

CHAPTER V

LOCATIONAL CHARACTERISTICS OF INDIAN SUGAR INDUSTRY

Locational Characteristics of Indian Sugar Industry

(The Distribution of Sugar Industry in Northern India)

Like Cotton and Jute Textile, the Sugar Industry is agro-based. It is a weight loosing material. Just as butter is prepared near the source of milk, and canning industries grow up in the districts with a surplus production of vegetables and fruits, sugar factories have to be installed in the areas where sugar cane is grown in sufficient quantities.

In the choice of location of the industry, the supply of fuel or electricity plays an important role, because source of power is an essential factor to establish a new factory. Bagasse, a by-product of sugar, is enough to meet the entire requirements of the mills for raising the steam to drive the machinery. Therefore, the sugar industry is entirely independent of the supply of coal or electricity. It, therefore, is a "raw material localised" industry. In the location of the sugar industry, nature plays an important role, and the local distribution of sugar cane is more or less entirely dependant on climate and rainfall. Tropical as well as sub-tropical climates are suited to the cultivation of cane. Cuba, Java, Hawaii, Mauritius and Phillipines, ~~are~~ the tropical belts are important places for sugar cultivation. The cultivation of sugar cane in sub-tropical belt, outside India, is unimportant. Africa and Australia produce sugar cane in sub-tropical regions.

The sugar cane producing areas in India may be divided into two regions - (1) Sub-tropical, comprising northern and central India, and (2) Tropical, comprising Peninsular India. Since the climatic conditions are similar to those in Java and West Indies, Peninsular India should be the principal sugar producing region. But more than 80% of the total acreage under sugar cane lies in the sub-tropical belt of northern India, and less than 20% of the total acreage under cane lies in Peninsular India.

The cane production has been successful in north India, due to the rich and fertile alluvial soils of Gangetic Plain and the presence of thin varieties of cane.

Uttar Pradesh and Bihar are the most important regions from the point of view of acreage under sugar cane.

For sugarcane cultivation, Uttar Pradesh is divided into three regions - (1) Eastern, (2) Central, and (3) Western.

The amount of rainfall varies from one zone to another according to the position of the tracts. Generally the rainfall decreases from the east to the west and from the north to the south. Because, the summers are hot and winters are mild, sugarcane is grown without irrigation in the eastern region. In the central region, the extremes of temperature are not considerable and the danger of damage by frost is also very little. In the western region the climate^{is} rather extreme.

Due to variation in rainfall, both in the central and the western region, irrigation becomes essential. The level nature of the plain and the presence of snow-fed rivers renders the construction of canals very easy and less expensive. The canal system is excellent in both these regions. Here, irrigation charges are very moderate, since the sub-soil water is available only a few feet below the surface. Only for the cheap irrigation facilities in Uttar Pradesh, the sugar cane acreage is in a unique position. The crop is almost entirely dependant on artificial irrigation in the early period of growth of the crop throughout the hot and dry season. In the Gangetic Plains the alluvial soil region, is the main cane growing area.

North Bihar is the main sugar growing region. The region lies between the mountains on the north and river Ganges in the south. Summers are not but winters are mild in North Bihar and therefore, the sugar cane crops are not liable to damage by frost.

This region is a level plain, falling gradually from the foot of the Himalayas, with a belt of fairly high land near the banks of the river Ganges. Here, soil is older alluvial. The alluvial soil has been replaced by more recent deposits of sand and silt in low land. Due to capricious rainfall, all the cane in this region is unirrigated. On account of these above facilities, the cost of sugarcane is normal.

In Bihar the sugar cane plantations are managed by the firms of planters, who took to sugar cane planting after the collapse of indigo and opium plantations. The area under sugar cane, therefore, is sufficiently compact in Bihar.

