

REPORT ON THE DECCAN CANALS
FINANCIAL IMPROVEMENT COMMITTEE
- 1932

TABLE OF CONTENTS.

Paras.	INTRODUCTORY.	
1	Origin of Committee	1
2	Personnel	1
3-5	Evidence	1
CHAPTER I—THE FINANCIAL POSITION.		
6-10	Financial data and results	2
CHAPTER II—ECONOMIC FACTORS.		
11	Area and Revenue	6
12	Revenue due to cane	6
13	Lack of substitutes for cane	6
14	Canals depend on cane	7
CHAPTER III—POSSIBILITIES OF EXTENSION OF CANE.		
15	Products of cane	7
16	The gul market	8
17-18	Rival sources of gul supply	8
19	Cane area	8
20	Prices of gul	9
21	Effect of rainfall	9
22-23	Departmental Rules	9
24-26	The Block System	10
27	Bund Rules	12
28	Expansion of cane area for gul	13
CHAPTER IV—SUGAR.		
29	Scope for Indian made white sugar	14
30-33	Sugar prices	14
34-35	Factory supply of cane	15
36	Factory season	15
37-40	Cost of cane	15
41-42	Improved varieties	16
CHAPTER V—LAND FOR SUGAR FACTORIES.		
43-44	How land can be obtained	17
45	Acquisition	17
46	The Java System	18
47	Compulsory leases	18
48	Compulsion justifiable	19
49	Fixing the rent	19
50	Legislation required	19
51	Size of factories	20
52	Railway facilities	20
53	Financial aid	20

Paras.		Page
CHAPTER VI—WATERLOGGING AND DRAINAGE.		
54	Necessity for drainage	21
55-59	The Cess	21
CHAPTER VII—MISCELLANEOUS.		
60-65	Agricultural Policy	23
66	Irrigation Establishment	25
67	Accounts	25
68-69	Memorandum by the Sugar Technologist, Imperial Council of Agricultural Research	27
70-71	Conclusion	28
	Summary of Conclusions	29
	Note by Mr. C. H. Bristow	35
	Minute of Dissent by Rao Bahadur G. K. Chitale	37
	Minute of Dissent by Mr. N. E. Navle	46
	List of References	47
	Appendices	48
	Plates	72

REPORT ON THE DECCAN CANALS FINANCIAL IMPROVEMENT COMMITTEE, 1932

INTRODUCTORY.

ORIGIN AND PURPOSE OF THE COMMITTEE.

1. On 6th August 1931 a Resolution was moved in the Bombay Legislative Council requesting Government to appoint a Committee to consider and report as to how the financial aspect of the Irrigation Works in the Deccan can be improved. The resolution was accepted by Government and was carried into effect by the issue of Government Resolution, Public Works Department, No. L.C. 1924, dated 14th October 1931, appointing a Committee

“... to consider and report after taking evidence as to how the financial aspect of the Irrigation Works in the Deccan can be improved, having regard to the fact that the present return on the sum of Rs. 10 crores sunk in their construction is very meagre, and to suggest ways and means to improve the same.”

PERSONNEL.

2. In the same Resolution the composition of the Committee was announced as follows :—

Chairman.

Mr. B. S. Kamat, M.L.C.

Members.

Mr. C. H. Bristow, I.C.S., Special Officer attached to the Retrenchment Committee.

Mr. C. C. Inglis, B.A., B.A.I. (Dub.), M.Inst. C.E., I.S.E., Superintending Engineer, Irrigation Development and Research Circle.

Rao Bahadur G. K. Chitale, M.L.C.

Mr. Fenton Millar (General Manager, Belapur Company, Limited).

Mr. N. E. Navle, M.L.C.

Khan Bahadur Abdul Latif Haji Hazrat Khan, M.L.C.

Mr. J. S. Reid, B.Sc. (Eng.), I.S.E., Executive Engineer, Special Irrigation Division, was appointed to be Secretary to the Committee. The Secretaryship was taken over on 5th December 1931 by Mr. W. A. Evershed, B.Sc. (Lon.), Assoc.M.Inst.C.E., I.S.E., who assumed charge as Executive Engineer, Special Irrigation Division, on that date.

EVIDENCE.

3. The first business of the Committee, which commenced its sittings on 30th October 1931, was to draw up a questionnaire. A general questionnaire was issued to certain individual irrigators and to Irrigators' Associations, and a departmental questionnaire was sent to Government officials in the Deccan Irrigation Circle as soon as possible. Subsequently

a third questionnaire was drawn up and issued to representatives of financial, industrial, and commercial interests in Bombay whose views on certain aspects of the problems before us were required.

4. We have heard the evidence of the following Government officials, viz. the Superintending Engineer, Deccan Irrigation Circle, the Executive Engineers, Nira Left Bank Canal Division and Mutha Canals Division as well as selected Sub-divisional Officers. The Director of Agriculture and the Deputy Director of Agriculture, Southern Central Division, also gave evidence before us.

5. In addition to obtaining information from replies to our general questionnaire, we visited Baramati, Belapur, and Kopargaon, and recorded the evidence of the Irrigators' Associations on the Nira, Pravara, Godavari, Girna, and Kadva Canals. The representatives of these Associations were in all cases the President, the Secretary, or some prominent member, but evidence and discussion was not confined to them alone, and other irrigator members expressed their views. At Belapur, we took the evidence of experts, agricultural and technological, in the employ of the Belapur Company. Several gentlemen and firms who were invited by us to give evidence were unable to attend our meetings in Bombay, but the evidence of Sir Joseph Kay and Messrs. Ralli Brothers was very useful.

CHAPTER I.

THE FINANCIAL POSITION.

DATA.

6. The problem is, as already indicated in the terms of reference, how to improve the return on the outlay of the canals. It is convenient to indicate the state of affairs by Tables I and II (see next page). The figure of Rs. 10 crores of capital has been mentioned by Government while issuing instructions as to the formation of this Committee. This figure includes many small canals and minor tank works where in some cases no cane is grown at all. We understand that the subject of our enquiry is the Major Canals and not the Minor Irrigation Works. Accordingly, for the purpose of this report, a comparison of year to year data is the main consideration and that given in these two tables applies to the chief cane areas only, viz. the Nira Left Bank Canal, the Mutha Canals, the Pravara Canals, the Godavari Canals, the Krishna Canal and the Nira Right Bank Canal.

FINANCIAL RESULTS.

7. The Major Canals of the Deccan were constructed between 1875 and 1929 for the purpose of protecting the Eastern Deccan from famine. The total outlay and the return on capital in 1929 30 according to the Irrigation Administration Report are given below (see Table II also).

TABLE I.

Financial Data and Results for the chief cane producing canals compiled from Administration Reports.

Year.	Capital outlay to end of year.	Gross assessed revenue.	Working (Direct and Indirect) expenses.	Net assessed revenue.	Return on capital outlay.	Working expenses on capital outlay.
	Rs.	Rs.	Rs.	Rs.	Per cent.	Per cent.
1924-25 ..	7,29,05,330	22,62,545	11,14,463	11,48,082	1·57	1·57
1925-26 ..	7,63,99,869	25,55,070	11,99,030	13,56,040	1·78	1·57
1926-27 ..	7,91,30,333	20,08,379	11,77,456	17,30,923	2·19	1·49
1927-28 ..	8,08,22,242	28,18,137	11,49,512	16,68,625	2·06	1·42
1928-29 ..	8,24,37,939	25,37,290	13,95,794	11,41,496	1·39	1·69
1929-30 ..	8,41,96,945	24,91,781	13,76,574	11,15,207	1·33	1·63

TABLE II

Year.	Gross assessed Revenue.	Percentage return on capital outlay.	Total cane area for canals excluding overlap.	Total area of other crops irrigated by canal.	Total area of cane on tanks, wells, bandharas, etc.	Total cane area in the Presidency excluding Sind.	Average price per palla of gul (sales from Co-operative Society's shop).	Average price of Java White sugar at Calcutta.	Average annual rainfall on Nira Left, Godavari, Pravara areas.
1	2	3	4	5	6	7	8	9	10
	Rs.	Per cent.	Acres.	Acres.	Acres.	Acres.	Rs./Palla.	Per maund. Rs. a. p.	Inches.
1924-25 ..	22,62,545	1.58	25,123	1,56,597	33,251	58,374	24.4	14 1 7	19.34
1925-26 ..	25,55,070	1.78	26,436	1,92,415	38,463	64,899	33.4	10 13 9	14.50
1926-27 ..	29,08,379	2.19	28,207	1,50,859	37,131	65,338	25.8	11 13 11	14.31
1927-28 ..	23,18,137	2.06	29,488	1,21,198	34,510	63,998	21.9	10 6 0	24.63
1928-29 ..	25,37,290	1.39	23,357	1,20,326	37,411	60,768	21.0	9 12 6	22.51
1929-30 ..	24,91,781	1.33	19,806	1,41,765	43,209	63,015	25.8	9 0 2	19.27
1930-31 ..	.....	.....	20,032	1,21,816	.....	.....	24.1	8 8 3	.....
1931-32 ..	.....	.....	.....	.....	.....	.....	14.1	10 11 0	.....
							(9 months only.)	(approx. in Bombay at the moment.)	

Note.—Figures of rainfall, revenue, and percentage return have been compiled from the Administration Reports.

Acreage figures have been compiled from various official sources.

Gul prices are based on actual sales in Co-operative shops.

Sugar prices are taken from the Report of the Indian Tariff Board on the Sugar Industry except for 1931-32.

Year.	Canal.	Capital cost.	Net assessed revenue.	Return percentage.
		Rs.	Rs.	
1929-30	Krishna	9,49,807	52,526	5.53
	Nira Left	1,28,02,462	5,91,692	4.62
	Mutha	65,55,233	2,95,474	4.50
	Godavari	1,03,25,861	68,322	0.66
	Pravara	1,50,07,048	2,19,284	1.46
	Nira Right	3,85,56,534	— 1,12,091	— 0.29

For purposes of comparison we give similar data for 1926-27, being the year in which the best result was attained (Appendix I).

Year.	Canal.	Capital cost.	Net assessed revenue.	Return percentage.
		Rs.	Rs.	
1926-27	Krishna	9,49,807	27,111	2.85
	Nira Left	1,10,56,697	8,26,837	7.48
	Mutha	65,50,461	2,03,990	3.11
	Godavari	1,03,09,941	2,15,882	2.09
	Pravara	1,50,36,408	3,55,870	2.37
	Nira Right	3,52,27,019	1,01,233	0.29

8. As the works were designed for protective purposes it cannot be said that they should yield a certain minimum return or otherwise must be considered a failure. For protective works no fixed percentage of return can be laid down. Moreover there are indirect advantages in the saving of expenditure on measures to meet years of scarcity and in enhanced return of revenue.

9. The percentage of return is, however, important as showing the amount of the burden which has to be borne by the general taxpayer. Also the capital cost is such an enormous sum that in the present financial situation it is of the greatest importance that the biggest return possible should be obtained, and the object of our appointment is to make proposals to this end.

10. The most striking feature of the figures given above is the heavy load of debt due to the lack of development of the Nira Right Bank Canal, which has only recently been completed. While the six Major Canals together costing Rs. 8,41,96,945 pay as a whole a return of 1.33 per cent. the Nira Right Bank Canal costing Rs. 3,85,56,534 involves a loss of 0.29 per cent. We have throughout kept in mind the urgency of finding some remedy for this great annual loss.

CHAPTER II.

ECONOMIC FACTORS.

AREA AND REVENUE.

11. Appendices II and III show that the total area under cane in the last 5 years on the 6 Major Canals was as follows :—

						Acres.
1925-26	..	..	..	..	..	26,436
1926-27	..	..	..	..	..	28,207
1927-28	..	..	..	..	..	29,488
1928-29	..	..	..	..	..	23,357
1929-30	..	..	..	..	..	19,806
					Total ..	1,27,294
					Average per year ..	25,459 acres.

As nearly all this is grown in blocks and for every acre of cane there are three acres of block and the block water rate was Rs. 22 per acre, the revenue per annum from water rate received by Government on account of the block area can be computed to have been in the neighbourhood of Rs. $(25,459 \times 3 \times 22) = \text{Rs. } 16,80,294$.

The total gross revenue of the same canals for the same years was :—

Canal.	1925-26.	1926-27.	1927-28.	1928-29.	1929-30.
	Rs.	Rs.	Rs.	Rs.	Rs.
Nira Left	8,22,305	10,92,240	10,23,540	9,19,787	9,07,799
Mutha	3,49,942	3,66,586	3,90,094	3,72,084	4,29,970
Godavari	5,71,990	5,48,897	5,65,452	4,76,795	4,16,231
Pravara	6,36,823	6,59,104	6,49,366	5,76,997	5,27,075
Nira Right	88,979	1,90,764	1,25,254	1,28,422	1,39,465
Krishna	85,031	50,788	64,431	63,205	71,241
Total	25,55,070	29,08,379	28,18,137	25,37,290	24,91,781

Grand total .. Rs. 1,33,10,657

Average per year .. ,, 26,62,131

REVENUE DUE TO CANE.

12. In other words more than half the gross revenue is derived from cane blocks. The proportion is actually higher as the cane figures do not include the charges for overlapping cane, which would bring the cane block revenue up to about Rs. 18 lakhs.

LACK OF SUBSTITUTE FOR CANE.

✓13. Cane takes twice as much water as fruit trees and 6 to 12 times as much as most bhusar crops and it takes water all the year round. Of possible substitutes for cane, viz. fruit trees, cotton, groundnut, vegetables etc., fruit trees are a capitalist's crop. They pay no return for 3 to

5 years and they can only be grown on areas reserved for fruit trees or in areas with abnormally good drainage because they do not thrive where the sub-soil water comes within 8 feet of the surface. Vegetables require the close proximity of a railway or bus service running direct to a market. For all other crops the amount of water used is very small compared to that required for cane, so that even if there were a largely extended area of other crops they would not serve as a substitute for cane.

This can be most easily explained by an example :—

Suppose a canal is designed for 16,000 acres of cane and 48,000 acres of seasonal crops in the rabi season the canal capacity required would be

$$\frac{16,000}{40^*} + \frac{48,000}{80^*} = 400 + 600 = 1,000 \text{ cusecs.}$$

Now 1 acre of cane requires 8 acre-feet of stored water and 1 acre of seasonal crop requires 1 acre-foot of stored water.

The storage would therefore be $16,000 \times 8 + 48,000 \times 1 = 176,000$ acre-feet.

Now it is obvious that none of this storage could be used for cotton and groundnut, which require water in the monsoon season; consequently to use up the storage provided (176,000 acre-feet), 176,000 acres of rabi crops would have to be grown; but the canal, which has a capacity of only 1,000 cusecs could only irrigate $1,000 \times 80 = 80,000$ acres of rabi, so that to use the storage water provided for cane, the capacity of the canal would have to be doubled and there would have to be 176,000 acres per year of suitable land available and a demand for 176,000 acres of rabi crops.

Actually there is no demand for such an area of rabi crops even if the canal were doubled in size, and there are several technical difficulties which would make such a canal undesirable. These need not be dealt with here.

CANALS DEPEND ON CANE.

14. Past experience shows that the development of canals has followed and has not preceded sugarcane, so that we are forced to the conclusion that the financial position of the canals depends mainly on the area of cane which is grown profitably under them. It is of course necessary that the cane be grown profitably as otherwise it cannot continue for more than a year or two.

CHAPTER III.

POSSIBILITIES OF EXTENSION OF CANE.

PRODUCTS OF CANE.

15. The extension of cane depends upon the possibility of extending the market for its products either by increasing their consumption or by capturing part of the market supplied from rival sources. There are

(*40 acres of cane and 80 acres of seasonal crops can be irrigated per cusec of canal capacity.)

only two main products of cane namely gul and white sugar. The former is the only one for which cane is grown by cultivators in the Deccan at present. The only sugar factory is at Belapur (Ahmednagar District) and there the Company grows its own cane. So at present the area under cane grown by cultivators depends entirely on the gul market.

THE GUL MARKET.

16. Gul is eaten by all the cultivating classes in the villages and by the bulk of the middle classes and labouring classes in towns. It is consumed chiefly at festivals, but is also cooked with vegetables. It is never used in tea. The great increase in tea drinking has very largely increased the consumption of white sugar but not at the expense of gul. On the other hand, we are told that certain kinds of cakes used on festival occasions and made with gul are to some extent being replaced by confectionery made with sugar which lasts better. Gul eating is largely a matter of custom and this factor appears also in the preferences for certain types of gul shown by certain persons. Deccan gul is of a superior quality and some people will eat no other. It will be seen from this that the consumption of gul is steady but not likely to increase unless there is a great increase in general prosperity. There are also some signs of gul being given up for sugar for certain purposes.

RIVAL SOURCES OF GUL SUPPLY.

17. Gul grown on the canals has to compete directly with gul grown under wells in the Deccan and Southern Maratta Country. It also is in indirect competition with the rather inferior quality of gul grown in other provinces. Deccan gul is exported to Hyderabad, Khandesh and Gujarat. But cheap United Provinces gul is also imported into Gujarat and gul from Kolhapur, Mysore, and Madras comes into Bombay. It should also be mentioned that new large irrigation projects in Madras, Hyderabad, and Mysore are now being developed. The gul market in the Deccan is therefore sensitive to any increase in the supply from these sources, and the canal irrigator must keep pace with any reduction of the cost of production in other provinces if he is to hold his own.

18. We have ascertained that in the Mysore State the area under sugarcane now varies between 30,000 and 40,000 acres, mainly under existing tanks. When the irrigation under the Krishnaraja Sagara across the Cauvery river fully develops it is anticipated that an additional 40,000 acres would come under sugarcane cultivation. Similarly, we find from official figures that in the Hyderabad State (Deccan) 20,000 acres of cane can be cultivated under the Nizamsagar Canal.

CANE AREA.

19. From Appendix II and Plate I it will be seen that the total area of cane grown in the Presidency excluding Sind has been in the neighbourhood of 60,000 acres during the 8 years from 1922-23 to 1929-30. The greatest area is 68,000 and the smallest 58,000. The

area under tanks, wells, and bandharas has varied from 33,000 to 43,000 acres, while that under canals rose from 21,000 in 1922-23 to 29,000 in 1927-28 and since then has fallen abruptly to 19,800 in 1929-30. While 1929-30 had the lowest area under canals it had the largest area under tanks and wells. An examination of the rainfall figures (Appendix II and Plate II) shows that the variation in the area of cane under wells and tanks varies directly in accordance with the rainfall of the previous monsoon. The canal figures show no such variations (Plate III). They rise to a peak in 1927-28 and then fall steeply. From 1913 onwards the Godavari Canal areas were being developed and from 1923 a large new supply of water was rendered available on the Pravara from Bhandardara. It is evident that the area under cane under canals went on increasing with the greater supply of water available until 1927-28 after which it received a check.

GUL PRICES.

20. In Appendix V the prices of gul are given. From 1920-22 the price was Rs. 41 per palla of 240 lbs. It then fell to 27 and 24 and rose to 33 in 1925 after which it fell rapidly to 25 in 1926 and 21 in 1927. When it is realised that a fall of Rs. 4 per palla means a loss of Rs. 132 or more per acre and that the price in 1927 was half of that in 1922-23 equivalent to a reduction in the value of the gross outturn by Rs. 660 per acre (33 pallas at Rs. 20), the enormous effect of this fall on the prospects of the canegrower will be evident. The price would not have fallen had the demand remained strong. A fall in price is proof of a slackening demand and the continuous fall shows that the market is fully supplied if not glutted.

EFFECT OF RAINFALL.

21. We would draw attention to a further point. While the area under canals was rapidly falling away the ample rains of 1927-28 and 1928-29 allowed an increase in the area under tanks and wells from 34,000 to 37,000 and 43,000 in 1929-30 (Appendix II and Plate III), so that the decrease of 10,000 acres of cane on canals between 1927-28 and 1929-30 was almost made up by an increase of 9,000 acres under tanks and wells. We can only account for this on the supposition that the price which proved deterrent to the canal irrigator was not deterrent to the irrigator from a well. In other words, cane can be produced more cheaply under wells than under canals presumably owing to the better economic balance of the holding managed by the owner himself with his own bullocks. We mention this as showing how the position of the canal irrigator was threatened when the price of gul fell to Rs. 21. At the present rate of Rs. 15 it is still more precarious.

DEPARTMENTAL RULES.

22. It has been stated in evidence before us, both by some officers of the Irrigation Department and by tenant farmers and big cultivators who appeared as representatives of the Irrigators' Associations, that the

contraction in cane area is partly due to the prejudicial effect of the Departmental Rules and the general rigidity with which (1) the Block System and (2) the Bund Rules for water distribution are enforced. It is alleged that these rules are too complicated for the illiterate cultivators to follow and for want of elasticity lead to harassment on the part of the subordinates of the Department. It is urged that their simplification and some relaxation in administering them is necessary if expansion of cane area is to be expected in these days of slump. We understand that the question of simplification of rules is being already dealt with by Government and we urge that this be carried out as far as possible.

