

GROWTH AND TRENDS OF SUGARCANE CULTIVATION IN INDIA: AN ECONOMIC ANALYSIS

Basavaraj Talawar¹ and Dr. (Smt) V. Sharada²

¹Research Scholar, Department of Economics, Karnatak University, Dharwad,

²Associate Professor, Karnatak Arts College, Dharwad

Abstract: *Commercial crops are one of the most essential parts of the agricultural sector in India. In commercial crops sugarcane crop is an important crop in country. The production has grown dramatically over past several years. This enabled India to become the second largest producer of sugar in the world leaving the other major producers of Brazil and is also the largest producer of sugarcane and the largest consumer of sugar in the world. Sugarcane growing in 4.39 million hectares in land and nearly 306.07 million tonnes of sugarcane is growing annually in India (FAOSTAT 2018). Sugarcane growing area in India can be broadly classified into two agro-climate regions, Tropical region and Sub-Tropical region. The major sugarcane producing states in India are Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Bihar and etc¹. The sugarcane cultivation in India plays a vital role towards socio-economic development in the rural area by mobilizing rural resources and generating higher income and employment opportunities. In this backdrop the present study explores the growth and trends of India. The objectives of the study are; to analyze the growth performance in major sugarcane producing countries in the world; to examine the trends of sugarcane area, production and yield in India. The study is based on secondary data, a source which was collected from Ministry of Agriculture and Farmers Welfare, Government of India, FAOSTAT (2018) over a period of time since 1990-91 to 2014-15. In this study were used simple statistical tools such as average, percentage and Compound Annual Growth Rate etc.*

Key Words: Sugarcane, Area, Production, Yield, Increase and Growth Rate.

1. Introduction

Agriculture forms the backbone for the economic development of Indian economy. So, Agriculture is one of the oldest and most important occupations of man. Therefore, in any country almost half of the economic status directly or indirectly depends on agriculture. The role of agriculture in development can be similarly assessed on the basis of how it helps the development of a under developed economy from the stage stagnation to the progressive stage.

¹ Misra S. K., Puri V. K., Indian Economy, Himalaya Publishing House, Chennai 2010, P. 537.

Development of agriculture always depends on fertility of soil, rainfall, water resources, good and suitable climate, chemicals, improved seeds from technology etc.

At present the share of agriculture and allied activities in our national income is nearly 16.4 per cent in 2017-18 (1st Advance Estimates). We know that with the process of development the share of agriculture in the national income has been declining, while the share of industry sector is on rises. Therefore, despite all its weaknesses, agriculture is likely to remain the most promising and the biggest source of employment in future also.

India's agricultural productivity is very low because of gambling in the monsoon. Therefore more number of farmers have shifted to growing of commercial crops mainly sugarcane cultivation. Sugarcane is an important commercial crop in India and grown on an area of about 4.5 million hectare, which is around 3.7 percent of the net area sown in the country. Sugarcane contributes about 4.6 percent of total value of output from agriculture and impacts rural livelihood of about 50 million sugarcane farmers and around 5 lakh workers are 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 producer of sugarcane and the largest consumer of sugar in the world (GOI). Sugar industry occupies an important place among organized industries and the second largest industry after textiles industry in India. In India, sugarcane is the key raw material, planted once a year during January to March. The production of sugarcane is spread across the country. Sugarcane growing area in India can be broadly classified into two agro-climate regions, Tropical region and Sub-Tropical region.

Indicating the agro-climate region and the states involved in sugarcane production in India

Agro-Climate Regions	States
Tropical region	Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Gujarat
Sub-Tropical region	Uttar Pradesh, Bihar, Haryana, Punjab

India is bestowed with favorable agro climatic conditions duly supplemented with suitable soils for sugarcane cultivation. In the country, there were a number of perennial rivers with dams, reservoirs, bore wells and open wells to supply water for sugarcane cultivation. The tropical region of the India contributes a lion share in the sugarcane production by constituting 189309.50 tonnes of total sugarcane production in the year of 2014-15.