South Bihar does not have favourable conditions for sugar cane cultivation. Because, the rainfall is about 42 inches and the presence of alluvial soil in South Bihar is less marked, the sugar cane development, therefore, is less developed here. Attempts are now being made to develop tube-well irrigation on the lines of U.P.

In sugar cane acreage, Punjab ranks next to the U.P. Due to climatic condition, Uttar Pradesh is not in a position to produce good quality of white sugar. The important sugar cane growing region in Punjab lies into the east, and the south of river Chenab. Here, temperature varying from below freezing point, specially in December and January to maximum of about 116 degrees in May and June. Frosts are severe enough to effect the sucrose content of cane.

The early growth of cane is retarded by hot and dry winds specially in summers. The soil of the Punjab is mostly loamy alluvium, generally sandy and fairly uniform. Irrigation is necessary here, because rainfall is much less than U.P. and Bihar.

The percentage of irrigated cane in Hoshiarpur and Ambala is between 75 and 80. The irrigation charges, in this region is very low, due to presence of snow fed rivers and level nature of the plains. In the Punjab, the irrigation system is probably unparalleled in the world.

In sugar cane acreage, West Bengal ranks next to the Punjab. It enjoys a better climate and other facilities than any other part of the north India. Like other States of northern India, West Bengal lies in the sub-tropical zone. But this province is situated near the sea, and it enjoys certain tropical advantages.

In the southern, eastern and northern regions of West Bengal, the soils are new alluviums of the Ganga. From the point of view of soil, West Bengal enjoys better facilities for the cultivation of sugarcane. The greatest drawback of the western part of West Bengal for the cultivation of cane sugar is the lack of early summer rain in the planting season.¹

1. Location of Industries in India by Tulsi Ram Sharma,
P. 139-154.

Possibilities of the shift of the Sugar Industry to
the South

In the sub-tropical regions, thin and medium varieties of canes can be grown and India obtains between 80 to 90 per cent of her cane sugar from this area. The sub-tropical type of climate of Peninsular India is suitable for the growth of the varieties of canes. The superiority of these canes from the point of view of acreage and quantity and recovery over the canes of northern India is shown in the following table.

Table 86

Recovery of Sugar Production, Acreage of Sugar cane in India
1970-71⁻²

Regions	Recovery of sugar percent of cane 1970-71	Sugar production (Metric tonnes) 1970-71	Acreage of sugar cane 1970-71 (Thousand Acres)
<u>Tropical</u>			
Maharashtra	11.25	10,54,884	537
Tamil Nadu	8.99	2,99,029	334
<u>Sub-Tropical</u>			
Uttar Pradesh	9.16	12,99,393	3,382
Bihar	9.01	2,92,799	400

2. Indian Sugar, July, 1972, PP. 389, 388, 385.

Due to the deficient, seasonal and irregular rainfall in India, irrigation is necessary in the south as well as in the north. In the north, the construction of extensive canal systems is easy and cheap on account of the existence of snow fed rivers and level nature of the plains and here, the irrigation charges per acre are not more than Rs. 10 or 11. In the districts of Eastern U.P., North Bihar, sugar cane is grown without irrigation. In northern, eastern and central Bengal sugar cane is grown without irrigation.

On account of uneven nature of the land, the construction of canals in the Punjab and in U.P. is impossible. In the southern part of India (a plateau dissected by numerous rivers) there are many difficulties due to the absence of snow-fed rivers there. The provision of irrigation channels, wherever possible, mostly depends upon the costly storage works. The irrigation charges in Sn India are high only due to these difficulties.

For preparation of soil for sugar cane cultivation considerable amount have to be spent for irrigation in the south. In the north the remarkable properties of the alluvium of the Indo Gangetic Plains reduced the dependance on artificial measures to a very great extent. Thus the irrigation charges and the cost of manures are the two most important elements that raise the cost of production in the south.

From the point of view of sugar cane acreage, the State of Tamil Nadu was the most important in the south at the time of the grant of protection to the sugar industry in 1932.

