

# Performance of Sugar Industry in India During Pre and Post Independence Period

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## Abstract:

Although sugarcane was being grown in India from the Vedic period and sugar was being produced from fourth century, there was no sugar industry in India. The modern sugar processing industry in India made its beginning in 1904 when the first vacuum pan process sugar plant was set up at Saran in Marhowrah in Bihar. The growth of the industry was slow till 1930 with only 30 sugar mills. To meet the domestic demand of sugar, India had to import sugar mainly from Java (Indonesia). In 1931, a Tariff Board was set up and the sugar industry was brought under protection. Since then sugar industry in India has experienced a long journey. Hence it would be useful to study the performance of sugar industry in India since evolution, particularly during two periods i.e. Pre Independence Period and Post Independence Period. Present paper aims to fulfil this need for study. To achieve the objectives of the study the paper made use of secondary data obtained from various reputed and reliable sources. Appropriate statistical tools like growth rates, coefficient of variation, averages, charts, graphs and tables have been applied wherever find necessary. Besides to test the significance of compound annual growth rate semi log regression model has been applied and results have been drawn with the help of p and t values. Paper suggests that it will be the efficiency and paying capacity of the sugar mills that will govern the sustainability of the sugar industry. Without improving the efficiency in operations whether it is sugarcane cultivation or sugar processing, the paying capacity of the sugar mills cannot be improved. Efficient utilization of by products, capacity utilization, modernization of machinery and diversification would be the key factors to improve the performance of this industry.

**Index Terms-** Sugar Industry, Performance, CAGR, Semi Log Regression, Pre and Post Independence Period

## Background:

Although sugarcane was being grown in India from the Vedic period and sugar was being produced from fourth century, there was no sugar industry in India. It is said that a French people at Aska in Orissa established the first sugar plant in India in 1824 and it stopped its operation around 1940. The modern sugar processing industry in India made its beginning in 1904 when the first vacuum pan process sugar plant was set up at Saran in Marhowrah in Bihar. The growth of the industry was slow till 1930 with only 30 sugar mills. By 1931-32, there were 31 sugar factories in India, all of which were in the private sector. The total production of sugar at

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Present paper is based on the author's own doctoral research thesis titled as "A Critical Study of the Performance of Sugar Industry in India with Special Reference to Sugar Mills of Baharaich District of Uttar Pradesh" submitted to the Department of Economics, University of Allahabad, Allahabad, India.

that time was only about 1.5 lakh tonnes, whereas the consumption was about 12 lakh tonnes. To meet the domestic demand of sugar, India had to import sugar mainly from Java (Indonesia). In 1931, a Tariff Board was set up and the sugar industry was brought under protection. Since then sugar industry in India has experienced a long journey. Performance of sugar industry since evolution has been analysed in this research paper during two periods i.e. Pre Independence Period and Post Independence Period.

### Review of Literature:

Using secondary data, **Damodaran (2007)**<sup>2</sup>, attempted to explain the different phases of the evolution of the sugar industry in Uttar Pradesh. The study is based on time series data and is descriptive in its nature. The study described how the sugar industry that have originally developed roots in the eastern part of the state, is now mainly concentrated in the western and central districts and how the sugar industry of Uttar Pradesh lost its pre-eminent position to Maharashtra during the decades of 1960s to 1990s. The study, however, noticed a recent resurgence in the sugar industry of Uttar Pradesh, similar to the boom of 1930's.

With the help of ancient literature and government records, **Gandhi M. P. (1945)**<sup>3</sup> made a praiseworthy attempt to elaborate development of sugar industry in India during Ancient, and medieval period in general and in British period - especially in the pre - protection and post - protection period in particular. The study showed that the word Sharkara occurred several times in Atharva Veda and Ramayana. The word used for sugar, in Sanskrit was Sharkara and in Prakrit was Sakkara and there can be no dispute that sugar was known to Hindus earlier than any other race in the world. Sugar production has been carried on in India from the time immemorial.

Another study conducted by **Sirohi S.S. (2005)**<sup>4</sup> attempted to elaborate the development of the Cooperative sugar sector in India. The study utilized secondary data to describe the status of the cooperative sugar sector in India during the pre and post independence period. The study endeavored to analyze various problems faced by this sector and made useful recommendations for improving the health of the same.

