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**REPORT**

**OF THE**

**Indian Tariff Board**

**ON THE**

**SUGAR INDUSTRY**



DELHI: MANAGER OF PUBLICATIONS  
1938

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## PRELIMINARY.

1. The enquiry into the Sugar Industry was referred to the Tariff Board under the Resolution of the Government of India in the Department of Commerce, No. 127-T. (1)/37, dated the 27th March, 1937, which runs as follows:—

“ The amount of protection afforded to the Sugar Industry by the duties imposed by section 2 of the Sugar Industry Protection Act, 1932, will determine on the 31st March, 1938, and section 3 of that Act provides that the Governor General in Council shall cause to be made by such persons as he may appoint in this behalf an enquiry to ascertain if the protection of the Sugar Industry during the period from 31st March, 1938, to the 31st March, 1946, should be continued to the same extent or to a greater or lesser extent. The Government of India have decided that this enquiry should be undertaken by the Tariff Board and the following terms of reference have been framed for its guidance:—

(a) The Board is requested to examine the measure of protection now enjoyed by the Sugar Industry and to report whether it is necessary to continue protection to this extent or to a greater or lesser extent.

(b) In making its recommendations the Tariff Board will take all relevant considerations into account including that stated in part (b) of the Resolution adopted by the Legislative Assembly on the 16th February, 1923.

2. Firms and persons interested in the Sugar Industry or industries dependent on the use of sugar who desire that their views should be considered by the Tariff Board should address their representations to the Secretary of the Board.”

2. The Board entered upon its duties at the beginning of April: Board's Communi- and issued a press communiqué dated the 5th April, 1937, in the following terms:—

“ In the Government of India, Department of Commerce, Resolution No. 127-T. (1)/37, dated the 27th March, 1937, the Tariff Board has been directed to hold an enquiry to ascertain if the protection afforded to the Sugar Industry by the duties imposed by section 2 of the Sugar Industry Protection Act, 1932, should be continued to the same extent or to a greater or lesser extent during the period from the 31st March, 1938, to the 31st March, 1946. Those Associations, firms or persons interested in the Sugar Industry or industries dependent upon sugar who desire that their views should be considered by the Board are requested to forward their representations not later than the 1st May, 1937.”

3. As the working season of sugar factories was rapidly drawing to a close, it was found advisable to proceed forthwith on tour in the main sugar producing areas in order to study factory problems under working conditions and in particular the arrangements for the purchase, transport and delivery of sugarcane. This preliminary survey of the industry and informal discussions with officials and non-officials were of great assistance in framing the general and special questionnaires which were issued to Provincial Governments, Indian States, Chambers of Commerce and other Associations, manufacturers, merchants and representatives of cane growers.

4. During the enquiry conducted by the previous Tariff Board the case for the adoption of the policy of discriminating protection for the Sugar Industry was presented mainly by the Imperial Council of Agricultural Research and four provincial Governments. On the present occasion the Council have tendered no evidence but supplied us with such statistical and technical information as they were in a position to give without expressing definite opinions on particular points. We regret that we have not had the advantage of a formal expression of their views on the important agricultural questions which it has been necessary for us to consider, more especially the cost of cultivation and the fair price of cane.

The case for the Sugar Industry has been presented by the Sugar Mills Association who deputed Sir. T. Vijayaraghavachariar, C.B.E., to watch their interests during the course of our enquiry and supply us with such information as we required. Sir T. Vijayaraghavachariar's long experience, especially in his capacity as Vice-Chairman of the Imperial Council of Agricultural Research, has been of material assistance to us in our examination of the case, particularly in its agricultural aspects.

5. Replies to our questionnaires were received from all Provincial Governments, 11 Indian States, 29 Associations and 90 individuals. Apart from the general representation of the Indian Sugar Mills Association 128 out of 159 factories or refineries have sent individual replies and supplied us with figures of production, cost of manufacture, stocks, etc. We desire to express our appreciation of the assistance we have received from officials and non-officials who have taken considerable trouble to supply us with the facts and figures we required.

6. In July the Board again proceeded on tour partly for the purpose of recording evidence but partly also to visit areas not covered in the first tour and to study the conditions of sugarcane cultivation. Starting from Madras we proceeded in succession to Mysore, Bombay, Hyderabad, Delhi, the Punjab, the United Provinces, Bihar, Orissa and concluded our tour in

Bengal. In the course of our tours we have inspected 32 factories and refineries and 15 agricultural stations. We have also made a point, wherever possible, of inspecting sugarcane cultivation and holding impromptu conversations with the actual cultivators in their fields. We have recorded evidence from 25 witnesses and taken notes of informal discussions with 77 other persons which have been of assistance to us on points of detail.

7. The terms of reference by the Government of India might appear to restrict the scope of our enquiry to narrower limits than

the enquiry conducted by the previous Tariff Board. Unlike the previous Tariff Board we are not called upon to discuss the desirability of protection for the Sugar Industry, but only the extent of such protection. The benefits to India from the policy of discriminating protection for the Sugar Industry have in recent years been set forth at length in many publications which, so far as we are aware, stand unchallenged. But the rapidity with which this policy has proved effective beyond the expectation of the most sanguine in freeing India from dependence on foreign supplies of sugar to the point now reached of self-sufficiency in internal production has given rise to new problems and difficulties which could not be foreseen. We have therefore found it necessary to discuss some aspects of the case in considerably more detail than the previous Tariff Board.

8. Beginning with a general survey of the world sugar position and the progress of the industry in India, we have dealt in

turn with raw material, manufacture, marketing and consumption. The interests of the grower of sugarcane, the manufacturer, the merchant and the consumer are often different and sometimes conflicting; we have endeavoured to assess the relative importance of the respective interests from the point of view of the measure of protection required. The statistical tables contained in our report are based on official publications or information supplied by the Imperial Council of Agricultural Research, the Director of the Imperial Institute of Sugar Technology, Cawnpore, or the Director General of Commercial Intelligence and Statistics. In some cases we have been able to check the figures by independent calculations based on information gathered during the course of our enquiry. Where necessary, we have appended explanatory notes.

9. Other questions incidental to the main enquiry but intrinsically of considerable importance have received our considera-

tion such as the relation between the Sugar and the "Gur" Industry, the by-products of sugar manufacture, subsidiary industries, labour conditions and State assistance to the industry. For convenience of reference we have followed generally the main lines of the previous Tariff Board's report, but a slightly different arrangement of the material has been found necessary to suit the scope of our terms of reference. Many of the conclusions

at which the previous Tariff Board arrived still hold good and we have not found it necessary to repeat some of the information it supplied. The statistics in our report are in continuation of those furnished in the previous report and begin generally from the year 1930-31.

For facility of reference we have, where necessary, converted foreign currencies into rupees, annas and pies (1 rupee=16 annas : 1 anna=12 pies). Throughout our report the term maund is to be taken to mean the standard maund of 82½ pounds.

10. We desire to express our appreciation of the help received from our Secretary, Mr. K. B. Bhatia, I.C.S., from Rai Sahib H. C. Sen, from Mr. Amritlal Sahgal, B.A., LL.B., A.C.A., R.A., and from the other members of our staff.

## APPENDIX A.

**NOTE.**—The costs of cultivation as given by cultivators selected as typical do not usually include repairs and renewals, interest on working capital or insurance. Costs per maund are not to be taken as average costs for any particular area.

The average cost figures given in the body of the Report include repairs and renewals, interest on working capital and insurance and are calculated on the basis of the figures given by all the cultivators examined whose cost estimates were accepted as reasonably accurate.