Coastal district of northern Side of Tamil Nadu is the main sugar producing region of this State. The deltas of the rivers Godavari and the Krishna included in this district, and here rainfall is over 47 inches annually. Mixed alluvial soil, washed from the hills and the uplands cover the area. They are also well served by the delta canals and, therefore, the irrigation charges are very moderate. There is no part of India, except possibly the Deccan canal tract of Maharashtra where the cane is grown with greater profit. The tropical regions contain a warm moist climate with moderate intervals of hot dry weather.

The cost of cultivation in coastal districts is low, but the chief difficulty of these districts is that they are lashed by very violent storms during the growing period of the cane.

The southern districts of the east coast region may get about 35 inches of rain from the north east monsoon, and district of Tinnevely hardly gets more than 4 inches so that artificial irrigation becomes a necessity.

The central tract (including the Deccan famine zone districts) receives on an average only about 26 inches of rain and it is not well distributed. For this irregular distribution of rainfall, locally and periodically, the growth of the crop depends largely on irrigation. Tanks and wells are the sole sources of water supply in the south.

Due to these reasons the percentage of area under cane to the total cultivated area has always been very low.

In the plateau of Mysore, extreme temperatures do not exist due to its high altitude of 2,000 to 3,000 . Rainfall is well distributed and the rainy season lasts from June to November. But the total amount of rainfall outside Maland is not sufficient for growing cane. The rainfall ranges from 600 to 1000 mm in most of the cane growing areas of the State; and the extension of the area under cane is limited by the provision of storage works. The Irwin canal tract, commanded by the Krishnaraja Sagar reservoir is the main sugar cane region. In Chitardrug and Shimoga districts, irrigation facilities are very limited.

The north eastern and south-western parts of Hyderabad are also suitable for the growth of cane. The cultivation of cane is possible only with the help of irrigation due to its

mm.
1000 to 71020/ rainfall and its hot and damp climate from March to September and moderate temperature for the rest of the year. There are limited facilities of rainfall in Medak, Nizamabad and Karimnagar districts. Rainfall is only about 550 mm in south-east and irrigation facilities are provided by the Tungabhadra canal in the Raichur District.

In the whole of the Peninsular India, the production of crystal sugar is the most important, specially in the State of Maharashtra. Major part of the total amount of sugar comes from this State. Here cane is grown entirely under irrigation due to its insufficient rainfall, varying from 500 to 600 mm. The upper courses of rivers Godavari and Krishna and their tributaries like the Pravara, the Mutha and the Nira have all been tapped to provide limited irrigation facilities in the districts of Ahmednagar, Nasik, Poona, Shoalapur and Satara. The soil of this region is of volcanic origin, formed by the weathering of the Deccan trap.

The sugar cane crops in the northern most part (within an elevation from 1,600 to 1,800 ft.) are liable to be damaged by occasional frosts. The lower percentage of sugar cane acreage in Maharashtra indicates that the sugar cane areas are too scattered. The major portion of its cane requirements are transported by its own tramway system to the factories.

In the states of Peninsular India, there are no cold season and frost to restrict the growth of the cane, except in the extreme north of Maharashtra. The planting season in the main sugar cane belt of northern India is confined to two or three months from February to April due to its extreme climate. Sugar cane can be planted practically throughout the year in southern India, due to its favourable climatic condition.

On account of climatic factors the crushing season is also much longer in the tropical region than in the sub-tropical zones. The positions of the northern and southern regions in this respect are as follows :

Table 87
Percentage of total cane crushed (1965-66 to 1969-70) ³

Region	Percentage of total cane crushed		
	Factory cane	Gate cane	Rail cane
<u>Northern region</u>			
Northeastern U.P.	5	70	25
North Bihar	3	55	42
<u>Southern Region</u>			
Bombay	85	15	-
Tamil Nadu	5	67	28

3. Report on the marketing of sugar in India, 1971.

The position of Maharashtra is unique in this respect in the whole of India, as 85 per cent of the cane is grown on the factory farms and remaining 15 per cent is received fresh at the gate. The position of Tamil Nadu is as good as that of north eastern U.P. and is much better than that of north Bihar. The percentage of rail cane, however, do not show a disparity between the north and the south clearly. The percentage of factory cane, gate cane and rail cane at Tamil Nadu are 5,67 and 28 respectively.

