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SUGARCANE CULTIVATION IN INDIA: UNVEILING COSTS, CHALLENGES, AND PATHWAYS TO SUSTAINABLE FARMING IN THENI DISTRICT

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Abstract

The primary source of sugar in India is sugarcane, which is also a significant cash crop. The states that produce the most sugarcane in India include Tamil Nadu, Uttar Pradesh, Bihar, Assam, Haryana, Gujarat, and Andra Pradesh. India is regarded as a sugar behemoth, with more than 500 sugar mills and one of the biggest sugar exporters. A research was carried out in the Theni District, and 374 farmers were contacted to gather information about the costs associated with production and the challenges that farmers encountered during that period. Additionally, research offers a solution to farmers' difficulties.

Key Words: Cost and returns, Farmers, Sugarcane, Problems, Percentage.

Introduction

Since sugarcane is a crop that requires a lot of water, producing more crops with less water is a difficulty. The country's sugarcane growing regions have been negatively impacted by the repeated droughts. In India, sugarcane is cultivated over an area of around 4.5 million hectares, or roughly 3.7 percent of the net area planted, and is a significant cash crop. The main purpose of growing sugarcane is to create sugar, which is used by the confectionery, beverage, and domestic industries, among others. India is the world's biggest consumer of sugar and one of the fastest-growing markets for non-household products like soft drinks and confections, which are important consumption drivers. Approximately

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4.6% of the value of agricultural production is derived from sugarcane, which helps rural 50 million sugarcane farmers make their living from their crops, while 5 lakh people work directly in sugar mills. India is the world's biggest consumer of sugar as well as the world's largest producer of sugarcane and sugar, ranking second globally behind Brazil. Nonetheless, India's output level pales in comparison to that of other major producing nations, such as Thailand and China. Of the 731 sugar mills in the nation, 485, or almost two thirds, were operational in 2016–17. There are 731 mills in all; 328 are operated by cooperatives, 44 are controlled by the state, and 359 are privately owned. The state sector has the largest percentage of shuttered mills (75%) followed by cooperatives (36.6%) and the private sector (25.9%). Average usage of capacity of the sugar industry in the years 2015–16 was almost 75%.

Significance of the Study

Farmers who grow sugarcane and the sugar industry both make significant economic contributions to the state. It also makes a substantial contribution to the creation of jobs in the state by giving agricultural laborers and sugarcane growers jobs. The state's GDP is attributed to agricultural and related industries at a rate of 18.4%. Sugarcane makes up 17.05% of this GDP, making the overall contribution of sugar and sugarcane 22.33%. The manufacturing sector as a whole accounts for 32.11% of the industrial goods and products made from sugar. The current study's primary goal is to quantify and analyze the cost-return of producing sugarcane while also looking at the issues faced by growers in the Theni District.

Objectives of the Study

1. To calculate the sugarcane production cost and return structure for small, medium, and large farmers.

2. To determine the challenges associated with the district of Theni's sugarcane production.

Methodology of the Study

The primary data for the study are used.Personal interviews have been used to gather primary data, with the assistance of scheduled interviews.Information on the costs associated with producing sugarcane under small (1 to 5 acres), medium (6 to 10 acres), and large (11 to 15 acres) farmers in Theni District.

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Tools of Analysis

The mean, median, variance minimum, and variance maximum statistical analyses have been employed to analyze the data in terms of central tendency measures. In this study, a simple average and percentage analysis were employed.

Table 1

Age-Wise Classification of the Respondents

Age	*Small*		*Medium*		*Large*	
	Number	*%*	*Number*	*%*	*Number*	*%*
31-40 Years	40	31.2	20	16.0	16	13.2
41-50 years	30	23.5	22	17.6	32	26.4
51-60 years	40	31.2	36	28.8	40	33.1
61-70years	18	14.1	47	37.6	33	27.3
Total	**128**	**100**	**125**	**100**	**121**	**100**

Source: Primary Data

This indicates that the older responders will have had enough exposure and expertise to maximize costs and revenues, acquire resources and use them effectively, improve farming activities and procedures, and deal with the quantity and quality of sugarcane produced.