		Cost of cultivation per acre.
<i>United Provinces—Gorakhpore District.</i>		
		Rs. A. P.
1. Trenching . . . . .		10 0 0
2. Manure, sulphate of ammonia . . . . .		18 8 8
3. Neem cake . . . . .		10 12 7
4. Cane seed . . . . .		7 9 5
5. Cost of irrigation, crude oil and mobil oil . . . . .		18 11 1
6. Labour (excluding cost of trenching) . . . . .		19 1 6
7. Cartage . . . . .		24 11 10
8. Cost of harvesting and stripping . . . . .		12 14 11
9. Rent . . . . .		12 0 0
10. Farm salaries . . . . .		21 0 0
11. Cost of oil cake for bullocks . . . . .		2 10 10
12. Interest on capital outlay . . . . .		20 7 10
	Total . . . . .	178 8 8

Yield per acre 811 maunds 37 seers.  
Cost per maund of cane Re. 0-3-6.

<i>United Provinces—Gorakhpore District.</i>		
1. Trenching . . . . .		11 0 0
2. Manure, sulphate of ammonia . . . . .		20 1 4
3. Cost of irrigation, crude oil and mobil oil . . . . .		6 8 0
4. Labour (excluding cost of trenching) . . . . .		20 6 4
5. Cartage . . . . .		18 3 4
6. Cost of harvesting and stripping cane . . . . .		10 4 11
7. Cane seed . . . . .		5 12 9
8. Rent . . . . .		12 0 0
9. Farm salaries . . . . .		14 4 8
10. Cost of oil cake for bullocks . . . . .		4 12 4
11. Interest on capital outlay . . . . .		19 8 10
	Total . . . . .	142 14 6

Yield per acre 620 maunds 17 seers.  
Cost per maund of cane Re. 0-3-7.

Cost of cultivation  
per acre.

*United Provinces—Bilari District.*

	Rs.	A.	P.
1. Cultivation charges . . . . .	5	7	6
2. Cost of manure and manuring . . . . .	22	0	3
3. Cost of seed and sowing . . . . .	15	14	0
4. Irrigation . . . . .	18	10	2
5. Hoeing and earthing . . . . .	9	9	4
6. Rent . . . . .	20	0	0
7. Harvesting . . . . .	0	12	8
8. Carting . . . . .	4	11	1
9. Overhead charges . . . . .	7	4	4
10. Other expenses . . . . .	1	12	10
11. Dept. charges on bullocks, building, and tube-well . . . . .	15	13	4
Total . . . . .	121	15	6

Yield per acre 441 maunds.

Cost per maund of cane Rs. 0-4-5.

*United Provinces—Meerut Division.*

1. Green Manure . . . . .	8	10	0
2. Manuring . . . . .	25	0	0
3. 6 ploughings . . . . .	7	8	0
4. Sowing . . . . .	1	8	0
5. Irrigation . . . . .	4	11	0
6. Seeds . . . . .	15	10	0
7. Interculture . . . . .	3	12	0
8. Earthing up . . . . .	2	8	0
9. Binding . . . . .	3	12	0
10. Rent . . . . .	16	0	0
11. Supervision . . . . .	10	0	0
12. Cutting . . . . .	12	9	0
Total . . . . .	111	8	0

Yield per acre 603 maunds.

Cost per maund of cane Re. 0-2-11.

*United Provinces—Dehra Dun District.*

1. Tilling 8 times . . . . .	13	12	0
2. Preparing nursery including hang . . . . .	5	0	0
3. Manure 5 carts . . . . .	25	0	0
4. Spreading manure . . . . .	1	9	0
5. Seed price . . . . .	25	0	0
6. Cutting seed carting and planting . . . . .	5	0	0
7. Weeding 3 times . . . . .	15	0	0
8. Levelling nurseries . . . . .	2	8	0
9. Earthing . . . . .	10	0	0
10. Watching . . . . .	5	0	0



Cost of cultivation  
per acre.*United Provinces—Dehra Dun District—contd.*

	Rs.	A.	P.
11. Watering 8 times . . . . .	2	8	0
12. Land rent . . . . .	30	0	0
13. Water rent . . . . .	10	0	0
Total . . . . .	150	5	0

Yield per acre 500 maunds.

Cost per maund of cane Re. 0-4-10.

*Bihar—Hajipur District.*

1. Tamni—digging . . . . .	5	8	0
2. Ploughing and levelling 4 times before October . . . . .	4	6	5
3. Manure cost 20 carts cow dung and transport .	27	8	0
4. (a) Spreading of manure—cooly 4 . . . . .	1	1	7
(b) Ploughing . . . . .	1	1	7
5. Furrowing . . . . .	1	1	7
6. Seed (cost) 40 and transport . . . . .	17	9	7
7. Disinfecting seed with coal tar . . . . .	2	3	2
8. Planting 4 and levelling . . . . .	1	10	5
9. Weeding twice . . . . .	4	6	5
10. Tamni . . . . .	2	3	2
11. Earthing twice . . . . .	1	10	5
12. Rent for 2 years . . . . .	5	8	0
13. Harvesting . . . . .	11	0	0
Total . . . . .	86	14	4

Yield per acre 500 maunds.

Cost per maund of cane Re. 0-2-9.

*Bihar—Darbhanga District.*

1. Ploughing with country ploughs . . . . .	10	0	0
2. Trench cutting . . . . .	7	0	0
3. Manuring . . . . .	15	0	0
4. Sowing and dressing the trenches . . . . .	2	0	0
5. Earthing . . . . .	2	0	0
6. Seeds with carting . . . . .	15	0	0
7. Rent for 2 years . . . . .	10	0	0
8. Cutting and cleaning cane for delivery to the mills or for crushing . . . . .	4	0	0
9. Spading and taking out cane roots after cane is cut . . . . .	4	0	0
Total . . . . .	69	0	0

Yield per acre 300 maunds.

Cost per maund of cane Re. 0-3-8.

Type of cane Co.213.

## APPENDIX.

Cost of cultivation  
per acre.*Bihar—Muzaffarpur District.*

	Rs. A. P.
1. 8 ploughings at 8 annas per ploughing . . . . .	4 0 0
2. 1 maund green manure . . . . .	3 12 0
3. 3 ploughings for green manure . . . . .	1 12 0
4. 10 ploughings before planting . . . . .	5 0 0
5. 30 cartloads of farmyard manure . . . . .	15 0 0
6. Ploughing after manure . . . . .	2 0 0
7. Trenching and levelling . . . . .	0 12 0
8. Preparation and planting of seed . . . . .	1 0 0
9. Ploughing (Harrowing) . . . . .	0 8 0
10. Earthing up . . . . .	0 4 0
11. 2 years rent . . . . .	10 0 0
12. Harvesting, cutting and loading . . . . .	5 10 0
13. Seed 40 maunds at 5 annas . . . . .	12 8 0
14. Watching . . . . .	7 8 0
Total . . . . .	69 10 0

Yield per acre 400 maunds.

Cost per maund of cane Re. 0-2-9.

*Bihar—Champan District.*

1. Ploughing . . . . .	5 8 0
2. Harrowing . . . . .	2 0 0
3. Manure . . . . .	6 0 0
4. Cartage for manure . . . . .	3 0 0
5. Labour charge for spreading the manure . . . . .	1 0 0
6. Seed at As. 4-9 per maund 1 katha= 2½ maunds . . . . .	18 2 0
7. Labour engage for sowing . . . . .	1 2 0
8. Weeding and Ryding . . . . .	5 0 0
9. Cartage for carrying cane to weighbridge . . . . .	13 12 0
10. Scruping of cane at the time of harvesting . . . . .	2 0 0
11. Interest on advance taken by cultivator . . . . .	10 11 0
12. Rent . . . . .	3 0 0
13. Supervision . . . . .	5 0 0
14. Watching charge . . . . .	2 0 0
Total . . . . .	78 3 0

Yield per acre 300 maunds.

