ORIGINAL RESEARCH PAPER

Economics

PRODUCTION AND CONSUMPTION OF SUGARCANE INDUSTRY IN INDIA – OVERVIEW

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ABSTRACT

The sugar industry also supports diversified ancillary activities and skills that support the local economy. The dependent population creates substantial demand for local goods and services. There are broad areas of public intervention that regulate the sugar market in India. First, both the Central and the State Governments set a price support for sugar cane. Next is by restrictions on sugar quantities to be sold in the market also impose on the sugar factories a so-called sugar levy, by which they are required to sell at below market price to the public distribution centers. The data were appropriately tabulated and classified to analyze the tools like Annual compound growth rate, trend analysis by method of least squares. The productivity ratios and the production function were computed by Solow model. Multiple Regression analysis was used to ascertain its impact on variables and they were tested by 5% level of significance. The analysis reveals that the relationship between Raw Materials and other independent variables i.e. the Capital, Labour and Sales has contributed 99 percent on dependent variable of the companies which started after green revolution period. The growth of the northern region has positive growth in terms of output, capital employed and also there is better rainfall and irrigation in this region than that of the southern region. The trend line moves towards maximum in BHL companies. The average growth of sugar industry was slower in the southern region than that of northern region due to poor irrigation and rainfall. There is a need for improving the productivity and it can be done by improving the quality of labour compensation such as providing reward to their workers

Production- The production of sugar is primarily from sugarcane and sugar beet. It is cheaper to make sugar from cane hence the cultivation of sugar beet is gradually declining.

Consumption- The consumption of sugar has been increasing over the years but it is now being estimated that most of the growth in sugar consumption occurs in the developing economies of Asia and Africa.

INTRODUCTION

Sugarcane is a renewable, natural agricultural resource because it provides sugar, besides biofuel, fibre, fertilizer and myriad of by products/co-products with ecological sustainability. The world demand for sugar is primarily derived from sugar cane. Sugar cane accounts for eighty per cent of sugar produced and the rest is made from sugar beets. Sugarcane predominantly grows in the tropical and subtropical regions, and sugar beet predominantly grows in colder temperate regions of the world. A few merchants began to trade in sugar - a luxury and an expensive spice until the 18th century. Before the 18th century, cultivation of sugarcane was largely confined to India. Sugarcane plantations, like cotton farms, were a major driver of large human migrations in the 19th and early 20th century

Sugar industry: global sugar scenario

Sugar is produced in 115 countries. It is extracted from sugarcane and sugar beet. Sugarcane is cultivated in tropical climates, while sugar beet is grown in temperate regions. Around 75 percent of the sugar produced in the world is produced from sugarcane, with beet sugar accounting for the rest. Weather conditions, crop diseases; soil quality, international trade agreements and domestic price support programme --- all these influence the production of sugarcane and sugar beet.

Table – 1.1 Sugar: World Production, Consumption

('000 tonnes, raw value)	2009-10	2010-11	2011-12	2012-13	2013-14 *P
Production					
European Union (EU)	18,875	17,132	21,648	21,847	16,475
Brazil	23,810	26,400	28,175	27,080	30,340
Thailand	7,286	7,010	5,187	4,810	6,200
Cuba	2,250	2,550	1,300	1,200	1,300
China	11,380	10,734	9,826	9,600	11,105
US	7,644	7,847	7,146	6,741	7,466
Indonesia	1,755	1,730	2,050	2,100	2,200
Russia	1,580	1,930	2,250	2,500	2,550
Consumption					
European Union (EU)	14,361	13,014	17,529	17,586	17,425
Brazil	9,750	10,400	10,000	10,750	10,950
Thailand	1,940	1,980	2,070	2,150	2,250
Cuba	700	700	700	700	700
China	10,950	11,600	11,400	11,200	11,200
US	8,955	8,971	9,330	9,311	9,446
Indonesia	3,400	3,400	3,550	3,850	4,100
Russia	6,400	6,100	6,300	6,700	6,810

Source: Secondary Data

Analysis of selected variables of sugar industry
The analysis of financial performance can also significantly prove through the selected variables of a company or of the industries as a whole. All techniques have been adopted to appraise the financial performance of the sugar industries in this chapter. An attempt has also been made to estimate trend co-efficient for selected variables of selected sugar industries in Tamil Nadu during the study period by fitting a linear regression model. The liner model fitted is as follows.

