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Though generally speaking, the distribution of the installed capacity among different States is production-based, a detailed study of the Saurashtra region provides evidence for the export-oriented nature of the industry's location.

There is heavy under-utilization of capacity in the existing units. Even in the Saurashtra region, the heavily concentrated groundnut region, the extent of capacity used is only 65 per cent. Data for the past three years show a regressive trend in the capacity used, gross margin obtained, and the rate of return.

Shortage of raw materials is the chief hindrance to growth and even the economic viability of this industry. The solvent extraction industry as a foreign exchange earner can vitally help the economy of the country and thus play a significant role in the development of the agricultural sector.

LOCATION OF COTTON GINNING AND PRESSING INDUSTRY IN LUDHIANA DISTRICT

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The success or otherwise of an agro-industry depends, amongst other things, upon the strategy of its location. The location of such an industry, in turn, depends upon such factors as the easy availability of raw material in the feeding area, availability of quick transport, location of capital market, volume of business handled by the processing unit, cost structure of the firm and its net earnings.

The ginning and pressing industry in respect of cotton was located in the Ludhiana district without giving considerable thought to the factors that should govern such decisions. Consequently, this industry has already started showing signs of disintegration and some of the ginning factories, particularly those located in the Ludhiana market, have closed their gates. In other markets such as Raikot and Mullanpur, the locational disadvantage of this industry has resulted in a decline in its business. The present study was undertaken to examine the locational and other factors affecting the economy of cotton ginning and pressing industry in the Jagraon and Mullanpur markets.

Methodology

The cotton ginning and pressing factories are mostly concentrated in Khanna, Jagraon and Mullanpur markets of Ludhiana district. Khanna market is much more established for the processing of groundnut than for cotton. The remaining two markets, *viz.*, Jagraon and Mullanpur are located within 13 miles distance of each other and considerable quantities of cotton are processed in these markets, year after year. These two markets were, therefore, purposively selected for the present study.

There are ten ginning factories at Jagraon and two at Mullanpur. Of these factories, four have arrangements for the pressing of cotton at Jagraon and one at Mullanpur. One factory each, providing for both ginning and pressing of cotton, was selected from Jagraon and Mullanpur for intensive study. Thus, the data were collected from the Jagraon Cotton Ginning and Pressing Factory, Jagraon and M/s Surja Ram and Co., Ginning and Pressing Factory, Mullanpur, for analysis.

Availability of Raw Material

The easy availability of raw material in the feeding area helps the processing industry to expand its business to its installed capacity.

The availability of raw material for the selected factories was examined by considering the arrivals of cotton (both American and *desi* cotton) in the Jagraon and Mullanpur markets from where these factories made bulk purchases. The cotton arrivals in the Jagraon and Mullanpur markets from 1956-57 to 1965-66 are shown in Table I.

TABLE I—COTTON ARRIVALS IN JAGRAON AND MULLANPUR MARKETS: 1956-57 TO 1965-66

(in thousand quintals)

Year	Jagraon	Mullanpur
1956-57	123.4	26.7
1957-58	102.5	21.4
1958-59	102.1	19.5
1959-60	112.1	22.9
1960-61	162.3	26.9
1961-62	171.2	23.1
1962-63	81.6	13.9
1963-64	168.2	26.2
1964-65	82.9	10.4
1965-66	135.1	19.3

Source: Market Committees, Jagraon and Mullanpur.

The data regarding cotton arrivals in Table I were transformed so as to show three years' moving averages. Linear functions were fitted to the transformed data which gave the following results :

Jagraon market : $Y = 45.4 + 2.3\,X$
(12.0)

Mullanpur market : $Y = 23.6 - 0.7\,X$
(2.18)

The linear functions indicated that whereas there was a tendency for the cotton arrivals to increase with the passage of time in the Jagraon market, there was a tendency for these arrivals to decline in the Mullanpur market. The values of 't' in both the cases were, however, non-significant at 5 per cent level. Thus, the increase or decrease in cotton arrivals in the selected markets during the decade ending 1965-66 was not significant. This indicated that there was very little scope for this industry to expand its business further in these areas.