It is also a major provider of livelihood to millions of agricultural families and their dependents particularly in rural areas. About a million people in the state depend upon sugar

industry, directly or indirectly. Apart from this, sugar factories are considered to be Welfare Centers in rural areas, as they give scope for establishment of educational institutions, hospitals, communication and transportation facilities etc².

The results of the study indicated that, wide temporal fluctuations were observed in sugarcane production in India as their analysis showed increasing trends in the study periods. This paper briefly reviews the production aspects of sugarcane in India with special emphasis on the factors associated with variation in production during the period from 1990-91 to 2014-15.

This paper briefly reviews the ecology, growth characteristics and production aspects of sugarcane in India, with special importance on the factors associated with variation in production during the past twenty five years.

2. Objectives of the Study

1. To analyze the growth performance in major sugarcane producing countries in the world.
2. To examine the trends of sugarcane area, production and yield in India.

3. Methodology of the Study

The study is based on secondary data, collected from Ministry of Agriculture and Farmers Welfare, Government of India, FAOSTAT (2018) over a period of time since 1990-91 to 2014-15. In this study were used simple statistical tools such as average, percentage and coefficient of variation.

4. Results and Discussion

Before reviewing the sugarcane production in India, following is the statistics for World and India sugarcane production trends. The total cultivated area, production and yield of sugarcane in FAOSTAT (2018), is the least in India among all Countries of the world.

Table 1 represent that the country wise production of sugarcane in the world. India is second largest producer of sugarcane in the world after Brazil. In India during 2018 sugarcane was harvested in an area of 4.39 million hectares with production of 306.07 million tonnes and with the productivity of 69.74 tonnes per hectare.

² Devaraja T. S. (2009) Financial Performance of Agro-Based Industries: The Case of Sugar Industry in Karnataka – Anmol Publications, New Delhi.

Table-1: Production, Yield and Area harvested of major Sugarcane producing countries in the world (2018)

Countries	Area (Million Hectares)	Production (Million Tonnes)	Yield (Tonnes per hectare)
Brazil	10.18 (37.23)	758.55 (38.97)	74.48
India	4.39 (16.05)	306.07 (15.73)	69.74
China	1.38 (5.03)	104.79 (5.38)	76.10
Thailand	1.37 (5.00)	102.95 (5.29)	75.24
Pakistan	1.22 (4.45)	73.40 (3.77)	60.32
Mexico	0.77 (2.82)	56.95 (2.93)	73.78
Australia	0.45 (1.66)	36.56 (1.88)	80.63
Colombia	0.40 (1.45)	34.64 (1.78)	87.16
Guatemala	0.28 (1.02)	33.76 (1.73)	121.01
United States of America	0.37 (1.34)	30.15 (1.55)	82.41
World	27.35 (100)	1946.32 (100)	71.15

Source: FAOSTAT 2018

Note: Figures in parenthesis shows percentage share

Area of sugarcane in India

Table 2 indicated that area under sugarcane in India, considered of period of 1990-91 to 2014-15. Area of sugarcane has continuously increased from 1990-91 to 2014-15, exclude the period of 1997-98, 2003-05 and 2008-09 because during the drought time of some major sugarcane growing states of country. The area under sugarcane in the country, subsequent periods of the 1990-91 has slowly increased 3.69 million hectares from 4.17 million hectares in 1996-97. This period area of sugarcane continuously increased. But in the period of 1997-98 area under sugarcane was declined from 3.93 million hectares because during the drought time of some sugarcane growing states in the country and due to lack of water sugarcane loses its weight. At the time, the sugarcane farmers expected much support (mainly financially) was not fully satisfied by the Government. So, the sugarcane farmers immediately go far cropping pattern change. After 1998-99, there was an increase in area of sugarcane up to 2014-15 in respect of 4.05 million hectares to 5.07 million hectares. This table also shows that 1990-91 to 2014-15 subsequent periods continually increased sub-tropical region compared with tropical region. The area under sugarcane is highest growth rate of 2.35 per cent of tropical region compared with respect of India and sub-tropical region respect of 1.33 per cent to 0.66 per cent of the study period.

