Performance analysis of cooperative sugar factories in north-eastern Karnataka

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Abstract
The study was attempted to measure the economic performance of cooperative sugar factories in terms of total costs and returns, capacity utilization, physical and financial indicators and ratio analysis of the factories. In this study the three cooperative sugar factories are taken into consideration and the Compound Annual Growth Rate (CAGR) for all the physical and financial indicators are worked out wherein the results suggested that a significant variation in the total cost and returns, capacity utilization and both physical and financial indicators over years within the three sugar factories was found. Further, the study revealed enough evidence about the financial ratios, which in turn showed the economic potentiality of the respective sugar factories. For the better performance of the factories an efficient planning and automation well before the start of the season is necessary and the government should come forward to help the farmers in making the cane bill payment at an early stage by the factories, by extending the financial assistance.

Keywords: CAGR, Physical and financial indicators, Performance, Ratio analysis

INTRODUCTION

Karnataka state is one among the major sugarcane and sugar-producing states in the country, as the sugarcane is being cultivated in large areas since many decades for manufacture of jaggery, *khandsari* and white sugar. It is also a major provider of livelihood to millions of agricultural families and their dependents particularly in rural areas (Nadoni *et al.* 2013). It has tremendous potential for increasing the cane cultivation and achieving higher yields, as the soil and climatic conditions are most suitable for planting the cane in different seasons (Jayaraja and Joh, 2012). It has conducive agro-climatic conditions for sugarcane cultivation resulting in increased sugarcane production year after year with the annual growth rate of 6.3 per cent which was significant at 5 per cent respectively, giving scope for establishment of more sugar units in the state. In Karnataka, sugarcane is produced to the tune of 35.73 million tonnes in an area of 0.43 million hectares. On an average, the productivity of the cane is 65 tonnes per ha. (Anonymous, 2013)

Karnataka is the second state in the country to establish a sugar factory. Mysore Sugar Company Ltd., Mandya, is the first sugar factory established in the year 1933-34 in public sector. Similarly, India Sugars and Refineries Ltd., Hospet, Bellary District in the private sector was established in 1934-35 (Sarbapriya, 2012). The Kampli Cooperative Sugar Factory Ltd., Kampli in Bellary District (now privatized and called M/S. Sundari Sugars Ltd.) in the cooperative sector was established in the year 1958-59. Over the past four decades, there is substantial rise in cane production in Karnataka. On account of this large number of sugar factories have come up (Girish , 2012). In the year 2014, 29 factories are operating in private and public sector and 20 under cooperative sector. Many sugar units in the state have also increased their installed crushing capacities. The annual crushing capacity is 250 lakh tonnes. In addition, byproducts like ethanol, co-generation

and compost making have become integral part of sugar economy (Richard, 2014).

Bidar district is one of the major sugarcane and sugar producers of Karnataka state. The district has three cooperative sugar factories. The average crushing of all these sugar factories put together is around 18 lakh tonnes for the past three years. The three major cooperative sugar factories of the district are:1). Bidar Sahakari Sakkare Karkhane, Bidar (BSSK Ltd.) Estd-1970-71,2). Naranja Sahakari Sakkare Karkhane, Bidar (NSSK Ltd.) Estd-2001-02 , 3). Mahatma Gandhi Sahakari Sakkare Karkhane, Bidar (MGSSK Ltd.) Estd-2003-04.

Keeping all the above said points in view, the present study was carried to workout the economics of sugar production and the performance of cooperative sugar factories in North-eastern Karnataka.

MATERIALS AND METHODS

In North-eastern Karnataka (NEK) region, Bidar is one of the sugarcane producing area wherein sugar factories have been established in cooperative sectors and also *khandsari* in private sector. During the year 2005 *khandsari* have been closed due to their poor performance. Hence in the present study the factories which have been established are taken to study their growth and performance of all the following three sugar factories. The secondary data were collected from the published Annual reports maintained by the Bidar

Sahakara Sakkare Karkhane (BSSK), Naranja Sahakara Sakkare Karkhane (NSSK) and Mahatma Gandhi Sahakara Sakkare Karkhane (MGSSK) Ltd.