23. We do not think an examination of the rules for water distribution comes within the purview of our enquiry, nor are we in a position to suggest any modification of the rules in the absence of such examination. We are informed that a Conference of Departmental Officers is examining this question. We have not had the benefit of being furnished with any information as to the conclusions of the Conference in regard to the alleged hardships caused by the rules. We can only state that during our inspection of the canal areas and in the course of evidence taken at Baramati and Kopargaon we heard strong complaints against some of these rules and the manner in which they are enforced, and observed a general feeling of discontent. We however did not go into evidence as the subject was outside the scope of our enquiry. Our main concern is to judge from the financial point of view whether the rules, directly or indirectly, lead to contraction in cane plantation, and secondly if any relaxation thereof would lead to a material expansion of cane area and therefore of the irrigation revenue.

THE BLOCK SYSTEM.

24. The main objects of the block system, it may be briefly stated, are to secure (i) standardisation of the control and distribution of water, (ii) rotation of crops for maintaining the fertility of the soil, (iii) concentration of cane in suitable areas and (iv) selection of suitable soils, the system as a whole aiming at orderly and economical irrigation which will benefit the cultivators and Government, and will restrict damage. Land under cane, especially in deep soils, is likely to lose its fertility if it is irrigated continuously. The rules therefore lay down that only $\frac{1}{3}$ rd of the allotted area, that is one acre in three shall be planted with cane each year and the cultivator can plant the other two parts with bhusar crops. If an irrigator chooses to leave $\frac{2}{3}$ rds of his block area fallow he can do so, but he must under the rules pay for the canal water whether he takes the water or not, or even if he grows the bhusar crops on the monsoon rains. The basic idea of the block system is borrowed from the "Phad" system which has been in vogue in the Nasik District from ancient days, and its application to the Deccan Canals dates back from 1905 when Sir M. Vishveshvaraya was in charge of and introduced it on the Nira Left Bank Canal. The area allotted for a block may be in more than one plot—provided such plots are on the same outlet; $\frac{1}{3}$ rd of the area of these plots which form a block is intended for

cane and $\frac{2}{3}$ rds for bhusar crops and the allotment is for a period of six years. The irrigators feel it a hardship that they have to pay for the water for the bhusar crops (Rs. 15 per acre of cane grown) each of the six years even when rains are plentiful. On the other hand, it is contended by the Irrigation Department that the arrangement is an insurance to the cultivator against failure of the monsoon at a comparatively small cost, and but for such a six-yearly arrangement it would be difficult to guarantee water on a sudden general demand in the midst of a season. It is also an encouragement to grow bhusar crops which experience showed before the introduction of blocks in 1905 were being neglected in favour of cane only. It is urged that the intelligent cultivators know the value of rotation. This may be the case but the bulk of them are not likely of their own accord to keep their lands free from heavy irrigation in a definite proportion in the absence of the block system. We are inclined therefore to hold that the abolition of the block system would tend to be detrimental to the lands suitable for cane and ultimately to the irrigation revenue.

25. It has been suggested that if the block system cannot be abolished, at all events there should be no compulsion to pay for canal water for the bhusar crops when the irrigator chooses to take his chance with the monsoon rains. We understand that the rates for water for bhusar crops have been recently revised. It is not for us to suggest how far Government can go further in this respect consistently with the state of their finances. We can only point out that a remission of the water rate on the area not covered by cane in a block would amount to Rs. 15 for every acre of cane grown on the basis of the existing block rate of Rs. 20 per acre. It is suggested by witnesses, both official and non-official, that such a remission would go a long way towards inducing irrigators to go in for more cane. Indeed some witnesses have even suggested as an encouragement for the expansion of the cane area a reduction of Rs. 15 per acre in the present water rate of Rs. 45 on the analogy of reduction of railway fares to attract greater traffic. We have considered these suggestions from the point of view as to whether or not any lowering of the rates would result in permanent expansion of the cane area and an improvement of the revenue. If it is intended to be a relief to the irrigators in their present distress, it is a matter outside the scope of our enquiry. We have stated in Chapter II that the average gross revenue for the years 1925-30 from the Major Canals was Rs. 26.62 lakhs a year, of which the average revenue from cane block was Rs. 16.80 lakhs per annum, the average acreage of cane alone being 25,459. Now the rate per acre of block was $(Rs. \frac{45+15+6}{3})^* = Rs. 22$. If there had been a remission of Rs. 21 on the bhusar crops for say 3 in every 6 years, the irrigators' idea being that they should only pay for water to such crops in blocks when they actually required it, the remission would have been the equivalent of about Rs. 10 per acre

* These rates are (i) Rs. 45 for cane, (ii) Rs. 15 for two seasonal crops and (iii) Rs. 6 for the monsoon crops. (ii) and (iii) are the mean of the rates for heavy and light crops.

per annum for the bhushar and would have reduced the block rate to an average of Rs. 18 per acre. The resultant loss in the revenue of Rs. 16.80 lakhs would have been $25,459 \text{ acres} \times 3 \times (22 - 18) = \text{Rs. } 3,05,508$. To make good this deficit would have required an additional area of 6,789 acres of cane only at the water rate of Rs. 45 per acre, or of 16,973 acres of block at the rate of Rs. 18 per acre. The other suggestion to reduce the water rate for cane from Rs. 45 to Rs. 30 would have brought the block rate down to Rs. 17 per acre. The loss in revenue (based on Rs. 16.80 lakhs) would have been $25,459 \text{ acres} \times 3 \times (22 - 17) = \text{Rs. } 3,81,885$, to make good which an additional 12,730 acres of cane only at the water rate of Rs. 30 would have been required, or 22,464 acres of block at Rs. 17 per acre. We do not think that an expansion to the extent of an additional 12,730 acres of cane is possible merely by lowering the water rate to Rs. 30.

26. If the revenue is to be improved to obtain a return of, say, 4 per cent. on the capital outlay, the expansion of cane, it is obvious, will have to be far more than what we have indicated above. Now so far as cheapening the cost of production is concerned a remission of Rs. 15 per acre in the water rate is only a fraction of a rupee per palla of gul in the irrigators' cost towards counteracting the present low prices of gul. This small difference of annas 8 per palla cannot turn the loss into a profit where the fall in prices has been from Rs. 25 to Rs. 15 since 1925. It will thus be seen that supporters of the idea of lowering the rates, directly or indirectly, as a measure for improving the situation are only basing their case on a pious hope. We are convinced that whatever the merits or the faults of the block system may be, we cannot expect to secure the necessary extension of cane area simply by the lowering of the water rate as long as the present unfavourable economic factors in the gul market prevail. If lowering of the water rates for bhushar or cane is justifiable on other grounds, it is a different matter outside our enquiry.

BUND RULES.

27. Coming to the question of the Bund Rules of the Irrigation Department, which form the second main complaint of the irrigators, it may be explained that these rules are intended (i) to prevent excess water wasting on to and damaging adjoining lands, and (ii) to improve control of the water; other advantages are facilities for inspection and terracing along the bund lines. The rules lay down that land prepared for cane plantation must be divided into units of 20 gunthas ($\frac{1}{2}$ acre = 10 gunthas), and these must be surrounded by earthen bunds of prescribed dimensions. On behalf of the irrigators it is stated that the extra labour involved in making these bunds increases costs of production, planting of cane along the water channel is prohibited and that the system leads to harassment from the subordinates of the department who withhold giving water thereby causing loss to the proprietor if he does not conform to the dimensions of the bunds even by

a fraction. It is admitted that bunds are necessary for irrigation and we have seen that the Belapur Company voluntarily take up more space with bunds than are required by the Irrigation Department's rules (Appendix VI and Plate IV), although we recognise that they stand in a different category with the ordinary cultivator.

We are not concerned with the merits of the system, although we shall welcome any removal by Government of any legitimate grievances in the matter of the irrigators' alleged hardships. In fact since we finished our deliberations we understand that steps have been taken or are now under consideration to modify some of the rules, with reference to advance payment for demarcation, plantation in *pot pats*, and irrigation of areas less than one unit. We have been told that the cumulative effect of the rules is general discontent and it results in restriction of the cane area. We are not inclined to share this view. In our opinion, the dominating factor is the price of gul. In 1925-26 and 1926-27 prices ruled better, and the cane area was 28,207 in 1926-27 and 29,488 in 1927-28 (Table II *ante*), although the Bund Rules were in force. As in the case of the Block System so also in this, we have no firm grounds to believe that the abolition or modification of the rules *per se* would prove such a great incentive to cane expansion as to give us the needed improvement in the revenue.

EXPANSION OF CANE AREA FOR GUL.

28. We believe we have so far made it clear that the prospect of any large expansion of cane (Plate I) grown for the manufacturing of gul is remote, and any such expansion is improbable unless the cost of production can be reduced relatively more than it has been reduced in other Provinces. Low prices and the stress of hard times have compelled the cultivators to modify their extravagant use of manure which was common during the boom until recent years. The price of manures has fallen and wages are falling. The present cost of production is considerably lower than that of a few years ago, but the price of gul last season was down to Rs. 14 a palla in Poona. The only chance of considerable reduction now lies in the introduction of improved varieties of cane. It is by this means that the output in Northern India has been so greatly increased and we find that "Pundia" which is a cultivators' cane has been discarded at Belapur and has disappeared from the estate. Even in this direction there is less room for improvement in the Deccan because Pundia is already a far better cane than the thin canes previously used in Northern India, and the position is that Northern India is catching up the Deccan rather than that it has got ahead from a level start. The fact remains that the cost of cane in Northern India is 4 to 5 annas per maund or Rs. 6-13-0 to Rs. 8-8-0 per ton (Tariff Board's Report on Indian Sugar Industry, page 59, para. 48). Costs of cane per ton grown on the Deccan Canals are discussed later in this report.

CHAPTER IV.

SUGAR.

SCOPE FOR INDIAN WHITE SUGAR.

29. We trust we have shown that the canals cannot depend on the area of cane grown for gul, as this is not an expanding market. The only other market for cane depends on the manufacture of white sugar and we are of the opinion that it is in this direction that we must look for methods of improving the irrigation revenue. The annual import of white sugar into India is approximately one million tons and the quantity manufactured in India was for the season 1930-31 120,000 tons. Clearly there is a vast market for Indian made sugar if it can take the place of that imported (Appendix VII).

SUGAR PRICES.

30. About 75 per cent. of the imported sugar comes from Java and it is with this article—plantation white sugar—that Indian made factory sugar has to compete. The Tariff Board Report shows (pages 76 and 77) that Java can without loss land sugar in India at Rs. 4 per maund or Rs. 5-7-0 per cwt. At present when there is a temporary surcharge on all import duties this is equivalent to Rs. 14-8-0 per cwt. duty paid. The present market quotation is Rs. 15-11-0 in Bombay inclusive of Town Duty or about Rs. 15 net per cwt. for sugar exported from Bombay to other parts of India.

31. It has to be noted, however, that the Tariff Board has recommended a duty of Rs. 7-4-0 per cwt. for sugar of the grade of Java White, and this is the duty which—excluding the surcharge—is at present in force for revenue purposes. The Government of India have introduced legislation to declare the sugar industry protected for fifteen years, the duty on imported sugar to be Rs. 7-4-0 per cwt. for the first seven years and thereafter to be reconsidered at the end of that time. After the removal of the temporary enhancement the duty paid price of Java sugar in India would be Rs. 12-11-0 per cwt. at port, and it is therefore this price which we must consider.

32. On the figures given to us by our colleague Mr. Fenton Millar a well equipped factory of 350 to 400 tons daily capacity controlling its own estate and growing all its own cane could produce sugar at Rs. 7-8-0 per maund or Rs. 10-3-3 per cwt., so that on the basis of an import duty of Rs. 7-4-0 per cwt. such a factory could withstand foreign competition. There is, therefore, *prima facie* a strong case for the success of sugar factories in the Deccan.

33. We have to emphasise the fact that Mr. Fenton Millar's figures of cost of production are based on the following conditions:—

- (i) A factory of not less than 350 tons daily crushing capacity.
- (ii) Complete control of its cane supplies, that is, having its own plantation and growing its own cane under modern methods of cultivation.
- (iii) A manufacturing season extending to 180 working days.

Such a plantation could, it is stated, land cane at the factory at a cost, inclusive of charges for depreciation of agricultural machinery and overhead, of 8 annas per maund.

FACTORY SUPPLY OF CANE.

34. We are also informed by witnesses in Bombay representing financial interests and by the Belapur authorities that a requisite condition for the success of a sugar factory is the control of an adequate supply of cane for a sufficiently long period; this condition can be fulfilled only if the factory grows its own cane, and it can only do this if it controls a sufficient area of land, and does so for a long period and can secure the land at a reasonable price. It is necessary therefore to compare a factory so situated with one which had to depend upon outside supplies, i.e. cane purchased from cultivators.

35. It is obvious that a factory cannot succeed unless it is kept fully supplied with its raw material, cane. The position of a factory entirely dependent on the willingness of cultivators to sell cane would clearly be hopeless, since the cultivators have an alternative market (if not a very profitable one) in gul, while the factory cannot exist without cane. Consequently, even if the requisite supply were forthcoming, the cultivators would be in a position to demand the maximum price for cane and the whole of the factory's profits would be absorbed therein.

FACTORY SEASON.

36. It is further economical that the factory should be kept working for as long a season as possible, since the longer the season the smaller the overhead charges. One of the advantages of a factory in the Deccan as compared with Northern India is that a longer ripening season is possible and this means a longer crushing season. A season of 180 working days may be attained in the Deccan while 120/130 days is the normal in the North of India. To make it possible to obtain this advantage a special system of planting is required so as to control the ripening period and so ensure a continuous supply of mature cane throughout the manufacturing season. It would be difficult, if not impossible, to secure this result unless the factory planted its own cane.

COST OF CANE.

37. Apart from this there is the question of the cost at which cultivators can grow cane as opposed to the cost of cane grown by a factory (Appendix VIII). We were informed by the irrigators at Baramati that they would sell at Rs. 17 per ton, but that the price would depend on the price of gul. Rs. 17 per ton of cane is equivalent to 10 annas per maund and this confirms the estimate submitted by the Agricultural Department to the Tariff Board of annas 10/4 per maund. To this must be added the cost of cartage to the factory which would be a greater distance than that to the gul furnace which is allowed for in the

estimate. Nine pies should be added on this account. The cost of cultivators' cane at the factory would therefore be annas 10/9 to 11 per maund.

38. The statement of cost of growing cane supplied by the Belapur Company shows Rs. 387 per acre for an average yield of 38 tons or Rs. 10·2 per ton (Appendix VIII). This is exclusive of overhead charges and any allowance for depreciation of agricultural machinery. Adding these the cost of cane landed at the mill is Rs. 13·6 per ton (8 annas per maund).

39. The Agricultural Department now gives Rs. 425 per acre as the average cost of cane grown by cultivators and states that this could be reduced by improved methods of cultivation to Rs. 375 (Appendix IX). Both these figures are exclusive of cultivators' profit which may be taken at about Rs. 60 if they are to get a return which will induce them to go on growing cane.

The Agricultural Department's figures are for an outturn of 36 pallas of gul, or 33 tons of cane. Reduced to cost per ton of cane the figures on the basis of Rs. 425 per acre are :—

	Rs.
Cost per ton	12·88
Cultivators' profit	1·82
Cartage to factory	1·28
	<hr/>
Total cost per ton landed at factory ..	15·98

Even assuming the cost could be reduced by improved methods to Rs. 375, the total cost per ton landed at the factory would be Rs. 14·46.

40. It is clear from the above that the cost of production of cultivators' cane even if they adopt improved methods is going to be considerably higher than that of cane grown by the factory itself. It is thus advantageous for factories to grow their own cane.

IMPROVED VARIETIES.

41. We have also to take into account the quality of the cane which is grown by the cultivator—Pundia—and that of factory-grown cane. The recovery of sugar per 100 cane for Pundia is about 10 while that from the improved varieties grown at Belapur is 11. This means that to produce 1 maund of sugar a factory purchasing Pundia will have to buy $\frac{100}{9}$ maunds at 11 annas per maund = Rs. 6·88 (the price at which the cultivators said they would sell the cane), whereas if it grows improved varieties by modern methods it will require $\frac{100}{11}$ maunds at annas 8 = Rs. 4·50. It is obvious that this difference of Rs. 2·38 per maund of sugar in the cost of raw cane is sufficient to make sugar production on the former system unprofitable. Taking Rs. 3·0 as the total cost of manufacture of a maund of sugar, it would raise the cost from Rs. 7·50

to Rs. 9·88 per maund or from Rs. 10·21 to Rs. 13·40 per cwt. It is true that cultivators may adopt the newer kinds of cane and also improved methods of cultivation, but there will always be their profit to pay and they will naturally wish to make this as high as possible. Moreover improvement, if we depend on the cultivators, would take a very long time to become general and would be possible only after extensive propaganda.

42. It was represented to us that capital for sugar factories will not be available unless the tenure of the land for cane is assured for a long period. It is, indeed, obvious that no one would risk Rs. 10 to 30 lakhs in establishing factories if after 10 years or so the factories were to be left with no area of cane which they could control and so be ruined. Sir Joseph Kay, Chairman of the Board of Directors, the Belapur Company, gave 30 years with the option of two renewals as the necessary period of a lease. We agree that the period should be not less than 30 years with the option of at least one renewal.

CHAPTER V.

LAND FOR SUGAR FACTORIES.

HOW LAND CAN BE OBTAINED.

43. The next question is as to the means of obtaining land for factories. The Belapur authorities consider that 6,000 acres is a minimum. We are informed that there are, however, small factories in Northern India dealing with 60 tons a day and to supply these for a season of 120 days an area of cane of 200 acres or 600 acres of land in all would be necessary. It is just possible that by agreement a few holders of large adjoining pieces of land might be able to provide the smaller area, but even then, the holders of the rest of the land on that outlet would have to be included if any combination is to be made. On the other hand it is certainly not possible that 6,000 acres could be obtained voluntarily, and the available area of Government land is too small. We are thus driven to the conclusion that if land is to be obtained for factories some form of compulsion will be inevitable. Moreover the period of ripening of cane must be so arranged as to give the longest possible crushing season.

44. There are three possible methods :—

- (1) Acquisition of land.
- (2) The Java System.
- (3) Compulsory leasing for long periods.

ACQUISITION.

45. Acquisition was used in the case of the Belapur Company. It involves the raising of a very large sum in capital to pay for the land and this means a heavy load on the factory in capital outlay. Acquisition is unpopular with land owners who thus lose all connection with the

land. We do not recommend this method except for land to be occupied for non-agricultural purposes such as the factory buildings.

THE JAVA SYSTEM.

46. Under the Java System land is leased to the factories for long periods but the owner has the use of it for $1\frac{1}{2}$ years in every three years. It is an old established method in Java and it appears that no one refuses to lease his land. There is no such custom in the Bombay Presidency, and the evidence given shows that land would be required anyhow for nearly 2 years out of 3, allowing for preparation, planting of sann for manure, harvesting beyond the 12 months' period of growth, and so on. Also Adsali cane takes 18 months. This leaves about one year for the owner to use the land between two crops of cane, but the Belapur witnesses say that, rather than the Java System, they would prefer to have the land at their disposal all the time. There can be no doubt that there would be difficulties in getting the owner to give up possession punctually if he were allowed in for a year. It would of course be open to a sugar company to lease part of their lands back to the owners when not required for cane by mutual agreement. It would also be necessary under the Java System to preserve the survey boundaries, thus limiting the possibilities of ploughing by machinery as opposed to bullocks.

COMPULSORY LEASES.

47. Leases for 10 years are very common in canal areas, particularly of land for cane. On undeveloped canals like the Nira Right Bank Canal a system of long leases is the only method by which a rapid extension of the cane area can be brought about, and they are definitely profitable to the owner who as a rule has not the capital or skill to start irrigation himself. For the purpose of factories only two modifications of the ordinary lease are necessary, (1) that the period should be extended, and failing a voluntary agreement (2) that the lease should be compulsory. There is *prima facie* no reason to suppose that this compulsory leasing would be very unpopular at all events in the undeveloped areas provided a fair rent was paid. The owner does not lose his ownership and in many cases he secures a bigger income than he, as a man unskilled in irrigation, could get from the land, and left to himself he would possibly lease the land to an irrigator if he could find one to take it. This is what happened on the Godavari and Pravara Canals. In the case of factories, however, the factories cannot run away as the tenants did when the market fell. In the long run too, it will be beneficial to the countryside by introducing capital, providing work, and giving a practical demonstration of cane growing which is the only way in which the growing of irrigated crops can be extended. We hold that leases should be on a voluntary basis as far as possible, but where this is not possible we do not see any other way but compulsion of getting the requisite land; without land the sugar industry cannot succeed.

COMPULSION JUSTIFIABLE.