$$P = \alpha + \beta t + e$$

Where P is rate of selected variables, t is the time and α and βt are the parameters [intercept and co-efficients respectively] and e is the error term. To test whether the difference between actual selected variables and estimated selected **variables was significant or not, the following hypothesis is framed and tested. "There is no** significant difference between actual values and the trend values of selected variables among different years Further, the annual production and consumption of world sugar industry, area, yield, production of sugarcane and sugar, consumption of sugar and sugar recovery of Indian sugar industry, annual production, sales, crushing of sugar canes in selected sugar companies in Tamil Nadu over the study period are achieved through estimation of mean, co-efficient of variation and compound annual growth rate.

Table – 1.2 Annual Production and Consumption of World Sugar Industry (2001-2002 to 2011-2012)

(in MT)

Year	Production		Consumption	
	Actual	Growth	Actual	Growth
2002 - 03	137.45	100	134.67	100
2003 - 04	141.75	103.13	137.39	102.02
2004 - 05	141.1	102.66	143.1	106.26
2005 - 06	144.26	104.95	147.99	109.89
2006 - 07	148.97	108.38	151.19	112.27
2007 - 08	167.2	121.64	156.44	116.17
2008 - 09	167.1	121.57	160.69	119.32
2009 - 10	152.98	111.30	164.32	122.02
2010 - 11	159.89	116.33	167.13	124.10
2011 - 12	165.6	120.48	168.3	124.97
Mean	154.48		154.46	
S.D	12.59		12.39	
CV	8.15		8.02	
CAGR	0.023		0.022	

Source: Secondary Data

Table inference:
The production and consumption of world sugar industry have been shown in Table – 1.2. The highest growth of production in the year 2007-08 is 121.64 and consumption in the year 2011-12 is 124.97. The mean values of production and consumption of world sugar industry are 154.48 and 154.46 respectively.

The compound annual growth rate of world sugar production which worked out as 0.023 and in world sugar consumption is 0.022. The coefficient of variation indicates that the annual production and consumption of world sugar industry are moderately fluctuated during the study period.

Table – 1.3 India: Sugarcane Area, Production, and Utilization

Sugar Cane	Area[1]	Yield[1]	Product[1]	Sugar[1]	Khandsari[2]	Gur[2]	Seed[2]
	Mha	MT/ha	MMT	MMT	MMT	MMT	MMT
1990/91	3.69	65.39	241.05	122.32	13.18	76.63	28.93
1995/96	4.15	68.02	282.09	174.76	10.00	67.27	30.06
2000/01	4.32	69.35	299.32	176.65	11.00	75.75	35.92
2001/02	4.41	67.09	295.95	180.32	10.50	69.62	35.51
2002/03	4.52	63.58	287.38	194.33	9.50	49.07	34.49
2003/04	3.94	59.39	233.86	132.51	10.00	63.29	28.06
2004/05	3.66	64.74	237.08	124.77	9.50	74.36	28.45
2005/06	4.20	66.93	281.17	188.67	8.50	50.26	33.74
2006/07	5.15	69.03	355.52	222.00	10.00	80.86	42.66
2007/08	5.06	68.81	348.18	249.91	7.00	49.49	41.78
2008/09	4.44	64.19	285.02	145.00	6.50	99.32	34.20
2009/10	4.18	70.01	292.30	185.55	6.50	65.17	35.08
2010/11	4.89	70.09	342.38	240.00	7.50	53.79	41.09
2011/12	5.08	71.07	361.03	257.00	7.00	53.70	43.32
2012/13	5.06	67.38	341.20	251.50	7.00	41.75	40.94
2013/14	5.01	70.26	352.14	234.32	8.00	67.56	42.25
2014/15	5.14	70.44	362.33	265.40	8.00	45.45	43.48
2015/16	4.96	70.25	348.45	238.00	8.50	60.13	41.81
2016/17	4.38	70.02	306.70	193.30	8.50	68.09	36.80
2017/18	4.95	79.80	395.00	278.00	9.00	60.60	47.40
2018/19	5.20	79.81	415.00	292.00	9.00	55.00	49.80

Note: Figures for 2017/18 and 2018/19 are FAS estimates.

