

An Analysis on Trends in Sugarcane, Sugar and Jaggery Production in India

Madegowda M

*Research Scholar, Dept of Studies in Economics and Cooperation,
University of Mysore, Manasagangothri, Mysuru, Karnataka - 570006.*

Dr. Mahesha M

*Professor, Dept of Studies in Economics and Cooperation,
University of Mysore, Manasagangothri, Mysuru, Karnataka - 570006.*

ABSTRACT

Sugarcane, Sugar and Jaggery play significant role in economy of India, trade and livelihood. Sugar industry is country's second largest agro-based industry, next to cotton. Sugarcane and sugar industry together impact the livelihood of over 5 crore farmers and their dependents involved in cultivating sugarcane in an area of almost 50 lakh hectares. India is the largest consumer and the second-largest producer of sugar in the world. Average annual production of sugarcane is around 35.5 crore tonnes which is used to produce around 3 crore tonnes of sugar. The domestic consumption is estimated to be around 2.6 crore tonnes during 2019-20. With this background the main objective of present research work is to examine the trends of sugarcane production, Sugar and Jaggery in India. The present research study is based on secondary data. To study the trends in area, production and yield of sugarcane at India level study period taken as 1990-91 to 2018-19. But for value of output of sugar and Jaggery the study period is 2004-05 to 2017-18. The study reveals that the area under Sugarcane and sugarcane yield in India has significantly increased during the study period. The area under Sugarcane and production of Sugarcane in Northern states is very high compare to Southern states during the study period in India. Though the area under Sugarcane and Production of Sugarcane are very high in Northern states compare to Southern states, the Sugarcane yield is high in Southern states than Northern states. The Jaggery industry is labour intensive and provides employment to millions of sugarcane farmers and others. It occupies a prominent place in the sugar economy. The Uttar Pradesh has highest share in the value of output of Jaggery followed by Maharashtra, Tamil Nadu, Bihar, Karnataka and other states. The result of the study has some policies implications.

KEYWORDS: *Sugarcane, area, yield, Sugar and Jaggery.*

Date of Submission: 15-03-2022

Date of Acceptance: 29-03-2022

I. INTRODUCTION

The Sugarcane, Sugar and Jaggery plays a significant role in India's agricultural economy. They have been and continue to be important commodities of trade and livelihood. It directly or indirectly impacts the livelihoods of farmers and their dependents, involved in cultivating sugarcane. India is the largest consumer of sugar in the world. The sugar industry is amongst the most important agro-based industries in the country that impact livelihood of about 5 crore farmers and their family members and 5 lakh workers directly employed with the sugar mills. There are more than 700 installed sugar factories in the country with crushing capacity of about 340 lakh MT of sugar and annual turnover of about Rs 80,000 crore. These numbers reflect the important role of the sugar industry plays in India's economy (Report of the Task Force on Sugarcane and Sugar Industry)¹.

The Indian sugar industry, second largest in the world, is a key driver of rural development, supporting India's economic growth. The industry is inherently inclusive supporting over 6 million farmers and their families, along with workers and entrepreneurs of over 550 sugar mills, apart from a host of wholesalers and distributors spread across the country. Contribution of sugarcane to the national GDP is 1.1% which is significant considering that the crop is grown only in 2.57% of the gross cropped area. In India sugar is an essential item of mass consumption, and the domestic demand is around 25 million tonnes per annum. The crop besides providing the food and energy needs of the country also contribute to employment and revenue generation, social development and environmental safety. Because of the benefits from the crop and its wide and

¹Report of the Task Force on Sugarcane and Sugar Industry, Government of India, March 2020.

varied uses, sugarcane agriculture will remain a major contributor to the sustainable development of sugar industry in India (Solomon S)².

II. OBJECTIVES OF THE STUDY

The main objectives of the study are

- To analyze the trends in area, production and yield of Sugarcane in India.
- To examine the trends in production of Sugar and Jaggery in India.

III. HYPOTHESES OF THE STUDY

- There is a significant difference in the area, production and yield of sugarcane between northern and southern India.
- Production of Sugar and Jaggery between northern and southern India is significantly different.

IV. METHODOLOGY

The study is based on secondary data. To study the trends in area, production and yield of sugarcane at India level study period taken as 1990-91 to 2018-19. But for value of output of sugarcane, sugar and Jaggery the study period is 2004-05 to 2017-18. The secondary sources of data collected from Directorate of Economics & Statistics, DAC & FW, Govt. of India, and MOSPI. The econometric and Statistical tools such as Log-Lin model, Independent Sample Test, averages, charts, graphs and tables have been used to draw meaningful inferences.

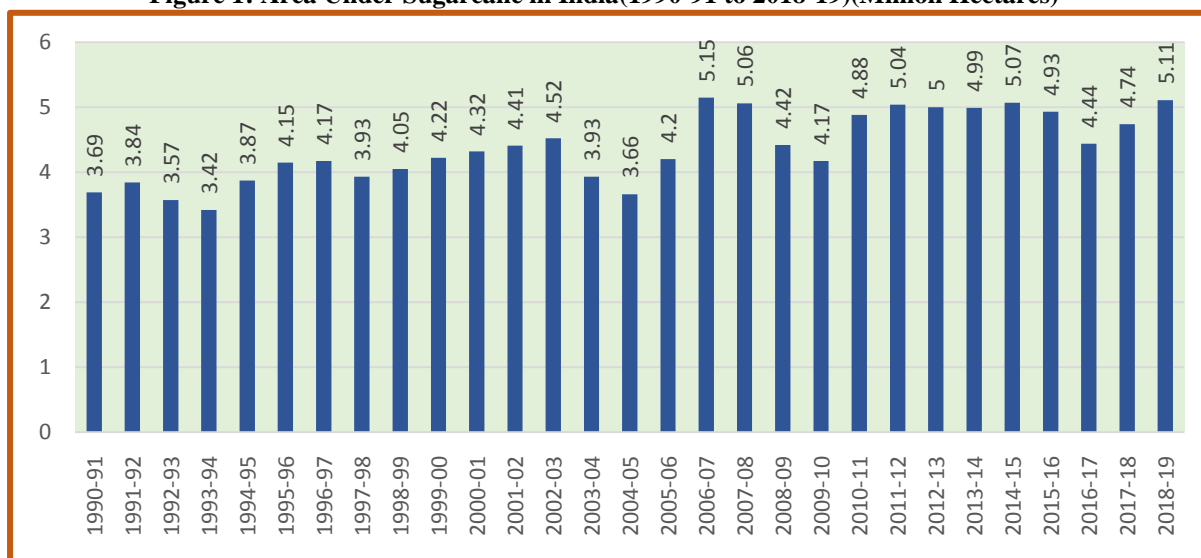
V. RESULTS AND DISCUSSION

Keeping in view the objectives of the study, this section discusses the results of the study pertaining to the trends and pattern of sugarcane, sugar and Jaggery in India.