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<sup>2</sup> Damodran Harish & Singh Harvir (2007), "Sugar Industry in Uttar Pradesh: Rise Decline and Revival" Economic and Political Weekly September 29 2007.

<sup>3</sup> **M. P. Gandhi (1945)**, PROBLEMS OF SUGAR INDUSTRY IN INDIA- SCOPE AND PROSPECTS OF RE-ORGANISATION IN POST WAR PERIOD" published by Gandhi & co.

<sup>4</sup> Sirohi S.S. (2005), *The Status of Co-Operative Sugar Industry in India - Past, Present and Future*, Co-operative Sugar, Vol.36, No.12, August 2005.

**Pandey A.P. (2007)**<sup>5</sup> tried to explain the development of sugar industry in India during various five year plans. Secondary data and previous scholarly works have been utilized in the study, while simple tools of analysis like tabulation were utilized for analysis. The study observed that Indian sugar industry has been facing raw material, and resource as well as infrastructural problems. The study comes up with the suggestion that in the era of globalization, sugar industry needs more competitive edge, which can be given by way of modernization, enhancing productivity, and manufacturing of excellent quality sugar at competitive prices. It needs quality management at every level of activity to enhance its performance.

### **Objectives of the Study:**

The present paper attempts to study the performance of sugar industry in India during pre and post independence period.

### **Methodology of Research and Data:**

The present paper is based on the authors own doctoral thesis titled as “A Critical Study of the Performance of Sugar Industry in India with Special Reference to Sugar Mills of Baharaich District of Uttar Pradesh” submitted to the Department of Economics, University of Allahabad. To achieve the objectives of the study the paper made use of secondary data obtained from various reputed and reliable sources. Appropriate statistical tools like growth rates, coefficient of variation, averages, charts, graphs and tables have been applied wherever find necessary. Besides to test the significance of compound annual growth rate semi log regression model has been applied and results have been drawn with the help of p and t values.

### **Analysis:**

#### **Performance of Sugar industry in India: Pre Independence Period**

After the introduction of tariff board in 1931 and the protection given to sugar industry the number of sugar mills has increased from 31 in 1931-32 to 128 in 1934-35 which shows more than 300 % increase within three years after protection. During the same period, as an outcome of increase in the number of sugar mills the resulting sugar production has also registered a record 259 % annual growth rate during the pre independence period. Since the increase in total number of sugar mills and resulting increase in sugar production was so huge that in subsequent years the growth in the same was relatively small. The total number of sugar factories increased from 31 in 1931-32 to the 140 in 1946-47, while the level of sugar production increased from 1.61

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<sup>5</sup> Pandey A.P. (2007), Indian Sugar Industry-A Strong Industrial Base for Rural India, MPRA Paper No. 6065, posted 03. December 2007 / 12:26, web link: <http://mpra.ub.unimuenchen.de/6065/MPRA Paper No. 6065, a/o 10/04/15>

lakh tonnes to the level of 9.35 lakh tonnes during the same period. During the entire pre independence period the total number of sugar factories registered 9.88 % compound annual growth rate (CAGR) while the sugar production was increased at 11.62% CAGR. The same has been summarized in the table 1.

**Table 1: Sugar Industry during Pre-Independence Period**

Year	Number of sugar factories (no's)	Annual growth rate (%)	Sugar production (lakh tonnes)	Annual growth rate (%)
1931-32	31	-	1.61	-
1934-35	128	312.90	5.78	259
1937-38	136	6.25	9.46	63.67
1940-41	148	8.82	11.13	17.65
1943-44	151	2.02	12.36	11.05
1946-47	140	-7.28	9.35	-24.35
CAGR	9.881		11.622	

Source; Co-operative Sugar, August 1972. p. 613, NFCSFL

During the pre independence period the average installed sugar production capacity and recovery rate also increased. The installed average capacity registered 1.61 % CAGR. Whereas, the sugar recovery rate and molasses recovery rate has increased at 0.75 % and 0.73 % CAGR respectively during the period. The molasses production however experienced a slight decline during the period.

