

FOOD AND AGRICULTURE DEPARTMENT

**THE REPORT OF THE SPECIAL COMMITTEE OF THE
STATE SUGARCANE COMMITTEE**

FOR

**INVESTIGATION OF TECHNIQUE OF CULTIVATION OF
SUGARCANE VARIETIES SUITABLE FOR THE
SEVERAL FACTORY AREAS**

1951

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PREFATORY NOTE

This Report was submitted to the Government by the Special Committee of the State Sugarcane Committee under the Chairmanship of Dr. T. S. Venkataraman, D.S.C., I.A.S , (Retired) constituted by the Govt. in G.O. Ms. 102, Food and Agriculture, dated 16-1-50. The terms of reference of the Committee were (1) to examine the technique of cultivation of sugarcane of varieties suitable for each of the sugar factory areas in this State; (2) to suggest ways and means to improve the quality and yield of sugarcane and at the same time to bring about a reduction in the cost of cultivation and (3) to submit a plan for the intensive cultivation of sugarcane and for increasing sugar production in the next three years. The Report was submitted to Government on 9th June, 1950.

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BRIEF SUMMARY OF THE REPORT.

Taking into account conditions of soil and climate prevailing in the other sugarcane countries of the world the Committee feels that the State of Madras has in it the possibilities of producing sugar at costs competitive with the rest of the cane world if the industry in the Province is suitably organised. Various Committees from the time of the 1920 Sugar Committee have recorded the comparative high cost of raw material, viz., the sugarcane in the Madras State.

After examining in some detail the various agricultural practices obtaining in the factory areas and methods of transport of the material to the factory as also the manner in which costs of raw material are worked out the Committee feels that the costs could ultimately be lowered to at least those in the sub-tropical parts of India by effecting improvements in all directions.

They find that the location of factories at present has often been on historic or other grounds and not the suitability of the region to grow the crop cheaply. If in future licensing of sugar factories, these are taken into consideration and the other agricultural recommendations of the Committee are brought into effect, sugar production in the State could definitely be cheapened.

There has been a prevalent opinion in sugar circles dominated mainly by sub-tropical opinion, that the 800 tons factory is the lowest economic unit. Under Madras conditions, the Committee feels that the tonnage limit for such units would be round about 450 tons in the case of the usual joint stock companies. In the case of co-operative ventures this limit could be much lower even 75 tons.

In the future set up the Committee feels that it is essential that the interests of both the grower-suppliers and the manufacturing units should be brought together. Co-operative ventures where this is possible would be the best and in other cases the Committee makes detailed recommendations for establishment of better relationships between the two parties. These cover (1) association of growers as share-holders in the case of Joint Stock Companies (2) provision of better amenities to the grower and his cattle at the factory yards (3) supply of sugar and of by-products to the grower-suppliers (4) expeditious release of cane-carrying vehicles from the factory yards and (5) helping the growers with regard to their difficulties connected with the transport of canes to the factory.

The Committee makes extensive and detailed recommendations for bringing down costs under various heads in the growing of the crop. They find that the cane crop is one eminently suitable for being grown in large-sized blocks through co-operative or joint farming of the crop. Such growing of the crop in blocks, would conduce to the benefit of the crop and cheapening irrigation and drainage facilities, so important to the crop.

The Committee finds that considerable economies could be effected in the manure bills by having greater recourse to (1) the growing of green manure crops, (2) the utilisation of waste materials of the field and the factory (press-mud, etc.) including the large amount of cane trash that are now generally burnt or used otherwise than as manure. This loses to the grower very large amounts of organic nitrogen. The growers in the factory areas have taken largely to the use of fertiliser mixtures and this has resulted partly from the factory trying to spread its use among the growers. The ryots

need to be educated about the cheapness and value of composts and straight fertilisers.

In the matter of irrigation, it is necessary for cheapening sugar production in the State, to locate future factories in regions where water which plays a great role in the growth of the cane and the production of sugar, is available in plenty and at cheap rates.

The Committee finds that economies could be effected in cost of agricultural operations through the substitution of manual with bullock or mechanical power. This will become increasingly necessary as labour charges run high and they have a tendency to do so.

The Committee was pleasantly surprised to find that the very costly operation of wrapping and propping as practised in the Godavary delta and South Vizag district, puts up the yield by 10 to 15 tons per acre. This is full justification for the continuance of the practice in the above areas and also for its trial in other regions as well with continuous attempt at cheapening the cost of the operation through the use of more lasting material than the bamboo—like concrete or other posts and galvanized wires.

The Committee studied in some detail the varietal composition in the factory areas and found that in certain cases there was difference of opinion between the growers and the factory in regard to the most suitable cane variety for that area. This was because the grower looked at the variety only from its weight view point and the factory from the recovery view point. After careful consideration of the question from all view points the Committee has recommended a Varietal Advisory Committee for the whole State which would be in a position to judge in the matter after taking into consideration the interests of all the concerned parties on the basis of sugar per acre. This Committee would be represented in its composition by the growers, the factory and the Department of Agriculture.

The Committee finds that cost of transport is an important item in the cost of material—sometimes up to 15% of the total. In this regard the Committee recommends the conditioning of feeder roads and the organisation of tractor trailer units for taking the cane direct from the field to the factory weigh-bridge and the provision of suitable wagons and railway sidings where necessary.

The Committee is surprised that in the concessions granted by Government to crops, sugarcane is not considered as food crop. The Committee wishes to emphasize that sugar is not only food but one of a high order for energy. This distinction between the cane and other crops like paddy has led to various anomalies and malpractices such as taking out the manures in the name of the food crop and applying it to the cane, involving difficulties to the cane growers.

The newly organised system of liaison farms is only one year old on date but the Committee feels that it has great potentialities in the future set up in the matter of bringing together the grower, the factory and the Department of Agriculture.

The Committee is confident that if the various recommendations made are carried into effect speedily and efficiently, both maximization of sugar and cheapening it to the benefit of all concerned will be realised.

THE REPORT OF THE SPECIAL COMMITTEE OF THE STATE SUGARCANE COMMITTEE FOR INVESTIGATION OF CULTIVATION OF SUGARCANE VARIETIES SUITABLE FOR THE SEVERAL FACTORY AREAS

PART I.

General Picture of the Industry in the State and main recommendations.

The fact that though sugarcane is a tropical plant, the Indian Sugar Industry is now concentrated in the sub-tropics has been somewhat of a puzzle to persons conversant with the crop in the different parts of the world. The usual reason alleged for this state of affairs has been the lower costs of sugarcane growing in the sub-tropical regions. The 1920 Sugarcane Committee put these figures at As. 5.70 per imperial maund for the tropics and As. 5.73 for the subtropical portions of India. According to the First Tariff Board Report of 1931, the cost figures of sugarcane in Madras was Re. 0-7-0 per maund as compared with Re. 0-6-4 per maund for the Uttar Pradesh and Re. 0-4-8 per maund for Bihar. That this disparity in production costs continues to this day is evident from the latest Tariff Board Report which gives Rs. 1-8-8 per maund as cost of production in Madras against Rs. 1-7-3 for Uttar Pradesh and Rs. 1-6-0 for Bihar. The figures for Uttar Pradesh and Bihar have been taken because they are the two Provinces which contain the largest area under sugarcane, and Madras imports its deficit in white sugar from both the Provinces.

It is, therefore, none too soon for the Government of Madras (Vide Appendix No. I, G.O. 102) to have set up this Committee for examining this question with particular reference to the maximisation of white sugar production in the State and the cheapening of the raw material-sugarcane. The Committee decided, therefore, to examine any existing defects that stand in the way of increasing acre yield and manufacturing efficiency and consider ways and means for removing existing defects and effecting increases. Regarding the growing of sugarcane the Committee went into great details of the agricultural operations in the growing of the crop and a careful examination of all cost factors till the sugarcane is placed on the carriers in the factory. Both factory representatives and the growers were interviewed at the places of visit and data gathered on certain points which were drawn up by the Committee before setting out on their tours. The usual questionnaire method was carefully avoided as recently both the factories and the growers had such from at least three bodies in this regard. It is gratifying to be able to state that needed data became easily and freely available by this method. Besides the formal talks, very useful data were collected during the social contacts with individuals and organisations. The first part of the Report deals with the general picture of the ~~future~~ position of the Madras industry with reference to the Indian industry as a whole and summary of recommendations. In the paragraphs that immediately follow, the findings of the Committee on the outstanding issues and its recommendations are given. The next part of the report deals with the existing practices along with the recommendations of the Committee with regard to each factory area. In the concluding parts the varietal position in factory areas, maximisation of sugar and cheapening costs are dealt with.

Location of Factory :

In locating factories in future, in addition to considerations such as soil, climate, irrigation facilities and the availability of suitable land for sugarcane near the factory, etc., the possibility of producing raw material, viz., sugarcane at cheap cost, should be kept in view. In granting licences in future, it is necessary to see that two factories are not so located as to encroach on each other's supply area. The needs of the Madras State in white sugar is to the tune of one lakh tons. The State produces today within its confines 55,000 tons of sugar and imports the balance of nearly 45,000 tons from outside, chiefly Uttar Pradesh and Bihar. The immediate aim in organising and planning the sugar industry of the State should be to produce this deficit quantity at a cheap price.

Land:

It is well known that commercial and industrial crops put up prices and rentals of agricultural land much above those prevailing in the adjoining portions wherein the common staple crops of the region are grown. These higher rentals are the result of the higher prices at which the commercial and industrial crops are able to sell. In the case of the sugarcane—for which the minimum price has been fixed by Government—the rentals are high because of the price now paid for it. In calculating cost of raw material the current rental for the crop is taken into account and this in turn creates a vicious spiral and through its operation costs go up in connection with all the operations connected with cane growing and even transport. In our opinion the rental for such cost purposes should be that of the alternative or staple crop of the region together with an incentive factor for growing the particular crop. So long as this incentive factor is above zero the sugarcane area will not be adversely affected. Such a method would introduce greater realism into the costing of commercial and industrial crops.

Secondly the growing of crops is done either by owner or tenant cultivators. In the latter case the services which the tenant cultivator hires out in growing his crop is taken into account for crop costing. Is this the right way? Would it be sound to compute the food budget of a family in terms of the charges which the family would incur for purchasing its meals from a neighbouring hotel? It is well known that where the family prepares its own food there are considerable economies in directions which are not possible in the hotel arrangement. The case of the owner cultivator is in many respects comparable to the family preparing its own food. As the majority of sugarcane growers in the regions visited are owner cultivators, the costing figures as worked out from tenant holders are unrealistic.

The defect in the existing methods of costing would appear to lie in trying to apply to agriculture which is a mode of living in our country a system of commercial accounting that is foreign to it. This explains why the many attempts made at arriving at useful cost figures of agricultural crops have failed in the past. The example of the then Imperial Council of Agricultural Research which spent a few lakhs some years back and the absence of any satisfactory figures from it indicate the direction in which such costs should be computed. Four of our colleagues who do not share these views, have appended their note of dissent to the report.

Tonnage Capacity of Minimum Economic Sugar Factory:

Apparently on technological grounds the 800 ton unit has been in vogue as the minimum economic unit. The result has been that smaller units have been definitely discouraged and active encouragement has been given to the development of large size factories. While on the whole this has perhaps been an advantage, the Committee has found certain other factors in the State which under certain circumstances render smaller units economical. The ideal would be for the factory to derive its supplies from adjoining areas both for higher recoveries and hence maximisation and also for cheapening costs by way of saving transport charges. Certain factors associated with the set up of existing factories have led to sugarcane material being carried over unnecessarily long distances, with adverse results both on recovery and costs. Under such conditions the setting up of more than one factory in the supply area instead of a big one at one end of the supply area would be economical in the interests of national production. The circumstances of each area will have to be carefully considered before rejecting licence applications. In the case of Joint Stock Companies, the Committee considers that in the circumstances prevailing in the State a factory of daily crushing capacity of 450 tons is the minimum economic unit provided the working season is extended by growing varieties which mature in different parts of the season and provision is made for extension of the factory as the cane area develops. However, in the case of co-operative factories smaller units down to 75 tons per day could function economically.

Zoning:

At present the sugar factories in Madras are not too crowded but situations are arising—as in the case of Samalkot and Pithapuram—where zoning of the area for each factory will soon be needed. In the case of the new Pithapuram factory the Committee understands that if not properly zoned, it will have to draw upon the area now supplying Samalkot. It was also understood that in the licence granted to the factory the location was not specified. For healthy development of the industry it is necessary that this kind of overcrowding within a small zone should be avoided.

Treating Sugarcane as a Food Crop:

The Committee is constrained to observe that the system of supplying ammonium sulphate through tendering firms has encouraged black marketing and resulted in high prices for the stuff. The Committee recommends that this material should be distributed through the factories and co-operative societies.

While it is true that sugarcane is not a food crop in the sense that the cereals are, yet there is little doubt that the cane plant yields a palatable and useful energising food to the people. The Committee had ample evidence that the cheaper ammonium sulphate which is made available to food crops is taken out, but actually applied to the sugarcane crop. This shows that the intention of the framers of the rules is nullified and the only result has been increase in the cost of growing sugarcane and difficulty in obtaining nitrogenous artificials for this crop. If the State Government are interested in producing

all their sugar needs from within their borders, the present practice and rules will need to be suitably amended. Sugarcane should be treated as a food crop for all State aid, such as well subsidies, compost making etc., either from Centre or from the State.

Unifying the Interests of the Growers with that of the Factory

On date there is often a clash of interests between the sugar factory and the cane grower. The production of white sugar is at its best and cheapest when both the parties are under one direction or feel themselves one in their dealings. Java, which till recently was an exemplar in this matter, sought to combine the two interests by passing on sugarcane growing to factory management. The system of land tenure in our State renders such an arrangement difficult and the Committee has, therefore, included suggestions by which the two interests can be combined in other ways. These recommendations will be found under various heads in the body of the report.

At present there are various points causing friction between the two parties, viz., the grower and the factory. The relationship between the two parties varies widely in different areas, depending largely on the personnel in the factory.

Factory out stations

Cane growers and their cattle come from long distances for delivering canes to the factory. None of the factories in the State owns out-stations in the supply area for purchasing canes. In North India where the industry is older such out-stations do exist for rail canes. Similar out-stations by the larger size sugar factories in their important areas are recommended. The factories' representatives on the Committee, however, consider these undesirable and not feasible on two grounds—in the first place the proposal merely transfers the burden from the supplier to the factory and does not reduce cost of sugar and secondly the cost of establishing out-stations would increase the cost of production of sugar. Otherwise such factories should try and organise their supplies from short distances. The disadvantage to the grower in the present arrangement is that he has to bear all the losses resulting from pilferage and dryage en-route, besides extra transport charges.

Improved Railway wagons:

The Railway could help the growers and the factory to a considerable extent in minimising such losses by (i) arranging quicker transport by special trains and (ii) supply of wagons suitably built to prevent pilferage and perhaps also dryage to some extent. The Railway should provide these facilities in the interest of national economy. One Railway facility which would directly contribute to increased recoveries and cheapening cost of sugarcane is the extension of Railway sidings into the factory at an early date where they do not exist.

Other than Railway Methods of Transport :

Organisation of tractor-trailor transport would appear to be the most suitable for our conditions. This system may be organised as a joint endeavour by the factory and the growers either on a co-operative basis or in the shape

of Joint Stock Companies. The object should be to avoid all intermediate loading and unloading between the harvested cane in the fields and the factory weigh-bridge. Such a system of transport will avoid the carrying of cane from the field to the roadside which would be necessary in the case of rail transport and the roads in the supply areas are often in a poor condition.

Feeder Roads :

The Committee is enclosing in the body of the report a list of roads and cause-ways furnished by the factories. As bad roads considerably increase transport charges and cause great inconvenience both to cattle and mechanical conveyances the improvement of roads needs attention both in the interest of maximisation and cheapening cost. The Committee would like to give priority to the cause-ways over Yeluru river near Peddapuram in East Godavari district and over Pennaiyar near Swarnavur in South Arcot district.

Amenities to Growers:

Both the growers and their cattle come from long distances at present for supplying cane to the factory. The factories should provide all possible conveniences both to the growers and their cattle in the matter of providing shelter, drinking water supply, and public conveniences. The arrangements in most factories are defective in this regard and the attitude of the factory management is in some cases very unhelpful.

The Committee understands that in some factories, there is considerable time-lag between the time of supply-bullock carts entering the factory yard and their leaving after weighing.

Such delays are not only a severe strain on the bullocks, the people and driver in the cart but also put up the cost of transport unnecessarily. With proper and quick arrangements the carts can do more trips per day thus lessening transport charges. When it is remembered that transport charges sometimes amount to ten to fifteen per cent of the total cost of raw material, the need for improvement would be obvious. Arrangements should be made to take expeditious delivery of canes on arrival.

