

## **Growth and Structure of Sugar Production in India**

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### **ABSTRACT**

This paper is mainly focused on growth and structure of sugar production in India over the study period from 1970-71 to 2017-18. Sugar output in India drop to a three years low next season from a record as dry weather shrivels cane plants in some major growing areas of the country. Droughts are withering cane fields in parts of Maharashtra and Karnataka, and the monsoon is delayed, reducing prospects for the coming crop. A lower harvest would trim a record domestic surplus, potentially curtailing exports and supporting global prices. India swings between being a sugar importer and exporter, depending on the size of local output. The computed 'F' value was found to be greater than the critical 'F' value, and hence the null hypothesis was rejected and the Chow test therefore seemed to support that there had been a structural change in sugar production between the period pre reform and post reform. In other words, the regression had shown that the intercept as well as the slope co-efficients had not remained the same over study period.

**Key Words :** Sugarcane, Production, Monsoon, Industry, Global price

### **INTRODUCTION**

India is the second largest producer of sugar in the world. Sugar also constitutes the largest segment of the agricultural industry in India, which employs nearly 50 million growers. However, they are being crushed by the actions and whims of some policy makers. If allowed to operate in a free and fair manner, the sugar industry would have become number one in the world and changed the face of Indian villages as well. The industry can produce 32 million tonnes of sugar a year; can export 9 to 10 million tones. Every year and can earn foreign exchange of \$ 4 to 5 billion annually. The growth of sugar industry has major impact on the rural economy. The integrated sugar industry (comprising sugar, molasses, alcohol, power and bio - fertilizer) now enjoys an annual turnover of around Rs. 90,000 crore (which can go up to Rs. 1,25,000 crore at 32 million tones of production) and contributes around Rs. 3000 crore to the Central Government exchequer, by way of central excise duty, every year. At 32 million tones production, India will produce enough to

replace 10 percent of petrol, power save coal and reduce pollution. The cost of producing sugar is around Rs. 3,500 a quintal, given the simple economics of paying Rs. 270 a quintal for cane and getting average recovery of less than 10 percent plus payment of sate duty and tax plus freight and cartage, plus interest plus depreciation and other costs. This is after considering or deducting realization from by – product such as molasses and bagasses.

India had been the home for sugarcane cultivation from very ancient times and references could be found even in the early vedic literature. The sugarcane was one of the luxuries provided by Vishwamitra to Trishanku in the special heaven created for him by the sage. In an article on “Sugarcane improvement in India”, Mr. N.L. Dutt, the Government of India sugarcane expert, had written that sugarcane had been grown in India from time immemorial and a mention had been made in the vedic literature also (5000 B.C). The Chinese visitors of the 18<sup>th</sup> century B.C. had recorded that the knowledge about sugarcane and its products were derived from

India. In 600 A.D. the Chinese expert Tsai Hong had sent agents to Bihar in India to learn about the art of sugar manufacturing and it was perhaps the first instance on record of a technical term “honey need”, and there are many reasons for believing that India was the original home of sugarcane cultivation.

## METHODOLOGY

### Objectives of the study:

1. To analyze the trend and growth rate of India’s sugar production during pre-reform and post-reform periods.
2. To identify the structural changes of India’s sugar production during pre-reform and post-reform periods.

### Period of the study:

The period of study taken up for the analysis is a period of forty eight years, from the year 1970-71 to that of the year 2017-18. The main reason for choosing this period is to know about the impact of New Economic Policy on India’s Sugar Production.

### Sources of data:

The present study had used only secondary data for analytical purpose. The data were collected from various issues of Handbook of Sugar Statistics, published by Indian Sugar Mills Association and Ministry of Consumer Affairs.

### Statistical tools:

Statistical tools had been used to analyze the collected data and to interpret the findings of the study. The statistical tools, Linear model, Semi-log model and Chow test had been used. The analysis was done by the software SPSS 19 Version.

## RESULTS AND DISCUSSION

The Table 1 presents the details related to sugar production in India during the pre-reform period of 1970-71 to 1990-91.

From the above Table 1 it could be known that the production of sugar was 37.40 lakh tonnes in the year 1970-71 and it had increased to the level of 38.58 lakh tonnes in 1979-80. It had again increased to touch the level of 57.50 lakh tonnes in 1980-81 and had reached the level of 120.47 lakh tonnes in the year 1990-91. There had been fluctuations in respect of sugar production in

India during the pre-reform period of 1970-71 to 1990-91. The annual fluctuations were found to be generally positive and only during six years, the annual fluctuations were found to be negative in sugar production.

**Table 1 : Sugar production in India during the pre-reform period**

Year	Sugar Production	Index Number	AAGR
1970-71	37.4	100	-
1971-72	31.13	83.23	16.76
1972-73	38.73	124.41	-24.41
1973-74	39.48	101.93	-1.93
1974-75	47.97	121.50	-21.50
1975-76	42.62	88.84	11.15
1976-77	48.4	113.56	-13.56
1977-78	64.61	133.49	-33.49
1978-79	58.41	90.40	9.59
1979-80	38.58	66.05	33.94
1980-81	57.5	149.04	-49.04
1981-82	84.37	146.73	-46.73
1982-83	82.29	97.53	2.46
1983-84	59.17	71.90	28.09
1984-85	61.44	103.83	-3.83
1985-86	70.16	114.19	-14.19
1986-87	85.02	121.18	-21.18
1987-88	91.1	107.15	-7.15
1988-89	87.52	96.07	3.92
1989-90	109.9	125.57	-25.57
1990-91	120.47	109.61	-9.61

Source: Computed Data

The Table 2 presents data on sugar production in India during the post-reform period of 1991-92 to 2017-18.

