

# Production and Performance of Sugarcane in Theni District - A Study

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## ABSTRACT

The aim of this paper to focus on production and performance of sugarcane in Theni district, the district among crops cultivation the sugarcane is one of the very highest rates of production like 1201221 tonnes were cultivated sugarcane. Sugar is produced in Sugar Mills by a process called, "Double Sulphitation Method". The sugar is crushed into fine fibrous material and juice extracted. Baggase generated during the crushing process is used as "Boiler fuel". Sugarcane juice is then heated to 65° to 75° in the boilers and subjected to simultaneous liming and sulphitation. At the end of the process, brilliant juice at the top is concentrated in multiple effect evaporators to make syrup. This is bleached and then boiled. The boiled syrup is cured in the three massecuite systems to get sugar. The district is based on agriculture business and 75% of people have depended on this practice, these way only economic resources of the particular district. This study on focuses on production and performance of sugarcane at theni district, also the district was located vaigai riverbed and has been greenery sources agricultural practices.

## 1. Introduction

India is the world's largest producer of sugarcane. Sugarcane is cultivated in about 5.10 million ha producing about 357.70 million tonnes of cane with an average productivity of 70 tonnes/ha. The prime concern of cane growers and the sugar industry is to achieve higher sugarcane productivity and high sugar recovery both of which support maximum economic returns. The wider spatial and temporal variations in soil characteristics are the major constraint for achieving the maximum cane productivity. Tamil Nadu one of the leading states in sugarcane production and productivity is of no exception. the district, which is located at the foot of Western Ghats comprises of about 11, 000 acres of sugarcane involving about 4500 cane farmers.

The average production of sugarcane in this district is 4.67 lakh tonnes with an average cane productivity of 65 to 70 tonnes per ha. Inventory of the physicochemical properties, available macro and micronutrients status of the soils help in demarcating areas where the application of particular nutrient is needed for profitable crop production, Singh, 2010<sup>1</sup>. Also, it is already well known that the properties of a soil are the basic attributes that influence directly the soil response to any specified use Sood et al., 2009<sup>2</sup>. Though sporadic information is available on characterization and classification of soils in the district, no detailed and systematic investigation on the properties of soils has been taken up so far. Hence, the present study was taken up in the major sugarcane growing soil series of the district with an objective to understand and update the knowledge on the potentials and limitations of these soils in enhancing the productivity of sugarcane to a minimum level of 100 tonnes per hectare.

The sugar industry has been playing a pivotal role in the development of rural Tamil Nadu. Tamil Nadu Sugar Corporation Limited in Tamil Nadu includes Rajshree Sugars and Chemicals Ltd, Varadaraj Nagar, Antipathy. The

government of Tamil Nadu took over Madura Sugars (December 1983). The assets of Madura Sugars (with an Installed capacity of 800 TCD) were vested December 1983<sup>3</sup> with TASCOC. The installed capacity of the mill was expanded to 1250 TCD in 1984-85. Due to the uneconomic size of the operation and the high cost of production of sugarcane, the mills remain closed since May 2002.

Sugar (the word stems from the Sanskrit Sharkara) consists of a class of edible crystalline substances including sucrose, lactose, and fructose. The evidence presented by research workers of recent times show that the cultivation of sugarcane was developed in New Geneva in pre-historic times. It is believed that the garden grown sugar cane from New Geneva was transported by man to Indonesia, China, Philippines, Malaya, Peninsula, Indochina, and India The first sugarcane mill was established in Uttar Pradesh in 1903.

### Sugar Cane Procurement

The State government allows the area to each sugar mill for procurement of sugarcane. Sugar mills then have to enter into agreements with the riots in these areas to ensure that they would get enough sugarcane from the registered areas to utilize their installed capacity in full.

### Baggase

Baggase is a fibrous residue of cane stalk that is obtained after crushing and extraction of juice. It consists of water, fiber and relatively small quantities of soluble solids. The composition of baggase, the maturity of cane, method of harvesting and the efficiency of the sugar mill. The usual baggase composition is given below.

Table No: 1 - Baggase

Contents	Range %
Moisture	46-52
Fibre	43-52
Soluble Solids	2-6

The production of baggage will be normally around 30% of the cane crushed. About 80% of the baggage will be utilized as fuel in the mill boilers for production of steam, which is utilized

for generation of electricity. The remaining quantity of baggage is sold to Tamil Nadu News Prints and Paper Limited.