Payment for Cane:

It is the usual practice in many factories to advance loans to growers on the area planted with sugarcane. This has proved of great help to the growers in financing such a costly crop as the sugarcane. There is however considerable variation in the rate of interest charged, the period over which such interest is charged, and the rate of advance. The factory at Vuyyur has the generosity of not charging any interest if the cane growers carry out certain instructions of the factory which in the opinion of the factory are conducive for the good growth of the crop. At the other extreme we have the factory at Hospet which by a peculiar method of calculation, charges interest at over ten per cent. This matter needs examination by Government.

• There have been complaints from the growers in Bobbili area including Scethanagaram about delay in payment. The factory represented that this

is because sugar at present is a controlled article and its movements subject to direction from the centre. This procedure locks up considerable moneys in the form of sugar stocks, rendering it difficult for the factory to pay promptly.

With regard to cane supplied, account should be made and the value of the cane credited to the grower's account by the end of following day of supply as in the case of Nellikuppam and Vuyyur and on third day or thereafter payment should be made on demand in writing. If the factory does not pay, interest should be credited to grower's account at the rate at which the factory advances money to the grower or the rate at which the factory borrows from the Bank.

Supply of Sugar and other by-products to Growers:

Under existing arrangements it often happens that after supplying quantities of sugarcane to the factory the grower is not able to obtain even his domestic sugar needs. It would definitely improve the relationship, if when desired the factory could supply sugar to the growers to meet their domestic needs as is now the case with some of them.

By-products like molasses, press-mud, spent-wash and other factory waste are best dispensed by the factory to the growers, if and when they desire such supplies. On a priori ground it is best to return to the land as much as possible of the material which the crop takes off from the land. This would help to keep up the fertility of the soil on which the crop is grown and also feed his cattle. The growers should be given the first refusal with suitable conditions for their speedy removal from the yards.

Rejections and Deductions from Cane supplied :

One cause of friction between the factory and the growers is the extent of rejections in the factory yard. Difference of opinion exists in the matter of water shoots and canes unsuitable for other reasons like rat-damage and dryage. The cane supply often comes from long distances and as far as possible a sympathetic attitude from the yard staff of the factory is necessary. The growers on their side should be prepared for reasonable rejections, the Government Inspector acting as arbitrator in cases of doubt. The factory should clean the material received at the cost of the grower and allow the grower to remove the rejected material.

Yet another thorny question has been the extent of deduction for binders. The Act now in force allows a deduction of only a half per cent. But certain factories have adopted various rates of deduction because they claim that the binders weigh more than a half per cent according to tests carried out by Government Inspector. The growers state that these tests were not carried out in their presence. The whole question requires examination and notice by Government for such action as they deem necessary.

In sub-tropical India the binders do not include any portion of the top cane as in that tract the harvest labour is paid in the shape of removed tops which are used as cattle feed. In the absence of such a practice in Madras the binders often contain cane tops which interfere with recoveries. These cane tops are very suitable as planting material but a serious defect in canes supplied to the factory. Elsewhere in this report will be found recommendations about the use of tops for planting.

IMPROVEMENTS IN AGRICULTURAL TECHNIQUE

Crop consolidation :

The generally small size of holdings and their scattered nature constitute a great impediment to agricultural efficiencies in the sugarcane as also in other crops. The present system of land tenure and the existing laws regarding inheritance would need considerable modification before they could be rectified. Sugarcane is eminently suited to large scale mechanised farming, as such farming would result in maximisation in production and cheapening costs. One way in which the growing of sugarcane in large size composite blocks could be realised even under existing conditions would be the organisation of co-operative or joint farming with regard to this crop and during the time it occupies the land. This is possible only through mutual co-operation between growers and the existence of leaders to start and guide such joint farming. At Vuyyur we met instances of such joint farming largely through the good offices of the factory whose advice is naturally respected by the growers in the area. For this, however, cordial relations among the growers and also between the growers and the factory are essential.

Water needs of Sugarcane :

It is well known that sugarcane needs a fair supply of water throughout its long life-cycle. Depending upon the stage of growth of the crop there are periods when the water needs vary in the matter of quantity. Even in places where fair quantities of water are available from river sources the closure of canals for repairs often disturbs the life-cycle, with permanent injury on crop yields. The Irrigation Authorities need to be made wise in this matter and the closure period made as short as possible. The availability of cheap irrigation water should be an important consideration in licensing new sugar factories.

Drainage needs of Sugarcane :

Though irrigation is an important factor in building tonnage the crop does not stand too much of it, particularly stagnation. Such a condition of affairs often occurs when the sugarcane crop is surrounded by paddy fields and paddy is a semi-aquatic. The formation of large blocks through grouping of holdings already mentioned will help in arranging proper drainage.

Manuring the Cane :

It is well known that the crop needs fair quantities of manure. Its requirements have been worked on nitrogen basis. At present the trash removed from the crop during its growth, is not properly treated for manure production. Secondly the very large amount of trash that becomes available at harvest gets wasted so far as its organic contents are concerned ; such trash is often burnt in the fields in certain parts or used for roofing and other purposes. According to the Provincial Sugarcane Specialist, the amount of nitrogen that could be returned to the soil by composting trash from one acre of sugarcane is 60 lbs. The area under cane in factory

zones is about 25,000 acres. On the present market value of organic nitrogen at about Rs. 1-4-0 per pound, the composting of cane trash would return to the soil, nitrogen to the value of Rs. 18.75 lakhs.

Cost of manures is a major item in the growing of sugarcane and in the factory areas fertiliser mixtures are largely in vogue. In the jaggery areas which form the bulk of the area under cane, straight fertilisers are generally more usual. The Committee feels that this manure bill should be lowered in the future by (i) resorting to sheep-penning where available and (ii) greater use of compost manures including trash and green manuring. The Committee finds on data presented to it, that straight fertilisers are generally cheaper than fertiliser mixtures whose cost include handling and transport charges and profits. In the past fertiliser mixtures to sugarcane got popular by the factory helping in its distribution ; but we are glad to note that the factories would take a neutral attitude in this matter in the future.

This Committee feels that the growers do not always apply manures to the crop in proper doses, combinations or time of application. They would be well advised to be guided by results at the Liaison Farms in the future in this regard in co-ordination with the factory and the growers.

Agricultural Operations :

A gradual substitution of manual labour with bullock or mechanical power are also recommended for cheapening production costs. Wrapping and propping now practised in certain parts of the state is found to definitely increase tonnage. There is however scope for reduction of expenditure in this operation, through the use of materials which would last longer or prove cheaper than those in use at present.

The fact that a single agricultural operation like wrapping and propping could put up yields by 10 to 15 tons in the Godavari Deltaic area shows that this should be tried all over the State by adopting cheaper methods in some form or other particularly because the expenditure incurred on the propping material and labour goes back into the country. Even if the extra cost only just compensates by extra yield, it is definitely useful for maximisation.

PART II .

EXAMINATION OF CURRENT AGRICULTURAL PRACTICES AND RECOMMENDATIONS FOR EACH FACTORY AREA.

(A) Current Agricultural Practices.

I. LAND.

(i) *Vuyyur Area*.—The land in Vuyyur is rich alluvium with plentiful water supply when the canals flow. The problem is one of drainage from June/July when the canal waters flow and the cane is surrounded by swamp paddy. During the summer months when the canal is closed for silt clearance there is dearth of water.

The alternative crop is paddy, and the net profit is Rs. 180 per acre for paddy plus Rs. 60 for the pulse crop. However the lease amount for sugarcane lands is not dependant on the net profits from the alternative crops of paddy and pulses but varies with the price for cane. More than three-fourths of tenant cultivators pay the lease in kind at 12 tons of cane per acre delivered at the factory gate which is equivalent to Rs. 560 at the current prices of cane. When the lease is agreed to be paid in cash it varies from Rs. 400 to Rs. 500 depending upon the fertility of the land and its nearness to road-sides which cheapens transport to the factory. Out of 1600 cane growers supplying the factory, 56 per cent are owner cultivators and 44 per cent are tenant cultivators.

(ii) *Samalkot Area*.—The land in the Samalkot Factory area is divisible into two main classes, viz., (a) Upland and (b) Delta land.

(a) *Upland*.—The soil is clay loam and is irrigated by the Yeleru river. The soil is rich and productive but there is great scarcity for water during the non-monsoon period. The lease value for land is about Rs. 250 to Rs. 300 per acre for sugarcane or eight bags of paddy of 164 lb. each. But the lease for sugarcane is not dependant on the net income from the alternative paddy crop. The lease is generally paid in cash in case of sugarcane. Seventy-five per cent of the cultivators who supply cane to the factory are tenant cultivators.

(b) *Delta Land*.—The land is rich alluvium with plentiful water supply, except for a month during summer when the canals are closed for silt clearance. The cultivators provide a system of drainage channels round the fields. The lease amount is about Rs. 300 to Rs. 400 for sugarcane or twelve bags in the case of paddy. Seventy-five per cent of the factory suppliers are owner cultivators. The lease for sugarcane land is not based on the net income from the alternative paddy crop.

(iii) *Anakapalle and Etikoppaka Area*.—The soil in this tract is rich loam tending to be sandy loam in a few places. The soil is rich and fertile. The alternative crops are gingelly, paddy and ragi. The crops are irrigated from the river channels or rainfed tanks and supplemented by wells in some places. The lease amount for sugarcane is

from Rs. 300 to 350 and not related to the income from the alternative crops. In the case of Inam Lands at Etikoppaka where leasing is rare, the amount is Rs. 60 to Rs. 100 only. The majority of the cane suppliers are owner cultivators.

(iv) **Bobbili and Seethanagaram Area.**—The lands are loamy with different proportions of clay and sand. The main limitation to cane cultivation here is water scarcity as the entire tract is dependant on rainfed tanks, and there are very few wells to supplement them. The alternative crop is paddy. The lease for sugarcane varies from Rs. 150 to Rs. 230 whereas the lease for paddy is roughly half this amount. Seventy-five per cent of the suppliers are owner cultivators.

(v) **Nellikuppam Area.**—Sixty per cent of the cane area is sandy loam and the rest clay loam. In general the soil fertility is poor and needs heavy manuring and irrigation. The alternative crops are ragi, cumbu and groundnut. 50 per cent of the suppliers are owner cultivators. The lease amount for sugarcane is from Rs. 250 to Rs. 350 per acre or in terms of kind 8 to 12 tons of sugarcane delivered at the factory gate whose money value is Rs. 350 to Rs. 550 at current prices.

(vi) **Kodaikanal Road Area.**—The soils are red loam and the bulk of the cane supply is from wet lands. The alternative crop is paddy in wet lands and cholam and paddy in garden lands. The lease for paddy ranges from twenty to twenty-five bags (48 m.m. each) valued at Rs. 300 for two crops. It is a little lower in the case of garden lands. The lease for sugarcane varies from Rs. 300 to Rs. 400 and this is not dependant on the net profit from alternative crops. About 85 per cent of the suppliers of the factory are owner cultivators.

(vii) **Pugalur Area.**—The soil along the river side in Karur taluk is rich alluvium while that of Kulitalai taluk is clay loam of poor type. There is plentiful water supply during most part of the year. The cultivation in the home area of the factory is of an intensive type and betelvine and plantains are the chief alternative crops. In the Kulitalai area, plantain is the chief alternative crop. Plantain is losing ground in the home area and is on the increase in Kulitalai area. The lease for land for sugarcane varies from Rs. 500 to Rs. 600 per acre and in the case of betelvine Rs. 1,000 to Rs. 1,200. The net profit from paddy is about Rs. 100 for single crop and Rs. 200 from a double crop of paddy. The lease value for sugarcane is out of all proportion to the net profit from paddy. The area under sugarcane and plantain in 1950-51 season is said to have increased at the expense of a good bit of paddy. The reason for such increase under commercial crops is not only the larger net profit from such crops but also the fact that a paddy grower is put to a great deal of inconvenience by the procurement officials. Seventy per cent of the cane suppliers to the factory are owner cultivators. In the Kulitalai area which is outside the home area the lease for sugarcane lands is Rs. 300 and the bulk of the suppliers to the factory are tenant cultivators.

(viii) **Hospet area.**—The soil is of mixed type, with fairly assured water supply for most part of the year from the Thungabhadra river.

Drainage is a problem in portions of the tract. There is scarcity of water during summer months when canals are closed for repairs.

The alternative crop is paddy. The lease value for sugarcane is on an average eight tons of cane delivered at the factory gate, while the lease for paddy is about twelve gudies (each gudi costing Rs. 12). The lease for sugarcane is not dependant on the lease of the alternative paddy crop. Majority of the suppliers are tenants.

2. PREPARATION OF LAND AND PLANTING.

(i) **Vuyyur Area.**—The land is ploughed six to eight times with country plough and furrows are made for planting. The total cost of preparatory tillage is Rs. 57 per acre.

In this area tops of canes are not used as planting material. The ryots do not seem to be aware of the utility of tops as planting material. Whole canes from garden land, particularly the late planted crop, are utilised as seed material. The main difficulty in the use of tops appears to be the long time taken in harvest of one acre plot. Since the cultivators transport the canes to the factory in their own carts they cut not more than one ton a day and this takes nearly a month to harvest one acre plot. The growers are also not aware that the tops of canes can be preserved in the heap for about a fortnight before planting.

The best time for planting to ensure good germination is January/February. Till the last season the bulk of planting was done in March/April, but during the current season the factory announced that canes planted in January only will be accepted for crushing by the factory and as such most of the area during 1950-51 season had been planted before the end of January.

Gaps are filled with setts and no special field operations are carried out to improve germination. Still the fields are gappy and the germination is estimated at 60%. This poor stand of crop may be to some extent responsible for low yield.

About two and a half tons of seed material costing Rs. 116-14-0 are planted. Preparation of setts and planting cost Rs. 30 per acre.

(ii) **Samalkot Area.**—(a) *Upland.*—The land is ploughed three times costing Rs. 24 per acre. Furrows are made and setts planted.

Whole canes about ten months in age are cut and planted. Plant canes are preferred to ratoons as source of seed material. Twelve to sixteen thousand setts per acre weighing about two and a half tons are used as planting material. In the matter of using tops as planting material, there are two difficulties in this tract. Firstly, the issue of cutting orders by the factory takes a long time for the harvest of an acre. Secondly, there is no assured water supply for this area and the ryots depend upon water turns from the Yeleru river for planting and they are not sure as to when they will get their turn.

When they get their turn, they have to rush through the planting and for this quick and large supply of seed material they cannot depend upon tops. Therefore they cut whole canes and plant. The ryots also pointed out that the plants coming from mature buds withstand drought in the early stages much better than the plants coming from immature buds. This difference between the plants from immature tops and mature buds of other portions of the cane requires test.

The best time for planting to ensure good germination is February and the planting in this tract is done between January/March. Since there is scarcity for water during planting time it is not possible to plant the entire area in this short period of one month. Six to eight days after planting, the field is hoed, and this conserves moisture and ensures good germination in the field.

Gaps are filled with setts but in experience the seedlings from such late planted setts do not pull up and grow well.

(b) *Delta Land*.—The land is ploughed five times and the corners are dug out and drainage channels laid all round the field, costing Rs. 56 per acre. If the field is not in condition crow-barring is resorted to.

In the delta area top halves of canes are used as planting material. Since there is plenty of water during the planting time, the difference between the plants from immature and mature buds in respect of their drought resistance has not been noticed. February is the best time for planting to ensure germination and bulk of the planting is done by February/April. Setts are planted with over-lapping buds and more setts per acre are used in delta land than in upland. Gaps are filled with setts.

It is possible to use tops of canes if the cutting order from the factory is regulated to enable the harvest of one acre in about ten days.

(iii) **Anakapalle and Etikoppaka**.—The land is ploughed eight times and ridges and furrows are formed. The total cost of preparatory cultivation is Rs. 57 per acre.

Where harvesting and planting coincide, tops of canes are used for planting. In bulk of the area these two operations do not coincide and as such the ryots use top two-thirds of cane as planting material. Bulk of harvest is completed from December/April and the planting is from March/May. The ryots also have an impression that the plant from the tops of canes are not so healthy and vigorous as those from the top two-thirds of cane. The issue of cutting orders by the factory is also spread over long periods which prevents the use of tops as planting material.

The best period for planting to ensure good germination is April, and the bulk of planting is done in March/April. Hoeing seven to ten days after planting is done to ensure germination. In the case of dry lands where there is greater scarcity for water, trash, trampled in cattle yards, is spread over the furrows to provide good mulch. This operation conserves moisture to certain extent.

Gaps are not generally filled.

(iv) **Bobbili and Seethanagaram.**—Land is ploughed six times, corners dug out and ridges and furrows formed and the total cost of preparatory cultivation is Rs. 33 per acre.

