



GROWTH AND DEVELOPMENT OF SUGAR INDUSTRY IN INDIA

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Abstract

Sugar industry is the largest agro-based processing industry after the cotton textiles industry. It has a lion's share in accelerating industrialization and in bringing socio-economic changes in the rural areas. The production of sugarcane and the sugarcane yield per hectare in India are fluctuated. One can attribute to this that the climatic conditions and lack of adequate power supplies, fluctuations in the area under sugar production, sugarcane production and sugarcane yield per hectare. States such as Haryana, Punjab, Uttar Pradesh, Uttarakhand stood first since the area under sugarcane production in such states consistently increased. the number of factories that are in operation in India increased in the beginning of the study period and decreased in the recent years of ten year study period. The said growth in the number of factories operating, sugar cane crushed, Sugar produced and the sugar rate recovery may be due to the prevalence of adverse conditions. the number of sugar factories working in India over first three years of five years study period is impressive whereas in the fourth and fifth years the number of sugar factories working in India is gradually decreased from year to year. Coming to the exports of sugar from India it is a different picture in the sense that the sugar exports from India have increased in the first four years of ten year study period and decreased in the next two years. On the whole, the exports of sugar from India are satisfactory.

Key words: Sugarcane, Agro-Based Industry, Exports, Sugar Factories, Production.

Introduction

Sugar is one of the precious consumer goods having tremendous demand as compared to other consumer goods in the world. Sugar can be produced from sugarcane, beet and fruits. About 60 per cent of sugar production in the world is from sugarcane and 40 per cent from the beet and fruits. In India, sugar is mainly produced from sugarcane. Sugar industry is the largest agro-based processing industry after the cotton textiles industry. It has a lion's share in accelerating industrialization and in bringing socio-economic changes in the rural areas. In under developed countries it supports 50 million farmers and their families by way of providing direct employment to the tune of more than 0.5 million skilled and semi-skilled persons in sugar mills and in its allied industries. The role of Indian sugar industry in the global sugar market is predominant since India is the second largest sugar producer in the world after Brazil.

Owing to the highest perishable nature of sugarcane, harvested sugarcane must be crushed in the time period ranging from 24-48 hours. Harvest season is limited whereas demand for sugar is uniform throughout the year. Sugar mills usually work, on an average for 280 days in a year. The seasonal workers in sugar mills, who constitute about 50 per cent of the work force, are out of work for a period of about 6 to 8 months every year. The sugar industry consists of two stage production processes; first, farm level sugarcane production and second, processing of sugarcane into sugar. Sugarcane processing also generates some by-products, which are used for many value-added products in downstream industries (producing mainly bagasse and alcohol-based products). India is the largest single producer of sugar including traditional cane sugar sweeteners, khandsari and gur equivalent to 26 million tonnes raw value.

Statement of the Problem

Sugar occupies a pride of place in Indian consumer's palate. However, apart from being perhaps the most regulated product, it also evokes strong sentiment and any change in government decision concerning it often prompts dramatic reactions from farmers and consumers alike. Unlike many western or major sugarcane growing countries, sugarcane is the only major source of sugar in our country and, therefore, any mismatch between demand and supply of sugar in the country assumes a significant importance at both national and state levels and influences the economics of sugarcane cultivation to a great extent. The sugar industry in India finds itself entangled in a complex web of problems leading to "declining profitability to the cane growers as well as sugar industries". The reasons for the same are to be traced and suitably addressed to give a boost to this sector in the country.

Objectives of the Paper

The following are the specific objectives of the present paper:



1. To examine the growth and development of sugar industry in India in terms of area under cane production, sugar production and sugarcane yield per hectare over a ten year period from 2004-05 to 2013-14.
2. To review the growth in exports, imports and consumption of sugar, state-wise, over a ten year period from 2004-05 to 2013-14.
3. To offer appropriate suggestions for improving the performance of sugar industry in India.

Sources of Data

The study is mainly based on secondary data. The secondary data were collected from the various issues of Co-operative Sugar, a monthly publication, annual reports of Indian Sugar associations, other academic journals, magazines, periodicals and the like.

