

CHAPTER - XII

PLACE OF SUGAR INDUSTRY IN THE INDUSTRIAL ECONOMY OF INDIA

Place of Sugar Industry in the Industrial Economy of India :

Introduction :

The relationship between economic growth and the production level of the sugar industry has been the subject matter of a lively controversy in India. The reorientation of industrial development programmes to create more employment, would therefore call for the organisation of production in low capital intensive units as far as possible.¹ Paucity of employment opportunities has caused the migration of labour in many parts of the country. India is a vast country where the distribution of economic resources is not uniform. Economic development in the country, therefore, has been unbalanced. "The essential object should be to secure the fullest possible utilisation of the resources of each region, so that it can contribute its best to the national pool and take its due share from the benefits accruing from national development."² All regions within a country do not offer equal opportunities for the development of the industry. There are many examples of countries and of regions within a country which have attained an appreciable rise in living standards with limited development of industry through

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1. Industrial Situation in India, January 1974, Vol. III, No.1, P. 50.
 2. Planning Commission, Government of India, Third Five Year Plan, P. 143.

the fuller utilisation of local and human resources. Considering the varied character of natural and human resources in different parts of the country, the possibilities of the development of labour in the agriculture processing industries like sugar, jute, cotton, tea etc. etc. need be explored along with development of basic and capital goods.³

Production in Sugar and various Agro-industries :

The sugar industry occupies an important place in the economic life of India. Next to Jute, Cotton and Tea, the Sugar industry is the biggest earner of foreign exchange for the country. By the intensive study of production and employment of sugar industry in India the other agro-based industry like Cotton, Jute, Tea etc. etc. it would be easy to understand the place of sugar industry in the industrial economy of India.

India happens to be the most important centre of Jute Mill industry in the world. About 3 lakh persons or roughly 7 per cent of the total industrial population in the country find employment in the industry. With the industry are also tied the fate of about 4 million agricultural families, thousands of traders and merchants the future of some 360 crores worth of national output, 20 per cent of country's exports, foreign exchange earnings of Rs.250 crores and a total revenue of Rs.60 crores for the Central and State Governments.⁴

3. Indian Industries - Development and Location, Dr. M.R. Chaudhuri, PP. 216, 217.

4. Industrial Situation in India, January, 1973, P. 21.

There is also a possibility of India and Bangladesh co-operating in production and marketing of Jute goods. On the other hand, the cotton textile industry occupies an important place in the economic life of India. The total number of mills in the country in March 1968 was 636, the number of spindles installed 17.20 million of looms 2,07,200. The average number of workers employed daily in all shifts was 7,61,837 and the consumption of raw cotton (in bales of 180 bag each) was 5,15,891 in the same year.⁵ Thus the importance of the tea industry in the economy of the country hardly needs any emphasis. The industry produces about 380 million kg. of tea of which about three fourths are exported. Tea is next ^{to} Jute, as a foreign exchange earner. Tea alone earns foreign exchange to the extent of over Rs. 100 crore annually. India was the largest exporter of tea till 1965. In the next three years Ceylon became the most important exporter. On an average, India exported about 53 per cent of its production during the years 1965, 1966 and 1967 as against 67 per cent in 1952.⁶ Though the sugar industry is one of the biggest organised industries in India, the sugar shortage in India is mainly due to short falls in cane production which again is attributed to conditions of weather, floods and plant disease. India faced sugar shortage during the period 1947-48 to 1955-56. During this period, the position of the

5. Indian Industries, Development and Location, Dr.M.R.Chaudhuri P. 158.

6. Ibid, PP. 199, 201, 190.

sugar supply in India became so acute that the country had to import sugar to maintain normal supplies.⁷ For the intensive study of the production of different agro-based industries, the following table shows the production trend of sugar, jute, cotton and oil seeds during 1968-69 to 1973-74.⁸

Table 133
Production of Commercial Crops in India from
1968-69 to 1973-74

| Year | Sugar cane (million tonnes) | Cotton (lakh bales 180 Kg each) | Jute (lakh bales 180 Kg each) | Oil seeds (lakh tonnes) |
|---------|--------------------------------|---------------------------------------|-------------------------------------|-------------------------------|
| 1968-69 | 124.68 | 51.44 | 29.31 | 68.44 |
| 1969-70 | 135.02 | 52.55 | 56.53 | 77.34 |
| 1970-71 | 126.37 | 44.99 | 49.38 | 92.58 |
| 1971-72 | 115.38 | 65.64 | 56.84 | 82.76 |
| 1972-73 | 126.00 | 54.89 | 48.69 | 70.00 |
| 1973-74 | 134.00 | 65.00 | 56.00 | 94.00 |

The above figures show the production figures of different commercial crops in India during the period 1968-69 to 1973-74.