There are a great possibilities in the south to extend the sugar industry practically over nine months of the year from October to May and the off season is very short here. But in the north, the off season is considerably longer than the busy season and, therefore, similar development may not be practical and paying proposition.

From the point of view of markets and the demand for sugar, the tropical region stands in a better position than the sub-tropical zone. The production of sugar cane and total production directly from the cane in different regions of the north and south is given in the table below. Here is found the total production of sugar directly from the cane is much more in the south than in the north. In certain regions

of Peninsular India like the north east coast districts of Tamil Nadu and Maharashtra are in a better position to export sugar⁴ in the post war period.

Table 88

Production of Sugar and total production of Sugar cane

5

North India			South India		
Trade Block	Total production of sugar (in metric tonnes)	Sugarcane production (in thousand metric tonnes)	Trade Block	Total production of sugar (in metric tonnes)	Sugarcane production (in thousand metric tonnes)
	1971-72	1970-1971-72		1971-72	1970-1971-72
Assam	5,000	128	Orissa	6,000	192
West Bengal	1,000	150	Tamil Nadu	2,96,000	1,144
Bihar	1,52,000	649	Andhra Pradesh	3,02,000	1,061
West U.P.	6,25,000	5,566	Maharashtra	10,00,000	1,679
East U.P.	2,15,000		Madhya-pradesh	21,000	163
Punjab	32,000	527	Mysore	2,38,000	848
Haryana	72,000	698	Kerala	11,000	38
Gujarat	95,000	194	Pondicherry	22,000	13
Rajasthan	7,000	122			
TOTAL :	12,04,000	8,034	TOTAL :	18,96,000	5,138

4. Tulsi Ram Sharma, Location of Industries in India, 1954. PP. 139-154.

5. Indian Sugar, July, PP. 388,386. (1972)

On account of superior climatic conditions, the output of sugar cane per acre and the recovery percentage are higher in the tropical regions than in the sub-tropical ones. The extent of demand in the local markets is also more favourable in the south than in the north. Since the cost of cultivation in the tropical region is high, the sugar mills in Peninsular India have not been able to raise their production to satisfy the local demand. The latest research shows that over manuring and over irrigation are generally done and the best results are possible with reduced quantities of manure and water. The irrigation charges and the price of manure are the heaviest items in the total cost of production of sugar cane in the south and, if it is found possible to reduce these items to reasonable limits, there is no doubt that this region will be able to produce sugar cane as cheaply as any of the regions in the north.

The second and the remaining obstacle in the path of progress of the sugar industry in the tropical region is the lack of irrigation facilities.

The distribution and comparative growth of the sugar industry in the northern and the southern parts of India are shown in the table below.

Table 89
Distribution of Vacuum-Pan Factories, 1969-70 to 1971-72⁶

Region	No. of Factories		
	1969-70	1970-71	1971-72
Northern India	123	124	126
Southern India	16	15	16
Tamil Nadu	41	41	41
Maharashtra	10	11	13
Mysore	19	19	19
Andhra Pradesh	2	2	2
Orissa	3	3	3
Kerala & Pondicherry	1	1	1

6. Indian Sugar July (1972), P. 391.

Conditions during the War and Post-war periods

The sugar industry is widely scattered, and as a result of dispersal the regional distribution appears to be improving slowly. The following table shows the pre-war condition of production of sugar