48. The compulsory principle is justifiable on the following grounds :—

(1) In the general interests of the community in establishing so important an industry and for the development of the tract.

(2) The depressed condition of cane cultivation owing to the lack of a wide market for its products.

(3) The impossibility of providing a market by the encouragement of sugar factories if only voluntary methods are used.

FIXING THE RENT.

49. The method of fixing the rent remains to be considered. The simplest way would be a Board of three with the occupant (or his representative), a representative of the factory, and a revenue officer as Chairman to be nominated by the Collector. The Chairman of our Committee however considers that the Chairman of this Board should be any person nominated by Government for this purpose. An officer of the Special Irrigation Department should also be present (without any right to vote) to advise on the quality and suitability of the land for irrigation. The rent should be that which the Board may consider to be fair and reasonable.

LEGISLATION REQUIRED.

50. The legislative provisions necessary would be briefly on the following lines :—

(1) No factory shall be established without the previous sanction of Government. This appears to be necessary because the allocation of the available water supply for a long period and the best possible development of the area will have to be decided by Government. Government must also protect the interests of existing canegrowers on the older canals. Any factory sanctioned shall be notified in the *Bombay Government Gazette*.

(2) The Local Government may declare a particular area to be a "Sugar Factory Area."

(3) In any sugar factory areas, the Local Government may order that such land as it thinks fit shall be leased to a sugar factory and it may specify the date by which the lease shall be executed, and the period of the lease.

(4) If the occupant and the factory are unable to agree upon the amount of rent, either party may apply to Government for the appointment of a Board.

(5) The Board shall consist of the occupant (or his representative), a representative of the Company, and the revenue officer nominated as Chairman of the Board.

(6) This Board shall fix such rent as they consider reasonable.

(7) There shall be only one appeal from the Board's decision. The majority think the appeal should be to the Collector. The minority consider the appeal should be to the District Court.

(8) No Civil Court shall have jurisdiction to entertain any suit on the amount of rent or the period of the lease.

SIZE OF FACTORIES.

51. As regards the size of the factories we have been supplied with comparative figures (estimated) between large and small factories by Mr. R. C. Srivastava, Sugar Technologist, Imperial Council of Agricultural Research, and by Mr. Fenton Millar (Appendices X, XI and Plate V). These figures agree in showing that both the return on capital cost and the efficiency (and consequently the cheapness of production) increase with the size of the factory. We think that it is for those who are going to open factories to decide the size for themselves.] In this connection we suggest that in order to lessen the load of unproductive expenditure on the canals the first necessity is to increase the return on the Nira Right Bank, the largest and newest canal. As stated elsewhere the capital cost was Rs. 3·86 crores and the return is a minus quantity equivalent to -0·29 per cent. On all the older canals there is some return, but here there is a dead loss. This canal should therefore be the first point of attack. Also, being undeveloped, the establishment of factories will clash exceedingly little with any existing cane cultivation and will introduce capital and technical skill into a neighbourhood where both are most needed. Our primary specific proposal therefore is the establishment of several factories in the Nira Right Bank Canal area.

RAILWAY FACILITIES.

52. We must here refer to the necessity of a railway if the area under the Nira Right Bank Canal is to be developed. We understand that there is a project for a branch of the Barsi Light Railway from Pandharpur to Lonand which would traverse this area, but that the project is held up for lack of funds. As a railway is essential for development we recommend that if the Barsi Light Railway cannot undertake the project, steps should be taken to allow an extension of the existing railway from Dhond to Baramati through Bauda and Akluj to connect if convenient with the Barsi Light Railway at Pandharpur.

FINANCIAL AID.

53. A majority of us think that Government should not advance loans, take shares, guarantee interest, or take any part in the management of these factories.* We are convinced that if facilities for the provision of land for an adequate period, the provision of an assured supply of a prescribed quantity of water, and freedom of internal distribution be given, the necessary capital under the present tariff conditions will be forthcoming from the public.

* The Chairman, Khan Bahadur Abdul Latif Haji Hazrat Khan, and Rao Bahadur G. K. Chitale differ on this point and think that Government help may be given in very exceptional cases.

CHAPTER VI.

WATERLOGGING AND DRAINAGE.

NECESSITY FOR DRAINAGE.

54. We have been impressed while visiting the canal tracts with the large areas of land spoiled by waterlogging and salt efflorescence and the possibilities of reclaiming it by drainage as has been done at the Baramati Experimental Salt Area. The following figures of the area damaged by waterlogging have been supplied to us by the Superintending Engineer, Irrigation Development and Research Circle (Appendix XII).

Fully damaged areas on the Canals.

Canal.	Cultivated commanded area in the perennial section.	Damaged areas.				
		1918	1920	1924	1925	1928
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Nira Left Bank Canal	81,051	8,249	..	..	{ 9,081 11·2%	{ 9,407 12%
Godavari	100,000	..	{ 10,497 10%	..	{ 13,439 13·3%	{ 17,000 17%
Pravara	95,933	..	..	{ 1,954 2%	{ 5,821 6%	{ 13,407 14%

These figures are for land which has gone out of cultivation. An equal or larger area has been partially damaged and the damage is increasing both in intensity and area. It is obvious then that the problem is a serious one, and the loss of revenue on the 40,000 acres odd already out of cultivation is of grave importance. We have seen such areas completely restored to fertility by drainage and we think that as far as possible all damaged areas should be drained. This is particularly necessary as it frequently happens that land situated on a ridge and intensively irrigated escapes damage while the adjoining low-lying areas, not necessarily irrigated, become waterlogged.

THE CESS.

55. It has been admitted in evidence before us both by official and non-official witnesses, that drainage is highly essential for remedying the damage from waterlogging and salt efflorescence. At present only about Rs. 60,000 are being spent annually by Government on drainage; although the need is great, there is no prospect of an increase of such works in the present financial stringency. Nor should the general taxpayer be asked to spend more money to undo the damage caused by those whose lands have benefited by the opening of the canals. That the areas under command of the canals have benefited very greatly from the construction of the canals built at the cost of the general taxpayer, is

proved by the high rent obtained, particularly for land under perennial irrigation, as compared with unirrigated land. The canals were built to protect the areas subject to famine, but they have done more and given the owners of land a large income from rent which they have done nothing to earn. We give the following figures showing multiples of rent of land used for cane and of unirrigated land in the canal area for the years 1922-26, *vide* pages 13 and 14 of the "Report on Certain Questions connected with Irrigation on the Deccan Canals" by Mr. C. H. Bristow, I.C.S. These figures are somewhat out of date but serve as a guide.

Name of Canal.	Multiple of assessment on cane land	Multiple of assessment on unirrigated land	Excess multiple of Column 2 over Column 3
Nira Left Bank	19.74	3.36	16.38
Mutha Right Bank	20.88	3.27	17.61
Mutha Left Bank	16.00	4.06	12.54
Pravara Right Bank	26.91	4.07	22.84
Pravara Left Bank	22.36	3.46	18.90
Godavari Right Bank	11.34	3.57	7.77
Average	19.63	3.63	16.00

56. We think it only fair that the owners of land so benefited should pay some share of this unearned rental value to supply funds for remedying the incidental damage due to the irrigation from which they have benefited, and this additional burden should not be thrown on the general taxpayer. This is not an entirely new principle as it is a principle of all land revenue assessment that it should be based on the potential and not on the actual value of land. We consider that such a cess would be fair in the interest of the financial improvement of the canal revenues and it should be leviable on all those who could benefit by taking water for irrigation, but do not do so.

57. From a reference to the Mysore State authorities we understand that since the year 1881 the Mysore Government have undertaken many large irrigation projects of which Vani Vilar Sagara and Krishnaraja Sagara works are large examples. Since 1888 the State has laid down the principle according to which, when an irrigation project is undertaken, contribution is levied from the landholders benefited by such irrigation works. The contribution per acre varies from a third to a fifth of the difference between the local market values of an acre of dry land and of an acre of wet land. The contribution which is in the nature of betterment levy is recoverable from the owner in return for the increase in the value of the land due to the supply of water for irrigation and is levied by means of agreements entered into with the holders of the land so benefited. When once a contribution is fixed the practice is to distribute it over a number of years and collect the annual instalments along with land revenue. The amount of contribution is fixed according to the character and permanence of the water supply, the quality of the soil, and other factors. The rules further prescribe

that "Where holders of not less than $\frac{5}{6}$ ths of the occupied area execute *Mutchalikas* under these rules and the holders of the remaining area refuse to do so the matter should be reported in the statement of the estimate (of the project) for the orders of Government, and Government then decide whether the work should be abandoned by reason of such refusal or the refusing landholders should be compelled to pay their due share of contribution." [The Mysore Government has also an irrigation cess imposed since 1868 and it is levied on all irrigated lands at one anna per rupee of assessment and it provides a fund for the upkeep of irrigation works and repairs of tanks.]

58. We recommend that a cess be levied on the extra rental value due to the canals. We are unable to agree as to what proportion of the extra rental value should be taken, some say $\frac{1}{4}$ th, some $\frac{1}{3}$ th. We leave the decision on this point to Government as the question is technical. We are agreed that the cess should be levied on all land for which a supply of water is assured, whether water is or has been taken or not. We wish to make it clear that this cess should not be leviable on land for which an assured supply of water is not available, nor on land for which water had been refused (unless the refusal was of a penal nature, e.g. on account of failure to pay up arrears etc.), nor would it be levied on damaged land. We would stipulate further that the proceeds of the cess should be spent primarily on drainage and improvements and none outside the canal areas. We consider that this solution is better than the method of a lump sum cess on the betterment value in the first instance which has been adopted by the Mysore State authorities in developing their canals (*vide* paragraph 57).

59. In view of the present low prices of produce we would recommend that for those already paying water rate a remission should be allowed equal to the amount of the cess. The cess would thus fall on those who could, but do not take water, and would prove an incentive to the taking of water and so would lead to the spread of irrigation.

CHAPTER VII.

MISCELLANEOUS.

AGRICULTURAL POLICY.

60. The Director of Agriculture has submitted a note for the consideration of the Committee putting forth his views regarding the Agricultural Development of the Deccan Canal zone. We have carefully considered the note particularly in its bearing on the financial circumstances of the canals. The note proposes that a comprehensive and constructive policy of agricultural development should be formulated, of which the framework should include *inter alia* the following specific items.

61. (i) *Agricultural Finance*.—It is suggested that financial aid to cultivators be given more freely and should provide for (a) long term loans at (b) low rates of interest (c) in kind rather than in cash.)

The subject of agricultural finance does not strictly come within the purview of our deliberations; the Provincial Banking Enquiry Committee has recently gone fully into the question. There is no lack of credit facilities in our opinion in the canal areas from the Sowkar or the Co-operative Societies. Indeed as the Banking Enquiry Committee puts it "... it is not the number of credit agencies or the volume of cheap credit available to a farmer but the business knowledge how judiciously to use his borrowings that forms the vital factor in the problem of his indebtedness."

62. (ii) *Promotion of agricultural industries.*—The suggestions under this heading are as follows:—

(a) *Sugar manufacture in large, small, or village factories.*—This matter is dealt with in the body of the report.

(b) *Livestock, i.e., dairying, rearing cattle and sheep.*—While we all agree that the encouragement of dairying and livestock (especially cattle for agricultural purposes) is most desirable, it is a matter for the Agricultural Department itself to put forward a practical scheme. There is no reason whatever why such subsidiary industries should not be taken up in the irrigated areas and we think that the first point to be studied is the probability of such schemes being financially successful. Given this assurance we feel convinced that intelligent irrigators would readily take up such schemes if the Agricultural Department got into touch with them.

(c) *Fruit.*—Fruit culture is expanding and the need for encouragement is in respect of horticultural details. It must be borne in mind however that except for papayas, bananas, etc., fruit trees are long lived and it is therefore necessary for the Irrigation Department to see that such operations are carried out in suitable lands. In illustration of this we have been informed that on the Nira Right Bank Canal the water level has already risen to within 10 feet of the ground surface over a large part of the canal tract even though there is only a very small area of perennial irrigation. To protect the irrigators from a loss on their investment it is necessary to confine fruit growing to areas where there is no risk of the subsoil water level rising subsequent to plantation, because experience has shown that this is fatal to their productivity.

63. (iii) *Colonisation.*—The Director proposes that expert dairy farmers, cane growers, tobacco growers, sann-fibre growers, etc., should be imported into the country-side in the midst of the existing population. Under the present circumstances we see difficulties in this, for naturally an outsider will not be willing to come into the area unless he sees a clear prospect of profit therefrom. In the past we have the example of the Saswad Malis who emigrated in turn to the Nira Left Bank Canal, the Godavari and the Pravara Canals, but at present there is no great sign of such emigration to the Nira Right Bank Canal presumably we think due to the present depression in prices; in fact we hear of some cases of Gujarati farmers who have been cultivating cane on the Deccan Canals and who are now returning to Gujarat because it pays them better to

do so. The tenant farmers who brought skilled knowledge to the Pravara and Godavari were, as the Director admits, the first to withdraw when prices became unfavourable.

64. (iv) *Technical propaganda, especially agricultural.*—This again is mainly an agricultural matter and we are of the opinion that the lines of such propaganda should be decided by co-operation between the Departments concerned.

65. (v) *Standing Committee.*—To carry the policy of Government regarding agricultural development into effect, it is suggested that there should be a standing sub-committee of the honourable Board with the Finance Member as Chairman. This sub-committee would carry out its plans through the medium of certain officials including (i) a Revenue Officer, Deccan Canals, (ii) the Chief Engineer for Irrigation, and (iii) the Director of Agriculture. These latter officials could be formed into a Development Board with the Commissioner, Central Division, as Chairman, the connecting link between this Board and the sub-committee of the honourable Board being the Chief Secretary to Government. The Director attaches much importance to the appointment of a Revenue Officer analogous to that for the Lloyd Barrage. This Committee has already come to the conclusion that there is no prospect of any rapid increase of irrigation for crops other than sugarcane for the manufacture of sugar. We therefore consider there is no justification for starting new committees nor for appointing a Revenue Officer, Deccan Canals, under existing circumstances.

IRRIGATION ESTABLISHMENT.

66. We have considered the question of the reduction in working expenses and irrigation establishment. One of our colleagues suggested that a limit should be laid down, say 25 per cent. of the gross revenue of each canal, beyond which the cost of establishment including working expenses should not go. We are not convinced that such an arrangement is workable. We understand that during the past two or three years a reduction in the numbers of the staff employed on irrigation has been effected. This has been carried out by amalgamation of charges, postponement of new works except those of an essential nature, the taking over of roads and buildings where possible, and other means. We are also aware that while a 10 per cent. emergency cut has been effected in the pays of certain officials, pays of other officials have been reduced or are being considered with a view to reduction. We further understand that some posts are being abolished so as to reduce the cadres. We suggest the problem of further economies may be examined by Government at the hands of the Expert Committee which has been announced since the close of our deliberations.

ACCOUNTS.

67. We desire to point out that the system of administrative accounts followed in the annual accounts and statistical statements as published in the Administration Reports of the Public Works Department appears

to be somewhat misleading.) In the following statement (*vide* also Appendix XIII) we give the annual costs of establishment for 1929-30 and 1930-31 on the Nira Left Bank Canal as supplied to us by the Superintending Engineer, Irrigation Development and Research Circle, for comparison with those of the Accountant General :—

*Cost of Establishment of the Nira Left Bank Canal
in 1929-30 and 1930-31.*

		1929-30	1930-31
		Rs.	Rs.
Canal working expenses	.. { A. G.'s ..	2,12,130	2,88,797
	.. { Actual ..	1,43,743	1,36,891
Remodelling	.. { A. G.'s ..	2,66,426	1,32,616
	.. { Actual ..	60,928	48,956
Roads	.. { A. G.'s ..	Not known.	Not known.
	.. { Actual ..	1,440	1,440
Total		4,78,556	4,21,413
		2,06,111	1,87,287

It appears that in some cases more than half of the Accountant General's total has been applied in the form of overhead charges. Some of these, we are informed, consist of :—

1. A pro rata distribution of the total establishment charges of a circle over the P. W. Major Heads according to the works outlay in that Circle.
2. 1/10th share of the Secretariat establishment is charged similarly pro rata (presumably Public Works Department Secretariat only).
3. 1/9th share of leave allowances in England is charged similarly pro rata.
4. 1/9th share of the establishment of the Electrical and Mechanical Engineers to Government is charged pro rata.
5. 1/7th of 1/2 of the Consulting Architect's establishment is charged pro rata.
6. Actual establishment charges pertaining to the Revenue establishment or Survey establishment under Heads " XIII " and " 15 " are charged under those heads only and are not distributed pro rata.

While we realise that some percentage overhead charges must be added for the Secretariat establishment and others, we are not in a position to know how such percentages have been determined and think that some of them might be reconsidered. We are of the opinion that the cost of the Electrical Engineer to Government and the Consulting Architect to Government, for instance, is not a fair charge against irrigation and that it would be better to charge fees for work actually done whenever necessary. There seems no point in further discussion of this matter and of the incidence of working expenses without understanding the exact significance of the figures. We recommend that all such overhead charges and distribution of debits effected by the Accountant General should be

communicated in detail to the Superintending Engineers and Executive Engineers concerned in order that they may know where they stand with regard to the financial position of the irrigation works under them.

MEMORANDUM BY THE SUGAR TECHNOLOGIST, IMPERIAL
COUNCIL OF AGRICULTURAL RESEARCH.

68. Subsequent to the drafting of this report some of us had an opportunity of meeting Mr. R. C. Srivastava, Sugar Technologist, Imperial Council of Agricultural Research, at which he gave us after his tour in the Canal tracts an outline of his observations regarding sugar factories in the Deccan. He shortly afterwards submitted a memorandum which appears as Appendix XIV.

It will be seen that the figures of Mr. R. C. Srivastava differ in some respects from those given on Plate V, that is, of estimates for large and small factories. The figures given in Plate V have been supplied by our colleague Mr. Fenton Miller who has been in charge of the Belapur estate and factory. It may be briefly stated that Mr. Miller considers the figures of the Sugar Technologist are underestimated for the small factory in the following items, viz., manufacturing materials, allowances for current repairs and renewals, and depreciation. In the last item Mr. Srivastava makes a much smaller allowance than Mr. Fenton Miller. This is of course a matter for decision by the management. Mr. Miller was requested to submit figures for a season of 120 days whereas Mr. Srivastava has calculated on 130 working days which reduces the overhead charges. It should be pointed out that both Mr. Miller (*vide* Plate V) and Mr. Srivastava have based their calculations on Pundia cane; they are agreed that with improved varieties the prospects for small factories would be greatly enhanced. As regards the large factory of 400 tons daily capacity similar differences apply and Mr. Miller assumes a price of Rs. 15 while Mr. Srivastava takes Rs. 14 per ton.

Mr. Srivastava has suggested various forms of technical assistance from Government to promoters of small factories. The Committee agrees that in order to ensure the success of small factories some technical advice will be necessary in the initial stages. With such assistance, Mr. Miller considers a recovery of 9 per cent. of sugar quite possible, whereas in his estimates on which he showed 8·5 per cent. (Plate V, small factories) he had not contemplated such supervision and assistance.

The majority of the Committee are not in favour of granting any subsidies to factory owners.

For the reasons set forth in the report we do not agree with Mr. Srivastava that land can be obtained for factories without some form of compulsion in respect of leases.

Regarding Mr. Srivastava's statement that several parties from Java are at present enquiring into the possibilities of establishing sugar factories in India and that they may find the Deccan canal area particularly suitable for setting up factories, a majority of the Committee agree with the Sugar Technologist in holding that it would be undesirable to allow Java

people to secure land under the canal area and thus virtually to frustrate the object of protection to the Indian industry. Our colleague, Mr. Inglis, holds however that it would be highly desirable financially for such factories to be established so far as the canals are concerned; he realises that there are strong objections to such a course, but he considers them to lie outside the terms of reference of the Committee.

69. Our colleague Mr. Bristow left India on leave before Mr. Srivastava's memorandum could be discussed. He left a note embodying his views on the memorandum, *vide* page 35 *post*.

CONCLUSION.

70. The Committee sat for 23 days, the attendance of members being given below :—

	Days.
The Chairman, Mr. B. S. Kamat	23
Mr. C. H. Bristow	21
Mr. C. C. Inglis	22
Rao Bahadur G. K. Chitale	17
Mr. Fenton Miller	18
Mr. N. E. Navle	17
Khan Bahadur Abdul Latif Haji Hazrat Khan	17

71. The members of the Committee desire to record their thanks to the Chairman for the tactful and able manner^a in which he has conducted the business of the Committee. They also appreciate the valuable assistance given by the Secretaries, namely, Mr. J. S. Reid in the initial stages and thereafter Mr. W. A. Evershed, in the course of the investigations and the preparation of the report.

(Signed) B. S. KAMAT.

(..) C. H. BRISTOW.

(..) C. C. INGLIS.

(..) G. K. CHITALE.