Cost per maund of cane Re. 0-4-2.

*Punjab—Lahore District.*

(Cost given by three cultivators.)

1. Land rent . . . . .	50 0 0
2. Preparation of land . . . . .	10 0 0
3. Seed . . . . .	20 0 0

Cost of cultivation  
per acre.

*Punjab—Lahore District—contd.*

	Rs.	A.	P.
4. Hosing . . . . .	10	0	0
5. Irrigation . . . . .	80	0	0
6. Manure . . . . .	20	0	0
Total . . . . .	190	0	0

Yield per acre 600 maunds.

Cost per maund of cane Re. 0-5-1.

*Bengal—Murshidabad District.*

1. Ploughing . . . . .	9	0	0
2. Trenching . . . . .	22	8	0
3. 3 diggings at Rs. 6 . . . . .	18	0	0
4. One weeding . . . . .	6	0	0
5. Cutting seed, carting and cutting into sections and applying coal tar . . . . .	2	12	0
6. Planting and applying nicifos . . . . .	3	12	0
7. Watering and applying disinfectant . . . . .	2	4	0
8. Applying ammonia . . . . .	1	8	0
9. Price of coal tar . . . . .	2	0	0
10. Price of disinfectant . . . . .	1	0	0
11. Price of nicifos . . . . .	9	6	0
12. Price of sulphate of ammonia . . . . .	13	0	0
13. Price of seed (one acre will plant not less than 12 acres and often more if the cane is good) . . . . .	10	0	0
14. Rent 1½ years at Rs. 3 . . . . .	4	8	0
15. Cane cutting . . . . .	12	0	0
Total . . . . .	117	10	0

Yield per acre 750 maunds.

Cost per maund of cane Re. 0-2-6.

Type of cane Co.213, 243, 270.

Bengal—Rajshahi District.

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Year.	Tillage.	Insect pest.	Trench.	Applica- tion of manure.	Planting.	Hoeing and weed- ing.	Plough- ing for weeding.	Earthing.	Thrashing.	Harvest- ing.	Cutting.	Cost of manure.	Total.
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1933-34 . .	5 9 3	..	17 10 9	3 3 9	7 14 9	0 13 6	..	3 12 0	3 13 6	24 0 0	10 5 9	15 0 0	92 3 3
1934-35 . .	6 15 0	0 14 3	0 6 0	2 13 0	6 8 3	5 15 3	..	0 10 6	10 11 3	24 2 3	13 12 0	5 4 0	67 14 9
1935-36 . .	6 5 3	0 7 6	0 3 3	2 14 6	8 1 0	6 6 0	1 8 9	1 5 0	..	23 10 9	18 8 9	11 4 0	66 11 3
1936-37 . .	6 6 9	0 14 6	0 11 3	0 13 6	5 10 0	2 3 6	..	0 6 9	3 9 0	16 10 3	14 10 0	10 2 0	62 6 6

Yield per acre 368 maunds. Cost per maund of cane Re. 0-2-8. Type of cane Co. 213.

APPENDIX.

Cost of cultivation  
per acre.*Bengal—Rajshahi District.*

	Rs. A. P.	Rs. A. P.
1. Ploughing . . . . .	12 0 0	
Harrowing . . . . .	6 0 0	
Laddering . . . . .	1 8 0	
	<hr/>	19 8 0
2. Trenching by ridger . . . . .	6 0 0	
Spreading . . . . .	4 8 0	
	<hr/>	10 8 0
3. Cutting setts . . . . .	14 4 0	
Planting . . . . .	9 0 0	
	<hr/>	23 4 0
4. Manuring . . . . .	15 0 0	
Applying manure . . . . .	4 8 0	
	<hr/>	19 8 0
5. Harrowing for interim cultivation . . . . .	6 0 0	
Earthing by meddle breaker . . . . .	6 0 0	
	<hr/>	12 0 0
6. Weedings . . . . .		9 0 0
7. Harvesting and dressing . . . . .		22 8 0
8. Carting to the cane centre . . . . .		25 5 0
9. Rent . . . . .		6 0 0
10. Sundries neem oil cake . . . . .		4 8 0
		<hr/>
Total . . . . .		152 1 0

Yield per acre 540 maunds.

Cost per maund of cane Re. 0-4-6.

*Bombay—Ahmednagar District.*

1. Manuring with green manure . . . . .	25 0 0
2. Ploughing . . . . .	20 0 0
3. Farmyard manure (15 carts at Rs. 2 per cart) . . . . .	30 0 0
4. Planting . . . . .	14 0 0
5. Setts 10,000 . . . . .	30 0 0
6. Weeding . . . . .	10 0 0
7. Ammonium sulphate 2 bags . . . . .	22 0 0
8. Oilcake 14 pallas at Rs. 6-8 a palla . . . . .	91 0 0
9. Cost of earthing up . . . . .	12 0 0
10. Labour for spreading manure and top dressing . . . . .	6 0 0
11. Waterman (no watching required) . . . . .	20 0 0
12. Supervision . . . . .	15 0 0
13. Rental for one year . . . . .	30 0 0

		Cost of cultivation per acre.	
<i>Bombay—Ahmednagar District—contd.</i>		Rs. A. P.	
14.	Irrigation charges for 15 months (including local cess Rs. 4) . . . . .	64	0 0
15.	Cost of cutting . . . . .	18	0 0
Total . . . . .		407	0 0

Yield per acre 40 to 50 tons or 1,225 maunds.

Cost per maund of cane Re. 0-5-4.

Type of cane Co.416, 360 and E.K. and P.O.J. varieties.

<i>Bombay—Poona District.</i>			
1.	Ploughing and furrowing . . . . .	20	0 0
2.	Green manure or in the alternative farmyard manure—20 carts at Rs. 2 a cart . . . . .	40	0 0
3.	10,000 setts of cane at Rs. 3 per 1,000 setts . . . . .	30	0 0
4.	Binding, manuring and planting . . . . .	15	0 0
5.	Six weedings . . . . .	15	0 0
6.	Top dressing, earthing up, and tethering (stirring soil) . . . . .	15	0 0
7.	Ammonium sulphate two bags each of 2 cwts. . . . .	24	0 0
8.	$\frac{1}{2}$ ton ground nut cake and 1 ton castor cake . . . . .	88	0 0
9.	Waterman and watching (1 man for 5 acres) . . . . .	30	0 0
10.	Rent of land . . . . .	20	0 0
11.	Irrigation cess (1 anna per rupee) and overlap . . . . .	60	0 0
12.	Add interest on 300 for 12 months at 12 per cent. per annum . . . . .	36	0 0
13.	Harvesting . . . . .	18	0 0
Total . . . . .		411	0 0

Yield per acre 40 tons or 1,089 maunds.

Cost per maund of cane Re. 0-6-0.

Type of cane E.K.28 and P.O.J.2878.

NOTE.—Average yield in 1937 was 50—63 tons for Adsali crop (18 months) and 45 tons for one year crop.

<i>Madras—Cuddalore District.</i>			
1.	Preparatory . . . . .	15	0 0
2.	Seed . . . . .	27	0 0
3.	Sowing . . . . .	4	0 0
4.	Interculture . . . . .	20	0 0
5.	Fertilizer . . . . .	64	0 0
6.	Rent . . . . .	30	0 0 (Esti- mated).
7.	Irrigation from tube-well . . . . .	70	0 0
8.	Harvesting . . . . .	18	0 0
Total . . . . .		248	0 0

Yield per acre 953 maunds.

Cost per maund of cane Re. 0-4-2.

Cost of cultivation  
per acre.*Madras—Vizagapatam District.*

Rs. A. P.