7. Ibid, PP. 199, 201, 190.

8. Industrial Situation in India, April, 1974, P. 87.

In comparison, though the production of sugar cane is better in position than the other commercial crops in India, the present production of cane, however, is inadequate to meet the growing needs. About one-fourth of the sugar cane production in India is used for the production of sugar. On the other hand, the entire amount of cotton crop produced in the country is virtually consumed by the cotton textile industry only a small portion of about 2 lakh bales of raw cotton is exported. The fluctuation in raw cotton production in recent years has adversely affected the cotton textile industry. Like the sugar industry, the raw material problem in this industry is mainly created by droughts, and other weather conditions. After the partition of the country, the Government of India launched the 'Grow-More-Jute Drive' to make India self-sufficient in the matter of raw Jute. The production trend of raw Jute is almost uniform except the year 1968-69 and 1972-73. But self-sufficiency in raw Jute has yet to be attained. The maximum production of oilseeds is 94.00 lakh tonnes in the year 1973-74. The production trend of oilseeds is as good as the sugar cane production. By the comparative study, therefore, it is easy to understand and also to compare the trend in production in different commercial crops in India. By the study of production, these crops will tell and re-tell their problems which will be more help to the cane growers as well

as the Cotton, Jute and Oilseeds growers to solve the problems and to keep these industries better in position.

Employment in selected Agro-based Industries :

"Cotton mill Industry is the premier national industry of India; because it employs the largest number of workers; about 9 lakh in its 664 factories. The number of people engaged in the cultivation and distribution of cotton as well as those who deal in cloth, 1.5 crores persons depend upon this industry. In point of capital invested in its, it occupied till recently the top position - with an investment of about Rs. 150 crores. With its total capital investment of about Rs. 90 crores and providing employment to about 2.2 lakh workers, the Jute Mill Industry occupies a pivotal position in India's economy particularly that of West Bengal. This industry has developed without protection on the strength of favourable factors.

Sugar Industry is the third largest Indian industry next only to the Iron and Steel and Cotton Mill Industries. Its total capital out-lay in 1968-69 was over Rs. 400 crores. It gave employment to 225,000 persons including a large number of technicians and highly skilled workers."

"As a foreign exchange earner, tea is next to Jute. A large labour force numbering more than a million finds employment in the tea industry. Tea alone earns foreign exchange to the extent of over Rs. 100 crores annually."⁹

9. Indian Industries - Development and Location, Dr. M.R. Chaudhuri, 1970, PP. 199.

The above figures show the nature of employment in the different agro-based industries in India. Place of sugar industry in the employment is fourth after cotton, tea and jute respectively. The more intensive farming methods associated with the new technology require more farm labour. The new varieties will not respond to the traditional practice of planning the crop and then virtually forgetting it until harvest time. Pulses, oilseeds, sugar cane, cotton, jute and plantation crops have yet to be launched on the HYV (High yielding varieties) path much research work has yet to be accomplished before the new technology is adopted.

From the above studies, it is easy to understand the place of sugar industry in the industrial economy of India. The production can be raised by the "Green Revolution" or by the "revolution of mind" on the part of millions of Indian farmers. For the first time in the history of Indian agriculture, the farmer has realised the farming is a business and not merely a way of life to which he must resign himself. On the other hand the majority of the peasants and farm labourers have remained outside the orbit of the new technology.