5.1 Area, Production and Yield of Sugarcane in India

The sugarcane is one of the major commercial crop in India in which there are many employment opportunities are generated directly and indirectly. The main sugarcane growing states in India are Uttar Pradesh, Maharashtra, Karnataka, Andhra Pradesh, Haryana, Bihar, Gujarat and Punjab. With this backdrop this section deals with the area under Sugarcane, production and yield of Sugarcane in India.

Figure 1: Area Under Sugarcane in India(1990-91 to 2018-19)(Million Hectares)



Source: Directorate of Economics & Statistics, DAC&FW, GoI.

The figure 1 exhibits the area under Sugarcane in India from 1990-91 to 2018-19. In 1990-91 the area under Sugarcane was 3.69 million hectares. Then it increased to 5.15 million hectares in 2006-07. But the considerable decline was recorded during 2008-09, 2009-10 and 2016-17. The area under Sugarcane cultivation

² Solomon, S. (2016) "Sugarcane Production and Development of Sugar Industry in India", Sugar Tech, pp 588–602.

is decline by 9.93 percent during the year 2016-17 in India due to drought. Then it started to increase from 2017-18 and finally reached to 5.11 million hectares in 2018-19.

Table 1: Results of Growth model of Area under Sugarcane in India
Dependent variable: Area under Sugarcane

Variable	Coefficient	Std. Error	t-ratio	p-value
constant	1.29663	0.0281020	46.14	0.000***
time	0.0115167	0.00163616	7.039	0.000***

Source: Values Computed by Researcher.

Note: *** Indicates 1% Level of Significance

** Indicates 5% Level of Significance

* Indicates 10% Level of Significance

To estimate the growth of area under Sugarcane in India exponential growth model has been used for the period 1990-91 to 2018-19. The results are presented in the Table 1. It is found that the growth of area under Sugarcane has shown positive growth of 1.15 percent over the study period. The growth is also statistically significant at 1 percent level of significance.

Table 2: Results of Dummy Variable Regression Model for Sugarcane Area in India

Variables	Coefficient Value	Std. Error	t-Statistic	p-value	R Square	F value
Intercept Dummy	3.891	0.105	37.004	0.000***	0.631	22.294
Period- 2 2000-01 to 2009-10	0.493	0.148	3.315	0.002***		
Period- 3 2010-11 to 2018-19	1.020	0.152	6.677	0.000***		

Source: Values Computed by Researcher

Note: *** Indicates 1% Level of Significance

** Indicates 5% Level of Significance

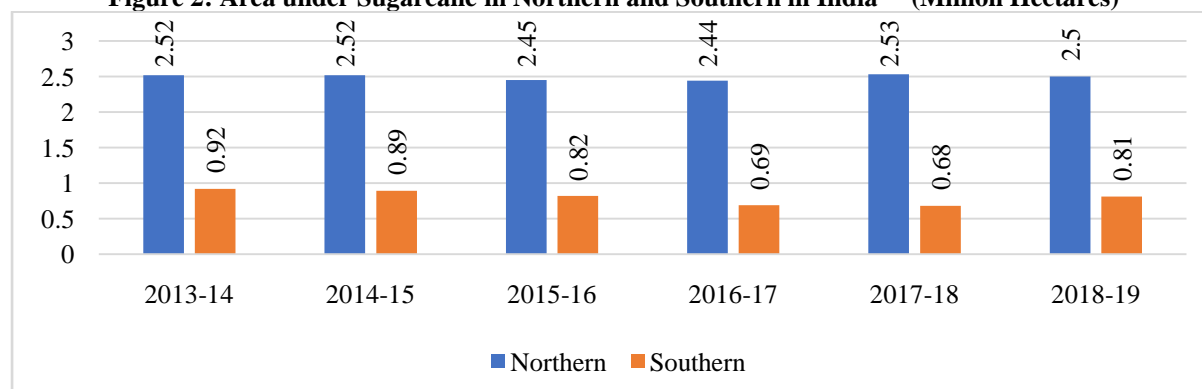
* Indicates 10% Level of Significance

A study of thirty years is too long to analyse the changes in any economic variables hence, the paper also attempted to analyse the difference in area under Sugarcane by dividing selected time period (1990-91 to 2018-19) in to three subperiods namely period 1 (1990-91 to 1999-2000), period 2 (2000-01 to 2009-10) and period 3 (2010-11 to 2018-19).

To compare the area under the Sugarcane in India among three different periods the dummy variable regression has been used. The results of the model are shown in table 2. The results revealed that the estimated value of the intercept dummy is 3.891, which means that on an average the area under Sugarcane was 3.89 million hectares during 1990-91 to 1999-2000 which is significant at 1 percent level of significance. The area under Sugarcane in the second period is higher by an amount of 0.49 million hectares compare to the first period. The estimated value of the dummy intercept is also statistically significant at 1 percent level of significance.

Further it is observed that the area under Sugarcane is higher by an amount of 1.02 million hectares during 2010-11 to 2018-19 which is also significant at 1 percent level of significance. The R square of the model is 0.63. From the above result it is observed that there is significant difference in the area under Sugarcane and compared to first period both in the second and third period of the study the area under Sugarcane is higher.

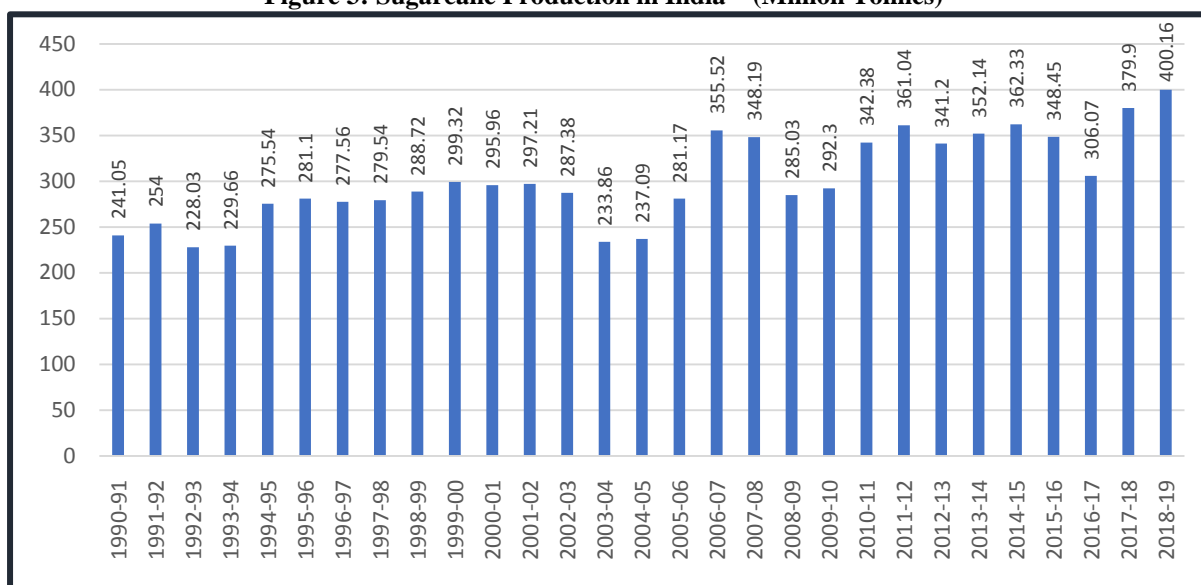
Figure 2: Area under Sugarcane in Northern and Southern in India (Million Hectares)



Source: Directorate of Economics & Statistics, DAC&FW, GoI.

