

CHAPTER I
CANE SUPPLY AND ITS PROBLEMS ~~IN INDIA~~.
IN INDIA.

CANE SUPPLY AND ITS PROBLEMS IN INDIA.

1.1. Introduction :

India is the home^{of} sugarcane, to which one can find reference in the ancient and pre-historic literature such as the vedas. From 327 B.C. sugarcane is among the chief crops of India. The important sugarcane growing countries are India, South China, Jawa, Philippines, Peru, West Indies, Central America, Brazil, Cuba, Egypt, Pakistan, Maxico, Australia and South Africa. In India, Uttar Pradesh and Bihar occupy still now an important position in its production and consumption. The sugarcane plant is a vigorous and rapidly growing pernnial grass which reaches a height of 8 to 12 feet or more and a diameter of about an inch in cultivation. It grows in clumps with bamboo like stems arisan from large foot stacks with very ornamental feathe^{ry} of flowers. The stem is solid with a tough rind and numerous fibres strands and contains about 80 per cent of juice, the sugar content of which varies greatly. About 25 per cent of the world sugar is produced in India.

Sugarcane has a peculiar feature in one sense. Unlike the cotton and jute fibres, sugarcane, the raw material of the sugar industry is a " weight l^osing material " at the sugar manufactured from it is within the range of 9 % to 13 % of the total weight of the sugarcane crushed. The sucrose content of cane is prone to deteriorated soon after it has

been cut from the field. Sugar recovery gives better results if cane is crushed in 24 hours of its separation from the root.

1.2. Geographical conditions and control for the growth of Sugarcane :

The climatic conditions which are ideal for sugarcane production can be summarised as stated below.

1. A long warm, sunny sugarcane growing seasons with adequate rainfall to the extent of 60 is the first ideal condition.
2. A fairly dry sunny and cool but frost free ripening and harvesting season with an average of 80° temperature is the second essential condition.
3. The last but not ^e of the last importance is the condition which requires freedom from typhones and hurricanes and fertile soil for better development of the cane.

It is a happy trend that India that has an enormous home market. She has fairly favourable geographical conditions and cheap labour. The regions of great significance for sugarcane cultivation are found in the Ganges valley. Bihar and Uttar Pradesh are its main sections besides the belts of peninsular in India.

For the purpose of breeding cane varieties suitable for different agro-climatic conditions, India has divided into seven agro-climatic zones. Recently, the number of zones increased to 15.

Planting time of sugarcane varies from place-to-place and is dependend upon the climatic conditions. The planting time varies state-wise and with the type of cane crops to be taken. The planting times of different states are given in following table.

TABLE NO. 1

Showing season for sugarcane in Different States of the Countr

STATES	SHOWING SEASONS	
	ADSALI	EKSALI
Andhara Pradesh	June-August	December-April
Assam	--	June-February
Bihar	--	February-March October-November.
Gujarat	--	January-February October-November.
Haryana	--	February-March.
Karnataka	July-October	January-March and July-November (a)
Kerala	--	September-February
Madhya Pradesh	--	October-March
Maharashtra	July-August	October-January
Orissa	August-September	February-April
Punjab	--	February-March.

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STATE	ADSALI -----	SHOWING SEASONS EKSALI -----
Rajasthan	--	January-April.
Tamilnadu	--	December-May and July-September (a)
Uttar Pradesh	--	October-November February-March
West-Bengal	--	October-March October-November,
Pandhichery	--	December-September.

Planting continued for six months (a) Special Season.

Source :- Sugar Industry Enquiry Commission Report,
1974, Vol. 1, Part II, Table No. 1.9, P.662.

1.3. The Different Cane Growing Areas in India :-

The sugarcane growing areas in the country have been broadly divided into two belts.

1. Sub-tropical belt.
2. Tropical belt.

The sub-tropical belt consists of the states of the Punjab, Haryana, Rajasthan, Madhya Pradesh, Uttar Pradesh, Bihar, Orissa, West Bengal and Assam. Sugarcane is generally planted in the month of February and March, and is harvested

from the month of November to April in this belt. The characteristic feature of the sub-tropical belt is that it constitutes 74 % of the area under sugarcane in India. Uttar Pradesh and Bihar share major part of the cane average in the country. This belt has been endowed by nature with rich and fertile alluvial soil of the Gangatic plain. The loomy soils of this zone are marvelously good for sugarcane growing as they reduce considerably the expenditure on chemical fertilizers. Besides agricultural operations are sophisticated and simple, and culturing of the soil does not involve much expenditure in the belt.