## Preparatory Cultivation—

1. 1st ploughing with country plough . . . . .	3 3 0
2. 2nd ploughing with country plough . . . . .	2 2 0
3. Patti . . . . .	0 4 3
4. Guntaka . . . . .	0 8 6
5. 3rd ploughing with country plough . . . . .	1 9 6
6. Patti . . . . .	0 4 3
7. Guntaka . . . . .	0 8 6
8. 4th ploughing covering manure . . . . .	1 9 6
9. Digging headlands . . . . .	1 4 0
10. Forming furrows . . . . .	1 1 0
11. Forming irrigation channels and rectifying furrows at headlands . . . . .	1 4 0
Total . . . . .	<u>13 10 6</u>

## Manures and manuring—

1. Transporting 20 carts of F.Y.M. and spreading . . . . .	3 3 6
2. Cost of 20 carts F.Y.M. . . . .	10 0 0
3. Sheep penning . . . . .	15 0 0
4. Ammonium sulphate 2 bags at Rs. 4 each . . . . .	8 0 0
5. Application of ammonium sulphate . . . . .	1 14 0
Total . . . . .	<u>38 1 6</u>

## Seeds and sowing—

1. Preparation of seed from 10 cwts. or about 5,000 lbs. . . . .	4 11 0
2. Distribution of setts and planting . . . . .	2 0 6
3. Irrigation by mhote . . . . .	5 8 0
4. Cost of 10 candies seed at Rs. 2-8-0 per candy . . . . .	25 0 0
Total . . . . .	<u>37 3 6</u>

## Irrigation—

1. March—1 irrigation . . . . .	5 8 0
2. April, May and June—2 irrigations each month . . . . .	33 0 0
3. December and January—irrigation in each month . . . . .	11 0 0
Total . . . . .	<u>49 8 0</u>

Cost of cultivation  
per acre.

*Madras—Vizagapatam District—contd.*

	Rs. A. P.
After cultivation—	
1. 1st hoeing in March . . . . .	3 2 0
2. 2nd hoeing in April . . . . .	3 14 6
3. May-June earthing up . . . . .	7 13 0
4. June-July 1st wrapping . . . . .	4 11 0
5. August 2nd wrapping . . . . .	6 4 0
6. September 3rd wrapping . . . . .	7 13 0
7. November 4th wrapping . . . . .	9 6 0
8. January 5th wrapping . . . . .	9 6 0
9. November and December—removal and side- shorts . . . . .	1 14 0
10. Fixing 3,000 bamboos . . . . .	3 2 0
11. Cost of 3,000 bamboos at Rs. 3 per 100. $\frac{1}{4}$ cost is debited for each year . . . . .	30 0 0
Total . . . . .	37 5 6

Harvesting—

1. Harvesting, stripping, tapping, etc. . . . .	43 12 0
2. Rent of land . . . . .	40 0 0
Total . . . . .	83 12 0

Yield per acre 40 tons=1,089 maunds.

Cost per maund of cane Re. 0-4-7.

Type of cane J.247

1. Acre 2-0 of J.247 with lift irrigation, wrapping and propping—	
(a) Preparing the land . . . . .	2 5 6
(b) Manuring the land (sheep manure and chemical manure) . . . . .	42 7 3
(c) Planting the seed material . . . . .	11 3 0
(d) Subsequent irrigation, wrapping, prop- ping, etc. . . . .	178 13 0
(e) Rent of land at Rs. 40 per acre . . . . .	80 0 0
(f) Depreciation of ploughing bulls of Rs. 16 per acre . . . . .	232 0 0
(g) Cutting and preparing the sugar cane and delivery at the factory excluding cart hire which is included in depreciation of bulls . . . . .	26 4 0
Total . . . . .	482 12 9

The yield of cane being 70 tons for 2 acres the  
average cost per ton of cane is Rs. 5-5-3  
or Re. 0-3-1 per maund.



Cost of cultivation  
per acre.

*Madras—Vizagapatam District—contd.*

	Rs. A. P.
<b>2. Another item of acres 2 consisting of Co.281 and J.247—</b>	
(a) Preparing the land . . . . .	6 7 0
(b) Manuring the land (cattle manure and chemical manure) . . . . .	56 15 9
(c) Planting the seed material . . . . .	2 13 6
(d) Subsequent irrigation, wrapping and propping, etc. . . . .	139 2 0
(e) Rent of land at Rs. 40 per acre . . . . .	80 0 0
(f) Depreciation of ploughing bulls, etc., at Rs. 16 per acre . . . . .	32 0 0
(g) Cutting and preparing the sugarcane and delivery at the factory . . . . .	26 4 0
<b>Total . . . . .</b>	<b>343 10 3</b>

The yield of cane being 70 tons for 2 acres the average cost per ton of cane is Rs. 4-14-6 or Re. 0-3-6 per maund.

<b>3. Cultivation of J.247, area being acres 2-50—</b>	
(a) Preparing the land . . . . .	26 7 6
(b) Manuring the land (cattle manure and chemical manure) . . . . .	75 6 3
(c) Planting the seed material . . . . .	23 7 0
(d) Subsequent irrigation, wrapping, propping, etc. . . . .	225 12 0
(e) Rent of land at Rs. 40 per acre . . . . .	100 0 0
(f) Depreciation of ploughing bulls, etc. . . . .	40 0 0
(g) Cutting and preparing the sugarcane and delivery at the factory excluding cart hire which is included in depreciation of ploughing bulls . . . . .	32 10 0
<b>Total . . . . .</b>	<b>523 10 9</b>

The total yield being 87 tons, the cost of cultivation per ton of cane is Rs. 6-0-3 or Re. 0-3-6 per maund.

<b>4. Co.281 and J.247, area being acres 2-0—</b>	
(a) Preparing the land . . . . .	2 6 6
(b) Manuring the land (sheep manure and chemical manure) . . . . .	46 5 6
(c) Planting the seed material . . . . .	10 14 6
(d) Subsequent irrigation, wrapping and propping, etc. . . . .	171 0 9
(e) Rent of land at Rs. 40 per acre . . . . .	80 0 0
(f) Depreciation of ploughing bulls, etc., at Rs. 16 per acre . . . . .	32 0 0

Cost of cultivation  
per acre.

*Madras—Vizagapatam District—contd.*

	Rs.	A.	P.
(g) Cutting and preparing the sugarcane and delivery at the factory excluding cart hire which is included in depreciation of ploughing bulls . . . . .	26	4	0
Total . . . . .	368	15	3

The total yield being 70 tons and the cost of cultivation per ton of cane is Rs. 5-3-2 or Re. 0-3-1 per maund.

5. Co.313 and 243, area being acres 2-50—

(a) Preparing the land . . . . .	3	14	0
(b) Manuring the land (sheep manure and chemical manure) . . . . .	53	13	0
(c) Planting the seed material . . . . .	22	11	6
(d) Subsequent irrigation, wrapping and propping . . . . .	90	10	0
(e) Rent of land at Rs. 40 per acre . . . . .	100	0	0
(f) Depreciation of ploughing bulls, etc. at Rs. 16 per acre . . . . .	40	0	0
(g) Cutting and preparing the sugarcane and delivery at the factory excluding cart hire which is included in depreciation of ploughing bulls . . . . .	32	10	0
Total . . . . .	343	10	6

The total yield being 87 tons of cane and the cost of cultivation per ton of cane is Rs. 3-15-3 or Re. 0-2-4 per maund.