Table 90
Production of Sugar - Pre War conditions

Region	1939-40	1942-43	1943-44	Region	1939-40	'42-43	'43-44
North India				South India			
N.W.F.P.	-	3.17	6.25	Madras (with States)	43.21	33.72	46.09
Sind	3.02	2.01	-	Bombay (with states)	91.06	96.26	102.25
Punjab (with States)	19.59	10.83	28.34	Mysore	30.60	16.21	20.23
Uttar Pradesh (with States)	676.43	634.33	759.44	Hyderabad	10.45	12.30	17.47
Bihar	315.48	237.67	212.81	Orissa	2.32	2.09	1.69
Bengal	39.87	16.54	13.65	Others	-	0.09	0.99
Assam	0.04	-	-				
C.I.	7.43	7.18	12.17				
Rajaputna	1.96	1.45	2.18				
TOTAL	1,063.82	913.18	1,034.84		177.64	160.67	188.72
ALL INDIA :	1,241.46 (1939-40, N+S)			1,073.85	1,223.56 (1943-44 N+S)		
				(1942-43, N+S)			

Now the real problem of Indian Sugar Industry is the supply of good quality cane at cheap rates comparable to the prices of similar cane in countries like Java. Because 85 per cent of the cane is grown in the north, where heavy yielding varieties cannot establish themselves, and major part of the cane is obtained by the factories from the cultivators.

Agricultural side of the industry can be much better controlled on factory farms of a suitable size. But in densely populated regions like the plains of the river Ganga where majority of people practise peasant farming, it is not practicable to provide farms to a substantial section of sugar mills.⁷

7. Tulsi Ram Sharma, Location of Industries in India, 1954, PP. 139-154

Locational characteristics of Indian Sugar Industry

Factor's effecting the location of the industry and causes

Main areas of concentration:

Uttar Pradesh, Bihar, Madras, Tamil Nadu and Maharashtra, are the main sugar producing areas of India, and the sugar industry, thus is mainly concentrated in these areas. Uttar Pradesh and Bihar produce together about 70% of the total quantity of sugar in the country because of the pre-eminence of these two states in the production of sugar cane.

Other states like West Bengal, the Punjab and Andhra Pradesh have also succeeded in attracting the industry in recent years, because of the extension of sugar cane cultivation in these areas consequent upon the development of irrigation and transport facilities. The recovery percentage of sugar is higher in Maharashtra and Tamil Nadu than in Uttar Pradesh and Bihar. But the cost of sugar cane production is much higher in Tamil Nadu and Maharashtra, than in Bihar and Uttar Pradesh. Due to high cost of irrigation and practice of manuring, the cost of sugar cane production is higher in Maharashtra. The cost of transportation of sugar cane is very high in Maharashtra and Tamil Nadu, because the sugar cane is cultivated in these areas in scattered areas. The white sugar industry has flourished in Uttar Pradesh and Bihar. The progress of the industry has been very much hampered

in Maharashtra and Tamil Nadu. Sugar cane has to compete with groundnut, or tobacco in the Deccan, and therefore, it could not be a popular crop there. Due to the development of irrigation facilities and transport, the extension of sugar cane cultivation and development of sugar industry in the Deccan has now been more advanced. In West Bengal, the development of sugar industry has been much retarded due to the competition of sugarcane with rice and jute and other crops.⁸