The tropical belt is mainly comprised of the states of the Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. The Climatic conditions of the belt are very much favourable to the sugarcane cultivation and the yield of sugar. The cane crop is generally sown in January-May and harvested in November-April. Apart from the factors such as irrigation, fertilizer use, climate and soil differences between sub-tropical and tropical belts have effect on the average yield, of sugarcane per acre as also on its quality. In recent years, the tropical belt plays a leading role from the standpoint of both cane cultivation and commercial white sugar production in India. A close and critical study of both these belts shows some sharp differences in the matters of cane growing method and the amenities afforded.

- 1) The sub-tropical belt is chiefly dependent on rains or natural water for sugarcane growing. Irrigational facilities in this region are quite inadequate and unsatisfactory. Quite contrary to this situation in the peninsular India. The Government has made sufficient arrangement for irrigation purpose for the sake of cane cultivation in this belt. The government has got agreements executed with sugar factories for the guaranteed supply of irrigational water on long-term basis on the interest of sugarcane growers.

- 2) Normally more than half the production of sugarcane goes to manufacture of gur and khandsari. The area of operation of the sugar factories is not clearly demarkated and not in compact block in the case of North sub-tropical belt. That is why the sugarcane is diverted for manufacture of gur and khandsari more in sub-tropical belt. In tropical belt of the south, the area is compact and demarkated and consequently therefore the tendency to manufacture gur is minimal unless the price of gur is very lucrative.

- 3) In the tropical belt most of the sugar factories have been operating on cooperative basis. Majority of the factories in this belt are co-operative sugar factories with a bias to co-operation. The move in this direction in the region has been given an impetus owing to Government, preferential treatment to co-operativ

sugar factories in the matters of opening new factories or granting of licences to open new factories or extending credit facilities to them. The nature and character of benefits reaching members-growers of sugarcane in case of co-operative sugar factories in the tropical belt is by far laudable with the improvement in agriculture irrigation, providing infrastructural and social services for the people and growers. Whereas in sub-tropical belt these facilities are greatly lacking owing to the fact that sugarcane factories are not operating on co-operative basis leaving a few case.

- 4) In the tropical region, the agricultural departments of the factories and the extension service of the state government have worked hand in glove to import the knowledge of new cane crops and new High Yielding Varieties to the farmers. But this sort of coherence between two is greatly lacking in the sub-tropical belt.
- 5) Though about three-fourth of the area under sugarcane in India has always been in the sugar tropical belt, the size of holdings in these regions is not big enough to ensure scientific cultivation of cane. But in the south (in-tropical belt) each factory has it's own plantation, generally spread over an area of about 30 to 40 square miles. The plantation has been divided into different sections formulated on the principles of farm management. Each section is under the supervisor

of highly qualified staff. The scientific organization has maximised the yield per acre in the tropical belt. According to the Report of the Sugar Enquiry Commission 1964, the yield per acre in the sub-tropical belt is about half of that in the tropical belt, and the content of the sub-tropical sugarcane is, on an average lower than that of the tropical sugarcane.

- 6) In the sub-tropical regions sugarcane cultivation extend to long distances from the sugar factories. The problems of transportation after harvest over long distances leads to higher costs of sugarcane cultivation and consequently cost of sugar production. Sometimes there is sufficient time lag between the harvesting of sugarcane and its reaching the sugar factories owing to non-availability of means of transport or very slow transport means such as bullock cart. This leads to great loss of sucrose in cane. In the tropical belt, the sugar factories have spacious sugarcane cultivation areas in their very proximity or they themselves have big cane farms either on leases or by purchase for the sake of sugarcane cultivation.
- 7) In the sub-tropical belt, the agricultural operation of sugarcane is ~~is~~ ~~as~~ ~~yet~~ dependent chiefly on the old outdated tools and implements. In the tropical regions, specially in the areas of Maharashtra, the cultivation of sugarcane is highly mechanised. Each factory is fully equipped with the organisational set of modern equipments. In Maharashtra

sugar factories are now organised transport departments with trucks, tractors-trailors on behalf of the members (growers). The truck and tractor-trailors are purchased (on behalf of the members) on hire purchased basis. They are preferentially engaged for transport of sugarcane during every sugar factory seasons. Some factories in this region, have purchased crawler chain type tractors with bulldozers which are used for levelling of lands of the member growers on concessional terms and conditions. The factories of the tropical belt have taken full advantages of the schemes sponsored by the Governments and the help given by the Government to be cane growers by way of subsidy on compost pits, green manuring and allotment of fertilizers, improved method of spraying insecticides on the sugarcane and supply of quality seed material to the intending sugarcane cultivators during each plantation season.