**Table 2: Capacity, Recovery Rate and Molasses Production**

Year	Average Capacity (Tonnes per Day)	Recovery Rate (%)	Molasses Production (000 tonnes)	Molasses Recovery (%)
1930-31	NA	8.96	NA	NA
1935-36	644	9.29	336	3.33
1940-41	750	9.70	431	3.76
1945-46	768	10.09	333	3.61
CAGR %	1.61	0.75	-0.08	0.73

Note: Researcher's Calculation, Data Source: Cooperative Sugar (Various issues)

Table 3 contains information about the sugarcane scenario during pre independence period in India. With the increase in total number of sugar mills the area, production and yield of sugarcane also increased. The area under sugarcane increased from 1176 thousand hectare in 1930-31 to 1299 thousand hectare in 1945-46, which shows 0.67 % CAGR.

**Table 3: Sugarcane during pre-independence period**

Year	Area under Sugarcane (000 Ha)	Production of Sugarcane (tonnes)	Yield of cane per Ha (000 tonnes)	Total Cane Crushed (000 tonnes)
1930-31	1176	36354	30.9	1339
1935-36	1681	62185	37.0	10045
1940-41	1617	51978	32.1	11492
1945-46	1299	42273	36.4	9510
CAGR %	0.67	1.01	1.09	13.96

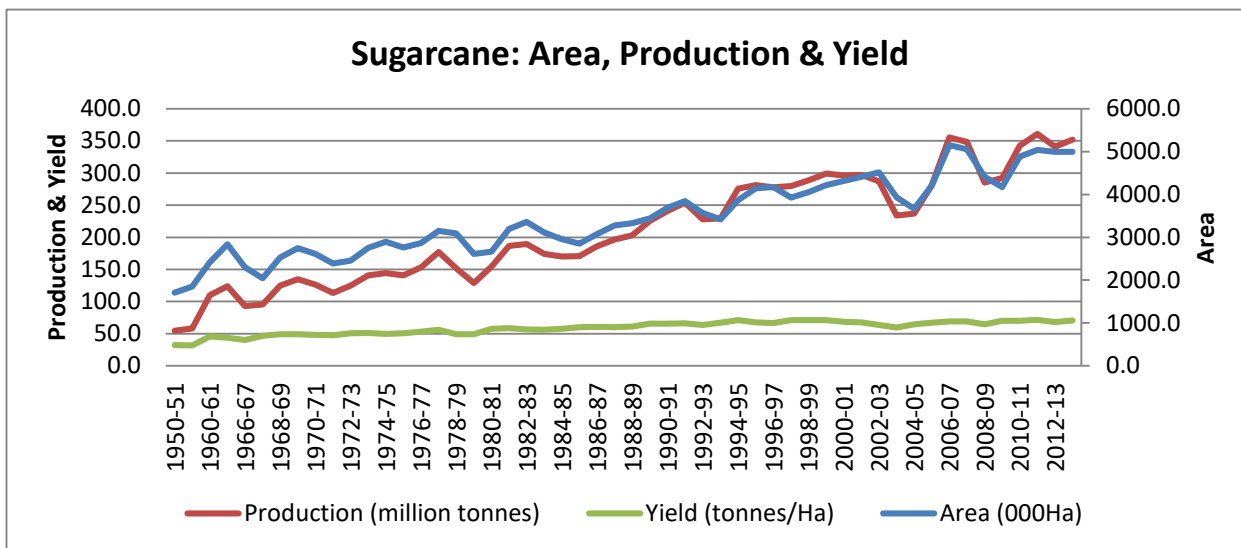
Note: Researcher's Calculation, Data Source: Cooperative Sugar (Various issues)

The production of sugarcane also increased from 36.35 million tonnes to 42.27 million tonnes during the same period. The yield of sugarcane registered in the year 1945-46 was far better than the yield registered in the year 1930-31. However when compared to yield in 1935-36, the yield in 1945-46 was relatively low. During the pre independence period the CAGR of production and yield was computed to be 1.01 % and 1.09 % respectively. One of the most important factor which contributed to remarkable increase in sugar production during pre independence period was the quantity of cane crushed for sugar production. The quantity of cane crushed increased from 1.34 million tonnes in 1930-31 to 9.51 million tonnes in 1945-46, accounting for nearly 14% CAGR during the pre independence period.

## **Performance of Sugar industry in India: Post-Independence Period**

### **Sugarcane: Area, Production and yield**

Sugarcane is the chief raw material for sugar industry and accounts for about 70 % of the total cost of production of sugar. Sugarcane accounted for 6.0 percent of the total value of agriculture output and occupied about 2.5 percent of India's gross cropped area in 2013-14 (CACP 2015-16). Besides, it is also the major source of income of cane growers. Both area and production of sugarcane fluctuate considerably from year to year. This is due to variations in climatic conditions, the vulnerability of areas cultivated under rain fed conditions, fluctuations in prices of gur and Khandsari and the changes in returns from competing crops. Despite this instability, both area and production of sugarcane have increased considerably during the post independence period. At present India ranks second next to Brazil in terms of area under sugarcane and sugarcane production.