8. Indian Industries, Development and Location,
Dr. M.R.Chaudhuri, PP. 194-195.

Table 91

Present Distribution of Sugar Mills in India.9

States	1959-60	'60-61	'61-62	'62-63	'63-64	'64-65	'65-66	'66-67	'67-68	'68-69
U.P.	70	71	72	72	72	72	71	71	71	-
Bihar	28	28	28	28	28	29	29	29	27	-
Punjab & Hariyana	6	6	6	7	8	8	8	8	8	-
West Bengal	2	2	2	2	2	1	1	1	1	-
Assam	1	1	1	1	1	1	1	1	1	-
M.P.	5	5	5	5	4	5	5	4	3	-
Rajasthan	2	2	2	2	2	2	2	2	2	-
Maharashtra	27	27	27	29	33	32	32	33	34	-
Gujarat	22	3	3	3	3	3	3	3	4	-
Orissa	1	1	1	1	2	2	2	2	2	-
Andhra Pradesh	11	11	14	17	18	19	20	20	20	-
Tamil Nadu	5	8	9	9	10	12	13	14	15	-
Mysore	7	3	8	8	8	8	9	9	9	-
Kerala	1	1	1	1	2	3	3	2	3	-
Pondicherry	-	1	1	1	1	1	1	1	1	-

ALL INDIA:	168	174	180	186	194	198	200	200	201	-

9. Report of the Second Central Wage Board for the Sugar Industry (1970, PP.9-11.

Trend and Localization of Sugar Industry in India : (variation
in locational quotient)

The location of sugar industry is conditioned by the availability of sugar cane in sufficient quantities within a reasonable economic distance. After the stocks have been cut, the sucrose content of the cane begins to deteriorate and hence for securing better recovery, the accessibility of the units to the cane supplies is essential. According to Weberian terminology, the sugar industry has a "material index" of greater than unity, and hence the industry is not capable of considerable dispersal. The cost of production of sugar and the price of sugar cane represent half to two third of the total costs, and for this reason the importance of raw materials can be judged. Therefore, the sugar industry is "raw material oriented" and the location of this industry is fully controlled within a reasonable economic distance, from the sugar cane.¹⁰

10. Structure of the Indian Industries, Dr. M.M.Mehta (1955),
PP. 177-178.

The following table shows the trends in the localization¹¹ of sugar industry (variation in location quotient - 1965-66)

Table 92

Trends in the localisation of Sugar Industry.

States	A.	B.	Location quotient $\frac{B}{A}$
	Percentage of workers employed in large establishment	P.C.workers employed in sugar Inds. only	
Andhra Pradesh	4.30	6.30	1.46
Assam	1.47	-	-
Bihar	4.06	8.12	2
Gujarat	6.27	.62	.1
Jammu & Kashmir	.20	-	-
Kerala	2.89	.70	.25
M.P.	2.87	1.40	.30
Madras	6.92	4.20	.61
Maharashtra	14.38	8.80	.61
Mysore	3.22	2.73	.85
Orissa	1.32	.44	.33
Punjab	1.57	1.29	.82
Rajasthan	1.39	.51	.39
U.P.	5.45	24.80	0.45
West Bengal	16.62		
Andaman Nicobar	.04		
Delhi	1.49		
Himachal Pradesh	.15		
Tripura	.02		
Pondicherry	1.12		
Goa	.02		
Haryana	25.33	40.45	1.20
Chhatisgarh	6.15		

11. Annual Survey of India, 1966.

In some regions loamy soils are found and they are exceptionally suited for cane cultivation. This industry is predominantly localised in Uttar Pradesh and over 70% of the productive capacity of the industry come from this state and little less than three fourth of the total number of workers are employed in this industry on the area. The physical and climatic factors are so much responsible for the excessive concentration of sugar industries in Uttar Pradesh. In recent years, the gradual dispersal of the industry in newer and newer regions is seen due to the various natural advantages, irrigation facilities, consumer's markets for excellent transport system. This gradual but unmistakable tendency for the dispersal of the industry has not been accompanied by a decline in the place of original locations. Uttar Pradesh and Bihar still continue to occupy the dominant position. Other provinces like Tamil Nadu, Maharashtra, the Punjab and Andhra have succeeded in attracting the industry. Tamil Nadu and Maharashtra (entire tropical) are best suited for the superior variety of cane cultivation and good quality of cane grown in these States. Due to the natural advantages, the irrigation facilities, the proximity of consumer's markets and excellent transport relations in Maharashtra and Tamil Nadu the further expansion of the industry is much advantageous. Besides these natural and economic advantages, the industry has been unable to make rapid progress in these two States. In Tamil Nadu groundnuts, banana, chillies, cotton and tobacco, compete with sugarcane as cash crops.