According to the data furnished by Indian Sugar Mills Association, the yield of sugarcane in India, is lowest in the world. There are several factors that lead to the higher yields in the foreign countries. In countries like Guyana, Barbados, Indonesia and Mauritius, sugar is the principal industry. They enjoy favourable climatic conditions within the tropics. In addition to all these factors sugarcane is grown in these countries on extensive contiguous areas. Although the average yield

in India as a whole is lowest in certain states of India like Andhra Pradesh, Karnataka, Maharashtra and Tamil Nadu being in the tropical regions have average yields which compare favourably with those in the foreign countries. The low yield of cane per hectare in India is vivid (see table 1.2)

TABLE NO. 1.2

Comparative Figures of Yield of Cane in Different Countries	
<u>Countries</u>	<u>Yield(Tonnes per hect.)</u>
Cuba	36.7
Pakistan	44.4
India	48.5
B.R. Honduras	50.0
Philippines	50.0
Costa Rica	50.1
Fiji	50.5
Puerto Rico	55.8
Barbados	77.0
Mauritius	73.3
Australia	74.2
Gayana	81.3
Indonesia	81.3
Asia	48.3
World	51.2

Source :- Government of India, Tariff Commission Report on the Cost structure and Fair Price Payable to the Sugar Industry, Bombay, 1973.

1.4. Trends of Sugarcane Production and cane yield :-

It is shown in the following tables that the area/ under sugarcane, its production and per hectare yield of sugarcane which shows an upward trend during the plan period. However, there are variations in both area under cane and production.

Contd.
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States 1966-67 1969-70 1970-71 1971-72 1972-73 1973-74 1974-75 1975-76 1976-77 1977-78 1978-79 1979-80 1980-81 1981-82 1982-83 1983-84.

States	1966-67	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84.
Assam	32.2	47.8	37.3	37.5	38.2	40.4	38.4	37.0	35.8	31.5	34.6	37.7	35.8	36.6	42.0	43.9
West Bengal	44.2	47.0	54.2	48.7	50.6	52.8	58.0	58.5	61.4	51.4	58.7	49.1	60.7	61.3	51.4	50.4
Bihar	29.2	39.1	38.4	32.1	35.1	37.2	39.1	36.7	32.2	35.8	27.3	32.7	31.4	33.8	33.8	30.4
Uttar Pradesh	33.1	44.1	40.6	38.6	43.4	41.3	47.1	40.5	44.8	47.7	38.2	37.3	47.1	46.3	45.6	46.3
Punjab	28.0	41.2	41.3	39.1	45.8	49.1	50.0	53.7	53.7	56.2	56.7	51.0	55.1	57.1	60.9	61.9
Haryana	33.8	46.9	45.0	45.1	44.1	39.7	36.7	43.5	43.3	45.5	36.3	31.1	40.5	39.7	37.4	44.2
Madhya Pradesh	23.1	25.1	26.6	27.7	26.4	26.7	28.8	32.0	45.0	46.2	36.8	34.6	38.8	38.7	37.6	44.2
Gujarat	52.2	50.8	51.8	50.8	47.1	50.1	49.0	55.2	55.4	56.4	56.8	56.1	59.1	59.6	70.3	75.5
Maharashtra	62.2	65.0	68.0	63.2	61.6	78.7	92.8	89.1	89.2	94.8	92.1	89.3	91.3	96.9	96.2	90.3
Karnataka	89.9	84.7	87.7	82.2	81.2	78.2	69.5	79.6	69.7	73.4	71.4	71.5	79.6	74.5	79.8	73.2
Andhra Pradesh	74.1	70.1	76.3	88.8	73.8	5.9	58.2	70.5	70.4	78.4	63.6	74.1	76.2	83.4	74.2	68.8
Orissa	49.0	52.1	53.9	62.8	65.2	8.7	62.7	65.5	61.6	60.5	61.0	60.7	62.9	64.4	61.9	57.7
Tamil Nadu	78.2	75.7	77.4	82.3	74.2	8.3	90.9	93.0	92.2	104.6	99.9	103.0	101.5	98.8	88.9	92.2
Pondichery	84.4	87.8	85.6	93.8	95.0	12.5	88.2	59.9	85.8	93.8	88.1	67.8	75.5	79.2	86.9	86.1
Kerala	62.5	64.3	48.9	50.1	51.3	4.1	56.7	53.9	56.2	56.9	57.0	57.4	57.8	59.1	59.4	107.4
Nagaland	--	--	--	--	--	--	30.8	30.0	30.6	30.6	54.8	52.0	35.6	31.8	45.0	26.7
Goa	--	--	--	--	--	--	51.9	47.5	47.0	43.6	45.8	46.7	50.0	53.7	49.8	44.5