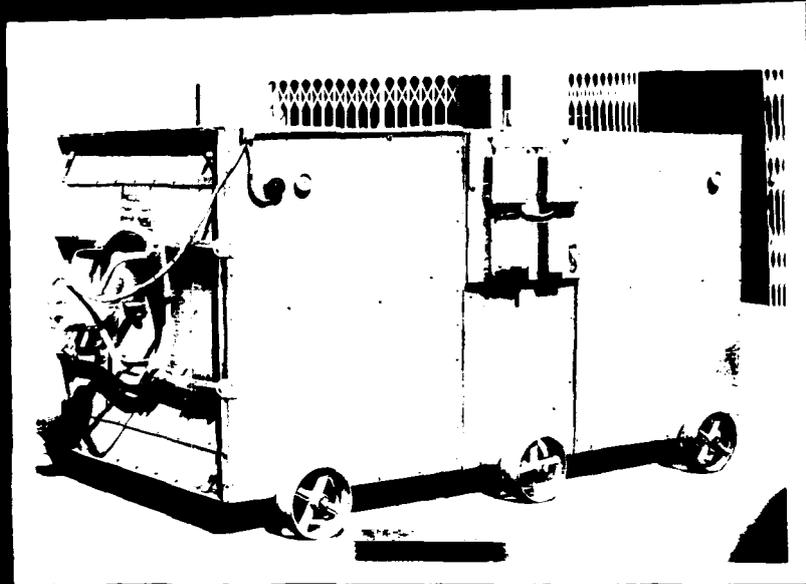
Conclusion :

These imbalances of production in different agricultural industries has been caused by the small size of the holdings and the limited resources. In some areas, tenants are being reduced to farm labourers as land owners discover the profitability of the new technology in the current economic setting.

CHAPTER - XIII

FUTURE DEVELOPMENT OF SUGARCANE PRODUCTION (SOME SUGGESTIONS)

Plate-25



Hot Air Treatment Unit (Technological treatment)

Plate-26



Better sugar cane yield obtained for hot air treated than untreated.

Plate-27



Bumper Sugarcane crop raised - using hot air treated seed material.

Grassy Shoot and Ratoon Stunting Diseases of Sugarcane :

Grassy shoot and ratoon stunting, two major important diseases, which effect the sugarcane crop, to grow and to develop freely. Pathogens are the cause of these diseases. Heat therapy is effective against GSD as well as RSD (Plate 25). Either hot water treatment at 52°C for 20 minutes or at 50°C for 2 hours or hot air treatment at 54°C for 8 hours are necessary to remove these diseases. Hot air was first tried in Java (Kobus, 1889) against such disease. Hot water treatment was tried in Australia, when the RSD^{was} discovered, and was found of virous origin.

In the Indian Institute of Sugarcane Research, experiments on both hot water and hot air treatments were carried out. In an experiment canes infected with GSD were kept submerged in hot water at 50°C for 2 to 2½ hours depending upon the thickness in (i) single layer, (ii) in a bundle with one sett in the centre and a layer of setts all around; and (iii) one setts in the centre and two layers of setts all around it. After half an hour of hot_{water} treatment, the cane has to keep in cool water and planted in pots maintained in a glass house. Experiment was conducted with variety B.O.17 and suitable checks with untreated disease and healthy setts were maintained and plants raised from the treated setts were kept free from insects (Plate 26 and 27). It was observed that none of the plants was diseased

after the treatment of hot water therapy. This treatment showed that six plant out of ten were attacked by disease.

In Louisiana, the hot air plant is used, and the temperature in the plant is not uniform throughout the entire volume. It has been observed that a hot air treatment plant capable of treating about 4 to 5 quintals of cane at a time. Improper handling of cane, leakage of air or heating beyond 8 hours may result into loss in germination to a tune of 10-27%, over the check. It was observed that losses are mostly due to handling of cane which causes mechanical damage to buds. Following table shows the increase of germination of buds after hot air therapy.

Table 134

Germination of buds and disease increase in hot air treated cane setts (raised in nursery)

| Variety | Treatment | Germination (%) | GSD incidence (%) |
|----------|-----------|-----------------|-------------------|
| CO 2/3 | Treated | 39.4 | 0 |
| | Checke | 55.3 | 5.2 |
| CO 453 | Treated | 65.9 | 0 |
| | Check | 44.9 | 17.5 |
| CO.S.510 | Treated | 42.9 | 0 |
| | Check | 52.2 | 66.6 |
| B.O. 17 | Treated | 55.3 | 0 |
| | Check | 61.3 | 6.0 |

Germination of hot air treated setts of varieties CO.1148 and CO. 1158 planted over one hectare of land was 52 to 62 per cent of the buds, planted at Shahzadpur Farm (Haryana) in spring of 1972.