(subject to a minute of dissent).

(..) J. FENTON MILLER.

(..) N. E. NAVLE

(subject to a minute of dissent).

(..) ABDUL LATIF HAJI HAZRAT KHAN.

SUMMARY.

For convenience a summary of the conclusions and recommendations of the Committee are given below.

INTRODUCTORY.

- Paras.
 1-2 .. Records the formation and personnel of the Committee.
 3-5 .. The issue of questionnaires and taking of evidence from both officials of the Irrigation and Agricultural Departments and from Irrigators' Associations and representatives of commercial interests.

CHAPTER I—THE FINANCIAL POSITION.

- 6 .. Explains the data to be considered.
 7-8 .. Remarks on the financial figures of recent years.
 9 .. Points out that the general taxpayer bears a large burden in view of the small return on the capital invested and that the object of the Committee is to make proposals to effect the biggest return possible.
 10 .. A striking feature of the figures is the loss on the Nira Right-Bank Canal of which the capital cost is nearly Rs. 4 crores.

CHAPTER II—ECONOMIC FACTORS.

- 11-12 .. From a consideration of the area and revenue, it is concluded that more than half the gross revenue is derived from cane blocks and that this porportion would be higher if overlap were included.
 13 .. Reasons are given for the conclusion that cane cannot be replaced by substitutes such as fruit, cotton, groundnut etc. and points out that the canals were constructed on the basis of cane being the main crop.
 14 .. The conclusion is reached that the financial position of the canals depends on cane.

CHAPTER III—POSSIBILITIES OF EXTENSION OF CANE.

- 15 .. The only products of cane are gul and sugar. The conclusion is that the cane area depends on the gul market.

Paras.

- 16 .. Gul--its use, quality, and consumption. It is concluded that the market for gul is steady but not likely to increase without an increase in the general prosperity of the people.
- 17-18 .. Gul grown on the canals competes with that grown on wells in the Bombay Presidency as well as with gul imported from other Provinces. This will increase with the completion and development of new schemes in certain provinces. Points out that large acreages under cane will shortly result from schemes nearing completion in Mysore and Hyderabad states. It is concluded that the gul market is affected by outside supplies and that irrigators must keep pace with reduction of cost of production of gul from outside.
- 19 .. Points out that canal cane does not increase or decrease according to rainfall like that grown on wells, but that canal cane increased with the supply of water made available as new canals were opened as long as the price was favourable.
- 20 .. Remarks on the decrease of the price of gul since 1922 and concludes that the market is fully supplied.
- 21 .. Points out that cane on wells fluctuates with the rainfall, and that the deficiency of canal cane in recent years has been made up by cane on wells with good rainfall. This shows the precarious position of the canal irrigator.
- 22-23 .. Evidence has been given that the reduction of cane area is due to the prejudicial effect of departmental rules, and that simplification if carried out would help to increase the area.
- 24 .. Objects of the Block System are stated. It is concluded that abolition of the system would be detrimental to revenue.
- 25 .. Describes suggestions from cultivators that bhuser crops in blocks should not be charged when irrigators prefer to chance the rainfall. An alternative idea is to reduce the cane rate by Rs. 15 per acre. The financial effect of these suggestions is approximately estimated and it is concluded that it would be impossible to get the large additional area of cane that would be necessary to make up the deficit in revenue. The proposal is merely a pious hope on the part of its supporters.
- 26 .. The Committee is convinced that extension of cane area cannot be obtained by the lowering of water rates so long as unfavourable economic factors prevail.

Paras.

- 27 .. Explains the Bund Rules and irrigators' complaints thereon. It is understood that modification of some rules is under consideration. The Committee does not consider that the rules have resulted in restriction of the cane area, but believes that the dominating factor is the price of gul, and hence that abolition of the rules would not improve revenue.
- 28 .. The prospect of expansion of cane area for gul is considered to be remote unless the cost of production can be reduced to compete with that in other Provinces. This can best be attained by the adoption of improved varieties and methods.

CHAPTER IV—SUGAR.

- 29 .. The only other market for cane is in the manufacture of white sugar for which there is vast scope if imported sugar can be replaced.
- 30-33 .. Details regarding prices of sugar and import duties are given and it is concluded that with legislation contemplated in the matter of a protective import duty there is a strong case for the success of sugar factories. Conditions on which the above conclusion is based are (1) factory of 350 tons daily capacity, (2) factory control of cane and (3) a season of 180 days.
- 34-35 .. A comparison between a factory dependent on its own cane and one obtaining its supply of cane from outside (the cultivators) is given and the advantages of the former are made clear.
- 36 .. The advantages of a long working season are explained, also the fact that the Deccan makes this possible whereas the season in North India is 120-130 days.
- 37-40 .. The cost of cane is detailed. Cultivators' cane would cost annas 11 per maund at factory, compared with annas 8 per maund for a factory growing its own cane. It is therefore concluded that it is advantageous for factories to grow their own cane.
- 41 .. Details of the advantages of improved varieties over Pundia cane as found by the Belapur Company are given.
- 42 .. Evidence was given that the tenure of land for cane must be assured for a long period if capital is to be forthcoming. The Committee agreed that the period should be for not less than 30 years with the option of at least one renewal.

Paras.

CHAPTER V—LAND FOR SUGAR FACTORIES.

- 43 .. Discusses the problem of providing land and the conclusion is that some form of compulsion will be inevitable.
- 44-47 .. There are three methods possible. Acquisition is not recommended on account of its expense and unpopularity. The Java System is described and the difficulties which would occur are pointed out. For long term leases two modifications of ordinary leases would be necessary, viz. to extend the period and (failing a voluntary agreement) to make the lease compulsory. The advantages of the long term lease are pointed out. It appears to the Committee that this is the only satisfactory method to ensure success for the sugar industry in the Deccan.
- 48 .. Compulsion as regards leases is justifiable.
- 49 .. The Committee suggests that a Board should be formed to fix rents.
- 50 .. A brief outline of the legislative provisions necessary is given.
- 51 .. The question as to whether large or small factories should be recommended is left for those who think of starting such factories to decide, although from figures supplied it is shown that the return on capital and efficiency increase with the size. The Committee proposes that factories should be encouraged on the Nira Right Bank Canal area first.
- 52 .. Refers to the lack of railway facilities on the Nira Right Bank Canal and recommends that steps be taken to expedite the matter.
- 53 .. Government participation in financing factories is negatived by a majority of the Committee, but all agree that with facilities as regards land, supply of water, distribution, etc., the public will produce the necessary capital.

CHAPTER VI—WATERLOGGING AND DRAINAGE.

- 54 .. Large areas have been spoilt by waterlogging and salt—figures of the area damaged—serious nature of the problem. The Committee considers all areas should be drained.

Paras.

- 55 .. Small sum spent annually by Government on drainage at present—no prospect of increase—general tax-payer should not pay for drainage—high rents obtained for land under perennial irrigation—figures showing multiples of rent of land used for cane compared with land not irrigated.
- 56 .. It is considered fair that owners benefited should pay a share of the unearned rental value to provide funds for drainage.
- 57 .. Principle of a betterment contribution as applied in Mysore State is detailed.
- 58-59 .. The Committee recommends that a cess be levied on the extra rental value due to canals. The cess should be spent primarily on drainage and improvements and none should be spent outside the canal area.

CHAPTER VII—MISCELLANEOUS.

- 60-65 .. Remarks on a Note submitted by the Director of Agriculture regarding his views on the need of an agricultural policy. He suggests that (i) financial aid be given more freely to cultivators, but against this is the warning given by the Provincial Banking Enquiry Committee. In (ii) are suggested sugar factories, which is fully dealt with in this Report; other agricultural industries, which the Committee points out is a matter for the Agricultural Department; and fruit, which the Committee points out needs careful consideration from the fact that the sub-soil water table must be taken into account. Colonisation forms item (iii) of the Note but there are difficulties under present conditions. (iv) is regarding technical propaganda, especially agricultural, on which the Committee expresses the opinion that it is a matter for co-operation between the Departments concerned. In (v) two new committees are proposed to formulate and carry out the policy to be decided upon. The members of this Committee do not consider there is justification for new committees under existing conditions.
- 66 .. Consideration of the working expenses and establishment charges on canals is mentioned and the Committee suggests that the possibility of further economies be examined.

Paras.

- 67 .. The Committee points out that the system of accounts (*vide* Administration Reports) appears to be misleading, especially with regard to overhead charges. The Committee recommends that such overhead charges debitable to irrigation projects be communicated to the Superintending and Executive Engineers concerned.
- 68-69 .. The Committee remarks on a memorandum regarding sugar factories submitted by the Sugar Technologist, Imperial Council of Agricultural Research, which was received after drafting the report. Figures are explained. The Committee are not in favour of subsidising factories, but some technical advice will be necessary. The Committee does not agree that land can be obtained without compulsion in some form. Mr. Bristow submits a note on the matter as he had left India when the discussion took place.
- 70-71 .. Concluding remarks.

Note on the memorandum submitted by Mr. R. C. Srivastava, Sugar Technologist, Imperial Council of Agricultural Research, India, on the sugar and gur industries in the Deccan Canals area, by Mr. C. H. Bristow, I.C.S.

On the main points which lie within his special sphere the Sugar Technologist corroborates the opinions already formed by the majority of the Committee from the evidence laid before them. These are :—

- (1) that the profits from gur-making are never likely to be large but improved methods may prevent loss ;
- (2) that sugar factories in the Deccan should be able to compete with imported sugar while the present tariff is in force ;
- (3) that sugar factories must control their own plantation ;
- (4) that the larger the factory the more economically it can be worked ;
- (5) that small factories (of 50 to 150 tons) are really too small to be economical under normal conditions.

The memorandum, however, is not confined to opinions based on technical grounds. The author has laid down the rule, based on personal, or what may be described as moral, grounds that no compulsion is justifiable in the obtaining of land for factories, and the adoption of this principle radically affects his recommendations and in fact excludes the logical conclusions to which his technical findings lead. Thus, although he admits large factories to be sounder economically than small factories, he is driven to say that they are impossible in developed areas because they would not be able to obtain cane at a reasonable price owing to his conclusion (3). He, however, appears to think that this objection would not apply in new areas. He has here overlooked the fact, which he was not likely to discover in a rapid inspection, that even if the required area could be obtained for a few years it would not be possible to get land on 30 to 60 years' leases without which no one would risk the construction of a big factory. The grounds, therefore, on which he states that large factories cannot be successful in developed areas also preclude their succeeding in new areas.

The Sugar Technologist appears to think that small factories could be supplied by the voluntary association of a few large cane growers and that therefore no compulsion would be necessary. A closer acquaintance with conditions in the Deccan would have shown that a factory cannot control the distribution of water under an outlet unless it controls the whole of the supply. Unless, therefore, all the irrigators under one outlet unite in supplying cane to the factory, either the factory will have to be abandoned or the dissentients will have to be coerced. It very rarely happens that all the land under an outlet is in the possession of only two or three persons, and it is notoriously difficult to get a larger number to agree. There is generally a dissentient minority. If the minority is not to be coerced, the project of a factory will have to be abandoned, unless the small factory is to do without the facility, which it is proposed to grant to all factories, of distributing their own supply of water. Thus

the Sugar Technologist's principle of no compulsion practically rules out the small as well as the big factory.

There is, however, no reason why the Committee should pay any attention to Mr. Srivastava's personal views on a non-technical matter. His technical views lead to the conclusion that large factories are sounder financially than small and that factories must control their own plantation. For this purpose compulsion is necessary and we have therefore recommended compulsion where it cannot be avoided.

As regards the Sugar Technologist's recommendations about scholarships and subsidies it need only be said that his point of view is different from that of the Committee which is purely the financial one. From the financial point of view expenditure, including subsidies to small factories, amounting to a total of rupees 3 lakhs does not commend itself when, to quote the words of the memorandum "the margin of profit for a large sugar factory is so large that it can afford to pay a handsome rent for the land which it takes on lease".

(Signed) C. H. BRISTOW.

22nd March 1932.

MINUTE OF DISSENT BY RAO BAHADUR G. K. CHITALE.

PART I.

PRELIMINARY.

1. The main task of the committee is to see (1) how the financial aspect of the Deccan Canals can be improved and secondly to suggest ways and means to improve the same. As regards the first question the present position of the financial aspect is shown in statements and percentage returns for the years 1922-23 to 1929-30 attached to the main Report.

2. The analysis of these statements shows that in the last three years, revenue has considerably fallen and expenditure has considerably risen and the acreage under sugarcane has also correspondingly fallen.

We note that the statements of acreage of cane area on tanks, wells and bandharas supplied to us by Mr. Inglis are for the whole presidency.

CAUSES OF REDUCTION OF REVENUE.

3. This shrinkage of the revenue and acreage under sugarcane in the last three years appears to us to be due to the following causes:—

(i) Wherever we have gone we have noticed that the Bagaitdars are very much discontented on account of the rigidity of the rules which are being more rigorously enforced than before. This is corroborated by official witnesses from the Agricultural and Engineering Departments and an outsider like Mr. Srivastava, Technological Expert from U. P.

(ii) Sharp fall of commodity prices and more especially that of gul.

(iii) The diminished staying power of the Bagaitdars who appear to have increased their indebtedness which is twenty-one times of land assessment per acre in the last three years as the result of the unprecedented decline in prices of all commodities (*vide* Report of Banking Inquiry Committee, p. 42).

(iv) The uniformity of water rates on all canals irrespective of the factors of the relative cost of cultivation and greater or lesser facilities for credit, cheaper money, cost of manures etc., cumulative effect of which is to leave no margin of profit.

(v) Dual control of the Superintending Engineer, Irrigation Division proper and Superintending Engineer, Development and Research Circle.

(vi) Want of necessary facilities for ample and timely finance.

(vii) The low prices of gul in the last three years has the effect of immensely lessening the financial credit of the Bagaitdars with their Sawcars.

✓ 4. We may further note that the capital expenditure on the new canals has been much heavier than on the older canals and dams such as Bhatgar on Nira, Mudhmeshwar on Godavari and Bhandardara on

Pravara ; we notice that the original estimates have been considerably increased and therefore the original forecast of revenue has not materialised.

5. Then again we find that the recent improvements of Nira Left Bank Canal system which has cost hitherto about 40 lakhs of rupees has not brought us any revenue even though it has increased facilities for providing water to about 19 thousand more acres of land.

6. The expenditure of reclamation and research so far shows poor financial results and even though it may be considered that such kind of expenditure is necessary, in our opinion, Government will be very well advised if it stops this kind of expenditure from loan funds as it adds to the already existing heavy financial burden and the reclaimed lands are not easily saleable or lettable so as to produce any revenue ; again it is financially bad policy to spend unproductively when we have on hand very extensive acreage available for irrigation on different canals as is shown by the proportion of irrigated land to the present irrigable land which is about one to two (1 to 2).

7. The tail ends of each canal on Nira, Pravara and Godavari varying in length from 12 to about 7 miles of canals are not at present used for irrigation purposes and thus giving no return on the capital expenditure.

8. In our opinion the establishment charges and ordinary repairs have been much heavier than they should have been and we very strongly recommend that they should bear a proportion of not more than a fixed percentage of the gross assessed income on each canal. This will give the Irrigation Department fair discretion in the economical management of the Deccan Canals.

9. We note that the working expenses per acre irrigated in different canals vary considerably and are much heavier than in Sind, *vide* Reports for 1929-30. Nira Left Bank 4.16, Godavari Canals 13.56, Pravara Canals 7.63 as against 2.46 and 1.86 in Indus Right and Left Bank Canals.

10. As pointed out in the main report the basis of calculations of working expenses bears no relation to actual expenditure and thus confuses the minds of ordinary readers. The present method of calculating working expenses may be according to rules laid down by the Government of India but from the practical point of view, it has no doubt the effect of confusing the actual returns of each canal on a reasonable basis.

11. The extremely unfavourable financial results of Irrigation Estate are well known to all and the issues that they raise must receive very serious consideration.

Revenue results of each of the irrigation works must be carefully watched. It is clear that the most conspicuous feature is that there is substantial increase in capital expenditure in the last 10 years at a considerably increased rate of interest and there is no commensurate increase in revenue. There is a large increase in working expenses and interest charges.

Looking at the matter in the broadest way it appears to me that the main practical issues for the present must be:—

- (1) Whether after duly discounting the effect of recent abnormal conditions the productivity of capital expenditure has conformed to expectation.
- (2) Judged in the light of recent and present experience what should future policy be in the matter of getting more revenue ?

PART II.

WAYS AND MEANS.

1. Of the five canals Krishna Canal is paying pretty good return. The expansion on Mutha canal has reached the maximum and there is not much scope for further expansion on account of the canal water being sold to Poona City and Poona Cantonment. Nira Right Bank Canal on which about four crores have been invested is at present giving minus return. But in course of time the expansion is likely to lead to good results if we profit by the past experience of really desirable reforms, after laying down a definite policy of proper advancement.

2. The remaining canals namely Nira Left, Pravara and Godavari are to be considered. Of this Nira Left Bank Canal was for a number of years financially the most remunerative and used to pay about 6 to 7 per cent. as percentage return on the basis of net assessed revenue up to the year 1926-27. But since that year this percentage return has been steadily falling. In 1928-29 it fell to 4.90. In 1929-30 to 4.66 and in 1930-31 to 2.96 and perhaps may give smaller percentage return in 1931-1932. So also on Pravara and Godavari Canals the revenue is showing smaller and smaller return. On these canals we think expansion on a large scale is possible if timely measures are taken in the direction recommended below.

3. Wherever we have gone we have heard from the Bagaitdars long tales of woe ; for good or bad reasons they are thoroughly discontented. In these days of democratic advance it is not possible to expect any good result without their contentment and good will. Thus even at the sacrifice of efficiency and stringent administrative control it is worth buying up their contentment. (In this respect the dual control exercised by the two Superintending Engineers, Deccan Canals, must in our opinion be ended as it has undoubtedly led to a good deal of heart burning amongst the Bagaitdars.) Fortunately the term of Mr. Inglis' department expires in about September 1932 and in view of the fact of the financial stringency there would be no scope for some years at least for his department and part of his work will be done by the Research Department at the new station which is being put up at Padhegaon at the instance of the Agricultural Research Institute of Government of India.

4. The result of the evidence that we have heard has left a definite impression on our minds that the Government will be well advised in

abolishing the block system altogether, because we find that it does not exist on Mutha Canals and is not insisted upon larger estates like Manjri or Belapur. At least there should be no objection to remove its linking up of sugar crops with other crops like Bhusar.

5. In order to popularise expansion we also recommend the following measures :—

(a) Reduction of the present water rate for sugarcane from Rs. 60 to Rs. 35 per acre, as long at least as the low level of prices of gul lasts. We notice that when Nira Left Bank Canal system was started in 1885-86 water rates were low. In 1905-06 when gul was selling at Rs. 18 per palla the water rate stood at Rs. 30. This was raised to Rs. 35 in 1912-13 and Rs. 45 in 1918-19 when prices of gul were higher. After the boom year in 1926-27 they were raised to Rs. 66-8-0 but that rate was never realised. At present gul is selling on an average for a lesser price than Rs. 18 per palla. So some relief must be given to Bagaitdars to induce them to go in for sugarcane cultivation. We do not accept the plea that the water rate is only 5 to 10 per cent. of the cost of cultivation per acre. On the other hand we accept the contention of the Bagaitdars that it is much fairer and more reasonable to put it in a certain proportion to the net profits per acre of sugarcane provided the Bagaitdars agree to pay a certain basic rate of Rs. 30 at least per acre at all times so that the revenue may not suffer.

(a) (1) The information that we have obtained from Hyderabad, Mysore and Bikaner States, confirms our views that the present pitch of the water rates on the Deccan canals is too high as compared with those in force in these States. Even after making allowances for the cost of construction, it is still apparent that in Mysore and in Hyderabad where the canals run through soils similar to ours, there is no reason especially in these days of competition, as to why we should insist upon a water rate which does not bear a fair proportion to the net profits.

(b) The Bagaitdars must be given greater freedom of action as regards distribution of water and unitisation of their fields according to the nature of the fields concerned. In this respect Belapur and Manjri have certain liberty of action and there is no reason why the same should be withheld from at least bigger Bagaitdars who go in for a cultivation of 60 to 100 acres of cane. We are told that Gibbs modules are working satisfactorily and they could be set up on every distributary and the water let out could be satisfactorily measured out to the Bagaitdars who have their lands on that distributary. This system in our opinion would meet all departmental objections.

(c) In view of the facts that the Bagaitdars appeared to be heavily involved in debts due either to private Savkars or the Provincial Central Bank and the need of necessary finance of the basis of at least five hundred rupees an acre for sugarcane cultivation, in our opinion it is necessary to devise a scheme for joint cultivation on each distributary as far as possible by pooling up the monetary resources of all

Bagaitdars so as to have profitable and economical workable units. This would foster the spirit of co-operation on sound lines and would save costs all round. This may be effected by formation of Co-operative Societies of Private companies of not more than 20 in number and in order that they may function properly and on satisfactory lines we would like to attach to them small advisory council for propaganda and other purposes. This council should consist of a sitting or an ex-member of the Council, one representative of the Bagaitdars on each distributary to be elected by the Banking community who may be financing the Bagaitdars concerned.