**Chart 1: Sugarcane: Area, Production and yield**

Note: Researcher's illustration, Data Source: Cooperative Sugar (various issues), NFC SFL

It is evident from the Chart 1 that during the last 65 years of post independence period, the sugar industry in India has experienced a long journey in the form of growth in the area, production and yield of the sugarcane. The area under sugarcane cultivation has increased from 1176 thousand hectare in 1950-51 to 4993 thousand hectare in 2013-14. The result of Semi Log Linear Regression Model reveals that the area has experienced a significant growth in terms of CAGR 1.61 % (p value = .000, t = 22.777).

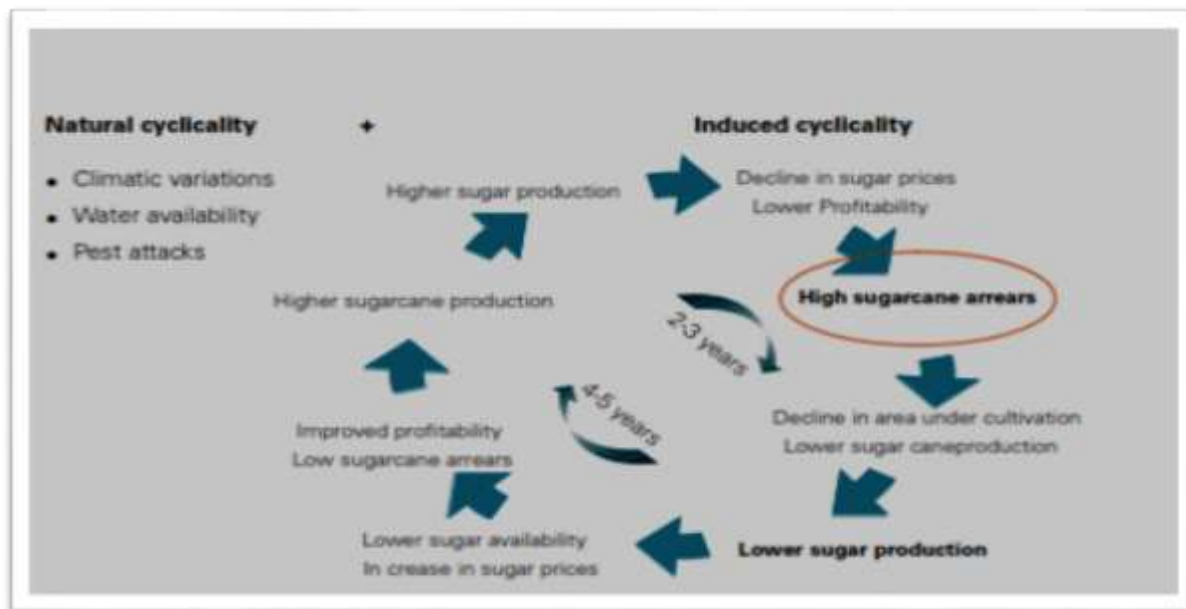
With the increase in the area the production has also increased from the 54.82 million tonnes in 1950-51 to 352.14 million tonnes in 2013-14. The result of Semi Log Linear Regression Model reveals that the increase in the production of sugarcane has been found significant in terms of CAGR 2.74 % (p value = 0.000, t = 23.98).

Among the three indicators used to assess the condition of sugarcane, the yield of sugarcane is the most important factor from the point of view of long term viability and profitability of sugarcane farming. The yield of sugarcane per hectare has remarkably increased from the level of 32.1 tonnes per hectare in 1950-51 to the level of 70.5 tonnes per hectare in 2013-14. The result of Semi Log Linear Regression Model reveals that during the study period the yield has recorded significant growth in terms of CAGR 1.11% (p value = .000, t = 15.652). Hence the growth in the level of sugarcane production is the composite outcome of the significant growth in area and yield.