Source: [1] Directorate of Economic and Statistics, Ministry of Agriculture FAS/New Delhi Estimate.

Table – 1.4 Area, Yield, Production of Sugarcane, Production of Sugar, Consumption of Sugar and Sugar Recovery of Indian Sugar Industry (2002-2003 to 2011-2012)

Year	Production of Sugar (MT)		Consumption of Sugar (LT)		Sugar Recovery (per cent)	
	Actual	Growth	Actual	Growth	Actual	Growth
2002-03	20.145	100	183.84	100	10.36	100
2003-04	13.546	67.24	172.85	94.02	10.22	98.65
2004-05	12.69	62.99	185	100.63	10.17	98.17
2005-06	19.267	95.64	189.45	103.05	10.21	98.55
2006-07	28.328	140.62	201.6	109.66	10.16	98.07
2007-08	26.357	130.84	220	119.67	10.55	101.83
2008-09	14.539	72.17	230	125.11	10.03	96.81
2009-10	18.912	93.88	210	114.23	10.19	98.36
2010-11	24.394	121.09	207.36	112.79	10.17	98.17
2011-12	25.8	128.07	214.12	116.47	10.17	98.17
Mean	20.4		201.42		10.223	
S.D	5.65		18.17		0.14	

| CV | 27.72 | 9.02 | 1.37 |
| CAGR | 0.0279 | 0.0171 | -0.0021 |

Source: Secondary Data

Table inference:
The area, yield, production of sugarcane, production of sugar, consumption of sugar and sugar recovery of Indian sugar industry have been shown in Table – 1.4. The highest growth of area in the year 2006-07 is 118.12, yield (t/ha) is 108.82 of 2011-2012, sugarcane production (million tonnes) in the year 2006-07 is 126.26, production sugar (million tonnes) is 140.62 in the year 2006-07, consumption of sugar (LT) in the year 2008-09 is 125.11 and sugar recovery (percentage) in the year 2007-08 is 101.83. The mean values of area, yield, production of sugarcane, production of sugar, consumption of sugar and sugar recovery of Indian sugar industry are 4500, 66.71, 298, 20.4, 201.42 and 10.223 respectively. The compound annual growth rate of area, yield, production of sugarcane, production of sugar, consumption of sugar and sugar recovery of Indian sugar industry which worked out as 0.0174, 0.0094, 0.0164, 0.0279, 0.0171 and -0.0021 respectively. The coefficient of variation indicates that the area, yield, production of sugarcane, production of sugar, consumption of sugar and sugar recovery of Indian sugar industry were moderately fluctuated during the study period.

Recommendations for Price Policy
The Commission formulates its price policy for sugarcane within the scope of its mandate and the terms of reference given to it under the Sugarcane (Control) Order, 1966 issued under the EC Act, 1955. Prior to 2009-10 sugar season, the Central Government was fixing the Statutory Minimum Price (SMP) of sugarcane and farmers were also entitled to share profits of a sugar mill on 50:50 basis. The sharing provision was introduced in the Control Order as Clause 5A in September, 1974 with a well intended purport to empower farmers to equally share the dividends of the mills. However, it remained virtually unimplemented mainly on account of delays in the announcement of profits by the mills. The Sugarcane (Control) Order, 1966 was amended vide notification 22.10.2009 and the concept of SMP was replaced by the Fair and Remunerative Price (FRP) of sugarcane. For this purpose of working out FRP, a new item 'reasonable margins for growers of sugarcane on account of risk and profits' was inserted in Clause 3(1) vide notification dated 22.10.2009 and made effective from 2009-10 season. Clause 5A relating to sharing of profits between sugar factories and farmers was thus deleted.

CONCLUSION
In order to appraise the sugarcane production, the associated factors of production are to be identified and the growth behaviour of the different factors over time needs to be critically assessed. In this study, growth trends in respect of some important factors related to sugarcane production had been extensively studied for the cases of India as a whole. The maximum instability had been seen in the price of sugarcane in India as well as in Tamil Nadu and both is equal. It means an increase in the price of sugarcane in Tamil Nadu and in India is same. The coefficient of variation in the price of sugarcane are consistent and the growth rate is also maximum therefore the growth rate can be made stable by changing the prices and other contribution factors.

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