(d) We find that drainage system on a properly designed basis is necessary on these canals so as to get maximum results of expansion without spoiling irrigable lands which are under command of such distributaries. The desirability of such reforms is acknowledged by the Bagaitdars that we examined and we find such schemes are prepared by the development and research circle and are only awaiting allotment of financial funds for putting them into execution. We are afraid in the present financial stringency—such funds are not likely to be had.

(e) It is said that the production of gul has certain limits and it is calculated that 60,000 acres of land under sugarcane on the Deccan Canals is sufficient for this purpose so that the gul markets may not be glutted, eventually lowering the price of gul and making its manufacture not profitable. Even accepting for a moment this contention we believe that the present statistics of production of gul on wells and bandharas are not accurate inasmuch as there are no statistics worth the name to show how much gul is produced on lands irrigated on wells and bandharas. The argument that the total acreage on wells and bandharas under sugarcane must produce definite quality of gul cannot be accepted. Neither do we accept the argument that it can be produced at a lesser cost of cultivation. Sugarcane on wells or bandharas has definite limitations and in our opinion it cannot successfully hope to compete either in price or quantity with the gul produced on the canals. The joint cultivation which we have recommended would certainly lower the cost of cultivation and may put the gul industry on a stable basis.

(f) There is a lot of room for expansion of small and big sugar factories on the Deccan Canals and we agree with the view that the Deccan Canals would financially profit a good deal if this sugar industry can be fostered on them. We accept the view that the Bombay Deccan is a fine sugar producing area on account of its geographical position, climatic conditions and extensive canals systems suitable for cane cultivation. It can successfully compete with the present white sugar tract in U. P. or Behar. Mr. Srivastava's note convinces us that small factories producing 60 to 100 tons of sugar are possible on the Nira, Godavari and Pravara Canals. There again the question of finance comes in. A larger factory on the basis of Belapur costs in all about 13 to 20 lakhs if not 30 lakhs of rupees. But smaller

factories producing 60 to 100 tons which cost about 2 to 4 lakhs of rupees can be a success if properly organised; and as for the finance required by smaller factories we suggest the levy of an octroi or terminal tax on the export of gul or sugar from the canal producing tracts. This again should be levied only if the proceeds thereof can be earmarked for helping these factories of not more than 100 tons. We are advised that the people would have no objection as it would conduce to the stability of new business and at the same time would give the State a good return on its canal system. As regards the methods on which these taxation proposals should be matured we would rather like to leave that task to an expert committee. All that we emphasise is the necessity of all the above problems being looked at from the People's point of view. Their solution is not very difficult. As regards bigger sugar factories it is a problem for substantial business people, so we would rather not like to express an opinion on the financial side of it. As regards the question of small versus large sugar factories we quote below a note* published by Mr. Vartak, the owner of Hanuman sugar factory at Phursangi, district Poona. If we take this note along with Mr. Srivastava's notes on these questions we think it abundantly proved that there is a future for small sugar factories in developed canal areas, and the Government will certainly be well advised in giving whatever help they can as recommended in the main report.

(g) As regards the question of imposing a cess roughly equivalent to one-fourth of the extra rental value due to the canals on all irrigable lands we are against these proposals as made in the report. We are convinced that such imposition is neither reasonable nor equitable as it works on actual figures to about Rs. 13-8-0 per acre.

It may be pointed out that even Mr. Bristow's report comments on the fact that the Irrigation Department cannot supply figures as to the exact acreage of irrigable lands on each canal and he therefore had to content himself with the acreage of irrigated lands only.

We are however in favour of a modified proposal which is described below :—

(1) The exact acreage of irrigable lands on each canal should be first ascertained.

(2) After this is done the exact acreage of lands irrigable for sugarcane or perennial crops should be laid down and also the acreage for seasonal or eight months' crops and Kharif crops.

(3) After this is done a cess of not more than Rs. 4 per acre for sugarcane and not more than Re. 1 for seasonal or eight months' crops and annas two for Kharif crops may be imposed on the definite understanding that a right to take water for all these who pay the cess is guaranteed.

(4) The cess should not be based on the rental basis which is not a safe guide but it should be in the form of a flat rate per acre.

* See page 44.

(5) The cess should be for a definite period of six years in the first instance and the amount thus realised should be scrupulously earmarked for drainage and general improvement of the canal areas.

(6) The present cess on water rate should be abolished so as to avoid misunderstandings and many practical difficulties as the rents may vary from time to time and in that case the basis of cess will be unreasonable and inequitable. It must also be observed that we are putting it up for the first time not before the construction of the canals as in Mysore but after and in time of great economic distress and general depression.

(Signed) G. K. CHITALE,
Member of the Deccan Canals
Financial Improvement Committee.

Ahmednagar, 11th April 1932.

NOTE ON VARTAK'S HANUMAN SUGAR FACTORY AT PHURSANGI,
DISTRICT POONA.*

This sugar factory is a complete unit in itself having a capacity of about 60 tons of cane per day if the Unit is worked for 20 hours in a day. The capacity can be increased by about 25 per cent. if certain minor additions and alterations are made in the existing machinery.

From experience gathered so far the plant has so far given an average yield varying between 8·1 and 8·80 per cent. of marketable white sugar on weight of cane, the variety of cane treated being the popular Pundya variety grown in the Deccan. This yield includes second and third sugars but these for the sake of calculating are taken in quantities reduced in proportion to the lower market price available for them. Thus the above percentage is more or less all of 1st white marketable sugar, the qualities of which is slightly inferior to the imported Java sugar. Big crystals of sugar such as are imported are not made in this factory but the sugar that is made has a wide market and if the rates are somewhere about the rates of imported sugar the whole produce could be sold immediately it is manufactured.

In Poona, the rate of imported sugar is at present 35 rupees per palla of 120 seers (one seer equal to 76 tolas). Rate of gul is 18 Rs. per palla and this works out the rate of sugarcane at about 14-8-0 or 15 Rs. per ton from the ordinary cultivator's point of view. This rate of gul also is likely to go down further as the crushing season advances. This means that the sugarcane rate of Rs. 15 per ton is not likely to be exceeded at any time this year.

To manufacture one ton of sugar 11·75 tons of ripe cane are required and this costs Rs. 177 ; the manufacturing cost should not exceed Rs. 70 per ton including all expenses, depreciation, etc. Thus one ton of white sugar would cost Rs. 247 or say Rs. 250 (for 9·53 pallas of sugar). This would give a net yield of Rs. 314 per ton to sugar (calculating the rate at only Rs. 33 per palla, Rs. 2 being allowed for selling expenses). Thus a factory like this can make a profit of about Rs. 5 per ton of cane treated and one full working season should mean about 120 days at 50 tons of cane per day, i.e. 6,000 tons of cane making of one ton of sugar would give about 10 Rs. worth of molasses but this is omitted from the calculation and would more than cover any unexpected expenditure.

The rate of imported sugar is not likely to go below the present rate for some years to come and based on the above calculations a factory like this can easily pay a dividend of 10 per cent. at least even if the gul rate goes up to Rs. 21-8-0 per palla as against the present rate of Rs. 18 per palla.

Of course the question of the cane grower remains to be considered and it is not certain that he would make a decent margin of profit if he sells his cane at Rs. 15 per ton. Most of the cultivators would definitely lose

* See note on page 42.

at this rate but the prices of gul and cane would adjust themselves within the above margin of Rs. 18 per palla and Rs. 21-8-0 per palla and sugar manufacture for some years to come at least has surely fair prospects even if worked on this factory's scale.

(Signed) G. K. CHITALE,
Member of the Deccan Canals
Financial Improvement Committee.

Ahmednagar. 11th April 1932.

MINUTE OF DISSENT BY MR. N. E. NAVLE.

I entirely agree with Rao Bahadur Chitale in his minute of dissent, except on two proposals of additional taxation, namely (1) Levy of Octroi or terminal tax on export of Gul or Sugar from the canal producing tracts and (2) the imposition of a cess of not more than 4 rupees per acre for Sugarcane and not more than one rupee for seasonal or eight monthly crops and two annas for Kharif crops even though they are earmarked for specific purposes such as giving financial assistance to promoters of Sugar factories on small scale or for purposes of drainage.

As I look at the financial problem of the Deccan Canals, I think the only way to improve the position is to encourage the starting of smaller sugar factories without undertaking to give direct financial assistance from Government Treasury, much less by means of any additional taxation on the irrigators who are already in an extremely deplorable state and by relaxation of the rigid rules, etc.

Except the two taxation proposals, I entirely adopt Rao Bahadur Chitale's minute of dissent as my own.

(Signed) N. E. NAVLE,

Member of the Deccan Canals
Financial Improvement Committee.

Ahmednagar, 11th April 1932.

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- The Pratt Committee's Report of 1920.
- Mr. Bristow's Report and Subsidiary Report of 1927 on Certain Questions connected with Irrigation on the Deccan Canals.
- The Indian Tariff Board Report on the Sugar Industry, 1931.
- Note regarding suitability of the small local (as opposed to the large Central) type of Sugar Factory for the Deccan Canals Tract by Mr. R. C. Srivastava, Sugar Technologist, Imperial Council of Agricultural Research.
- Report of Indian Sugar Committee, 1920.
- Government of Bombay. Public Works Department, Technical Paper No. 21—Note on the outturn and profit for sugarcane crops grown in the Deccan Canal Tracts—by C. C. Inglis and V. K. Gokhale.
- By Mr. R. C. Srivastava, Sugar Technologist, Imperial Council of Agricultural Research, India :—
- (i) Review of the Sugar Trade in India during the official year 1929-30 (*vide* the Indian Trade Journal dated 13th August 1931).
 - (ii) Note on the production of sugar by factories direct from cane during the season, 1930-31.
 - (iii) Note on the production of sugar by refineries in India during 1929-30.
 - (iv) Expansion of the Indian Sugar Industry (*vide* "Capital" for December 1931).
 - (v) Memorandum for submission to the Indian Tariff Board.
 - (vi) Memorandum for presentation to the Sugar Research Conference to be convened by the Empire Marketing Board, London.
- Report of the Bombay Provincial Banking Enquiry Committee, 1929-30, Vol. I.

LIST OF APPENDICES.

	PAGE
I. Statement showing the percentage return on the Six Major Canals in the Deccan for the years 1922-23 to 1929-30 on the basis of net assessed revenue ..	49
II. Statement showing the total cane area in the Presidency excluding Sind	49
III. Statement showing the cane area and rainfall on the Six Major Canals in the Deccan	50
IV. Statement showing the total area irrigated excluding cane by canals on the Six Major Canals in the Deccan	51
V. Statement giving the average rate of gul per palla of 240 lbs. each year	52
VI. System of Irrigation followed by the Belapur Company on their estate	53
VII. Statement showing the imports of sugar into ports of the Bombay Presidency and Kathiawar ..	53
VIII. Statement showing the costs of cane cultivation by cultivators, by the Manjri Standard Method, and by the Belapur Company	54
IX. Statement showing details of cost of cane cultivation by the Manjri Standard Method as supplied by the Director of Agriculture	56
X. Statement showing the estimated capital of a sugar company to crush 350 tons cane daily ..	57
XI. Statement showing comparative figures of capital cost of large and small type factories ..	58
XII. Statement showing the fully damaged areas on the Deccan Canals	58
XIII. Note on the cost of Establishment	59
XIV. Memorandum on the sugar and gur industries in the Deccan Canals area by Mr. R. C. Srivastava, Sugar Technologist, Imperial Council of Agricultural Research, India	59
XV. Note on cost of the Committee	71

APPENDIX I.

Percentage return on the six Major Canals in the Deccan for the years 1922-23 to 1929-30 on the basis of net assessed revenue.

Year.	Nira Left Bank Canal.	Mutha Canal.	Godavari Canals.	Pravara Canals.	Nira Right Bank Canal.	Krishna Canal.	Remarks.
1922-23	7.22	3.08	3.52	1.30	..	3.57	
1923-24	7.73	3.70	3.58	1.74	..	4.19	
1924-25	6.25	2.53	2.21	1.96	..	4.29	
1925-26	5.53	2.82	1.74	2.41	0.11	5.96	
1926-27	7.48	3.11	2.09	2.37	0.29	2.85	
1927-28	6.77	3.97	2.69	2.17	Minus Revenue Do.	4.52	
1928-29	4.90	3.58	1.38	1.58	Do.	3.48	
1929-30	4.62	4.50	0.66	1.46	Do.	5.53	

APPENDIX II.

Statement showing total (including non-canal) cane area, i.e., cane area on tanks, wells, bandharas, etc., and that on the six Major Canals in the Deccan.

Year.	Cane area excluding long and short term overlap on the six Major Canals.	Cane area on tanks, wells, bandharas, etc.	Total cane area in the Presidency excluding Sind.	Rainfall.	Remarks.
1	2	3	4	5	6
	Acres.	Acres.	Acres.	Inches.	
1922-23	21,806	38,038	59,844	28.5	
1923-24	25,535	42,524	68,059	25.5	
1924-25	25,123	33,251	58,374	27.9	
1925-26	26,436	38,463	64,899	25.3	
1926-27	28,207	37,131	65,338	26.6	
1927-28	29,488	34,510	63,998	26.1	
1928-29	23,357	37,411	60,768	31.8	
1929-30	19,806	43,209	63,015	24.8	

APPENDIX III.

Statement showing cane area and rainfall on the six Major Canals in the Deccan.

L. T. O. means Long Term Overlap.

S. T. O. means Short Term Overlap.

Year.	Nira Left Bank Canal.					Godavari Canals.				
	New cane.	L.T.O.	S.T.O.	Total.	Rain-fall.	New cane.	L.T.O.	S.T.O.	Total.	Rainfall.
	1	2	3	4	5	6	7	8	9	10	11
1922-23 ..	6,611	312	2,328	9,251	21·86	7,610	1,930		9,540	17·27
1923-24 ..	6,780	383	2,849	10,012	9·42	7,595	2,131		9,726	15·22
1924-25 ..	6,472	303	8,729	13,504	16·06	7,142	1,365		8,507	22·87
1925-26 ..	6,478	1,490	2,228	10,196	15·42	6,840	2,739		9,588	14·13
1926-27 ..	8,800	842	3,576	13,218	15·38	6,064	227	1,847	8,138	13·61
1927-28 ..	8,612	729	4,514	13,855	22·75	6,924	317	1,437	8,678	25·93
1928-29 ..	7,381	483	4,104	11,968	22·62	5,518	166	2,043	7,787	18·94
1929-30 ..	7,070	28	3,473	10,571	24·56	4,021	173	1,148	5,342	20·39
1930-31 ..	6,339	791	4,343	11,473	..	3,784	..	519	4,803	..

Year.	Pravara Canals.					Mutha Canals.				Kri-shna Canal.	Nira Right Bank Canal.	Total cane, L.T.O. and S.T.O. on 6 canals.	
	New cane.	L.T.O.	S.T.O.	Total.	Rain-fall.	New cane.	L.T.O.	S.T.O.	Total.	New cane.	New cane.		
	1	12	13	14	15	16	17	18	19	20	21		22	23
1922-23 ..	3,033		83	3,113	20·54	3,205		237	3,442	1,338	..	..	21,806
1923-24 ..	5,911		52	5,963	13·95	3,454		1,246	4,700	1,795	..	..	25,535
1924-25 ..	7,641		1,189	8,830	19·08	2,761	38	801	3,700	1,107	..	..	25,123
1925-26 ..	9,061		2,109	11,170	13·94	2,408	338	155	2,901	1,640	..	..	26,436
1926-27 ..	9,720	608	1,062	12,290	13·94	2,779	73	931	3,783	826	18	..	28,207
1927-28 ..	10,337	246	3,369	13,952	25·20	2,485	25	1,166	3,676	1,145	15	..	29,488
1928-29 ..	6,479	918	6,144	13,541	25·97	2,726	36	996	3,768	1,240	13	..	23,357
1929-30 ..	5,060	828	2,876	8,764	12·85	2,202	54	1,258	3,514	1,389	64	..	19,806
1930-31 ..	5,340	582	2,137	8,059	..	2,615	33	263	2,911	1,568	388	..	20,032

APPENDIX IV.

Statement showing total area irrigated excluding cane by canals on the six Major Canals.

Year.	Nira Left Bank Canal.		Godavari Canals.		Pravara Canals.	
	1		2		3	
	Area acres.	Rainfall inches.	Area acres.	Rainfall inches.	Area acres.	Rainfall inches.
1922-23	65,774	21·86	41,077	17·27	40,871	20·54
1923-24	67,328	9·42	43,081	15·22	33,378	13·95
1924-25	65,126	16·06	35,755	22·87	28,126	19·08
1925-26	72,774	15·42	30,990	14·13	38,060	13·94
1926-27	64,952	15·38	18,757	13·61	19,720	13·94
1927-28	59,254	22·75	18,615	25·93	9,950	25·20
1928-29	56,031	22·62	18,042	18·94	18,491	25·97
1929-30	57,721	24·56	19,802	20·39	31,142	12·85
1930-31	50,130	..	20,568	..	17,406	..

Year.	Nira Right Bank Canal.		Total of columns 1 to 4.	Mutha Canals.		Krishna Canal.	
	4			6		7	
	Area acres.	Rainfall inches.	Area acres.	Area acres.	Rainfall inches.	Area acres.	Rainfall inches.
1922-23 .. ..	..	..	1,53,722	17,153	24·92	5,180	26·75
1923-24 .. ..	..	..	1,43,785	13,418	15·56	7,606	14·21
1924-25	2,786	..	1,31,793	17,054	21·10	7,750	20·35
1925-26	17,825	11·74	1,50,649	21,596	14·13	11,170	15·89
1926-27	26,540	13·66	1,29,909	14,778	30·18	6,112	30·59
1927-28	17,030	14·63	1,04,858	11,151	25·57	5,189	24·00
1928-29	14,155	27·86	1,06,719	10,000	23·17	3,607	22·17
1929-30	16,082	22·31	1,24,747	12,224	21·06	4,794	25·60
1930-31	18,480	..	1,06,584	11,989	..	3,243	..

The reduction of area on the Mutha Canals is not due to any reduction of demand but is entirely due to less water being available due to the city and cantonment taking more water.

The water rates were increased by 40-45 per cent. from 1926.

Two seasonal blocks were introduced on the Godavari and Pravara Canals from 1929.

APPENDIX V.

Statement giving the average rate of gul per palla of 240 lbs. each year worked out from the sales at Co-operative shops at the places mentioned.

Year.	Poona market.		Baramati.	Kopargaon.	Belapur.	Remarks.
	Average of March, April, May when gul sold.	12 months' average.	12 months' average.			
1920-21 ..	41·9					
1921-22 ..	41·9					
1922-23 ..	41·3					
1923-24 ..	27·4					
1924-25 ..	24·4					
1925-26 ..	33·4					
1926-27 ..	25·8	25·79	21·74			
1927-28 ..	21·9	22·08	18·52			
1928-29 ..	21·00	24·15	21·66			
1929-30 ..	25·84	28·30	26·52	29·66	29·42	Prices were high during August to November.
1930-31 ..	24·09	22·04	19·68	22·10	21·92	
1931-32 ..	14·10	15·55*	13·52*	15·21*	15·51*	*Average of 9 months only, abnormally low prices.

Note.—Average rate for March, April and May shows the rate which the majority of cultivators obtain because it is during these months that large quantities of gul are sold.

Twelve months average rate for the year (1929-30 to 1931-32) shows that nearly the same rate prevails at Poona, Kopargaon and Belapur, but that for Baramati it is less by rupees two because being an out of the way place, it costs more for transport of gul to the place where it is finally sold (Khandesh, Gujarath, Berars).

APPENDIX VI.

System of Irrigation followed by the Belapur Company on their Estate.

- (1) The area is divided into square plots of 1,200' × 1,200' each to suit the Steam Tackle cultivation.
- (2) Field roads 15' wide are made in the middle of the plot both ways making 4 sections of about 8 acres each.
- (3) Each section is subdivided into small units as under :—
 - (a) 2 acres unit (300' × 300') in fairly level lands where slope does not exceed 6 inches in 100 feet.
 - (b) 1 acre unit (300' × 150') where the gradient is over 6" and up to 12" in 100 feet.
 - (c) $\frac{1}{2}$ acre unit (300' × 75') in more sloping units.
 - (d) $\frac{1}{4}$ acre unit (150' × 75') in lands with slopes from 3 sides.
- (4) Bunds 18" high and 15" wide at top are raised round every unit. They settle down to 12" high and 15" wide at top by the end of the year.
- (5) Furrows are opened every 3 $\frac{1}{2}$ ' from centre along the main contour.
- (6) Cross water channels are opened every 20–25 feet.
- (7) Beds of 2 or 3 rows are made for irrigation.
- (8) Irrigation for about 2 months, i.e., until the crop germinates fully and starts tillering, is given to each bed separately.
- (9) Irrigation after 2 months is given by zigzag method for 13 to 14 rows or about 300 feet length.
- (10) Irrigation, after earthing up in fairly level lands, is given by zigzag method to 40 rows or about 800 feet length.
- (11) Irrigation in every sloping unit is given in beds up to the end.

