

SUGARCANE SCENARIO IN INDIA – A VIEW

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ABSTRACT

India is the largest producer and consumer of sugar in the World. About 45 million sugarcane farmers, their dependents and a large agricultural force, constituting 7.5 percent of the rural population, are involved in sugarcane cultivation, harvesting and ancillary activities. This enabled India to become the largest producer of sugarcane and sugar in the world leaving the other major producers Brazil and Cuba.¹ The major sugarcane crop growing states in India are Uttar Pradesh, Bihar, Assam, Haryana, Gujarat, Maharashtra, Karnataka and Tamil Nadu. The sugarcane cultivation and sugar industry in India plays a vital role towards socio-economic development in the rural areas by mobilizing rural resources and generating higher income and employment opportunities. The major problem of sugarcane in India is based on monsoon and water supply. The cyclical nature in sugar production has caused distortions in the export of sugar in India. This study analyzes the state-wise production and reasons for the changes in production of sugarcane. Agro-based industries have been playing a crucial role in Indian economy. About 7.5% of the rural population, covering about 60 million cane farmers, their dependents and a large number of agricultural labor are involved in sugarcane cultivation, harvesting and ancillary activities. Additionally, the country is said to have had 503 operating sugar factories / mills that generate employment for over 50 million people as of 2011–12.

Keywords: Sugarcane, Sugarcane Farmers, Production of Sugarcane, Sugar Industries, Sugar Economy in India

INTRODUCTION

Sugarcane is a versatile crop. Sugarcane Juice is the main raw material for sugar industries. By Products of sugar industry are also playing important role in the national economy molasses. The chief by-product is the main raw material for alcohol and alcohol based industries in the country. Another by-product Bagasse is used as fuel, for production of fibreboard, papers, plastics and

furfural (Biswal, 2013), only a fraction of its production is used in small scale industry for making local khandasri and gur. Sugarcane products viz., sugar and fermented products are very important in making and preserving various kinds of medicines, Green tops of cane are good source of fodder for cattle. Also sugarcane stubbles are good sources of manure in alkaline and saline soils. Because of its diversified uses in different industries.

Cultivation of sugarcane in India dates back to vedic period. The earliest mention of sugarcane cultivation in Indian literature is found during the period 1400 to 1000 BC. It is now widely accepted that India is the original home of *Saccharum* Species. India is the second largest producer of sugarcane next to Brazil. Production of sugarcane in India is about 339 million tons from an area of 5064 thousand hectare in 2012. Though Indian productivity (71.60 tonnes per ha) is higher than average world productivity of 70.24 tonnes, it stands 14th in world ranking against 127.81 tonnes perha. of Peru, stands 1st and is almost double than of India. The major producers of sugarcane in the country during 2012 are Uttar Pradesh(43 percent), Maharashtra(15 percent) Tamil Nadu (10percent), Karnataka (8percent), which together share about 76 percent of total sugarcane production while remaining 24 percent in contributed by Andra Pradesh, Punjab, Haryana, Gujrat etc.,

The figure for the year 2012 indicates that there are about 529 working sugar factories in India with a production capacity of 26.34 million tones of sugar. India exported about 4074.90 thousand metric tones of sugar, worth Rs.129737.3 million and imported about 119.661 thousand metric tones of sugar of value 3746.7 million in 2012.

As sugarcane occupies a significant position among the commercial crops in India, a proper forecast of production of such important commercial crops is very important in an economic system.