When the factory is working, top halves or top one-third portions of canes are used as planting material. Tops alone are not used. The ryots feel that tops are good material for planting. Harvesting and planting do not coincide and also the issue of cutting orders by the factory is spread over a long period and this makes it difficult in using tops as seed material and when purchased it costs Rs. 120 for planting an acre.

February/March is considered the best period for planting but this operation is decided by the availability of water in the tanks for planting. Generally, bulk of the area is planted by March. Two hundred panams (each panam equal to 80 setts) or 16,000 setts per acre are planted. Hoeing and weeding are done to ensure germination and conservation of moisture. In the last two years ridge or any plough is worked, between rows of planted cane six to eight days after planting i.e., before germination commences. This operation is done to conserve moisture and to ensure germination. Gap filling is not generally done because there is dearth of water during this period. Where wells supplement, a few ryots carry out this operation.

(v) **Nellikuppam.**—Sixty per cent of the home supply area and 90 per cent of the outlying area are garden lands. The land is ploughed 4 times, and trenches are dug at 2' 9" to 3' apart. The preparatory cultivation costs Rs. 30 to 40 per acre. In wet lands which constitute 40 per cent of the home supply area digging with crowbar employing thirty to thirty-five men costing Rs. 30 per acre is made in the preparatory cultivation.

Tops are considered as best planting material as compared to any other portion of cane. These are being used in bulk of the area for planting. The ryots preserve the material in heap for about a fortnight if necessary before planting. Except when new varieties are introduced, at other times tops from their own fields are used. Depending upon the demand and the variety, the tops may cost Rupees six to ten per thousand. When new varieties are introduced, short cropping is common. February/March is considered the best period for planting and nearly one-third of the area is planted during this period. In garden lands the planting may extend even up to May/June.

During planting, the buds are laterally placed by the coolies for which they are well trained. This helps in good germination. One light irrigation after seven days is given to ensure germination.

Gaps are filled 3 weeks after planting with ~~setts~~ or germinated setts from the same field.

(vi) **Kodaikanal Road.**—The land is ploughed six times and laid in furrows. The total cost of preparatory cultivation is Rs. 30 per acre.

Two to three setts from a cane are cut for planting. Entire cane is not used as planting material. When there is great demand for setts immature crops are cut as short crop and planted.

In wet land area February/April is the best planting period and in garden land May/July is the best period. However in the case of late planting if there is too much rain from early monsoon germination is affected. In general bulk of the area is planted in February/March.

Gap filling is done with setts and in recent times germinated setts from the same field are used

(vii) **Pugalur.**—In the hofae area the land, if in condition, may be ploughed or else dug with mammuty with manual labour and drainage channels and trenches are laid out. This preparatory cultivation will cost Rs. 50 per acre. In the Kulittalai area the land is ploughed 4 times and trenches laid out costing Rs. 50 per acre.

Mostly nursery material is used for planting and tops are not at all used. Immature canes of seven to eight months age are purchased, cut and planted. The cost of setts is nine rupees per thousand of two budded setts. The ryots prefer nursery material to top setts.

There are two planting seasons in this area: January/March and June to August. In other months too there are plantings to varying extent. In the Vangal area, June to August is considered best period for germination and the bulk of the planting is done during this period. In the Nerur area, October to January is considered the best period for planting. The distance between the rows in Vangal is $1\frac{1}{4}$ feet while in Nerur area it is 2' to $2\frac{1}{2}$ '.

Gaps are filled with setts. In general, the ryots prefer July/August planting as it is reported to give higher yield than February/March planting.

(viii) **Hospet.**—The land is ploughed four times with country plough and furrows are made for planting. Since trouble from stray cattle is serious particularly round about Hospet, fencing is fairly common with Babul thorns in Hospet and bamboo trellies in Kamalapur. Cost of preparatory cultivation and fencing is Rs. 94-8-0 per acre.

The cultivators generally reserve a portion of their crop for use as seed material. Whole canes are cut and planted and use of tops is not common. Due to heavy harrowing in this tract, the ryots consider that use of tops is not feasible in this tract. The seed rate is fairly low with about 10,000 setts per acre and the cultivators believe that higher seed rate makes the canes thinner. Cost of seed and planting is Rs. 106 per acre.

Until last year the bulk of planting was in the months of March/April but now on the initiative of the factory the planting periods have been advanced and during the season about six hundred acres in January over thousand acres in February and another thousand acres in March were planted. Gaps are not generally filled in this tract.

, 3. MANURING.

(i) **Vuyyur Area.**—Four bags of cake at planting and four bags of cake and 2 cwt. of ammonium sulphate in June are applied. This dose of manure is considered adequate for the tract. Any excess dose leads to lodging. The factory prefers castor cake to groundnut cake as according to them the manurial elements NKP are better balanced in castor cake while nitrogen is more in groundnut cake. The manure is applied broadcast in the field.

In the previous seasons, manuring was done as late as September/October due to late availability of manures in the market. During the current season the factory has made arrangements for the supply of castor cake and one of the conditions for advance of money to cane growers free of interest towards manure is that the manuring must be finished before June end. Application of cattle manure as basal dose is not common, due to non-availability of the same. Raising of green manure between cane rows is not preferred due to the fear that the green manure crop exhausts the soil moisture and there is water scarcity in May/June and the moisture is conserved by intercultural operations.

During the last season press-mud, cane trash and spent-wash from distillery and pig manure were utilised in composting. This compost manure was supplied to the ryots at Rs. 2 per ton but during the current season, the press-mud is issued to the ryots at Rs. 12 per ton.

The possibility of composting cane trash in the field itself is being tested by Sri V. Ramakrishna in his Farm. The trash is spread between alternate cane rows and press-mud at about 5 per cent of the calculated weight of trash, is spread over it. Pig manure is added as a starter. The advantage of this method is the utilisation of irrigation furrow as field trash-pit, thus saving the cost of transport of trash and turning it. It is expected that by this method of composting the trash in situ, the trash composts easily and is incorporated in the soil by the fourth month. The results of this experiment are worth watching, and if found satisfactory, recommended for general adoption.

Phosphates have not been tried on cane. Relative manurial values of castor v/s groundnut cakes both for yield and quality should be tested on Liaison Farm. The manure bill is Rs. 200 to Rs. 250 per acre.

(ii) **Samalkot Area.** (a) **Upland.**—Cattle manure when available is applied at ten cart loads per acre. 4 cwts. of ammonium sulphate only or 2 cwts. of ammonium sulphate plus five bags of groundnut cake are applied in June with the out-break of the monsoon. The manure is in short supply and the ryots take ammonium sulphate in the name of paddy crop and apply it to sugarcane. They also pay as much as Rs. 50 per bag while the control price is only about Rs. 35. The manure bill is about Rs. 170 per acre.

(b) **Delta Area.**—In the factory farm 6 cwts. of Samalkot Perry's mixture containing 12.4 per cent nitrogen and 7.2 per cent phosphate and 2 cwts. of ammonium sulphate, supplying 130 lbs. nitrogen and 48 lbs. phosphate per

acre are applied. The manure is applied in one dose in June at the out break of the monsoon. The registered ryots of the factory mostly apply Parry's mixture due to its availability in adequate quantity and in time. The factory supplies this manure on credit. The factory gives a maximum advance of Rs. 255 per acre as manure or a cash advance up to Rs. 135 per acre. Ryots do not generally avail of cash advance and they mostly take manure for their crop. Sureties are taken for such advances, and interest charged at 4 per cent. Press-mud is not utilised as manure. Trash also is not used for composting. Green manuring is not done.

Supply of straight manures is neither adequate nor available in time. The cost of ammonium sulphate issued for cane is higher than that for food crops.

(iii) **Anakapalle and Etikoppaka Area.**—Cattle manure when available is applied at eight to ten tons per acre costing Rs. 48 to Rs. 60. This manure is applied either during preparatory tillage or ten days after planting after first hoeing is given. Sheep-penning is fairly common and 3,000 sheep are penned per acre costing Rs. 50. When sheep-penning is done farm yard manure is not applied. If there are summer showers early planted crop is trenched in April and wild indigo applied at this time. Application of wild indigo at 3,000 to 4,000 pounds per acre at first trenching was quite common but now-a-days due to non-availability of this material the practice is dying out. Six bags of groundnut cake only or two bags of groundnut cake and 2 cwts. of ammonium sulphate are applied. The ryots prefer groundnut cake and they feel that the application of castor cake is desirable only when there is plentiful water supply. The manure bill varies from Rs. 140 to Rs. 230 per acre.

Green leaf manure particularly wild indigo to the extent available is applied between cane rows at trenching time. Raising green manures between cane rows has not been tried. Trash is not composted but in water scarcity areas it is spread on the field to conserve soil moisture.

(iv) **Ebbilli and Seethanagaram Area.**—Application of cattle manure at twelve cart loads per acre when available is common. Sheep-penning at thousand to two thousand per acre costing Rs. 30 is also common. Five bags of groundnut cake and 2 cwts. of ammonium sulphate in two doses, one in June/July and the other in August are applied. The total manure bill is about Rs. 140 excluding the value of farm yard manure. During the last season, ammonium sulphate was not supplied. This dose of manure is considered adequate but with increase in water supply this may be increased. Trash and press-mud are not in general use. The factories issued the available press-mud either free or at Rs. 0-2-0 per cart load during the season. There was general complaint that groundnut cake and ammonium sulphate are sold at far higher prices than the fair ones.

(v) **Nellikuppam Area.**—The factory recommends application of nine bags equal to 18 cwts of Parry's mixture which supplies 221 lbs nitrogen and 48 lbs. phosphate per acre. The ryots apply upto twelve bags of Parry's mixture and also supplement it with groundnut cake and ammonium sulphate

and the total amount of nitrogen per acre varies from 150 to 300 lbs. per acre and in exceptional cases even 500 lbs. The manure bill according to the factory is Rs. 298 per acre. The ryots apply up to thirty bags of groundnut cake per acre and their manure bill may go up to Rs. 380 per acre. Nearly 70 per cent of the growers purchase Parry's mixture because it is available easily and in time. They prefer straight fertilisers as it may be cheaper by Rs. 75 per acre. The factory, however, disputes this. The manure is applied in two to three doses at second, third and fifth months.

Though this district is classified as a surplus district so far as groundnut cake is concerned, the oil mills are not working to full capacity as most of the stock of kernels are exported to other districts and as such there is not enough of groundnut cake in the market. Being classified as surplus, import from other districts is prohibited and as such the crops suffer from inadequate supply of groundnut cake.

The factory applies press-mud at three tons per acre in their farms. This factory waste is sold by auction and the factory realised about Rs. 13,000 this year. The ryots feel that this material may be usefully issued to them direct at nominal prices. It was also pointed out that this press-mud is taken out of the factory zone and sold to outer areas by the contractor. The factory farm composts the cane trash but the ryots generally burn the same. There is dearth for labour and this stands in the way of extensive composting of cane trash.

Supply of molasses to such of the ryots who are willing to prepare compost out of cane trash was requested by ryots. They also require the same to feed the cattle which work in the cane fields.

In the factory farm sunnhemp is raised as green manure. But very few ryots adopt this practice. In the current season raising sunnhemp between cane rows has been tried with success. The factory recommends 200 to 220 lbs nitrogen with organic and inorganic nitrogen in 2 : 1 proportion, along with 45 lbs. of Phosphoric acid.

• (vi) **Kodaikanal Road Area.**—In wet land application of cattle manure at thirty cart loads per acre and in garden land, sheep-penning at thousand sheep per acre are common. Sheep-penning costs Rs. 30 per acre. Besides this, six to ten bags of groundnut cake costing Rs. 16 to Rs. 18 per bag are applied in the second month. Two cwts. of ammonium sulphate are applied in the fifth month. The manure bill is Rs. 140 to Rs. 200 per acre. There is difficulty in securing the manure, and the tract is estimated to be deficit by 50 per cent. Composting cane trash and use of press-mud are not known. Green manuring is being done in very small areas from this year. Phosphatic or other manures are not applied.

• (vii) **Pugalur Area.**—The factory recommends Karur Sugar Fertiliser seventeen bags at Rs. 15-2-0 per bag, supplying 190 lbs. nitrogen and 82 lbs. P₂O₅ plus two cwts of ammonium sulphate in two doses at thirty to forty days and ninety to one hundred days in equal quantity. This dosage is considered adequate and any increase may lead to lodging of the crop. The

Karur fertiliser is sold by Parry & Co., through their agents, but when a ryot requires the fertiliser on credit, the factory advances the necessary money. Nearly Rs. 417 per acre comprising of Rs. 257 towards manure and about Rs. 160 as cash are advanced by the factory.

The ryots in Vangal area apply two bags of ammonium sulphate at forty-five to sixty days and twenty bags of Parry's mixture. The total nitrogen applied is about 250 to 300 lbs. per acre. The manure bill is about Rs. 400.

In Kulittalai area, cattle manure when available is applied at fifteen to twenty carts per acre. Four cwts. of ammonium sulphate is applied at forty to sixty days and ten bags of groundnut cake at third or fourth month. The manure bill is about Rs. 325 per acre.

Sale of press-mud is restricted to one or two ryots. But on the factory farm cane trash is composted using dung as starter and press-mud is weighed on the top of compost heap. From next year the factory proposes to issue press-mud to all ryots at Re. 1 per ton. Daincha was raised as green manure in Pettavathalai farm and it was found better than sunnhemp. In Nerur area pillipesara was tried by a ryot between cane rows and it was reported to be a success.

The factory requires about 500 tons of ammonium sulphate for its registered ryots and this is not available to them in time. The ryots generally purchase cake and ammonium sulphate at very high prices. The sugarcane growers represented that they should be treated on par with food producers in respect of supply of manure as well as the price of fertilisers issued for cane.

(viii) **Hospet Area.**—Farm yard manure to the available extent with an average of thirty cart loads per acre are applied during the preparatory tillage. Application of the same to the extent of fifty cart loads per acre is common. Sheep-penning at 2,000 per acre is also common. Four cwts. of ammonium sulphate and six bags of groundnut cake (4 bags only in Kamalapur area) costing Rs. 160 per acre are applied. Green manuring to the preceding paddy crop is universal. In general the cultivators are keen in incorporating a large amount of organic manure into the soil. However they are not at present utilising the cane trash for the purpose. Press-mud is applied to the preceding crop of paddy and this is sold by the factory at Re. 1 per ton. The total manure bill is about Rs. 204 per acre.

The manure is applied in one dose two months after planting. The factory supplies both cake and ammonium sulphate and advances up to Rs. 250 per acre at five per cent interest. However, the factory does not appear to furnish details of accounts to the growers in their pass book and the rates of interest as calculated by the factory seem to be much more than the announced rate.

The municipal compost of Hospet is fully utilised by the growers and they represented that if the Bellary municipal compost which is not now utilised, if supplied at fair price, will be taken by them.

PUMPING PROJECTS—VUYYUR AREA.

Serial No.	Name of the project.	Irrigable area for cane cultivation.	Electric motor or oil engine.	Horse power.	Size of the pump.	Gallons of water per minute.	Consumption.
1	2	3	4	5	6	7	8
		Ac.	Cts.				
1	Gandigunta	...	...	Motor	60 H.P.	25"/21"	10,584 26 units per hour.
2	Chinavogirala	...	...	Motor	30 H.P.	18"/18"	7,776 9 -do. - "
3	Pedavogirala (two pumps)	...	...	Motor	40 H.P.	12"/12" each.	3,456 13 do.
4	Chalivendrapalem	...	...	Oil Engine.	20/22 I.H.P.	12"/10"	2,400 1 gallon per hour.
5	Boddapadu	...	...	do.	24/26 I.H.P.	14"/12"	3,456 3/4 do.
6	Pulleru right bank (old)	...	...	Motor	20 H.P.	12"/10"	2,400 9 units per hour.
7	Pulleru right bank (new)	...	...	Motor	15 H.P.	8"/8"	1,536 5 do.
8	Pulleru left bank	...	...	Motor	15 H.P.	12"/10"	2,400 7 do.
Total Area		...	2,105	80			

Note.—(i) The water from the projects is given to the ryots at Rs. 30 per year for all their irrigation required during the year.

(ii) Nos. 6, 7, 8 belong to Sri A. Gopalakrishnayya Garu and irrigate his own lands plus a small area of ryots.