Note.—Experiments to improve on this method are in progress and if found successful and advantageous necessary modifications will be made.

APPENDIX VII.

Statement showing the Imports of Sugar in tons into ports of the Bombay Presidency and Kathiawar.

Year:	Port of Bombay.	Subordinate ports of the Bombay Presidency.	Kathiawar ports.	Port of Karachi.	Total tons of sugar imported.
1920-21	82,563	4,204	....	50,549	1,37,316
1921-22	1,62,856	6,391	311	1,76,921	3,46,279
1922-23	1,53,239	7,803	8,177	97,425	2,66,644
1923-24	1,28,881	7,836	6,922	98,230	2,41,669
1924-25	1,79,092	9,389	17,546	1,94,072	4,00,099
1925-26	1,87,923	10,026	46,348	1,70,753	4,15,050
1926-27	1,84,396	11,465	1,01,568	2,32,157	5,29,586
1927-28	1,77,978	12,718	79,431	1,52,075	4,22,202
1928-29	2,02,950	15,135	1,36,262	2,11,332	5,65,679
1929-30	2,17,450	18,370	1,29,932	2,21,627	5,87,379

APPENDIX

Statement showing the costs of cane
Agricultural Farm, and by

Particulars.	Godavari Canals.		Pravara Canals.		Nira Left
	H. B. Girme, M. K. Pandhre.	G. B. Kulkarni and T. V. Ganpule.	Aba Shankar.	Patilba Thakuji.	Association.
	Rs.	Rs.	Rs.	Rs.	Rs.
1. Ploughing, pulverising, discing, and levelling.	20	30	....	30	30
2. Bunding, making channels and dressing ends.	....	....	....	30	....
3. Sets	40	40	75	75	40
4. Cutting, applying, arranging and planting.	20	20	....	....	20
5. Weeding	20	12	20	15	15
6. Earthing up	11	10	....	15	10
7. Farm yard manure ..	50*	75	80	....	50 Sann. 75 F. Y. M
8. Cake	132	120	100	100	102
9. Sulphate of ammonia ..	....	15	20	....	23
10. Powdering (1) and Applying (2).	(1) 6 (2) 5	(1) 6	(2) 40	(2) 100	5
11. Water rate, Local fund, etc.	65	60 5 10 (overlap)	48	48	60
12. Labour for irrigation ..	30	25	35	....	40
13. Cutting, stripping, bunding and carting.	....	....	....	....	....
14. Manufacture of gul ..	100 ⁿ	100	100	....	120
15. Interest	35	40	40	40	40
16. Supervision	40	30	....	....	20
17. Rent	50	60	....	....	25
18. Brokerage	20	30	....	....	25
19. Depreciation	45	....	....	....	....
20. Miscellaneous	11	6	....	....	....
21. Carting gul	10	10	....	....	....
Total ..	710	710	558	453	700
Outturn	Pallas 40 per acre.	Pallas 36 to 40 per acre.	Not given.	Not given.	Not given.

Note.—(A) See Appendix IX for details
(B) Excludes depreciation and

VIII.

*cultivation by cultivators, by the Manjri
the Belapur Company.*

Bank Canal.	Nira Right Bank Canal.	Mutha Canals.		Manjri standard method supplied by the Director of Agriculture.	Belapur method (supplied by the Belapur Company).
Dy. 18 Sangh.	Association.	Dagdoba Tuka- ram.	Namdeorao Kalbhor.		
Rs.	Rs.	Rs. a. p.	Rs.	Rs. a. p.	Rs. a. p.
30	30	30 0 0	24	16 10 0	34 0 0
....	....	....	9	9 14 0	6 0 0
50	60	40 0 0	30	30 0 0	23 0 0
30	15	4 0 0	6	5 14 0	8 0 0
15	15	25 0 0	24	5 14 0	18 0 0
....	13	....	9	3 8 0	7 0 0
50	120	90 0 0	75	57 1 3	15 0 0
125	65	97 8 0 Fish 25 0 0	75	(sann.) 28 0 0	(sann.) 60 0 0
....	....	....	....	24 4 0	24 8 0
(1) 10 (2) 5	52	(1) 8 0 0 (2) 25 0 0	....	1 12 0	4 8 0
65	55	50 0 0	48	58 0 0	50 0 0
25	36	50 0 0	18	21 8 0	34 8 0
....	....	....	....	28 12 0	41 8 0
100	100	90 0 0	110	....	....
50	36	30 0 0	31	24 0 0	....
....	72	....	....	30 0 0	36 0 0
....	15	40 0 0	30	80 0 0	25 0 0
....	10	....	....	....	....
....
....	20	....	....	....	....
25	....	....	7	....	....
580	714	604 8 0	496	425 1 0(A)	387 0 0(B)
Pallas 25 to 30 per acre.	Not given.	Not given.	Not given.	36 pallas gul per acre.	38 tons cane per acre.

of costs and further possible reduction.
overhead charges.

APPENDIX IX.

Operation.	Expenditure (1931-32).	Further reduction in expenditure.
	Rs. a. p.	Rs. a. p.
1. Ploughing, pulverising, ridging, discing and levelling.	16 10 0	....
2. Bunding, making channels and dressing ends ..	9 14 0	....
3. Sets 10,000 or 8 per cent. on an acre of cane of 33 tons.	30 0 0	2 0 0
4. Cutting, supplying, arranging and planting ..	5 14 0	....
5. Weeding	5 14 0	....
6. Earthing up	3 8 0	....
7. Cost of Sann Green Manuring	57 1 3	12 5 0
8. Cake groundnut equal to 75 lbs. 'N' or 4½ pallas at Rs. 59 per ton.	28 0 0	....
9. Sulphate of ammonia 375 lbs. at Rs. 145 per ton equal to 75 lbs. 'N'	24 4 0	2 8 0
10. Powdering and applying	1 12 0	....
11. Water rate	58 0 0	....
12. Labour for irrigation	21 8 0	....
13. Cutting, stripping, bunding and carting	28 12 0	....
14. Interest at 12 per cent. on Rs. 200 (half annual investment).	24 0 0	....
15. Supervision	30 0 0	....
16. Rent (at Manjri Farm rent is Rs. 120 for 3 acres, of which ⅓rd is debited to cane).	80 0 0	*33 3 0
Total ..	425 1 3	—50 0 0
	(838 maunds)	= Rs. 375

*Total reduction in units by 3 annas, i.e., from 10 annas to 7 annas.

APPENDIX X.

Estimated Capital of a Company to cultivate 6,000 acres, i.e., 2,000 acres per annum with a factory to crush 350 tons of cane per day.

		Rs.	Rs.
FACTORY.	£40,000		
Freight, insurance, customs, etc. 20 per cent.	£8,000		

	£48,000	6,50,000	
Freight local		15,000	
Building		1,25,000	
Erection		50,000	
Laboratory, apparatus, etc.		5,000	
		-----	8,45,000
BUILDINGS.			
GENERAL.			
Bungalows, offices, godowns	1,55,000		
Staff quarters	25,000		
Fitters, Sugar Boilers, etc.—1 wadi of 20 rooms.	15,000		
	-----	1,95,000	
AGRICULTURAL.			
Agricultural Wadies—5 wadies of 12 rooms each.		80,000	
MISCELLANEOUS		10,000	
		-----	2,55,000
FURNITURE AND FITTINGS			15,000
• RAILWAY.			
Line, 20 miles		80,000	
3 locos		30,000	
Trucks, 125 at Rs. 400		50,000	
		-----	1,60,000
IMPLEMENTS.			
2 Sets Steam Tackle		1,20,000	
1 Tractor and Implements		7,000	
Bullock Implements, 50 ploughs, carts, etc.		5,000	
		-----	1,32,000
LIVESTOCK.			
Bullocks 50 pairs .. .. .		....	15,000
ROADS (including Public) .. .. .		....	1,00,000
ESTATE DEVELOPMENT.			
6,000 acres at Rs. 25 per acre (levelling, dismantling bunds, clearing etc.)		....	1,50,000
CONTINGENCIES. 15 per cent., say .. .. .		....	2,50,800
PRELIMINARY EXPENSES, 2½ per cent.		....	75,000
WORKING CAPITAL .. .. .		....	10,00,000

Total .. .. .		....	29,97,800

N.B.—No allowance has been made for quarters for operatives. Railway siding not included.

APPENDIX XI.

Statement showing comparative figures regarding large and small factories.

(A) Figures supplied by Mr. R. C. Srivastava for conditions in Northern India.

(B) Figures supplied by Mr. Fenton Millar.

Capacity of factory in tons cane per day.	Capital cost of factory i.e. working capital.		Outturn of sugar per season.		Percentage of sugar recovered.		Cost of one maund of sugar.	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
60	2,70,000	2,50,000	16,830	16,660	8.25	8.5	..	Rs. 10 6 0
100	4,00,000	4,00,000	29,750	27,764	8.75	8.5	..	10 4 0
150	5,10,000	..	..	..	..	..	..	..
200	6,00,000	..	55,080	..	9.0	..	..	..
250	6,90,000	..	..	..	..	..	..	..
300	8,00,000	..	72,720	..	9.0	..	..	..
350	9,00,000	..	..	..	..	..	..	..
400	10,25,000	10,50,000	1,04,895	1,30,656	9.25	10.0	..	8 4 0

APPENDIX XII.

Statement showing fully damaged areas on the canals.

Canal.	Cultivable commanded area in the perennial section.	Damaged area on the canals.				
		1918.	1920.	1924.	1925.	1928.
Nira Left Bank..	81,051	8,249 11%	..	..	9,081 11.2%	9,407 12%
Godavari ..	1,00,000	..	10,497 10%	..	13,439 13.3%	17,000 17%
Pravara ..	95,933	..	..	1,954 2%	5,821 6%	13,407 14%

Note.—These figures are for land which has gone out of cultivation, but an equal area and in some cases twice this is also partly affected and the damage is still extending. Some of these lands are capable of improvement but many are only suitable for water resistant crops such as cane, rice, and barley, and considerable area can only be reclaimed at an excessive cost. For each acre of cane grown about 1½ acres become fully damaged and 3 acres or more are partially damaged. Those, unless drained, will be permanently damaged.

(Signed) C. C. INGLIS,
Superintending Engineer,
Irrigation Development and Research Circle, Poona.

APPENDIX XIII.

Note on the Cost of Establishment.

I have been trying for some time past to ascertain the actual cost of establishment employed in this Circle on various works to ascertain how retrenchment could best be effected with a minimum loss of efficiency.

The result of this enquiry has been to show that the figures given in the Annual Administration Report bear no resemblance to actual costs, as the following figures show :—

Cost of Establishment of the Nira Left Bank Canal Division in 1929-30 and 1930-31.

		1929-30.	1930-31.
Canal working expenses	(A. G's) (actual)	2,12,130 1,43,743	2,88,797 1,36,891
Remodelling	(A. G's) (actual)	2,66,426 60,928	1,32,616 48,956
Roads	(A. G's) (actual)	not known 1,440	not known. 1,440
Total ..	(A. G's) (actual)	4,78,556 2,06,111	4,21,413 1,87,287

The Accountant General's figures include a share of the cost of the Superintending Engineer's office and of the Secretariat and they also appear to include part of the cost of certain specialist officers; but I have so far been unable to ascertain why the Accountant General's figures—especially for Remodelling—are so widely different from actuals.

(Signed) C. C. INGLIS,
Superintending Engineer,
Irrigation Development and Research Circle.

APPENDIX XIV.

*Memorandum on the Sugar and Gur industries in the Deccan Canals area by
Mr. R. C. Srivastava, Sugar Technologist, Imperial Council of
Agricultural Research, India.*

IMPORTANCE OF CANE CULTIVATION.

The importance of cane cultivation in the Deccan cannot be over-estimated. Under the existing conditions in this locality, the well-being of the cultivator as well as the financial stability of the canals rest, to a very great extent, on the continuance and extension of cane cultivation. Hitherto cane cultivation has, however, been dependent entirely on the Gur industry. But this industry is at present in a depressed condition, in consequence of which only the more efficient cultivators are able to make any profit at all by Gur making.

CAUSES OF DEPRESSION OF THE GUR INDUSTRY.

The causes which have contributed towards the present slump in the Gur industry may be summarised as follows :—

(a) The general economic and agrarian depression is, perhaps, the most potent cause. In consequence of the reduced purchasing power of the people, the demand for Gur (which in comparison with the essential articles of food and clothing is something in the nature of a luxury) has necessarily been considerably curtailed.

(b) The prices for Gur in Northern India are exceptionally low this year, having dropped to Rs. 2-8-0 per maund in certain parts. As a result of competition

from Northern India Gur in the common markets (the Central India, Berar, the Rajputana States etc.) the Deccan Gur is unable to retain its previous privileged position in those markets.

(c) There has been considerable increase in cane cultivation all over India, and with the increasing adoption of improved varieties of sugarcane, the tonnage per acre has also increased. The increased acreage under cane in localities adjoining the Deccan—the Nizam's dominions, the Mysore State and the Central Provinces—has directly reacted on the industry in Deccan.

(d) The change in customs and tastes of the people is gradually increasing the demand for sugar, which is partly in displacement of the demand for gur.

FUTURE PROSPECTS OF THE GUR INDUSTRY.

On the basis of the above analysis of the causes of depression of the Deccan Gur Industry, it is possible to form some idea of the future prospects of the industry. It will be observed that with the exception of the first of the above mentioned causes, namely, the agrarian depression—which, it is to be hoped, is of a temporary nature—all the other causes are of a more or less permanent type. In consequence of this it is likely that instead of any improvement in the condition of the Gur industry, a further decline may take place. All the indications appear to show that this is what may be expected and that eventually gur prices may become stabilised at round about Rs. 13 per palla in a year or so.

This will mean a serious dislocation of the agricultural economy of the canal area and will inevitably result in a further curtailment of the area under cane, thereby reducing the revenue from canals.

To prevent these serious consequences, the following remedies are suggested :—

- (a) Adoption of measures which will increase the margin of profit from Gur making,
- (b) Introduction of sugar making.

IMPROVEMENT OF GUR MAKING.

The Gur industry is already well established on an extensive scale. Any improvements which may be introduced in the industry will, therefore, have the advantage of benefiting cane cultivation directly and immediately. The following suggestions are made for assisting the industry :—

(a) Government may give serious consideration to the possibility of helping the irrigators in the matter of water charges and of simplifying the rules governing the use of canal water.

Complaints were made by practically every cultivator who was interviewed that the water charges are excessive and should be reduced, and that the irrigation rules, particularly those in connection with the block system and bunding, are too complicated and irksome. It was outside the purpose of my enquiry to go into the merits and demerits of these assertions. But in view of the unanimity with which complaints were made by almost all the cultivators interviewed, attention is being drawn to them here.

(b) Every possible effort should be made by the Department of Agriculture to introduce methods whereby the cultivator may be able to reduce the cost of cane growing. An extensive programme of demonstration of the methods evolved at the Manjri farm should be adopted.

(c) The Gur industry is at present too much dependent on a single variety of cane, namely, the Pundia. It is true that from the Gur makers' points of view the variety has many important qualities in its favour—e.g. its softness, light coloured juice, high sucrose content and its quality of responding to intensive cultivation. But it has several serious defects also. Thus it is liable to disease, needs heavy manuring, has a delicate root system, is a poor ratooner and is inferior to some of the other varieties in respect of sucrose content and tonnage.

From the Gur makers' point of view P.O.J. 2878 is likely to be superior to Pundia in every respect specially in view of its light colour and low glucose content. The H. M. varieties developed at the Hebbal farm in Mysore, particularly H. M. 320 have higher sucrose and brix and lower glucose than even P.O.J. 2878. The Department of Agriculture should give special attention to popularising these varieties amongst the cultivators.

(d) There is considerable room for improvement on the manufacturing side of the Gur industry. The type of cane crusher which is most commonly in use in the Deccan has been almost entirely discarded in the Northern India on account of its weak construction and the low extraction of juice which it gives. There are several well known crushers of a strong and efficient type on the market and the Department of Agriculture should arrange for demonstration of these.

The furnace used for boiling the juice, commonly called the Poona furnace, which was evolved by the Department of Agriculture, is in many ways the most efficient furnace for gur making in India. Thus, it has a large capacity and is extremely efficient in respect of fuel consumption. But there is still room for improvement in several respects, particularly in the shape and size of the pans and the construction of flues. The department of Agriculture should make a further study of the furnace and introduce such improvements as will remove these defects.

The present system of Gur making does not provide for any kind of clarification of the juice. This is an important omission, and but for this the quality of Gur produced should have been much more superior. The clarifying agents commonly used in the Rohilkhand khandhari industry may be given a trial.

Finally, suitable improvements should be made in the manufacturing process which will increase the keeping quality of Gur. One method which suggests itself is to smear the cloth, which is placed in the mould, with a paste of sugar. This will form a coating on the block of Gur which will prevent surface oxidation and avoid the consequent discolouration.

If improvements on the lines indicated above are made, Gur making need not be a losing business, although it is likely that the margin of profit will always be small.

DEVELOPMENT OF SUGAR MAKING.

In order that cane cultivation in the Deccan may become profitable and that it may be placed on a more permanent footing, it is essential that cane should be turned into sugar in preference to Gur. The reasons favouring sugar making are firstly, the higher efficiency of the sugar making process as compared with that of making gur and, secondly, the assurance that a suitable price level will be maintained for some years, which has been given by the adoption of a protective tariff on sugar. Whereas sugar prices are more or less certain to remain at a reasonable level for the next 15 years, there is no similar assurance in regard to Gur prices which will continue to be affected by supply and demand.

If it is accepted, as appears to be obvious, that sugar making should be adopted and encouraged in the Deccan, the next point for consideration is as to the size and type of unit factories to be established and the methods by which they are to be brought into existence.

Large Factories.—As regards the size of unit factories it is evident that the larger the factory, the more advantageous it will be from every point of view. There is, within certain limits, an increase in efficiency with an increase in the size; and there is also, at the same time, a reduction in the overhead charges and management expenses. For conditions obtaining in the Northern India where the white sugar industry of India is mostly established, a capacity of 400 tons of cane per day has been found to be a good average size for a factory. The same size may be recommended for the Deccan area. A factory of this size will require an estate of about 6,000 acres. A scheme for a 400 tons factory with an estate of 6,000 acres is attached to this memorandum showing details of capital cost and working expenses for such a factory (see Scheme No. 1).

Whilst, as stated above, a large factory, is to be preferred, there are serious difficulties in the way of establishing such factories on the existing *developed* canals in the Deccan. It will be impossible for such a factory to get even a fraction of its cane supplies by purchasing from the existing cultivators. This was the experience of the ill-fated Baramati factory, and there is no reason why the same fate may not befall factories that may be built hereafter, as the circumstances have not altered. For a factory to be assured of its cane supply, it is necessary that it should have its own plantation. There is, however, no locality on the developed canals in the Deccan where 5,000 or 6,000 acres of irrigable land suitable for cane cultivation may be available. Nothing short of compulsory acquisition will enable a factory to get so much land in one place, but there will be no justification on public grounds for such compulsory acquisition by Government.

The above remarks apply to the developed canal areas only. On the undeveloped canals, like the Nira Right Bank Canal, particularly in the Malsiras Taluka where cane cultivation has not been taken up by the cultivators so far, it should be possible for sugar factories to get the necessary land on lease by direct negotiations provided they pay reasonable rents. There is believed to be about 30,000 acres of such land on the Nira Right Bank Canal, which should be sufficient for five or six new factories.

Small factories.—On the areas commanded by the developed canals where all the Deccan gur industry is located and where it is not possible, as explained above, to establish large factories, there is no alternative excepting to introduce small factories. Such factories, which will have capacities ranging between 50 tons and 150 tons of cane

perday, are really too small to be economical under normal conditions, but they are recommended for the peculiar conditions of the developed canal area in the Deccan, because—

- (a) they are more efficient than Gur making,
- (b) their size will be just suitable for the area under cane which an average cultivator can command.
- (c) their capital cost is not too high, and
- (d) they will pave the way to the establishment of large factories later on, as happened in Northern India.

Two schemes for such small factories are given at the end of this memorandum. One of these (scheme No. 2) relates to a factory having a capacity of 50 tons cane per day and requiring a capital investment of about 1½ lakhs. This is a simple type of factory equipped with machinery of moderate efficiency, a large proportion of which can be made in India, thus reducing the expenditure on import duty, freight etc. Excepting for its low capital cost a factory of this type is however not to be recommended. It is a much better proposition to spend a little more money and put up a factory of 60 tons capacity capable of extension later on to 150 tons, details of which are given in Scheme No. 3.