India has been known as the original home of sugarcane and sugar. India is the second largest producer of sugar in the World after Brazil and produces more of cane sugar and not beet sugar. Sugarcane is the important commercial crop of the country. In India, sugarcane is the key raw material, planted once a year during January to March. It is the major cost driver for the production of sugar the region and the states involved in sugarcane production in India Region, States Subtropical Uttar Pradesh, Bihar, Haryana Tropical Maharashtra, Gujarat, Tamil Nadu, Andhra Pradesh, Karnataka The production of sugar is spread across the country. In the above states, they are classified into three groups according to its production capacity. They are, the high sugar producing states are Maharashtra and Uttar Pradesh. The second category was the medium sugar producing states. They are Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, and Haryana. The remaining States are low producing States. They were Bihar and Assam Achievements of sugarcane production in various plans of India. Achievements of sugarcane

production in various plans Plans Sugarcane (in million tonnes) Target Actual First Plan 63 60 Second Plan 78 104 Third Plan 100 127 Fourth Plan 150 140 1 c Fifth Plan 165 165 Sixth Plan 215 170 Seventh Plan 217 170 Eighth Plan 275 277 Ninth Plan 336 300 Tenth Plan 336 345 Eleventh Plan - 357.7 Source: Plan documents and Economic surveys Sugarcane as a commercial crop: Sugarcane is a major cash crop in India responsible for the overall socio-economic development of the farming community. Molasses, sugar and khandsari etc, are produced from the juice of sugarcane. Production of the crop is mainly located in the states of Uttar Pradesh, Maharashtra, Tamil Nadu, Karnataka and Gujarat. Sugarcane cultivation needs temperature of 15 degree to 40 degree and rainfall of 100 to 150 centimeters and fertile loamy soil or hard soil. Sugarcane is a long duration crop which produces huge amounts of biomass, requiring large quantities of water, which typically are supplied through 25-30 irrigation cycles per crop season sugarcane is cultivated from Kanyakumari (Southern Part) to Punjab (north – west) but it is more cultivated in Uttar Pradesh, except these States, sugarcane is an important crop in Maharashtra, Tamil Nadu, Andhra Pradesh, Karnataka, Punjab, Haryana, and Bihar etc. In India, the sugar industry is the second largest agriculture based industry after textile fibers. It arises over INR 225 billion in taxes for the common wealth and state governments. The five year plan periods and achievements of sugarcane production in graphical representation. Indian sugarcane production statistics and percentage are 78% of sugarcane is used for sugar production, 15% of the crop is used for the production of various other sweets (gur), 7% of sugarcane is used for bio – fuel production, There are 468 sugar mills functioning in India.

Sugar economy in india

Agro-based industries have been playing a crucial role in Indian economy. About 7.5% of the rural population, covering about 60 million cane farmers, their dependents and a large number of agricultural labor are involved in sugarcane cultivation, harvesting and ancillary activities. Additionally, the country is said to have had 503 operating sugar factories / mills that generate employment for over 50 million people as of 2011–12.

Production and consumption pattern of sugarcane

In India, sugarcane is used to make Sugar (63.4%), Gur (21.8%) and Khandsari (3.2%) while 11.7% of the cane production is used for seeds. The traditional sweeteners of India like Gur & Khandsari are consumed mostly by the rural population and both are mostly consumed within the same year of production. Centrifuged sugar, on the hand, can be stored for longer periods of time and has domestic as well as commercial use. 30% of the sugar produced in the country goes for domestic consumption while the remaining 70% is used by food processors such as bakeries, confectioners and soft drink manufacturers.

Nature of the agro-industry

Sugarcane farming is mostly labor intensive, requiring ample human hands at every stage i.e. sowing, hoeing, weeding, irrigating, cutting and carrying sugarcane to the factories. Therefore, cheap abundant labor is a prerequisite for its successful cultivation. Once harvested, it is important that the canes are loaded on to trucks or tractors or by any other fast means of transportation to take them quickly to the mill for the processing as early as possible to preserve the high quality of sugar. The sugar mills are generally located near producing areas. Because firstly, the sugar deteriorates if it is not quickly processed and secondly, sugar accounts for only between 10 to 20 per cent of the bulky sugarcane and thus it would be prohibitively expensive to transport cane over long distances in its original form.

Now, sugar Industry is regarded second after the Textile Industry in India as per the agro-processing industry in the country and has two sectors:

- Organized-Centrifugal Sugar factories / mills usually belong to the organized sector.
- Unorganized sector. Those producers who produce traditional sweeteners (Gur and Khandsari) fall into unorganized sector.

