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# An Economic Analysis on Sugarcane Cultivation in Karnal District of Haryana, India

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## **Abstract**

*Sugarcane is the important commercial crop of the country. India is the largest consumer of sugar in the world, and the second largest producer, after Brazil (India Sugar Trade Industry, 2013) and produces more of cane sugar and not beet sugar. The main objectives of the study are to examine the economics of sugarcane cultivation and to identify the major constraints faced by sugarcane cultivators. To fulfill the above said objectives both primary and secondary sources of data has been used in this research work. The researcher revealed that the cost of seeds and harvesting are high as a result the total cost of production is also high. The study also highlighted that shortage of labour, high wage rate of labour and low price are the important problems faced by the farmers of the study area.*

**Key words:** *Producer, Economics, Cultivation, Constraints, Production.*

## **INTRODUCTION**

Sugarcane originally belongs to South East Asia and tropical South Asia different varieties of

sugarcane originated from different countries. Saccharum barberi is a variety of sugarcane originated from India (Prakash and Muntyandi, 2014). So India has been known as the original home of sugarcane and sugar. India is the largest consumer of sugar in the world, and the second largest producer, after Brazil (India Sugar Trade Industry, 2013) and produces more of cane sugar and not beet sugar. Sugarcane is the important commercial crop of the country. In India, sugarcane is the key raw material, planted once a year during January to March.

Sugar has been considered to be one of the unavoidable necessities of life and it is demanded by the people belonging to all the classes of the society. The consumption of sugar in the country during past few years has been rising at a faster rate than the home-grown production and, therefore, the gap in demand and supply of sugar is fulfilled by imports of sugar. Fortunately, India is predominantly an agricultural country with a favorable agro-climatic condition for sugarcane cultivation,

which can not only fulfill the demand of country, rather it may export more sugar to rest of the world when our farmers are trained with skilful utilization of technology.

The average yield of sugarcane in India is 69.85t/ha for the year 2014-15. While, Haryana being a sugarcane producing state in the country produces only 7.39t/ha during the year which is around ten times lower than the national average and 335.42 t/ha at the competition plots in sub-tropical India. This shows a wide gap between potential and production of sugarcane in the country (Handbook of RBI, and Statistical Abstract of Haryana, 2015-16).

Speedy development in case of sugarcane cultivation is vital to the progress of our country. A large population of farmers in the country is not able to exploit the potentiality of their crops because of poor utilization of available technologies. Haryana has a vast scope of improvement in the productivity of sugarcane. With an increase in the productivity, production is also increased. Therefore, to explore the possibilities of raising farm production and farm income in this region, there is a need to understand sugarcane-based farming systems and their economics. The present study was carried out with the following specific objectives:

To examine the trends and growth pattern of sugarcane cultivation in state and in Karnal district of Haryana.

To analyze the economics of sugarcane cultivation and to identify the major constraints faced by sugarcane cultivators.

## LITERATURE REVIEW

**Nandhini, T.S.K.D. and Padmavathy, V. (2017)** has analyzed the production of sugarcane in India in their study. The study was based on secondary sources of data. The researcher revealed that there were variation in the production of sugarcane and pattern of growth was not uniform across the states. The study also revealed that the unpredictable monsoon condition was considered as a major reason for low production and productivity.

**Jawanjal, B.G. et al. (2015)** highlighted the cost, returns and profitability of sugarcane cultivation in konkan region in their study. The study was based on field survey. The researcher revealed that the per hectare profitability of both ratoon and suru sugarcane were profitable at all levels of their costs. Non remunerative rates offered by sugarcane factories and inadequate returns were the major constraints faced by both type of sugarcane cultivators.

**Rao, A.S.S. (2014)** has examined the input use pattern and cost of cultivation of sugarcane in Telangana Region of Andhra Pradesh in his study. The study was based on primary and secondary sources of data. The researcher revealed that input use pattern and cost of cultivation was found higher in case of large farmers. The expenditure on cultivation was lower for marginal and small farmers due to the family labour contribution in farming.