It may be pointed out that small scale sugar manufacture according to the Khandsari system, as followed in the United Provinces or according to the modified Khandsari system developed by Mr. Hadi and others, is not to be recommended for the Deccan. These processes are much too inefficient to be able to compare favourably with the highly developed Gur industry of the Deccan. Their suitability to the United Provinces is due to the exceedingly small scale on which the industry is worked there. The cane cultivators in the Deccan, on the other hand, have comparatively larger quantities of cane to deal with and the Khandsari process will be unsuitable for their requirements.

RECOMMENDATIONS.

In addition to the proposals already made in this memorandum the following recommendations are made with the object of developing the sugar industry in the Deccan :—

(a) *Large factories.*—For the development of these, no assistance from the Government is needed. The protection which has been granted is sufficient assistance. There is no necessity for Government assistance in acquiring land, whether by purchase on lease, for such factories. Similarly, semi-compulsory arbitration is also not recommended, as generally the cultivator fails to secure an equal and impartial representation on such arbitration boards. The margin of profit for a large sugar factory is so large that it can afford to pay a handsome rent for the land which it takes on lease and this should be a sufficient inducement for the cultivators to give their land to the factory. This incidentally will ensure that the cultivators will have at least a small share in the profits of the sugar factories. These profits, it should be remembered, have been made possible as a result of the high protective tariff for which the consumer pays approximately 10 crores of rupees annually. The recommendations of the Tariff Board regarding protection for the sugar industry were based largely on considerations affecting the general agricultural economy of the country and not so much on the interests of sugar factory owners.

It may also be pointed out that several parties from Java are at present enquiring into the possibilities of establishing sugar factories in India. Their main difficulty is that they cannot get land for cane cultivation. In Northern India, where most of the sugar factories are located, the practice is for the factories to purchase cane from cultivators over whom they have no control. Such a system does not permit of improvements being made in the cultivation of cane and without such improvement the Java manufacturers cannot obtain in India the high efficiencies which they get in their own country. In the Deccan canals area, however, the conditions are different and it is quite possible that they may try to secure land for cane cultivation and set up factories under the protection afforded by the high tariff on sugar. Every care will have to be taken that this is not allowed to happen. Such a policy will be justifiable, because sugarcane cultivation in this areas has been made possible only on account of the canals, which have been built with public funds. One possible method of preventing such factories being put up is to refuse canal water to them.

(b) *Small factories.*—In order to assist in the establishment of small factories in the developed canals area, the following recommendations are made :—

- (i) Technical assistance to those wishing to set up small factories should be given by the Government. Such assistance will be required in the preparation of schemes and specifications, in the erection of plant and operating it during the first few

seasons, and in improving the cultivation of cane with the object of reducing the cost of cultivation. For this purpose the Government should engage, on short term contracts, the following technical staff—

A Sugar Engineer with experience of erecting and operating Sugar machinery. Salary Rs. 700—50—800. To be engaged for 3 years.

A Sugar Chemist with experience of sugar manufacture and chemical control work. Salary Rs. 500—50—700. To be engaged for 5 years.

A Sugarcane Agriculturist with experience of improved methods of cane cultivation in the Deccan. This officer may be lent by the Department of Agriculture. Salary Rs. 250—25—350. To be engaged for 5 years.

The above technical staff should be placed under the department of Agriculture who should provide facilities for the use of laboratories and libraries. The services of the staff should be available free of charge to those putting up small sugar factories, either with or without Government help.

(ii) There is a course of training in Sugar Technology at the H. B. Technological Institute, Cawnpore. Suitably qualified students who have taken the B.Ag. or the B.Sc. degree and who belong to families of sugarcane cultivators in the Deccan should be awarded scholarships of Rs. 25 per mensem each by the Bombay Government, and should be sent for training to Cawnpore. The Imperial Council of Agricultural Research nominates five students annually for free training in the course of Sugar Technology. Arrangements can be made for the inclusion amongst the Council's nominees of one or two students every year from the Deccan.

(iii) As regards financial assistance to those starting small factories, no loans or grants from the Government, are recommended, as these usually attract persons of an unsuitable type, who either have not sufficient money of their own or are not able to raise the requisite capital. The assistance may much more effectively be given in the form of a subsidy on the actual output of sugar to a limited number of pioneer factories built within, say, the first three years. The location of these factories should be carefully selected, so that they may be useful as centres for demonstration and propaganda. The subsidized factories should be required to provide facilities for training apprentices.

The scale of subsidy suggested is Re. 1 per maund (of 82 lbs.) of sugar produced in the first season, Re. 0-12-0 in the second season and Re. 0-8-0 in the third season, after which the subsidy will cease. The full output of a 50 tons factory will be about 15,000 maunds of sugar per season. Assuming the factory to have 80 per cent. of its normal output in the first season, 90 per cent. in the second and 100 per cent. in the third season, the total amount of subsidy which it will receive will be about Rs. 30,000, spread over a period of three years. This is not a large amount, considering that, unlike loans and grants, it will be payable only if and when the factory has been built and sugar has actually been produced. The subsidy will be instrumental in inducing private capital to be invested in the industry (which is the only proper foundation on which to establish a new industry) and will also provide the necessary incentive for the newly established factories to increase their efficiency and output in order to get a larger amount as subsidy.

The total number of pioneer factories to which subsidy on the above lines will have to be paid, will depend in the interest which the first few factories create amongst the public. Possibly two such factories started every year for three years, the subsidy being given to each for three years will be sufficient to produce the necessary response from the cultivators of the entire Deccan Canals area.

The financial effect of the above proposals may be summarised as follows:—

	Rs.
1. Salary of Sugar Engineer for 3 years	27,000
2. Salary of Sugar Chemist for 5 years	36,000
3. Salary of Sugarcane Agriculturist for 5 years	18,000
4. Clerical and inferior establishment for the above officers	12,000
5. Stationery and sundry office expenses for the above officers..	5,600
6. Laboratory equipment and tools	6,000
7. Travelling Allowance for above officers	8,500
8. Contingencies	1,500
9. Scholarships at Rs. 25 per month for 3 years each to 6 students.	5,400
10. Subsidy at Rs. 30,000 each to six factories	1,80,000
	3,00,000

This expenditure which will be spread over a period of five years is not large judged either from the point of view of the interests of the Deccan cane cultivators or from that of making the Deccan canals a source of profit to the Government.

(Signed) R. C. SRIVASTAVA,

Sugar Technologist,
Imperial Council of Agricultural Research, India.

The 11th March 1932.

ANNEXURE.

Three schemes for factories having capacities of 400 tons, 50 tons and 60 tons cane per day are annexed. The schemes have been prepared on the basis of conditions obtaining in the Deccan Canals area, which are entirely different to those in the White Sugar tract of Northern India. Although the schemes have been prepared after a tour of enquiry in the Canals area, they should be regarded as only estimates. In order to prepare schemes which would be accurate in all details, more exact local enquiry for each individual case will be necessary. Thus the price of machinery which forms the largest single item in the capital cost of a factory, will vary with the type and design selected, and with the degree of efficiency and durability required. It is hoped however that in spite of these limitations, the schemes will serve to give a fairly accurate idea of the capital cost and manufacturing expenses of factories of these sizes.

In connection with the 50 ton and 60 ton schemes, it should be pointed out that the price of cane has been reckoned at Rs. 15 per ton. The price of Gur in the Deccan is at present about Rs. 15 per palla (250 lbs.). A ton of cane generally gives a palla of gur. Therefore by allowing Rs. 15 per ton for cane supplied to the factory the cane grower gets a return for his cane equivalent to what he would get if he converted it into gur and sold the gur at a price per palla equal to Rs. 15 plus an amount equivalent to the cost of manufacturing a palla of Gur. If, as is likely to be the case in the Deccan, the cane grower also happens to be the owner of the factory, his profit from sugar making will be in addition to that from selling cane at Rs. 15 per ton.

SCHEME No. 1.

Scheme for a factory to crush 400 tons of Cane per day and produce direct consumption white sugar in the Deccan Canals Area. The factory to have its own estate for cane cultivation.

I. DATA.

The following data have been accepted for preparing the scheme :—

(d) *Duration of cane season.*—From 1st November to end of April or a total of 181 days.

Allowing for holidays and unforeseen stoppages, the factory will work for 145 days.

(b) *Cane required.*—The factory will require 58,000 tons (or 15,77,600 mds.) of cane per season, which at 35 tons cane per acre will be the crop of 1657 acres. Assuming a three years rotation, an estate of 5,000 acres will be required. Actually an estate of 6,000 acres is provided in the scheme.

(c) *Quality of cane.*—The cane as delivered at the factory is assumed to have the following analysis (average for the whole season):—

Sucrose	13 per cent. on cane.
Fibre	11½ per cent. on cane.
Purity of mixed juice—	82.

(d) *Recovery*—

Sugar—10 per cent. on cane (equivalent to 76·9 per cent. overall efficiency).
Molasses—3½ per cent. on cane.

(e) *Prices*—

Cane—The cost of cultivation on an estate of this size should be about Rs. 400 per acre. For the purpose of this scheme, the cost of cane, delivered at the factory, is assumed to be Rs. 14 per ton (equivalent to Rs. 490 per acre at 35 tons cane per acre).

Sugar—Rs. 10-8-0 per md. (or Rs. 14-5-6 per cwt.) ex-factory, average for 1st and 2nd grades. The price is based on the assumption that the present surcharge of 25 per cent. on the import duty on sugar will not be re-imposed after March 1933, after which foreign sugar will have to pay only the protective duty of Rs. 7-4-0 per cwt.

Molasses—Re. 0-8-0 per md. ex-factory.

II. CAPITAL COST.

A. ESTATE.—It is assumed that land will be taken on lease and will not be purchased outright. The expenses for developing the land are calculated on the basis of land of the type obtainable along the Nira Right Bank Canal, in the Malsiras Taluka.

The capital expenditure on the Estate is estimated as follows :—

	Rs.
(a) One set steam tackle, consisting of 2 engines and 4 implements (plough, cultivator, disc harrow and disc ridger)	60,000
(b) Heavy type crude oil tractor, complete with implements	12,000
(c) 50 pairs of bullocks at Rs. 250	12,500
(d) Bullock ploughs and ridgers, bullock carts and implements	1,000
(e) 12 miles trolley line, 2 feet gauge, at Rs. 4,000 per mile	48,000
(f) Two kerosene or crude oil engines for traction, at Rs. 5,000	10,000
(g) 100 cane trucks, 3 tons capacity, at Rs. 300 each	30,000
(h) Farm buildings at four centres	40,000
(i) Development of land, 6,000 acres at Rs. 20 per acre. (This will be spread over several years.)	1,20,000
(j) Main roads and cart tracks on the estate, 50 miles at Rs. 1,000 per mile, average	50,000
(k) Working capital for Estate (equivalent to outlay on one season's crop)	6,00,000
(l) Contingencies	16,500
Total ..	10,00,000

B. FACTORY.

(a) Cost of machinery (including factory plant, staging, piping, driving gear, repair shop, erection tools and tackle and electric lighting), F. O. B. port of shipment, £42,000	5,60,000
(b) Insurance, sea and rail freight, dock dues and customs duty	90,000
(c) Factory building, roofing material, doors and windows and electric wiring	60,000
(d) Machinery foundations, boiler brickwork, flues and erection of machinery	70,000
(e) Salary and passage of machinery erector (portion for period of erection charged to capital)	8,000
(f) Water supply (tube well and water mains)	10,000
(g) Condenser water cooling tank with drains	4,000
(h) Molasses tanks	15,000
(i) Sugar godown	25,000
(j) Buildings for office, mill-stores and laboratory	10,000
(k) Apparatus, chemicals, and equipment for laboratory	5,000
(l) Assisted railway siding and weighbridge	20,000
(m) Bungalow and quarters	70,000
(n) Factory, boundary walls, gates and drainage	10,000
(o) Land, 35 acres	7,000
(p) Trolley and cart weighbridges	6,000
(q) Contingencies	20,000
Total ..	10,00,000

Total capital cost including Estate and Factory .. 20,00,000

Rs.

III. ^o WORKING EXPENSES PER YEAR.

(a) Cost of cane, 58,000 tons at Rs. 14 per ton	8,12,000
(b) Salaries and wages (as per details in IV)	93,000
(c) Fuel (coal, firewood and crude oil)	12,000
(d) Lime	4,000
(e) Sulphur	7,000
(f) Filter cloth	8,000
(g) Lubricants	5,000
(h) Gunny bags	16,000
(i) Sundry stores	10,000
(j) Repairs and renewals	15,000
(k) Railway siding charges	3,000
(l) Depreciation on machinery and buildings	50,000
(m) Interest on bank overdraft for working capital	25,000
(n) Insurance, brokerage, commission, Directors' and Auditors' fees, etc.	25,000
Total	10,85,000

IV. DETAILS OF SALARIES AND WAGES (EXCLUDING ESTATE STAFF).

(a) Manager at Rs. 1,000 for 12 months	12,000
(b) Engineer at Rs. 700 for 12 months	8,400
(c) Chemist at Rs. 500 for 12 months	6,000
(d) Two Assistant Engineers at Rs. 150 and Rs. 100 for 12 months	3,000
(e) Three Assistant Chemists at Rs. 100 for 12 months	3,600
(f) Cane supply Overseer at Rs. 100 for 12 months	1,200
(g) Permanent office establishment, as per details below, at Rs. 470 for 12 months	5,640
1. Accountant and Head Clerk Rs. 100.	
2. Cashier Rs. 50.	
3. Stenographer Rs. 70.	
4. Record Keeper and Despatcher Rs. 40.	
5. Godown Clerk Rs. 40.	
6. Time Keeper Rs. 40.	
7. Store Keeper Rs. 50.	
8. Two extra clerks Rs. 80.	
(h) Fifteen seasonal clerks at Rs. 30 for 7 months	3,150
(i) Three panmen on Rs. 100, 60 and 50 (Total Rs. 210) for 7 months	1,470
(j) Thirty mistries, assistant panmen and mates at Rs. 30 for 7 months	6,300
(k) 500 coolies for 6 months at Rs. 11 each per month	33,000
(l) Contract labour at Rs. 1,000 for 6 months	6,000
(m) Retainers for off season to (i) and (j), lump sum	3,240
Total	93,000

V. RECEIPTS PER YEAR.

(a) Sugar (at 10 per cent. of 1,577,600 maunds cane or 157,760 maunds sugar) at Rs. 10-8-0 per maund, mill delivery	16,56,480
(b) Molasses (at 3½ per cent. of 1,577,600 maunds cane or 55,216 maunds molasses) at Re. 0-8-0 per maund, mill delivery	27,608
Total Receipts	16,84,088

VI. ANALYSIS OF COST OF PRODUCTION.

	Total.	Per maund of sugar.
	Rs.	Rs. a. p.
(a) Cost of cane	8,12,000	5 2 4
(b) Total manufacturing expenses	2,73,000	1 11 9
<hr/>		
Gross cost of production of sugar	10,85,000	6 14 1
Deduct—Price of molasses	27,608	0 2 8
<hr/>		
Net cost of production of sugar	10,57,392	6 11 5

VII. PROFIT PER YEAR.

	Rs.
(a) Receipts (as per V)	16,84,088
(b) Expenses (as per III)	10,85,000

Profit .. 5,99,088

or 30 per cent. on a capital Rs. 20 lakhs.

This profit is exclusive of any profit which the Estate may make by growing cane at below Rs. 14 per ton, for which there is a reasonable scope.

SCHEME No. 2.

Scheme for a factory to crush 50 tons of cane per day and produce direct consumption white sugar. The factory to be of simple type suitable for small cane cultivators.

I. DATA.

The following data have been accepted for preparing this scheme :—

(a) *Duration of cane season.*—From 15th November to end of April (assuming that the season is started with Adsali cane), or a total of 166 days.

Allowing for holidays and unforeseen stoppages the factory will work for 130 days.

(b) *Cane required.*—Assuming the cane crushed to be one-third Adsali and two-thirds plant and ratoon cane, and the yields to be 50 tons and 40 tons per acre for Adsali and plant Pundia cane respectively, the requirements will be :—

	Tons.	Acres.
(1) Adsali Pundia cane	2,167	44
(2) Plant Pundia cane	4,333	108
	<hr/>	<hr/>
	6,500	152

or 176,800 maunds cane.

(Note.—The above acreage allows only for the crop to be actually harvested each season and not for ratoon crops, overlapping, etc.)

(c) *Quality of cane.*—The cane as delivered at the factory is assumed to have the following analysis (average for the whole season) :—

Sucrose	13 per cent. on cane.
Fibre	11½ per cent. on cane.
Purity of mixed juice.	82.

If a harder cane containing a higher percentage of fibre issued, a more efficient milling plant will have to be provided which will increase the capital cost of the factory.

(d) *Recovery.*—Sugar—8½ per cent. on cane (equivalent to 65.4 per cent. overall efficiency).

Molasses—4½ per cent. on cane.

(e) *Prices.*—Cane—Rs. 15 per ton, delivered at the factory.

Sugar—Rs. 10 per maund (or Rs. 13-9-6 per cwt.) ex factory, average for 1st and 2nd grades.

This price is based on the assumption that the present surcharge of 25 per cent. on the import duty on sugar will not be reimposed after March 1933, after which foreign sugar will have to pay only the protective duty of Rs. 7-4-0 per cwt.

Molasses—Rs. 0-8-0 per maund ex factory.

	Rs.
II. CAPITAL COST.	
(a) Cost of machinery (including factory plant, staging, piping, driving gear, and electric lighting). Machinery to be partly made in India	85,000
(b) Insurance, sea and rail freight, dock dues and customs duty on imported machinery	6,000
(c) Machinery foundations and erection, and factory buildings	25,000
(d) Water supply from canal and a small tube well	1,000
(e) Molasses tank of iron or masonry	1,500
(f) Sugar godown	2,500
(g) Land, 5 acres	1,000
(h) Contingencies	3,000
Total ..	1,25,000

(Note.—Residential and office buildings are not allowed for in the above as it is presumed that these will be available locally.)

	Rs.
III. WORKING EXPENSES PER YEAR.	
(a) Cost of cane, 6,500 tons at Rs. 15 per ton	97,500
(b) Salaries and wages (as per details in IV)	19,800
(c) Fuel (firewood and crude oil)	3,000
(d) Lime	400
(e) Sulphur	700
(f) Filter cloth	1,000
(g) Lubricants	600
(h) Gunny bags	2,200
(i) Sundry bags	1,500
(j) Repairs and renewals	1,500
(k) Depreciation on machinery and buildings	4,000
(l) Interest on borrowed working capital	3,000
(m) Insurance, Auditors' fees, brokerage and commission	1,000
Total ..	1,36,200

	Rs.
IV. DETAILS OF SALARIES AND WAGES.	
(a) Chemist at Rs. 200	2,400
(b) Engineer at Rs. 150	1,800
(c) Accountant and Cashier at Rs. 50	600
(d) Store Keeper at Rs. 25	300
(e) One Assistant Chemist at Rs. 75 for 6 months	450
(f) One Assistant Engineer at Rs. 75 for 6 months	450
(g) Six seasonal clerks at Rs. 25 per month for 6 months	900
(h) Three panmen at Rs. 40, Rs. 30 and 30 (total Rs. 100) for 6 months	600
(i) Six mistries and mates at Rs. 25, average, for 6 months	900
(j) 120 coolies for 6 months at Rs. 15 per month each	10,800
(k) Miscellaneous contract labour at Rs. 100 per month for 6 months	600
Total ..	19,800

	Rs.
V. RECEIPTS PER YEAR.	
(a) Sugar (at 8½ per cent. on 176,800 maunds cane, or 15,028 maunds sugar) at Rs. 10 per maund, mill delivery.	1,50,280
(b) Molasses (at 4½ per cent. on 176,800 maunds cane, or 7,956 maunds molasses) at Re. 0-8-0 per maund, mill delivery	3,978
Total Receipts	1,54,258

VI. ANALYSIS OF COST OF PRODUCTION.				Total	Per maund of sugar.
				Rs.	Rs. a. p.
(a) Cost of cane	..	..	..	97,500	6 7 10
(b) Total manufacturing expenses	..	..	..	38,700	2 9 2
<hr/>					
Gross cost of production of sugar	..	..	..	1,36,200	9 1 0
Deduct—Price of molasses	..	..	..	3,978	0 4 3
<hr/>					
Net cost of production of sugar	..	..	..	1,32,222	8 12 9
<hr/>					
VII. PROFIT PER YEAR.					
(a) Receipts (as per V)	..	..	..	1,54,258	
(b) Expenses (as per III)	..	..	..	1,36,200	
<hr/>					
Profit	..	..	..	18,058	

or 14 per cent. on a capital of 1¼ lakh rupees.

