilization, Material inputs

M. Srikala — PhD Scholar, Department of Agricultural Economics S.V.Agricultural college, Tirupati Andhra Pradesh-517502

T.V. Neelakanta Sastry — Professor and Head, Dept. Of Agrl. Economics, S.V. Agricultural College, Tirupati-517 502, Andhra Pradesh, India

ABSTRACT

The results reveled that the major economic practices were preparation of land, water management, weed control and pest and disease management. Maximum labour absorption was in harvesting (56.98 per cent) followed by irrigation (13.68 per cent) and preparation of setts (7.15) and planting (7.76 per cent) in planted crop on the pooled farms. that the tractor use was 10, 12 and 11 hours per hectare on small, large and combined farms respectively. Transportation of inputs accounted for 100 per cent of total tractor hours on all the farms. The application of chemicals to control weeds on small, large and combined farms was 1, 1.20, 1.10 litres per hectare respectively. The use of rodenticides was to the extent of 8, 10 and 9 kg per hectare on small, large and combined farms respectively.

Introduction: Sugarcane is a major commercial crop consuming more labour force for planting. In India, during 2011-12, the area under sugarcane crop was 5.09 million hectares with a total production of 347.87 million tonnes (Directorate of Economics and Statistics & Ministry of Agriculture, 2012). The sugar industry is the second largest agro industry in India, next to textiles. In Andhra Pradesh, Sugarcane is grown in 2.40 lakh hectares. It is largely grown in Vishakapatnam, West Godavari, Medak, Chittoor, Krishna, Vizayanagaram, Nizamabad, Srikakulam and Nellore Districts with 90 per cent of the area under this crop. About 167.30 lakh tonnes of sugarcane is produced in the state (2011-12) (Directorate of Economics and Statistics &Ministry of Agriculture, 2012). From this about 11, 18000 tonnes of sugar is produced. Sugarcane planting is a time consuming and labour intensive operation in sugarcane cultivation. In the traditional method in India, all the sugarcane cultivation processes are carried out by manual labour except land preparation. Sugarcane planting requires manual power and a pair of bullock or a tractor with ridger to plant sugarcane setts in one hectare on an average.

Materials and Methods

The present study was undertaken in Nellore district as it is one of the important districts of Andhra Pradesh in sugarcane cultivation. The study was based on primary data collected from randomly selected four villages namely Kovur, Gangavaram, Rebala and Buchireddypalem which stood first and second respectively under sugarcane cultivation. From the selected two mandals, a list of villages under sugarcane crop was arranged in the descending order of their acreage. The first two villages from each mandal with highest area under the selected enterprise were selected for a detailed study. The selected villages were Kovur and from Kovur mandal and and Buchireddypalem from Buchireddypalem mandal. From each of the selected villages, 20 farmers in each size group were selected at random. Thus 40 small and 40 large farmers constituted the sample of the study. The total number of sugarcane growers selected for the purpose of study was 80. The data used in the study to fulfill various objectives were collected from the selected farmers through personal interview with the help of pre-tested schedules designed for the purpose.

Results and Discussion

Costs include the expenditure on various inputs and input services employed in the production process are given below.

Human labour Utilisation

Human labour is one of the important input services influencing the cost structure. Every cultural operation requires human labour for its successful completion. The operation wise human labour utilisation in sugarcane main and ratoon crop is presented in Table.1.

Table-1: Human labour utilisation- operation wise in sugarcane cultivation (in mandays per hectare)