Period of the Study

The study covers a period of 10 years from 2004-05 to 2013-14.

Production

Particulars of area under sugarcane production, sugar production, sugarcane yield per hectare in India from 2004-05 to 2013-14 are presented in table 1:

**Table No.1, Progress in Sugarcane area, Production and Yield in India
From 2004-05 to 2013-14**

Year	Area under Sugarcane (in '000 Hectare)	Production of Sugarcane (in '000 tonnes)	Sugar cane Yield of Per Hectare (in tonnes)
2004-05	3662	237088	64.8
2005-06	4201	281172	66.9
2006-07	5151	355520	69.0
2007-08	5055	348188	68.9
2008-09	4415	285029	64.6
2009-10	4175	292302	70.0
2010-11	4886	342382	70.1
2011-12	5038	361037	71.7
2012-13	4998	341198	68.3
2013-14	4993	352141	70.5
AVG	4657.40	319605.70	68.48
SD	507.51	42287.68	2.38
CV	10.90	13.23	3.47
CGR	3.50	4.49	0.94

Source: Cooperative Sugar, may-2014, Vol. No 45, No-10.

Note: @ - Not significant; *significant at 5 per cent level;

**significant at 1 per cent;

Table 1 shows the time series data pertaining to area under sugarcane cultivation in thousand hectares, production of sugarcane in thousand tonnes, and sugarcane yield per hectare in tonnes over a ten year period of study in India. Area under sugarcane in thousand hectares has been increased in the initial period of three years the of ten year period. In the next consecutive period of three years from 2007-08 to 2009-10, the area under sugarcane cultivation got gradually decreased and the same increased after another two years i.e. from 2010-11 to 2011-12. In 2012-13 and 2013-14 the area under sugarcane production decreased. The average area under sugarcane production in thousand hectares over a ten year study period is 4657.40 hectares. The area under sugarcane production in hectars is more than the average area under sugarcane production in 2007-08 and in the recent period i.e. from 2010-11 to 2013-14. The compounded growth computed for the time series data pertaining in the area under sugarcane production is 3.50 per cent over the ten year study period. The growth rate in the area under sugarcane production is not so significant. The production of sugarcane in thousand tonnes substantially increased



from year to year for the first three years i.e. from 2004-05 to 2006-07 of ten year study period. In the next two years there is a significant decrease in the production of sugarcane, again for another three years 2009-10 to 2011-12 of study period the

sugarcane production was substantially increased. The sugarcane production in 2012-13 got decreased and in 2013-14 the sugar cane production went up again. The growth in sugarcane production is a bit higher than the growth in the area of sugarcane production. The same trend is reflected in the sugarcane yield per hectare. However, the growth in the sugar cane yield per hectare is very very insignificant over the study period.

From the foregoing analysis one can infer that the area under sugarcane production, the production of sugarcane and the sugar cane yield per hectare in India are fluctuated. However there is an improvement in all these three respects from the beginning year to end year of the study period. One can attribute this to the climatic conditions and lack of adequate power supplies, fluctuations in the area under sugar production, sugarcane production and sugarcane yield per hectare.

Table No.2, State – wise area under sugarcane in India
(In '000 hectares)

Name of the State	2009-10	2010-11	2011-12	2012-13	2013-14
Andhra Pradesh	158	192	204	196	191
Assam	27	30	26	28	29
Bihar	116	248	218	263	266
Chhattisgarh	12	#	9	13	11
Gujarat	154	190	202	185	180
Haryana	74	85	95	101	130
Jharkhand	7	7	7	7	7
Karnataka	337	423	430	425	410
Kerala	3	3	3	2	1
Madhya Pradesh	62	65	69	59	77
Maharashtra	756	965	1022	937	936
Orissa	8	13	15	15	13
Punjab	60	70	80	83	96
Rajasthan	6	5	6	5	5
Tamil Nadu	293	316	346	383	232
Uttar Pradesh	1977	2125	2162	2212	2172
Uttarakhand	96	107	108	110	122
West Bengal	14	15	16	16	20
Others	15	27	20	24	23
All India	4175	4886	5038	5064	4921

Source: Cooperative Sugar, June-2014, Vol. No 45, No-10.