The region wise area under Sugarcane in India has been reported the figure 2. It is observed that the area under Sugarcane in Northern states is very high compare to Southern states during the study period. Because of the availability of irrigation facilities and more Sugar factories established in Northern states than Southern states. In the year 2013-14 area under Sugarcane in Northern states is 2.52 million hectares and Southern states has only 0.92 million hectares during the same period. The similar trend can be observed during even 2014-15 to 2018-19. The area under Sugarcane in Southern states is only 32.4 percent of area under Sugarcane in Northern states during 2018-19.

Figure 3: Sugarcane Production in India (Million Tonnes)



Source: Directorate of Economics & Statistics, DAC&FW, GoI.

The Sugarcane production in India is depicted in the figure 3 for the period from 1990-91 to 2018-19. Starting with the lowest sugarcane production of 241.05 million tonnes during 1990-91 the production of sugarcane increased to 400.16 million tonnes during 2018-19. But it is reported that production of Sugarcane has reduced during 2002-03, 2003-04, 2008-09, 2009-10 and 2016-17. The production of sugarcane decreased from 295.96 million tonnes in 2000-01 to 233.86 million tonnes in 2003-04 then it increased to 355.52 million tonnes in 2006-07, again decreased to 285.03 million tonnes in 2008-09. It has reached to 362.33 million tonnes in 2014-15. Hence it can be concluded that the production of Sugarcane in India is fluctuating. The year of surplus sugar production causes glut leading to crash in the domestic prices. This creates crises for both millers as well as farmers, leading to reduced cane and sugar production in the subsequent years. Then the year of reduced production causes shortages leading to increased prices which again motivate the farmers to expand the area under crop. This causes induced cyclical nature of sugar as well as sugarcane production. (Priyanka Upreti and Alka Singh).

Table 3: Results of Growth model for Sugarcane Production in India

Variable	Coefficient	Std. Error	t-ratio	p-value
constant	5.47327	0.0371610	147.3	0.000***
time	0.0150217	0.00216360	6.943	0.000***

Source: Values Computed by Researcher.

Note: *** Indicates 1% Level of Significance ** Indicates 5% Level of Significance * Indicates 10% Level of Significance

To estimate the growth of Sugarcane production in India exponential growth model has been used for the period 1990-91 to 2018-19. The results are presented in the table 3. It is found that the Sugarcane production has shown positive growth with 1.50 percent over the study period. The growth is also statistically significant at 1 percent level of significance.

Table 4: Results of Dummy Variable Regression Model for Sugarcane Production in India

Variables	Coefficient Value	Std. Error	t-Statistic	p-value	R Square	F value
Intercept Dummy	265.45	9.834	26.992	0.000***	0.611	20.486
Period- 2 2000-01 to 2009-10	25.919	13.908	1.863	0.073*		
Period- 3 2010-11 to 2018-19	89.400	14.289	6.256	0.000***		

Source: Values Computed by Researcher.

Note: *** Indicates 1% Level of Significance

** Indicates 5% Level of Significance

* Indicates 10% Level of Significance

To compare the Sugarcane production in India among three different periods the dummy variable regression has been used. The results of the model are shown in table 4.

The paper attempted to analyse the difference in Sugarcane production by deviding selected time period (1990-91 to 2018-19) in to three periods namely period 1 (1990-91 to 1999-2000), period 2 (2000-01 to 2009-10) and period 3 (2010-11 to 2018-19).

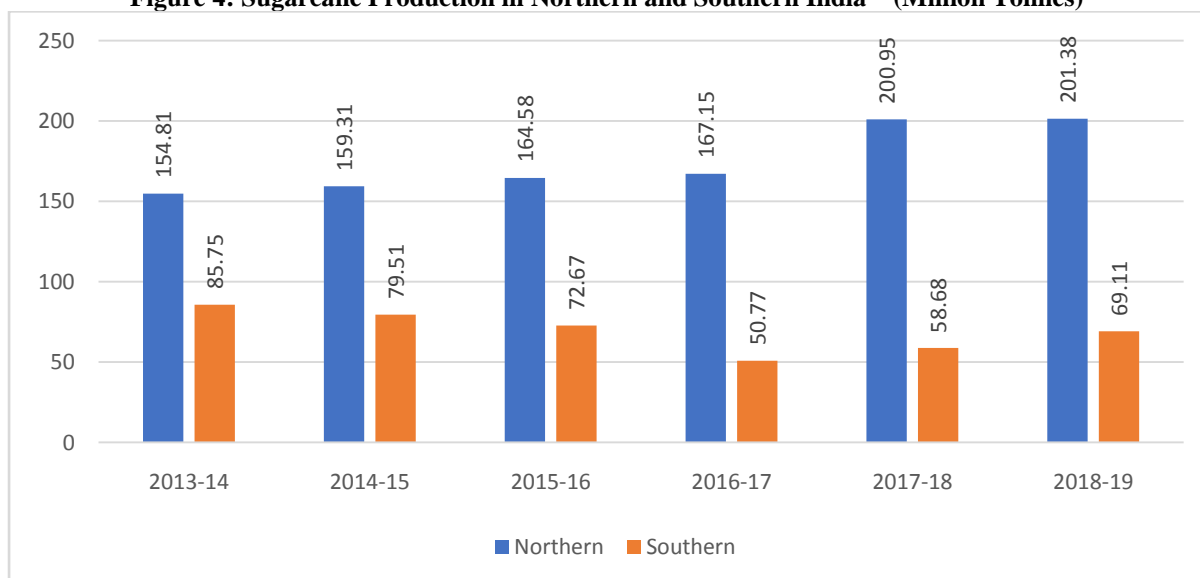
The results revealed that the estimated value of the intercept dummy is 265.45, which means that on an average the production of Sugarcane was 265.45 million tonnes during 1990-91 to 1999-2000 which is significant at 1 percent level of significance.