All India	40.3	49.1	48.3	47.5	50.2	.2	49.9	50.9	53.4	56.4	49.1	49.4	57.8	57.5	56.2	55.9
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Source :- Indian Sugar, March 1986 (V)

TABLE NO. 1.5.

STATEMENT SHOWING STATEWISE CANE YIELD PER HECTARE FROM 1966-67 to 1983-84.

TABLE NO. 1.3.

STATEMENT SUGARCANE ACREAGE IN INDIA FROM 1970-1971 to 1984-1985 (Thousand hectares)

States	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Assam	32	34	34	39	42	41	46	49	48	47	48	49	49	49	47	47
Andhra Pradesh	120	119	134	144	195	146	146	169	142	114	132	180	170	141	136	136
Bihar	162	142	134	139	141	134	128	139	131	120	111	124	103	128	128	128
Gujarat	37	36	38	44	41	38	49	62	58	57	75	84	95	103	100	100
Haryana	155	114	136	150	161	158	168	196	190	127	115	147	147	134	143	143
Kerala	8	8	8	10	9	9	7	7	7	8	8	8	8	8	8	8
Maharashtra	217	182	46	165	185	212	244	246	244	222	256	297	326	294	296	296
Karnataka	97	107	104	110	124	129	144	159	154	135	157	169	187	183	156	156
Madhya Pradesh	61	52	52	57	81	77	77	56	62	51	39	54	47	70	54	54
Orissa	30	31	31	41	44	45	45	43	46	47	49	50	51	52	57	57
Punjab	128	103	103	110	123	114	113	116	110	77	71	106	104	84	87	87
Pandicherry	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Rajasthan	37	28	34	40	51	40	44	61	60	34	29	37	38	37	34	34
Tamil Nadu	135	117	144	186	160	128	154	167	154	149	183	189	175	157	118	118
Uttar Pradesh	345	1,274	1,308	1,473	1,492	441	1,456	1,637	1,634	1,373	1,363	1,660	1,783	1,704	1,551	1,551
West Bengal	38	34	33	31	29	29	30	31	32	29	14	23	31	20	13	13
Others	11	7	11	11	14	19	16	15	14	18	15	14	15	11	6	6
Total	2,615	2,390	2,452	2,753	2,894	762	2,868	3,151	3,088	2,610	2,667	3,195	3,358	3,167	2,900	2,900

SOURCE :-

Indian Sugar, March 1986. (III).

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Table with multiple columns and rows, containing faint text and numbers. The table is oriented vertically on the page. Some legible numbers include 103, 114, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200.