**Prakash, K. and Muntyandi, B. (2014)** have analyzed the economics of sugarcane cultivation in Tamil Nadu. The study was based on primary sources of data. The researchers revealed that the cost of seeds and harvesting was found highest for the sugarcane. The main problems faced by the sugarcane growers were harvesting problems and low price. The government should ensure fair price policy so that the farmers can obtain higher returns.

#### **DATA COLLECTION AND TOOL OF ANALYSIS**

This study is based on time series and cross-sectional data. Time series data has been collected from various issues of **Statistical Abstract of Haryana** while the cross-sectional data was collected from Karnal district of Haryana. A random sampling method has been used for this purpose. A total of 70 farmers have

been selected from which 35 were from Assandh block of the district and 35 from Indri block. The farmers were interviewed with the help of well-structured and pre-tested questionnaire. After collecting the data from farmer's simple statistical tools like average, percentage has been used to analyze the data. Simple statistical tools like mean, S.D (Standard Deviation), C.V (Coefficient of Variation) and ACGR (Annual compound growth rate) has been used on time series data for analyzing the growth pattern of sugarcane in Haryana as well as in the sampled district Karnal.

#### **Analysis of growth rates:**

The study examines the growth rates of area, production and productivity of sugarcane in Haryana as well as in sampled district Karnal because it helps to examine the tendency of sugarcane to increase, decrease or remain stagnant over a period of time. The estimation of growth rate has been done with the help of common method of growth rate i.e., Annual Compound Growth Rate (ACGR). It also specifies the magnitude of the rate of change per unit of time in the variables under consideration. The Annual compound growth rate (ACGR) is estimated by employing the following formula: -

$$Y = ab^t$$

By using logarithm, it may be written as:

$$\text{Log } y = \text{log } a + t \text{ log } b$$

$$Y^* = a^* + t.b^* \text{ (where } \text{log } y = y^*, \text{ log } a = a^* \text{ and } \text{log } b = b^*)$$

The value of  $b^*$  is computed by using OLS Method. Further, the value of ACGR can be calculated by followed method:

$$\text{ACGR} = (\text{Antilog } b^* - 1) \times 100$$

### Instability Analysis:

Instability is simply the deviation from mean and the researchers in their studies have used the coefficient of variation (CV %) as a tool for estimating the instability. In present study instability of area, production and productivity have been estimated by using coefficient of variation (CV). The CV for these parameters has been calculated by using the following formula:

Standard deviation

$$\text{CV } (\%) = \text{-----} \times 100$$

Mean

## RESULT AND DISCUSSION

Firstly, current status of sugarcane cultivation in Haryana as well as in sampled district Karnal has been analyzed. In particular, various aspects such as details of area, production and yield of sugarcane in Haryana and Karnal have been included. Further the economics of sugarcane and the constraints faced by sugarcane cultivators have been examined.

### 1. Growth pattern of sugarcane cultivation in Haryana and sampled district Karnal:

Table-1 highlighted the growth rate and variation in area, production and productivity of sugarcane cultivation in Haryana and sampled district Karnal during 2004-05 to 2014-15.

**Table-1**  
**Area, Production and Productivity of Sugarcane in Haryana and Sampled district Karnal**

Year	Haryana			Karnal		
	Area	Production	Productivity	Area	Production	Productivity
2004-05	133	823	6188	10.6	74	6693
2005-06	129.2	831	6442	11.9	82	6852
2006-07	140.6	965.1	6845	12.4	87	7253
2007-08	140.4	885	6322	12.3	83	6938
2008-09	90.5	520.6	5720	9.6	63.8	6375
2009-10	79.2	570.7	7224	8	63.7	7964