The production of Sugarcane in the second period is higher an amount of 25.91 million tonnes compare to the first period. The estimated value of the dummy intercept is also statistically significant at 10 percent level of significance showing a marginal difference.

Further it is observed that the production of Sugarcane has higher by an amount of 89.40 million tonnes during 2010-11 to 2018-19 which is significant at 1 percent level of significance. The R square of the model is 0.61.

Compared to first period in production of Sugarcane the amount of difference in the second period is significant only at 10 percent level of significance. Whereas the Sugarcane production in the third period is significant at 1 percent level compared to first period.

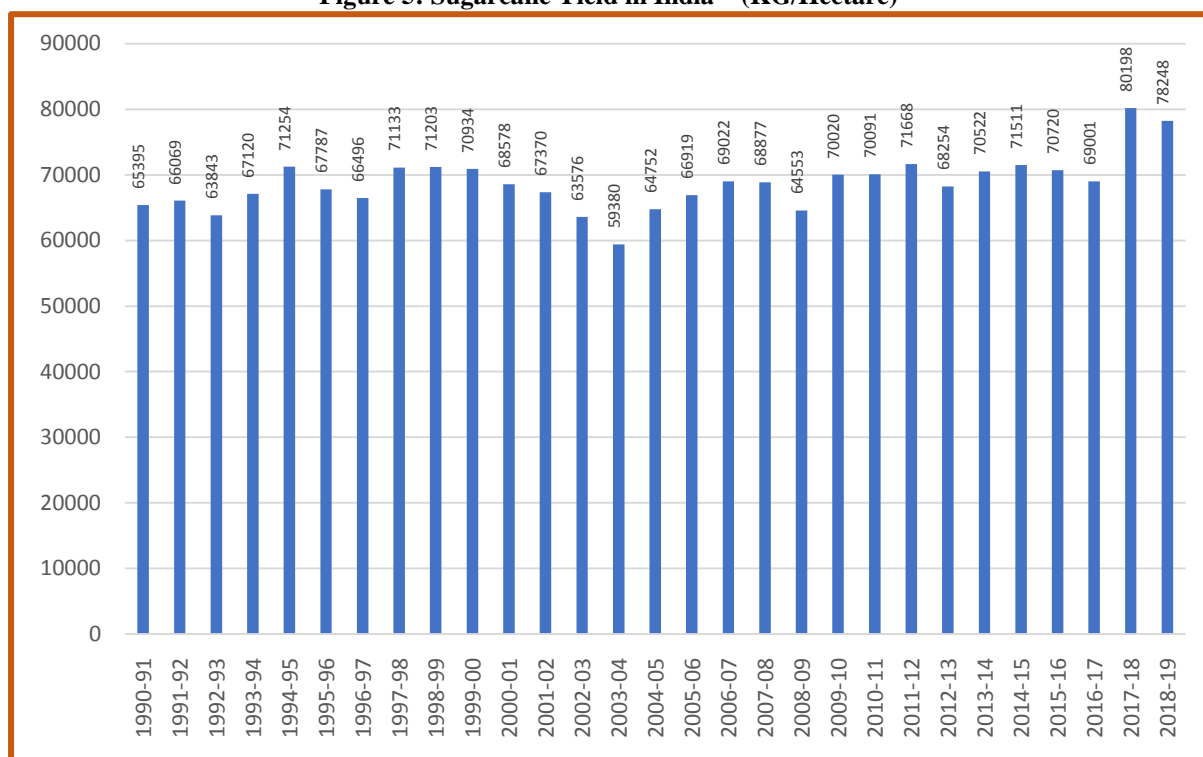
Figure 4: Sugarcane Production in Northern and Southern India (Million Tonnes)



Source: Directorate of Economics & Statistics, DAC&FW, GoI.

The region wise production of Sugarcane in India has been reported the figure 4. It is observed that the production of Sugarcane in Northern states is very high compare to Southern states due to the area under Sugarcane in Northern states is very high compare to Southern states during the study period. In the year 2013-14 production of Sugarcane in Northern states is 154.81 million tonnes and Southern states has only 85.75 million tonnes during the same period. It is increased to 201.38 million tonnes in Northern states but it is decreased to 69.11 million tonnes in Southern states during 2018-19. The production of Sugarcane in Southern states is only 34.31 percent of production of Sugarcane in Northern states during 2018-19.

Figure 5: Sugarcane Yield in India (KG/Hectare)



Source: Directorate of Economics & Statistics, DAC&FW, GoI.

The figure 5 presents the trends in Sugarcane yield in India. The trends showed that the yield is more or less stable during the study period. However, the yield of Sugarcane has started to increase from 2017-18. Further it is found that during 2002-03 to 2004-05 the yield of Sugarcane in India was slightly low.

Table 5: Results of Growth Model of Sugarcane Yield in India

Variable	Coefficient	Std. Error	t-ratio	p-value
constant	11.0841	0.0198504	558.4	0.000 ***
Time	0.00351763	0.00115573	3.044	0.0052 ***

Source: Values Computed by Researcher using data from Directorate of Economics & Statistics, DAC&FW, GoI.

Note: *** Indicates 1% Level of Significance

** Indicates 5% Level of Significance

* Indicates 10% Level of Significance

The growth of Sugarcane yield in India is reported in the table 5 for the period from 1990-91 to 2018-19. It has positive growth of 0.35 percent during the study period 1990-91 to 2018-19 which is significant at 1 percent level of significance.

Table 6: Results of Dummy Variable Regression Model of Sugarcane Yield in India

Variables	Coefficient Value	Std. Error	t-Statistic	p-value	R Square	F value
Intercept Dummy	68123.400	1077.570	63.219	0.000***	0.365	7.479
Period- 2 2000-01 to 2009-10	-1818.700	1523.914	-1.193	0.243		
Period- 3 2010-11 to 2018-19	4122.489	1565.673	2.633	0.014**		

Source: Values Computed by Researcher.

Note: *** Indicates 1% Level of Significance
 ** Indicates 5% Level of Significance
 * Indicates 10% Level of Significance

To compare the Sugarcane production in India among three different periods, namely, period 1 (1990-91 to 1999-2000), period 2 (2000-01 to 2009-10) and period 3 (2010-11 to 2018-19), the dummy variable regression has been used. The results of the model are shown in table 6.

