

Economics of Sugar Production of Cooperative Sugar factories in North Eastern Karnataka

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ABSTRACT

Economics of sugar production was measured by considering the three cooperative sugar factories using different parameters like costs and returns from sugar production, sugar sales and revenue, by-products sales and revenue in Bidar district of North-Eastern Karnataka (NEK) region. Thus, the calculated sugar sales, revenue accrued and price of sugar revealed that, the average total sugar sales under both open and levy quota was 3722 metric tonnes, while average revenue of sugar sales under levy quota was ₹ 163 lakh, but the average price of sugar was ₹ 2275 per quintal over the study period. In order to reduce the losses in the factory, an effort towards the integration and coordination of various sections of the factory must be converged so that the factories can run on a profit basis.

Keywords: Economics, cooperative, production, sugarcane, North-Eastern Karnataka

In the early stages of economic development, agro-based industries occupied a prominent position in the industrial sector. As the real national income increases, the relative share in the value added from all manufacturing industries declines (Devaraja, 2011). This should not be considered as declining opportunities for development of these industries. This is because acceleration growth and in per capita income and its more equitable distribution beyond threshold will respectively relax the constraints of availability of primary agricultural commodities as raw materials and demand for product of these industries. This would in turn facilitate the absolute size of their output and value added in real terms to grow over a time (Abdul Kalam, 2010)

In India, sugarcane was grown over an area of 3.82 million hectares with a production of 280.49 million tonnes during 1994-95 and it is increased to 5.37 million hectares with the increased production of 350 million tonnes in 2013-14. Uttar Pradesh ranked first in terms of area under sugarcane with 1.98 million hectares (47.01%) with the production

of 93.10 million tonnes (37.05%), followed by Maharashtra, Tamil Nadu, Karnataka and Andhra Pradesh constitute about 16.01 million hectares with production of 126.30 million tonnes during 2013-14. (www.indiastat.com).

In Karnataka state, sugarcane was grown on 0.34 million hectares with a production of 33.09 million tonnes during 1994-95 increased to 0.43 million hectares with production of 35.73 million tonnes in 2013-14. The major producing districts are Belgaum, Bidar, Bagalkot and Mandya constitute 59.34 and 74.14 per cent of the total area and production, respectively.

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 (Richard, 2014). 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

Considering the preceding discussion as a backdrop, the present study analyzes the economics of all the three cooperative sugar factories BSSK, NSSK and MGSSK, Bidar district of Karnataka. The purpose of the study is to examine the economics of sugar production of cooperative sugar factories in north eastern Karnataka.

Data and Methodology

The research was conducted in Bidar district of North-Eastern Karnataka (NEK) region. In 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. But in the recent year's *khandsari* have been closed due to their poor performance. Hence, in the present study the economic analysis of basic information of the sugar factory, relating to procurement and processing of cane in sugar factory is taken up.

Analytical tools

The analysis was carried out with tabular analysis and growth rate analysis.

Tabular analysis

The technique of tabular presentation was used to estimate the costs and returns from sugar production, sugar sales and revenue, by-products sales and revenue etc. The percentages and averages were computed and compared to obtain meaningful results.

Compound growth rate analysis

The exponential function of the following type was employed to estimate the growth rates.

$$Y = ab^t \quad \dots(1)$$

Where,

Y = indicator

a = constant

b = regression coefficient (rate of change of Y per unit of time)

t = years (time)

Annual average compound growth rate in percentage was calculated as follows:

$$r = (b-1)*100 \quad \dots(2)$$

The above said function was employed to estimate the compound growth rates of physical and financial indicators of the BSSK, NSSK and MGSSK cooperative sugar factories as a whole.

RESULTS AND DISCUSSION

Cost and returns from sugar production in MGSSK, NSSK and BSSK Ltd., Bidar

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 total cost of production in MGSSK was ₹ 509 per quintal in 2003-04 and ₹ 901 per quintal in 2013-14, the highest cost was seen as ₹ 1000 in 2012-13. The average cost of production per quintal of sugar was ₹ 802. Whereas, in case of NSSK the total cost was ₹ 423 in 2001-02 and the highest cost was ₹ 1418 in 2013-14 with the average cost of ₹ 820. In case of BSSK the total cost was ₹ 237 per quintal in 1993-94 and it increased gradually, with the maximum cost of ₹ 1565 per quintal in 2013-14.