6. Cultivation of Co.213, the area being acres 6-50—

(a) Preparing the land . . . . .	13	15	0
(b) Manuring the land (cattle manure and chemical manure) . . . . .	139	10	0
(c) Planting the seed material . . . . .	32	1	6
(d) Subsequent irrigation, wrapping, propping, etc. . . . .	149	5	6
(e) Rent of land at Rs. 40 per acre . . . . .	260	0	0
(f) Depreciation of ploughing bulls at Rs. 16 per acre . . . . .	104	0	0
(g) Cutting and preparing the sugarcane and delivery at the factory excluding cart hire which is included in depreciation of ploughing bulls . . . . .	79	3	6
Total . . . . .	778	3	6

The total yield being 169 tons and the cost of cultivation per ton of cane is Rs. 4-9-6 or Re. 0-2-8 per maund.

Cost of cultivation  
per acre.

*Madras—Vizagapatam District—concl'd.*

	Rs. A. P.
7. Co.213, area being 4.50 acres—	
(a) Preparing the land . . . . .	...
(b) Manuring the land (sheep manure and chemical manure) . . . . .	96 6 6
(c) Planting the seed material . . . . .	39 7 3
(d) Subsequent irrigation, wrapping and prop- ping, etc. . . . .	45 11 0
(e) Rent of land at Rs. 40 per acre . . . . .	180 0 0
(f) Depreciation of ploughing bulls, etc., at Rs. 16 per acre . . . . .	72 0 0
(g) Cutting and preparing the sugarcane and delivery at factory excluding cart hire which is included in depreciation of ploughing bulls . . . . .	54 13 6
Total . . . . .	<u>488 6 3</u>

The total yield being 117 tons and the cost of  
cultivation per ton of cane is Rs. 4-2-10 or  
Re. 0-2-5 per maund.

8. Co.213, area being acres 1.50—	
(a) Preparing the land . . . . .	7 10 0
(b) Manuring the land (sheep manure and chemical manure) . . . . .	32 2 0
(c) Planting the seed material . . . . .	3 8 3
(d) Subsequent irrigation, propping and wrapping . . . . .	35 8 3
(e) Rent of land at Rs. 40 per acre . . . . .	60 0 0
(f) Depreciation of ploughing bulls at Rs. 16 per acre . . . . .	24 0 0
(g) Cutting and preparing the sugarcane and delivery at the factory excluding cart hire which is included in depreciation of ploughing bulls . . . . .	18 12 0
Total . . . . .	<u>181 8 6</u>

The total yield of cane being 40 tons and the  
cost of cultivation per ton of cane is Rs. 4-8-7  
or Re. 0-2-8 per maund.

## APPENDIX B.

*A note on the improvement in extraction and recovery during the three seasons ending 1936-37, and the portions thereof due to better cane and better efficiency, dated 28th November, 1937, by Mr. R. C. Srivastava, Director, Imperial Institute of Sugar Technology, India, Cawnpore.*

It is well known that these figures depend on the quality of cane and on the efficiency of the milling and manufacturing operations. The figures for recovery and extraction under reference show that the composition of cane and extraction have both altered. The present note concerns with apportioning the above improvement into—

- (i) The improvement in milling and boiling house extractions, as well as in recovery of sugar per cent. cane, resulting from quality of cane;
- (ii) The improvement in milling and boiling house extractions, as well as in recovery resulting from increased technical efficiency.

*Mill-extraction.*—The figures relating to the increase or decrease in mill-extraction, with reference to cane quality and milling efficiency are given in Table I for three years.

From the figures it will be observed that the quality of cane has been deteriorating so far as milling extraction is concerned. The increase in fibre content in cane diminishes the milling value of the cane and this had an adverse effect on mill-extraction. The increase in the average fibre content in cane is to some extent due to increase in the area under ratoon cane and to the crushing of over-ripe cane at the end, due to a longer crushing season. This adverse effect is, however, greatly minimised, as a result of the increase efficiency of the milling operation. Thus all the provinces except the Punjab, Bengal and Madras, even registered an increase in extraction, in spite of the adverse effect due to increased fibre content. It will further be observed, that the milling efficiency has increased in all the provinces in 1936-37 except in Madras.

The effect of the quality of cane on mill-extraction has been at a maximum in the Punjab (2.68 in 1935-36 and 2.05 in 1936-37) followed by Madras (1.92) and Bengal (1.91) in 1935-36, and by Madras (1.88), Bengal (1.83) and West United Provinces (1.34) in 1936-37. There has been only one case, where the quality of cane has improved from the point of view of milling, and that is in East United Provinces in (1935-36). But this is not kept up in 1936-37, due perhaps to ratoon cane and longer season.

The increase in mill-extraction due to improvement in milling efficiency has been maximum in the Punjab (2.05) followed by West United Provinces (1.27) and East United Provinces (1.09) in 1935-36, while the 1936-37 this is shown by East United Provinces (2.75), closely followed by South Bihar (2.60).

The largest increase in mill-extraction as a combined result of quality of cane and efficiency has been in East United Provinces both in 1935-36 and 1936-37, being 1.32 and 2.22 units respectively. The mill-extraction has decreased to a maximum of 2.17 units in Bengal in 1935-36 and of 2.06 units in Madras in 1936-37.

*Boiling House Extraction.*—The figures relating to boiling house extraction are given in Table II. It will be observed from the figures given in the table that the effect of the variation in the quality of cane on the boiling house extraction was not as uniform as was the case with mill-extraction.

The increase in boiling house extraction due to better quality cane was highest in the Punjab and West United Provinces, in both years 1935-36 and

1936-37. It is very necessary to point out in this connection however that this was not due to these parts having produced much better cane than the others, but was due to the very poor quality cane obtained in these parts in 1934-35, with which the figures for the subsequent years are being compared.

Excluding therefore the Punjab and West United Provinces the maximum increase in boiling house extraction due to better quality cane has been in Bombay (2·36 units) in 1935-36, and in Bengal (3·71 units) in 1936-37. The quality of cane had the maximum adverse effect on boiling house extraction in North Bihar (2·56) and Central United Provinces (2·34) in 1935-36, and in North Bihar (7·08) in 1936-37.

The maximum increase in boiling house extraction due to improvement in boiling house efficiency is shown in North Bihar, the increase being 5·10 and 10·59 units in 1935-36 and 1936-37 respectively. North Bihar is followed by the Punjab recording an increase in boiling house extraction of 4·68 and 9·20 units in 1935-36 and 1936-37 respectively. The boiling house efficiency decreased to the greatest extent in Bombay and Baroda in 1935-36, the decrease being 2·66 units, while in 1936-37, this portion was taken by Madras with a decrease of 1·88 units.

The increase in boiling house extraction resulting from the combined effect of the quality of cane and efficiency, excluding however, the Punjab and West United Provinces (for reasons already stated), has been maximum in North Bihar (2·54 units) in 1935-36, and in 1936-37 in Bengal (5·93 units) followed by North Bihar (3·51 units).

*Recovery of Sugar per cent. Cane.*—Figures relating to the increase or decrease in recovery, and the portions thereof due to quality of cane and due to efficiency are given in Tables III, IV and V.

The greatest increase in recovery has been recorded by the Punjab, which is closely followed by West United Provinces, in both the years 1935-36 and 1936-37. This, however, as already explained has not been the result of a much superior cane quality or efficiency, but to a great extent due to the conditions having come to the normal from the highly sub-normal conditions that existed in these parts in the year 1934-35.

Excluding the Punjab and West United Provinces increases in recoveries are recorded by North Bihar (0·56; 0·54), East United Provinces (0·49; 0·86) and Bengal (0·03; 0·53) in 1935-36 and 1936-37, and also in South Bihar (0·41) and Central United Provinces (0·45) in 1936-37. Bombay and Madras have shown a decrease in average recovery during these years. This is to some extent due to the smaller units that have been introduced in those Provinces. East United Provinces and North Bihar. have however shown a steady increase in recovery.

