

Growth and Sustainability of Sugar Industry in Odisha: An Overview

Abstract

Odisha is considered as the 'rice bowl of India' It accounts for about 8 percent of the country's net sown area and around 7 percent of the country's food-grain production. Odisha occupies sixth position in sugar production in India. This study aims to measure the performance of sugar industry in Odisha in terms of Sugar factory, Area and Production, Yield etc. The researcher has used the secondary data. The data has been collected from various sources like Books, Journals, Newspapers; Abstract industries report Annual audited reports and internet. The research tools like percentage .The period coverage applied here from the data ranges from 2005-06 to 2014-15. The analysis infers that the total production of the sugarcane is dependent on the total cultivated area but in some years, the cultivated area increased but the production of sugarcane decreased. The share of Odisha in sugarcane production found fluctuations where as share of Odisha in sugar production indicated ups and downs during the study period.

Keywords: Sugar Industry, Odisha, Cultivation, Production, Consumption.

Introduction

Sugar Industry is one of the industries that can be considered as a multi-product industry producing not only sugar but also industrial/ potable alcohol, bio-electricity, fuel ethanol, bio-gas. Apart from contributing to the GDP, the industry also supports around 5 crore sugarcane farmers and approximately 5 lakh skilled and semi-skilled workers for their livelihood and also plays an important role in contributing to the renewable energy pool of the country. India is the second largest producer of sugar after Brazil.

Sugar Industry in Odisha

Orissa located between 17o 49'N to 22o 34'N latitude and from 81o 29'E to 87o 29'E longitude on the eastern coast of India. Odisha has a geographical area of 1,55,707 sq.Kms. and is divided into ten agro climatic zones depending upon the soil types, topography, rainfall and cropping pattern. The total cultivated land of the State is 61.80 lakh ha out of which 29.14 lakh ha (47%) is High land 17.55 lakh ha ii (28%) Medium land and 15.11 lakh ha (25%) low land and about 54% of cultivated land is irrigated. West Bengal in northeast, Jharkhand in the north, Madhya Pradesh in the west, Andhra Pradesh in the south and the Bay of Bengal in the east bound it. Orissa can be divided into three broad regions - the Coastal plains, the Middle mountainous country and the Plateaus and rolling up lands. The Orissa Coastal Plains region stretches from the West Bengal border i.e. from the River Subarnarekha in the north to the River Rushikulya in the south. This region is the combination of several deltas of varied sizes and shapes formed by the major rivers of Orissa, such as the Subarnarekha, the Budhabalanga, the Baitarani, the Brahmani, the Mahanadi, and the Rushikulya. The Middle Mountainous Region covers about three-fourth of the entire State and comprises the hills and mountains of the Eastern Ghats, which rise abruptly and steeply in the east and slope gently to a dissected plateau in the west running from north-east (Mayurbhanj) to north-west (Malkangirig). The Plateaus are mostly eroded plateaus forming the western slopes of the Eastern Ghats with elevation varying from 305-610 metres.

Over 76 percent of the people are dependent on agriculture. Out of the gross cropped area of 87.46 lakh hectares, 18.79 lakh hectares are irrigated. Rice, pulses, oil seeds, jute, mesta, sugarcane, coconut and turmeric are important crops. There are also cash crops like tea, cotton and rubber. The major industries of the state include cement, aluminium, ceramic glass, chemical, fertilizer, heavy water, aeronautical industry, and agri-based industries such as cotton textiles, sericulture, sugar mills and rice mills.



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State of Agriculture: Major Crops and Farming Sector

The State with its ten agro-climatic zones and varied soils produces various fruits accounting for 29 percent of the country's mango production, 25 percent of citrus, 12 percent of pineapple, 8 percent of grape and 7 percent of banana and guava. The state has two major rivers, the Kathjodi and Mahanadi. Agriculture contributes 12.9 percent of the State GDP and employs 62 percent of the total workforce.