The price of by-product of all the three sugar factories was studied. In MGSSK the price has increased gradually from ₹ 41 per quintal in 2003-04 to ₹ 1288 in 2013-14. The average price of by-product sales was ₹ 505 per quintal. Whereas in case of NSSK the price was ₹ 35 in 2001-02 increased to ₹ 1280 in 2013-14 and the average price realised was ₹ 520 per quintal.

The price of sugar in MGSSK was ₹ 1052 per quintal in 2003-04 and it increased to ₹ 2986 during 2013-14. The average price of sugar was ₹ 2275. In NSSK the price of sugar was ₹ 1246 in 2001-02 and ₹ 2885 in 2013-14 with average price of ₹ 1860. Whereas in case of BSSK the price was seen as ₹ 745 in 1993-94 and ₹ 2980 in 2013-14 with average of ₹ 1535 per quintal over the study period.

The total returns in case of MGSSK increased from ₹ 1093 per quintal in 2003-04 to ₹ 3155 in 2013-14. The average returns of sugar over the study period was ₹ 2543 per quintal. In case of NSSK the total returns increased from ₹ 1282 per quintal in

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; **Source:** Sales department, Co-operative sugar factories, Bidar; ***Significant at 1% level, **Significant at 5% level

2001-02 to ₹ 4165 in 2013-14. The average returns of sugar was ₹ 2326. Whereas, in BSSK the total return increased from ₹ 672 per quintal in 2003-04 to ₹ 4561 in 2013-14. The average returns of sugar over the study period was ₹ 1853 per quintal. The CAGR was worked out wherein, total cost (7.5%) and returns (8.2%) were significant at 1 and 5 per cent respectively. Similarly the price of sugar sales was significant at 1 and 5 per cent, in NSSK (5.9%) and MGSSK (8.4%) respectively.

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

Sugar sales and revenue in MGSSK Ltd., Bidar

Sugar sales, revenue accrued and price of sugar is presented Table 2 and those showed a varying trend over the study period. Sugar sale under open

market increased gradually from 1328 metric tonnes in 2003-04 to 5145 metric tonnes in 2013-14. The average sale under open market was 3423 metric tonnes over the study period. Sugar sale under levy quota was nil up to 2006-07 and it did not show a definite trend. It was 717 metric tonnes in 2007-08, and it increased to 652 metric tonnes in 2008-09 and further decreased to 300 metric tonnes in 2009-10, and showed an increasing trend to 569 metric tonnes during 2012-13. An average sale under levy quota was 299 metric tonnes over the study period.

The total sugar sale which includes both open and levy showed the increasing trend over the study period. It increased from 1328 metric tonnes in 2003-04 to 5617 metric tonnes in 2013-14. The average total sugar sales under both open and levy quota was 3722 metric tonnes. The revenue of sugar sale under open market showed increasing trend. It was ₹ 1139 lakhs in 2003-04, increased to ₹ 13726 lakhs in 2013-14. The average revenue from open market sales was ₹ 6859 lakhs over the period.

Table 2: Sugar sales and revenue of MGSSK Ltd., Bidar

Years	Sales				Total sugar sales (MT)	Value of open sales (₹ in lakh)	Value of levy sales (₹ in lakh)
	Open (MT)	Levy (MT)	Percentage of open sales	Percentage of levy sales			
2003-04	1328	0	100.0	0.0	1328	1139	0
2004-05	1592	0	100.0	0.0	1592	2100	0
2005-06	4762	0	100.0	0.0	4762	4835	0
2006-07	2629	0	100.0	0.0	2629	4064	0
2007-08	2843	717	79.9	20.1	3560	3605	296
2008-09	3147	652	82.8	17.2	3799	4805	315
2009-10	2267	300	88.3	11.7	2567	6277	141
2010-11	4455	115	97.5	02.5	4570	11868	200
2011-12	4517	461	90.7	09.3	4978	11874	250
2012-13	4974	569	89.7	10.3	5543	11156	300
2013-14	5145	471	91.6	08.4	5617	13726	287
Average	3423	299	92.8	07.2	3722	6859	163
CAGR (%)	11.5***	4.9	—	—	12.6**	14.9	5.9