OBJECTIVES

1. To the socio-economic development in the rural areas,
2. To the reasons for the changes in production of sugarcane
3. To the cyclical changes in prices of sugar influence changes in production.

METHODOLOGY

This study is based on secondary data. The data on sugarcane production in India was collected from various sources such as <http://www.indiastat.com>, <http://agricrop.nic.in/> and other websites, books, journals.

State-Wise Production of Sugarcane in India The major sugarcane in nine states in India. Sugarcane is important for people and it is related to the culture and tradition of Indian people. The state-wise production of sugarcane in India. Uttar Pradesh and Maharashtra stood the first and second places continuously. Assam has the lowest production of sugarcane in India. The States such as Arunachal Pradesh, Andaman and Nicobar Islands, Chhattisgarh, Goa, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Kerala, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Pondicherry, Punjab, Rajasthan, Tripura, Uttarkhand and West Bengal are in the others category with minimal production. The Percentage share of Uttar Pradesh was 35.8 per cent in 2000-01, it was the highest in 2004-05 (50 percent) after which it

was started declining, though it was still the topper state, the production was only 35.6 percent in 2011-12. The share of Bihar varied from 1 to 3 percentages. The percentage share of Assam was less than 0.5 in all the years. Assam was the least producer of sugarcane in India. The reasons for the low production and productivity of Assam was land fragmentation, lack of modern technology, or continued reliance on rain for irrigation, there are several other problems that hinder the development of agricultural sector in Assam.

In 2001-02, a minimal increase in area was observed. After which was a continuous fall in acreage till 2005-06. During this period, though there was a continuous fall in area but the productivity showed a hike. This is due to technological advancement like improvement in mechanization. In 2006-07 all the three components were found at its highest. In years of increase in area, an increase in productivity is evident except for the year 2010-11, while in spite of increase in area, the productivity of sugarcane has declined. The production of sugarcane in Andhra Pradesh in 2003-04 has declined to 15070 thousand tonnes from 18082 thousand tonnes in 2001-02. This was because of unfavorable weather condition. The production has showed a negative growth compared to the previous year. After 2004-05, there was an increase in production up to 2006-07. In the production of sugarcane, Andhra Pradesh stood the sixth rank among the nine states in India.

The north of Bihar was agro-climatically were very suitable for producing good quality with monsoon inputs as compared to other states. But the production of sugarcane in Bihar was very low and this state was ranked the second least producer of sugarcane after Assam. A large number of existing sugar mills run under the State, Bihar sugar corporation had to be closed due to old and obsolete equipment skills, as modernization of the existing plant and equipment and retraining of personnel had not been undertaken by these sugar mills. These are the main reasons for low production and productivity of sugarcane. The highest production of sugarcane in Gujarat was at 2006-07 about 15630 thousand tonnes. Gujarat stood fifth place in yield of sugarcane and in production it took the seventh place. There was low production in 2001-02 was negative at -1.2 percent. In 2002-03 the production has increased to 14071 thousand tonnes from 12465 thousand tonne in 2001-02. In 2003-04, the area and production was negative but the productivity was high because of increase in electricity supply to agriculture for promoting irrigation and thus the output rose.

In 2004-05 also, there was an increase in production and it continued till 2011-12, except one year 2009-10 during which an increase in productivity was witnessed. Haryana ranked the sixth in production and productivity of sugarcane in India. In 2002-03, the productivity was very low. In 2007 to 2009, the annual production and productivity was very low. In 2010-11, there was a positive annual growth in production. The production of sugarcane in Karnataka stood at third