SCHEME No. 3.

Scheme for a factory to crush 60 tons of cane per day and produce direct consumption white sugar. The factory to be capable of extension to a capacity of 150 tons.

I. DATA.

The following data have been accepted for preparing this scheme :—

(a) *Duration of cane season.*—From 15th November to end of April (assuming that the season is started with Adsali cane), or a total of 166 days.

Allowing for holidays and unforeseen stoppages the factory will work for 130 days.

(b) *Cane required.*—Assuming the cane crushed to be one-third Adsali and two-thirds plant and ratoon cane, and the yields to be 50 tons and 40 tons per acre for Adsali and plant Pundia cane respectively, the requirements will be :—

			Tons.	Acres.
(i) Adsali Pundia cane	..	..	2,600	52
(ii) Plant and ratoon	..	..	5,200	130
<hr/>				
Total	..	..	7,800	182

or 212,160 standard maunds.

(c) *Cane required after extension.*—When the factory is extended to 150 tons capacity, the cane requirements will be as follows :—

			Tons.	Acres.
(i) Adsali Pundia cane	..	..	6,500	130
(ii) Plant and ratoon Pundia cane	..	..	13,000	325
<hr/>				
Total	..	..	19,500	455

or 530,400 standard maunds.

(Note.—The above acreage allows only for the crop to be actually harvested each season and not for ratoon crops, overlapping cane, etc.)

(d) *Quality of cane.*—The cane as delivered at the factory is assumed to have the following analysis (average for the whole season) :—

Sucrose	..	..	13 per cent. on cane.
Fibre	..	..	11½ per cent. on cane.
Purity of mixed juice	..	..	82.

(e) *Recovery.*—Sugar—9 per cent. on cane (equivalent to 69 per cent. overall efficiency).

Molasses—4½ per cent. on cane.

(Note.—After the factory is extended to 150 tons capacity, the recovery of sugar should increase to 9¼ per cent. on cane, that of molasses remaining 4½ per cent.)

(f) Prices.—Cane Rs. 15 per ton delivered at the factory.

Sugar Rs. 10-4-0 per maund (or Rs. 13-15-0 per cwt.) ex factory average for 1st and 2nd grades. This price is based on the assumption that the present surcharge of 25 per cent. on the import duty on sugar will not be reimposed after March 1933, after which foreign sugar will have to pay only the protective duty of Rs. 7-4-0 per cwt.

Molasses—Re. 0-8-0 per maund ex factory.

II. CAPITAL COST.

	Rs.
(a) Cost of machinery (including factory, plant, staging, piping, driving gear, repair shop, erection tools and tackle and electric lighting), F. O. B. port of shipment, £10,000 ..	1,34,000
(b) Insurance, sea and rail freight, dock dues and 10 per cent. customs duty	30,000
(c) Factory buildings of brickwork, roofing material, doors and windows and electric fittings	20,000
(d) Machinery foundations and erection, boiler and flues ..	1,500
(e) Water supply (from canal and a small tube well) ..	1,500
(f) Molasses tank (of iron or masonry)	2,000
(g) Sugar godown	5,000
(h) Buildings for office, mill stores and laboratory ..	3,000
(i) Apparatus, chemicals and equipment for laboratory ..	3,000
(j) Factory boundary wall, gates and drainage	2,000
(k) Land, 7 acres	1,500
(l) Contingencies	3,000
Total ..	2,25,000

(Note.—Residential buildings are not allowed for in the above as it is presumed that these will be available locally.)

III. WORKING EXPENSES PER YEAR.

	Rs.
(a) Cost of cane, 7,800 tons at Rs. 15 per ton	1,17,000
(b) Salaries and wages (as per details in IV)	22,130
(c) Fuel (coal, firewood and crude oil)	3,000
(d) Lime	400
(e) Sulphur	800
(f) Filter cloth	1,200
(g) Lubricants	800
(h) Gunny bags	2,700
(i) Sundry stores	1,500
(j) Repairs and Renewals	1,500
(k) Depreciation on machinery and buildings	8,000
(l) Interest on bank overdraft for working capital ..	3,000
(m) Insurance, Auditors' fees, brokerage, commission, etc. ..	2,000
Total ..	1,64,030

IV. DETAILS OF SALARIES AND WAGES.

(a) Manager and Chemist at Rs. 250	3,000
(b) Engineer at Rs. 150	1,800
(c) Permanent office establishment as per details below at Rs. 120 per month for 12 months	1,440
1. Accountant and Cashier Rs. 50.	
2. Typist and general clerk Rs. 35.	
3. Store Keeper Rs. 35.	
(d) One Assistant Chemist at Rs. 75 for 6 months ..	450
(e) One Assistant Engineer at Rs. 75 for 6 months ..	450
(f) Five seasonal clerks at Rs. 25 for 6 months ..	750
(g) Three panmen on Rs. 45, 35 and 35 (total Rs. 115) for 6 months	690
(h) 9 mistries and mates at Rs. 25, average, for 6 months ..	1,350
(i) 120 coolies for 6 months at Rs. 15 per month each ..	10,800
(j) Miscellaneous contract labour at Rs. 150 per month for 6 months	900
(k) Retainers for off season (d), (e), (g) and (h), lump sum ..	500
Total	22,130

		Rs.
V. RECEIPTS PER YEAR.		
(a) Sugar (at 9 per cent. on 212,160 maunds cane, or 19,094 maunds sugar) at Rs. 10-4-0 per maund, mill delivery.		1,95,713
(b) Molasses (at 4½ per cent. on 212,160 maunds cane, or 9,547 maunds molasses) at Re. 0-8-0 per maund, mill delivery		4,773
	Total Receipts ..	2,00,486

		Total.	Per maund of sugar.
		Rs.	Rs. a. p.
(a) Cost of cane		1,17,000	6 2 1
(b) Total manufacturing expenses		47,030	2 7 4
		1,64,030	8 9 5
Gross cost of production of sugar		1,64,030	8 9 5
Deduct—Price of molasses		4,773	0 4 0
		1,59,257	8 5 5
Net cost of production of sugar			

		Rs.
VII. PROFIT PER YEAR.		
(a) Receipt (as per V)		2,00,486
(b) Expenses (as per III)		1,64,030

36,456

or 16 per cent. on a capital of Rs. 2¼ lakhs.

APPENDIX XV.

Under G. M., P. W. D., No. S. 192/5423-E, dated 15th March 1932, the following allotment was sanctioned :—

Rs.	
2,000	Travelling allowance to non-official members of the Committee.
100	Establishment contingencies (exclusive of charges for printing the report).

2,100

Actually the travelling allowance has amounted to Rs. 1,556-15-0 and establishment contingencies to Rs. 120. An honorarium of Rs. 50 was given to the clerk detailed from the office establishment of the Special Irrigation Division for the typing and clerical work in connection with the Committee. The cost of printing is estimated by the Manager, Government Central Press, Bombay, to be Rs. 533-2-0.*

2. Official members attended to the work of the Committee in addition to their ordinary duties. Non-official members received no remuneration but drew travelling allowance.

* The cost of printing this second edition is estimated to be Rs. 422.

LIST OF PLATES.

- PLATE I—Graph showing cane areas in the Bombay Presidency excluding Sind from 1910 to 1930.
- „ II—Graph showing non-canal cane and rainfall (of the previous year) in the Bombay Presidency.
- „ III—Graph showing cane area in the Bombay Presidency (excluding Sind) and average annual rainfall in the Deccan.
- „ IV—Diagram illustrating the System of Irrigation followed by the Belapur Co.
- „ V—Chart showing comparative costs of the manufacture of sugar in large central and small local type factories.

IRRIGATION DEVT: AND RESEARCH CIRCLE.

SUGAR CANE AREAS IN THE BOMBAY PRESIDENCY

EXCLUDING SIND.

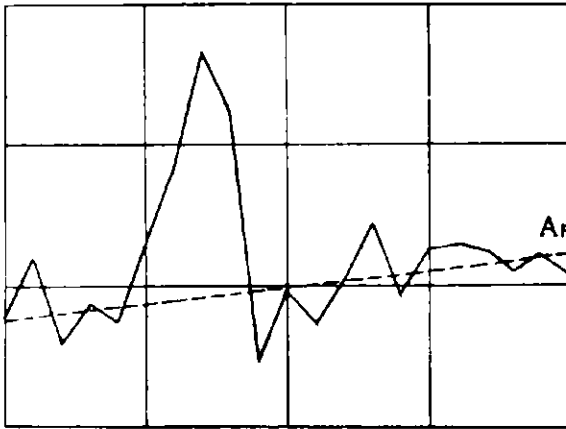
ACRES.

100,000

80,000

60,000

40,000



AREA = $434y + 55484$

$\sigma = \pm 3780$

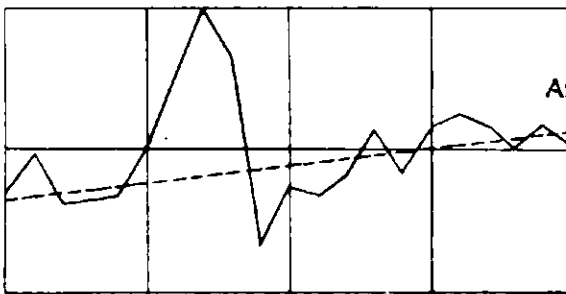
Variation as % of mean (60050 acres) = 6.3 %

SUGAR CANE AREAS IN THE BOMBAY DECCAN

60,000

40,000

20,000



AREA = $454y + 33422$

$\sigma = \pm 2890$

Variation as % of mean (38404 acres) = 7.5 %

YEARS → 1910

UNITS → 0

5

10

15

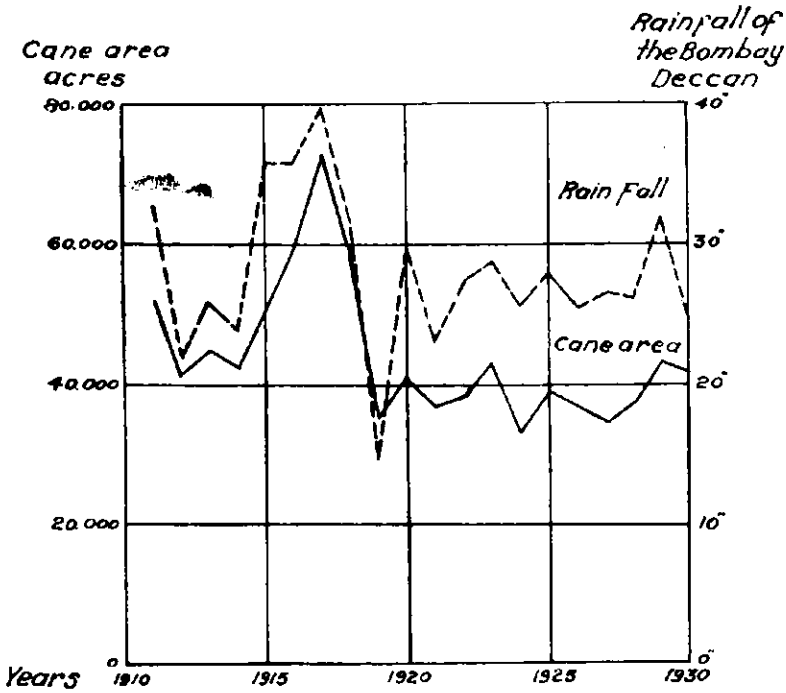
20

Note: Year 1915 to 1919 being abnormal have been ignored in the calculation of σ .

CC Singh

Superintending Engineer
Irrigation Dept: & R.C.

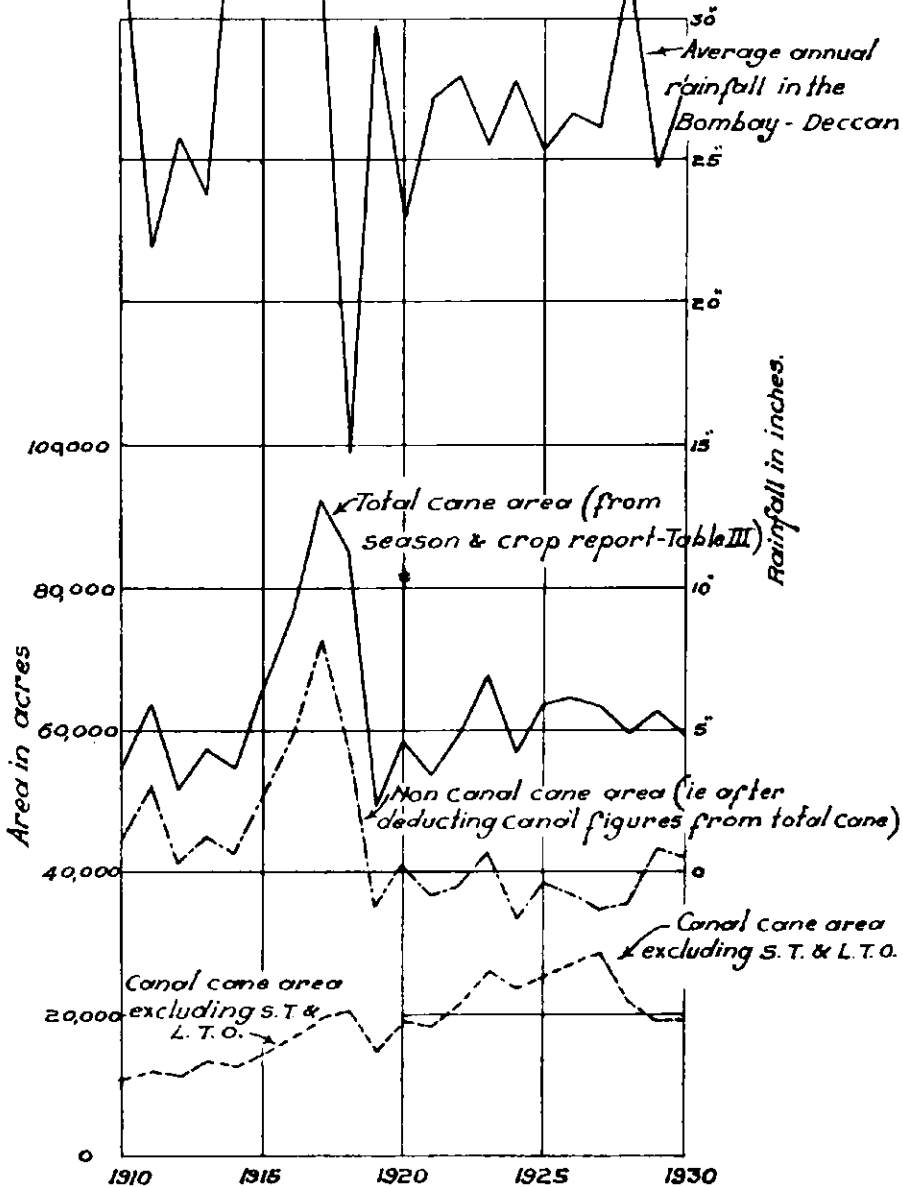
Irrig: Devpt: and Research Circle.
Graph showing non-canal cane & rainfall
(of the previous year) in the Bombay presidency.



C. B. Singh
Superintending Engineer
Irrigation Devpt: & R.C.

T. By - D. B. Gode 27-1-38

Irrig: Dept: and Research Circle.
Graph showing cane area in the Bombay Presidency
(Excluding Sind)
and average annual rainfall in Bombay - Deccan.



Note:- Cane areas are exclusive of the cane areas of the Belapur Sugar Company & represent cane used for gur making only

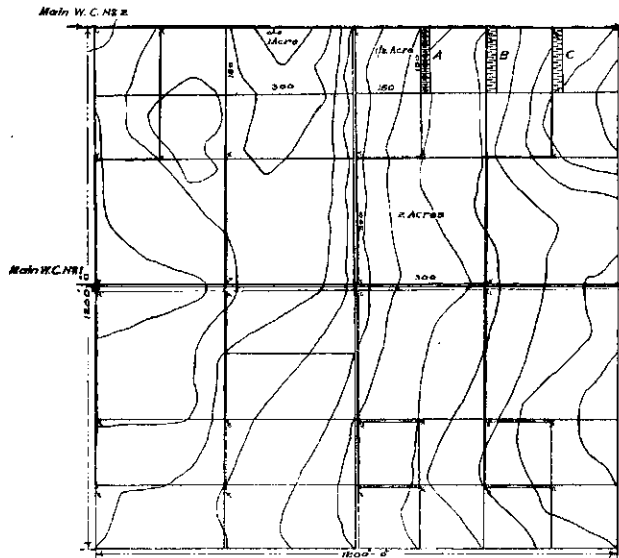
C. S. J. S.

Superintending Engineer
 Irrig: Dept: & R.C.

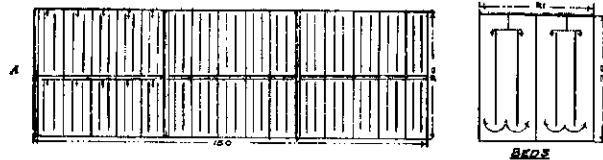
SYSTEM OF IRRIGATION FOLLOWED
BY
THE BELAPUR CO.

PLATE IX

PLOT



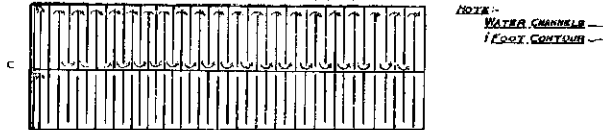
SYSTEM AT THE TIME OF PLANTING



TWO MONTHS AFTER



AFTER EARTHING UP IN LEVEL LAND



NOTE:
 WATER CHANNELS —
 1 FOOT CONTINUOUS

Cost per moud of Sugar

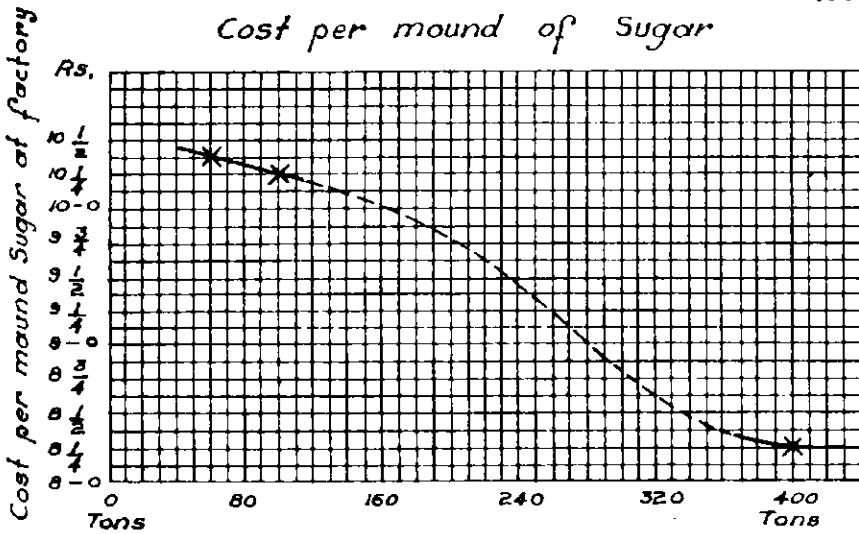


Figure of Mr. Fenton Millar

Detail	Capacity of Factory		
	In tons per day		
	60	100	400
No of Working days	120	120	120
Quantity of Cane	72.00 Tons (19,600 Mds.)	12,000 Tons (3,26,640 mds)	48,000 Tons (13,06,500 mds.)
Cost of Cane per ton	Rs. 15/-	Rs. 15/-	Rs. 15/-
Estimated recovery of sugar @	8.5%	8.5%	10%
or			
Capital required for factory erected	16,660 mds. Rs. 2,50,000/-	27,764 mds. Rs. 4,00,000/-	130,656 mds. Rs. 10,50,000/-

Note:- (1) Depreciation and interest on Working capital included in all cases
(2) Other Overhead charges: excluded in all cases

Cost of production:-	As.	As.	As.
Cane 10 mds. 11.76 mds. & 11.76 mds. respectively to make 1 md. of sugar @ 8.82 as per md. (Rs. 15/- per ton)	103.7	103.7	88.2
Manufacture: 60 100 400			
Material	24.8	24.8	16.7
Labour	7.0	6.0	3.8
Supervision	4.6	4.6	6.3
Repairs and Renewals	8.0	8.0	7.1
	44.4	43.4	33.9
Depreciation @ 6% (63,000/-, 24,000/- & 15,000/- respectively)	14.5	13.8	7.7
Interest on Working Capital @ 7% (2,50,000/-, 75,000/- & 50,000/- respectively)	3.4	3.0	2.1
Total	166.0	163.9	131.9
For one moud sugar	Rs. 10-6-0	Rs. 10-4-0	Rs. 8-4-0

Note:- Molasses - No allowance has been made for sale of molasses because it is not certain that a market could be found for this by product. on the basis, however, of Rs 1/- per moud for molasses at the factory, this would be equivalent to about six annas for each moud of sugar produced.