Source: Annual reports, MGSSK Ltd., Bidar; ***Significant at 1% level, ** Significant at 5% level

The revenue from sale of sugar under levy quota showed varying trend over the study period. It increased from ₹ 296 lakhs in 2007-08, and decreased to ₹ 141 lakhs in 2009-10 and again it increased to ₹ 300 lakhs during 2012-13. Average revenue of sugar sales under levy quota was ₹ 163 lakhs, over the study period. The CAGR was worked out wherein, open sales (11.5%) and total sugar (12.6%) was significant at 1 and 5 per cent respectively.

Sugar sales and revenue in NSSK Ltd., Bidar

Sugar sales, revenue accrued and price of sugar is presented Table 3 and those showed a varying trend over the study period. Sugar sale under open market increased gradually from 11542 metric tonnes in 2001-02 to 48446 metric tonnes in 2013-14. An average sale under open market was 30772 metric tonnes over the study period. Sugar sale under levy quota was nil up to 2002-03 and it did not show a definite trend. It was 485 metric tonnes in 2003-04 and further decreased to 304 metric tonnes in 2004-05, then it showed an increasing trend to 2129 metric tonnes during 2013-14. An average sale under levy quota was 2458 metric tonne over the study period.

The total sugar sale which includes both open and levy showed the increasing trend over the study period. It increased from 11542 metric tonnes in 2001-02 to 50575 metric tonnes in 2013-14. The

average total sugar sales under both open and levy quota was 33229 metric tonnes. The revenue of sugar sale under open market showed increasing trend. It was ₹ 1124 lakhs in 2001-02 increased to ₹ 12858 lakhs in 2013-14. The average revenue from open market sales was ₹ 6797 lakhs over the period. The revenue from sale of sugar under levy quota showed varying trend over the study period. It was ₹ 59 lakhs in 2003-04 and it decreased to ₹ 31 lakhs in 2004-05 and it again showed the increasing trend to ₹ 1295 lakhs during 2011-12. Average revenue of sugar sales under levy quota was ₹ 404 lakhs, over the study period. The CAGR was worked out wherein, open sales (12.2%) and total sugar sales (13.2%) were significant at 1 per cent and levy sales was significant at 5 per cent respectively.

Sugar sales and revenue in BSSK Ltd., Bidar

Sugar sales, revenue accrued and price of sugar is presented Table 4. Sugar sale under open market increased gradually from 4360 metric tonnes in 1993-94 to 21896 metric tonnes in 2013-14. An average sale under open market was 14608 metric tonnes over the study period. Sugar sale under levy quota was 4996 metric tonnes in 1993-94, and it increased to 9056 metric tonnes in 2000-01 and further decreased to 1075 metric tonnes in 2002-03, it again showed an increasing trend to 2153 metric tonnes during 2011-12. An average sale under levy

Table 3: Sugar sales and revenue of NSSK Ltd., Bidar

Years	Sales				Total sugar sales (MT)	Value of open sales (₹ in lakh)	Value of levy sales (₹ in lakh)
	Open (MT)	Levy (MT)	Percentage of open sales	Percentage of levy sales			
2001-02	11542	0	100.0	00.0	11542	1124	0
2002-03	15077	0	100.0	00.0	15077	1474	0
2003-04	19981	485	97.6	02.4	20466	5346	59
2004-05	14301	304	97.9	02.1	14605	2041	31
2005-06	12660	517	96.1	03.9	13177	2179	97
2006-07	34383	4853	87.6	12.4	39236	6519	527
2007-08	59263	1601	97.4	02.6	60864	10707	207
2008-09	35998	3166	91.9	08.1	39164	6550	409
2009-10	29474	5399	84.5	15.5	34872	7767	955
2010-11	40661	3661	91.7	08.3	44322	10316	533
2011-12	37740	5383	87.5	12.5	43122	9777	1295
2012-13	40507	4455	90.1	09.9	44962	11697	819
2013-14	48446	2129	95.8	04.2	50575	12858	227
Average	30772	2458	93.7	06.3	33229	6797	404
CAGR (%)	12.2***	24.2**	—	—	13.2***	21.7	28.2**