It can easily be observed from the Chart 1 that the growth path of sugarcane production has been accompanied with the cyclicity. Besides natural factors which affect this cyclicity like climatic variations, water availability and pest attacks, the sugar sector is impacted by induced cyclicity also. According to KPMG (2007)<sup>6</sup> the high sugar and sugarcane prices in the current year lead to increase in sugarcane and sugar

<sup>6</sup> KPMG (2007), The Indian Sugar Industry Sector Roadmap 2017

production in the next year at the cost of other crops. As a consequence the price of sugar decreases in the domestic market. The resulting low prices for sugar impact the ability of mills to pay the farmers, thus leading to creation of cane price arrears. High arrears lead to a significant fall in cane cultivation in the next year, leading to high sugar prices and increased attractiveness of cane.

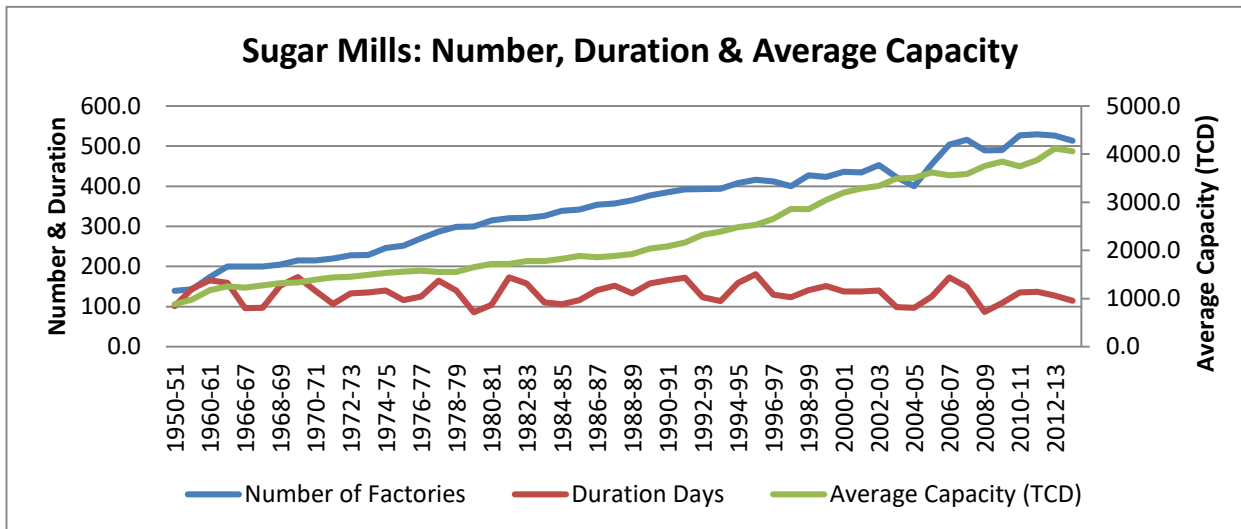


**Chart 2: Induced cyclicality in the sugar sector**

Source: KPMG (2007), The Indian Sugar Industry Sector Roadmap 2017

### Sugar Mills: Number, Average Duration and Average Capacity

Given other things, the level of sugar production depends upon the cane crushing capacity and the recovery rate. The total cane crushing capacity of the industry is a product of the total number of operational sugar mills, their average cane crushing capacity per day and the average working duration of sugar mills in a sugar season. As evident from the Chart 3, the number of factories in operation and the average cane crushing capacity has increased remarkably during the study period. The number of factories in operation has increased from 139 in 1950-51 to 513 in 2013-14. The result of Semi Log Linear Regression Model reveals that during the study period the number of sugar factories has registered a significant growth in terms of CAGR 2.22% ( $p = 0.000$ ,  $t = 33.895$ ). Not only the number has been increased but the installed capacity has also increased. The average installed capacity was 980 tonnes per day in 1950-51, which has increased to the 4061 tonnes per day in 2013-14. The capacity has also enjoyed a significant growth in terms of 2.62% CAGR ( $p = 0.000$ ,  $t = 51.94$ ). Although the Number and capacity has improved significantly, the growth in average duration of operations has been stagnant over a period of time. The average duration was 101 days in 1950-51 increased to 115 days in 2013-14. However the semi log linear regression model does not find any significant growth in the duration. The computed CAGR for duration was zero ( $p = 0.842$ ,  $t = -0.2$ ).