Included in others.

Table 2 shows state-wise area under sugarcane in India. Available statistical data in India on area under sugarcane reveals that the area under sugarcane increased for the first four years of the study period from 2009-10 to 2012-13 and decreased in 2013-14. In some of the states like Andhra Pradesh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Tamil Nadu, Uttar Pradesh Uttarakhand and West Bengal the area under sugarcane continuously increased in the initial period of three years over a five year study period. In some other states such as in Haryana, Punjab and Uttarakhand the area under sugarcane substantially increased from 2009-10 to 2013-14. In all other states, states which are not mentioned above, the area under sugarcane production highly fluctuated from year to year. Thereafter, the growth in the area under sugarcane significantly increased from 2010-11 to 2012-13. The area under sugarcane in Assam, Bihar, Haryana, Punjab, Uttarakhand and west Bengal has increased significantly from 2011-12 to 2013-14. The mean area under sugar cane production in Uttar Pradesh is more than the mean area under sugarcane production in other states. The growth in the area of sugar cane production in Bihar is higher than the growth in the area of sugarcane production in other states.

From the foregoing analysis one can infer that the area under sugarcane in majority of the states is more than the area under sugar cane in other states. States such as Haryana, Punjab, Uttar Pradesh, Uttarakhand stood first since the area under



sugarcane production in such states consistently increased. Hectares under sugar cane production in Uttar Pradesh are more followed by Uttarakhand, Haryana, and Punjab.

Table No.3, Number of sugar factories operating, Sugarcane crushed, production and recovery of sugar from sugar cane from 2004-05 to 2013-14

Year	No. of Factories in Operation	Sugar cane Crushed (in '000 tonnes)	Sugar Produced (in '000 tonnes)	Recovery of Sugar from sugar cane (percentage terms)
2004-05	400	124772	12690	10.17
2005-06	455	188672	19267	10.21
2006-07	504	279295	28367	10.16
2007-08	516	249906	26357	10.55
2008-09	489	144983	14539	10.03
2009-10	490	185548	18912	10.19
2010-11	527	239807	24394	10.17
2011-12	529	256975	26343	10.25
2012-13	526	250598	25140	10.03
2013-14	513	238176	24360	10.23
AVG	494.90	215873.20	22036.90	10.199
SD	40.38	51779.81	5363.23	0.14
CV	8.16	23.99	24.34	1.41
CGR	2.80	7.45	7.52	0.06

Source: Cooperative Sugar, June-2014, Vol. No 45, No-10.

Note: @ - Not significant; *significant at 5 per cent level; **significant at 1 per cent;

Table 3 shows the number of factories operating in India, sugarcane crushed in thousand tonnes, production of sugar in thousand tonnes and recovery of sugar from sugarcane over a ten year study period from 2004-05 to 2013-14. The number of sugar factories that are operating in India in 2003-04 was 400 and increased to 513 in 2013-14. Average number of factories operating in India is 494.90. The total Number of factories operating in India is more than the average number of factories operating in India in 2006-07 and in 2007-08 and from 2010-11 to 2013-14. The growth in the number of factories operating in India in absolute terms for the study period fluctuated. The growth is positive in respect of the number of factories operating in India.

Sugar cane crushed in thousand tonnes increased from year to year in the first three years of ten year study period. In the subsequent two years i.e. in 2007-08 and 2008-09, the cane crushed gradually decreased from year to year and for the next three years i.e., from 2009-10 to 2011-12, it continually and substantially increased. In the last two years of the ten year study period the sugar cane crushed decreased. On the whole the growth in the sugar cane crushed is not consistent, rather it fluctuated. The growth in the sugar cane crushed over the ten year study period is positive and moderate. The same trend is observed even in the case of sugar produced in thousand tonnes over the study period of ten years. The growth in the production of sugar is almost the same as that of the growth in the sugarcane crushed for the same period. The average sugar cane crushed in thousand tonnes over the ten year study period is 215873.20 tonnes. The sugar cane crushed in 2006-07, 2007-08 and from 2010-11 to 2013-14 is more than the average sugarcane crushed over the ten year study period.