TABLE 2

Classification of Respondents by Literacy level

Literacy level	*Small*		*Medium*		*Large*	
	Number	*%*	*Number*	*%*	*Number*	*%*
Up to Secondary	64	50	60	48	56	46.3
Higher Secondary	62	48.4	65	52	65	53.7
Graduation	2	1.6	0	0	0	0

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Total	**128**	**100**	**125**	**100**	**121**	**100**
Source: Primary data.						

According to the survey, the respondents' literacy level is crucial for developing expertise using resources, optimizing costs and revenues, and managing yield concerns related to both quantity and quality

TABLE 3
Classification of Respondents According to Family Size

Family Size	***Small***		***Medium***		***Large***	
	Number	***%***	***Number***	***%***	***Number***	*%*
Below 4 members	8	6.2	7	5.6	9	6.4
5 – 8 members	58	45.3	49	39.2	45	40.6
Above 8 members	62	48.4	69	55.2	67	52.9
Total	**128**	**100**	**125**	**100**	**121**	**100**
Source: Primary data.						

According to the report, the majority of farmers cultivate sugarcane using members of their own families, especially those who cultivate on their own property.

Cost, revenue and production yield of sugarcane farmers

The cost, income, and production yields of the sugarcane planters in the study region of Theni district, Tamilnadu state, India, are depicted in the sugarcane cultivators' economics. This section covers the costs associated with using resources such as land, labor, materials, electricity, water, and technology for sugarcane cultivation, as well as the sales income from the sale of the crop's products and the yields of sugarcane production. The information gathered from the representative respondents is imprecise. The average total cost of resource utilization, the average total cost of the entire yield, the average revenue, and the average production yields of the entire yield (three yields) are the following details. Small, medium, and big land size farmers are mentioned according to group.

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Table 4

Average total cost incurred for resource usage in sugarcane cultivation (Small land size)

Small land size farmers (N=128)	Land Cost (Rs.)	Manpower Cost (Rs.)	Material Cost (Rs.)	Electricity Cost (Rs.)	Water Cost (Rs.)	Technology Cost (Rs.)
Mean	29558.82	118167.48	67500.96	26384.80	16302.23	8794.93
Std. Deviation	14679.393	70338.733	33443.989	12573.185	8120.241	4191.061
Variance	2.1558	4.9489	1.1199	1.5818	6.5947	1.7567
Minimum	8467.50	17319.00	22003.50	8517.00	5137.50	2839.00
Maximum	60937.50	346851.00	138676.50	53800.50	33517.50	17933.50

Source: SPSS output

Table 4 shows how there is a considerable difference in the average cost associated with resource utilization. The average cost for different resources ranges from Rs. 8795.00 to Rs. 118167.00, depending on the quantity and quality issues. The majority of small-scale farmers spend between Rs. 28,399.00 and Rs. 3,46,851.00 at most. The sales income that is presented in the next section has a considerable correlation with the expenditure cost.

Table 5

Average total cost incurred for resource usage in sugarcane cultivation (Medium land size)

Medium land size farmers (N=125)	Land Cost (Rs.)	Manpower Cost (Rs.)	Material Cost (Rs.)	Electricity Cost (Rs.)	Water Cost (Rs.)	Technology Cost (Rs.)
Mean	79629.98	346555.76	180111.77	68282.99	43480.81	22760.99
Std. Deviation	16868.612	1.86464	37315.371	15461.282	8682.547	5153.760

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Variance	2.8468	3.47710	1.3929	2.3918	7.5397	2.6567
Minimum	6007.50	30169.50	134070.00	51246.00	32814.00	17082.00
Maximum	121851.00	695313.00	278802.00	107346.00	66804.00	35782.00
Source: SPSS output						

Table 5 shows how there is a considerable difference in the average cost associated with resource utilization. The average cost for different resources ranges from Rs. 22,760.00 to Rs. 3, 46, 555.00, depending on the quantity and quality issues as well as the economical use of resources. The majority of farmers with medium-sized farms spend between Rs. 6007.00 and Rs. 6,95,313.00 at most. The sales income that is presented in the next section has a considerable correlation with the expenditure cost.