The average percentage of the increase in recovery due to cane quality has been highest in West United Provinces (89·42 per cent.) and next in the Punjab (64·57 per cent.). This high contribution towards the percentage of the increase in recovery by cane quality is only apparent for reasons already stated.

Excluding the Punjab and West United Provinces the percentage of the increase in recovery due to better quality cane has been highest in Bengal (58·93), which is followed by East United Provinces (43·7 per cent.). The quality of cane had a decidedly adverse effect on the increase in recovery in Bombay, South Bihar and North Bihar. This adverse effect has been compensated for by better efficiency in North and South Bihar and the increase in recovery should have been much higher due to improved efficiency, if the average cane quality cane had not decreased.

In Bombay, though the efficiency has considerably improved, the adverse effect of cane quality has been too high and consequently there is a decrease in recovery in spite of better efficiency. In Madras, on the other hand, the quality of cane has slightly improved and this should have given an increased recovery, but actually the recovery per cent. has decreased due

to decrease in efficiency. This however may to some extent be due to the addition of less efficient units, rather than the decrease in the efficiency of the old units.

*Conclusion.*—The analysis of the increase in recovery has clearly shown that the greater portion of the increase in recovery is due to increased efficiency, rather than better cane quality. The increased efficiency has almost in all the provinces a greater share of the increase in recovery (excluding the Punjab and West United Provinces for reasons explained already).

The quality of cane has not improved to the extent it should have, and has actually declined in Bombay, North Bihar and South Bihar. To some extent increases under ratoon cane and the longer seasons have been responsible for this diminution in the average cane quality. In Bombay, the improvement in efficiency has not been able to make this up and a decrease in recovery has resulted. In Bihar, on the other hand, the increase in efficiency has been able to make up for this and an increase in recovery has taken place. If the cane quality had at least been the same as before, the increase in recovery would have been much higher in Bihar, due to efficiency alone.

TABLE I.--Showing increase or decrease in milling extraction separately due to (i) quality of cane, (ii) milling efficiency and (iii) total from the season 1934-35 to seasons 1935-36 and 1936-37.

Serial No.	Groups.	SEASON 1934-35.		SEASON 1935-36.						SEASON 1936-37.					
		Fibre per cent. cane.	Actual mill extraction.	Fibre per cent. cane.	Calculated mill-extraction.	Increase or decrease in mill-extraction due to quality of cane.	Actual mill-extraction.	Increase or decrease in mill-extraction due to milling efficiency.	Total increase or decrease in mill-extraction.	Fibre per cent. cane.	Calculated mill-extraction.	Increase or decrease in mill-extraction due to quality of cane.	Actual mill-extraction.	Increase or decrease in mill-extraction due to milling efficiency.	Total increase or decrease in mill-extraction.
			(A)		(B)	(B-A)	(C)	(C-B)			(B <sub>1</sub> )	(B <sub>1</sub> -A)	(C <sub>1</sub> )	(C <sub>1</sub> -B <sub>1</sub> )	
1	Punjab . . . . .	13.74	89.79	15.97	87.11	-2.68	89.16	2.05	-0.63	15.93	87.86	-1.98	89.82	1.46	-0.47
2	Western United Provinces . . . . .	14.06	89.87	15.06	89.01	-0.86	90.28	1.27	0.41	15.63	88.53	-1.34	90.89	1.86	0.52
3	Central United Provinces . . . . .	15.27	91.04	16.50	90.05	-0.99	90.43	0.88	-0.61	16.02	90.61	-0.48	91.68	1.02	0.59
4	Eastern United Provinces . . . . .	15.74	88.75	15.46	88.98	0.23	90.07	1.09	1.32	16.36	88.22	-0.58	90.97	2.75	2.22
5	North Bihar . . . . .	16.15	91.12	16.72	91.08	-0.09	91.68	0.60	0.51	16.80	90.69	-0.43	91.76	1.07	0.64
6	South Bihar . . . . .	16.69	89.12	16.72	89.09	-0.03	89.01	-0.08	-0.11	17.94	88.13	-0.99	90.79	2.66	1.67
7	Bengal . . . . .	14.68	90.72	17.19	88.81	-1.91	88.55	-0.26	-2.17	17.07	88.89	-1.88	89.58	0.69	-1.14
8	Madras . . . . .	10.21	94.16	18.10	92.24	-1.92	92.54	0.32	-1.60	13.04	92.23	-1.88	92.10	-0.18	-2.06
9	Bombay and Baroda . . . . .	18.88	89.15	14.62	88.47	-0.68	89.44	0.97	0.29	14.50	88.53	-0.57	90.23	1.65	1.08
10	Mysore . . . . .	..	..	12.89	..	..	90.71	..	..	..	..	..	..	..	..

TABLE II.—Showing increase or decrease in boiling house extraction due to (i) quality of cane, (ii) boiling house efficiency and (iii) total from the season 1934-35 to seasons 1935-36 and 1936-37.

Serial No.	Groups.	SEASON 1934-35.		SEASON 1935-36.						SEASON 1936-37.					
		Mixed juice purity.	Actual boiling house extraction.	Mixed juice purity.	Calculated boiling house extraction.	Increase or decrease in B. H. E. due to quality of cane.	Actual boiling house extraction.	Increase or decrease in B. H. E. due to efficiency in B. H.	Total increase or decrease in B. H. extraction.	Mixed juice purity.	Calculated boiling house extraction.	Increase or decrease in B. H. E. due to quality of cane.	Actual boiling house extraction.	Increase or decrease in B. H. E. due to efficiency in B. H.	Total increase or decrease in B. H. extraction.
		(A)	(B)	(B-A)	(C)	(C-B)			(B <sub>1</sub> )	(B <sub>1</sub> -A)	(C <sub>1</sub> )	(C <sub>1</sub> -B <sub>1</sub> )			
1	Punjab . . . . .	72.49	73.82	75.48	77.45	3.68	82.13	4.68	8.31	77.83	79.64	5.82	88.84	9.20	15.02
2	Western United Provinces . . . . .	78.84	82.23	77.49	85.43	8.20	87.22	1.79	4.99	79.69	87.22	4.99	88.28	1.06	6.05
3	Central United Provinces . . . . .	81.46	86.26	78.96	83.92	-2.34	85.42	1.50	-0.84	82.13	86.88	0.62	86.66	-0.22	0.40
4	Eastern United Provinces . . . . .	81.57	86.85	81.26	86.68	-0.27	88.19	1.61	1.34	82.03	87.25	0.40	88.92	1.67	2.07
5	North Bihar . . . . .	84.42	88.90	82.86	81.84	-2.56	86.44	5.10	2.54	79.00	76.82	-7.08	87.41	10.59	3.51
6	South Bihar . . . . .	80.12	87.26	78.87	85.82	-1.44	87.95	2.13	0.69	79.91	87.09	-0.17	87.52	0.43	0.23
7	Bengal . . . . .	75.29	82.25	75.01	81.98	-0.27	81.81	-0.17	-0.44	79.40	85.96	3.71	88.18	2.22	5.93
8	Madras . . . . .	79.80	83.83	80.58	84.56	0.73	83.83	-0.73	0.00	80.55	84.58	0.75	82.70	-1.88	-1.13
9	Bombay and Baroda . . . . .	84.24	88.07	81.68	85.71	2.36	88.37	-2.66	-0.30	83.56	87.45	-0.62	90.23	1.73	1.16
10	Mysore . . . . .	..	..	84.60	..	..	85.73	..	..	..	..	..	..	..	..



TABLE III.—Showing increase or decrease in sugar recovery separately due to (i) quality of cane and (ii) overall efficiency from the season 1934-35 to seasons 1935-36 and 1936-37.