There is a variation in the study period for different factories due to the variation in the year of establishment. For instance, BSSK though it was established in 1970-71, the data is available from 1993-94 and hence data were collected for the period of 21 years. In the other two factories data were collected since their inspection *i.e.,* NSSK from 2001-02 for the period of 13 years and MGSSK from 2003-04 for the period of 11 years respectively.

In aggregate, 24 performance indicators were identified to have close association with the functioning of the factories, of them nine indicators are related to physical aspects and they were termed as physical indicators, while the remaining 15 indicators related to the financial aspects of the factories and were termed as financial indicators.

RESULTS AND DISCUSSION

Cost and returns from sugar production: The relevant data relating to cost and returns from sugar production of all the three factories is presented in Table 1. The total cost of sugar production per quintal showed varying trend over the study period. The average cost of production per quintal of sugar in MGSSK was ` 802. Whereas, in case of NSSK and BSSK it was ` 820 and ` 671 respectively. The price of by-product of all the three sugar factories was studied. In all the three

Table 1. Cost and returns from sugar production in MGSSK, NSSK and BSSK Ltd., Bidar. (` **Per quintal**)

Years	Total costs			By-products sales			Price of sugar sales			Total returns		
	M	N	B	M	N	B	M	N	B	M	N	B
1993-94	-	-	237	-	-	21	-	-	745	-	-	672
1994-95	-	-	272	-	-	35	-	-	796	-	-	650
1995-96	-	-	306	-	-	46	-	-	800	-	-	701
1996-97	-	-	329	-	-	51	-	-	841	-	-	746
1997-98	-	-	337	-	-	66	-	-	910	-	-	800
1998-99	-	-	372	-	-	99	-	-	987	-	-	1200
1999-00	-	-	395	-	-	105	-	-	1001	-	-	940
2000-01	-	-	415	-	-	115	-	-	1051	-	-	980
2001-02	-	423	401	-	35	181	-	1246	1287	-	1282	1025
2002-03	-	488	472	-	56	242	-	1377	1160	-	1433	1214
2003-04	509	565	511	41	64	360	1052	1641	1269	1093	1705	1357
2004-05	683	683	650	51	107	450	1123	1644	1456	1435	1751	1575
2005-06	537	611	617	91	191	476	1588	1538	1587	1694	1729	1635
2006-07	471	706	661	122	352	581	2135	1236	1632	2544	1588	1941
2007-08	654	792	754	183	448	610	3654	1547	2076	3960	1995	2404
2008-09	1206	901	912	323	595	700	3105	1624	1966	3525	2219	3051
2009-10	867	832	1087	547	671	750	2757	2063	2094	2964	2734	2963
2010-11	1010	965	1147	865	837	814	1865	1976	2396	2055	2813	3021
2011-12	985	1073	1216	944	982	980	2199	2392	2548	2564	3374	3456
2012-13	1000	1201	1441	1095	1138	1051	2564	2306	2654	2985	3444	4014
2013-14	901	1418	1565	1288	1280	1190	2986	2885	2980	3155	4165	4561
Average	**802**	**820**	**671**	**505**	**520**	**425**	**2275**	**1860**	**1535**	**2543**	**2326**	**1853**
CAGR (%)	7.5[***]	9.3	9.5	25.8	26.5	22.1	8.4[**]	5.9[***]	7.3	8.2[**]	9.7	10.6[**]

Note: - Data not available, M = MGSSK, N = NSSK and B = BSSK, [***] Significant at 1% level, [**] Significant at 5% level

Table 2. Total cane crushed, duration of cane crushed and capacity utilizationin MGSSK, NSSK and BSSK Ltd., Bidar.