**Chart 3: Sugar Mills: Number, Duration & Average Capacity**

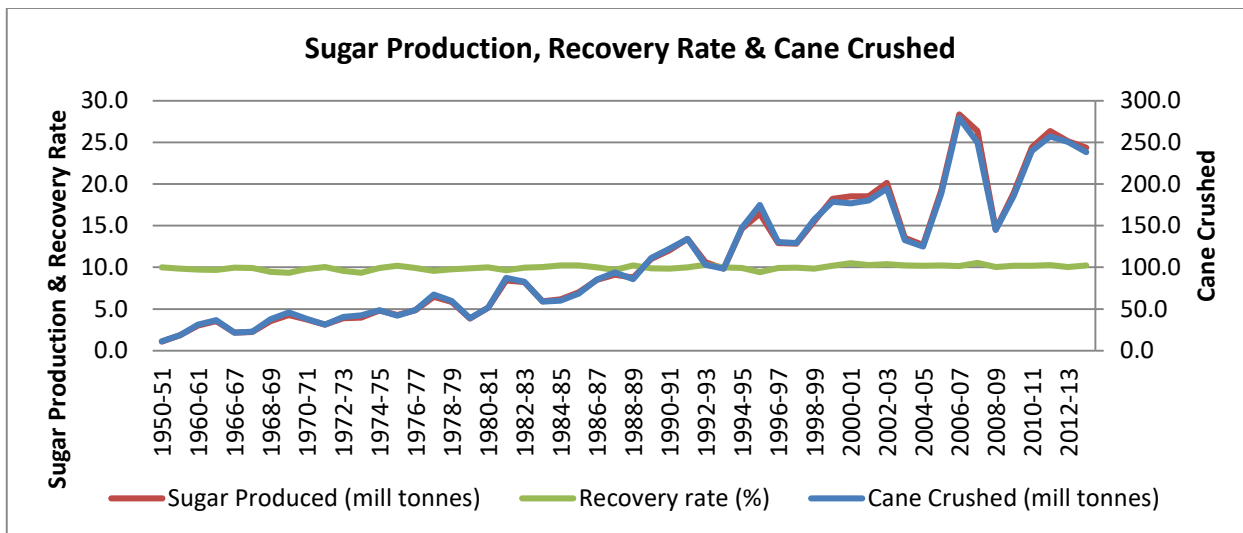
Note: Researcher's illustration, Data Source: Cooperative Sugar (various issues), NFCSFL

### Sugar Mills: Cane Crushed, Sugar Produced and Recovery Rate

The quantity of sugarcane production and the recovery rate are two major factors which determines the output level in the sugar industry. The growth in terms of the level of cane crushed, sugar production and the recovery rate has been illustrated in the Chart 4. It could easily be observed from the Chart that the quantity of sugarcane production for sugar production and the level of sugar production has increased continuously with the passage of time with seasonal variations. The recovery rate has however been stagnant during the same period. The level of sugarcane production has increased from 11.35 million tonnes in 1950-51 to the level of 238.18 million tonnes in 2013-14. The semi log regression model reveals that the level of sugarcane production has registered a significant growth in terms of 4.81% CAGR ( $p = 0.000$ ,  $t = 25.562$ ).

In the same manner the level of sugar production has also increased over a period of time. The sugar production has increased from 1.1 million tonnes in 1950-51 to 24.36 million tonnes in 2013-14. The improvement in the level of sugar production has taken place with a significant 4.92% CAGR ( $p = 0.000$ ,  $t = 25.983$ ).