Table-2 Area under sugarcane in India (1990-91 to 2014-15)

Year	India (In million hectares)	Tropical Region (In million hectares)	Sub-Tropical Region (In million hectares)
1990-91	3.69	1.30	2.38
1991-92	3.84	1.36	2.49
1992-93	3.57	1.23	2.34
1993-94	3.42	1.26	2.16
1994-95	3.87	1.60	2.26
1995-96	4.15	1.65	2.49
1996-97	4.17	1.48	2.70
1997-98	3.93	1.46	2.47
1998-99	4.05	1.64	2.42
1999-00	4.22	1.77	2.45
2000-01	4.32	1.80	2.51
2001-02	4.41	1.75	2.66
2002-03	4.52	1.70	2.82
2003-04	3.94	1.31	2.62
2004-05	3.66	1.20	2.46
2005-06	4.20	1.55	2.65
2006-07	5.15	2.32	2.83
2007-08	5.06	2.29	2.76
2008-09	4.42	1.85	2.56
2009-10	4.17	1.77	2.41
2010-11	4.88	2.16	2.73
2011-12	5.04	2.28	2.76
2012-13	5.00	2.14	2.86
2013-14	4.99	2.11	2.88
2014-15	5.07	2.27	2.79
CAGR	1.33	2.35	0.66

Source: Ministry of Agriculture and Farmers Welfare, Government of India

Production of sugarcane in India

Table no 3 trend analysis that a high fluctuation was observed in the production of sugarcane in India, considered of period of 1990-91 to 2014-15. Production of sugarcane has continuously increased from 1990-91 to 2014-15, exclude the period of 1992-93, 2002-03, 2003-04 and 2008-09 because during the drought time, water scarcity, decreasing of harvested area of some major sugarcane growing states of country. The production of sugarcane in the country,

subsequent periods of the 1990-91 has slowly increased 241.04 million tonnes from 253.99 million tonnes in 1991-92. This period production of sugarcane continuously increased. But in the period of 1992-93 sugarcane production was declined from 228.03 million tonnes because during the drought time of some sugarcane growing states in the country and due to lack of water sugarcane loses its weight. After 1993-94, there was an increase in production of sugarcane up to 2001-02 in respect of 229.65 million tonnes to 297.21 million tonnes, after which it declined in the subsequent periods of the production of sugarcane in India in 2002-03 has declined to 287.37 million tonnes from 233.86 million tonnes in 2003-04 area under sugarcane showed declining trend due to the frequent occurrence of droughts and floods resulting in irregular supply of cane. The wide variation was due to cyclical nature of sugarcane production which happens once in 2-3 years i.e. two year surplus production followed by deficit production of cane in the succeeding two/ three years³. After 2004-05, there was an increase in area of sugarcane up to 2014-15 in respect of 237.08 million tonnes to 362.28 million tonnes. This table also shows that in the study period in recent years of 2006-07 to 2014-15 subsequent periods continually increased tropical region compared with sub-tropical region. The production of sugarcane is highest growth rate of 2.35 per cent of tropical region compared with respect of India and sub-tropical region respect of 1.71 per cent to 1.11 per cent of the study period.

³ Rangarajan C. (2012) Report of the committee on Regulation of Sugar Sector in India: The way forward. Ministry of Agriculture, Government of India, Pp 11-27.

Table-3 Production of sugarcane in India (1990-91 to 2014-15)

Year	India (In million tonnes)	Tropical Region (In million tonnes)	Sub-Tropical Region (In million tonnes)
1990-91	241.04	108.40	132.64
1991-92	253.99	113.05	140.94
1992-93	228.03	101.45	126.57
1993-94	229.65	105.96	123.70
1994-95	275.54	142.81	132.72
1995-96	281.09	132.94	148.15
1996-97	277.55	120.07	157.48
1997-98	279.54	124.91	154.62
1998-99	288.72	148.07	140.64
1999-00	299.32	160.44	138.87
2000-01	295.96	158.30	137.66
2001-02	297.21	143.48	153.73
2002-03	287.37	130.88	156.49
2003-04	233.86	89.45	144.41
2004-05	237.08	91.07	146.01
2005-06	281.17	128.02	153.15
2006-07	355.52	189.15	166.37
2007-08	348.18	191.92	156.27
2008-09	285.03	151.13	133.89
2009-10	292.30	151.58	140.72
2010-11	342.38	187.79	154.59
2011-12	360.98	196.83	164.15
2012-13	341.15	170.71	170.43
2013-14	352.08	178.94	173.14
2014-15	362.28	189.31	172.97
CAGR	1.71	2.35	1.11

