

Factors responsible for the performance of cooperative sugar factories in North-Eastern Karnataka

Yasmeen*, Suresh S. Patil and N. Vijaykumar

Department of Agricultural Economics, College of Agriculture, Raichur. UAS, Raichur, India

ABSTRACT

This paper attempts to measure the factors responsible for the performance of cooperative sugar factories. In this study the three cooperative sugar factories are taken into consideration. It has been observed that in the study area, factors for becoming the member of sugar factories, are recovery percentage, remunerative price and correct weight. The study has provided enough evidence about the financial ratios which has shown the economic potentiality of the respective sugar factories. To improve cane procurement by sugar factories according to their fixed targets, the factory has to plan the programmes well before the start of the season, so that the installed capacity utilisation can be met. The government should come forward to help the farmers in making the cane bill payment at an early stage by the factories, by extending financial assistance, so that farmers can go for the purchase of inputs well in advance for sugarcane cultivation.

Keywords: Performance, sugar factories, factors, sugarcane

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 of the value added from all manufacturing sector declines. This should not be considered as declining

opportunities for development of these sectors. 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 the product of these industries. This would, in turn, facilitate the absolute size of their output and value added in real terms to grow over time. Moreover, changes in the processing of the primary agricultural commodities by addition of further stages of processing and induction of new technology outside the household sector also occur. There also, in long run, usually arise

Access this article online	
Publisher	Website: http://www.ndpublisher.in
	DOI: 10.5958/0976-4666.2016.00030.9

Address for correspondence

Yasmeen: Department of Agricultural Economics, College of Agriculture, Raichur. UAS, Raichur, India

E-mail: itsmeyas786@gmail.com

different utilization patterns of byproducts and waste products (downstream products) of these commodities. Hence, agro-processing industries assume greater importance in our country.

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 increased to 5.37 million hectares with the increased production of 350 million tonnes in 2013-14. Uttar Pradesh ranked first regarding area under sugarcane with 1.98 million hectares (47.01%) with the production of 93.10 million tonnes (37.05%). The area under the sugarcane in Maharashtra, Tamil Nadu, Karnataka and Andhra Pradesh constitute about 16.01 million hectares with a 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 a 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% of the total area and production, respectively.

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 the public sector. Similarly, India Sugars and Refineries Ltd., Hospet, Bellary District in the private sector was established in 1934-35. The Kampli Co-operative 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 a substantial rise in cane production in Karnataka. On account of this large number of sugar, factories have come up. 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. Also, byproducts like ethanol, co-generation, and compost making have become an 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

Considering the preceding discussion as a backdrop, the present study analyzes the performance of BSSK, NSSK and MGSSK, Bidar district of Karnataka. The purpose of the study is to identify different factors influencing both internal and external to this industry to (or “intending to”) improving their performance and contributions to rural-led economic development.

DATA AND METHODOLOGY

The study 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 the private sector. But in the recent years, *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 the following three sugar factories. The secondary data were collected from the published Annual Reports maintained by the BSSK, NSSK and MGSSK Ltd., and primary data were collected from 60 randomly selected farmers and 60 randomly selected board of directors (BOD) and an official from the three factories.

Analytical Tools

The analysis was carried out with Tabular analysis and Friedman two-way analysis of variance.

Friedman two-way analysis of variance

In the study, factors were identified for the performance of the sugar factory through the non-parametric tests namely Friedman two-way analysis and Chi-square for the goodness of fit.

In the present study we have taken three sugar factories as column features, *i.e.*, MGSSK, NSSK and BSSK. Sixty factors were identified for the performance of sugar factory out of which the ranks were allotted based on the personal interview with Board of Directors of the respective sugar factories and twenty-three factors were identified as the best which are responsible for the performance of the respective departments in turn the performance of the sugar factories. The Chi-square test has been run to see the significance of these factors.

Sl. No.	Factors
1.	Employees engaged in offseason
2.	Promotion of employees
3.	Efficient work & relationship
4.	Supply of short duration varieties
5.	Consumption of power produced by own
6.	Technical advice
7.	Purchase of cane other than factory area
8.	Timely purchase
9.	Provision of go down
10.	Sufficient space for storage of sugar
11.	Maintenance of go down
12.	Borrowing of capital from financial institutions
13.	Incentive to the employees
14.	Lending adequate credit to the farmers
15.	Good recovery percentage
16.	Capacity utilization
17.	Training for shareholders
18.	Installation of weights and measurements
19.	Sale of byproducts
20.	Export of power to KPTCL
21.	No objection certificate from the Government
22.	Licensing of all equipment
23.	Proper disposal of industry waste

These factors have been identified from eight departments of the each factory, those are Administrative department, Production department, Purchase Department, Stores department, Finance department, Cane department, Sales department and Environment department which

were taken as the absolute deviation of three factories from the observed or ground truth value, and then the ranks were allotted for deviated value of twenty-three factors within the three sugar factories.