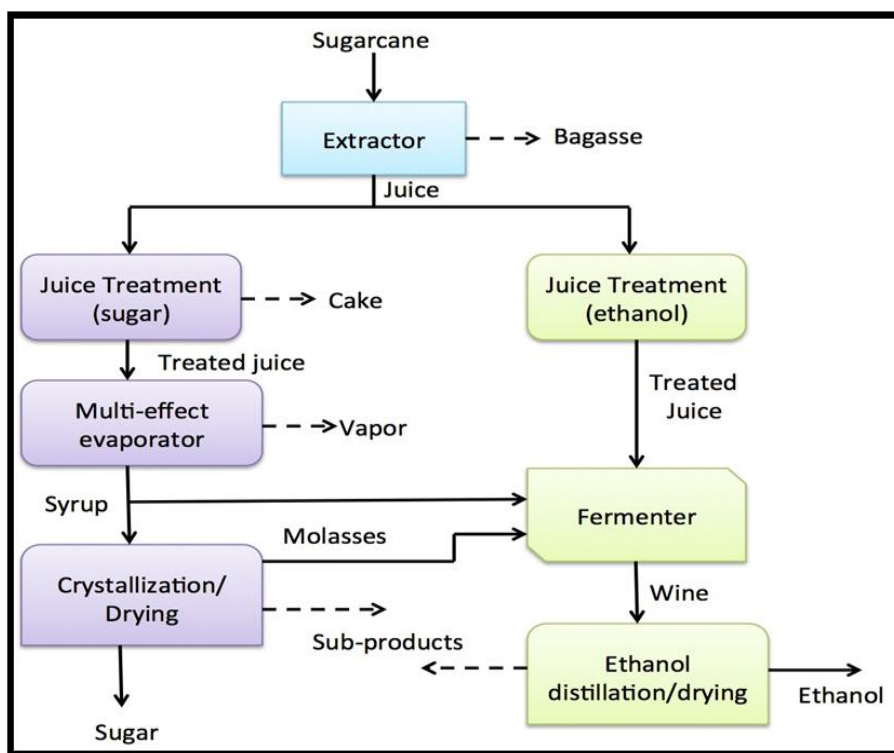


Figure: 1 – Process of Sugarcane Production

**Objectives of the Study**

- To study the process and cultivation of the sugarcane.
- To study the productivity efficiency in sugarcane at the district.
- To offer findings and suggestions for improving the sugarcane cultivation in the district.

**2. Review of literature**

In this review of related works pertinent to the topic of research was made in order to know the present status of research in the area. The knowledge of these studies would help the researcher to proceed in an appropriate direction in the present study and to draw meaningful conclusions.

**Rao I.V.Y. Rama (2012)<sup>3</sup>** in his study entitled that Efficiency, yield gap and constraints analysis in irrigated vis-à-vis rain-fed sugarcane in the northern coastal zone of Andhra Pradesh. the economics of yield gap in irrigated and rainfed sugarcane cultivation has been studied in North Coastal Zone of Andhra Pradesh for the period 2008–09 by collecting data on various aspects of costs and returns. Budgeting techniques, cost concepts, the benefit-cost ratio (BCR), yield gap analysis and response priority index have been used for the analysis. The study has shown that the value of BCR is higher for plant crop in irrigated (1.49%) than in rainfed (1.43%) regions. The yield gap between irrigated and rainfed regions has been found to be 67.00%, in which input usage had a higher (41.86%) effect than cultural practices (25.93%). The most important constraint in sugarcane cultivation is a shortage of labor during crucial operations.

**Jaswanth Singh, R.D.Singh, S.I.Anwar and S.Solomon (2011)<sup>4</sup>** in their paper entitled that ‘Alternative Sweeteners Production from sugarcane in India: Lump Sugar (Jaggery)’. Importance of sweeteners has long been recognized in Indian diets. Sweetness and flavor are very important as regards consumers’ acceptability. The sugar and jaggery are the main sweetening agents which are added to beverage and foods for increasing palatability. Over the years, food habits of human beings have been greatly influenced by research and developmental activities and also due to their health consciousness. Despite witnessing pressure of industrialization, the jaggery industry has flourished in different states of the country viz., Uttar Pradesh, Tamilnadu, Karnataka, Maharashtra and Andhra Pradesh. The increasing trend of their production is of much significance to learning about peoples’ liking towards jaggery in rural areas mainly due to it’s nutritional and medicinal values. About 25.30% of sugarcane produced in the country is utilized for production of jaggery and khandsari and this industry serves as very important means of subsistence and livelihood for masses. The technology and equipment for production of quality jaggery and its value-added products have been developed. Due to its nutritional and medicinal values, the jaggery has great export potential in the world.

