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Economic Analysis of Sugarcane Cultivation

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ABSTRACT

The total (cost C) for sugarcane planted crop was higher at Rs. 1, 13,117.30 on large farms compared to small farms (Rs. 1, 06,672.62) indicating positive relationship with the size of the holding. Cost A_1 (Rs. 96,017.30) and A cost B (Rs. 1, 13,117.30) were found to be higher on large farms than on small farms (Rs. 79,132.62 and Rs. 97,052.62) reflecting a direct relationship with the farm size. The cost C for ratoon crop was Rs. 76,827.50, Rs. 80,986.15 and Rs. 78,906.82 on small, large and combined farms respectively. The cost of production of a tonne of sugarcane planted and ratoon showed inverse relationship with the size of the holding as it was Rs. 1,015.92 and Rs. 777.99 on small farms and Rs. 1,005.48 and Rs. 762.21 on large farms. The net income from sugarcane planted and ratoon increased from Rs. 6,727.38 and Rs. 29,822.50 on small farms to Rs. 8,382.70 and Rs. 33,763.85 on large farms respectively. The break-even analysis indicated that the break-even output per hectare in the cultivation of sugarcane planted and ratoon was 78.12 and 39.10, 77.50 and 37.69 and 77.87 and 38.64 tonnes on small, large and pooled farms respectively.

Key words : Cost of production, Net income.

Sugarcane is one of the most important commercial crops of the India. At present it is grown in most of the Indian states. It has become a crop of great socio-economic importance in the country. Nearly 45 million growers are involved in the cultivation of sugarcane and sugarcane crop based industry provides employment to more than 3.50 lakh skilled and unskilled workers in the manufacturing of sugar, khandarsari and gur.

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. The present study was carried out to analyse the cost concepts and fam income measures in production of sugarcane.

MATERIAL AND METHODS

Based on the largest area under sugarcane, two manadals viz; Kovur and Buchireddypalem of Nellore district were selected for the study. After arranging the villages in the descending order of magnitude based on the acreage under sugarcane cultivation, two villages from each mandal were selected. The selected villages were Kovur and Gangavaram from Kovur mandal and Rebala and Buchireddypalem from Buchireddypalem manadal. From of the list of sugarcane growers of the selected villages. 20 small farmers and 20 large farmers were selected randomly from each selected village. Hence the total sample size was 80 sugarcane growers consisting of 40 small farmers and 40 large farmers. The required information was collected from the selected respondents for be the planted and ration crops using a pre-tested schedule. The collected information was analysed using the following tools.

Cost concepts

Cost concepts were and Income measures and income measures used to estimate the cost of cultivation and to derive the measures of efficiency viz., farm business income, family labour income, net income and farm investment income. The cost

concepts viz., Cost A_1, Cost A_2, Cost B and Cost C were used in the present study and they are derived as follows.

Cost A_1: This cost includes value of hired human labour, owned and hired cattle labour, owned and hired tractor services, seeds, fertilizers, farm yard manure, plant protection chemicals, depreciation, repairs, land revenue and interest on working capital.

Cost A_2: Cost A_1 + rent paid for leased in land. In the present study, all the selected farmers were owner cultivators. Hence Cost A_1 and A_2 were one and the same.

Cost B: Cost A_2 + rental value of owned land + interest on fixed capital.

Cost C: Cost B + imputed value of family labour. It gives the total cost of cultivation.

Farm income measures

Farm business income = Gross income - Cost A_1
Family labour income= Gross income - Cost B
Net Income= Gross income – Cost C
Farm investment income= (Gross income – Cost C) + (Cost B – Cost A_1)

RESULTS AND DISCUSSION

It is noticed from table 1 that the total cost (cost C) for sugarcane planted crop was higher at Rs. 1, 13,117.30 on large farms compared to small farms (Rs. 1, 06,672.62) indicating positive relationship with the size of the holding. Cost A_1 (Rs. 96,017.30) and cost B (Rs. 1, 13,117.30) were found to be higher on large farms than on small farms (Rs. 79,132.62 and Rs. 97,052.62) reflecting a direct relationship with the farm size. It is noticed that cost B and cost C were the same on large farms because there was no family labour use on large farms.

The contents of Table 1 revealed that the cost C for ratoon crop was Rs. 76,827.50, Rs. 80,986.15 and Rs. 78,906.82 on small, large and combined farms respectively. As in the case of planted crop, ratoon cultivation also exhibited direct relationship between cost C and the size of the holding. The same trend persisted in the case of cost A_1 and cost B between the two size groups.