4. IRRIGATION.

(i) *Vuyyur Area*.—This area is irrigated mostly by gravity flow. There are eight irrigation projects, five belonging to the factory and three belonging to Sri A. Gopalakrishnaiah which irrigate nearly 2,105 acres by pumping out canal water. The details of the pumping projects are shown in the separate statement (enclosed). Irrigation from wells is rare. The water rate is Rs. 12-8-0 per acre for cane. The factory charges Rs. 30 per acre in the project area for pumping and this is taken as a service to the growers. There is shortage of water in April/May when the canals are closed, whereas drainage is a serious problem from July/August onwards when the cane crop is surrounded by paddy. Even though water is allowed into canals by May 15th, it is permissible to take water for paddy nurseries only and water is not allowed to cane till the end of June. In the case of project areas, it is not permissible to use water from canals till 1st August. If water is permitted for cane from the time water comes in the canal it will not only increase the yield but also will enable the cane to grow up sufficiently before the land becomes water logged due to paddy planting all round. Cane receives 8 to 10 irrigations per year, costing Rs. 15 per acre.

During the water scarcity period of April/May, the soil moisture is conserved by working country ploughs or guntaka between the cane rows. Drainage during monsoon months is a serious problem as the ryots do not lay down any system of drainage channels in the crop. In order to provide good drainage, during the current season the factory authorities grouped the cultivators and brought them together particularly on roadsides to cultivate blocks of about 100 acres each. The factory proposes to lay down drains at convenient intervals and thus improve crop growth. This grouping into blocks of at least 100 acres was done also with the purpose of easy transport from fields to the factory in the early periods of harvest when paddy is still standing in the fields.

(ii) *Samalkot Area*.—(a) *Upland*.—Depending on the availability of water in the Yeleru river, water is given to ryots by turns once in 18 days in the summer months up to June but generally the month of May is practically dry. A total of ten to twelve irrigations are given for the crop costing Rs. 25 per acre. The dam across the Yeleru river is now in bad condition and requires immediate repairs. Out of the ten to twelve irrigations for the crop three to four only are given in summer. In a village of about 400 acres, only about fifty acres get irrigation in a turn and the rest go without irrigation.

Due to recent cyclone a big breach has been formed in the Yeleru river and this submerges about fifty villages during the rainy months while many villages suffer from drought during summer. The following suggestions have been put forward to improve the irrigation facilities of this area :—

- (i) A reservoir for Yeleru river to conserve the water which is now flowing into the sea and utilise the same during summer months.
- (ii) Formation of irrigation boards.
- (iii) Construction of regulators for Dabba Kalva, Ramavaram Kalva and Thamarada Kalva etc.

(iv) Construction of diversion dams for Yeleru river.

(v) Removal of Matti Kattu for Zammidoddi Kalva and Velugudoddi Kalva.

Stoppage of irrigation before harvest is not practised.

(b) *Delta Land*.—In the delta land which is fully served by canals the scarcity for water is from April middle to June middle. The crops do not show any severe symptoms of drought. After the introduction of Coimbatore canes the crop tides over the drought with much greater ease than in the case of exotic canes. The sub-soil water is only four to six feet below the ground level and it is worth experimenting on the increase in yield that could be obtained by tapping the sub-soil water for irrigation during the period of drought. The crop receives about ten irrigations costing about Rs. 15 per acre in labour. Irrigation is stopped fifteen days before harvest. The factory Chemist pointed out that canes from upland are better in quality with less of invert sugar than the canes from delta. In upland, the purity of mixed juice is about 85 per cent while in delta it is less. Further there is greater amount of invert sugar in the canes of delta and this affects recovery per cent. This situation is due to heavy irrigation given to cane even at maturity phase in the delta.

(iii) *Anakapalle and Etikoppaka Area*.—In both these areas the crop is irrigated by lift in summer and by flow from June onwards. About five irrigations are given in summer and eight to ten thereafter. For lift irrigation it costs Rs. 15 per irrigation. The water table is 8' to 10' from ground level. There is no practice of withholding water before harvest. In dry areas where there is scarcity for water in summer, the soil moisture is conserved by spreading cane trash in the planted field.

(iv) *Bobbili and Seethanagaram Area*.—Ninety per cent of the area is irrigated by rainfed tanks, and the rest are supplemented by wells. Bulk of the crop is irrigated once at planting and thereafter it passes through summer without any irrigation and is again irrigated after the outbreak of the monsoon from rainfed tanks. There is serious shortage of water at planting time which operation is rushed through before the water in the tanks is dried up. The scarcity for water is also felt by the mature crops which do not stand the field in summer without irrigation. On account of this water scarcity from February/March onwards the ryots prefer to harvest their cane early in the season and do not prefer to wait to supply the cane to the factory for late crushing. Therefore, they dispose of their crop even at less price early in the season.

Irrigation facilities in this tract will go a long way in maximising production firstly by increasing yield per acre and secondly by enabling the ryots to keep the crops standing in the fields late in the season without much dryage and deterioration.

(v) *Neilikuppam Area*.—Sixty per cent of this area is by lift and forty per cent by flow irrigation from channels, spring channels, or rainfed tanks. Water rate is Rs. 12 per acre. Normally there is no scarcity for water in the lift area. But during the current year some difficulty is being experienced due to the

fact that the North East Monsoon had failed continuously in the last three seasons and the water table has gone down considerably ; so much so that in many cases the pumps had to be lowered for lifting the water. Thirty-six to forty irrigations are common for the crop in garden land and about twenty in wet lands. But many ryots irrigate the crop heavily and once in five days combined with heavy manuring they consider it optimum for a heavy tonnage crop of fifty tons per acre. Irrigation bill costs Rs. 130 to Rs. 150 per acre in garden lands and Rs. 30 in wet lands. The factory considers that irrigation once in six days in the first three months and then once in ten days until the harvest are optimum under lift irrigation. Yield and quality are both affected by excessive as well as inadequate irrigation. Under wet land conditions irrigation once in ten days in the first three months and once in fifteen days thereafter are considered adequate. Stoppage of irrigation fifteen days before harvest is considered conducive to quality by the factory. They also suggest that the irrigation bill may be cheapened if the soil retentivity for moisture is improved by continuous additions of organic matter to the soil. Supply of cheap electricity and subsidies for sinking bore and tube wells and power boring machinery are desired.

(vi) *Kodaikanal Road Area*.—This area is served both by flow and lift irrigations. In wet lands six to seven irrigations are given before the outbreak of the monsoon. In garden lands on average thirty irrigations for the crop costing Rs. 180 are given. Irrigation once in ten days is considered optimum. Except for three months March/May, channel water is available for irrigation in wet land.

(vii) *Pugalur Area*.—The area is mostly under flow irrigation—water rate is Rs. 15 to Rs. 20 per acre. About forty irrigations are given for cane. There is water scarcity only for one month in the year when the canals are closed. In the Kulittalai area the water rate in high level channel is Rs. 29 per acre and this high rate is applicable to about 22,000 acres. Three to five irrigations are given every month. There is scarcity for water from February to June. The Pugalur ryots pointed out that at present a *Korambu* is put up at the head sluice of the Pugalur channel and water is taken. This is not considered efficient and they suggest linking up Pugalur channel to Jodurpalayam bed regulator. Such a system will improve their water supply.

(viii) *Hospet Area*.—Irrigation is by gravity flow. About forty irrigations are given to the crop. There is scarcity for water only during summer months, when canals are closed. During the current season due to co-operation among the ryots and initiative from the factory and the Department the canals were repaired in a short period in April itself and to a large extent the scarcity for water in summer has been overcome. Regulation of the closing dates of channels and shortening the closing period for repairs would appear to be helpful in increasing yield as well as in overcoming the drought in summer.

5. AGRICULTURAL OPERATIONS DURING CROP GROWTH.

(i) *Vuyyur Area*.—Before monsoon breaks in June two ploughings with country plough and thrice working with guntaka are generally carried out and all the interculture operations are done by bullock power.

These operations are done mainly to conserve soil moisture and it costs Rs. 35 per acre. The factory owns 3 tractors which were hired out to the ryots at Rs. 20 per acre. In the fields worked by the tractor the problem of nut grass was lessened to a considerable extent.

Except for the inter-culture operations mentioned above no other operations are done. Earthing up of the crop at the manuring is not usually done. The manure is applied broadcast and country plough worked between the cane rows. Wrapping and propping which are usual in the circars are also not done. Removal of unthrifty tillers from July/August which is a concomitant operation to wrapping in July/August is also not done. Thus in this area very little attention is paid to the crop during its growth. Drainage of excess water is also not properly attended to.

(ii) *Samalkot Area.*—(a) *Upland.*—Hoeing, weeding, trenching, wrapping and propping are the important operations carried out during the growth of the crop. First hoeing is done four to eight days after planting and the second hoeing by 20th day. First trenching is at 1½ to 2 months after planting and the second trenching in June at the time of manuring. Thirty-five men are employed for the three weedings in the early stages of the crop costing Rs. 43 per acre. Thirty-six men at Rs. 2 per man are employed for the two trenching and earthing-up operations. In the upland area many of the ryots are giving up propping. When propping is done thirty-five men for putting up bamboos and 100 men for five wrappings on average at Rs. 1-8-0 per man are employed. The bamboos cost Rs. 12 per 100 and about 3,500 bamboos lasting for three seasons are put up per acre. Thus the wrapping and propping operations cost Rs. 320 per acre.

(b) *Delta Land.*—The inter-culture operations in the delta land are the same as in the upland area, with the difference, that the crop is always propped in the delta. 5,000 to 6,000 bamboos are used for propping, which is generally more than what is used in the upland. First wrapping is done in June before manuring. Propping and second wrapping are done one month after the first wrapping. Three or four wrappings are done thereafter at monthly intervals. Wrapping and propping will cost Rs. 400 per acre including depreciation on bamboos.

(iii) *Anakapalle and Etikoppaka Area.*—Hoeing, weeding, wrapping and propping and trenching are the important operations done during the growth of the crop. Two hoeings with forty-five women at Re. 0-8-0 per day costing Rs. 22-8-0 are done. Five to six wrappings (25 men, plus 22 men, plus 26 men, plus 30 men, plus 35 men) at Re. 1 per day costing a total of Rs. 138 and 3,000 to 3,500 bamboos at Rs. 150 per 1,000 lasting for three seasons and costing a total of Rs. 288 per acre inclusive of depreciation on bamboos are the costs for wrapping and propping operations. Earthing-up of the crop in June at the time of second manuring will cost Rs. 30 per acre.

(iv) *Bobbili and Seethanagaram Area.*—Hoeing and weeding, wrapping and trenching are the only inter-culture operations done to the crop in this area. Two to three weedings are done with forty-six women costing

Rs. 23 per acre. In the recent years, use of bullock power and implements for this inter-culture operation is becoming very common. Two earthing-ups employing about twenty-seven men at Re. 1 per man are done to form trenches and to earth-up the crop. The crop is wrapped once or twice by June and this operation costs about Rs. 27 per acre. Propping with bamboos is not done. Where the growth is good stooking the clumps is sometimes done.

(v) *Nellikuppam Area*.—Weeding and trenching are the two operations done during the growth of the crop. Two to three weedings at third, fifth and tenth weeks by manual labour employing sixty women at Re. 0-6-0 and costing Rs. 20 to Rs. 25 per acre, are done. The soil is turned with mammuty by contract at Rs. 10 to Rs. 12 per acre. The manure is applied in three doses at 60, 120 and 150 days and two earthing-ups at 12th and 20th weeks are done at Rs. 10 for each earthing-up. The employment of bullock power for inter-culture operations is not considered feasible because the soil is loose and sandy and the irrigation furrows are necessarily short to avoid too much loss by seepage. The employment of bullock power will damage the irrigation channels necessitating re-making them.

(vi) *Kodaikanal Road Area*.—Weeding, hoeing and earthing-up are the important operations done during the growth of the crop. A light earthing-up at the second month of the crop and second earthing-up at the fifth month of the crop after manuring are done at a total cost of Rs. 55 per acre. Trashing and stooking are also done on contract at Rs. 30 per acre.

(vii) *Pugalur Area*.—Three weedings at fifteen women for each, costing Rs. 22-8-0 per acre are done. The two weedings are done in conjunction with manuring. Removal of mud from drainage channels four times cost Rs. 20. Earthing up the crop twice cost Rs. 40. These are the important operations done during the growth of the crop.

(viii) *Hospet Area*.—Three to four weedings employing in all about sixty women and earthing-up by third month are the important operations during growth. The earthing-up is commonly done by the improvised country plough. Drains are cut all round the field and these are kept in condition during the crop growth. Total cost of inter-culture operation is only Rs. 52-4-0 per acre.

6. HARVEST

(i) *Vuyyur Area*.—The usual period for harvest is December middle to April middle. This harvest period does not usually vary but in the coming season it is proposed to crush from first December in order to tackle the increased area under sugarcane in the tract.

The cane area is divided into blocks and each block is tested for maturity before cutting orders are issued. For laboratory tests two random samples of clumps are taken. There are twenty maistries who test individual fields with Hand Refractometer before any particular field is taken for harvest.

Brix readings recorded by Hand Refractometer record 2° more than the laboratory spindle. The varieties in this factory area are shown below :

Variety.	Area in acres under.	
	Plant crop.	Ratoon.
Co. 419	100.00	532.00
Co. 527	2,893.00	1709.00
Co. 449	160.00	25.00
Total	3,153.00	2,266.00

Co. 527 ratoon from wet lands, Co. 527 plant crop from wet lands, Co. 419 ratoon and then Co. 419 plant crop from wet lands is the order of preference for crushing in the factory. From February middle the crop from garden land is crushed mixed with others in the factory. At the commencement of the crushing season and at the close of it canes which are not in peak maturity are crushed. The fall in recovery is steeper at the close of the season than at the beginning. Maximum recovery is from February middle to March middle. During the current year (1949-50) the fall in recovery at the close of the crushing season was far less than usual and the curve was rather flat. In the opinion of the factory this is due to reduction in area under Co. 419. The factory closes after finishing all the canes available in the area and the closure is not decided by the recovery per cent.

Recovery at the commencement of season in 1949-50 was below 8 per cent and peak was over 10 per cent. The recovery at the close of the season fell to about 8.6 per cent. Average recovery for the season was 9.94 per cent.

For harvest, canes are cut with knives and the trash stripped with sickles. Tops are not removed to the proper extent, before the canes are sent to the factory. The tops are used in binding canes into bundles and they are also used as fodder. Rs. 3 to Rs. 3-8-0 per ton are paid on contract for harvest of canes. The canes are cut, trashed, topped and loaded into carts.

Co. 527 is reported by the ryots to yield thirty three tons per acre while Co. 419 yields forty tons. The difference in yield between Co. 527 and Co. 419 will be on average ten tons for plant crop and three to five tons for ratoon, when not affected by cyclone. Co. 527 is not affected by Cyclone.

(ii) *Samalkot Area*:—December/April is the usual harvest period. Harvest is done by using knives, cutting canes, leaving 1" to 2" above ground.

For judging maturity, laboratory test and field test with Hand Refractometer are adopted. For laboratory test two random canes from one field are taken and percentage of extraction, brix and pol of top and bottom halves are first examined and later invert sugar for a mixed juice is also estimated. The laboratory analysis always records higher than actual mill analysis. The Chemist pointed out that for Co. 419 invert sugar below 1.0 is indicative for its ripeness.

The factory crushes unripe and to a smaller extent deteriorated canes every season. The peak maturity period is middle February to end of March. During the current season the factory commenced crushing in the third week

of December with a recovery of about 8 per cent, reached the peak recovery by February middle at 10.3 per cent and for the season closed by March end with a recovery of 9.8 per cent—average recovery being 9.67 per cent. The Chemist pointed out that due to the crushing of immature and deteriorated canes the loss may be computed on an average at 1 per cent on cane for the season or roughly at 10 per cent on sugar production. The maximum recovery is from February middle to March middle for about three weeks.

The factory prefers to adopt a suitable varietal schedule for early and late seasons. This being a jaggery area the varietal schedule will not be acceptable to the ryots.

(iii) *Anakapalle and Etikoppaka Area.*—The usual period for harvest is December to April. The ryots judge maturity of cane by arrowing or by trial boiling of jaggery. The variety grown is predominantly Co. 419 and other varieties like Co. 421, Co. 449, Co. 475 and Co. 544 are also under study in Etikoppaka. In the case of Thummapala factory, Co. 419 is the only variety. This factory offered a premium of Rs. 2 per ton for Co. 527 but so far this variety was not taken by the ryots.

During the current season, Etikoppaka started in December with a recovery of about 8.5 per cent reached the peak of 9.3 per cent by middle of March and closed at 7.7 per cent by middle of April. Average recovery for the season was 8.77 per cent.

In the case of Thummapala factory, it commenced crushing by last week of December with a recovery of about 8.5 per cent and reached the peak of 9.7 per cent by February 20th by which date it had to close for want of cane supply. Average recovery for the season was 9.01 per cent.

Since these two factory areas are also jaggery areas and since Co. 419 is a high yielding variety, it was mentioned that it is difficult to introduce varietal schedule in these areas.