Sl. No.	Particulars	Main Crop			Ratoon Crop		
		Small	Large	Combined	Small	Large	Combined
1.	Land preparation	12.50 (3.62)	14.20 (3.83)	13.35 (3.73)	-	-	-
2.	Application of manures	8.04 (2.32)	9.50 (2.56)	8.77 (2.45)	5.04 (1.95)	6.00 (2.16)	5.52 (2.06)
3	Preparation of setts	24.90 (7.20)	26.33 (7.11)	25.61 (7.15)	-	-	-
4	Planting and pressing	25.64 (7.42)	29.90 (8.07)	27.77 (7.76)	-	-	-
5	Application of fertilizers	9.08 (2.63)	12.64 (3.41)	10.86 (3.03)	6.08 (2.35)	8.80 (3.17)	7.44 (2.78)
6	Weeding	11.00 (3.18)	9.20 (2.48)	10.10 (2.82)	9.00 (3.48)	8.00 (2.88)	8.50 (3.17)
7	Twisting	8.50 (2.46)	8.70 (2.35)	8.60 (2.40)	8.00 (3.09)	8.20 (2.96)	8.10 (3.02)
8	Irrigation	45.20 (13.07)	52.80 (14.25)	49.00 (13.68)	40.20 (15.53)	50.80 (18.32)	45.50 (16.97)
9	Harvesting	200.80 (58.10)	207.23 (55.93)	204.01 (56.98)	190.50 (73.60)	195.50 (70.50)	193.00 (72.00)
10	Total	345.66 (100.0)	370.50 (100.0)	358.07 (100.0)	258.82 (100.0)	277.30 (100.0)	268.06 (100.0)
11	Owned labour	120.25 (34.79)	-	60.12 (16.79)	90.25 (34.87)	-	45.12 (16.83)
12	Hired labour	225.41 (65.21)	370.50 (100.0)	297.95 (83.20)	168.57 (65.13)	277.30 (100.0)	222.94 (83.17)

Note: Figures in parentheses indicate percentages to the total.

Human Labour Utilisation in Planted Crop

The land utilised for sugarcane planting should be such that it should be easy to drain excess water whenever necessity arises. Sugarcane is planted during summer months from January to March in the study area. Therefore, there is a need for protecting the crop in its tender age by adequate irrigation. Since irrigation resources are not satisfactory in many areas, conservation of moisture in the soil to the maximum extent possible has to be arranged by bringing the soil to a fine tilth. After ploughing the soil, the fields are laid out into ridges and furrows. To accomplish this cultural operation, small and large farmers employed 12.50 and the 14.20 mandays per hectare respectively. The same was 13.35 mandays per hectare on combined farms. Application of manures and fertilizers is necessary to realize maximum yield.

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For the application of manures, 8.04 mandays were employed by small farmers while large farmers needed 9.50 mandays and the same on combined farms was 8.77 mandays per hectare. The buds on the cuttings germinate to give plants. Top setts or cuttings are taken from a crop ready for harvest and used for planting. For undertaking this operation, the human labour requirement was 24.90, 26.33 and 25.61 mandays per hectare on small, large and combined farms respectively. Cane setts were spread along the ridges and planted in the furrows after letting water into the same. After the field dries up, the setts will be pressed down into the soil and light earthling up done. For this cultural operation, small and large farmers employed 25.64 and 29.90 mandays per hectare respectively. For the application of fertilizers 9.08 mandays were employed by small farmers while large farmers needed 12.64 mandays and the same on pooled farms was 10.86 mandays. Water is the most important part of a cane plant not only compositional but also physiological. Sugarcane requires water continuously. For undertaking this operation, the human labour requirement was 45.20, 52.80 and 49.00 mandays per hectare on small, large and combined farms respectively. Underlying the importance of clear cultivation, the sugarcane growers in the area were cautious in keeping the field as clean as possible. Weeding was undertaken by the farmers to keep the sugarcane field weed free employing 10.10 mandays per hectare on combined farms .Twisting required 8.50 mandays on small farms, 8.70 mandays on large farms and 8.60 mandays per hectare on combined farms. Among cultural operations done to sugarcane, steps to keep the crop errect are prominent in certain districts of Andhra Pradesh. Operation wise labour requirement had shown that 200.80 mandays (58.10 per cent), 207.23 mandays (55.93 per cent) and 204.01 mandays per hectare (56.98 per cent) were employed for harvesting alone on small, large and pooled farms respectively. Sugarcane being the water, nutritive exhaustive and labour intensive commercial crop utilised 345.66, 370.50 and 358.07 mandays of human labour per hectare on small, large and combined farms respectively.

Human labour Utilisation in Ratoon Crop

Ratooning sugarcane is one of the important methods of reducing cost of production. When ratooning is done, cost of seed material can be eliminated and the preparatory cultivation charges will be lower than when the field is prepared for planting. Generally, one or two ratoons are kept after the harvest of the planted crop.

Human labour utilisation on ratoon crop presented in Table-1 revealed that the total labour utilisation was 258.82, 277.30 and 268.06 mandays per hectare on small, large and combined farms respectively.

It is noted that the maximum labour absorption was in harvesting (193.00 mandays) followed by irrigation (45.50 mandays) on combined farms. These two operations together accounted for 88.97 per cent of the total labour used on the combined farms. More or less the same trend persisted in both the size groups with regard to labour absorption. Further, it is observed that family labour use was 90.25 mandays per hectare on small farms. However on large farms, the total labour required was met by hiring.

