Factors responsible for the performance of Cooperative Sugar Factories in North-Eastern Karnataka

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ABSTRACT

In the present investigation, three cooperative sugar factories were considered to measure the factors responsible for the performance of cooperative sugar factories. It was observed that the recovery percentage, remunerative price and correct weighment are the factors required to become a member of sugar factories. Further, the study revealed enough evidence about the financial ratios, which in turn exhibited the economic potentiality of their respective sugar factories. Before fixing the target to improve the cane procurement, the factory needs to plan programs well before the start of season and hence the installed capacity utilisation can be met. Besides, government should come forward to help the farmers to issue the cane bill payment at an early stage by the factories and extending financial assistance, so that it will facilitate for the farmers to purchase of inputs well in advance for sugarcane cultivation.

Keywords: Performance, sugar factories, factors, sugarcane

INTRODUCTION

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. 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 (Basheer, 2016). 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 (Sathe, 2015). Besides, in long run, usually arise 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 (Jayaraja and Joh, 2017). 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%). The area under the sugarcane in 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. 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. 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 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. 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. Three major cooperative sugar factories of the district are as follows:

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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 with a view to improving their performance and contributions to rural-led economic development.

MATERIALS AND METHODS

The study was conducted in Bidar district of North-Eastern Karnataka (NEK) region. In NEK region of Bidar is one of the sugarcane producing area wherein sugar factories have been established in cooperative sectors and also *khandsari* in private sector. But, as per the recent report, *khandsari* have been closed due to their poor performance. Hence, the present study comprises the factories, which have been established are considered to study their growth and performance of the following three sugar factories. The secondary data were collected from the published Annual reports maintained by

Table 1. Factors used for identifying the performance of sugar factory

Sl. No.	Factors
1.	Employees engaged in off season
2.	Promotion of employees
3.	Efficient work & relationship
4.	Suppy of a short duration varietiesl
5.	Consumption of power produced by own
6.	Technical advice
7.	Purchase of cane other than factory area
8.	Timely purchase
9.	Provision of godown
10.	Sufficient space for storage of sugar
11.	Maintenance of godown
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 measurement
19.	Sale of byproducts
20.	Export of power to KPTCL
21.	No objection certificate from the Government
22.	Licensing of all equipments
23.	Proper disposal of industry waste

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 official from the respective 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 present study, factors were identified (Table 1) for the performance of the sugar factory through the non-parametric tests namely Friedman two way analysis and Chi square for goodness of fit (Kaliya Murthy, 2016). Further, the investigation considered 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 had been carried out to test the significance of these factors.

These factors have been identified from eight departments of the each factory, those are Administrative, Production, Purchase, Stores, Finance, Cane, Sales and environment department respectively (Singh, 2014), 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. 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 = sum of ranks in jth column

Where, x_r^2 is distributed approximately as chi square with (k-1) df.

Decision: If observed value of x_r^2 > table x_r^2 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, classifier is more nearer to the ground truth.

RESULTS AND DISCUSSION
Socio-economic characteristics of sample farmers
The study has adopted the important characteristics of the sample farmers which are responsible for the performance of the sugar factory. It could be observed from the Table 2. that the maximum percentage of sugarcane growers of all the three factories who were interviewed out of which 81.7 per cent were male followed by 18.3 per cent of females. Gender was non significant 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 non significant with 0.765 Chi square. The annual income of the sugarcane growers revealed that 40.0 per cent of the farmers had an income of < [1] 55,000 followed by [1] 55,000-90,000 (35.0%) and >[1] 90,000 (25.0%) respectively. It showed non-significant with 2.257 Chi square values. The total number of household size of sugarcane growers in the study area which included male, female and children was identified as 36.7 per cent of medium, followed by 33.3 per cent of large and 30.0 per cent of small household respectively.