Table 6

Average total cost incurred for resource usage in sugarcane cultivation (Large land size)

Large land size farmers (N=121)	Land Cost (Rs.)	Manpower Cost (Rs.)	Material Cost (Rs.)	Electricity Cost (Rs.)	Water Cost (Rs.)	Technology Cost (Rs.)
Mean	128299.33	692547.91	294145.66	112197.28	70411.77	37399.09
Std. Deviation	22392.162	1.82860	51683.908	19980.778	12332.277	6660.259
Variance	5.0148	3.34410	2.6719	3.9928	1.5218	4.4367
Minimum	10162.50	58050.00	23250.00	9000.00	5625.00	3000.00
Maximum	159859.50	885067.50	349798.50	133647.00	83017.50	44549.00
Source: SPSS output						

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Table 6 shows how there is a considerable difference in the average cost associated with resource utilization. The average cost for different resources ranges from Rs. 37399.00 to Rs. 6, 92, 548.00, depending on the quantity and quality issues as well as the economical use of resources. The majority of farmers with big land sizes spend between Rs. 3000.00 and Rs. 8,85,067.00 at most. The sales income that is presented in the next section has a considerable correlation with the expenditure cost.

Accordingly, the study found a substantial mean difference in the amount of money that different types of farmers (those with small, medium, and big land sizes) spent on resource utilization when cultivating sugarcane. The findings of the analysis of variance are shown in the section that follows. The study found that farmers often incurred significant costs for labor, equipment, supplies, and the use of land resources. Economic resource use has a major role in reducing costs and raising outputs. Direct or indirect management styles and farming expertise are necessary for the economical use of resources. The study's findings indicate a strong correlation between management styles and resource consumption experience and economic resource utilization, which is covered in more detail in the section that follows.

Average total cost, total revenue, and total sugarcane production yield

This section covers the average total cost of resources used in sugarcane cultivation, the average total sales income from the sale of sugarcane products, and the average total yield of sugarcane production. The yield, revenue, and cost numbers that have been gathered and computed are estimations. The research posited a noteworthy average discrepancy in expenses, earnings, and productivity among the three categories of farmers, namely small, medium, and big landowners. The discrepancies are the study's findings. This variation is dependent on a number of variables, including the resources available, how they are used, the growing techniques, and more. The next section on mean differences reports the results of testing the differences.

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TABE 7
Average total cost, total sales revenue and production yield

	Small land size farmers (N=128)			Medium land size farmers (N=125)			Large land size farmers (N=121)		
	Total Cost (Rs.)	Sales Revenue (Rs.)	Production Yield (Tonnes)	Total Cost (Rs.)	Sales Revenue (Rs.)	Production Yield (Tonnes)	Total Cost (Rs.)	Sales Revenue (Rs.)	Production Yield (Tonnes)
Mean	343886	448269	647	957415	1212560	687	1730136	1901890	797
SD	148116.2	2.208	380.39	296586.4	2.903	426.9	375975.0	3.304	369.7
Variance	2.19	4.8791	144620.0	8.7961	8.4311	182320.0	1.41	1.09	136661.1
Minimum	136458	149035	90	409244	149035	90	141450	149035	90

Average total cost, total revenue, and total sugarcane production yield

This section covers the average total cost of resources used in sugarcane cultivation, the average total sales income from the sale of sugarcane products, and the average total yield of sugarcane production. The yield, revenue, and cost numbers that have been gathered and computed are approximations. The research posited a noteworthy average discrepancy in expenses, earnings, and productivity among the three categories of farmers, namely small, medium, and big landowners. The discrepancies are the study's findings. This variation is dependent on a number of variables, including the resources available, how they are used, the growing techniques, and more. The next section on mean differences reports the results of testing the differences.