The recent decline in cotton arrivals in these markets was mostly due to changed climatic conditions of these areas. Heavier rains during monsoons and attack of jassids and thirps on the standing cotton crops in the feeding areas of these markets have become a common feature and the production of cotton has gradually declined. In fact, cotton cultivation has shifted to dry climate areas of Ferozepur, Bhatinda and Hissar districts (Appendix 1) where it has a comparative advantage over other crops.

Again, increase in yields of American and *desi* cotton brought about by intensive cultivation methods introduced through the Intensive Agricultural District Programme in the Ludhiana district was off-set by the reduction in the area under these crops due to changed physical conditions. Cotton cultivation in this area is now being replaced to some extent by groundnut which meets the requirements of the changed agro-climatic conditions. This is evident from Appendix 2 indicating the arrivals of groundnut in the Jagraon and Mullanpur markets during the quinquennium ending 1964-65. These trends were not carefully considered by cotton ginning and pressing firms while deciding their location in the Ludhiana district. As more and more firms enter into the business in the cotton belt areas of Ferozepur, Bhatinda and Hissar, the Jagraon and Mullanpur firms located in the Ludhiana district will face more competition and suffer further decline in their business.

Price Structure

Arrivals of cotton in the Jagraon and Mullanpur markets were also influenced by the price that the farmer-sellers got for cotton in these markets. These price differentials were studied in Table II.

It will be observed from Table II that the prices of both American and *desi* cotton were, generally, ruling higher in the Jagraon market than in the Mullanpur market. It was because the former was a bigger and more competitive market than the latter. There were ten substantial cotton buyers in the Jagraon market as against

TABLE II—MONTHLY PRICES OF AMERICAN AND *Desi* COTTON IN JAGRAON AND MULLANPUR MARKETS : 1963-64 TO 1965-66

(in rupees per quintal)

Period	Jagraon		Mullanpur		Price differential in Jagraon over Mullanpur	
	American cotton	*Desi* cotton	American cotton	*Desi* cotton	American cotton	*Desi* cotton
1. Cotton season 1963-64						
October, 1963 ..	110.00	85.75	106.95	83.25	+3.05	+ 2.50
November, 1963 ..	114.25	85.00	106.50	80.70	+7.75	+ 4.30
December, 1963 ..	117.00	90.50	107.00	83.25	+10.00	+ 7.25
January, 1964 ..	114.00	94.60	100.00	80.00	+14.00	+14.60
February, 1964 ..	118.00	94.00	112.00	89.00	+6.00	+ 5.00
March, 1964 ..	114.00	86.50	108.00	90.00	+6.00	— 3.50
2. Cotton season 1964-65						
October, 1964 ..	121.00	101.90	115.00	99.00	+6.00	+ 2.90
November, 1964 ..	125.00	98.00	121.00	104.05	+4.00	— 6.05
December, 1964 ..	135.00	122.60	132.00	116.00	+3.00	+ 6.40
January, 1965 ..	120.25	114.50	117.50	100.50	+2.75	+14.00
February, 1965 ..	125.40	116.50	115.00	103.00	+10.40	+13.50
March, 1965 ..	120.00	102.75	107.30	94.15	+12.70	+ 8.60
3. Cotton season 1965-66						
October, 1965 ..	135.00	115.50	128.50	99.50	+6.50	+16.00
November, 1965 ..	138.00	114.25	133.00	104.00	+5.00	+10.25
December, 1965 ..	135.00	106.50	128.00	95.00	+7.00	+11.50
January, 1966 ..	135.00	102.50	128.00	96.00	+7.00	+ 6.50
February, 1966 ..	125.00	100.00	116.50	90.00	+9.50	+10.00
March, 1966 ..	103.00	91.50	104.60	92.00	—1.60	— 0.50

Source: Market Committees, Jagraon and Mullanpur.

two in Mullanpur. The higher prices in Jagraon attracted cotton producers not only from 105 villages comprising the Jagraon market area but also from 195 other villages for the sale of their cotton whereas the Mullanpur market received

cotton produce from its market area consisting of 40 villages only. Thus the Jagraon factory was more favourably located than the Mullanpur factory from the standpoint of assured supplies of cotton.