Table 2. Socio-economic characteristics of sample farmers

Sugar factories / Characteristics	MGSSK (n=20)		NSSK (n=20)		BSSK (n=20)		OVERALL (n=60)		χ^2 value
	No.	%	No.	%	No.	%	No.	%	
Gender									
Male	17	85.0	15	75.0	17	85.0	49	81.7	0.891[NS]
Female	3	15.0	5	25.0	3	15.0	11	18.3	(P = 0.641)
Age (Years)									
< 45	8	40.0	4	20.0	8	40.0	20	33.3	2.570 [NS]
45-59	7	35.0	9	45.0	6	30.0	22	36.7	(P = 0.632)
> 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	
Secondary	4	20.0	4	20.0	6	30.0	14	23.3	4.911 [NS]
High School	4	20.0	3	15.0	3	15.0	10	16.7	(P = 0.767)
PUC	7	35.0	4	20.0	3	15.0	14	23.3	
Graduation	2	10.0	2	10.0	1	5.0	5	08.3	
Farm size (Acres)									
< 8.5	7	35.0	9	45.0	7	35.0	23	38.3	0.765 [NS]
8.5-13	7	35.0	7	35.0	8	40.0	22	36.7	(P = 0.939)
> 13	6	30.0	4	20.0	5	25.0	15	25.0	
Income ($\square$/Annum)									
< 55,000	6	30.0	10	50.0	8	40.0	24	40.0	2.257 [NS]
55,000-90,000	8	40.0	5	25.0	8	40.0	21	35.0	(P = 0.689)
> 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]
Medium (5-9)	8	40.0	6	30.0	8	40.0	22	36.7	(P = 0.939)
Large (>9)	7	35.0	7	35.0	6	30.0	**20**	33.3	

NS: Non significant

Farmer's perception in determining the performance of sugar factories.
The information regarding the performance and reasons for becoming the member of the sugar factory. It was observed 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 per cent level of significance. Besides, it was identified that correct weighment 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 per cent level of significance.

Factors responsible for performance of sugar factories
In the present study, 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 factories, 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 analyzed which is presented in Table 4 for identifying the factors responsible for the sugar factories, which showed the significant value at 5 per cent level of significance.

Table 3. Farmers perception in determining the performance of sugar factories

Sugar factories / Aspects	MGSSK (n=20)		NSSK (n=20)		BSSK (n=20)		OVERALL (n=60)		χ^2 value
	No.	%	No.	%	No.	%	No.	%	
Members satisfaction									
Timely procurement of cane	6	30.0	4	20.0	2	10.0	**12**	**20.0**	
Adequate transportation facilities	10	50.0	5	25.0	3	15.0	**18**	**30.0**	12.53* (P = 0.014)
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**	
Correct weighment	10	50.0	12	60.0	9	45.0	**31**	**51.7**	11.21* (P = 0.024)
Technical assistance for better production	6	30.0	4	20.0	0	00.0	**10**	**16.6**	

*Note: * significant at 5% level of significance,*

Table 4. Test of significance of Friedman two way analysis of variance

Total Ranks of Sugar factories	Total ranks (R_j)	x_r^2
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 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 upto 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 in order to become internationally competitive *i.e.*, cost effective and quality producer.

REFERENCES

Basheer A. 2016. Factors responsible for success of new generation co-operatives. *Agri. Business. Management. Thesis,* University of Agricultural Sciences, Bengaluru.
Jayaraja S and Joh S. 2017. A study on the Management of tiruttani co-operative sugar mills limited at Thiruvalangadu in Tiruvallur district. *International Journal of Management and Social Science Research Review.* **2**(6): 947-951.
Kaliya Murthy S. 2016. Important factors for achieving high sugar recovery. *Paper presented at 40th Annual Convention of Sugar Technologists Association of India.* New Delhi, 1-8th of August, 2016.
Sathe RG. 2015. Financial performance analysis of co-operative sugar factory. *International Journal of Technology Marketing* **2**(6): 6-18.
Singh SP. 2014. Factors affecting the sugarcane yield and sugar recovery. *National Federation of Co-operative Sugar Factories* 14-28.
www.indiastat.com