(iv) *Bobbili and Seethanagaram Area.*—The usual harvest period is from November to April. The late season harvest is confined to areas supplemented by wells and Co. 419 is the variety. Other varieties that are grown in this tract are Co. 527 and Co. 421. Variety Co. 542 is under multiplication. The average yields of different varieties are Co. 527—12 to 15 tons; Co. 421—15 to 18 tons; Co. 419—18 to 21 tons. The yields are higher by 4 to 5 tons when the varieties are under well irrigation.

In 1949-50 the Seethanagaram factory commenced crushing in December with 10.459 % recovery, reached peak of 11.559 % by February middle and the drop commenced in April and went down to 10.413 % in March. Average recovery for the season was 11.01 %. The factory does not stop crushing on the basis of recovery but continues to crush until all the registered canes are crushed. Canes are cut with knives flush to the ground and sickles are used for trashing.

(v) *Nellikuppam Area*.—The harvest period is December/May. The factory considers that the testing of maturity in individual plots over 3,000 in number is not feasible. Sample of two stools are taken and tested in small mill which gives 60 to 65 per cent extraction. The judging of maturity is largely by time of planting and twelve months period is taken, the ratoons being accepted first for harvest. Hand Refractometer is not used here as its readings are not found useful. The following are the rough acreages under different varieties :—

Co. 281	Early season	3,000 acres	Yield 22 tons average.
Co. 527	Early season	2,000 do.	30 do
Co. 349	Mid season	3,000 do.	31 do
P.O.J. 2878	Late season	3,000 do.	28 do

Co. 419 is reported to have been tried by the factory but given up due to smut susceptibility and low quality. P.O.J. 2878 gives maximum sugar per acre in March/April and maintains quality late. Co. 527 is found to maintain quality to much later date than other varieties. Co. 527, Co. 449 Co. 620, and Co. 444 are considered by the factory as promising varieties expected to replace the existing ones. In the last three seasons, Adsali is under trial and during 1949-50 season it received a premium of 10 per cent and in 1950-1951 only 5 per cent premium is offered. The factory commenced crushing in December with a recovery of 9.35 % and was still continuing to crush when the Sub-Committee visited it in May. Average recovery by 18th May 1950 was 9.50 %.

Maximum recovery is recorded from the end of February to middle of April. March is the peak month. Most economical period is 15th January to 15th April for maximum sugar production.

(vi) *Kodaikanal Road Area*.—This is the first crushing season for the factory. The factory started with a recovery of 7.60 per cent. in January and reached the peak 10.46 per cent in March and fell down to 7.60 per cent on April 16th when factory closed, overall recovery being 8.88 per cent.

Harvest is done by mammuty, cutting the canes 2 inches below the ridge. In the case of plots to be ratooned more cane above the ground level is left.

(vii) *Pugalur Area*.—Records of planting dates are kept by the factory and the maturity is judged primarily by twelve months age of the crop. Hand Refractometer is used when the factory commences crushing but not thereafter. There are two crushing seasons, the main season from December to March and the second season from July to October. During the last season crushing commenced with 1st January with about ten per cent recovery and reached the peak of 10.25 per cent early in February and the lowest of 7.6 per cent in March. For the second season crushing commenced in third week of July with 8.65 per cent, reached the peak of 9.35 per cent early in September and reached the lowest by October 14th with an over all recovery of 9.06 per cent. Co. 419 is the only variety in this tract. This being a jaggery area, introduction of varietal schedule is considered difficult. Canes are cut with knives (Kodali) of special type.

(viii) *Hospet Area*.—The usual harvest period is November to March. The factory issues cutting orders. Complete analysis is done by the factory before cutting orders are issued.

During the year the factory commenced by second week of November with 8.35 per cent recovery and reached its peak recovery of 12.19 in the first week of February and closed by second week of April with 8.67 per cent recovery. Average recovery for the season was 10.68 per cent. Co. 419 is the only variety in this tract. This being a jaggery area introduction of early rich varieties with yields lower than that of Co. 419 is considered difficult.

7. TRANSPORT OF CANES.

(i) *Vuyyur*.—The entire supply to the factory is by gate canes, which are brought to the factory from within a radius of six miles. Bullock carts owned by growers are used for transport of canes. The canes usually reach the factory within three to four hours after harvest and the canes are crushed within twelve hours after harvest. Carts do not wait for more than four hours at the factory. Ryots bear the cost of transport which is mostly by their own carts or they pay Rs. 3 per ton as hire. Each cart transports one and a quarter tons of cane. Minimum cutting order is one permit which equals one cart load of cane per acre of the crop under cultivation by one individual. A ryot harvests on average one acre of crop in about ten to fifteen days. Each ryot harvests the crop with his own labour. One hundred and forty rubber tyred carts are available with the factory and these are hired to the ryots at Re. 1 per day. These pneumatic tyred carts can transport 2-1/2 tons of cane. Since the canes reach the factory within few hours after harvest there is no loss of sugar in transport. The factory, therefore, considers it unnecessary to purchase canes at out-stations.

There are 35 miles of feeder roads which require metalling, as shown below :—

1.	Thadanki—Meduru road	...	...	8 miles
2.	Vuyyur—Valluru road	...	...	6 "
3.	Vuyyur—Kalavapamūla via Katuru road	...	...	7 "
4.	Kaṅkipadu—Komatigunta road	...	...	4 "
5.	Gandigunta—Kunderu road	...	...	3 "
6.	Vuyyur—Gurajada road	...	...	3 "
7.	Vuyyur—Penamakura via Kommamuru and Kanakavalli road	...	...	4 "
Total				35 miles

Transport of canes from fields is difficult in the early harvest season when paddy is still standing in the fields. To facilitate easy transport the factory has grouped the cane plots into at least 100 acre blocks particularly on roadsides. This grouping is also helpful in other ways. The ryots experience difficulty in securing iron cart-tyres of suitable size to the locality (1-7/8" size).

(ii) *Samalkot*.—The average distance from which canes are carted to the factory is eight miles. Bulk of the crop is transported by bullock-carts owned by the cultivators. Average time lag between the harvest and reaching of cane to the carrier is 24 to 36 hours as detailed below :

Within 16 hours	...	20 %
Within 24 hours	...	65 %
Within 36 hours	...	15 %

Cost of transport per ton of cane is on average Rs. 5. The factory owns a few Dunlop tyre carts and it charges Rs. 1-8-0 per day as hire. The ryots are not using these carts as they are useful only on roadside. The entire supply of cane to the factory is by gate canes and since the bulk of the crop is reaching the cane carrier within 24 hours, there is no loss of sugar due to delay in transport.

The cultivators pointed out that hired carts are not generally available because there was too much delay and waiting of carts at the factory and the hired cart men are averse to this waiting. An instance of cane from a field four miles from the factory waiting for fourteen hours at the factory was mentioned. Regulation of cutting orders to minimise waiting at the factory was demanded by cultivators. The carts have to wait until the canes are put into the carrier. If waiting by cartmen is avoided, it was mentioned that transport may become cheaper by Re. 1 per ton. Because of the abnormal delay in unloading carts at the factory, much of the good canes are reported to be diverted for jaggery making. The following roads require immediate repairs:

- (1) Prathipadu—Samalkot Road—In progress.
- (2) Vecravaram—Rajapalem Road.
- (3) Muddollu—Rajapalem Road.
- (4) Gudivada—Pulimeru Road.
- (5) Kandrakota—Samalkot Road *via* Peddapuram—A cause-way or bridge over Yeleru river near Peddapuram is a matter of urgency.
- (6) Gorinta—Jelluru road *via* Mallam.
- (7) Divili—Lakshminarayana—Narasapuram Road.
- (8) Chandrampalem—Fhakruddinpalem Road.
- (9) Atchampeta—Samalkot Road *via* Unduru.
- (10) Kirlampudi—Thimmapuram Road.

The cause-way near Peddapuram is very important to facilitate supply of cane to Pithapuram factory. At present 400 to 500 acres only can be normally carted to Pithapuram. When Mallam-Mangithurthi road is formed an additional 1,000 acres may be brought under Pithapuram factory.

During the current season the supply of gate canes by different modes of transport were as shown below :—

Country cart	...	91.94 %
Rubber tyred carts	...	2.02 %
Lorries	...	1.76 %
Boats	...	4.28 %

There is no loss in sugar due to transport as most of the canes are crushed within twenty-four to thirty-six hours of harvest. Therefore, the factory does not consider it necessary to purchase canes at out-stations.

(iii) *Anakapalle and Etikoppaka.*—For Thummapala the average distance from supply area is five miles, and for Etikoppaka it is within ten miles. In both the factories the entire supply of cane is by gate canes. The cost of transport near Thummapala is Rs. 3 to Rs. 7-8-0 with an average of Rs. 4 per ton of cane. The canes reach the carrier within fourteen to twenty hours after harvest and at Etikoppaka it is within twelve hours. In both the cases there is very little loss of sugar during transport. A cause way across the river is necessary to facilitate easy transport of canes to Etikoppaka factory.

(iv) *Bobbili and Seethanagaram.*—The average distance of supply area is five to six miles. Country carts are the only modes of transport. The carts take three to six hours for reaching the factory. It costs Rs. 3 to Rs. 10 with an average of Rs. 4 to 5 to transport one ton of cane depending on distance. The entire supply of cane to the factory is by gate canes. Bulk of the cane is crushed within twenty-four hours after harvest and as such there is no loss of sugar in transport. The ryots pointed out that they are in short supply of iron cart tyres. Repairs to the following roads in Bobbili area are stated to be essential :—

- Bobbili.*— (1) Gunnathota valasa—Gollapalli—Piridi Road.
 (2) Gollapalli—Karada—Nandabalaga Road.
 (3) Alazangi—Palteru—Mugada Road.

Seethanagaram.—Laying of new roads—

- (1) Gutchimi to Nidagallu.
 (2) Seethanagaram to Makkuva.
 (3) Seethanagaram to Boorja.
 (4) Chinthada to Komatapalle to Antipera.

(v) *Nellikuppam.*—The entire supply of cane to the factory is by gate canes, as shown below :—

Rail	...	...	50%	8.7	tons average per truck.
Lorry	...	...	26%	4.1	tons per lorry.
Tyre carts	...	...	11%	3.48	tons per cart for 4 wheeler.
				1.7	tons for 2 wheeler.
Country carts	...	...	11%	0.73	ton per cart.
Tractor trailer	...	...	2%	3.73	tons per trailer.

There is an Ex-Servicemen Co-operative Society with sixteen lorries and this is working economically. Canes from thirty-five miles distance are now coming by road and lorry. Rail canes up to thirty miles are received. 50% of the rail canes are crushed in twelve to twenty-four hours and the balance of rail canes are crushed within forty-eight hours. The following data show loss in transport in an experiment :—

Interval.	Sugar yield % cane.	Percentage of loss in recovery.
0	8.70	
24	8.60	1.15%
48	8.14	6.44%
72	7.69	11.61%

The factory considers that for a transport of five miles by road and then twenty five miles by rail it is cheaper to transport by lorry which costs only Rs. 7-8-0 per ton against Rs. 8 by road and rail and also the cane reaches the factory carrier twelve hours earlier than by rail. For rail canes a siding charge of fourteen annas per unit on rail is charged by the railways and the factory does not charge anything for unloading. Pilferage during transport is reported to be heavy and is estimated at 5%. In one instance a truck with six tons of cane reached the factory empty. Special types of wagons are the only solution. But so far the Railways have not agreed. Concession rates by railways have been withdrawn. The railway freight has been increased from Rs. 1-4-0 to Rs. 3-8-0 per ton. The factory suggests that supply of a single type of wagons at all stations, and supply of empties and removal of loads at fixed hours at each station would minimise delay in transport and reduce interval between harvest and milling considerably. Lorries and tractor trailers are suggested for quickening road transport. Construction of a cause-way across Pennaiyar at Swarnavur will shorten the distance of transport of canes from Villupuram taluk.

(vi) *Kodaikanal Road*.—The average distance for transport of canes is five miles. The average transport charge is Rs. 3-8-0 per ton, for five miles and additional four annas per mile. During the current year, the factory paid towards transport from the road side to the factory and, was allowed to sell sugar at higher rate to compensate for this arrangement. But this arrangement is not likely to continue.

(vii) *Pugalur*.—The entire supply of cane to the factory is by gate canes. The canes are carted mostly by country carts and in the case of distant areas by lorries. Railborne cane forms a very small proportion. The railway authorities have not given facilities for rail transport of canes. The factory gives preference to the lorries in the matter of cutting orders and also for weighing at the bridge. For a distance of ten miles transport costs Rs. 4 per ton. The factory is situated $3\frac{1}{2}$ miles away from the railway station and during the year the transport of canes from rail to the factory was left on contract at Rs. 3-2-0 per ton. The home-area cane is crushed within twenty-four hours of harvest and the railborne cane within forty-eight hours.

Transport of canes is a major problem in this area and 80% of the canes are transported by road. The road from Noyyel to Nerur is the main track on which the cane supplies to the factory are transported. If this road is improved reduction in transport cost is a possibility. The ryots suggest the laying down trolley line which is expected to reduce cost of transport from Rs. 9 to Rs. 4 per ton. Tractor trailer transport is also suggested for reduction in costs. Feeder roads are in bad condition and repairs to these will also reduce cost. Transporting canes to roadsides by headloads increase the cost very much. Bullock carts make a single trip per day while the lorries with a load of three to three and a half tons make three trips per day. Average cost of transport by bullock-cart is Rs. 7 per ton and by lorry Rs. 6 per ton. Sufficient number of lorries are not available. For Kulittalai area, transport by lorry costs Rs. 10 to 12 per ton.

The growers said if the factory arranges transport of cane, bulk of the cane in the area will be supplied to the factory.

Concession by railways on transport of cane had been withdrawn. The ryots represented that the factory should take up transport of canes in which case it can maintain an efficient and quick system of transport of canes. The ryots of this area desire that the price of canes should be fixed ex-field, and that the factory should establish purchasing centres as in North India.

(viii) *Hospet*.—The entire supply to the factory is by gate canes. These are brought to the factory mostly by country carts and from last year lorries have been introduced. The average distance for this supply area is about five miles. The canes usually reach the factory within twenty four hours of harvest and there is no loss in sugar during transport. There are two weigh bridges in the factory ; but they seem to be inadequate to deal with the carts coming into the factory and there are abnormal delays in the release of carts after weighment. For the near areas it costs Rs. 6 per ton for harvest and transport to the factory ; but for distant areas like Kamalapur the transport charge alone is Rs. 7 per ton. Delay at factory being common, there appears to be considerable jamming of carts in which cattle get hurt. Regulation of supply for different shifts is an important necessity to avoid the above troubles. The ryots prefer to have outstations for purchase by the factory.

The roads in the factory zone are in very bad condition. Immediate repairs to the same would cheapen the cost of transport. The list of roads to be repaired is noted below :

- (1) Hosur Road.
- (2) Ippethevar Road.
- (3) Basavandrug Road.
- (4) Amaravathi Road.
- (5) Nagenahalli Road.
- (6) Kalghatta Road.
- (7) Danapur Road.

Supply of iron cart tyres is not in enough quantity

AVERAGE HOLDINGS OF SUGARCANE IN VUYYUR AREA.

Serial No.	Size of holding.	1948-49.		1949-50.		1950-51.		Remarks.
		Number of ryots.		Number of ryots.		Number of ryots.		
1	Less than 1/2 acre	...	289	...	81	...	254	
2	1/2 acre — 1 acre	...	477	...	327	...	441	
3	1 acre — 2 acres	...	43	...	395	...	509	
4	2 " — 3 "	...	183	...	154	...	265	
5	3 " — 5 "	...	163	...	136	...	218	
6	5 " — 7½ "	...	73	...	62	...	85	
7	7½ " — 10 "	...	30	...	36	...	46	
8	10 " — 15 "	...	18	...	38	...	51	
9	15 " — 20 "	...	11	...	22	...	27	
10	20 " — 25 "	...	6	...	8	...	14	
11	25 " — 30 "	...	2	...	8	...	4	
12	30 " — 40 "	...	4	...	5	...	8	
13	40 " — 50 "	...	3	...	...	...	4	
14	50 " above	...	...	...	...	...	2	
Total No. of ryots		...	1712	...	1372	...	1,928	
Total No. of acres		...	4,320 acres.	...	4,031 acres.	...	5,950 acres.	
Average holding		...	2.51 Ac.	...	2.9 Ac.	...	3.1 Ac.	

MISCELLANEOUS.

(i) **Vuyyur :**

(a) *Ratoons* :—From the factory view point, one ratoon is preferred since it gives higher recovery in the early crush. There is no bad effect on lands by ratooning if canes are properly manured and cultured. Sri Ramakrishna pointed out that in Hawaii canes were raised for half a century in the same fields by uprooting the crop and replanting the same field, without any bad effects on land. Even in such lands yields went up from about one ton to over six tons of sugar. Therefore it is stated that there can be no serious damage to soil by continuous planting of cane even for long period.