The analysis of human labour utilisation in the cultivation of sugarcane planted and ratoon indicated direct relationship between labour use and the size of the farm. It is also noted that the major labour absorbing operations were harvesting, irrigation, preparing the seed setts and planting in the case of main crop and harvesting and irrigation in the case of ratoon crop as more than 85 per cent of total labour was used in these operations. It is further observed that maximum labour absorption was in harvesting (56.98 per cent) followed by irrigation (13.68 per cent) and preparation of setts (7.15) and planting (7.76 per cent) in planted crop on the pooled farms.

Bullock and machinery services

Bullocks and tractors were employed for operations like land preparation and transportation of inputs. The particulars of bullock and tractor services are presented in Table-2 and 3.

Table-2: Cattle Labour utilisation – operation wise in sugarcane cultivation (in cattle pair days per hectare)

Sl. No.	Particulars	Main Crop			Ratoon Crop		
		Small	Large	Combined	Small	Large	Combined
1.	Ploughing	3.00 (15.66)	0.61 (3.36)	1.80 (9.65)	-	-	-
2.	Inter-cultural operations	16.16 (84.34)	17.57 (96.64)	16.86 (90.35)	15.00 (100.0)	16.20 (100.0)	15.60 (100.0)
3	Total	19.16 (100.0)	18.18 (100.0)	18.67 (100.0)	15.00 (100.0)	16.20 (100.)	15.60 (100.)
4	Owned	12.16 (63.47)	-	6.08 (32.57)	9.75 (65.00)	-	4.87 (31.22)
5	Hired	7.00 (36.53)	18.18 (100.0)	12.59 (67.43)	5.25 (35.00)	16.20 (100.0)	10.73 (68.78)

Note: Figures in parentheses indicate percentages to the total.

Table: 3 Tractor power utilisation – operation wise in sugarcane cultivation (in hours per hectare)

Sl. No.	Particulars	Main Crop			Ratoon Crop		
		Small	Large	Combined	Small	Large	Combined
1.	Ploughing	21.50 (60.80)	23.75 (61.29)	22.65 (61.08)	-	-	-
2.	Transportation of inputs	13.86 (39.20)	15.00 (38.71)	14.43 (38.92)	10.00 (100.0)	12.00 (100.0)	11.00 (100.0)
3	Total	35.36 (100.0)	38.75 (100.0)	37.05 (100.0)	10.00 (100.0)	12.00 (100.0)	11.00 (100.0)
4	Owned	-	18.50 (47.74_	9.25 (25.00)	-	5.75 (47.92)	2.87 (26.10)
5	Hired	35.36 (100.0)	20.25 (52.26)	27.80 (75.00)	10.00 (100.0)	6.25 (52.08)	8.13 (73.90)

Note: Figures in parentheses indicate percentages to the total.

Bullock and machinery services in main/planted crop

It is discernable from the data furnished in Table-2 and 3 that the cattle labour used in growing one hectare of sugarcane planted was 19.16, 18.18 and 18.67 cattle pair days on small, large and combined farms respectively, Maximum cattle labour use was for inter- cultivation accounting for 84.34, 96.64 and 90.35 per cent respectively on the above said farms. The share of hired cattle labour on small and large farms was 36.53 and 100 per cent respectively.

The results presented in Table 2 and 3 revealed that the tractor use was maximum at 38.75 hours per hectare on large farms followed by 37.05 hours on pooled farms and 35.36 hours on small farms. The tractor use showed positive relationship with the size of holding indicating greater degree of mechanization on large farms. Farmers employed tractor services for ploughing (22.65 hours) and transportation of inputs (14.43 hours) accounting for 61.08 and 38.92 per cent of total tractor use on pooled farms respectively. The same trend was observed on both the size groups.

Bullock and tractor use in ratoon crop

It is evident from the Table 2 and 3 that the total bullock labour used in the cultivation of one hectare of sugarcane ratoon varied from 15.00 cattle pair days on small farms to 16.20 cattle pair days on large farms. The same on combined farms was 15.60 cattle pair days. The entire cattle labour was used for inter cultivation since there was no need of cattle labour for land preparation.