position. There was a negative annual percentage growth rate of area and production. But in productivity, there was a positive growth rate in 2004-05. Then there were some fluctuations in productivity. The production of Maharashtra is the second among the nine sugarcane producing states. In 2010-11 there was an increase in area and production, but the annual change in productivity was zero compared to the previous year. The production of sugarcane in Tamil Nadu has touched the peak at 41124 thousand tonnes in 2006-07. Tamil Nadu stood at fourth place in production of sugarcane and first place in yield. In 2007 to 2010, there was a decline in annual area, production and productivity was low because of low quality of crops, outmoded agricultural techniques and population pressure. In 2010-11, there was an increase in area, production and productivity. The production of sugarcane in Uttar Pradesh was the first among all the sugarcane producing states in India. In 2001-02, there was an increase in area, production and productivity. In 2007-09 all the three elements had negative annual percentage growth rate, which was found to be positive in 2011-12.

In India Karnataka stands 3rd in cane production next to Uttar Pradesh and Maharashtra States and 2nd with respect to sugar recovery after Maharashtra. Sugarcane is grown in 16 districts of the state. Belgaum, Bagalkot, Bijapur, Mandya, Mysore, Chamrajnagar and Bidar are the major sugarcane producing districts. This study examines the economics of sugarcane production and sugar, jaggery and khandsari production in three selected states of India, viz., Karnataka, Uttar Pradesh and Haryana. Trends in area, production and productivity of sugarcane are examined. Forward and backward linkages in the sugar agroindustry, the financing of production, marketing aspects, exports and imports, and demand and supply aspects are also examined. Finally, constraints in the supply chain are identified, and measures to overcome them are presented.

Consequently, its place was taken by sugarcane cultivation. Another reason is that sugarcane has to face tough competition for land from a number of other cash crops such as cotton, tobacco, groundnut, coconut, etc. in the south.

1. Uttar Pradesh

The largest concentration is in the upper Ganga-Yamuna Doab, Rohilkhand and trans-Saryu areas which together produce about 70 per cent of sugarcane produced in this state. Western part of the state forms the core of sugarcane production in the country. As many as 30 districts of U.P. produce sugarcane. However, Muzaffarnagar, Meerut, Bijnor, Moradabad, Saharanpur, Kheri, Deoria, Bulandshahr, Ghaziabad, Bareilly and Sitapur are the important sugarcane producing districts.

2. Maharashtra

Though Maharashtra is the second largest producer of sugarcane in India, this state lags far behind U.P. with respect to area and the production accounting only for about 13 per cent of the production and almost the same percentage of the area of the country. But Maharashtra is in a superior position with respect to recovery of sugar and duration of crushing period. Most of the sugarcane is grown on black lava soil with the help of irrigation. Most of the production comes from Ahmednagar, Kolhapur, Pune, Nashik, Solapur, Sangli, Satara, Osmanabad and Aurangabad.

3. Karnataka

With over 11 per cent of the production and over 8 per cent of the area, Karnataka is the third largest sugarcane producing state of India. Most of the sugarcane is grown with the help of irrigation. Belgaum, Mandya, Mysore, Bijapur, Shimoga and Chitradurga are important producing districts.

4. Tamil Nadu

Though Tamil Nadu accounts only for about 11 per cent of the production and nearly 6 per cent of the area under sugarcane of the country, this state has unique distinction of giving highest yield of 1,067.8 quintals/hectare. Over 80 per cent of the production comes from North Arcot Ambedkar, South Arcot Vallalar, Periyar, Salem, Tiruchirapalli and Coimbatore districts. The rest is contributed by Dharampuri, Madurai, Thanjavur and Ramnathpuram districts.

5. Andhra Pradesh

Most of the cultivation is done in the coastal areas having fertile soil and suitable climate. West Godavari, East Godavari, Vishakhapatnam, Krishna, Srikakulam and Nizamabad are important producers.

6. Gujarat

Gujarat produces only 4.99 per cent sugarcane from 4.65 per cent area of India. Its recovery of 10.31 per cent of sugar is one of the highest among the major sugar cane producing states of India. Surat, Bhavnagar, Rajkot, Junagadh and Jamnagar are the important sugarcane producing districts.