Experiments conducted at IISR, Lucknow and at several other places have shown that cent per cent control of the disease is obtained with the hot air treatment. After the treatment of hot air, none of the plant was found affected with GSD. On the other hand, untreated lots showed both GSD and RSD. It is found that, after the treatment of hot air, the plants become more vigorous in growth, develop thicker and taller, has better root system and produce more millable canes than the crops raise from untreated plants.

Following data show the yield of plant and ratoon crops raised after hot air treatment against RSD and GSD

Table 135

| | Plant Crop | | | | | Ratoon | | |
|---------------|-------------------------------|------------------------------|------------------------|-----------------------|------------------------------|-----------------|------------------------|-------------------------------|
| | Average length of cane in cm. | Average girth of cane in cm. | Total No. of canes/row | Wt.of cane/row in kg. | % in-crease in Wt.over check | No.of canes/row | Wt.of canes/row in Kg. | % in-crease in Wt. over check |
| D.312 (RSD) | | | | | | | | |
| Treated | 145 | 1.63 | 364 | 129.65 | 35.00 | 324 | 112.6 | 79.16 |
| Check | 130 | 1.58 | 320 | 95.65 | | 204 | 62.84 | |
| D.1158 (RSD) | | | | | | | | |
| Treated | 202 | 2.19 | 292 | 239.20 | 10.11 | 380 | 259.4 | 24.56 |
| Check | 136 | 1.83 | 276 | 217.12 | | 312 | 208.24 | |
| D.S.5/0 (RSD) | | | | | | | | |
| Treated | 156 | 1.64 | 404 | 142.48 | 12.28 | 320 | 165.4 | 16.73 |
| Check | 142 | 1.53 | 344 | 126.00 | | 392 | 141.72 | |
| D.L (RSD) | | | | | | | | |
| Treated | 152 | 1.90 | 214 | 90.60 | 40.31 | 215 | 76.58 | 55.65 |
| Check | 116 | 1.64 | 206 | 64.50 | | 152 | 49.20 | |
| D. 453 (GSD) | | | | | | | | |
| Treated | 178 | 1.87 | 235 | 106.86 | 7.12 | 258 | 100.92 | 51.66 |
| Check | 155 | 1.64 | 191 | 99.75 | | 210 | 66.54 | |

Note : Length of rows, 12.3 metres; Number of setts (50 planted per rows; Number rows, 4 per treatment.

There are some varieties which do not show clear symptoms of RSD and a few are symptomless carriers. Therefore, in order to determine RSD, all cane may have to be opened and examined. But, this difficulties do not find in case of GSD, because the symptoms are found from outside.

"It is well recognised that heat therapy is a fairly severe treatment and may reduce germination to a certain extent. However, varieties appear to differ slightly in this respect. It was observed that if damage in handling, especially while loading and unloading is avoided, temperatures are kept uniform the equipment is perfectly are tight, the time schedule adhered to, the door are opened immediately after the treatment and cane is planted without further desiccation, germination is just about the same as under check and in certain varieties better. Examples of CO. 1148 and CO. 1158 at Shahzadpur Farm raised in one hectare" - in 1975.

The seed borne insect pests like top borer, *Seirpophaga nimella* fabr. stalk borer, *chilo auricilius* Dudg. and mealy bug, *Saccharicoccus sacchari* ckll. are killed due to hot air treatment.¹

1. Hot Air Therapy of sugarcane against grassy shoot and ratoon stunting Disease, Singh Kishan, Shukla U.S. and Srivastava N.S.L., Indian Sugar, April, 1973, Vol. XXIII, No. 1, PP. 43-47.

Plate-28



Companion Cropping with sugarcane.

Change in companion cropping with Sugarcane

For better utilization of fertilizers, irrigation water resources and plant protection problems, cultivators and technologists have been thinking of raising an additional crop in space between the sugar cane rows usually between 80-90 cm. apart. At the "Indian Institute of Sugarcane Research", systematic investigation were taken on hand.

It is found that October planted cane suits the practice of companion cropping much more than the spring planted cane. Due to favourable condition of moisture, moderate temperature, the germination of autumn planted crop is more than 55 per cent where as 30 to 35 per cent germination is found in spring planted crop only for its low temperature. If factory is started in November, a February or March planted crop is hardly 8 to 9 months old whereas October planted crop provide 13 months crop to the factory. This obviously has a beneficial effect in terms of sugar recovery and cane yield.