Serial No.	Groups.	SEASON 1934-35.			SEASON 1935-36.						SEASON 1936-37.					
		Sugar per cent. cane.	Actual overall results.	Sugar recovery per cent. cane.	Sugar per cent. cane.	Calculated overall recovery due to cane quality.	Calculated recovery after allowing for cane quality.	Increase or decrease in recovery due to cane quality.	Actual recovery of Sugar per cent. cane.	Increase or decrease in recovery due to overall efficiency.	Sugar per cent. cane.	Calculated overall recovery due to cane quality.	Calculated recovery after allowing for cane quality.	Increase or decrease in recovery due to cane quality.	Actual recovery of sugar per cent. cane.	Increase or decrease in recovery due to overall efficiency.
				(M)		(N)	(N-M)	(P)	(P-N)			(N <sub>1</sub> )	(N <sub>1</sub> -M)	(P <sub>1</sub> )	(P <sub>1</sub> -N <sub>1</sub> )	
1	Punjab . . . .	8-96	66-30	5-99	10-63	67-47	7-17	1-18	7-80	0-63	10-98	69-97	7-68	1-69	8-63	0-95
2	Western United Provinces.	9-61	73-90	7-06	11-39	76-04	8-66	1-80	8-84	0-18	11-88	77-20	9-17	2-11	9-43	0-26
3	Central United Provinces.	11-81	78-54	9-25	11-91	75-57	9-00	-0-25	9-15	0-15	12-16	78-72	9-57	0-32	9-70	0-13
4	Eastern United Provinces.	11-72	77-07	9-07	12-06	77-04	9-28	0-21	9-56	0-23	12-28	76-97	9-45	0-88	9-98	0-43
5	North Bihar . . .	11-28	76-45	8-62	11-59	74-04	8-58	-0-04	9-18	0-80	11-42	69-87	7-96	-0-66	9-16	1-20
6	South Bihar . . .	11-61	77-77	9-03	11-38	76-46	8-66	-0-37	8-87	0-21	11-88	76-75	9-12	0-09	9-44	0-82
7	Bengal . . . . .	11-27	74-12	8-15	11-29	72-81	8-22	0-07	8-18	-0-04	11-00	76-41	8-41	0-26	8-68	0-27
8	Madras . . . . .	11-73	78-94	9-30	11-90	78-00	9-28	-0-02	9-21	-0-07	11-97	78-05	9-34	0-04	9-12	-0-22
9	Bombay and Baroda	13-80	78-51	10-90	13-14	76-83	9-96	-0-94	10-40	0-44	13-27	77-46	10-28	-0-62	10-84	0-56
10	Mysore . . . . .	..	..	..	13-13	..	..	..	10-25	..	..	..	..	..	..	..

TABLE IV.—Showing total increase or decrease in recovery of sugar for the seasons 1935-36 and 1936-37 over the season 1934-35.

Serial No.	Groups.	Sugar recovery per cent. cane for the season 1934-35.	SEASON 1935-36.		SEASON 1936-37.	
			Sugar recovery per cent. cane for the season 1935-36.	Total increase or decrease in recovery over 1934-35.	Sugar recovery per cent. cane for the season 1936-37.	Total increase or decrease in recovery over 1934-35.
1	Punjab . . . . .	5.99	7.80	1.81	8.63	2.64
2	West United Provinces . . . . .	7.06	8.84	1.78	9.43	2.37
3	Central United Provinces . . . . .	9.25	9.15	0.10	9.70	0.45
4	East United Provinces . . . . .	9.07	9.56	0.49	99.3	0.86
5	North Bihar . . . . .	8.62	9.18	0.56	9.16	0.54
6	South Bihar . . . . .	9.08	8.87	-0.16	9.44	0.41
7	Bengal . . . . .	8.15	8.18	0.03	8.68	0.53
8	Madras . . . . .	9.30	9.21	-0.09	9.12	-0.18
9	Bombay and Baroda . . . . .	10.90	10.40	-0.50	10.84	-0.06
10	Mysore . . . . .	..	10.25	..	..	..

TABLE V.—Showing the increase or decrease in recovery and the portions thereof due to quality of cane and to efficiency.

Serial No.	Groups.	1935-36.					1936-37.					AVERAGE PER CENT. INCREASE OR DECREASE.	
		Total increase or decrease in recovery over 1934-35.	Increase or decrease due at (A) to cane quality.	Increase or decrease at (A) due to efficiency.	Per cent. increase or decrease due to cane quality.	Per cent. increase or decrease due to efficiency.	Total increase or decrease in recovery over 1934-35.	Increase or decrease at (B) due to cane quality.	Increase or decrease at (B) due to efficiency.	Per cent. increase or decrease due to cane quality.	Per cent. increase or decrease due to efficiency.	Due to cane quality.	Due to efficiency.
		(A)				(B)							
1	Punjab . . . .	1.81	1.18	0.63	65.19	84.81	2.64	1.60	0.95	64.02	35.98	64.57	35.43
2	West United Provinces	1.78	1.60	0.18	89.89	10.11	2.37	2.11	0.26	89.08	10.97	89.42	10.58
3	Central United Provinces.	-0.10	-0.25	0.15	-250.00	150.00	0.45	0.32	0.13	71.11	28.89	20.00	80.00
4	East United Provinces	0.49	0.21	0.28	42.86	57.14	0.86	0.88	0.48	44.19	55.81	43.70	56.30
5	North Bihar . . .	0.56	-0.04	0.60	-7.14	107.14	0.54	-0.66	1.20	-122.22	222.22	-68.68	168.68
6	South Bihar . . .	-0.16	-0.37	0.21	-231.25	131.25	0.41	0.09	0.32	31.95	78.05	-112.00	212.00
7	Bengal . . . . .	0.03	0.07	-0.04	233.33	-133.33	0.53	0.23	0.27	49.05	50.95	58.93	41.07
8	Madras . . . . .	-0.09	-0.02	-0.07	-22.22	-77.78	-0.18	0.04	-0.22	22.22	-122.22	7.41	-107.41
9	Bombay and Baroda .	-0.50	-0.94	0.44	-183.00	83.00	-0.06	-0.62	0.56	-1,033.33	933.33	-178.75	78.75
10	Mysore . . . . .	..	..	..	..	..	..	..	..	..	..	..	..

## APPENDIX C.

*Manufacturing expenses of a 500-ton sugar factory crushing for 130 days, working for 22 hours per day, with 9.5 per cent. recovery of sugar.*

		As. P.	Rs. A. P.
<i>Manufacturing expenses—</i>			
Power and fuel . . . . .		1 0	
Stores (including other raw materials) . . . . .		2 8	
Repairs and renewals . . . . .		2 8	
(A) Salaries and wages—			
Technical staff . . . . .		4 6	
Non-technical staff . . . . .		3 4	
Labour . . . . .		4 1	
Packing (including cost of gunny bags) . . . . .		2 3	
Miscellaneous (water, lighting, etc.) . . . . .		2 1	
		<hr/>	1 6 7
<i>Overhead Charges—</i>			
Depreciation . . . . .		...	
Interest on working capital . . . . .		...	
(B) Management expenses . . . . .		1 9	
Directors' and Auditors' fees (including travelling allowance) . . . . .		0 5	
Insurance . . . . .		0 9	
Rents, rates and taxes . . . . .		0 5	
Miscellaneous . . . . .		0 7	
Sales expenses . . . . .		1 6	
		<hr/>	0 5 5
			<hr/>
	Total . . . . .		1 12 0
			<hr/>
		Cost per maund.	
	Rs.	As. P.	As. P.
(A) I. <i>Technical Staff—</i>			
(a) Permanent . . . . .	35,700	3 5	
(b) Seasonal . . . . .	11,760	1 1	
	<hr/>		4 6
47,460			
II. <i>Non-technical staff—</i>			
(a) Permanent office establishment . . . . .	15,108	1 5	
(b) Seasonal clerks . . . . .	5,862	0 7	
(c) Engineering Department . . . . .	7,980	0 9	
(d) Skilled labour . . . . .	6,630	0 7	
	<hr/>		3 4
35,580			
III. <i>Labour—</i>			
(a) 500 men at Rs. 12 per month each for 6 months (working season) . . . . .	36,000	3 5	

III. Labour—contd.	Rs.	Cost per maund.	As. P.	As. P.
(b) 100 men at Rs. 12 per month each for 6 months (seasonal labour—20 per cent. of the working season staff) . . . . .	7,200	0 8	4	1
	43,200		4	1
Total . . . . .	1,26,240		11	11

(B) Management expenses include commission of managing agents at the rate of 7½ per cent. plus head office expenses.