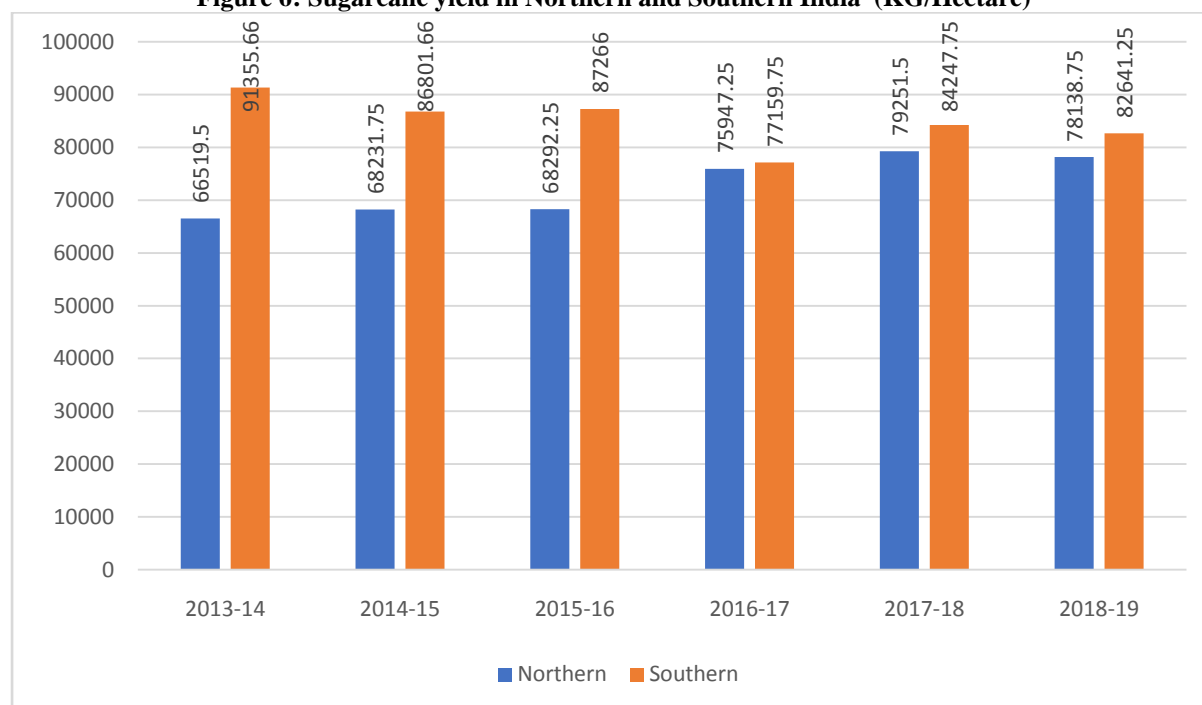
The results revealed that the estimated value of the intercept dummy is 68123.400, which means that on an average the Sugarcane yield increased by 68123kg per hectare during 1990-91 to 1999-2000 which is significant at 1 percent level of significance.

But discernible changes is observed during the second period, because the differential intercept value during that period is -1818.7, which means that the Sugarcane yield level has negative by an amount of 1818.7 kg per hectare, although the result is statistically insignificant.

Further it is observed that the Sugarcane yield has higher by an amount of 4122 kg per hectare during 2010-11 to 2018-19 which is also significant at 5 percent level of significance. The R square of the model is 0.36.

Compared to first period Sugarcane yield in the second period is decreased, but statistically insignificant. Whereas in the third period it is higher compared to first period and also significant at 5 percent level.

Figure 6: Sugarcane yield in Northern and Southern India (KG/Hectare)

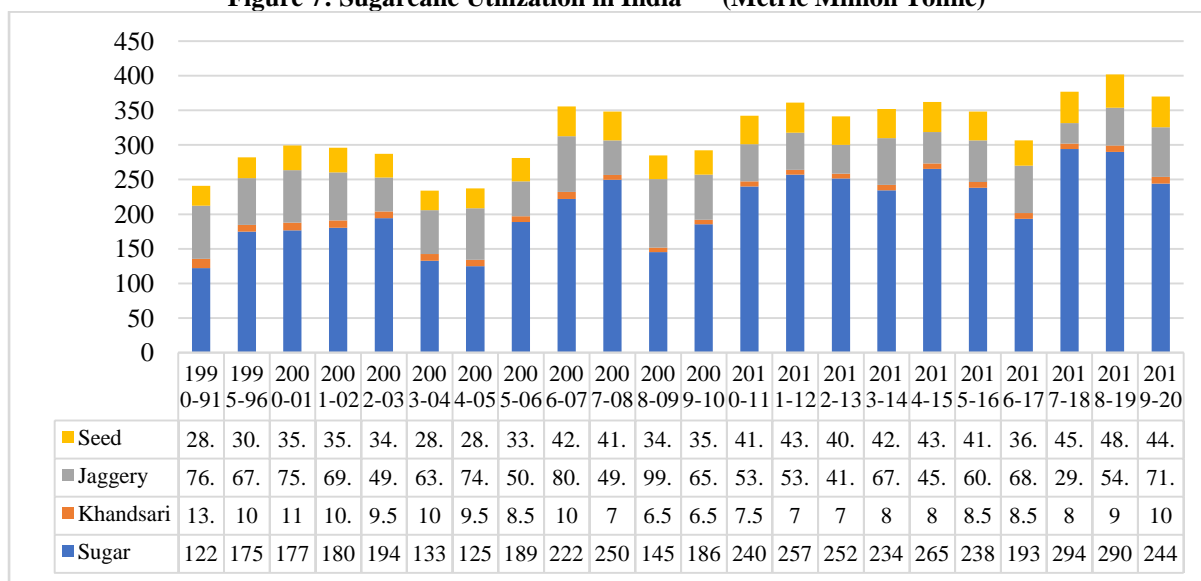


Source: Directorate of Economics & Statistics, DAC&FW, GoI.

The region wise Sugarcane yield in India has been reported in the figure 6. It is observed that the Sugarcane yield in Southern states is very high compare to Northern states during the study period. In the year 2013-14 Sugarcane yield in Northern states is 66519.5 Kg per hectare and Southern states has 91355.66 Kg per hectare during the same period. It is increased to 78138.75 Kg per hectare in Northern states but it is decreased 82641.25 Kg per hectare in Southern states during 2018-19. The Sugarcane yield in Northern states is 94.55 percent of Sugarcane yield in Southern states during 2018-19.

Though the area under Sugarcane and Production of Sugarcane are very high in Northern states compare to Southern states, the Sugarcane yield is high in Southern states than Northern states. In Northern states, the Sugarcane yield per hectare is low because of the unfavourable climatic conditions prevailing in the region. In Southern states, the Sugarcane yield per hectare is high because of the prevalent tropical climates in the region.

Figure 7: Sugarcane Utilization in India (Metric Million Tonne)



Source: Directorate of Economics & Statistics, DAC&FW, GoI.