Cultivators who raise good crops of wheat usually irrigate their fields in preference to sugarcane particularly during winter months. With a companion crop of wheat which has to be irrigated in any case sugarcane gets benefitted on this site (Plate 28). Thus, a much better use of limited irrigation

facilities can be made with a companion crop with autumn planted sugarcane. Because of the coverage, this combination provided lesser chances for damage due to frost.

At the IISR and at few other research centres, a number of other field and vegetable crops have been tried. These are wheat, sugar-beet, toria, berseem, potato, onion, garlic, radish, okara, cotton etc. Out of these, the IISR has found it convenient to raise sugar-beet, wheat and toria on a large scale and berseem, okara and onion on a limited scale due to difficulties in marketing and storage.

At Jullundur, cotton is now being taken for the first time as a companion crop. With this in view, wheat is now being sown with a row to row distance of about 18 cm. instead of 23 cm. This gives higher population of wheat and does not appear to have any detrimental effect on the yield of wheat crop. Now new dwarf variety of wheat is taking as a companion crop with sugarcane, because (i) these do not cause any shading on young sugarcane crop, the growth of which is very slow during winter, and (b) these can be drilled into the soil fairly late. Selection of barley made by the breeders of IISR can be taken as a companion crop with sugarcane.

Berseem is another crop that can be taken along with sugarcane. The fields are irrigated - copiously, after the completion of germination of sugarcane, and before all the water is absorbed by the soil berseem seeds thoroughly mixed with live berseem culture are broadcast over the surface of water after agitating the water to make it a bit muddy. The result of this technique is much better to germinate the berseem.

India particularly in the north-western portion where the cool winter is prominent cultivation of sugar beet as a supplementary sugar crop may be possible. This cool winter is favourable to this crop. Therefore, sugar beet may be taken as a companion crop with sugarcane specially in this portion of the country.

Raising of onion and potatoes at Jagadhri and radish at Jullundur have given fairly good dividends. These are however still under experimental stage. With autumn planting companion cropping with toria, berseem, sugarbeet and wheat give on additional income of Rs. 415,2150,1170 and 1383 per hectare respectively. From autumn planted crop, the total net income is perhaps Rs. 3,337 per hectare.

Plate-29



Fallow land
may be used
for cultivation
of companion
crop.

Plate-30



Cultivator returning
from the field.

Plate-31



General view
of the factory
(Plassey
Sugar Mill)
Factory staff

The companion cropping will not only bring much greater return to the cultivator but also cut down the cost of cultivation of sugarcane as well and may use the fallow land (Plate 29). This companion cropping system would not only be the extra incentive to the farmers to put sugarcane on better lands instead of pushing it to marginal or sub-marginal portions in favour of other crops. Now, various cultural operations are being studied systematically to develop the companion crop with sugarcane.

"It was observed that for whole or partial mechanisation of operations with a view to reduce the cost of cultivation and ensure all the cultural operations on time it was necessary to alter the well accepted agronomic practices particularly with regard to inter-row spacing of sugarcane, without reducing the total plant population. Conventional sugarcane rows are 80-90 cm. apart. It has now been observed that if sugarcane is planted in paired rows there is no difference in yield in comparison to conventional planning. For this, two rows of sugarcane are planted 30 cm. apart. Then a distance of 150 cm. is left before another two rows are planted 30 cm apart."

In the first part of October, sugarcane is planted and wheat is drilled in the inter-row spaces towards the end of November. The inter-row cultivation is done with a

tractor-drawn cultivation in the intervening period. The tractor-drawn cultivation is much cheaper than inter-row cultivation with the conventional hand spades and kudalies.

In conclusion, therefore, it may be said that the companion cropping will definitely be more profitable to cultivators cut down cost of cultivation, bring good land under this crop and increase sugar per-unit area and time. The recent innovation of staggered planting 30-150 cm. has made this proposition all the more feasible and economical.²

2. Innovations in Companion Cropping with Sugarcane, Kishan Singh, Indian Institute of Sugarcane Research, Lucknow. From 'Indian Sugar', June, 1971 Issue.