7. Punjab

Sugarcane cultivation in Punjab has suffered a lot on account of shifts in favour of wheat after the introduction of Green Revolution strategy. Still Gurdaspur, Jalandhar, Sangrur, Rupnagar, Patiala, Ludhiana, Firozpur, Amritsar districts are important producers of sugarcane in Punjab.

8. Haryana

Haryana has progressed a lot in sugarcane cultivation during the last few years mainly due to the extension of irrigation facilities. It is an important cash crop in the fertile areas of Karnal, Kaithal, Ambala, Kurukshetra, Rohtak, Hisar, Panipat, Sonapat, Gurgaon and Faridabad districts. However, it avoids western dry districts.

9. Uttaranchal

Most of Uttaranchal is a hilly and mountainous area and is not suitable for sugarcane cultivation. However, parts of Udham Singh Nagar, Haridwar, Nainital and Dehra Dun districts are plain areas or areas located at the foothills.

As such these districts help the state to produce more than two per cent sugarcane of India. Udham Singh Nagar is basically a tarai area which is very rich from agriculture point of view. This district contributes major part of sugarcane production of the state.

10. Bihar:

Bihar's main sugarcane producing areas comprise a continuation of the main sugarcane producing belt of U.P. In the recent years, area under sugarcane has decreased because much of the sugarcane area has been shifted to wheat cultivation. Champaran, Gaya, Saran, Muzaffarpur, Darbhanga and Patna are the main producing districts.

ABOUT SUGARCANE

Sugarcane (*Saccharum officinarum*) family Gramineae (Poaceae) is widely grown crop in India. It provides employment to over a million people directly or indirectly besides contributing significantly to the national exchequer. Sugarcane growing countries of the world lay between the latitude 36.7° north and 31.0° south of the equator extending from tropical to subtropical zones. Sugar cane originated in New Guinea where it has been known for thousands of years. Sugar cane plants spread along human migration routes to Asia and the Indian subcontinent. Here it cross-bred with some wild sugar cane relatives to produce the commercial sugar cane we know today.

Cultivation of sugarcane in India dates back to the Vedic period. The earliest mention of sugarcane cultivation is found in Indian writings of the period 1400 to 1000 B.C. It is now widely accepted that India is the original home of *Saccharum* species. *Saccharum barberi* and Polynesian group of island especially New Guinea is the centre of origin of *S. officinarum*. It belongs to family Gramineae (Poaceae), class monocotyledons and order glumaceae sub family panicoidae, tribe Andriopogoneae and sub tribe saccharininea. The cultivated canes belong to two

main groups: (a) thin, hardy north Indian types *S.barberi* and *S.Sinense* and (b) thick, juicy noble canes *Saccharum officinarum*. Highly prized cane is *S. officinarum*.

In most countries where sugarcane is cultivated, there are several foods and popular dishes derived directly from it, such as:

- Raw sugarcane: chewed to extract the juice
- *Sayur nganten*: an Indonesian soup made with the stem of trubuk (*Saccharum edule*), a type of sugarcane.
- Sugarcane juice: a combination of fresh juice, extracted by hand or small mills, with a touch of lemon and ice to make a popular drink, known variously as *air tebu*, *usacha rass*, *guarab*, *guarapa*, *guarapo*, *papelón*, *aseer asab*, *ganna sharbat*, *mosto*, *caldo de cana*, *nước mía*.
- Syrup: a traditional sweetener in soft drinks, now largely supplanted in the US by high fructose corn syrup, which is less expensive because of corn subsidies and sugar tariff
- Molasses: used as a sweetener and a syrup accompanying other foods, such as cheese or cookies
- Jaggery: a solidified molasses, known as *gur*, *gud*, or *gul* in India, is traditionally produced by evaporating juice to make a thick sludge, and then cooling and molding it in buckets. Modern production partially freeze dries the juice to reduce caramelization and lighten its color. It is used as sweetener in cooking traditional entrees, sweets and desserts.
- Falernum: a sweet, and slightly alcoholic drink made from sugarcane juice
- *Cachaça*: the most popular distilled alcoholic beverage in Brazil; a liquor made of the distillation of sugarcane juice.
- Rum: is a liquor made from sugarcane products, typically molasses but sometimes also cane juice. It is most commonly produced in the Caribbean and environs.
- Basi: is a fermented alcoholic beverage made from sugarcane juice produced in the Philippines and Guyana.