**I.V.Y Rama Rao., G Sunil Kumar Babu (2011)<sup>5</sup>**: The present study was an attempt to work-out costs and returns in value-added products of Sugarcane viz., sugar, jaggery, and sugarcane juice, in order to suggest the sugarcane growers the profitable and sustained way to deal with sugarcane. Multistage sampling technique was adopted in selecting the sampling

units at various levels during 2010-11. Analytical tools like tabular analysis and Benefit Cost Ratio (BCR) were employed to achieve the objectives. The results revealed that cost of cultivation of sugarcane is the prime factor in the various value-added products. Among the value-added products, sugarcane juice production was found more profitable, which needs further study of the technical and financial feasibility of keeping quality in order to produce on large scale.

**Dr. Adya Prasad Pandey (2007)<sup>6</sup>** has studied on 'Indian sugar industry - a strong industrial base for rural India, in his study Indian sugar industry', second largest agro-based processing industry after cotton textiles industry in country, has a lion's share in accelerating industrialization process and bringing socio-economic changes in underdeveloped rural areas. Sugar industry covers around 7.5% of the total rural population and provides employment to 5 lakh rural people. About 4.5 crore farmers are engaged in sugarcane cultivation in India. Sugar mills (cooperative, private, and public) have been instrumental in initiating a number of entrepreneurial activities in rural India. The present paper is an attempt as to review the progress of sugar industry in India, understand its problems and challenges in the context of ongoing liberalization process. Indian sugar industry can be a global leader provided it comes out of the vicious cycle of shortage and surplus of sugarcane, lower sugarcane yield, lower sugar recovery, ever increasing production costs and mounting losses. It needs quality management at all levels of activity to enhance productivity and production. Attention is required on cost minimization and an undertaking by-product processing activities.

### 3. Need of the study

The Indian sugar industry as a green industry its future determines the livelihood of millions of farmers. The growth of these companies plays a prominent role in the economic development of the nation. The growth of an industry is based on its success and productivity. It is the primary test of the success of an industry. The consumers and the government are directly or indirectly involved in this industry. If the productivity is more, there will be the technological innovations and the economy will be growth high. The productivity and efficiency mainly depend on the age and region of the industry. Productivity and better efficiency help to set the industry on the pace of its higher growth. The analysis of productivity has necessities to increase certain industries' economic position. So, this study and an attempt were made to focus its measures on growth and productivity of the sugarcane.

### 4. Scope for the study

The studies focus on input-output relationship in crop cultivation, specific to one individual crop help us to understand the ways in which it is able to increase yield and production. At the same time these studies through light on cost and return of farmers for proper policy fixation that takes into account both the common farmer as well as the consumer. This highlights the need and importance of the study of the economics of sugarcane cultivation to understand the effectiveness of cultivation Policy in determining the area under sugarcane, It is worth to mention that proper investigation into cost and returns of sugarcane farmers would through light on the economics of

sugarcane cultivation that helps to judge the profitability of farming. In fact case studies have been most commonly used the method of research on farm economics.

## 5. Methodology

### (a) Sample Selection:

The discussion on methodology includes a selection of the study area, sample households, tools of analysis. Multistage sampling technique is used in the sample selection process. The levels are (i) Selection of the district (ii) Selection of sample villages and (iii) Selection of sample farmers. The district of Theni is one of the major sugarcane growing States in Tamilnadu.

#### (i) Selection of District:

In Tamilnadu State, Theni district is one of the major sugarcane growing district. Further, in Theni district, there are one sugar factory and one huge famous marketing yard at Cinnamanur. In view of these two facts, the Theni district is selected for the study.

#### (ii) Selection of Villages:

For the purpose of selection of villages, the command area of sugar factory is the base. From the command area of the sugar, factory villages are selected. A total of six villages are selected. Like, Aundipatty, Cinnamnur, Palayam, Bodi, Periyakulam, and Varusanadu. Further, for sugarcane farmers selection, the command area of the major sugarcane wholesale market is considered.

### (b) Data Base:

This study is based on both secondary data and primary data. To analyze trends in the growth of the area, output and yield published data is collected from (a) Statistical abstract of Tamilnadu and (b) Center for Monitoring Indian Economy. Data relating Theni district is collected from district Hand Book of statistics.

### Tools of Analysis:

- (a) The collected data is analyzed using different statistical techniques. Apart from averages and percentages appropriate statistical techniques are used wherever necessary. Compound Growth Rate is used to analyze temporal changes in area, production, and yield of sugarcane, the formula is given below. To capture the impact reforms on sugarcane cultivation. The total 08 years period is divided into two sub-periods, i.e. 2006-2007 to 2013-2014.
- (b) To find out the average relationship between two or more variables and there are two or more independent variables, the analysis that describes such a relationship is multiple regression.