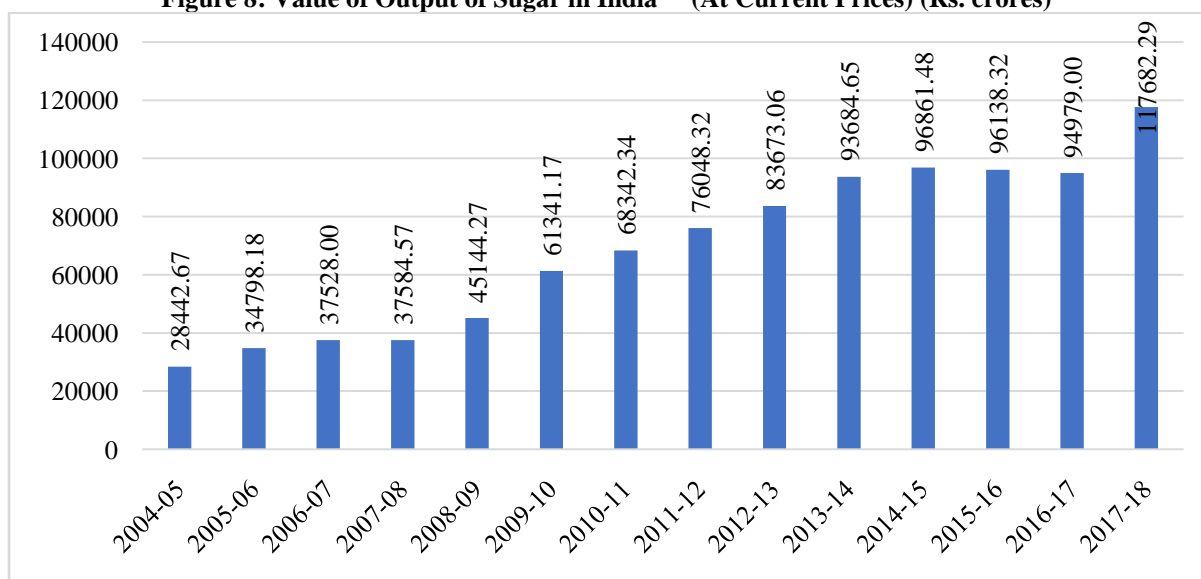
Figure 7 represents the utilisation of Sugarcane among four different products in India during the study period. Over the study period the percentage of Sugarcane utilized for the production of Sugar is more than 60 percent on the average. The second highest percentage of Sugarcane goes to the production of Jaggery followed by seed and khandasari.

In the study period the percentage utilization of Sugarcane for the production of Sugar has been increased during second half compare to the first half of the study period. But the percentage utilisation of Sugarcane for the production of Jaggery has been reduced in second half than first half in the study period.

5.2 Sugar Production in India

Sugar industry is an important agro-based industry that impacts rural livelihood of about 50 million sugarcane farmers and around 5 lakh workers directly employed in sugar mills. Employment is also generated in various ancillary activities relating to transport, trade servicing of machinery and supply of agriculture inputs. India is the second largest producer of sugar in the world after Brazil and is also the largest consumer. The following sections discusses extensively about the production of sugar in India.

Figure 8: Value of Output of Sugar in India (At Current Prices) (Rs. crores)



Source: National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India

The figure 8 shows the trends in value of output of Sugar in India for the period from 2004-05 to 2017-18. It is found that the value of output of Sugar was 28442.67 crores in 2004-05 which is increased to 76048.32 crores in 2011-12, further increased to 117682.29 crores in 2017-18. It clearly shows that there is an increasing trend in the value of output of Sugar during the study period.

Table 7: Results of Growth model of Value of output of Sugar in India

Variable	Coefficient	Std. Error	t-ratio	p-value
constant	10.2424	0.0661147	154.9	0.0001***
time	0.108325	0.00776478	13.95	0.0001***

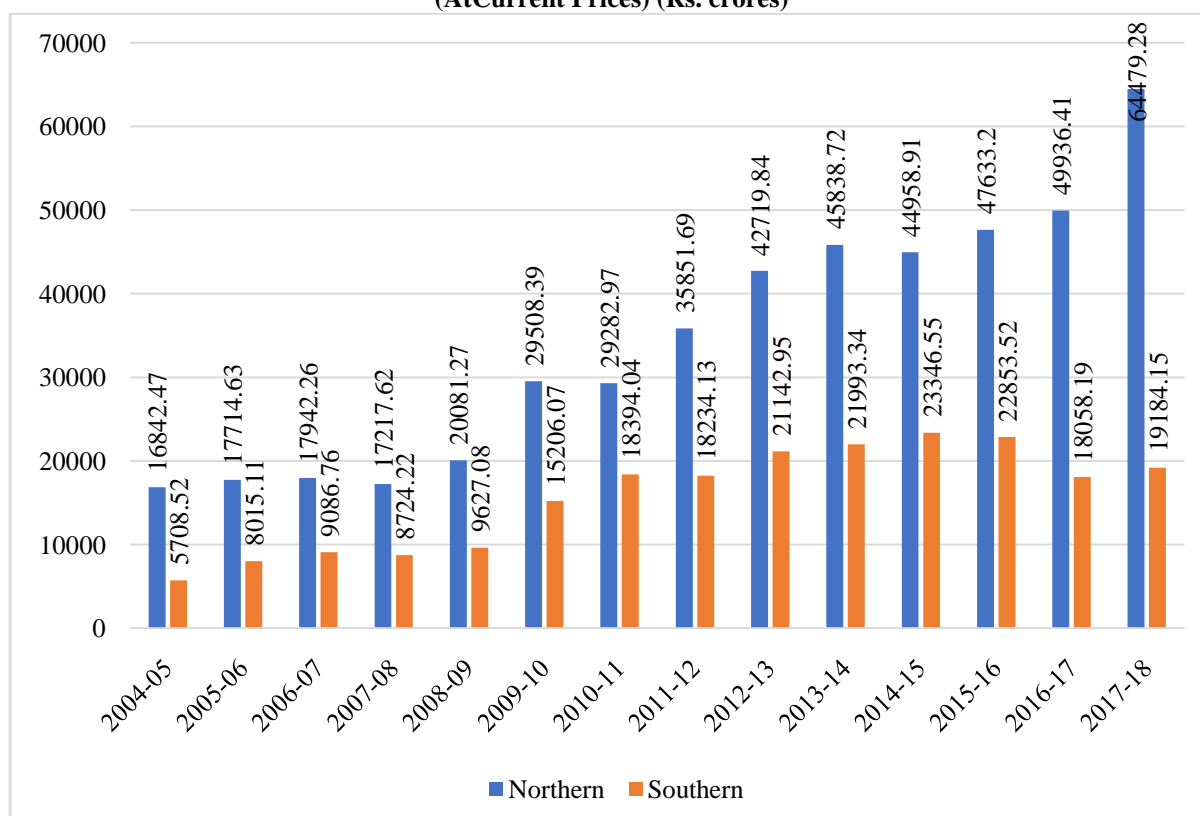
Note: *** Indicates 1% Level of Significance

** Indicates 5% Level of Significance

* Indicates 10% Level of Significance

The growth of value of output of Sugar in India is presented in the table 7 for the period from 2004-05 to 2017-18. It is found that the value of output of Sugar has positive growth by 10.83 percent over the study period. The growth is statistically significant at 1 percent level of significance.