<b>2010-11</b>	84.5	604	7108	11.6	91	7609
<b>2011-12</b>	94.8	695	7319	10.7	88	7977
<b>2012-13</b>	100.9	744	7426	10.6	86	7838
<b>2013-14</b>	101.3	773	7553	11.6	95	7881
<b>2014-15</b>	95.7	710	7390	11.1	93	8504
<b>ACGR</b>	-3.24	-1.47	1.79	0.46	2.31	2.42
<b>Mean</b>	108.19	738.31	6867	10.95	82.41	7444
<b>S.D</b>	23.01	136.44	608.38	1.29	10.85	663.42
<b>C.V (%)</b>	21.27	18.48	8.86	11.78	13.17	8.91

Calculations based on Statistical Abstract of Haryana (Various Issues)

Area in 000 hectares,  
Production in 000 tonnes and  
Productivity in kgs./hectare

The area and production under sugarcane cultivation has been decreasing year to year in Haryana but the decrease in area is more than that of production while the productivity of sugarcane has increased over the years. The increase in area under wheat and rice cultivation after the introduction of green revolution is mainly responsible for the decrease in area under sugarcane cultivation. The growth rate of area and production of Haryana are -3.24 and -1.47 per cent respectively. Productivity growth rate in Haryana is significant and positive. The productivity of sugarcane in the state was highest in 2013-14(7390 kgs/hectare) while that of lowest in 2008-09 (5720 kgs/hectare). The average production and productivity of

sugarcane in Haryana are 738.31 thousand tonnes and 3071 kgs/hectare respectively.

The area under sugarcane in the sampled district Karnal is more or less constant as the growth rate in area is only 0.46 per cent over the years while the area under sugarcane was highest in 2006-07 i.e. 12.4 thousand hectares. The growth rate in the production and productivity of sugarcane in the district is positive and significant i.e. 2.31 and 2.42 per cent respectively. The result shows that the positive growth rate in the productivity of sugarcane is solely responsible for the increase in production.

Furthermore, the results of statistical tools applied for filtering the data has been presented in the table which shows that the value of

coefficient of variation in the production of sugarcane in Haryana was 18.48 per cent but area shows highest variation in the state as well as in the sampled district.

## 2. Cost and return pattern of sugarcane cultivation in Karnal:

Table 5.1(a) shows the different cost variables. Basically the Variable cost has been divided into following parts i.e. preparatory tillage, sowing, ridging, cost of seeds, FYM, fertilizers,

Irrigation, Hoeing/Weeding, plant protection, harvesting, threshing/winnowing, interest on working capital and miscellaneous.

After the interview of the farmers of district Karnal the results were presented in the tabular form. The average cost for the preparatory tillage was Rs. 2780 in the district but it was higher found higher in Assandh block. The average cost of seed was found Rs. 11658 in the district and again it was higher in Assandh block as shown in the table.

**Table-2**  
**Cost of Cultivation and Returns of Sugarcane in Karnal during 2015-16**

(Per acre)

Sr. no	Particulars	Assandh	Indri	Average
1	Preparatory tillage	3020	2540	2780
2	Sowing	3747	3760	3753
3	Ridging	110	150	130
4	Seed	12126	11190	11658
5	FYM	620	560	590
6	Fertilizers	3010	3142	3076
7	Irrigation	4200	4600	4400
8	Hoeing / Weeding	4313	3750	4032
9	Plant Protection	3270	3100	3185
10	Harvesting	12200	12700	12450
11	Threshing /Winnowing	2460	3780	3120
12	Interest on working capital	4430	4470	4450
13	Miscellaneous	250	420	335
14	<b>Variable Cost</b>	<b>53756</b>	<b>54162</b>	<b>53959</b>
15	Rental Value of Owned Land/Rent on Leased in Land	38900	36500	37700

16	Management charges	5375		5416		5429	
17	Risk factor	5375		5416		5429	
18	Transportation	7100		7600		7350	
19	<b>Total Cost</b>	<b>110506</b>		<b>109094</b>		<b>109867</b>	
20	Average Production (qtl.)						
	(a) Main	355 qtl	111825	363 qtl	114345	359 qtl	113085
	(b) By product	38 qtl	3500	30 qtl	2880	34 qtl	3190
21	Average Price (qtl.)	315/qtl.		315/qtl.		315/qtl.	
22	<b>Gross Returns</b>	<b>115325</b>		<b>117225</b>		<b>116275</b>	
23	<b>Returns over variable cost</b>	<b>61569</b>		<b>63063</b>		<b>62316</b>	