Forty-five percent of the total geographical area of the state is under irrigation. The state is known as the 'granary' of east India. The Kathjodi and Mahanadi are the major rivers in the state. They irrigate 6 million hectares (14.8 million acres) of farmland. Odisha is an important agricultural state of the country. The state is a leading producer of cereals like rice, maize and jowar, and cash crops like tobacco, groundnut, chillies, turmeric, cotton, sugar and jute. Rice dominates the cropping pattern of Andhra Pradesh. In the food grains production as a whole, Odisha's position is about 6 percent of all India area and about 7 percent of output in the year 2008. The state occupies more than 23 percent of the area under chilies in India but at the same time contributes 43 to 50 percent to the country's total output. Odisha holds the first rank in area and production of mango, oil palm, chillies, turmeric, second rank in citrus and coriander, third rank in cashew, fourth rank in flowers, fifth rank in grapes, banana, ginger and guava and sixth rank in sugar production.

Types of Sugar

Sugar products can be broadly divided into four basic categories: granulated, brown, liquid sugar and invert sugar.

The most popular amongst all is the Granulated sugar, which pure crystalline sucrose, mostly used for domestic purpose, food processing industries and professional bakers. It can be further classified into several types of sugar based on the crystal size.

1. Regular / Extra Fine / Fine Sugar – is the regular sugar found in every home. It is most commonly used for domestic cooking.
2. Fruit sugar – is slightly finer than regular sugar and is used in dry mixes such as gelatin desserts, pudding mixes and drink mixes.
3. Bakers Specials – is even finer than fruit sugar. It was developed specially for the baking industry.
4. Superfine/ Ultrafine/ Bar Sugar – is the finest of all the types of granulated sugar. It is ideal for extra fine textured cakes and meringues.
5. Confectioners / Powdered Sugar – is granulated sugar ground to a smooth powder and then sifted. It is used in icings, confections and whipping cream.
6. Coarse sugar – is normally processed from the purest sugar liquor. Used in making fondants, confections and liquors.

By-Products & Their Uses**Molasses**

Molasses used for the manufacture of alcohol, yeast and cattle feed. Nearly 90% of molasses

produced is consumed by the industrial alcohol manufacturers.

Bagasse

Bagasse is a fibrous residue of cane stalk that is obtained after crushing and extracting juice. It is used as a combustible in furnaces to produce steam, which in turn produces power. It is also used as a raw material for production of paper and as feedstock for cattle.

The sugar mills have been successful in procuring up to 90-95% of its total power requirement, by using bagasse. Hence it has cut down its dependence on State Electricity for their power supply.

Ethanol

Ethanol is used as a blend fuel with gasoline in the transport sector.

Fly Ash

Fly Ash is the residue that is left after bagasse completely burns out. It can be used as a substitute for firewood. It is also used by the farmers for cultivation.

Press Mud

Press muds the residue that is left, after the filtration of the juice, is called Press mud. It is also known as oliver cake or press cake. It is used to produce high quality bio-manure.

Objective of the Study

The objectives of the study to analyse the

1. Sugar factory wise crushing capacity, capacity utilization, & average crushing period
2. Area and Production of Sugarcane in Odisha
3. Production of Sugarcane – share of Odisha
4. Sugar Production – share of Odisha
5. Yield of Sugarcane – share of Odisha

Review of Literature & Research Gap

Tariff Commission Report (1969) pointed out that sugarcane offered a better return as compared to other agricultural products. The areas under sugarcane has tended to rise steadily, nevertheless the acreage has not been stable. A four year cycle, two of reduced area followed by two of expansion, had been the characteristic feature of sugarcane cultivation.

Tiwari and Singh (1982) reported from Rajendra Agricultural University Pusa, that intercropping with sugarcane not only provided a profitable proposition, but at the same time helped the farmer in reducing the per quintal cost of production of cane.