On an average, the yield per hectare for sugarcane planted crop was 105.00, 112.50 and 108.75 tonnes on small, large and combined farms respectively. The small and large farms realized a gross income of Rs. 1,13,400.00 and Rs. 1,21,500.00 per hectare for planted crop respectively. The net income increased from Rs. 6,727.38 on small farms to Rs. 8,382.70 per hectare on large farms. The same was Rs. 7,555.04 on the combined farms. In the case of ratoon, the productivity exhibited positive relationship with the farm size. The per hectare yield increased from 98.75 tonnes on small farms to 106.25 tonnes on large farms. On an average, the sample cultivators produced 102.50 tonnes. Gross and net returns per hectare were higher on large farms (Rs. 1,14,750.00 and Rs. 33,763.85) compared to small farms (Rs. 1,06,650.00 and Rs. 29,822.50).

The unit cost of production of sugarcane planted crop was worked out as Rs.1015.92, Rs. 1005.48 and Rs. 1010.75 on small, large and combined farms respectively. For ratoon crop it was Rs. 777.99on small farms and Rs. 762.27 on large farms. The same was Rs. 769.82 on combined farms. These findings are similar to the findings of Rama Kumar (1985) and Suresh Kumar (1994).

Measures of farm income in sugarcane cultivation

Various farm efficiency measures viz., farm business income, family labour income, net income, farm investment income and returns per rupee of investment were worked out and presented in Table 1.

Planted crop

In planted crop sugarcane in grass income the net income too exhibited a direct relationship with the farm size. Large farms realized a net income of Rs. 8,382.70 as against Rs. 6,727.38 on small farms. The same was Rs. 7,555.04 on the combined farms. The trend of net income revealed that the large farms were efficient in the utilisation of resources in the production of sugarcane in planted crop.

Farm business income is a measure which indicates returns to owned resources like land, capital and labour. On this front, small farms were

Table 1. Cost concepts and Measures of farm income.

Sl. No.	Particulars	Main Crop			Ratoon Crop		
		Small	Large	Combined	Small	Large	Combined
1.	Cost A_1/A_2	79,132.62	96,017.30	87,574.96	51,687.50	63,886.15	57,786.82
2.	Cost B	97,052.62	1,13,117.30	1,05,084.96	69,607.50	80,986.15	75,296.82
3.	Cost C	1,06,672.62	1,13,117.30	1,09,894.96	76,827.50	80,986.15	78,906.82
4	Yield (tonne)	105.00	112.50	108.75	98.75	106.25	102.50
5.	Gross income	1,13,400.00	1,21,500.00	1,17,450.00	1,06,650.00	1,14,750.00	1,10,700.00
6.	Net income	6,727.38	8,382.70	7,555.04	29,822.5	33,763.85	31,793.18
7.	Cost of production (Rs./tonne)	1,015.92	1,005.48	1,010.52	777.99	762.21	769.82
8.	Farm business income	34,267.38	25,482.70	29,875.04	54,962.50	50,863.85	52,913.18
9.	Family labour income	16,347.38	8,382.70	12,365.04	37,042.50	33,763.85	35,403.18
10.	Farm investment income	24,647.38	25,482.70	25,065.04	47,742.50	50,863.85	49,303.18
11.	Returns per rupee of investment	1.06	1.07	1.06	1.39	1.41	1.40

Note: Figures in parentheses indicate percentages to the total.

distinctly superior to large farms in tapping maximum productivity out of these resources. It was Rs. 34,267.38 on small farms, Rs. 25,482.70 on large farms and Rs. 29,875.04 on combined farms in planted crop.

Family labour income is another measure of farm efficiency which represents returns to farmer's own labour and family labour. Small farms derived more family labour income amounting to Rs. 16,347.38 as against Rs. 8,382.70. The same on combined farms was Rs. 12,365.04 in planted crop.

Farm investment income is a measure which indicates the returns to fixed capital. It was Rs. 24,647.38, Rs. 25,482.70 and Rs. 25,065.04 on small, large and combined farms of planted sugarcane crop respectively.

Large farmers were able to secure a net income of Re. 0.07 per every rupee invested, while the small farmers realized Re. 0.06. The same on combined farms was Re. 0.06

Ratoon crop

It is observed from Table 1 that on an average, the selected sugarcane growers realized a total income of Rs. 1, 10,700.00 per hectare from the ratoon crop. Size wise analysis showed that gross income increased with the size of the holding. This ranged from Rs. 1, 06,650.00 on small farms to Rs. 1, 14,750.00 on large farms. On an average the net income was Rs. 31,793.18 per hectare for the sample as a whole. It was found that large farms obtained more net income (Rs. 33,763.85) than small farms (Rs. 29,822.50) and thereby indicating direct relationship with the size of the holding.