Source: Ministry of Agriculture and Farmers Welfare, Government of India

Yield of sugarcane in India

Table no 4 shows that the yield of sugarcane including tropical region and sub-tropical regions of India, considered of period of 1990-91 to 2014-15. According to in this table, even India's yield per hectare high fluctuation was observed in the yield of sugarcane during the study period. In India, yield of sugarcane has increased from 1990-91 to 2014-15, exclude the period of 1992-93. 1995-96, 1996-97, 1999-2000 to 2003-04 and 2008-09, because water scarcity, indiscriminate use of fertilizers, low sugarcane recovery of country. Especially, after during the

period of 2009-10, there was a continuous increase in yield of sugarcane up to 2014-15 in respect of 70.02 tonnes per hectare to 71.51 tonnes per hectare. Tonnes per hectare are essential average is for getting profit from sugarcane. In this table also shows that in the study period tropical region tonnes per hectare yield is very high which is higher than the country yield as well as sub-tropical region tonnes per hectare yield. The yield of sugarcane is highest growth rate of 0.45 per cent of sub-tropical region compared with respect of India and tropical region respect of 0.37 per cent to 0.00 per cent of the study period.

Table-4 Yield under sugarcane in India (1990-91 to 2014-15)

Year	India (In tonnes per hectare)	Tropical Region (In tonnes per hectare)	Sub-Tropical Region (In tonnes per hectare)
1990-91	65.40	83.28	55.63
1991-92	66.07	83.21	56.70
1992-93	63.83	82.50	54.03
1993-94	67.12	84.04	57.25
1994-95	71.26	89.16	58.60
1995-96	67.78	80.41	59.41
1996-97	66.50	81.25	58.41
1997-98	71.14	85.48	62.65
1998-99	71.21	90.55	58.13
1999-00	70.93	90.73	56.65
2000-01	68.58	87.72	54.82
2001-02	67.37	82.08	57.72
2002-03	63.58	77.03	55.48
2003-04	59.38	68.10	55.02
2004-05	64.75	75.97	59.29
2005-06	66.92	82.70	57.72
2006-07	69.02	81.64	58.71
2007-08	68.88	83.74	56.55
2008-09	64.56	81.67	52.21
2009-10	70.02	85.83	58.43
2010-11	70.09	87.08	56.67
2011-12	71.67	86.37	59.52
2012-13	68.25	79.72	59.66
2013-14	70.52	84.63	60.16
2014-15	71.51	83.28	61.94
CAGR	0.37	0.00	0.45

Source: Ministry of Agriculture and Farmers Welfare, Government of India

5. Findings of the study

- Brazil has highest area 10.18 (37.23 per cent of overall sugarcane growing) million hectares as well as production 758.55 (38.97 per cent of overall sugarcane production) in million tonnes compared to other major countries.
- Guatemala country has quite low area 0.28 million hectares for sugarcane in major countries in the world.
- Interesting point is United States of America has 0.37 million hectares area its higher than Guatemala country but level of production of sugarcane 30.15 million tonnes its low compared Guatemala.
- Considered major sugarcane produced countries Guatemala has quite highest yield 121.01 tonnes per hectare and Pakistan has quite low yield tonnes per hectare in major sugarcane producing countries in the world.
- Sugarcane area in million hectare continuously increasing in India exclude 1992-93, 1993-94, 1997-98, 2003-04, 2004-05 and 2008-09 during 1990-91 to 2014-15.
- Sub-tropical region in area of sugarcane has continuously increasing compared to tropical region in India.
- Production of sugarcane in million tonnes continuously increasing in India exclude 1992-93, 2003-04, 2004-05 and 2008-09 during 1990-91 to 2014-15 sugarcane production is declined because of area in sugarcane declined.
- In the study period in recent years of 2006-07 to 2014-15 subsequent periods continually increased tropical region compared with sub-tropical region.
- In India, yield of sugarcane has increased from 1990-91 to 2014-15, exclude the period of 1992-93, 1995-96, 1996-97, 1999-2000 to 2003-04 and 2008-09.
- Especially, after during the period of 2009-10, there was a continuous increase in yield of sugarcane up to 2014-15 in respect of 70.02 tonnes per hectare to 71.51 tonnes per hectare.
- In the study period tropical region tonnes per hectare yield is very high which is higher than the country yield as well as sub-tropical region tonnes per hectare yield.