Jagdish Lal (1992) in his article "Sugar and sugarcane production, trends and policies" studies the production of sugar and its consumption trend and examines the impact of sugarcane and sugar pricing and distribution policies. The study showed that there was an increasing trend in the case of production and consumption of sugar during the period 1950-1951 to 1990-1991.

Ray Sarbapriya (2012) in their paper they have attempted to measure the economic performance of Indian sugar industry in terms of capacity utilization measured econometrically at aggregate level over a period from 1979-80 to 2008-09. In this study, Optimal output is defined as the

minimum point on the firm's short run average total cost curve and the rate of capacity utilization is merely ratio of its actual output to capacity output level. Under Choice theoretic framework, the results suggest that a significant variation in the capacity utilization rates over years within same industry was found.

Chellaswamy Dr.P.& Revathi S.V. (2013) in their article they have taken 34 companies among 119 universal companies. The data were appropriately tabulated and classified to analyze the tools like Annual compound growth rate, trend analysis by method of least squares. The productivity ratios and the production function were computed by Solow model. Multiple Regression analysis was used to ascertain its impact on variables and they were tested by 5% level of significance. The analysis reveals that the relationship between Raw Materials and other independent variables i.e. the Capital, Labour and Sales has contributed 99 percent on dependent variable of the companies which started after green revolution period.

Patil Dilip S. et al (2017) in their paper aims at making financial analysis of a sugar entity in terms of liquidity, solvency, operational efficiency and profitability. Management practices with professional approach tend to improve the financial performance of sugar factories by implementing some innovative practices to reduce the controllable cost and generating additional revenues."

The present survey of related literature indicates that, even a good number of studies have been conducted on sugarcane industries in India; there is also a perceptible gap, which needs for further study. There is a lot of scope for analysing performance of sugarcane industry in Odisha.

Research Methodology

This study aims to measure the performance of sugar industry in Odisha. The researcher has used the secondary data. The data has been collected from various sources like Books, Journals, Newspapers; Abstract industries report Annual audited reports and internet. The research tools like percentage .The period coverage applied here from the data ranges from 2005-06 to 2014-15.

Data Analysis

Sugarcane Cultivation in Odisha

Sugarcane is grown extensively in the tropical belt including the State of as sugarcane, which is a tropical crop, has favourable agro climatic conditions for its growth in these States. The yields

are substantially higher in the tropical belt as compared to the sub-tropical regions. Sugarcane is being cultivated in the State for white sugar and Gur .The area, production& productivity of sugar cane is around 40,000 hectes, 29.07 lakh MTs & 71.12 M.T per hectare respectively. There are six Nos. of sugar mills in the State having the crushing capacity of around 17 lakh M.T. But the mills are able to utilise (40-45)% of their crushing capacity.

Major Sugar Cane Growing Districts

1. Koraput
2. Cuttack
3. Nawarangpur
4. Nayagarh
5. Ganjam
6. Bolangir
7. Kalahandi
8. Khurdha
9. Jajpur
10. Bargarh
11. Dhenkanal
12. Jagatsingpur

Minor Sugar Cane Growing Districts

1. Bhadrak
2. Balasore
3. Nuapada
4. Malkangiri
5. Maurbhanja
6. Sundargarh
7. Gajapati
8. Rayagada
9. Deogarh
10. Puri
11. Kendrapara
12. Sundargarh and others

(Source: Directorate of Economics and Statistics (DE&S), Odisha Directorate of Agriculture & Food Production (DA&FP), Odisha and Directorate of Horticulture (DH), Odisha.)

Sugarcane is the main agro industry based commercial crop of the state. Six nos. sugar factories are in operation. Three are in cooperative sector and another three are in private sector. The sugar factories have a total daily crushing capacity of 11,250 MT, having seasonal requirement of around 17 lakh MT of sugarcane for economic utilization of their crushing capacity. In the present context, the factories are able to utilise only 30 to 35% of their crushing capacity. Sugar factory wise crushing capacity, capacity utilization, & average crushing period are given below.