#### DETAILS OF 'A'.

##### Technical Staff—Permanent.

No. of staff.	Designation.	Scale.	Average per month.
		Rs.	Rs.
1	Manager . . . . .	750—900	825
1	Chief Chemist . . . . .	500—700	600
1	Chief Engineer . . . . .	500—700	600
1	Assistant Chief Engineer . . . . .	200—250	225
1	Assistant Chief Engineer . . . . .	200—250	225
3	Shift Engineers . . . . .	100—150	375
1	Cane Superintendent . . . . .	100—150	125
	Total salaries per month . . . . .		2,975
			or 35,700 per year.

##### Technical Staff—Seasonal.

		Rs.	Rs.
3	Shift Chemists . . . . .	100—150	375
1	Laboratory Chemist . . . . .	125—175	150
6	Laboratory Chemists . . . . .	70— 90	480
1	Head Panman . . . . .	200—300	250
3	Panmen . . . . .	80—100	270
6	Assistant Panmen . . . . .	50— 70	360
1	Assistant Cane Superintendent . . . . .	60— 90	75
	Total . . . . .		1,960
			or Rs. 11,760 for six months.

#### I. NON-TECHNICAL STAFF.

##### (a) Permanent Office Establishment.

No. of staff.	Designation.	Scale.	Average per month.
		Rs.	Rs.
1	Office Superintendent . . . . .	100—150	125
1	Accountant . . . . .	80—100	90
1	Cashier . . . . .	80—90	85
1	Stenographer . . . . .	80—90	85

## APPENDIX.

(a) *Permanent Office Establishment—contd.*

No. of staff.	Designation.	Scale.		Average per month.
			Rs.	Rs.
1	Record-keeper . . . . .	40—70		55
1	Despatch clerk . . . . .	40—60		50
1	Godown clerk . . . . .	50—70		60
1	Store-keeper . . . . .	50—60		55
1	Head Time-keeper . . . . .	50—70		60
6	Peons . . . . .	10—20		90
2	Head Watchmen . . . . .	15		30
1	Gardener . . . . .	20		20
5	Sweepers . . . . .	8—10		45
12	Chowkidars . . . . .	10—12		132
2	Assistant Gardeners . . . . .	10—12		22
1	Transport Superintendent . . . . .	80—100		90
3	Extra Clerks . . . . .	45—65		165
				1,259
				or Rs. 15,108 per annum.

(b) *Seasonal clerks.*

Serial No.	Designation.	Number re-quired.	Salary and Grade.	Cost during season (maximum).
			Rs.	Rs.
1.	Stores Clerks . . . . .	2	35—24—45	540
2.	Assistants to Cashier . . . . .	3	35—24—45	810
3.	Assistants to Time-keeper . . . . .	2	35—24—45	540
4.	Weighbridge Clerks . . . . .	8	20—24—30	1,440
5.	Cane Inspectors . . . . .	2	35—24—45	540
6.	Cane Clerks in office . . . . .	4	35—24—45	1,080
7.	Assistant Godown-keepers . . . . .	2	30—24—40	480
8.	Seasonal Chowkidars . . . . .	6	10—1—12	432
Total		29	...	5,862

(c) *Engineering Department—Permanent.*

Serial No.	Designation.	Number re-quired.	Salary.	Cost during the year.
			Rs.	Rs.
(a) <i>Engineering.</i>				
1.	Foreman (workshop) . . . . .	1	50	600
2.	Mechanics . . . . .	2	40	960
3.	Fitters, ordinary . . . . .	4	25	1,200
4.	Turner Fitters . . . . .	2	25	600
5.	Blacksmith . . . . .	1	20	240
6.	Moulder . . . . .	1	20	240
7.	Carpenters . . . . .	2	25	600
8.	Engine drivers . . . . .	3	30	1,080
9.	Foreman boilers . . . . .	3	25	900
10.	Electricians . . . . .	2	30	720

(c) *Engineering Department—Permanent—contd.*

Serial No.	Designation.	Number re-quired.	Cost Salary. during the year.	
			Rs.	Rs.
(b) <i>Manufacturing and General.</i>				
11.	Masons . . . . .	2	25	600
12.	Tailor . . . . .	1	20	240
	Total . . . . .	24	...	7,980

(d) *Skilled Labour.*

(a) <i>Engineering.</i>				
1.	Fitters . . . . .	9 (3×3)	25	1,350
2.	Engine drivers . . . . .	12 (4×3)	25	1,800
3.	Mates . . . . .	6 (2×3)	20	720
(b) <i>Manufacturing.</i>				
4.	Mates . . . . .	20	20	2,400
(c) <i>General.</i>				
5.	Mason's assistants . . . . .	2	15	180
6.	Carpenter's assistants . . . . .	2	15	180
	Total . . . . .	51	...	6,630

1. Lime used at 0·25 per cent. on cane rate, As. 13 per maund.
2. Sulphur at 0·075 per cent. on cane rate, Rs. 4·8 per maund.
3. Press Cloth 0·15 per cent. on cane rate, Re. 1 per maund.
4. Lubricating oil 0·12 gallons at Rs. 1·12 per maund.
5. Firewood at 1 per cent. on cane rate, Rs. 24 per maund.
6. Coal at 0·75 per cent. on cane rate, Rs. 14 per ton.
7. Filtergur at 0·005 per cent. on cane rate, Rs. 14·1 per maund.
8. Sumazine at 0·004 lb. per 100 cane, Rs. 7·8 per lb.
9. Blankit at 0·0018 per 100 maunds cane, Rs. 41 per maund.
10. Washing Soda at 0·015 per cane, Rs. 12 per maund.
11. E. C. at 0·04 gallon per 100 cane, Rs. 2 per gallon.
12. Packing including the cost of gunny bags at As. 2·3 per maund of sugar.
13. Press cloth repairs at 0·023 per 100 maunds cane.

## APPENDIX D.

*Alcohol production from molasses in different countries given in Hectolitres at 100° Gay-Lussac (2 hectolitre=220 gallons).*

Countries.	Years.	Quantity of Alcohol produced from molasses.
Austria . . . . .	1932	135,460
Belgium . . . . .	1932	89,300
Bulgaria . . . . .	...	9,730
Czechoslovakia . . . . .	1933	250,000
Denmark . . . . .	1932	18,942
England . . . . .	1932	500,000
Estonia . . . . .	1933	...
France . . . . .	1932-33	830,278
Germany . . . . .	1932	726,572
Hungary . . . . .	1929	140,000
Jugoslavia . . . . .	1931	118,000
Latvia . . . . .	1933	8,200
Luxemburg . . . . .	1932-33	1,542
Philippines . . . . .	1933	100,000
Poland . . . . .	1933	11,906
Rumania . . . . .	1933	90,700*
Sweden . . . . .	1933	91,500†
Switzerland . . . . .	1932	3,283
United States . . . . .	1933	1,822,000

\* For the whole of the production, molasses and materials.

† For the whole of the production, beet roots and molasses.

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