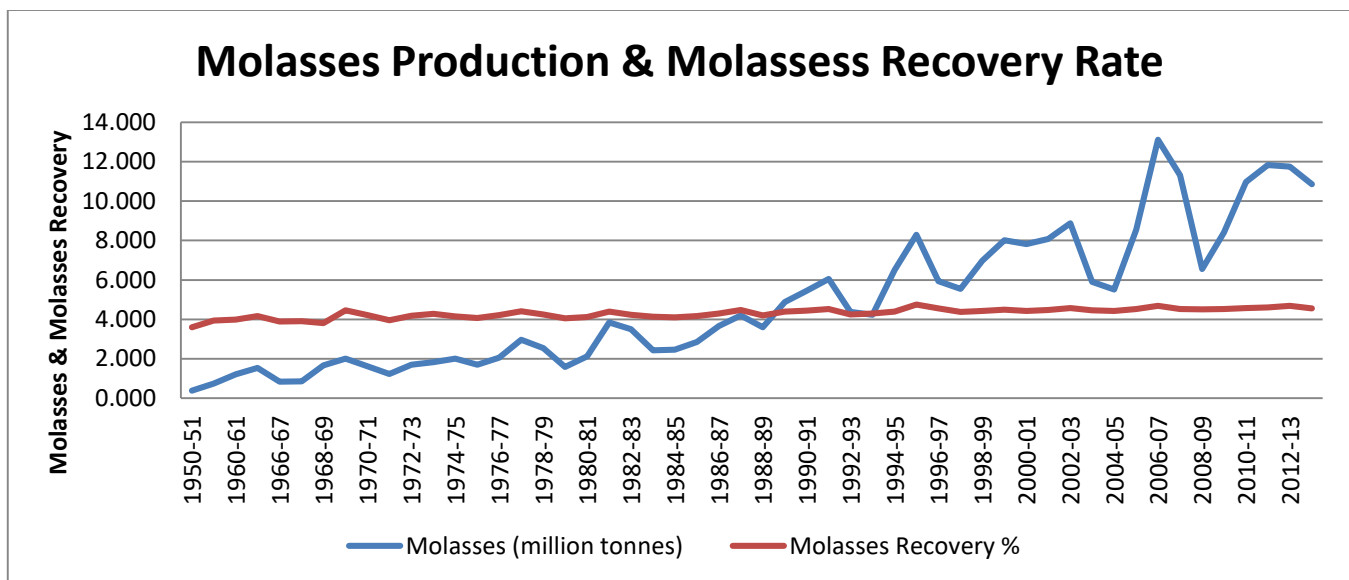
**Chart 4: Sugar Production, Recovery Rate & Cane Crushed**

Note: Researcher’s illustration, Data Source: Cooperative Sugar (various issues), NFCSFL

The recovery rate has been moving around the level of 10 % during the study period. The recovery rate which was 9.99 % in 1950-51, has gained a slight improvement during the post independence period and registered 10.23 % in 2013-14. Although this improvement seems negligible in terms of absolute value, but when accompanied with million tonnes of cane crushed a decimle increase in the recovry rate results in to significant change in overall production level of sugar. The result Semi Log Regression Model reveals that the recovery rate has increased significantly during the post independence period and registered a 0.10 % CAGR ( p = 0.000, t = 4.914)

**Sugar Mills: Molasses Production and Molasses Recovery Rate**

The growth in molasses production and the molasses recovery rate has been illustrated in the Chart 5. The molasses production has shown remarkable progress during the post independence period. It has increased from the 0.387 million tonnes in 1950-51 to 10.85 million tonnes in 2013-14, registering a significant 5.12 % CAGR (p = 0.000, t= 24.203). Unlike the sugar recovery rate, the molasses recovery has shown relatively better growth. The molasses recovery rate has increased from 3.60 % in 1950-51 to 4.56 % in 2013-14, registering a significant growth 0.3 % CAGR (p = 0.000, t = 11.087).



**Chart 5: Molasses Production & Molasses Recovery Rate**

Note: Researcher's illustration, Data Source: Cooperative Sugar (various issues), NFC SFL

## Conclusion:

Since evolution the sugar industry in India has experienced a long journey in the form of growth in the area, production and yield of the sugarcane. Among the three indicators used to assess the condition of sugarcane, the yield of sugarcane has been the most important factor from the point of view of long term viability and profitability of sugarcane farming. The growth path of sugarcane production has been accompanied with the cyclicity. Besides natural factors which affect this cyclicity like climatic variations, water availability and pest attacks, the sugar sector is impacted by induced cyclicity also. Given other things, the level of sugar production depends upon the cane crushing capacity and the recovery rate. The total cane crushing capacity of the industry is a product of the total number of operational sugar mills, their average cane crushing capacity per day and the average working duration of sugar mills in a sugar season. The number of factories in operation and the average cane crushing capacity has increased remarkably during the study period. However stagnant recovery rate and under utilization of plant capacity has been a matter of grave concern. It will be the efficiency and paying capacity of the sugar mills that will govern the sustainability of the sugar industry. Without improving the efficiency in operations whether it is sugarcane cultivation or sugar processing, the paying capacity of the sugar mills cannot be improved. Efficient utilization of by products, capacity utilization, modernization of machinery and diversification would be the key factors to improve the performance of this industry.

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