Sugar recovery from sugar cane in percentage terms almost fluctuated from time to time over the study period of ten years. The mean sugar recovery rate is 10.20. The sugar recovery rate is higher than the mean sugar recovery rate in 2007-08, 2011-12 and in 2013-14. In the remaining years of ten year study period the sugar recovery from sugar cane is less than the mean sugar recovery rate from sugar cane.

From the foregoing analysis one can infer that the number of factories that are in operation in India increased in the beginning of the study period and decreased in the recent years of ten year study period. The trend in the growth of sugar cane crushed in thousand tonnes and sugar produced in thousand tonnes is one and the same. The sugar recovery rate from sugar cane over



the ten year study period fluctuated. The said growth in the number of factories operating, sugar cane crushed, Sugar produced and the sugar rate recovery may be due to the prevalence of adverse condition.

Table 4, State –wise number of sugar factories operating in Indian

Name of the States	2009-10	2010-11	2011-12	2012-13	2013-14
Andhra Pradesh	35	37	37	36	34
Bihar	9	10	11	11	11
Goa	1	1	1	1	1
Gujarat	18	19	19	18	19
Haryana	14	14	14	14	14
Karnataka	54	59	58	60	61
Madhya Pradesh	11	13	13	12	15
Maharashtra	143	167	170	172	159
Odisha	4	5	5	5	5
Punjab	15	16	17	16	16
Puducherry	2	2	2	2	2
Rajasthan	1	1	1	1	1
Tamil Nadu	40	44	43	43	42
U.P	128	125	124	122	119
West Bengal	1	1	1	1	-
Uttarakhand	10	10	10	09	09
Chhattisgarh	3	3	3	3	3
All India	490	527	529	526	513

Source: Indian sugar, June-2014.

Note: @ - Not significant; *significant at 5 per cent level;

**significant at 1 per cent;

Table 4 shows number of sugar factories operating over different states in India over a period of five years from 2009-10 to 2013-14. It is observed from table 4 that more number of sugar factories is operating in Maharashtra. On an average more than 151 factories in each of the years are operating in Maharashtra from 2009-10 to 2013-14 followed by UP, Karnataka, Tamil Nadu, and Andhra Pradesh. In other words factories in triple digit number are operating in Maharashtra and UP where as in AP, Gujarat, Haryana, MP, Punjab, Tamil Nadu, Utterakhand they are in double digits. The number of units operating in India increased continuously for the first three years. Later their numbers is decreased. Units' number has increased continuously for the first three years of five year study period in some states such as Bihar, Maharashtra, and Punjab. The number of units operating in Goa, Haryana, Ponducherry, Rajasthan and Chhattisgarh is constant. In the remaining states in India the operating units' number fluctuated. The progress in the number of units operating in a majority of the states in India is not satisfactory.

From the foregoing analysis one can infer that the number of sugar factories working in India over first three years of five years study period is impressive whereas in the fourth and fifth years the number of sugar factories working in India is gradually decreased from year to year. There is no change in the states of Goa, Haryana, Puducherry, Rajasthan, and Chhattisgarh. Whereas the number of sugar factories working in some other states such as Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Punjab, has been fluctuated over five year period of study. In Maharashtra the sugar factories number gradually increased from 143 in 2009-10 to 172 in 2012-13 and decreased in 2013-14 to 154 factories. In Orissa number of factories in 2009-10 was four but it increased to five in 2010-11 and was the same for the remaining three years from 2011-12 to 2013-14.