(b) *Payment for cane* .—The payment for cane is at the rates fixed by the Government. There are two cleaning yards at the entrance to the factory. About 600 carts are examined every day and of these on average 100 carts require cleaning and removal of water shoots, dried canes etc. Records are maintained about carts entering and cleaning done in each case. Co. 419 has more water shoots. In the opinion of the factory, evolution of a formula for reduction in rates for burnt canes is necessary.

(c) *Other points* .—The highest yields recorded in the area are 50 tons per acre. But the average yield is about 28 tons. There had been no serious damages due to pests and diseases. Once in 5 years there is cyclone which reduces yields by about 5 tons per acre.

A number of growers are share-holders in the factory. There is no competition from any other factory and also there is no jaggery making in this tract. There is no need for zoning in this area. There is no home-farm nor Liaison Farm. The factory suggested the need for a Liaison Farm for this area.

There are about 1,500 growers cultivating about 6,000 acres of cane. There is no Co-operative Society in this tract. Extension of cane area is possible if the areas above Balliparrulock, Komatigunta lock, and Veeranki lock, are included in the zone for cane. In these areas, water is now available up to 15th February and this should be extended up to 15th April.

The ryots represented that the ammonium sulphate issued for cane is costlier than the stuff issued for the food crops through the Agricultural Department. There should be no difference in price levels.

Paddy coming in rotation after cane generally yields more due to the application of organic manures for sugarcane. The application of organic manure is the general practice and therefore sugarcane has helped in increasing the yield of paddy and maintenance of soil fertility in this tract.

The number of ryots with different sizes of holdings under cane are shown in the table (vide page 38) appended. The number of ryots with holdings below 5 acres being the largest, the factory has consolidated canes into big blocks as already pointed out.

(ii) **Samalkot :**

(a) *Ratooning* .—From the factory aspect, one ratooning is preferred since it can commence crushing from December with higher recovery per cent. The difference in yields between plant crop and ratoon is estimated at 5 tons less for ratoons.

THE DECCAN SUGAR & ABKHARI CO., LTD., SAMALKOT.

Average holding of registered sugarcane ryots in Samalkot factory area in 1949-50.

Serial No.	Size of holdings.	No. of ryots.	Total extent.	
			Acres.	Cents.
1	Upto 1/2 acre	49	22	50
2	From 1/2 acre to 1 acre	131	115	10
3	1 " 2 acres	223	363	53
4	2 " 3 "	103	274	71
5	3 " 5 "	90	364	77
6	5 " 7 1/2 "	48	303	7
7	7 1/2 " 10 "	18	158	65
8	10 " 15 "	10	117	13
9	15 " 20 "	7	126	20
10	20 " 25 "	1	22	5
11	25 " 30 "	3	84	...
12	30 " 40 "	1	31	...
Total			1,982	71

Average holding 2.9 acres.

(b) *Payment for cane*.—No deductions towards dried or diseased canes are made. The factory deducts a certain percentage towards binders, as indicated below :

Up to 29-3-50	...	...	...	...	2.2%
Up to 4-4-50	...	...	...	...	1.78%

There are no complaints from cultivators in regard to payment for cane.

(c) *Other points*.—The highest yield recorded in the factory farm was 80 tons per acre in a block of half an acre. At Samalkot Research Station the highest yield recorded was 82 tons in a block of one and a half acres in 1941-42. The average for all seasons in the factory farm is 40 tons per acre in wetland and 30 tons in upland area. There is one factory farm and one Liaison Farm in this area. No diseases in epidemic form are noticed in the tract.

The factory is of opinion that the relationship between the grower and the factory can be strengthened if all the requirements of cane growers are supplied through the factory and not through Co-operative Societies. In respect of this factory, zoning is considered essential when the Pithapuram factory commences crushing. Banning jaggery manufacture is not feasible as such a ban cannot be enforced. Consolidation of holdings under cane into large blocks to facilitate Co-operative Farming and mechanisation of Agricultural practices are considered useful by the factory.

Peddapuarum Sugarcane Growers' Co-operative Society gives advances up to Rs. 150 per acre towards manure. During the current season this Society had advanced over Rs. 2½ lakhs to its members. These advances are made on personal security or over continuity bonds. The factory helps this society by collecting their dues from the growers and passing it on to the society.

Zoning is considered necessary by the ryots. But until the road on Divili-Lakshminarasapuram is improved to facilitate transport, supply of canes to Pithapuram factory is difficult. It was brought to the notice of the Committee by cultivators that the Pithapuram factory is located in a wrong place in respect of cane supply, and this situation has risen due to the fact that the exact location of a factory is not specified in the licence issued for the erection of the same.

The number of ryots with holdings of different sizes under cane is shown in a table appended. (Vide page 40).

(iii) **Anakapalle nad Etikoppaka :**

(a) *Ratoon*.—One ratoon is common in this area. The ryots felt that there was very little savings by ratooning because the yields were correspondingly lower. This view is not confirmed in the experience of the Etikoppaka factory. In the latter the cost of ratoon crop is 50% of the plant crop and a successful ratoon with Co. 419 gives as much as 40 tons per acre. Thus ratooning is considered advantageous both to the factory and grower but only one ratoon is considered safe from the view point of yields, pests and diseases.

(b) *Payment for cane.*—Canes are paid at the rate fixed by the Government and no deductions towards diseased or dried canes are made. In both the factories half per cent deduction towards binders is made. In the case of Etikoppaka which is a Co-operative factory a bonus of Rs. 6 per ton was paid to cane suppliers during 1949-50 and Rs. 8 were paid in 1947-48. In the case of Thummapala factory, prices up to Rs. 50 per ton were offered but cane supply was short due to the prevailing high prices of jaggery. This factory had to stop crushing by 19th February for want of cane.

(c) *Other points.*—The highest yields are about 50 tons per acre. The representations from growers of Thummapala factory area were (i) cutting orders must be issued to enable the growers to harvest an acre in as short a period as possible; (ii) carts are to be released more speedily from the factory; (iii) feeder roads are to be repaired; (iv) a growers' representative is to be permitted at the weigh bridge; (v) one more person is to be permitted to enter the factory along with the cart to help the cartman in stacking the canes; (vi) the factory should undertake development work in the area and should not purchase canes through middlemen. In reply to the above points the factory representative pointed out that they do not wish to advance money to individual growers but would be willing to take cane development work through Co-operative Societies which should ensure them cane supply year after year irrespective of the prevailing prices for jaggery. They also said that the banning of movement of jaggery should be more effective and also fixation of ceiling price for jaggery was considered necessary.

The Etikoppaka factory considers that the growers must have effective voice in the management of factory to solve the existing differences between the growers and manufacturers. This factory is a co-operative organisation in which the growers are members and it is obligatory for them to supply canes to the factory. The growers benefit from the profits of the factory. This society gives financial assistance to the growers and also purchases and supplies manures to the growers. This factory is also of opinion that the price and movement of jaggery should be controlled, in the proper sense and proper form so that jaggery manufacture might not stand in the way of maximisation of sugar production in the State.

In the case of both the factories, there are no home-farms; but they are dependant on the experiments of Anakapalle Research Station and Department for technical guidance in cane cultivation.

(iv) **Bobbili and Seethanagaram :**

(a) *Ratooning.*—From the factory view point ratoons are preferred. Ratoons yield less by 25% on plant crops.

(b) *Payment for cane.*—Payment for cane is at the rates fixed by Government. No deductions are made for dried or diseased canes; but half a per cent of deduction is made for binders.

According to the existing system of payment, the supplier is to present the weighment chits to the factory after which his accounts are prepared. There was general representation that payments are considerably delayed.

(c) *Other points.*—The highest yield recorded is 30 tons per acre for Co. 419. During the current year both Seethanagaram and Bobbili factories did not maximise sugar production. In the case of Bobbili factory the management requested that the Government should make early arrangements for the supply of electric current by September/October of this year either from Machkund or from the saving of electric current effected at Visakhapatnam Ship Building Yard. The factory had been in correspondence with the Electricity Department (vide letter No. C. M. J. 3/Viz/12/223, dated 26-4-1950 from the Superintending Engineer, Andhra Power System, Vijayawada).

The following representations were made by the growers: (i) the carts are to be released after weighment more expeditiously and shade and drinking water amenities for both cattle and cartmen should be made at the factory yard; (ii) issue of cutting order to growers must be made on a planned basis and the present system of calling all the growers to the factory and issuing orders only to a few to the disappointment of many others who waited day-long should cease. Payment for cane is abnormally delayed. Installation of automatic ticket printing weighbridge is necessary. The factory has no home-farm and the ryots desire to have a Government Farm from Sugar Excise Funds or from any source. Supply of ammonium sulphate and cart tyres is inadequate in this tract.

Zoning is preferred due to competition in the case of purchase from Rayagada Sugar Factory.

The Bobbili Sugarcane Growers' Co-operative Society, Ltd., was registered in 1935-36 and has been increasing in membership from 1,678 members in 1942-43 to 3,163 members in 1949-50. During the last season the Society advanced over 3 lakhs of rupees as loans to members. It gives Rs. 100 as advance per acre, and by convention no member is given more than Rs. 500. This Society helps the growers by supplying them groundnut cake and ammonium sulphate but during the last season this Society did not receive any quota of ammonium sulphate.

(v) **Nellikuppam**

(a) *Ratooning.*—The factory recommends one ratoon only as further ratooning increases pests and diseases and also reduces sugar per acre.

(b) *Payment for cane.*—The factory pays at rates fixed by Government—but in the case of Adsali it paid a premium of 10% in 1949-50 and proposes to pay a premium of 5% in 1950-51.

The ryots are asked to clean and bring their canes in acceptable form for the purchase at the gate. At loading stations the Inspectors examine cane and advise the ryots to clean it if necessary. If not cleaned, the wagon is left in the lay-by on arrival at the factory and the ryot has to get it cleaned by contract labour at Rs. 15 per wagon. The factory is not prepared to take up cleaning as it fears that the ryots will bring canes in an unacceptable form to a larger extent if the factory takes up this work.

(c) *Other points*.—Average yield of cane for 8 seasons is 24.08 tons per acre and recovery per cent is 8.73.

The factory is not in favour of a varietal Advisory Committee because the factory itself has an experimental farm to serve the purpose.

It is in favour of an Advisory Council consisting of ryots nominated by the factory and presided over by the General Manager. In regard to smoothening the relationship between the suppliers and the factory, the factory is of opinion that the present systems of registration, payment of advances and payment for cane as adopted by the factory are the best. Zoning is not necessary for this area as there is no jaggery making and the factory has monopoly on the entire cane of the area. The Madras Sugar Factories Control Act, 1949, is considered defective by the factory and that it is more binding for the factory to purchase cane from the growers but it is not equally binding on the grower to supply the cane to the factory. Co-operative farming is suggested by the factory to mechanise cultivation and cheapen costs of production of cane. The following points were represented by the growers :—

(i) The present system of maturity test by factory staff and rejection of cane at the yard have led to a very wide system of corruption in the staff and this is estimated at Re. 1 per ton or over Rs. 3 lakhs per year. A closer supervision and check by the superior officers of the factory is desired.

(ii) There are binami transactions in registration of canes. The factory should register canes direct with the growers.

(iii) Tractors in large numbers should be purchased and given on hire by the factory to the ryots.

(iv) Ratoons should receive cutting orders a month in advance of plant crops.

(v) The company system of rejection of cane at the yard requires revision. The present system requires the grower to take back the cart, lorry or wagon and bring back the canes in acceptable form.

(vi) When the factory decides on reduction in area, it should not be enforced on small holdings particularly in the case of plots to be ratooned.

(vii) Sri R. Venkatasubba Reddi pointed out that reduction in prices of cane without first effecting reduction in the cost of manure, transport and irrigation, which were the essential items in cane growing was not a proper step. Reduction in those items should precede reduction in cane price. He also urged that economy should be effected in the cost of manufacturing sugar as is being aimed at cost of cultivation of sugarcane.

(vi) Kodaikanal Road:

(a) *Ratooning*.—Up to 4 ratoons in the case of Co. 419 are raised by the cane growers. Yield of ratoons is less by 5 tons from plant crop.

(b) *Payment for cane.*—No rejections of canes are made at the factory. Payment for cane is at the rate fixed by the Government and the suppliers are paid immediately on demand.

(c) *Other points.*—This is the first crushing season for the factory and it has so far maintained good relations with its suppliers. The factory advances Rs. 100 to Rs. 250 per acre at 6% interest to the growers.

There is no home-farm. Banning of jaggery making is not favoured by the cultivators. Control of jaggery prices may be necessary to ensure supply of canes to the factory.

(vii) **Pugalur :**

(a) *Ratooning.*—Four ratoons are common. Smut is severe in the ratoon crop. Ratoons are well treated with stubble shaving and heavy manuring. But only one ratoon is preferable for this tract.

(b) *Payment for cane.*—The payment is at rates fixed by Government. The factory mentioned that secondary shoots and suckers less than 4' in length are rejected. It deducts 0.75% for binders. When the ryots demand on the spot after delivery of cane, 90% of their dues are paid immediately and the balance is paid within 15 days when accounts are settled. The factory pays advance to cane growers at 4% interest.

(c) *Other points.*—The cane growers represented the following :—

(i) Cutting orders should be issued with more margin of time for arranging harvest ; (ii) for distance over 5 miles, the factory should arrange transport of canes ; (iii) formation of Local Advisory Council wherein the growers will have a place to represent their difficulties is necessary ; (iv) amenities as shade and drinking water for cane suppliers and cattle are necessary ; (v) the factory advances Rs. 410 (Rs. 160 in cash and Rs. 250 in the form of manure) to cane growers. The Parry's mixture costs Rs. 1-8-0 per pound of nitrogen against Re. 1 per pound when applied in the form of groundnut cake and nitrogen. On a reference being made to M/s Parry & Co., they said that this statement is incorrect as cost per lb. of nitrogen in their Karur sugarcane fertiliser is Rs. 1-5-0 per lb. whereas mixture of groundnut cake and ammonium sulphate at current prices to give the same quantity of nitrogen per acre would cost Rs. 1-4-0 per lb. In addition the Karur sugarcane fertiliser gives 82 lbs. of P_2O_5 per acre.

The growers of Kulittalai area prefer a sort of sliding system of payment which should have in it the ingredient of minimum price based on cost of cultivation.

(viii) **Hospet :**

(a) *Ratoon.*—Ratooning is banned in this area under the Pest Act in order to control smut. The ryots represented that they know the method of controlling smut by uprooting and burning totally the affected clumps and as such they should be permitted to raise one ratoon and subsequent

ratooning might be banned. The ratoons yield less but the growers are confident in giving proper cultural treatment to increase the yield to the level of plant crop. Ratoons are cheaper by about Rs. 300 per acre.

(b) *Payment for cane.*—Canes are paid at the rates fixed by the Government. On delivery Rs. 10 per ton of cane are paid and the balance paid within a fortnight after making the necessary deductions in respect of advances by the factory. There was general complaint that the account, furnished in the growers' pass book are incomplete and there is room for suspecting that the accounts are not correct. In respect of deductions for binders it would appear that the factory was not following the rules under the Act but were deducting excessive and uniform amount of 56 lbs. per cartr

(c) *Other points.*—The factory would appear to co-operate with the ryots in matter like repairing roads and channels. But in other directions the relationship between the two is none too cordial. The factory misinterpreted reservation of area under the Act and compelled the growers with threats of non-issue of permits in future years and thereby stopped ignorant growers from making jaggery. The factory was also unreasonable in rejecting offers of cane by the Co-operative Societies in the area and the explanation that they were late planted canes is not correct. The ryots desire that the factory should enter into agreement early in the season. Regulation of closing date and speedy repairs to channels, repairs to roads are essential requirements of growers. Iron materials like cart tyres and manures like cake and ammonium sulphate are in short supply. The growers would like more liberal issue of sugar for their domestic consumption. Banning of jaggery-making is not desired by growers.

B. RECOMMENDATIONS.

Vuyyur Area :

Planting and germination.—At present tops are not used for planting in this area. This not only involves an expenditure of Rs. 120 per acre for purchase of material but also results in poorer germination. For using tops for planting the factory has undertaken to time its cutting orders suitably to synchronise with harvesting and planting. The growers will need to be educated both with regard to the value of tops for planting and also the way of preserving them for about a fortnight. If tops had been used for planting in this area, during the last season, it would have increased sugar production by 1,500 tons. This would also reduce cost of cane per ton, by about Rs. 3. This recommendation should be implemented in two years. At present, gaps are filled with ordinary setts which do not catch up with the main crop in the field. Filling with germinated setts is recommended. More setts are to be planted at channel heads and the germinated setts are to be used for filling up gaps.