Important regions/ zones for sugarcane cultivation in India

Broadly there are two distinct agro-climatic regions of sugarcane cultivation in India, viz., tropical and subtropical. However, five agro-climatic zones have been identified mainly for the purpose of varietal development. They are (i) North Western Zone (ii) North Central Zone (iii) North Eastern Zone (iv) Peninsular Zone (v) Coastal Zone.

Tropical region Shared about 45% and 55% of the total sugarcane area and production in the country, respectively along with the average productivity of 77 t/ha (2011-12). Sub-tropical

region accounted for about 55% and 45% of total area and production of sugarcane with an average productivity about 63 t/ha (2011-12)

Tropical Sugarcane region

The tropical sugarcane region consists of sugarcane agro climatic zone 4 (peninsular zone) and 5(Coastal zone) which includes the states of Maharashtra, Andhra Pradesh, Tamil Nadu, Karnataka, Gujarat, Madhya Pradesh, Goa, Pondicherry and Kerala.

Sub-tropical sugarcane region:

Around 55 per cent of total cane area in the country is in the sub-tropics. U.P, Bihar, Haryana and Punjab comes under this region.

Crop distribution

Sugarcane growing countries of the world are lying between the latitude 36.70 north and 31.00 south of the equator extending from tropical to sub-tropical zones. In India sugarcane is cultivated all over the country from latitude 8° N to 33° N, except cold hilly areas like Kashmir valley, Himachal Pradesh and Arunachal Pradesh.

Climatic requirement

Temperature for different critical stages of sugarcane

The different critical stages are germination, tillering, early growth, active growth and elongation. Optimum temperature for sprouting (germination) of stem cuttings is 32° to 38°c. It slows down below 25°, reaches plateau between 30°-34°. Temperatures above 38° reduce the rate of photosynthesis and increase respiration. For ripening, however, relatively low temperatures in the range of 12° to 14° are desirable.

Reduction in yield of sugarcane due to rise in temperature

The sugarcane productivity and juice quality are profoundly influenced by weather conditions prevailing during the various crop-growth sub-periods. Sugar recovery is highest when the weather is dry with low humidity; bright sunshine hours, cooler nights with wide diurnal variations and very little rainfall during ripening period. These conditions favour high sugar accumulation. The climatic conditions like very high temperature or very low temperature deteriorate the juice quality and thus affecting the sugar quality. Favourable climate like warm and humid climate favour the insect pests and diseases, which cause much damage to the quality and yield of its juice and finally sucrose contents.

Area, production and yield of sugarcane in major growing states

In Tropical zone Maharashtra is the major sugarcane growing state covering about 9.4 lakh ha area with production of 61.32 Million ton, whereas the productivity of Tamil Nadu is highest in tropical zones. Uttar Pradesh is the highest sugarcane producing State in sub tropical zone having area about 22.77 Lakh ha with the production of 135.64 Million Ton cane whereas Haryana has highest productivity of sugarcane in Sub tropical zone.

CONCLUSION

The production of sugarcane in India has revealed that there were variations in production. It was evident from the trend equations that there were fluctuations in the production of sugarcane in India, no uniform pattern of growth. It is hereby to conclude that the major reason for low production and low productivity is the unpredictable monsoon conditions and also lack of incentives to the farmers. Thus initiatives on proper irrigation. management would enable the scope and increase the production of sugarcane in India. Government policies related on Prices of sugarcane and also provide remunerative prices to farmers.

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