Source: Annual reports, NSSK Ltd., Bidar; ***Significant at 1% level, ** Significant at 5% level

Table 4: Sugar sales and revenue in BSSK Ltd., Bidar

Years	Sales				Total sugar sales (MT)	Value of open sales (₹ in lakh)	Value of levy sales (₹ in lakh)
	Open (MT)	Levy (MT)	Percentage of open sales	Percentage of levy sales			
1993-94	4360	4996	46.6	53.4	9356	1043	902
1994-95	7014	4140	62.9	37.1	11154	1640	896
1995-96	8819	5503	61.6	38.4	14322	1959	930
1996-97	7382	5274	58.3	41.7	12656	1754	936
1997-98	10241	7923	56.4	43.6	18165	2768	1099
1998-99	11440	8707	56.8	43.2	20147	3101	1059
1999-00	12263	8896	58.0	42.0	21159	3209	1152
2000-01	15714	9056	63.4	36.6	24771	4186	1457
2001-02	17513	2133	89.1	10.9	19646	4623	715
2002-03	15349	1075	93.5	06.5	16424	5561	198
2003-04	18547	1166	94.1	05.9	19713	8061	112
2004-05	15366	1544	90.9	09.1	16910	6628	390
2005-06	18371	1652	91.8	08.2	20023	7929	436
2006-07	21389	2199	90.7	09.3	23588	8416	559
2007-08	18556	1031	94.7	05.3	19586	7393	193
2008-09	18956	1267	93.7	06.3	20223	8868	374
2009-10	13797	1965	87.5	12.5	15762	7605	733
2010-11	13455	2267	85.6	14.4	15721	7004	785
2011-12	18422	2153	89.5	10.5	20575	10069	785
2012-13	17913	1962	90.1	09.9	19875	9638	630
2013-14	21896	1573	93.3	06.7	23469	13267	417
Average	14608	3642	78.5	21.5	18250	5939	703
CAGR (%)	5.5	-7.8***	—	—	2.3***	11.2	-4.0**

Source: Annual reports, BSSK Ltd., Bidar; ***Significant at 1% level, ** Significant at 5% level

quota was 3642 metric tonnes over the study period. The total sugar sale which includes both open and levy showed the increasing trend over the study period. It increased from 9356 metric tonnes in 1993-94 to 23469 metric tonnes in 2013-14. The average total sugar sales under both open and levy quota was 18250 metric tonnes. The revenue of sugar sale under open market showed increasing trend. It was ₹ 1043 lakhs in 1993-94, increased to ₹ 13267 lakhs in 2013-14. The average revenue from open market sales was ₹ 5939 lakhs over the period.

The revenue from sale of sugar under levy quota showed varying trend over the study period. It is increased from ₹ 901 lakhs in 1993-94 and further decreased to ₹ 715 and ₹ 112 lakhs in 2001-02 and 2003-04 respectively, and it showed an increasing trend from 2004-05 with ₹ 390. Average revenue of sugar sales under levy quota was ₹ 703 lakhs over the study period. The CAGR was worked out wherein, levy sales (7.8%) and value of levy sales (4.0%) was negatively significant at 1 and 5 per cent respectively.

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 and the government should ensure the supply of raw inputs. There is a need of

coordinated and concerted effort for appreciation and consolidation of the needs of the consumer, farmer, processor and to address to various above issues if India has to attain the glory of self-sufficiency and attain the status of net exporter and an important significant player in the international market.

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 to 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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