Cultural operations including manuring.—Both the planting furrows and inter-culture to preserve moisture during the summer months are now done with cattle power which is satisfactory and economic.

The water problem in the area would appear to be one of scarcity during canal closure and adequate drainage after the monsoon sets in. Lodging is common when the crop is fairly heavy. Manuring is done by broadcasting it in the field. Permission to use canal water for cane along with paddy nurseries in the case of wet lands and permission to pump water in the case of sugarcane in dry or garden lands at the same time is strongly recommended. Consolidation of cane areas into large-sized blocks as developed at present at Vuyyur is strongly recommended as it would put up yields in this area and also facilitate drainage, care of the crop and transport. Experiments at deeper planting, earthing-up and tying-up in cocks with trash to prevent lodging are recommended. Application of manure close to the cane clumps and covering it up would conserve manure applied. The factory experiments at preparing trash compost in the field with starters like press-mud and pig manure should be examined by the Sugarcane Specialist and if found satisfactory should be recommended for general adoption.

Miscellaneous.—Arranging for planting at different times and synchronising the harvest with factory crushing would improve both yields and recovery. It was mentioned that iron cart tyres generally used in the south were being distributed in this area. This needs rectification. The supply of canes to the mills with proper topping and cleaning of roots should strongly be advocated.

Samalkot Area :

Planting material.—What has been mentioned regarding the use of tops and regulation of factory cutting orders to enable use of tops and filling up gaps under Vuyyur applies to this area.

Cultural operations including manuring.—The outstanding item in this area is the high cost of wrapping and propping. But as there is evidence that this operation puts up the yield by about ten to fifteen tons to the acre, experiments are indicated to evolve methods for cheapening this operation through cocking with trash and use of horizontal wires and verticals that would last longer than the bamboo.

It was represented to the Committee that in the past the factory gave preference by way of higher advances to growers who purchased fertiliser mixtures. They have now kindly agreed to give advances irrespective of the kind of manures used by the growers. The Committee strongly recommends that ammonium sulphate should always be applied in combination with organics. Greater use should be made of bullock power in cultural operations in the upland areas.

Miscellaneous.—The closing of breaches in the Yeleru river, the construction of a dam and the building of a cause-way over the Yeleru river near Peddapuram are items which need immediate attention particularly in view of the establishment of another factory in Pithapuram.

Anakapalle and Etikoppaka.—The 'main defect' at Thummapāla is the absence of any contract between the grower and the

factory and this has resulted in short supply of cane this year. Remarks on use of tops, filling up gaps and issue of cutting orders mentioned previously applies to this area also. The prevalent practice around Anakapalle of covering with trash or manure to improve germination and conserve moisture and sheep penning are healthy practices. Attempts should be made to encourage use of implements in cultural operations.

Etikoppaka Area.—This small seventy ton factory working to the advantage of both the grower and the factory through co-operative organisation is a lesson which bears both on the value of co-operative set up and throws doubt on the 800-ton being the lowest economical unit in all circumstances in factory organisation. Conditions of growth and culture are roughly the same as at Anakapalle.

Bobbili and Seethanagaram.—Increase of irrigation facilities by construction of river dams across the Swarnamukhi and Vegavathi was desired by the ryots. Subsidies for digging wells and supply of electric energy for pumping water are recommended. Early supply of electric energy to the Bobbili factory and before the next crushing season would greatly help. There is a cane growers' co-operative society with a large number of members which needs to be encouraged. The high recoveries are due to the cane quality resulting from the application of considerable quantities of organic manure to the crop, the preparation of cane for the factory without roots and tops, the short time lag between the field and the factory and the provision of shade for stacked canes. The issue of cutting orders to facilitate the use of tops for planting would be useful. Installation of automatic weigh bridges is strongly recommended. Cheapening of transport would prevent the draining of available cane supply to a factory outside the State border.

Nellikuppam Area.—The soil is a red sandy loam needing frequent irrigation. This is largely from deep well with electric or oil power. Cheapening of this item will contribute directly to lowering costs. The cultivation in the area is of a high order partly through the efforts of the factory and partly because of the existence in the area of enlightened growers. The growers are accustomed to using high doses of manure and are now experiencing short supply with regard to groundnut cake. It would be healthy practice and in the interests of cane crop if the factory could supply its refuse like press-mud to its suppliers at reasonable rate. Composting the cane trash now being recommended by the Department and the factory is a step in the direction of lowering manure bills, a costly item in cane cultivation. The scope for replacing manual labour by bullock power is worth investigation. The harvest operations now in vogue leave behind a good portion of the butts which are rich in sugar. Time lag and loss in transport of raw material to the factory are items which need rectification. The factory goes out even to 55 miles for its supply. This supply area should be narrowed down for better recovery. The growers represented that opening of out-stations for cane purchase would benefit directly the growers who at present bear all the losses from the field to the factory gates. The representatives of South Indian Sugar Mills Association consider that under factory management the situation will be worse in all respects and opening of out-stations would not lower ultimate costs. The Railway Board should be requested to restore the concessional rates for transport of canes.

The railway should provide wagons with suitable arrangements to prevent pilfering when the cane is on the way. There appear to exist differences of opinion between the suppliers and the factory management in the matter of rejections and what is known as cleaning up. The factory has agreed in future to get the canes cleaned at the cost of the growers. Considerable corruption has been alleged with receiving staff at the factory by some of the growers, but in the absence of co-operation from growers, the factory has not been able to rectify matters.

The Committee feels it necessary that in view of the performance of Co. 419 in other parts of this State, its performance under Nellikuppam conditions should be tested along with other varieties such as Co. 444, Co. 449 etc., and the results should be placed before the Varietal Advisory Committee.

As a beginning the factory has kindly agreed to supply seed material of Co. 419 to plant two acres each to ten ryots in Villupuram and to ten ryots in Cuddalore areas for the season 1951-52.

Kodaikanal Road Area.—The soil is sandy or clayey loam with facilities for drainage. The area has the great advantage of two planting and harvesting seasons and a cool ripening climate. There is scope for considerable increase in cane and the existence of grape vine cultivation in the area indicates the suitability of the soil. Cane growing on a large scale and for supply to the factory is comparatively new to the tract and the growers have, therefore, to be instructed in the well known methods of cane growing like use of tops, filling up gaps with germinated material, and use of implements for cultural operations. Sheeppenning which is a healthy practice is prevalent and needs to be encouraged as a valuable source of rich organic manure.

Pugalur Area.—This area comprises rich and costly land with ample irrigation waters from the spring channels in the Cauvery. The projected bridge across the river connecting it to the Salem border will greatly increase cane supplies to the factory. Between betelvine cultivation and cane growing yielding easily 40 tons and plantain cultivation now slowly going out because of breakage of plants, the land value in the tract is easily the highest being round about Rs. 10,000 per acre and even touching Rs. 15,000 nominal value as owners do not care to part with the land. The lease value is to the tune of Rs. 500 per year. The seed rate now is heavy being round about 25,000 to 30,000 two-budded setts. The possibility of planting canes all through the year and of harvest also all through the year would make it easy to secure economic working of the factory. Plenty of irrigation water is another attraction in the area. At present the factory draws part of its supplies from long distances up to forty miles in order to keep it fully working with both loss of sugar in transport and increasing cost of raw material chiefly because of the absence of another factory in its supply area. The cost of transport in some cases works to fifteen per cent of the cost of raw material delivered at the factory. This works against both maximisation of sugar and cheapening cost of sugar. Remarks made elsewhere regarding the cheapening of the manure bill and depending on indigenous and green manures, applies

to this area also. The existing high price of sugarcane has changed many lands from paddy to this crop. The method of procurement by officials is adduced as yet another reason for increase in cane area.

Hospet Area.—This is an old and interesting area for cane growing. Cane is usually grown on gravity water supply either from the canals direct or from tanks fed by canals. The soil is heavy clayey loam. The tract possesses a concentrated area. Stray cattle left unattended were seen to have caused much damage to the cane crops. Such cattle are generally those owned by non-agriculturists ; and the complaint was very bitter. The Committee was shown instances of almost total devastation of cane and other food crops in the area. The growers in the area are mostly of the small class with average holdings of two to three acres and as such the ryots are unable to stand up against the factory with its superior resources. They, therefore need organisations to protect their interests. There are a number of co-operative societies in the area and these should be encouraged to bring in their folds all the growers in the area. The factory would appear to fight the co-operative movement among the growers in various ways. One such is the non-registration or delayed registration of sugarcane from members of such societies. Priority is given to convenient individual suppliers. The pass-books issued to cultivators against their cane supply are incomplete and defective in many respects. The supplier does not know even the rate at which the manure has been supplied to him, the interest he has been charged against money advanced to him and other essential details. The supplier in this area would appear to have been deliberately deprived of his legitimate dues and collected interest at exorbitant rates. The Government agency operating in the tract through the Liaison cum Cane Inspector have been of little use to the grower who in this tract is generally illiterate and with little resources unlike his compeer in the South Arcot area. The growers are well versed in cane cultivation. There was revealed to the Committee a very interesting case of Co-operation among the ryots and to some extent the factory also in the cleaning up of irrigation channels and the maintenance of feeder roads. Recommendations made elsewhere such as use of tops, trash composting, etc., regarding the practice of standard methods of growing the cane applies to this area also. The canes could be harvested at lower level to secure for crushing the richest butt ends of canes. The factory is willing to accept the same if it is cleaned of roots and sticking mud. The transport here also is costly totalling to about 12% of the cost of raw material on the factory carriers. The ryots of Kamalapur urged the opening of an out-station in their area by the factory. The representatives of South Indian Sugar Mills Association however consider this neither feasible nor desirable. The deduction for binders at the factory was found to be illegal and very excessive. Ratooning has been prevalent in the tract for long and the ryots felt confident that they could control smut by total removal of the affected clump. The ryots complained of long delay at the factory. The practice followed at Vuyyur in arranging supply for different shifts is recommended for adoption in this area. The ryots claim to save Rs. 300 per acre by ratooning. Better arrangements between the factory and the growers are urgently needed in the interests of harmony to both parties.

PART III

THE VARIETAL POSITION IN FACTORY AREAS

The Varietal Position and Constitution of Varietal Committee

In the pre-Coimbatore period and when jaggery manufacture was the main end product, sugarcane varieties under cultivation continued for fairly long periods. The first upset of the varietal position in the State started with the out-break of red rot in epidemic form in the Godavari delta. This disease brought into cultivation a number of Mauritius canes as the then only possible method of checking the disease. This experience led to the introduction of other canes from Java, West Indies, and Fiji. The Coimbatore breeding work started in 1911 and began to release seedling canes from the year 1919, for experimental trial chiefly in sub-tropical India. Sugar interests in the State began the growing of Coimbatore productions from the year 1931—32. The steady flow of new canes from Coimbatore caused a rather frequent change in the varietal composition and to-day though Co. 419 holds a large portion of the area, newer canes have begun to appear as improvements on Co. 419, in respect of quality or earlier maturity. This constant change in varieties is bound to continue both by way of improved types and by way of fitting the cane more precisely to local conditions.

Sugarcane varieties, particularly seedlings, show great variations both in yield and quality. It often happens that a cane with satisfactory yield performance may not be equally satisfactory in the matter of quality or suitability to present conditions. As a result of this, differences in opinion are likely to arise between the growers and the factory about the cane most suitable to conditions in the factory areas. In this matter the main aim should be the maximisation of sugar per acre, and for this purpose, it is necessary to set up a competent body to examine data and enforce the growing of the most suitable type of cane in the factory areas for combining the interests of the grower with that of the factory keeping in mind the maximisation of sugar per acre.

At present the raw material is paid for in weight ; as such the grower has no interest in quality. The factory, on the other hand, is more interested in quality and would like to obtain greater recoveries from smaller quantities of raw material. The Committee feels it is necessary that a Varietal Committee whose findings will be binding on both the factory and the grower should be set up. This Committee before recommending particular varieties, should have at its disposal data about the performance of varieties to be recommended with regard to both quality and yield in (i) growers' fields, (ii) Liaison Farms and (iii) Factory Farms. The newly organised Liaison Farms should be useful for carrying conviction both to the grower and the factory about the recommended sugarcane varieties. It is very necessary that this Varietal Advisory Committee should include representatives of both the factory and the grower. Today in our State it is not usual for growers to carry on agricultural experiments with the co-operation and advice of the Research Stations. For this Variety Committee to function usefully it would be necessary that growers should co-operate with research stations and liaison farms in carrying out varietal experiments, as otherwise reliable data from growers' fields will not be available.

Such a Varietal Advisory Committee may be constituted for the State as a whole. But it should contain representatives from each important factory area. The setting up of such a Committee will also help not only in establishing contacts between the different factory areas but also in instituting comparisons between the areas. To mention one instance Co. 419 which is very much valued as a suitable cane in many parts of the State does not find favour with the Nellikuppam Factory personnel, and the growers naturally wonder why a cane so useful elsewhere is not encouraged in the Nellikuppam area. A Varietal Committee constituted as above should convince all parties interested in the matter.

PART IV.

MAXIMISATION OF SUGAR AND CHEAPENING COSTS OF PRODUCTION.

I. Cheapening the costs of production.

The Committee is unanimously of opinion that switching on from manual to cattle power and ultimately to mechanical power wherever possible would be one way of reducing costs in the matter of preparatory cultivation, and the inter-cultivation. It is felt that it was not possible to assign money value to the improvement that would follow the introduction of mechanical power. The higher efficiency of mechanical cultivation would put up yields. Mechanical appliances for agricultural operations are best owned by Co-operative Societies, Joint Stock Companies or large land owners but it is very necessary, that for keeping them in condition workshop facilities must be available. There should be a service station for this purpose, preferably in the factory. An effort should be made to implement this recommendation within three years.

Methods of planting sugarcane vary widely in the different regions. It is desirable that experiments be laid in agricultural, factory and liaison farms, to develop the most suitable methods for the various operations connected with the planting of setts, covering them up suitably and other matters.

The Committee is fairly well convinced that considerable saving could be effected in seed material in most places. At present in most parts about two tons of canes are used in the preparation of setts. By substituting tops for this material there are two advantages: firstly in the saving of the material going to the factory and roughly estimated at over Rs. 100 and better, quicker and healthier germination. If and when this practice becomes universal in the State, it would result in increasing the sugar output in the State by about 3,500 tons per annum. In areas where the superiority of the tops is proved and practicable, this recommendation should be implemented in two years.

Among the after cultivation operations, wrapping and propping occupy an important place in the Samalkot and Anakapalle tract. This item is at

present very expensive. But it is found that it adds to the yield of cane from ten to fifteen tons which justifies the practice. At the same time the Committee easily visualises the various methods by which this process can be cheapened in the future such as the use of more lasting verticals like concrete posts, galvanised wires for horizontal and under certain conditions, the process could be done with cocking and twisted trash, bringing together canes from the four points of the compass. The various farms particularly the factory and the liaison farms, should work on this problem.

A. MANURES AND MANURING.

The practice of sheep-penning as is prevalent in certain parts is a very healthy one particularly for quality. This should, therefore, be encouraged wherever possible. One direction in which the value of manures could be increased and its cost cheapened is in the direction of making composts either in the field between sugarcane rows where possible or in one corner of the field. It has been computed on high authority that trash composted would return to the field manure to the tune of 60 lbs. of nitrogen per acre. Growing of green manure either previous to sugarcane or in between cane rows where possible by way of irrigation facilities would also cheapen manure bill. In this matter, the aim should be to return to the field as much of the harvested material as possible including even trace elements. Application of inorganic nitrogenous manures without a balanced combination with organic manures is to be discouraged. The current rather extensive practice of using artificials or mixtures has definitely put up the manure bill which is to-day about 20 to 30 per cent of the total cost of cane growing. There is an immediate need and possibility of working down the manure bill by about 25 per cent by the measures mentioned above. Ultimately it should be possible to bring down the manure bill very considerably. This recommendation should be implemented in the next three years.

At present the Government through the Department of Agriculture is giving subsidies for compost making in pits at Re. 1 per ton. This should be extended and made applicable to compost making in between the rows of sugarcane as well and ploughing it in because that would greatly decrease the cost of transport and collection, an important item in the use of such bulky manurial item in order to popularise this sound practice. At present a distinction is made between the price of ammonium sulphate when supplied to food crops and when supplied to sugarcane. It is desirable that a flat rate should be introduced firstly because sugar is also a food and secondly because ammonium sulphate now taken in the name of food crop is very frequently applied to the sugarcane, thus encouraging unhealthy methods.

B. IRRIGATION.

Irrigation of sugarcane in this State is essentially of two types, *viz.*, (i) gravity flow from river systems and (ii) lift irrigation from wells. So far as the former system of irrigation is concerned, there is urgent need for re-aligning and shortening the period of canal closure for annual repairs. It has to be remembered that in the drying months when the canals are closed even one or two irrigations will make a big difference in crop yields. At present even

when water is available in the canals it is allowed to be used only for paddy nurseries. In the interests of maximisation of sugar production it is necessary that sugarcane crop also should be allowed the use of such water.