Small farms realized a farm business income of Rs. 54,962.50 followed by large farms with Rs. 50,863.85 establishing an inverse relationship with the farm size. Rs. 52,913.18 on combined farms and in ration crop..

It is evident from the table 1 that the family labour income received by small and large farms was Rs. 37,042.50 and Rs. 33,763.85 per hectare respectively exhibiting an inverse relationship with

Table 2. Break-even analysis – Sugarcane cultivation.

Sl. No.	Particulars	Main Crop			Ratoon Crop		
		Small	Large	Combined	Small	Large	Combined
1.	Total fixed costs	19,556.00	18,566.00	19,061.00	19,556.00	18,566.00	19,061.00
2.	Variable cost (Rs/tonne)	829.68	840.45	835.25	579.96	587.48	583.86
3.	Price (Rs/tonne)	1,080.00	1,080.00	1,080.00	1,080.00	1,080.00	1,080.00
4.	Break even output (tonne)	78.12	77.50	77.87	39.10	37.69	38.64
5.	Average output (tonne)	105.00	112.50	108.75	98.75	106.25	102.50
6.	Margin of safety (tonne)	26.88	35.00	30.88	59.65	68.56	63.86
7.	Percentage of BEO to Average Output	74.4	68.89	71.60	39.59	35.47	37.69

the size of the holding in ration crop . Farm investment income per hectare was of the order of Rs. 47,742.50, Rs. 50,863.85 and Rs. 49,303.18 on small, large and combined farm respectively.

The net returns per rupee of investment was Re. 0.39 on small farm and Re. 0.41 on large farm. For the sample as a whole, it was Re. 0.40.

An overview of the above analysis indicates that the gross income, net income and farm investment income showed positive relationship with the size of the holding in the case of planted and ratoon crop. The other income measures viz, farm business income and family labour income exhibited inverse relationship with the farm size indicating that small farmers realized more returns than large farmers for their fixed resources and family labour use in the farm business. It was also observed that there was no marked difference between the size groups in terms of returns per rupee of investment. However, sugarcane farmers realized higher net income per every rupee invested in ratoon compared to planted crop. Similar results were obtained by Balasubramanyam (1986), Ramesh (1988) and Suresh Kumar (1994).

Break even analysis

The break-even output in sugarcane production was worked out and presented in Table-2

The break even output on small, large and combined farms for planted crop was 78.12, 77.50 and 77.87 tonnes per hectare respectively. It is apparent at that the average yields obtained by small and large farms exceeded the minimum output to be produced. The margin of safety stood at 26.88, 35.00 and 30.88 tonnes on the above said categories of farms. The higher margin of safety on large farms over small farms to the extent of 8.12 tonnes was solely due to their managerial ability. This margin of safety confirmed the ability of farmers to cope up with any eventualities in sugarcane cultivation. The proportion of break-even output to the yield was relatively lower on large farms with 68.89 compared to small farms on which it was 74.40. The same on combined farms was 71.60 per cent.

From the above analysis it is evident that break-even output on small farms was 39.10 tonnes per hectare as against average yield of 98.75 tonnes indicating that these farms were operating in profit zone and can continue in the business. The small farms were obtaining nearly 60.47 per cent over and above the break even output and hence were in profit zone. On large farms, the break even output was 37.69 tonnes per hectare while the average yield was 106.25 tonnes per hectare. Thus, average yield was nearly 64.53 per cent over and above the break even output and indicated that these farms were also operating in the profit zone.

CONCLUSIONS:

The results of above analysis indicated that the gross income, net income and farm investment income showed positive relationship with the size of the holding in case of planted and ratoon crop. The other income measures viz, farm business income and family labour income exhibited inverse relationship with the farm size indicating that small farmers realized more returns than large farmers for their fixed resources and family labour use in the farm business. It was also observed that there

was no marked difference between the size groups in terms of returns per rupee of investment. However, sugarcane farmers realized higher net income per every rupee invested in ratoon compared to planted crop.

The small farms were obtaining nearly 60.47 per cent over and above the break even output and hence were in profit zone. On large farms, the break even output was 37.69 tonnes per hectare while the average yield was 106.25 tonnes per hectare. Thus, average yield was nearly 64.53 per cent over and above the break even output and indicated that these farms were also operating in the profit zone.

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