Figure 9: Value of Output of Sugar in Northern and Southern India (At Current Prices) (Rs. crores)



Source: National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India.

The region wise value of output of Sugar in India has been reported the figure 9. It is observed that the value of output of Sugar in Northern states is very high compare to Southern states during the study period due to large number of sugar factories located in the region. In the year 2004-05 value of output of Sugar in Northern states is Rs.16842.47 crores and Southern states has Rs.5708.52 crores during the same period. It is increased to Rs.64479.28 crores in Northern states and Rs. 19184.15 crores in Southern states during 2017-18. Southern states value of output of Sugar is only 29.75 percent of the value of output of Sugar of Northern states in 2017-18.

Table 8: Results of Independent Sample t Test for value of output of Sugar between Northern and Southern India.

Mean Difference	Std. Error Difference	Degree of Freedom	t value	Significance
1860235.92857	441108.62535	17.150	4.217	0.001

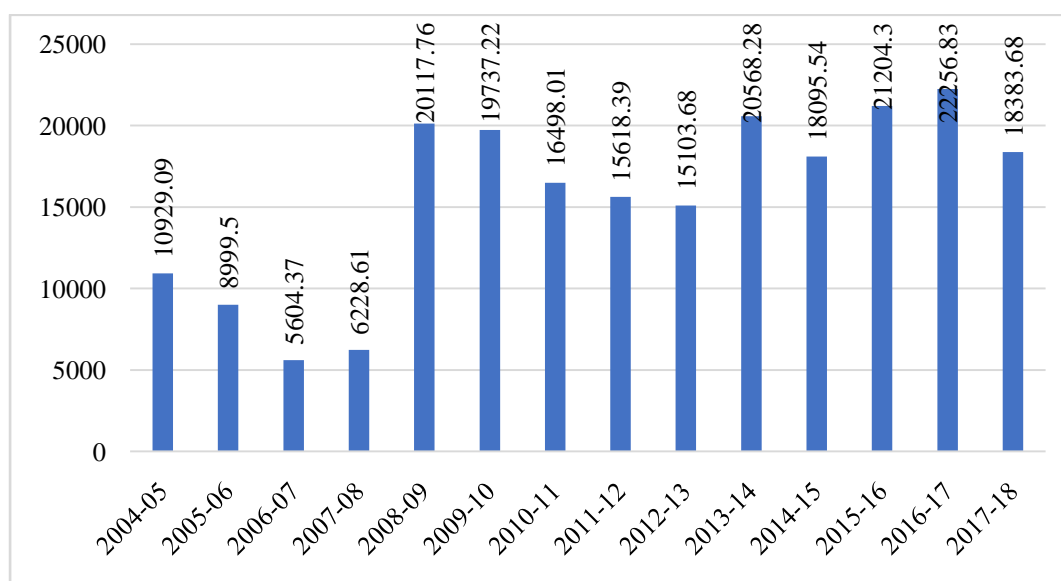
Source: Values Computed by Researcher.

The table 8 exhibits the results of independent sample test for value of output of Sugar between Northern and Southern states of India. The probability value is 0.001 which is significant at 1 percent level of significance. Hence it can be concluded that there is a significant difference in the value of output of sugar between Northern and Southern states. The average value of output of Sugar in Northern states is Rs. 3428626.14 lakhs whereas Southern states has only Rs. 1568390.21 lakhs.

5.3 Jaggery Production in India

The Jaggery industry is labour intensive and provides employment to millions of sugarcane farmers and others. It occupies a prominent place in the sugar economy. Jaggery making is a simple process comprising crushing of sugarcane for juice extraction, filtration and boiling of juice for concentration and then cooling and solidifying to give jaggery blocks. The juice is extracted in conventional crusher; this is then filtered and boiled in shallow iron pans. India is the largest producer and consumer of jaggery. The trends in output and growth of Jaggery have been discussed in this section.

Figure 10: Value of Output of Jaggery in India (At Current Prices) (Rs. Crores)



Source: National Statistical Office, Ministry of Statistics And Programme Implementation, Government Of India.

The figure 10 shows the value of Jaggery in India from 2004-05 to 2017-18. In the initial stage of the study period that is from 2004-05 to 2007-08 the value of output of Jaggery was very low. But starting from 2008-09 the value of output of Jaggery started to increase with slight fluctuations. The highest value of output of Jaggery reached to Rs. 22256.83 crores in 2016-17 and again decreased to Rs. 18383.68 crores in 2017-18.

Table 9: Results of Growth Model of Value of output of Jaggery in India

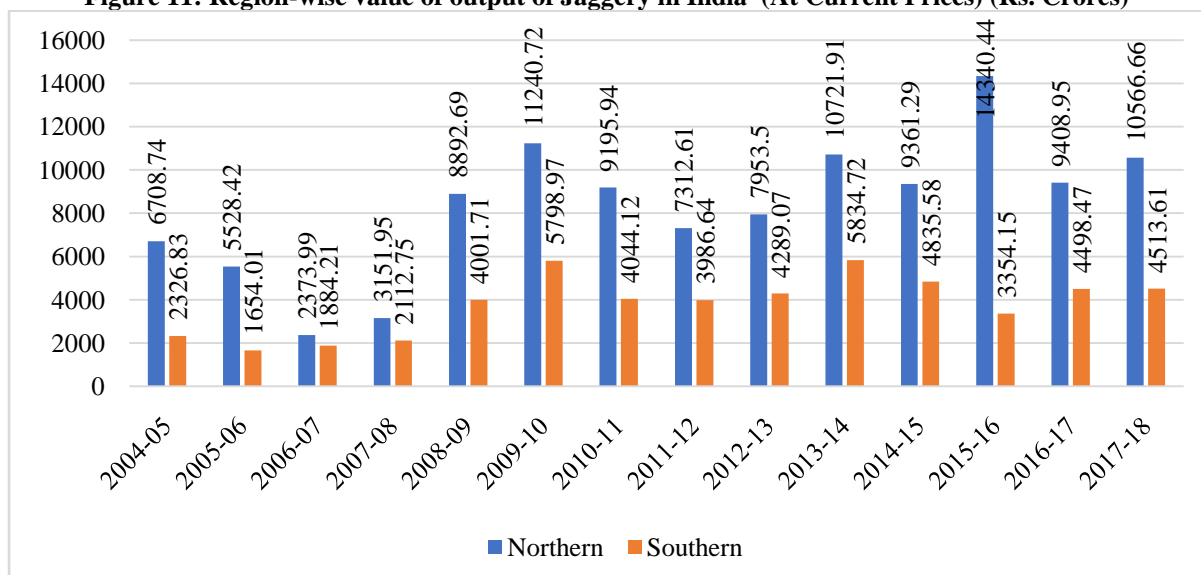
Variable	Coefficient	Std. Error	t-ratio	p-value
constant	13.5991	0.187823	72.40	0.0001***
Time	0.0778362	0.0220587	3.529	0.0042***

Source: Values Computed by Researcher using data from National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India.