STATES	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
Assam	1,210	1,274	1,311	1,584	1,608	1,525	1,665	1,430	1,658	1,692	1,723	2,153	2,076	2,159
Andhra Pradesh	9,122	10,571	9,917	10,907	11,496	10,332	10,281	12,847	9,044	8,422	10,054	14,961	12,606	9,688
Gujarat	1,937	1,849	1,801	2,227	1,999	2,080	2,717	3,487	3,287	3,192	4,435	5,023	6,695	7,746
Haryana	6,983	5,140	6,000	5,930	5,910	6,870	7,280	8,970	6,890	3,950	4,660	5,840	5,500	5,930
Kerala	376	391	400	513	529	506	405	378	376	487	462	479	821	838
Karnataka	8,483	8,776	8,453	8,563	8,629	9,719	9,985	11,606	10,973	9,671	12,421	14,186	14,916	13,412
Maharashtra	14,770	11,494	11,918	12,943	17,178	18,870	21,499	23,320	22,482	19,819	23,591	18,780	31,360	26,249
Madhya Pradesh	1,613	1,438	1,370	1,518	2,800	2,465	2,318	1,682	1,790	1,111	1,071	1,210	1,356	2,226
Orissa	1,627	1,917	2,002	2,406	2,750	9,974	2,770	2,600	2,810	2,823	3,060	3,220	3,169	2,862
Punjab	5,270	4,030	4,690	5,820	6,150	6,130	6,070	6,520	6,240	2,930	3,920	6,120	6,340	5,200
Pondichery	128	185	152	185	16	90	180	158	176	122	145	184	164	155
Rajasthan	1,215	1,203	1,352	1,946	9,17	1,558	1,991	2,828	2,196	1,160	1,164	1,437	1,430	1,485
Tamil Nadu	10,443	9,626	12,118	18,298	14,59	11,936	11,246	16,995	15,421	15,393	18,530	20,208	15,210	14,520
Uttar Pradesh	54,672	49,354	56,727	60,773	61,47	58,350	65,215	76,819	62,324	51,228	64,205	76,440	81,387	78,968
West Bengal	2,075	1,657	1,644	1,627	1,60	1,713	1,812	1,960	1,885	1,437	867	1,411	1,600	1,022
Bihar	6,209	4,465	4,753	5,157	5,50	4,907	4,176	4,952	3,570	3,914	3,480	4,180	4,464	3,885
Others	238	199	259	408	3	570	897	460	523	483	419	426	412	375

Total 1,26,368 1,13,569 1,24,867 1,40,805 1,44,2 1,40,604 1,53,007 1,76,965 2,51,655 1,28,833 1,54,248 1,86,358 1,89,506 1,77,020

Source :- Indian Sugar, March 1988 (IV)

000	10	2,130	9	3	0	0	0	0	0	0	0	0	0	0
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TABLE NO. 1.4.

STATEWISE PRODUCTION OF SUGAR CANE IN INDIA.

with figures

During the 1st Five Year Plan, both area under cane and production did not show any increase over the base year of planning 1950-51, due to successive drought conditions during 1952-53, and 1953-54. During the second plan period, both the area and cane production showed a steady upward trend, the increase in area and production over the base year 1950-51, being 24 % and 30 %, respectively. During the Third Plan Period also the increasing trend was maintained although the area under cane production declined during the two seasons 1962-63 and 1963-64. During the Fourth Plan Period both cane production and cane acreage fluctuated widely. There was a sharp decline in cane production and area under cane during the seasons 1966-67 and 1967-68. However, the introduction of partial decontrol in 1967-68, the declining partial decontrol in 1967-68, the declining trend in sugarcane area was reversed.

The yield of sugarcane per hectare over the last thirty years (i.e. 1950-51 to 1983-84) showed an increasing trend. However, it is still lower in comparison with other important cane producing countries of the world. The revised sugarcane production target for Fourth Five Year Plan was 1500 lakh tonnes whereas the target for area was kept at same figure (i.e. 25 lakh hectares). Thus it was proposed to increase the average yield per hectare to 60 tonnes during 4th Five Year Plan by progressive extension of the application of modern technology for the cultivation of sugarcane. But the actual yields per hectares during the Fourth Plan period (1969-1974) were only 49.1, 48.3, 47.5, 50.9, 51.2, tonnes against the targeted yields of 52.0, 54.0, 56.0, 58.2, 60.0 tonnes per hectare. During the Fifth Five Year Plan, (1974 to 1979) the yield goes to 49.9, 50.9, 53.4, 56.2, 49.1, tonnes per hectares. The planning commission estimated the requirement of sugarcane at 170 million tonnes by the end of the Fifth Five Year Plan (1978-79) but, against the estimated sugarcane production to 181.0 million tonnes, but the actual production of cane was 183.64 million tonnes i.e. bit higher level. It was because, more than 47.13 % of cane was diverted for sugar manufacturing. The states were advised high cane prices to be paid by the factories and a compulsion was put on factories to crush all surplus cane even during the summer months. As a results of the various measures taken by the states, the production of sugar increased from 1288.3, lakhs tonnes in 1979-80, 1895 lakh

tonnes in 1980-81, 1863.6 lakh tonnes in 1981-82 and 1895 lakh tonnes in 1982-83. However due shrinkage in area and other factors, the cane production declined to 1770 lakh tonnes in 1983-84. During the period between 1950-51 & 1984-85, the area under sugarcane production had increased by 75.28 % in India. This is mainly due to steep increase in the yield of sugarcane. The average was 104.3 tonnes per hectare in Tamil Nadu, 73.4 tonnes in Karnataka, Karnataka ranks after Rajasthan. Kerala has the highest yield per hectare about 107.4 tonnes per hectare. The total area under sugarcane was only 45.4 tonnes per hectare during 1984-85. One factor affecting the cane production is delayed payment of cane price by sugar factories. Cane prices arrears were causing immense hardship to the cane growers. To overcome this difficulty the governments raised the proportion of free sugar cane from 35 % to 45 %.