Years	Total cane crushed (MT)			Average duration cane crushed (Days)			Daily capacity (MT / day)			Capacity utilization (%)		
	M	N	B	M	N	B	M	N	B	M	N	B
1993-94	-	-	249343	-	-	140	-	-	3500	-	-	50.9
1994-95	-	-	442616	-	-	190	-	-	3500	-	-	66.6
1995-96	-	-	297126	-	-	150	-	-	3500	-	-	56.6
1996-97	-	-	342258	-	-	144	-	-	3500	-	-	67.9
1997-98	-	-	403244	-	-	150	-	-	3500	-	-	76.8
1998-99	-	-	450986	-	-	168	-	-	3500	-	-	76.7
1999-00	-	-	650002	-	-	198	-	-	3500	-	-	93.0
2000-01	-	-	466393	-	-	163	-	-	3500	-	-	81.8
2001-02	-	302105	415933	-	103	139	-	2500	3500	-	124.8	85.5
2002-03	-	395991	446760	-	157	161	-	2500	3500	-	100.9	79.3
2003-04	22548	270981	266347	40	93	87	2500	2500	3500	22.6	116.6	87.5
2004-05	26703	108845	224253	53	69	92	2500	2500	3500	20.2	63.1	69.6
2005-06	156296	407004	320659	120	154	143	2500	2500	3500	52.1	105.7	64.1
2006-07	393098	620042	653043	192	196	200	2500	2500	3500	81.9	126.5	93.8
2007-08	275162	505275	430546	158	180	174	2500	2500	3500	69.7	111.8	70.7
2008-09	168163	250607	197340	99	89	92	2500	2500	3500	67.9	112.2	61.3
2009-10	402220	430338	339779	166	157	126	2500	2500	3500	96.9	109.4	77.1
2010-11	440558	478429	380855	167	169	143	2500	2500	3500	105.5	113.0	76.1
2011-12	453806	498374	447494	161	157	158	2500	2500	3500	112.8	126.8	80.9
2012-13	521472	517682	414670	152	153	144	2500	2500	3500	137.2	134.7	82.3
2013-14	525685	500617	418558	164	156	154	2500	2500	3500	128.2	127.6	77.7
Average	**307792**	**408110**	**393248**	**133**	**141**	**148**	**2500**	**2500**	**3500**	**81.4**	**113.0**	**75.1**
CAGR (%)	33.3[***]	5.9[*]	0.2	11.4[***]	3.5[*]	-0.7	-	-	-	-	-	-

Note: Average recovery per cent for 100 tonnes of cane; Data not available, M = MGSSK, N=NSSK and B = BSSK; Significant at 1% level, ** Significant at 5% level, * Significant at 10% level

Table 3. Growth performance of physical indicators of cooperative sugar factories in Bidar district.

Sl. No.	Particulars	MGSSK	NSSK	BSSK
1	Grower members	11.1	-1.0[*]	3.7
2	Total members	4.9	1.2[**]	4.0
3	Sugarcane area under area of operation (Acres)	8.1	4.0[***]	7.7
4	Average yield (Tonne/ha)	1.5[**]	1.2[***]	1.3
5	Cane bill per MT (`)	12.3[*]	11.2	7.1[**]
6	Average duration of the crushing season (Days)	11.2[**]	4.8[*]	6.8
7	Sugarcane crushed (MT)	27.7[**]	5.8[*]	2.2[**]
8	Sugar bagged (Quintals)	30.1[***]	8.5[**]	6.8
9	Average sugar recovery	0.8[*]	0.7[**]	0.5[**]

***Significant at 1% level, ** Significant at 5% level, * Significant at 10% level

sugar factories the price has increased gradually. Whereas, the price of sugar also showed the increasing trend with the average of ` 2275 per quintal in MGSSK and ` 1860 and ` 1535 in NSSK and BSSK respectively. The average total returns of sugar over the study period was ` 2543 per quintal in MGSSK (10 years), whereas in NSSK (13 years) and BSSK (21 years) it was ` 2326 and `1853 respectively. The CAGR was worked out wherein, total cost (7.5%) and returns (8.2%) were significant at 1 and 5 per cent respectively. These results are in conformity with the study conducted by (Ravi, 2013) which revealed that, for the effective control of sugar industry the different cost components are very much responsible.