## 6. Growth of sugarcane in Theni district

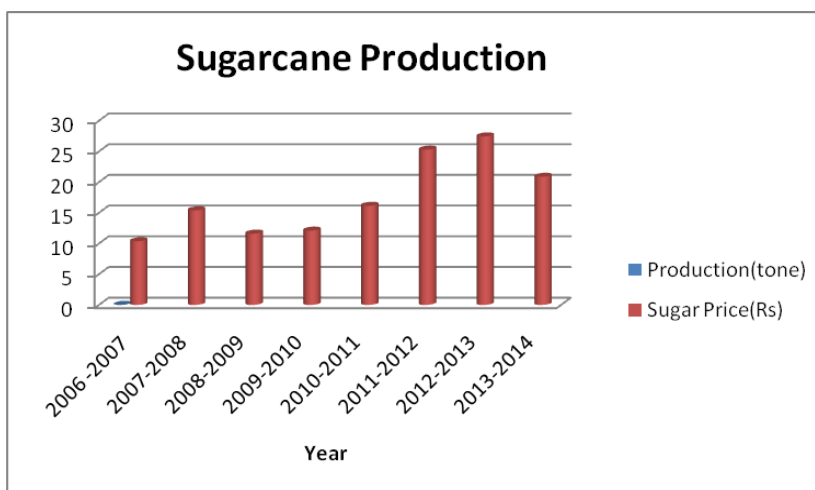
From the table, it is inferred that the sugar production would increase from 13.77 to 31.71 million tons from the period 2006-2007 to 2013-2014. The raw sugar prices also increased from Rs.10360 to Rs.24190 per ton. India's sugar production shows an upswing in production from 2008-2009 to 2011-

2012 and there is a decrease in sugar production during 2008-2009 and there is a steady increase in production. The average sugar production is 23.64 million tons with average Raw Sugar

price of Rs.17.40 per ton. The standard deviation is 6.95 percent in sugar production with 6.46 percent in raw sugar price.

**Table No: 2 - Sugarcane Production**

Year	Production(tonne)	Sugar Price(Rs)
2006 -2007	13.77	10.36
2007-2008	20.94	15.41
2008-2009	30.10	11.61
2009-2010	28.88	12.10
2010-2011	15.29	16.14
2011-2012	20.45	25.29
2012-2013	28.00	27.44
2013-2014	31.71	20.87
Mean	35.748	29.29
S.D	6.95	6.46



**Figure: 2 – Sugarcane Production**

**7. Multiple Regression Analysis**

Regression is the measure of the average relationship between two or more variables. When there are two or more independent variables, the analysis that describes such a

relationship is multiple regression. This analysis is adapted where there is one dependent variable is a function of two or more independent variables.

**REGRESSION ANALYSIS FOR SUGARCANE MANUFACTURING**

MODEL	R	R Square	Adjusted R Square	Std. Error of the Estimate
Companies Started before Green revolution	0.957	0.915	0.873	842.696
Companies Started After Green Revolution	0.995	0.990	0.986	231.805

The above table indicates that the companies started before green revolution has the relationship between the dependent variable i.e., Raw Materials and the other independent variables Capital, Labour, Sales which are found to be 0.957 (R) with R square 0.915. It means that all the independent variables have contributed 91.5 percent on the

dependent variable of Raw Materials. It is also found that the companies started after the green revolution has 0.995 (R) with R square is 0.990. It means that all the independent variables have contributed 99 percent on the dependent variable of Raw Materials.

**REGRESSION ANOVA**

MODEL	F	Sig.
Companies Started Before Green Revolution	21.594	0.001
Companies Started After Green Revolution	206.664	0.000

The above table represents the calculated value of F is 21.594 for the companies started before green revolution. And

the calculated value of F is 206.664 for the companies started after green revolution. The calculated value which is more than

the table value at 5 percent level in both type of companies. So the null hypothesis is rejected and hence the influence of independent variables on the dependent factor is significant.

### 8. Suggestions

- The average growth of sugar industry was slower in the southern region than that of the 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 labor compensation such as providing a reward to their workers.
- The sugar companies started before green revolution should increase production with the up gradation of modern technological innovation.
- Material accounts for nearly 80 percent of the cost of production. It constitutes a significant part of production cost and therefore proper planning;

purchasing, handling and accounting of material are of great importance.

### 9. Conclusion

The study brings out the fact that the production of sugar in the companies started after the green revolution is more effective than the sugar companies started before green revolution. It is due to the effective utilization and modernization of its resources. 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 the dependent variable of the companies which started after green revolution period. The study depicts the sugarcane production very effective in a district and farmers are prepared conventional methods of agricultural practices.

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