Note: *** Indicates 1% Level of Significance** Indicates 5% Level of Significance* Indicates 10% Level of Significance

The growth in value of output of Jaggery in India is reported in the table 9. The coefficient value is 7.78, it means that during the study period value of out of Jaggery is increased by 7.78 percent on the average. The result is significant at 1 percent level of significance.

Figure 11: Region-wise value of output of Jaggery in India (At Current Prices) (Rs. Crores)



Source: National Statistical Office, Ministry of Statistics and Programme Implementation, G o I.

The region wise value of output of Jaggery in India has been reported the figure 11. It is observed that the value of output of Jaggery in Northern states is very high compare to Southern states during the study period. In the year 2004-05 value of output of Jaggery in Northern states is Rs.6708.74 crores and Southern states has Rs.2326.83 crores during the same period. It is increased to Rs.14340.44 crores in Northern states and Rs. 3354.15 crores in Southern states during 2015-16. But it is decreased to Rs.10566.66 crores in Northern states and increased to Rs. 4513.61 crores in Southern states. Southern states value of output of Jaggery is only 42.71 percent of the value of output of Jaggery of Northern states during 2017-18.

Table 10: Results of Growth model of Value of output of Jaggery in Northern India

Variable	Coefficient	Std. Error	t-ratio	p-value
constant	12.9596	0.219753	58.97	0.0001***
time	0.0774287	0.0258087	3.000	0.0111**

Source: Values Computed by Researcher.

Note: *** Indicates 1% Level of Significance** Indicates 5% Level of Significance * Indicates 10% Level of Significance

Table 11: Results of Growth model of Value of output of Jaggery in Southern India

Variable	Coefficient	Std. Error	t-ratio	p-value
Constant	12.2547	0.172259	71.14	0.0001***
Time	0.0693895	0.0202308	3.430	0.0050***

Source: Values Computed by Researcher.

Note: *** Indicates 1% Level of Significance** Indicates 5% Level of Significance * Indicates 10% Level of Significance

The results from table 10 and 11 depict the growth rate of value of output of Jaggery in Northern and Southern states of India. The growth rate of value of output of Jaggery in Northern states is 7.74 percent and Southern states has 6.93 percent. This shows that the growth rate is high in Northern states than Southern states. The result is significant at 5 percent level of significance in Northern states and 1 percent level of significance in Southern states.

Table 12: Results of Independent Sample t Test for Value of Output of Jaggery in Northern and Southern India.

Mean Difference	Std. Error Difference	Degree of Freedom	t value	Significance
454449.78571	92767.47440	17.571	4.899	0.025

Source: Values Computed by Researcher.

The results of independent sample test for Jaggery production between Northern and Southern India are showed in table 12. The result indicates that the calculated value of the test is 4.899 and p value is 0.025 implies that there is a significance difference in value of Jaggery production between Northern and Southern states of India. The value of the difference is Rs.454450 crore.

VI. CONCLUSION

The present study examined trends and pattern of Sugarcane, Sugar and Jaggery at India level. The study found that area under Sugarcane in India has significantly increased during the study period. The area under Sugarcane in Northern states is very high compare to Southern states. The production of Sugarcane has a positive growth of 1.50 percent in India. It is also observed that the production of Sugarcane in Northern states is very high compare to Southern states in India. The growth of Sugarcane yield in India has increased significantly. Though the area under Sugarcane and Production of Sugarcane are very high in Northern states compare to Southern states, the Sugarcane yield is high in Southern states than Northern states.

Over the study period the percentage of Sugarcane utilized for the production of Sugar is more than 60 percent. The second highest percentage of Sugarcane goes to the production of Jaggery followed by seed and khandasari. In the study period the percentage utilization of Sugarcane for the production of Sugar has been increased during second half compare to the first half of the study period. But the percentage utilization of Sugarcane for the production of Jaggery has been reduced in second half than first half in the study period. The value of output of Sugar in India has a positive growth of 10.83 percent over the study period. It is very high in Northern states compare to Southern states in India.

The study found that value of out of Jaggery in India is increased by 7.78 percent. The result of independent sample test showed that there is a significant difference in the value of output of Jaggery between Northern and Southern states in India. The Uttar Pradesh has highest share in the value of output of Jaggery followed by Maharashtra, Tamil Nadu, Bihar, Karnataka and other states.

In recent years due to health consciousness among consumers the demand for Jaggery has been increasing. Therefore, it is suggested to utilise more Sugarcane to produce Jaggery and also the government has to provide appropriate facilities for Jaggery producers.

REFERENCES:

- [1]. A Status Report on Khandasari Sugar / Jaggery (Gur), Ministry of Micro, Small and Medium Enterprises, Government of India.
- [2]. Pocket Book of Agricultural Statistics 2020, Government of India Ministry of Agriculture and Farmers Welfare, Department of Agriculture, Cooperation and Farmers Welfare, Directorate of Economics and Statistics.
- [3]. Priyanka Upreti and Alka Singh (2017), "An Economic Analysis of Sugarcane Cultivation and its Productivity in Major Sugar Producing States of Uttar Pradesh and Maharashtra", *Economic Affairs*, Vol. 62, No. 4, pp. 711-718.
- [4]. Report of the Task Force on Sugarcane and Sugar Industry, Government of India, March 2020.
- [5]. Solomon, S. (2016) "Sugarcane Production and Development of Sugar Industry in India", *Sugar Tech*, pp 588-602.
- [6]. State wise and Item-Wise Estimates of Value of Output from Agriculture and Allied Sectors with New Base Year 2011-2012 (2011-12 To 2013-14), 2016, Central Statistics Office Ministry of Statistics and Programme Implementation Government of India.
- [7]. State-Wise and Item-Wise Value of Output from Agriculture, Forestry and Fishing Year: 2011-12 To 2017-18 with Base Year: 2011-2012, 2020, National Statistical Office, Ministry of Statistics and Programme Implementation Government of India.

Madegowda M, et. al. "An Analysis on Trends in Sugarcane, Sugar and Jaggery Production in India." *International Journal of Humanities and Social Science Invention (IJHSSI)*, vol. 11(03), 2022, pp 09-21. Journal DOI- 10.35629/7722