Test of significance can be performed to determine whether classifiers are differing significantly using chi-square test.

$$H_0 : M_1 = M_2 = M_3$$

$$H_1 : M_1 \neq M_2 \neq M_3$$

Test statistic,

$$x_r^2 = \frac{12}{Nk(k+1)} \sum_{j=1}^k (R_j)^2 - 3N(k+1)$$

Where,

N = number of rows

K = number of columns

R_j = sum of ranks in jth column

Where, is distributed approximately as chi square with (k-1) df.

Decision: If observed value of > table with (k-1) df, the null hypothesis is rejected at 0.05 or 0.01 level of significance.

Further, based on the magnitude of ranks we can compare the particular classifier with the ground truth, *i.e.*, higher the magnitude, the classifier is nearer to the ground truth.

RESULTS AND DISCUSSION

Socio-economic characteristics of sample farmers

The study has adopted the essential features of the sample farmers which are responsible for the performance of the sugar factory. It could be seen from the Table 1. that the maximum percentage of sugarcane growers of all the three factories who were interviewed out of which 81.7% were male followed by 18.3% of females. Gender was nonsignificant with Chi-square 0.891. On an average the maximum number of sugarcane growers were between the age group of 45-59 (36.7%) followed by <45 (33.3%) and >59 (30.0%) with non-significant Chi-square 2.570.

The farm size of the respondents was identified and indicated that maximum percentage of farmers had the land holding between <8.5 acres (38.3%). It showed nonsignificant with 0.765 Chi-square. The annual income of the sugarcane growers revealed that 40.0% of the farmers had an income of < ₹55,000 followed by ₹55,000-

90,000 (35.0%) and >₹90,000 (25.0%) respectively. It showed nonsignificant with 2.257 Chi-square value. The total number of household size of sugarcane growers in the study area which included male, female and children was identified as 36.7% of medium, followed by 33.3% of large and 30.0% of small household respectively.

Table 1: Socio-economic characteristics of sample farmers

Sugar factories	MGSSK (n=20)		NSSK (n=20)		BSSK (n=20)		OVERALL (n=60)		χ ² value
Characteristics	No.	%	No.	%	No.	%	No.	%	
Gender									
Male	17	85.0	15	75.0	17	85.0	49	81.7	0.891 ^{NS} (P = 0.641)
Female	3	15.0	5	25.0	3	15.0	11	18.3	
Age (Years)									
< 45	8	40.0	4	20.0	8	40.0	20	33.3	2.570 ^{NS} (P = 0.632)
45-59	7	35.0	9	45.0	6	30.0	22	36.7	
> 59	5	25.0	7	35.0	6	30.0	18	30.0	
Education (No.)									
Primary	3	15.0	7	35.0	7	35.0	17	28.4	4.911 ^{NS} (P = 0.767)
Secondary	4	20.0	4	20.0	6	30.0	14	23.3	
High School	4	20.0	3	15.0	3	15.0	10	16.7	
PUC	7	35.0	4	20.0	3	15.0	14	23.3	
Graduation	2	10.0	2	10.0	1	5.0	5	8.3	
Farm size (Acres)									
< 8.5	7	35.0	9	45.0	7	35.0	23	38.3	0.765 ^{NS} (P = 0.939)
8.5-13	7	35.0	7	35.0	8	40.0	22	36.7	
> 13	6	30.0	4	20.0	5	25.0	15	25.0	
Income (₹/Annum)									
< 55,000	6	30.0	10	50.0	8	40.0	24	40.0	2.257 ^{NS} (P = 0.689)
55,000-90,000	8	40.0	5	25.0	8	40.0	21	35.0	
> 90,000	6	30.0	5	25.0	4	20.0	15	25.0	
Household Size (No.)									
Small (<5)	5	25.0	7	35.0	6	30.0	18	30.0	0.797 ^{NS} (P = 0.939)
Medium (5-9)	8	40.0	6	30.0	8	40.0	22	36.7	
Large (>9)	7	35.0	7	35.0	6	30.0	20	33.3	