The Table 2 depicts that the production of sugar was 134.05 lakh tonnes in the year 1991-92, it had decreased to the level of 98.33 lakh tonnes in 1993-94. Then it had increased to the level of 146.43 lakh tonnes in 1994-95 and again to the level of 182.00 lakh tonnes in the year 1999-2000. The production of sugar had decreased to 85.11 lakh tonnes in 2000-01 then it had decreased to 185.28 thousand tonnes in 2001-02 and increased to touch the level of 283.67 lakh tonnes in 2006-07. In the year 2017-18 the production of sugar had reached to 243.75 lakh tonnes.

Table 3 displays the values of trend and growth rate of India’s sugar production for the year 1970-71 to 2017-18. Even though the annual average growth rate of sugar

**Table 2 : Sugar production in India during the post-reform period**

Year	Sugar Production	Index Number	AAGR
1991-92	134.05	111.27	-11.27
1992-93	106.09	79.14	20.85
1993-94	98.33	92.68	7.31
1995-96	164.53	112.36	-12.36
1996-97	129.05	78.43	21.56
1997-98	128.52	99.58	0.41
1999-00	182	117.12	-17.12
2000-01	85.11	46.76	53.23
2001-02	185.28	217.69	-117.69
2003-04	135.46	67.24	32.75
2004-05	126.9	93.68	6.31
2005-06	193.2	152.24	-52.24
2007-08	263	93.26	6.73
2008-09	146.8	55.81	44.18
2009-10	188	128.06	-28.06
2011-12	263.4	108.21	-8.21
2012-13	258.5	98.13	1.86
2013-14	245.5	94.97	5.02
2015-16	251.21	88.25	11.74
2016-17	225.21	89.65	10.34
2017-18	243.45	108.09	-8.09

Source: Computed Data

production shrunken from 5.7 per cent per annum during the pre-reform period to 3.4 per cent per annum during the post-reform period, its growth in absolute term had sprout up from 3.611 lakh tonnes per annum during the pre-reform period to 6.032 lakh tonnes per annum during the post-reform period. The growth and growth rate of sugar production were 5.162 lakh tones and 4.4 per cent during the overall study period from 1970-71 to 2017-18.

Regarding the compound growth rate of sugar production, it had shrunken from 5.8 per cent per year during the pre-reform period to 3.4 per cent per year during the post-reform period, and it was 4.5 per cent during the whole study period. The  $R^2$  values were found to be satisfactory and 't' values were also found to be statistically significant at one per cent level for all three different periods.

#### Structural changes of the sugar production:

##### The Chow Test:

$H_0$ : There is no structural change in India's sugar production between the pre-reform period and post-reform period.

$H_1$ : There is structural change in India's sugar

**Table 3 : Trend and growth rates of sugar production in India**

Period	Linear Model			
	a	b	t	$R^2$
Pre-reform period (1970-71 to 1990-91)	24.860	3.611	8.738 **	0.801
Post-reform period (1991-92 to 2017-18)	103.213	6.032	6.370 **	0.619
Whole period (1970-71 to 2017-18)	7.342	5.162	16.334 **	0.853
	Semi-log Model			CGR
	a	b	t	$R^2$
Pre-reform period (1970-71 to 1990-91)	3.476	0.057	9.570 **	0.828
Post-reform period (1991-92 to 2017-18)	4.709	0.034	6.033**	0.593
Whole period (1970-71 to 2017-18)	3.628	0.044	19.831 **	0.895

Source: Authors own calculation.

\*\* Significant at one per cent levels

**Table 4 : Growth rates of sugar production pre and post reform periods**

Period	$R^2$	ESS
Pre-reform period (1970-71 to 1990-91)	0.828	0.510
Post-reform period (1991-92 to 2017-18)	0.593	1.271
Whole period (1970-71 to 2017-18)	0.895	2.086

Source: Authors own calculation

production between the pre-reform period and post-reform periods.

Substituting the values we get

$$F = \frac{S_3/k}{S_4/(N_1 + N_2 - 2K)}$$

$$= \frac{0.1525}{0.0405}$$

$$F = 3.765$$

At five per cent level,  $F(2, 44) = 3.20$

The theoretical value of 'F' at the 95 per cent level of significance with  $V_1 = 2$ ,  $V_2 = 44$ , degrees of freedom was found to be 3.20. The computed 'F' value was found to be greater than the critical 'F' value, and hence the null hypothesis was rejected and the Chow test therefore seemed to support that there had been a structural change in the sugar production between the period pre reform and post reform. In other words, the regression had shown that the intercept as well as the slope co-efficients had not remained the same over study period.

### Conclusion:

By analyzing the data on sugar production in India from the year 1970-71 to 2017-18, by using linear trend model, semi-log model, compound growth rate and chow test, it could be concluded that as the frequent failure of monsoon the sugar production in India had shrunken during the post reform period than that of in the pre reform period. Failure of monsoon is not only reason for lower growth rate of sugar production, but also lower interest of the sugar former due to less profit, and heavy competition from Brazil, China and Thailand are also the reasons for this low level of growth of production of sugar. The government of India must encourage the farmers to grow more level sugarcane crop by giving subsidy and reasonable procurement price.

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