The results presented in Table 2 and 3 show that the tractor use was 10, 12 and 11 hours per hectare on small, large and combined farms respectively. Transportation of inputs accounted for 100 per cent of total tractor hours on all the farms.

Material inputs

Production of a commodity not only requires resource services viz., human labour, cattle labour, machinery services etc. but also material inputs like seeds, manures, fertilizers, plant protection chemicals etc., the details of which are presented in Table- 4.

Table- 4: Material inputs used in Sugarcane Cultivation (per hectare)

Sl. No.	Particulars	Units	Main Crop			Ratoon Crop		
			Small	Large	Combined	Small	Large	Combined
1.	Seed	Tonnes	9.64	9.91	9.77	-	-	-
2.	FYM	Tonnes	10.78	12.00	11.39	8.00	8.20	8.10
3	Fertilizers	Kgs						
	N		288.40	345.00	316.70	220.40	250.00	235.20
	P		107.02	127.80	117.41	80.00	100.00	90.01
	K		112.50	150.00	131.25	90.50	120.00	105.25
4.	Weedicides	Lts	1.16	1.54	1.35	1.00	1.20	1.10
5.	Rodenticides	Kgs	12.00	15.00	13.50	8.00	10.00	9.00

Material input Utilisation in the Cultivation of Main/planted Crop.

It is evident from Table- 4 that small, large and pooled farms used 9.64, 9.91 and 9.77 tonnes of sugarcane per hectare respectively for seed purpose. On an average, 11.39 tonnes of FYM per hectare was applied on combined farms and this varied from 10.78 tonnes on small farms to 12 tonnes on large farms. Chemical fertilizers were also applied and the breakup of the same into N, P and K resulted in 288.40 kg 107.02 kg and 112.50 kg per hectare respectively on small farms, 345 kg, 127.80 kg and 150 kg on large farms, 316.70 kg, 117.41 kg and 131.25 kg on combined farms respectively. Weedicides were used to the extent of 1.16 litres, 1.54 litres and 1.35 litres per hectare on small, large and combined farms respectively. To control rats farmers used 12kg, 15kg and 13.50kg of rodenticides on the above said categories of farms.

Material Utilisation in the Cultivation of Ratoon Crop

It is evident from Table-4 that small, large and combined forms used 8.00, 8.20 and 8.10 tonnes of FYM per hectare respectively. On an average, small farmers applied 220.40, 80 and 90.50 kg of N, P and K per hectare respectively. Large farmers used 250, 100 and 120 kg of N, P, and K per hectare respectively. The respondents as a whole applied 235.20, 90.01 and 105.25 kg of N, P and K per hectare respectively. It is also noticed from the table that application of chemicals to control weeds on small, large and combined farms was 1, 1.20, 1.10 litres per hectare respectively. The use of rodenticides was to the extent of 8, 10 and 9 kg per hectare on small, large and combined farms respectively.

Conclusion:

1. The total human labour utilised was 345.66, 370.50, 358.07 mandays per hectare in main crop on small, large and combined farms respectively. The same in the cultivation of ratoon crop was 258.82, 277.30 and 268.06 mandays per hectare on the above said categories farms. The maximum labour absorption was in harvesting (56.98 per cent) followed by irrigation (13.68 per cent), planting (7.76 per cent), preparation of setts (7.15 per cent) and land preparation (3.73 per cent) on combined farms in the case of main crop. About 72 per cent of the total labour was utilised for harvesting alone in the ratoon cultivation.
2. The cattle labour used in growing one hectare of sugarcane planted was 19.16, 18.18 and 18.67. cattle pair days on small, large and combined farms while that of tractor power use was 35.36, 38.75 and 37.05 hours respectively on the above said size groups.
3. The bullock labour used in the cultivation of one hectare of sugarcane (ratoon) varied from 15.00 cattle pair days on small farms to 16.20 cattle pair days on large farms. The tractor use on small, large and combined farms was 10, 12 and 11 hours per hectare respectively.
4. Farmers used 9.77 tonnes of sugarcane for seed, 11.39 tonnes of FYM, 316.70 kg N, 117.41 kg of P and 131.25 kg K, 1.35 litres of weedicide and 13.50 kg of rodenticides per hectare in the cultivation of sugarcane planted. To cultivate a hectare of ratoon, farmers used 8.10 tonnes of FYM, 235.20 kg of N, 90.01 kg of P and 105.25 kg of K, 1.10 litres of weedicide and 9 kg of rodenticides.

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