NS: Nonsignificant

Farmer’s perception in determining the performance of sugar factories

The information regarding the performance and reasons for becoming the member of the sugar mill. It was seen that percentage of recovery was the main factor (50.0%) behind the satisfaction of members regarding the performance of sugar factories (Singh, 2014), followed by adequate transportation facilities (30.0%) and timely procurement of cane (20.0%). The member satisfaction regarding the performance of sugar factory showed the significant value at 5% level of significance. It was identified that correct weight was the main reason (51.7%) for becoming the member of the sugar factories, followed by remunerative price (31.7%) and technical assistance for better production (16.6%). The reasons

for becoming the members of sugar factory showed the significant value at 5% level of significance.

Factors responsible for performance of sugar factories

In the present study, we have taken three sugar factories as column features and twenty-three factors from eight departments of the sugar factory as row features. The absolute deviation of three companies, factors from the observed or ground truth value, and then given ranks for deviated value within the each class. Friedman two-way analysis of variance was run which is presented in Table 3. for finding the factors responsible for the sugar factories, which showed the significant value at 5% level of significance.

Table 2: Farmers perception in determining the performance of sugar factories

Sugar factories	MGSSK (n=20)		NSSK (n=20)		BSSK (n=20)		OVERALL (n=60)		x ¹ value
	No.	%	No.	%	No.	%	No.	%	
Members satisfaction									
Timely procurement of cane	6	30.0	4	20.0	2	10.0	12	20.0	12.53* (P = 0.014)
Adequate transportation facilities	10	50.0	5	25.0	3	15.0	18	30.0	
Percentage of Recovery	4	20.0	11	55.0	15	75.0	30	50.0	
Reason for becoming member									
Remunerative price	4	20.0	4	20.0	11	55.0	19	31.7	11.21* (P = 0.024)
Correct weighment	10	50.0	12	60.0	9	45.0	31	51.7	
Technical assistance for better production	6	30.0	4	20.0	0	00.0	10	16.6	

Note: * significant at 5% level of significance, (0.05, 42df) = 9.4

Table 3: Test of significance of Friedman two way analysis of variance

Total Ranks of Sugar factories	Total ranks (R _j)	x ² _r
Ranks of MGSSK	40.0	
Ranks of NSSK	57.5	8.63*
Ranks of BSSK	40.5	

Note: * Significant at 5% level of significance,

$$x^2(0.05, 2df) = 5.991$$

R_j = Total ranks given based on the magnitude

CONCLUSION

The study has highlighted the economics of sugar production, performance of sugar factories and factors responsible for the performance of sugar factories. 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 productivity both regarding 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% improvement in extraction which can lead to 10% increase in production. Therefore, mills and farmers to work together to improve yield and extraction through better harvesting to become internationally competitive, *i.e.*, cost effective and quality producer.

REFERENCES

Abdul Kalam, A. P. J., 2009, The Mission vibrant sugar industry. *Indian Sugar Journal*, 4(2): 1-5.

Devaraja, T. S., 2011, Financial performance of agro-based industries: The case of the sugar industry in Karnataka. *Indian Journal of Economics and Development*, 13(2): 194-206.

FAO, 2010-11, Improving plant nutrient management for better farmer livelihoods, food security and environmental sustainability. Ministry of Finance, *Economic Survey 2010-11.*

Jadhav, M. S., 1989, Economic efficiency of co-operative sugar industry in Maharashtra. *Indian Journal of Agricultural Economics*, 4(2): 343-344.

Jared, G., Clement, E. W. and Rodney, 2006, Factors responsible for success of new generation co-operatives (NGCs). Research report: *Department of Agricultural Economics. University of Manitoba*. 412-420.

Ravi Ambi, 2011, Business performance of the Ugar Sugar Works Ltd, Athani. *Agri. Business. Management. Thesis*, University of Agricultural Sciences, Bengaluru.

Sachin Kumar, T. N., Arun Kumar, Y. S. and Basavaraja, H., 2012, Economics of jaggery production in Karnataka. *Indian Journal of Agricultural Marketing*, 26(2): 139-145.

Sarbapriya Ray, 2012, Reviewing performance of Indian sugar industry: an economic analysis. *Food Science and Quality Management*, 3: 35-53.

Singh, S. P., 2014, Factors affecting the sugarcane yield and sugar recovery. *National Federation of Co-operative Sugar Factories*. 14-28.