1.5. Causes of Low Yield of Sugarcane :-

There are several causes which account for the low yield of cane and its poor quality. The chief factors responsible for this sorry state of affairs in sugarcane cultivation may be summed up as follows.

- 1) Irrigation has a vital role to play for sugarcane cultivation. Indian Agriculture is gambling with monsoons. In Karnataka many big, small, and medium size dams are built for irrigation purpose. For example, Tungabhadra, Kaveri, Sarawati, Kali, Ghatprabha, Malaprabha, Hidakal,

Siva-Samudra, Kannambadi etc. In Karnataka irrigation facility has been provided for nine months to sugarcane crop. But this is not sufficient to sugarcane cultivation. This insufficiency is followed by power shortage and financial help rendered to the farmers for irrigation purpose.

TABLE NO. 1.6

STATEWISE POSITION OF SUGARCANE AREA IRRIGATED

(000 Hectares)

States	Total Irrigated Area	Sugarcane Area	% of Sugarcane to Total Irrigated Area.
Andhra Pradesh	4,342	171	3.2
Assam	572	--	---
Bihar	3,632	29	0.8
Gujarat	2,334	98	4.2
Harayana	3,309	103	3.1
Karnataka	1,676	154	9.2
Madhya Pradesh	2,453	70	2.8
Kerala	381	17	4.5
Maharashtra	2,516	254	10.1
Nagaland	61	--	---
Orissa	1,711	28	1.6
Punjab	5,781	65	1.1
Rajasthan	3,749	28	0.7
Tamil Nadu	3,294	183	5.6
Uttar Pradesh	11,371	1,088	9.6
West Bengal	1,541	11	0.7
All India	49,585	2,287	4.6

Maharashtra's irrigation potentials are being used for sugarcane to the extent of 10.1 % to total irrigated in India. U.P. & Karnataka rank second & third positions respectively. However, the total irrigated area used for sugarcane crop is only about 4.6 % that is only four states ranks above this national average.

- 2) Lack of draingage facilities are the major causes for poor crop & low yield per acre which accounts for water logging and spread of a number of diseaseest to sugarcane crop. About 40 % of the area under cane cultivation in North Bihar is affected by water-lögging. Any water gried system to be adopted or any scheme to measure of flood control by the Centgal Water and Power Commiss ion will be appreciable, if it tackles the problem of draingage and provides ways and means to avoid water logging condition.
- 3) Sugarcane is a soil exhausting crop and as such nut rients are essential to maintain the productivity of crop. The application of adequate doses of fertilizers to sugarcane crop x at the hungry time assure high yields of cane per acre. Recently, the increased irrigation facilities have compelled to use scientific heavier dees of fertilizers for high yielding sugarcane. Unfor- tunately, the sugarcane cultivators are lacking in the knowledge of the proper timing and scientifically prescribed doses of manuare and fertilizer for sugarcane plantation. The economic backwardness is another cause of low yield of sugarcane. The Fertilizers Corporation of India Ltd., has to play an important role in this regard.

- 4) Lack of credit facility is an important factor of low yield of cane in India, because most of farmers are poor. Their requirement is fulfilled by sugar factories, banks, co-operatives societies etc. The assistance is not given in time and to the required extent. The interest rate is also high. Moreover, many farmers do not use the available loans for productive purposes. The measurement of borrowed loan is observed.
- 5) A dynamic programme of breedings and evolution of improved varieties of sugarcane is the foundation pillar. This is one of the major cause of deterioration in average recovery in India. Each region should have a Zonal Research Station to assist the agriculturist in connection with use of high yielding varieties. In order to increase sugarcane yield, sugar recovery and sucrose content a list of suitable varieties of sugarcane has been recommended for commercial cultivation in different states.