Source: Primary survey

The cost on fertilizers and irrigation was found higher in Indri block of district. The average cost of fertilizers was Rs. 3076 and for irrigation was Rs. 4400 in the Karnal district. The average per acre cost of fertilizers was Rs. 3076 for all farmers of different categories of the district. The average cost on irrigation was estimated Rs. 4400 per acre for all the farmers while it was higher among the farmers of Indri block. The maximum share of cost was for harvesting i.e. 12450 for all the sampled farmers and it was found higher in Indri block of the district.

The cost of interest on working capital was almost similar between both blocks i.e. Rs. 4430 per acre was estimated in Assandh and Rs. 4470 in Indri. During the survey it was observed that the expenditure incurred on various inputs

varied among different categories of farmers. The total variable cost was estimated Rs.53959 for the district. The average transportation cost was Rs. 7350 for the sampled district. The total cost on per acre basis for sugarcane was found to vary between Rs. 110506 for Assandh block and Rs. 109094 was estimated in Indri block.

The table also shows that the average production of the farmers of the sampled district was 359 qtls. per acre as it has been seen from the table that the production of sugarcane was higher for the farmers of Indri block. Evidently it has been in the table that the farmers of the sampled district reaped an average price of Rs. 315/qtl during the year. The gross return from sugarcane cultivation was Rs. 116275/acre for all sampled farmers of district Karnal. At last



we can see in the table that the farmers of the district earned Rs. 62316 over the variable cost.

### 3. Problems faced by the farmers:

The problems faced by the sugarcane cultivators are shortage of labour, high wage rate of labour,

timely payments, inadequate modern technique, problem of marketing, price is low, problem of transportation, and other problems have been analyzed and presented in table-3.

**Table-3**  
**Problems Faced By the Sugarcane Cultivators**

Sr. no	Problems	Assandh	Indri	Total
1	Shortage of Labour	30 (85.71)	28 (77.14)	58 (82.86)
2	High Wage Rate of Labour	28 (77.14)	29 (82.86)	57 (81.42)
3	Timely payments	25 (71.43)	26 (74.29)	51 (72.86)
4	Inadequate Modern Technique	20 (57.14)	19 (54.29)	39 (55.71)
5	Problem of marketing	26 (74.29)	25 (71.43)	51 (72.86)
6	Price is Low	29 (82.86)	28 (77.14)	57 (81.42)
7	Problem of transportation	19 (54.29)	23 (65.71)	42 (60.00)
8	Other problems	17 (48.57)	16 (45.71)	33 (47.14)

Source: Primary survey

( ) Parenthesis indicates the percentages

The results presented in the table shows that majority of farmers i.e. 58 (82.86) out of 70 farmers belonging to district Karnal is reported that shortage of labour is the main problem faced by them. Almost similar trend was observed in both blocks. The second problem faced by them was high wage rate of labour and low price i.e. reported by 57 farmers. Third main problem faced by them was problem of marketing and timely payments and it was reported by 51 farmers. Problem of

transportation was faced by most of marginal and small category farmers due to limited resources such as tractor, trolley etc. i.e. almost 60 per cent of the sampled faced the problem of transportation. Around 47.14 per cent farmers were faced other problems such as reduction in domestic and local use of sugarcane.

### CONCLUSION:

As the cost on seeds and harvesting is found high as a result of which the total cost of



production has increased. In order to reduce the cost of production of sugarcane the farmers can go for mechanical harvester. The study highlighted that shortage of labour, high wage rate of labour and low price are the important problems faced by the farmers of the study area. The government can reduce the risk of sugarcane growers by ensuring the fair price policy for the cane growers so that there would be wider difference between the gross returns and cost of production thereby, higher return will be obtained by the farmers.

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