6. Policy Suggestions

The prime policy implications and suggestions which could be instrumental in improving the performance of sugarcane production in Karnataka are as follows.

- Government and sugarcane breeding institute need to provide drought resist varieties of sugarcane.
- Introduce high yielding varieties (HYVs) of seed setts and awareness of utilization to the cane growers.
- It was observed that the sugarcane farmers are facing many problems with sugar factories in India. Hence, the sugar factories are advised to ensure prompt payment to farmers, ensure reasonable price fixation, and extend the supply of seed material.
- Sugar factories have to lift the cane at the right time; otherwise cane will lose its weight.
- To increase and sustain the state future sugar production, improved soil management of sugarcane fields, irrigation technology and the use of improved clones need to be introduced.
- The productivity of the sugarcane was mild in the country. Hence concerned efforts should be made to enhance productivity through strengthening the existing research and extension policy in order to develop higher yielding varieties.

7. Conclusion

Sugarcane is one of the parts of agriculture sector in India and also is one of the important commercial crops of country. Now present situation of sugarcane production in India is the second largest producer of sugar in the world after Brazil and is also the largest producer of sugarcane and the largest consumer of sugar in the world. So many rural and semi-urban peoples use in our daily works. It is also provide employment generation. Most of growers utilize the dry land in sugarcane cultivation. The results of the study indicated that, wide temporal fluctuations were observed in sugarcane production in India as their analysis showed increasing trends in the study periods. These fluctuations were due to cyclical nature of sugarcane production which happens the study periods. Hence, these fluctuations were need to be tackled by assuring farmers a best price and quick payment and strengthening irrigation supportive schemes etc. as well as the State Department of Agriculture and sugar factory should take necessary steps to awareness the cane growers on scientific method of cultivation of sugarcane by conducting result demonstrations in the farmers' fields. Besides it is important that these agencies should provide necessary inputs like improved variety seed sets, fertilizers, plant protection chemicals etc., at

right time with reasonable prices. The factories are also need to be strengthened with greater crushing capacity and proper working condition to avoiding delay in cane crushing and also to make quick payment to the cane growers and encourage for following staggered planting and harvesting of cane.

8. References

- Misra S. K., Puri V. K., Indian Economy, Himalaya Publishing House, Chennai 2010, P. 537.
- Akwilin J. P. Tarimo and Yasuo T. Takamura (1998), “*Sugarcane production, Processing and Marketing in Tanzania*”, ‘African Study Monography’, 19(1): Pp 1-11, May 1998.
- Latha C M, Ashoka S R, Siddappaji D, and Dr. V Shanmugham (2014), “Economic Development of Commercial Crops in Karnataka”, *Journal Of Humanities And Social Science*, Volume 19, Issue 11, Ver. IV (Nov. 2014), PP 29-31.
- FAOSTAT (2018)
- Ministry of Agriculture and Farmers Welfare, Government of India.
- Devaraja T. S. (2009) Financial Performance of Agro-Based Industries: The Case of Sugar Industry in Karnataka – Anmol Publications, New Delhi.
- Rangarajan C. (2012) Report of the committee on Regulation of Sugar Sector in India: The way forward. Ministry of Agriculture, Government of India, Pp 11-27.