These factors implied that the sugarcane prices, other variable costs and fixed costs have increased both in absolute terms as well as in rela-tion to the total returns compared to other costs during the period under review.

Capacity utilization in sugar factories: The capacity utilization of MGSSK, NSSK and BSSK over the 10, 13 and 21 years respectively is presented in Table 2. Sugarcane crushed fluctuated over the years, in MGSSK, NSSK and BSSK an average of 3,07,792, 4,08,110 and 3,93,247 metric tonnes respectively. The average number of crushing days in MGSSK were 133, whereas in case of NSSK the average number of crushing days were 141 and 148 in BSSK respectively.

The capacity utilization by MGSSK showed varying trend over the study period. Average capacity utilization was 81.4 per cent over the study period with the average daily capacity of 2500 metric tonnes. In case of NSSK the average capacity utilization was 113.0 per cent with the average daily capacity of 2500 metric tonnes, and in BSSK the average

Table 4. Growth performance of financial indicators of cooperative sugar factories in Bidar district.

Particulars	MGSSK	NSSK	BSSK
Share capital	0.3[*]	2.5	4.0
Reserve fund and Surplus	7.2[*]	1.1	8.7
Owned fund	2.5	2.4	4.4
Current assets	26.9	13.5[**]	3.4
Fixed assets	7.1[***]	2.6	2.0
Total assets	14.9	6.8	2.9
Current liabilities	21.2[***]	14.6	4.3
Total borrowings	19.8	5.4	3.3
Total liabilities	18.6	7.7	3.5
Total sales	36.4	18.5	7.7
Gross income	3.9[**]	6.3[**]	-3.0[*]
Total expenses	31.2	7.5	12.5[**]
Inventory	31.5	28.0	14.4[**]
Depreciation	19.0[***]	20.9	3.5

***Significant at 1% level,   ** Significant at 5% level,
* Significant at 10% level

capacity utilization was 75.1 per cent with average daily capacity of 3500 metric tonnes over the study period. The CAGR was worked out for total cane crushed wherein the significance was observed in MGSSK (33.3%) and NSSK (5.9%) respectively.

These results are in conformity with (Ravi, 2013) and (Sarbapriya, 2012) who concluded that the capacity utilization showed the significant variation with the better farming and harvesting practices.

Growth performance of physical indicators:
The CAGR related to number of grower members, sugarcane cultivated area in the area of operation, sugarcane area under registered members, average yield, cane bill per metric tonnes, duration of the season, sugarcane crushed, sugar manufactured, sugar recovery per cent of MGSSK, NSSK and BSSK are presented in Table 3. The highest growth rate was recorded by sugar bagged (30.1%) in MGSSK which was significant at 5 per

cent level, followed by sugarcane crushed (27.7%) and grower members (11.1%). In case of NSSK the highest growth rate was recorded by cane bill per metric tonne (11.2%), followed by sugar bagged (8.5%) and average duration of the crushing season (4.8%) respectively. In BSSK the highest growth rate was recorded by sugarcane area under area of operation (7.7%) followed by cane bill per metric tonne (7.1%) and sugar bagged (6.8%) respectively. The increase in the growth of physical indicators was due to the increased sugarcane production and also recommendation of sugar rich variety against the long duration and also by providing incentives to the farmers for adopting the new varieties (Azad *et al.* 2011).