Availability of Transport

The availability of quick transport at reasonable cost is a very favourable factor to the growth of industries which are located at strategic points. Both the Jagraon and Mullanpur markets are located on the Ludhiana-Ferozepur branch of the Northern Railway. A metalled road parallel to the railway line connects the two markets with each other and other marketing centres. But the farmers and cotton traders of Jagraon market have developed better transport facilities than those of Mullanpur (Table III).

TABLE III—PERCENTAGE OF COTTON BROUGHT FROM VILLAGES TO JAGRAON AND MULLANPUR MARKETS BY VARIOUS TRANSPORTS : 1965-66

Transport	Jagraon	Mullanpur
Bullock carts ..	60	80
Tractor trolleys ..	25	20
Trucks	15	Nil
Others	Negligible	Negligible
Total	100	100

It is apparent from Table III that the farmers and traders in Jagraon used more truck transportation and tractor trolleys than those in Mullanpur. Such developments in market technology have been made possible by greater volume of business in Jagraon than in Mullanpur.

The availability of truck transportation and railway goods wagons for the transport of finished product (cotton bales) was easier at Jagraon than at Mullanpur. This factor also helped cotton market to grow at Jagraon but not at Mullanpur.

Availability of Capital

Availability of working capital had a major influence on the growth of an agro-industry in an area. Cotton traders at Jagraon obtained credit facilities from the Oriental Bank of Commerce, the State Bank of India, the Central Bank of India, the Punjab National Bank and the Warehousing Corporation against the security of their produce whereas cotton traders of Mullanpur obtained credit only from the Punjab National Bank and the Warehousing Corporation. Thus, there was better capital market in Jagraon than at Mullanpur. The cotton ginning

and pressing factory located at Jagraon did not, therefore, find any difficulty in obtaining adequate credit for financing its business operations whereas the one at Mullanpur did not find sufficient credit to meet its business requirements.

Volume of Business

The volume of business handled by a firm affects the cost structure and net returns from its business. The Jagraon and Mullanpur factories had 40 and 32 single roller gins respectively. Each gin had a capacity to handle 1 bale of cotton in eight hours. Besides, they had arrangements for pressing 125 bales per day. The volumes of business handled by the selected factories during 1965-66 are set out in Table IV.

TABLE IV—VOLUME OF BUSINESS HANDLED BY THE SELECTED COTTON GINNING AND PRESSING FACTORIES AT JAGRAON AND MULLANPUR : 1965-66

Particulars of business	Jagraon	Mullanpur
Ginning and pressing on own account ..	7,343 bales	2,200 bales
Ginning and pressing for others ..	2,837 bales	1,000 bales
Total ginning and pressing ..	10,180 bales	3,200 bales

The Jagraon factory ginned and pressed 10,180 bales as against 3,200 bales processed by the Mullanpur factory. Thus, the Jagraon factory was running up to 47.1 per cent of its installed capacity whereas the Mullanpur factory operated up to 18.8 per cent.

It is evident that the Jagraon factory handled over three times business than its counterpart at Mullanpur during 1965-66. It was because of better availability of raw material, credit and transport facilities in the Jagraon market.