Table -1
Sugar factory wise crushing capacity, capacity utilization, & average crushing period

Sl. No	Name of the factory	Crushing capacity MTs/Day	Cane Requirement for 150days in"000"MTs	Average crushing days of last 5years	Average cane crushed "000"MTs	Percentage of Capacity utilization
1	Aska Co op sugar Ind	2500	375.000	90	124.80	33.28
2	Baragarh Co-op Sugar mills	1250	187.500	57	65.11	34.72
3	Bijayananda Co-op Sugar mills	2500	375.000	37	32.50	8.66
4	Nayagarh sugar complex	1250	187.500	80	62.68	33.42
5	Sakti sugars Ltd	2500	375.000	135	204.66	54.58
6	Balajee sugars Ltd	1250	187.500	30	35.26	18.80
	Total	11250	1687.500		525.01	31.11

Source: Compiled from the records of statistics abstract of Odisha, Directorate of Economics and Statistics, Government of Odisha 2014.

Sugarcane is one of the important commercial crops of Odisha. Odisha occupies 6th place in sugar production and 5th place for cane area, and productively in the country during 2013-14. An all time record of cane production and sugar production was achieved during 2006-07 in the state. Sugarcane was grown in an area of 20 thousand hectares and produced a record level of cane of 1274 thousand tonnes with a productively of 70 tonnes per hectare during 2006-07. Thereafter, there was a drastic reduction in cane area and sugar production in the state. Cane area decreased from 20 thousand hectares in 2006-07 to 8.0 thousand hectares in 2009-10. Similarly, cane production decreased from 1274.92 thousand tonnes in 2006-07 to 497 thousand tonnes in 2009-10. The plant and ratoon crops were grown in 54.17 and 45.83 proportion during 2006-07. The area under plant crop decreased significantly from 2008-09 to 2010-2011 because of diversion of cane area to other competitive crops. But the area registered under plant crop changed in the subsequent years in all the sugar factory operational zones in the state.

Area and Production of Sugarcane in Odisha

The table-2 analyses the area under cultivation and the production of sugarcane in Odisha during the period from 2004-05 to 2013-14. During this study period, it is found from the above table that there were frequent ups and downs in both cultivated area production of sugarcane. In the year 2004-05, the area under sugarcane cultivation in Odisha was 15 thousand acres and the production of sugarcane was 860 thousand tonnes. In the next three years (2005-06 to 2007-08) the area under cultivation of sugarcane slowly increased year by year and reached to 20 thousand hectares in the year 2007-08 and at the same time the production of sugarcane also increased to 1073 and 1274 thousand tonnes in 2005-06 and 2006-07 respectively, but in the year 2007-08 the production decreased to 1096 thousand tonnes. In this way there were ups and downs in the cultivated area and in the year 2013-14, 35 thousand hectares were recorded. But, sugarcane production in the State shows an increase gradually and recorded 903

thousand tonnes in the year 2010-11. In 2011-12 the sugarcane production decreased to 885 thousand tones but it again rises to 952 thousand hectare in 2012-13. During the study period sugar production is recorded to be 937 thousand hectare.

The analysis infers that the total production of the sugarcane is dependent on the total cultivated area. In some years it is seen that the cultivated area decreased but the production of sugarcane increased because the yield capacity of the land increased in those respectively years of the study. Similarly in some years, the cultivated area increased but the production of sugarcane decreased.

Table-2
Area and Production of Sugarcane in Odisha during 2004-05 to 2013-14

Year	Area (000 Hectares)	Production (000 Tonnes)
2004-05	15	860
2005-06	16	1073
2006-07	20	1274
2007-08	20	1096
2008-09	11	646
2009-10	8	497
2010-11	13	903
2011-12	40	885
2012-13	39	952
2013-14	35	937

Source: Compiled from the records of statistics abstract of Odisha, Directorate of Economics and Statistics, Government of Odisha 2014.