**Table No.5, State – wise sugarcane production in India
(In '000 tonnes)**

Name of the State	2009-10	2010-11	2011-12	2012-13	2013-14
Andhra Pradesh	11708	14964	16686	15680	14976
Assam	1059	1075	994	1036	1073
Bihar	5033	12764	11289	14738	12278
Chhattisgarh	29	#	24	37	25
Gujarat	12400	13760	12750	13350	9530
Haryana	5335	6042	6959	7437	9344
Jharkhand	447	457	457	463	457
Karnataka	30443	39657	38808	35732	34666



Kerala	285	271	263	166	149
Madhya Pradesh	2535	2667	2677	2516	275
Maharashtra	64159	81896	86733	62175	75384
Orissa	490	903	885	952	797
Punjab	3700	4170	5653	4890	6600
Rajasthan	344	368	451	402	292
Tamil Nadu	29746	34252	38576	35188	37546
Uttar Pradesh	117140	120545	128819	134851	133386
Uttarakhand	5842	6498	6311	6718	6432
West Bengal	1001	1134	1681	1685	1680
Others	606	959	1021	947	1032
All India	292302	342382	361037	338963	345922

Source: Cooperative Sugar, June-2014, Vol. No 45, No-10.

Included in others.

Table 5 shows the state – wise sugar cane production in ‘000’ tonnes in India over a five year period of study. The sugar cane production increased for the first three years of five year period of study in India. In some states such as Haryana and Punjab sugar cane production continuously increased for all the five years. In some other states like Andhra Pradesh, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal the progress in the sugar cane production is continuous. The quantum of sugar production in Uttar Pradesh is significantly high followed by Tamil Nadu, Punjab and Haryana. Sugarcane production in Uttar Pradesh for five year period is highly consistent.

From the foregoing analysis one can infer that the sugar cane production is more in terms of volume in Uttar Pradesh than in other states of India. The progress in sugar cane production in some states such as in Haryana, Punjab and Uttar Pradesh is continuous. The progress in the sugar cane production in India is continuous for three years of five year study period. The progress in the sugar cane is also continuous in around fifty per cent of the given states. The quantum of sugar cane production is voluminous in Uttar Pradesh followed by Maharashtra, Karnataka and Jharkhand.

Table No.6, Year wise Imports and Exports of sugar in India over ten year period

Financial year (April - March)	Import		Exports	
	Quantity (tonnes)	Value (Rs. in Crores)	Quantity (tonnes)	Value (Rs. in crores)
2004-05	932740	976.18	108690	149.53
2005-06	558769	651.59	321204	569.11
2006-07	1052	3.49	1643403	3127.47
2007-08	496	2.24	4684554	5412.16
2008-09	386099	583.11	3331997	4448.74
2009-10	2424045	5961.24	44045	110.23
2010-11	1004100	2723.21	3249300	10352.27
2011-12	119661	374.67	4074900	12973.73
2012-13	1122259	3094.38	2784489	8576.83
2013-14	880958	2286.56	2460161	7135.98
Mean	743017.90	1665.67	2270274.30	5285.61
CV	97.72	112.97	73.84	84.57
LGR	7.44	16.11	11.47	20.48
t-value	0.670 [@]	1.354 [@]	1.507 [@]	3.051 [@]

Source: Cooperative Sugar, June-2014, Vol. No 45, No-10.

Note: @ - Not significant; *significant at 5 per cent level; **significant at 1 per cent;

Table 6 explains the growth in the imports and exports of sugar in India over ten year study period both in terms of quantity in tonnes and value in rupees. It is understood from the above table that the growth in the exports of sugar from India to various other countries is tremendous. Sugar exports in 2004-05 108890 tonnes and was increased to 2460161 tonnes in



2013-14. Of course there are fluctuations in the growth of sugar exports between the years. The reasons for the fluctuations in exports of sugar may be many. The sugar exports in terms of value also showed the same trend. Coming to the sugar imports it is understood from the table above that the import of sugar in terms of quantity tremendously increased in 2006-07 when compared to its previous year (2005-06). The sugar imports in terms of quantity substantially increased in 2009-10 and 2010-11 when compared to previous years 2008-09 to meet the consumption requirements in India. In the same way the sugar import decreased in 2011-12. Sugar imports in terms of value are very much significant when compared to the initial years of the study period of ten years. On an average quantity of sugar exported to other countries in the recent past is sizeable.