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TABLE 8
Average total cost, total sales revenue and production yield

	Small land size farmers (N=128)			Medium land size farmers (N=125)			Large land size farmers (N=121)		
	Total Cost (Rs.)	**Sales Revenue (Rs.)**	**Production Yield (Tonnes)**	**Total Cost (Rs.)**	**Sales Revenue (Rs.)**	**Production Yield (Tonnes)**	**Total Cost (Rs.)**	**Sales Revenue (Rs.)**	**Production Yield (Tonnes)**
Mean	343886	448269	647	957415	1212560	687	1730136	1901890	797
SD	148116.2	2.208	380.39	296586.4	2.903	426.9	375975.0	3.304	369.7
Variance	2.19	4.8791	144620.0	8.7961	8.4311	182320.0	1.41	1.09	136661.1
Minimum	136458	149035	90	409244	149035	90	141450	149035	90
Maximum	845044	894210	**1350**	1693488	2235525	**1350**	2127608	2235525	**1350**

Source: SPSS output

Table 8 shows how the average production yield, average total cost, and average total sales income of the farmers varied considerably from one another. From Rs. 3, 43, 886.00 to Rs. 17, 30, 136.00 is the average total cost. The range of the average total income is 4, 48, 269.00 to 19, 018, 90.00. The range of the average total yield is 647 tonnes to 797 tonnes. This wide variation is based on a number of factors, including the amount of land needed for sugarcane production, the labor force, materials, and other resources needed, how those resources are used, how the cultivation process is carried out, efficient marketing strategies, and more.

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In terms of growers' economics, the cost, income, and production mostly depend on the resources that are available and how well they are used for growing. The resources used in sugarcane cultivation were considered, their levels were assessed, the link between management styles (direct or indirect) and experience with the use of financial resources was determined, and the results are described in the section that follows.

Problems of Sugarcane Farmers

- When growing sugarcane, farmers' biggest concern is water supplies. Groundwater scarcity, global warming, and climate change all have an impact on the agriculture industry.
- Farmers do not receive prompt payment from the sugar mill. Therefore, the majority of farmers live in poverty.
- The decrease in productivity was also caused by many diseases that attacked the sugarcane during its growth, such as red rot, wilt, and grassy shoot.
- Every year, the amount of the leasing payment grew. However, the income level is lowered in order to balance the cultivation costs.
- The majority of farmers do not grow their own jaggery; • The primary issue with sugarcane farming is labor shortages and rising labor costs.
- In exchange for borrowing money to cultivate sugarcane, the majority of farmers are paying money lenders higher interest rates.
- The modern generation does not support their parents' sugarcane growing and is not eager or interested in working in the agriculture industry.

Findings &Suggestions

- The production of sugarcane in Theni District was much less year over year.
- In order to strengthen the financial situation of farmers, sugar mills raise the price at which sugarcane is purchased.
- Government programs assist farmers in growing jaggery on their own and provide them with training.
- The federal and state governments may set up training programs for farmers to produce jaggery and provide equipment at a discounted cost.

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- To shield farmers from having to pay moneylenders higher interest rates. Some farmers are having trouble paying back the loans they have taken out, therefore the lenders are selling the land.
- Banks assist uneducated farmers in obtaining loans for the production of sugarcane. Ignorant farmers are denied bank loans because they do not understand the loan application process.

Conclusion

In India, the growth of the sugar sector has been significantly influenced by state and federal government policy. Like many other nations, India has a heavily controlled sugar industry, which begins with sugarcane and ends with sugar.The Central Government and State Governments run mechanisms that sustain sugarcane prices. The Central Government sets the Statutory Minimum Price (SMP) that mills must pay for sugarcane at the start of each season based on the recommendations made by the Commission on Agricultural Costs and Prices. According to the current study, the Theni District's sugarcane crop has decreased, and farmers' incomes are insufficient for a living. In the future, both the amount of sugarcane produced in the Theni District and the income level of farmers will rise annually.

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