Production of Sugarcane – Share of Odisha

The sugarcane production in India and Odisha is not stable because of instability of sugarcane cultivation by the farmers in the country. This is because of the price of cane fixed by the Government, bank loans for cultivation of sugarcane, subsidies on loans etc., apart from this natural calamities are also one of the reasons which contribute to the instability of sugarcane production in India. During the study period i.e. between 2004-05 and 2013-14, there was a rise in sugarcane production in some years and in some others, there was fall in production. These

fluctuations are found in sugarcane production because of the above said reason. The following table 2 analyses the sugarcane production in India and Odisha and the share of Odisha in cane production during 2004-05 to 2013-14.

Table-3
Production of Sugarcane – share of Odisha during 2004-05 to 2013-14

(000 tonnes)			
Year	India	Odisha	Odisha share in total India's Production
2004-05	237088	860	0.36
2005-06	281172	1073	0.38
2006-07	355520	1274	0.36
2007-08	348188	1096	0.31
2008-09	285029	646	0.23
2009-10	292302	497	0.17
2010-11	342382	903	0.26
2011-12	361037	885	0.25
2012-13	341200	952	0.28
2013-14	348400	937	0.27

Source: Indian Sugar, Indian Sugar Mills Association, New Delhi, April'2014

The table 3 -shows the quantity of sugarcane production in India and Odisha during 2004-05 to 2013-14. In the year 2004-05, the production of sugarcane in India was 237088 thousand tonnes, whereas, in Odisha it was 860 thousand tonnes. In the next year, the production of sugarcane in India increased to 281172 thousand tonnes and it increased the State also to 1073 thousand tonnes. During 2006-07 year, the sugarcane production in India increased to 355520 thousand tonnes and in Odisha it was 1274 thousand tonnes. But later, in 2007-08 and 2008-09 there was a drastic downfall of sugarcane production in India which led to 348188 and 285029 thousand tonnes respectively. During this period in Odisha also there was a downfall of sugarcane production with 1096 and 646 thousand tonnes respectively. Again, in the next three year i.e. 2009-10, 2010-11 and 2011-12 the production of sugarcane in India increased tremendously to 292302, 342382 and 361037 thousand tonnes respectively. During 2009-10 period in Odisha encounters a decrease in the production of sugarcane to 497 thousand tonnes. But after that, in the years 2010-11 2011-12 and 2012-13 the sugarcane production in Odisha increased to 903, 885 and 952 thousand tonnes.

The share of Odisha in sugarcane production found fluctuations during the study period. In 2004-05 the share of Odisha in total sugarcane production of India was 0.36 percent which decreased to 0.17 percent in 2009-10. In 2010-11 year the share increased to 0.26 and in the next year it decreased 0.25 percent. In the next two years the share increased to 0.28 and 0.27 percent respectively.

Production of Sugar – Share of Odisha

Table-4
Sugar Production – share of Odisha during 2004-05 to 2013-14

(000 tonnes)			
Year	India	Odisha	Odisha share in total India's Factories
2004-05	13000	440	3.38
2005-06	19320	400	2.07
2006-07	28200	610	2.16
2007-08	26300	630	2.40
2008-09	14680	310	2.11
2009-10	18800	370	1.97
2010-11	24350	380	1.56
2011-12	26340	390	1.48
2012-13	25180	390	1.55
2013-14	24380	350	1.44

Source: Indian Sugar, Indian Sugar Mills Association, New Delhi, April'2014

The table-4 analyses the sugar production in India, Odisha and the share of Odisha during 2004-05 to 2013-14. The sugar production in India and in Odisha found fluctuations during 2004-05 to 2013-14. The total production of sugar in India during 2004-05 was 13000 thousand tonnes and increased to 28200 thousand in 2006-07. In Odisha the sugar production in 2004-05 was 440 thousand tonnes and decreased to 400 thousand tonnes in 2005-06. In the next years the total production of sugar in India increased to 610 thousand tonnes in the year 2006-07 and then increased to 630 thousand tonnes during 2007-08 year. But, in Odisha the sugar production during 2008-09 decreased to 310 thousand tonnes. Thereafter from 2009-10 to 2012-13 there was a tremendous increase of sugar production in the State and recorded 370,380,390 and 390 thousand tonned respectively. Later, in the year 2012-13 and 2013-14 again there was a downfall of sugar production in the country and the production decreased to 25180 and 24380 thousand tonnes respectively. In this period, in Odisha also there was a drastic decrease in sugar production and recorded 390 and 350 thousand tonnes respectively.