From the foregoing analysis one can infer that the quantity of sugar imported into India over a period of time has decreased considerably both in terms of quantity and in terms of value. Sugar imports into India for the first four years of the ten year study period have decreased and increased in the subsequent period of another two years. Thereafter, for the rest of the period of four years of the same ten year period, the sugar imports into India fluctuated. Coming to the exports of sugar from India it is a different picture in the sense that the sugar exports from India have increased in the first four years of ten year study period and decreased in the next two years and, in the last year of ten year study period, the exports of sugar decreased both in quantity and in value. On the whole, the exports of sugar from India are satisfactory.

Conclusion

The area under sugar cane production, the production of sugar cane and the sugar cane yield per hectare in India fluctuated. The area under sugar cane grown in majority of the states is more than the area grown under sugar cane in other states. The number of factories that are in operation of India increased in the beginning of the study period and decreased in the recent years of ten year study period. The same trend in the growth of sugarcane crushed in thousand tonnes and sugar produced in thousand tonnes is one and the same. The sugar recovery rate from sugar cane over ten year study period is fluctuated. The said growth in the number of factories operating, sugarcane crushed, sugar produced and the sugar rate recovery may be due to the prevalence of adverse conditions. The number of sugar factories working in India over the first three years of five years study period is impressive whereas in the fourth and fifth years the number of sugar factories working in India gradually decreased from year to year. There is no change in the states of Goa, Haryana, Puducherry, Rajasthan, and Chhattisgarh. Whereas the number of sugar factories working in some other states such as Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Punjab, fluctuated over the five year period of study. In Maharashtra the sugar factories number gradually increased from 143 in 2009-10 to 172 in 2012-13 and decreased in 2013-14 to 154 factories. In Odessa the number of factories in 2009-10 was four but it increased to five in 2010-11 and was the same for the remaining three years from 2011-12 to 2013-14. The progress in the sugarcane production in some states such as in Haryana, Punjab and Uttar Pradesh is continuous. The progress in the sugarcane production in India is continuous for three years of five year study period. The progress in the sugar cane is also continuous in around fifty per cent of the given states. The quantum of sugar cane production is voluminous in Uttar Pradesh followed by Maharashtra, Karnataka, and Jharkhand. The quantity of sugar imported into India over a period of time has decreased considerably both in terms of quantity and in terms of value sugar imports into India for the first four years of the ten year study period has decreased and increased in the subsequent period of another two years. Thereafter, for the rest of the period of four years of the same ten year period, the sugar imports into India are fluctuated. Coming to the exports of sugar from India it is a different picture in the sense that the sugar exports from India have been increased in the first four years of ten year study period and decreased in the next two years and in the last year of ten year study period the exports of sugar has been decreased both in quantity and in value. On the whole the exports of sugar from India are satisfactory.

References

1. Hulikar Bhagyashree & Yogish S.N. (2011), "Indian Sugar Sector – Status and Policy Operations", Southern Economist, September, 1, pp.21-24.
2. D.B. Niphade., & G.B.Ghorpade. (1998), "Attributing Factors for Higher Sugar Recovery", Cooperative sugar, January, Vol.29, No.5, pp.321-324.
3. Dr. Vasant B. Kodag, (2013) "Cooperative Sugar Industry in Maharashtra - A Case Study of Sangli District", Indian Cooperative Review, April, pp.207-216.
4. Dr. M.N. Sondge., (2013) "Progress & Projection of Sugar Industry in India", Indian Cooperative Review, July, pp.7-15.
5. G. Venkata Naidu & Lakshmi Narasaiah., (2000) "Sugar Industry in India: An Analysis", Southern Economist, Vol. 38, No 23&24, April 1-15, pp.11-13.
6. S.D. Soraganvi., R.R. Biradar., (2012) "Sugar Industry in A Global Perspective", Southern Economist, February 15, pp.29-33.
7. Journal of Cooperative Sugar, June-2014, Vol. No 45, No-10.
8. Journal of Indian Sugar, June-2014.