Cost Structure

The lower the unit cost of production, more profits will a firm make, other things remaining constant. The cost structure of the selected processing units was examined with a view to ascertaining the economies in the costs of one in relation to the other. The cost of ginning and pressing per bale of cotton at the selected cotton ginning and pressing factories at Jagraon and Mullanpur is indicated in Appendix 3. Some of the costs such as depreciation on buildings, wages paid to the staff, fuel and electricity were incurred as joint costs for ginning and pressing and oil expeller units in Jagraon factory. These joint costs were apportioned amongst the two units in the ratio of 60:40 in accordance with the factory's tradition. The expense on engine and boiler was, however, distributed in the ratio of 94:6. The Mullanpur factory had no side business and all the costs were, therefore, debited to the ginning and pressing unit.

The total cost of ginning and pressing per bale of cotton worked out cheaper at Jagraon (Rs. 18.79) than at Mullanpur (Rs. 19.06). The highr cost of production at Mullanpur was mostly due to lower volume of business.

Net Earnings

Assuming that the price was charged for ginning and pressing by both the selected factories at the rates prescribed by the State Government, *viz.*, Rs. 22 per bale, the Jagraon factory made a net profit of Rs. 32,677.80 from the ginning and pressing industry during the year 1965-66, while the Mullanpur factory earned Rs. 9,408.00 on this account. The profits per bale from this business worked out to Rs. 3.21 at the Jagraon factory as against Rs. 2.94 at the Mullanpur factory. The lower profits at Mullanpur were mostly due to its locational disadvantages.

Conclusion

Jagraon has much more strategic position than Mullanpur in respect of the location of the cotton ginning and pressing industry in the Ludhiana district. But because cotton belt has shifted to the dry areas of Ferozepur, Bhatinda and Hissar districts and more firms are entering into the ginning and pressing industry there and through time, even the factories located at Jagraon will experience greater competition and may face decline in business because of their locational disadvantages over others in the cotton belt.

APPENDIX 1

AREA AND PRODUCTION OF COTTON IN FEROZEPUR, BHATINDA AND HISSAR DISTRICTS : 1960-61 AND 1965-66

District	Area in '000 acres		Production in '000 tonnes		Per cent increase over 1960-61	
	1960-61	1964-65	1960-61	1964-65	Area	Production
Ferozepur	392	420	52.15	55.08	7.14	5.62
Bhatinda	269	289	27.06	36.72	7.43	35.70
Hissar	106	294	10.85	38.70	113.25	256.68
Total	767	1,003	90.06	130.50	30.77	44.90

Source: Statistical Abstracts of Punjab, 1961 and 1965, issued by the Economic and Statistical Advisor, Punjab, Chandigarh.

APPENDIX 2

ANNUAL ARRIVALS OF GROUNDNUT IN JAGRAON AND MULLANPUR MARKETS: 1960-61 AND 1964-65

(*in thousand quintals*)

Market	1960-61	1964-65	Per cent increase over 1960-61
Jagraon	2.6	29.9	1050.00
Mullanpur	15.4	42.8	177.92

Source : Market Committees, Jagraon and Mullanpur.

APPENDIX 3

COST OF GINNING AND PRESSING PER BALE OF COTTON IN JAGRAON AND MULLANPUR FACTORIES : 1965-66

(*in rupees*)

Particulars of cost	Jagraon factory	Mullanpur factory
A. Fixed Costs		
1. Depreciation on buildings	1.08	—
2. Lease amount for buildings and the amount of land revenue payable for the land on which the buildings were constructed	—	0.25
3. Depreciation on machinery	1.45	2.95
4. Wages of the permanent staff	2.08	2.10
5. Interest on fixed costs	0.41	0.47
Total fixed costs	5.02	5.77
B. Variable Costs		
6. Repairs and maintenance	1.91	1.56
7. Temporary staff including labour	2.08	2.25
8. Fuel	2.18	—
9. Electricity	0.41	2.28
10. Hoops and hessian cloth	3.80	3.80
11. Insurance	0.75	0.80
12. Miscellaneous costs	1.50	1.50
13. Interest on variable costs	1.14	1.10
Total variable costs	13.77	13.29
C. Total Costs per bale	18.79	19.06