The share of Odisha in sugar production indicated ups and downs during the study period. In 2004-05 the share of Odisha in the total sugar production of India was 3.38 percent which decreased to 2.07 percent in 2005-06. During 2006-07 and 2007-08 years the share of Odisha in sugar production in the country increased from 2.16 percent to 2.40 percent. Thereafter from 2008-09 to 2011-12 years the share of sugar production in the State decreased from 2.11 percent to 1.48 percent. During the study period the share of Odisha shows a decline of 1.44 percent.

Yield of Sugarcane – Share of Odisha**Table-5****Yield of Sugarcane – share of Odisha during 2004-2005 to 2013-14**

(Tonnes per hectare)

Year	India	Odisha	Odisha share in total India's yield
2004-05	70.9	80.1	112.98
2005-06	68.6	81.4	118.66
2006-07	67.4	82.9	123.00
2007-08	63.6	66.2	104.09
2008-09	59.4	72.1	121.38
2009-10	64.8	74.9	115.59
2010-11	66.9	76.8	114.80
2011-12	69.0	82.2	119.13
2012-13	68.9	82.2	119.30
2013-14	617	78.0	126.42

Source: Indian Sugar, Indian Sugar Mills Association, New Delhi, April'2014

The yield of sugarcane in India and Odisha during the study period i.e. from 2004-05 to 2013-14 along with the share of Odisha is presented in the table-5. In the total study period, during 2004-05 year was the most production year for sugarcane because in this year the average yield in the country was 70.9 tonnes per hectare and the year 2008-09 was the poorest year of sugarcane yield when 59.4 tonnes per hectare. In the starting year of the study, yield of sugarcane in the State was 80.1 tonnes per hectare and in the next two years it increased to 81.4 and 82.9 tonnes per hectare during 2005-06 and 2006-07. In the next year it decreased to 66.2 tonnes per hectare and after that, from 2008-09 to 2012-13 there is a continuous increase in the average sugarcane yield in the State. In the last year of the study (2013-14) the yield of sugarcane per hectare decreased to 78.0 tonnes.

The share of Odisha in sugarcane yield found fluctuations during the study period. In 2004-05 the share of Odisha in total sugarcane yield of the country was 122.98 percent which increased to 118.66 percent and 123.00 percent in 2005-06 and 2006-07 respectively. In the year 2007-08 the share of the State in the total country's average yield of sugarcane decreased to 104.09 percent, and it increased in the year 2008-09 to 121.38 percent. Later during 2009-10 and 2010-11 years the share of Odisha in sugarcane yield in the country increased from 115.59 percent to 114.80 percent. Thereafter

from 2010-11 to 2013-14 years the share of sugarcane yield in the State decreased from 119.13 percent to 126.42 percent.

Findings and Conclusion

The analysis infers that the total production of the sugarcane is dependent on the total cultivated area. In some years it is seen that the cultivated area decreased but the production of sugarcane increased because the yield capacity of the land increased in those respectively years of the study. Similarly in some years, the cultivated area increased but the production of sugarcane decreased. The share of Odisha in sugarcane production found fluctuations during the study period where as share of Odisha in sugar production indicated ups and downs during the study period.

So, it is concluded that the Intense research is required to increase the sugarcane production in the agricultural field and to introduce new technology of production efficiency in the sugar mills. Production cost can also be reduced through proper utilisation of by- products of the industry.

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