Apart from all these hindrances, sugarcane is being cultivated in the region where coop. sugar units are located. Sugar cooperatives are initiating to improve the cane cultivating. AS they (sugar co-operatives) are formed by farmers themselves, the farmers are motivating to improve their cultivating technique for higher yield of sugarcane and income. The state Govts. sugar Union, and Federations are also trying to bring quality in both sugarcane and sugar production. The problems that are newly arising in the way of cane supply should be tussled with innovated techniques so far developed by research initiated in country. But the only difficulty is that, our farmers are poor and both socially and economically backward. So, the problem will not be solved only by way of research and innovation but by improving the whole quality of life of our agricultural families.

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TABLE NO. 1.7

List of Sugarcane Varieties Recommended for Commercial

 Cultivation in Different States during 1983-84.

Sr. No.	Name of States	Early Ripening Varieties	Mid and Late Ripening Varieties.
1.	Andhra Pradesh	Co 997, CoA-1, Co 527, Co 6907, CoA 7601, Co 770, Co 801.	Co 975, Co 419, Co 62175, Co7119, CoA 7602, Co7219
2.	Assam	Co 997, Co 1008.	Co740, Co 1132, Co 6215, Co 961.
3.	Bihar	Bo 43, Bo 75, Bo 90, Bo 99, CoP 2.	Bo 34, Bo 70, Bo 84, Bo 88, Bo 89, Bo 91, Co 1148, Bo 51, (for south Bihar only).
4.	Goa	Co 6415.	Cos 802, Cos 767.
5.	Gujarat.	Co 775, Co 806, CoJ 64.	Co 419, Co 719, Co995, Co 6304, Co 62175.
6.	Haryana.	CoJ C 64, Co 6914, Co 7717.	CoL 9, Co 975, Co 1158, Co 1148, Co 7314, Cos 767.
7.	Karnataka	Co 6415, KHS 3296.	Co 419, Co 740, Co 449, Co 62175, B 37172, Co 7318, Co 7219.
8.	Kerala	Co 997, Co 658.	Co 6304, Co 785, Co 449, Co 62175.
9.	Madhya Pradesh	Co 527, Co 775, Co 1169, Co 1287.	Co678, Vo 1307, Co 6304, Co 6806, Co 419, Co 617, Co 853, Co 1305, Co 62175, Co 7318, Co 1148.

Table No. 1.7 (Cont.)

1.	2	3	4
10.	Maharashtra	Co 419,Co 775.	Co 740,Co 678, Co 62175,Co 853, CoM 7219,CoM 7125.
11.	Nagaland	Co 313,Co 997.	Co 419,Co 740,Co 421, Co 961,Co 1158, Co 943,Co 938.
12.	Orissa	Co 997,Co 527, CoA 71-1.	Co 419,Co 740, Co 675,Co 62175, Co 1053,Co 421.
13.	Pondicherry	Co 740,CoC 671, CoC 771,CoC 772, CoC 773,Co 6806.	CoC 774,CoC 775, CoSi 776,CoC 777 and 778,CoC 779, Co 62774-62175, Co 62198,Co 6364.
14.	Punjab-	CoJ 64,CoJ 76, CoJ 78.	CoJ 67,CoJ 46, Co 1148,Co62399, CoJ80,CoJ83, CoJ 46, CoJ 82.
15.	Rajasthan.	Co 449,Co 997, Co 427.	Co 312,Co 419, Co 1253,Co 1007, CoL 29.
16.	Tamil Nadu	CoC 671,CoC 771, CoC 772,CoC 773.	Co 6304,CoC 774, CoC 775,CoC 775, CoC 776,CoC 777, CoC 778,CoC 779, Co 419, and Co 6806, Co 6901,Co 62198, Co 7704.
17.	Uttar Pradesh	Co 395,CoS 510, CoS 687.	Co 1148,Co 1158, CoS 786,CoS 758, CoS 802,CoS 767, Co 1347,CoS 776, CoS 770,CoS 771, Co 6812,Co 62399, Cont.

Table No. 1.7 (Cont.)

6			
1.	2	3	4
			Bo 17,Bo 34,Bo 70, Bo 71,Co 1157,Bo 54, Co 6911, CoS 633, CoS 718,Co 5767, Co 5776,CoS 788, Co 5797,Co 5802, Co 7918.
18.	West Bengal.	Co 313, Co 997, Co 62019,Co 622, CoS 64.	Co 801,Co 842,Co 6315, Co 961,Co 1132, Co 1232,Co 6311, Cp 1008,Bo 17, Co 527,Co 1158, Co 1148,Co 419.

Source :- Indian Sugar Year Book 1983-84, Vol. I, pp. 47-48.