Growth performance of financial indicators:
The CAGR on share capital, reserve funds, owned funds, fixed assets, total borrowings, current liabilities, total liabilities, total sales, gross income, total expenses, net profit/loss and depreciation of all the three factories are presented in Table 4. The highest growth rate in MGSSK was recorded by total sales (36.4%) followed by inventory (31.5%), total expenses (31.2%) and total borrowings (19.8%) respectively. Whereas in case of NSSK the highest growth rate was recorded by inventory (28.0%) followed by depreciation (20.9%) and surplus (12.1%) respectively. In case of BSSK the highest growth rate was recorded by owned fund (4.4%) followed by current liabilities (4.3%), share capital (4.0%) and reserve fund and surplus (3.8%) respectively.

These results are in conformity with the findings of (Basheer, 2012), who reported that the growth of share capital of BSSK ltd was less than that of membership which implied that, the higher growth rate in share capital was due to higher contribution of individual members and the government.

Comparative statement of financial ratios: Table 5 provides the information regarding the aver-

Table 5. Comparative statement of financial ratios of cooperative sugar factories in Bidar district.

Particulars	Ratios	Average ratios		
		MGSSK	NSSK	BSSK
Tests of liquidity ratios	Current ratio	1.58	1.99	2.90
	Acid test ratio	0.64	1.07	0.70
	Inventory ratio	2.06	1.08	1.16
Tests of solvency ratios	Total liabilities to owned funds ratio	4.50	4.90	2.71
	Fixed assets to owned funds ratio	2.65	3.14	1.06
	Debt equity ratio	2.19	3.60	2.85
Tests of turnover ratios	Inventory turnover ratio	1.81	2.38	1.20
	Total assets turnover ratio	0.52	0.44	0.55
	Working capital turnover ratio	3.60	2.18	1.38
Tests of financial strength	Networth (` in Lakhs)	1719	2203	708
	Net capital ratio	1.21	1.18	1.09
	Equity capital ratio	0.60	0.87	0.34
	Fixed assets to total assets ratio	0.55	0.56	0.36
Fixed assets ratios	Fixed assets to net worth ratio	3.77	4.26	5.70
	Fixed assets to total sales ratio	1.64	1.70	0.70
Tests of efficiency and profitability	Efficiency of capital ratio	0.90	0.53	0.46
	Gross ratio	1.26	2.20	1.62

age financial ratios of MGSSK, NSSK and BSSK whereas in case of tests of liquidity ratios *i.e.,* the current ratio was highest in BSSK, followed by acid test ratio in NSSK and inventory ratio in MGSSK, respectively. In case of tests of solvency all the three ratios were highest in NSSK the main reason behind this was reflection of financial strength of an organization to meet its medium and long term obligations, the margin of safety offered to the creditors and the potential earnings from the use of borrowed funds was perfectly recorded. Similarly in case of test of turnover, inventory turnover ratio was highest in NSSK, total assets turnover was recorded highest in NSSK and working capital ratio was highest in MGSSK respectively. In case of tests of efficiency and profitability, efficiency of capital ratio was recorded highest in MGSSK and gross ratio was highest in NSSK respectively. The higher ratio is associated with problem of liquidation, because the claims of the owners have to be met by sale of fixed assets, which are in non liquid form. A higher the efficiency of capital ratio indicated efficient utilization of capital (Page *et al.* 2000).

Conclusion

The performance of all the three sugar factories varied significantly due to difference in ownership, size and location of the factories. In order to utilize its capacity fully and run efficiently, the sugar factories within the industry should get uninterrupted supply of raw sugarcane uniformly throughout the seasons. There is a need of coordinated and concerted effort for appreciation and consolidation of the needs of the consumer, farmer and processor. There is an urgent need to improve in productivity both in terms of yield as well as sugar contents and recovery by adopting better harvesting practices and close coordination of sugar mills with farmers. It has been estimated that better farming and harvesting practices could result up to 1.0 per

cent improvement in extraction which can lead to 10 per cent increase in production. Therefore, mills and farmers should work together to improve yield and extraction through better harvesting in order to become internationally competitive *i.e.,* cost effective and quality producer.

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