The table below shows the trends in localization of Sugar Industry
(variation in the co-efficient of localization in 1965-66)

Table 93

States	P.C. of workers employed in large Indst. establishment	P.C. of workers employed in sugar industry	Deviation from total - or +
Andhra Pradesh	4.30	6.30	+2
Assam	1.47		-1.47
Bihar	4.06	8.12	+4.06
Gujarat	6.27	.62	-5.65
Jammu & Kashmir	.20		-.20
Kerala	2.89	.70	-2.19
M.P.	2.87	1.04	-1.83
Madras	6.92	4.20	-2.72
Maharashtra	14.38	8.80	-5.58
Mysore	3.22	2.73	-.49
Orissa	1.32	.44	-.88
Punjab	1.57	1.29	-.28
Rajasthan	1.39	.51	-.88
U.P.	5.45	24.80	+19.35
West Bengal	16.62		-16.62
Andaman Nicobar	.04		-.04
Delhi	.497		-1.27
Himachal Pradesh	.15		-.15
Tripura	.02		-.02
Goa	.02		-.02
Hariyana	25.33	40.45	+15.12
Pondicherry	1.52		1.92
Total deviation			-40.53
			+40.53
Co-efficient of localization			0.41

12. Annual Survey of Industry (1966).

The following table shows a comparative study of trends in localization in sugar industry (variation in the co-efficient of localization, 1956)¹³

Table 93
Trends in the localization of Sugar Industries.

States	% of workers employed in large Indst. establishment	% of worker employed in sugar Industries	Deviation from total + or -
Bombay	33.25	9.61	-23.64
Rajasthan	1.36	.99	-.37
Madras	8.98	2.95	-6.03
Andhra	3.66	6.19	+2.63
Uttar Pradesh	9.65	52.98	+43.33
Bihar	6.53	21.07	+14.54
Mysore	3.43	3.12	-.31
Madhya Pradesh	1.08	-	-1.08
Assam	.46	-	-.46
Delhi	1.09	-	-1.09
Orissa	.93)	-	
West Bengal	26.18)		
Punjab	2.08)	3.09	-27.42
Kerala	1.26)		
Himachal Pradesh	.06)		
			60.40
Co-efficient of localization			<u>60.40</u>
			.40

13. Annual Survey of Industry (1956).

The following table shows the trends in localization of Sugar Industry (variation in location quotient, 1956).¹⁴

Table 94

States	A	B	Location quotient B/A
	% of workers in large Ind- ustries	% of workers in sugar industries	
Bombay	33.25	9.61	.28
Rajasthan	11.36	.99	.04
Madras	8.98	2.95	.32
Andhra	3.66	6.19	.18
U.P.	9.65	52.98	5.49
Bihar	6.53	21.07	2.18
Mysore	3.43	3.12	.91
Andhra Pradesh	1.08	-	0
Assam	0.46	-	0
Delhi	1.09	n-	0
Orissa	30.51	3.09	.10
West Bengal			
Punjab			
Kerala			
Himachal Pradesh			

The change of location co-efficient indicate that the locational character is changing it is a provincity for dispersal.

14. Annual Survey of Industry (1956).

Locational Characteristics of Indian Sugar Industry
Trend in the localization of Sugar Industry (variation in location
quotient, 1925-65 ¹⁵

Table 95

States	1925			1935			1945			1955		
	% of workers employed in large Indust. establishment	% of workers employed in Sugar Industries	Location quotient B/A	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
	A	B										
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Bengal	34.3	0.7	0.02	29.0	4.6	0.16	23.6	4.0	0.17	20.09	0.35	0.02
Bombay	21.3	5.0	0.23	21.6	2.7	0.13	42.2	6.0	0.25	28.11	6.81	0.24
Madras	7.0	24.9	3.56	8.3	4.6	0.55	8.5	6.0	0.71	14.51	7.00	0.49
Uttar Pradesh	4.6	33.7	7.3	7.2	58.7	8.15	8.7	49.5	5.70	8.00	52.92	6.62
Bihar & Orissa	10.2	34.6	3.39	9.2	23.0	2.50	5.6	19.8	3.54	6.27	23.37	3.73
Punjab	3.1	1.1	0.35	2.9	3.1	1.07	4.9	1.0	0.20	2.08	0.82	0.39
Rest of India	10.0	-	-	8.2			7.3	-	-	20.94	8.3	0.41
All States	9.5	-	-	13.6	3.3	0.24	17.2	13.7	0.79	8.56	8.73	1.02

15. Structure of Indian Industries, Dr. M.M.Mehta (1961), P. 186.

Trends in the Localization of Sugar Industry ¹⁶
 (Variation in the co-efficient of localization 1925-55)

STATES	1925			1935			1945			1955		
	Percentage of workers employed in large industrial establishment	Percentage of workers employed in Sugar Industry	Deviation from Total - or +	Percentage of workers employed in large industrial establishment	Percentage of workers employed in Sugar Industry	Deviation from Total - or +	Percentage of workers employed in large industrial establishment	Percentage of workers employed in Sugar Industry	Deviation from Total - or +	Percentage of workers employed in large industrial establishment	Percentage of workers employed in Sugar Industry	Deviation from Total - or +
. Bengal	34.3	0.7	-33.6	29.0	4.6	-24.4	23.6	4.0	-19.6	20.09	0.35	-19.74
. Bombay	21.3	5.0	-16.3	21.6	2.7	-18.9	24.2	6.0	-18.2	28.11	6.81	-21.30
. Madras	7.0	24.9	+17.9	8.3	4.6	- 3.7	8.5	6.0	- 2.5	14.51	7.00	- 7.51
. U.P.	4.6	33.7	+29.1	7.2	58.7	+51.5	8.7	49.5	+40.8	8.00	52.92	+44.92
. Bihar & Orissa	10.2	34.6	+24.4	9.2	23.0	+13.8	5.6	19.8	+14.2	6.27	23.37	+17.10
. Punjab	3.1	1.1	- 2.0	2.9	3.1	+ .2	4.9	1.0	-3.9	2.08	0.82	-1.26
. All States	9.5	-	- 9.5	13.6	3.3	-10.3	17.2	13.7	-3.5	-	-	-
. Rest of India	10.0	-	-10.0	8.2	-	. 8.2	7.3	-	-7.3	20.94	8.73	-12.21
Total deviation			+71.4 -71.4			+65.5 -65.5			+55.0 -55.0			+62.02 -62.02
Co-efficient of Localization			0.71			0.65			0.55			0.62

Again in Maharashtra and Tamil Nadu the cost of cane cultivation is much higher than in U.P. and Bihar. In Maharashtra the cost of cane cultivation is high due to the cost of irrigation and the practice of manuring. Like U.P. and Bihar the Sugar cane is not grown in such concentrated and compact blocks in these states. For this reason, the mills feel a great disadvantage in procuring fresh supplies of sugar cane in required quantities within a reasonable economic distance. And these difficulties are great obstacle for the further growth and expansion of industry. Similarly, in the Punjab the expansion of industry has been moderate. Other States like Mysore and U.P. are the attracting spot for the development of sugar industry. Due to completion of numerous irrigation projects like the Irwin canal in Mysore, Nizana-sagar and Tungabhadra Projects in Hyderabad and Cauvery and Mettur and Perityar irrigation projects in Tamil Nadu, the sugar industry gets more facilities for its future development.

18. Structure of Indian Industry, Dr. M.M.Mehta, (1955), PP. 178-181.