Coming to lift irrigation the practice at present is for a number of wells with electric or oil power to supply water to the sugarcane areas under cultivation. It would definitely cheapen irrigation costs if large sized tube wells with corresponding pumping plants are installed by the State or through the co-operation of the growers between themselves or the factories and the grower. It is also represented to the Committee that considerable savings could be effected if the present system resulting from licences of Government electric energy to suppliers is cheapened and liberalised in the interests of sugarcane growing. The figures gathered by the Committee with regard to cost of irrigation shows clearly the advantage of emphasising future development of sugarcane growing in areas where gravity irrigation is available. The relative figures are roughly 10 to 13 per cent of cost for lift irrigation against 1 to 3 per cent for gravity irrigation.

C. HARVEST.

Under harvest the main improvement is in the direction of cutting the clumps lower than of decreasing cost of the operation. At present 2 to 6 inches of the best part of the cane is left in the field. In the Mathurai district it was noticed that clumps could be cut lower by the use of the mammuty. This would be a suitable line of investigation for the Liaison Farms and the Factory Farms but it should be done on a fairly large scale for results to be useful.

Under seeds and planting, it was mentioned that it is desirable to use tops for planting. The harvest of the cane and the issue of cutting orders will need to be synchronised with planting operations to render possible the use of tops as seed material.

D. TRANSPORT.

This item of expenditure is non-agricultural in character and as such it is an expenditure which does not contribute to yield or quality. On the other hand when the time of transport is at all prolonged, weight is adversely affected through dryage, pilferage and other causes and quality affected through juice deterioration in transport. The figures gathered by the Committee show that transport charges contribute up to 15 per cent of the cost of sugarcane.

At present sugarcane material reaches the factories in three types of conveyances, viz., (1) the railway, (2) lorry and other transport and (3) bullock carts. It is likely that the bullock cart transport will continue in existence for a fairly long period as it has the advantage of transferring the cane from the field to the factory mill without other transfers in between. Definite steps are, therefore, urgently necessary by the factory providing for expeditious release of bullock carts from the factory yard after delivering the cane material. In future the trailer transport will be the most suitable as that also will take the cane direct from the field to the mill. The roads are generally in a very

bad condition which results in heavy strain both on the cattle and on mechanical forms of transport. Improvement is urgently needed as in that case bullock carts as well as mechanical transports can make greater number of runs between the field and the factory thus appreciably lowering transport cost. When rail transport is involved the concerned railway authorities should help the industry by the use of special wagons that would prevent pilferage and the running of special trains to scheduled timings and in the shortest period of time between the supplying station and the factory. The sugarcane wagons should be provided with needed tipping arrangements. Where a factory draws its supplies of cane from a distance more than five miles, the factory should either open out-stations or pay the difference in transport charges beyond five miles.

E. FENCING AND WATCHING.

The present cost of fencing and watching is a considerable item of expenditure in the growth of the crop, in most areas, and amounts to from Rs. 30 to Rs. 60 per acre. A more substantial type of fencing though it may cost more in capital expenditure, would reduce the cost per annum per acre. It is estimated that this item would aggregate Re. 1 per ton of cane in certain parts. Drastic legislation against damage by stray cattle is recommended. The formation of large blocks of sugarcane would reduce expenditure under this head.

2. Maximisation of Sugar in the State.

As the result of our visit to the different factory areas and prevailing conditions of growth of the crop and manufacture of sugar, the following recommendations are made to bring about maximization of sugar in the State :—

(1) The climatic advantages for producing sugar in the State are so great that Government should grant licences to new ventures freely at least till the estimated consumption target of one lakh tons is reached. After that stage is reached, the aim should be to cheapen sugar for export.

(2) When licensing new factories, care should be taken to see that their location is such with regard to soil, irrigation and climatic conditions as to ensure cheap production of sugar. Cheap irrigation and the possibilities of long crushing periods and development of concentrated sugarcane areas around and near the factory are certain factors useful for maximisation and cheapening costs of growing the crop. Plenty of sunshine and irrigation with the resultant humidities are favourable to growth while a comparatively cool and dry atmosphere is favourable for purities and recoveries.

(3) Schemes in which cane growers are associated with the projected factory as share-holders should be given priority as it conduces to smooth working and the resulting co-operation between the factory and the growers is conducive both to maximisation and cheapening of costs in all directions.

(4) Though the 800 tons capacity has now been adopted as the minimum economic unit from technological considerations, there are other potent factors connected with the growing and transport of cane material which would place this at a much lower figure, say about 450 tons for this State. In the case of growers' co-operative ventures we have found that lower capacities down to even 75 tons could function economically under favourable conditions. For many reasons and in the future set up of the country a dispersal of units smaller than the 800 tons in suitable regions are likely to prove more satisfactory than a bigger unit which has to draw its supplies from long distances.

In the body of the report general and special recommendations have been made for increasing yields and sugar production. Factory side of production needs examination by competent world authorities for toning up efficiency. The South India Sugar Mills Association has agreed to employ suitable personnel when it becomes available.

3. Increasing Sugar Production in the next three years period.

In the body of the report various recommendations have been made for bringing them into effect within a short period of 2 to 3 years. The sugar factories in the State have given a list of roads which they want to be brought into condition.

The Committee recommends that those road improvements be effected within the three years period. As for other recommendations made in the body of the report some of them are not likely to yield results within the three years period.

4. Liaison Farms.

In connection with sugarcane development work in the factory areas, Liaison Farms have come into being partly with funds placed at disposal of the State Government. These Liaison Farms are yet only one year old and it is, therefore, difficult to correctly judge their role. It is evident to the Committee, however, that they would form a useful link between the factory, the grower and the Department of Agriculture in guiding future sugarcane development work in the best interests of all concerned.

The Committee visited every one of the existing four Liaison Farms and had discussions with the officers-in-charge of these farms. They feel that for their full utility the programme of experiments for each year should be determined at a meeting consisting of representatives of the growers, the factory and the Department. It is important that the findings of this Committee should be recorded in writing by the Sugarcane Specialist so as to give definiteness and authority to such recommendations. The other reactions of the Committee to the Liaison Farms are (1) that the experiments should be confined to a few problems of regional importance and the material from such experiments should be sufficiently large in quantity to allow mill-test, (2) that the growers of the tract supplying canes to the factory should be roped in for establishing closer contacts as it is only thus that it could serve as a

link between the grower and the factory. The Committee feels that these Farms would be in a position to make suitable recommendations for the tract which would carry convictions both to the grower and the factory. At present there is a feeling in the growers that the factory farms are perhaps tilted on the side of factory interests. The Liaison Farms should work as a neutral body connecting the grower with the factory without leanings to either party.

In the working of the Sugarcane Liaison Farm last year, one difficulty experienced is that of obtaining area for growing and conducting experiments. Though according to the scheme the factory is charged for finding the land, some of them were indifferent and this has made the position of Sugarcane Specialist somewhat difficult. Though the period is short, yet the Committee feels that these farms would serve a useful purpose in the development of the industry and more than all in establishing a link between the grower and the factory. Working as a neutral body its recommendations should carry conviction to all concerned. The Committee, therefore, feels that steps are desirable to place this scheme on permanent footing and dependant on a cess to be levied by the State instead of depending on the Central Committee. The Committee feels that factories which are eager to avail of this scheme should be given preference in the establishment of sugarcane Liaison Farms in or near their areas over others which are indifferent.

ACKNOWLEDGMENTS.

We wish to acknowledge the co-operation and hospitality, we have received from the factories and cane growers. We wish also to acknowledge with gratitude the valuable guidance received by us from Sri T.S. Venkataraman, the Chairman, whose unrivalled knowledge of the subject has been of the greatest help. We should like to place on record our appreciation of the valuable and efficient assistance given to us by the Member Secretary, Sri S.V. Parthasarathy. We also wish to place on record the efficient services rendered by Sri P. Radha Krishna Murthy, Stenographer to the Committee.

(Sd.) T. S. Venkataraman
Chairman.

(Sd.) V. Ramakrishna.

(Sd.) M. J. Edwards.

*(Sd.) Thota Ramaswamy.

*(Sd.) R. Nagan Gowda.

*(Sd.) E. V. Sundara Reddi.

*(Sd.) R. V. Sundara Reddi.

(Sd.) S. V. Parthasarathy,

Sugarcane Specialist incharge & Secretary.

* Subject to the attached minute
of dissent

Madras

9th June 1950

LAND

(Minute of Dissent)

" The rental in the Agricultural economy of the State is related to a share of the produce whether such produce is staple or commercial. It is at least

1/3rd share of the produce. If the average tonnage of cane on an acre of land is taken as 30, the owners' share is 10 tons. The value of it in terms of current prices of cane is Rs. 420 to Rs. 472-8-0. The rentals paid for the cane do not exceed these amounts.

When land is leased out, it is not leased without reference to the crop to be raised on it. A crop like sugarcane has to take an assured supply of water throughout the year and would involve occupation of the land for a period of 14 months. The rental in respect of such crop would naturally be governed by such considerations. The value of a share of the produce of a staple crop which occupies land for a short period would not, therefore, be the determining factor.

The rental for sugarcane is to be related also to that derived from leasing out the land for other alternative cash crops like betels, groundnut, cotton, tobacco, plantains etc., the prices of most of which, it may be pointed out are not fixed by the Government. The suggestion that land would be available for sugarcane cultivation as long as the rental does not go below the level of the rental for a staple crop does not appear to be correct at all. Unless the rental derived from sugarcane crop provides sufficient incentive and inducement the land for sugarcane would not be available and this inducement and incentive are provided by the present rentals.

Again it is suggested that the position of a owner cultivator is comparable to a house-hold preparing its own food and that the cost incurred will be cheaper than if done in a hotel. It is axiomatic that when food is prepared on a large scale basis as in a hotel great economies are possible and the cost of food is cheaper, than when produced in home conditions. When the owner grows sugarcane whether he spends his own labour on it or utilises his own bullock-power or transport the value of these services which in turn depend upon the cost involved in maintaining himself and his bullock-power throughout the year has to be reckoned, not to speak of depreciation and risk regarding the cart and bullocks. It has therefore been an accepted practice that in computing costs the value of such services are reckoned on the basis of actual wages and hire paid for bullock or transport on the current hire rates. When land is cultivated by a tenant likewise whether he employs his labour, or bullock-power or not the value of such services go into the costs.

It is not correct to describe agriculture as a mere mode of life. It is also an occupation as much a business as any other. In the matter of computation of costs we fail to understand why different and unscientific methods should be employed. The Congress Agrarian Reforms Committee has rightly recommended that a technique should be evolved for maintaining parity between prices of Agricultural and Industrial Commodities. It is also necessary to note what Mr. M. P. Gandhi has said in the Sugar Industry Annual for 1949: "While it is somewhat facile to suggest that the cane price should be brought down appreciably, it should be remembered that the return from the cane crop will have to be related to the return from other alternative crops in order that the cane cultivator and his interests are not injured and cane cultivation is maintained."

Two other aspects of the question remain to be noticed. First the rentals would correspond to a fair return on an interest basis on the market value of the land suitable for the cultivation on the crop in question. Judged by this test the present rentals are not high. Secondly it is important to observe that the price of cane is fixed not at the commencement of the plantation season, when it could be said to affect the levels of rent and other factors of production but is done only at the commencement of the crushing season after costs of production have been incurred and such costs come to be the basis for the fixation of the cane price. It cannot therefore be urged that the prices fixed by Government influence the rental and the other cost items.

In any view of the matter, there does not appear to be any possibility of securing a reduction in rentals under present conditions.

(Sd.) Thota Ramaswamy.

(Sd.) R. Nagan Gowda.

(Sd.) E. V. Sundara Reddi.

(Sd.) R. V. Sundara Reddi.

APPENDIX I.

G. O. Ms. No. 102, FOOD & AGRICULTURE, Dated 16-1-50.

His Excellency the Governor of Madras approves the proposal of the Provincial Sugarcane Committee to constitute a Special Committee consisting of the following members, for the purpose of examining the technique of sugarcane cultivation of varieties suitable for the several factory areas of this Province after visiting the factory areas concerned and to submit a report suggesting ways and means to improve the quality and yield of sugarcane and to simultaneously bring about a reduction in the cost of cultivation.

Official Member :

Sugarcane Specialist (Anakapalle)—Secretary.

Non-Official Members :

- (1) Sir T. S. Venkataraman (*Chairman*).
- (2) Sri R. Nagan Gowda.
- (3) Sri E. V. Sundara Reddiar.
- (4) Sri Thota Ramaswamy.
- (5) Sri R. V. Sundara Reddiar.
- (6) Two representatives of the South Indian Sugar Mills Association.

The Director of Agriculture is requested to inform the members and also to take steps for the early constitution of the Committee.

2. The suggestion of the Director of Agriculture that the Committee may undertake the tour in three convenient trips is also approved.

3. The non-official members of the Committee will draw travelling allowance and halting allowance at the following rates :—

Railway journeys	...	...	...	One first-class fare.
Daily allowance	...	...	...	Rs. 10.

4. The charges on account of the travelling allowance, etc., to the non-official members should be debited to "40- Agriculture."

5. The Committee should submit its report to the Provincial Sugarcane Committee or its investigation within three months. The Director of Agriculture is requested to forward the report to the Government together with the recommendations of the Provincial Sugarcane Committee and with his remarks, if any.

6. The Government of India, Ministry of Agriculture, have requested the Provincial Government to prepare, in consultation with the factories concerned, a plan for the intensive cultivation of sugarcane and for increasing sugar production in the next three years. The Director of Agriculture is requested to entrust this work also to the Sub-Committee and submit the plan prepared by it, together with his remarks as quickly as possible.

APPENDIX II. ITINERARY OF THE SPECIAL SUGARCANE SUB-COMMITTEE.

Factory area visited.						Dates.
Vuyyur	...	...	...	...	...	23-4-1950 & 24-4-1950.
Samalkot	...	...	...	...	...	25-4-1950 to 27-4-1950.
Anakapalle & Etikoppaka	...	...	...	...	...	28-4-1950 & 29-4-1950.
Bobbili & Secthanagaram	...	...	...	...	...	30-4-1950 & 1-5-1950.
Nellikuppam	...	...	...	...	...	8-5-1950 to 10-5-1950.
Kodaikanal Road	...	...	...	...	...	11-5-1950.
Pugalur	...	...	...	...	...	12-5-1950 to 14-5-1950.
Sugarcane Breeding Station and Agricultural College and Research Institute, Coimbatore.						15-5-1950 & 16-5-1950.
Hospet	...	...	...	...	...	24-5-1950 to 26-5-1950.

APPENDIX III

PROCEEDINGS OF THE MADRAS PROVINCIAL SUGAR- CANE COMMITTEE MEETING HELD AT 4 P.M. ON 23—6—50, AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE, CHEPAUK, MADRAS.

Members Present :

1. Director of Agriculture (Chairman).
2. Sri G. Viswanatham (Joint Registrar of Co-operative Societies).
3. Dr. T. S. Venkataraman.
4. Sri P. L. N. Raju.
5. Sri R. V. Sundara Reddy.
6. Sri V. V. V. N. Nooka Raju.
7. Sri E. V. Sundara Reddy.
8. Dr. R. Nagan Gowda.
9. Sri P.S. Prabhu.
10. Sri M. K. Bandarkar.
11. Sugarcane Specialist in-charge (Secretary).

Sri S. N. Venkataraman, Provincial Marketing Officer, also attended the meeting.

Subject.—Consideration of the Report of the Special Sugarcane Sub-Committee.

The Chairman pointed out that it was his intention to furnish a printed copy of the report but there was some delay in getting the necessary permission from the Government. The Government would no doubt be keen to have endorsement of this Committee on the Sub-Committee's report.

Dr. T. S. Venkataraman, Chairman of the Sub-Committee, then read out the brief summary of the report and explained the salient features.

In regard to the setting up of Varietal Advisory Committee, the Chairman mentioned that the Advisory Committee, which had met previously that day had recommended local committees for each factory area and no statutory compulsion was contemplated in regard to their decision on varieties.

Dr. T. S. Venkataraman and Sri E. V. Sundara Reddy expressed that local committees might function until the Act was suitably amended for setting up a Central Varietal Advisory Committee.

The Committee unanimously endorsed all the recommendations of the Special Sugarcane Sub-Committee.

The Chairman moved and the Committee unanimously accepted to place on record their gratitude to Dr. T. S. Venkataraman, and other members of the Sub-Committee and particularly to the former who in spite of his ill-health undertook the difficult task of shouldering a heavy burden on himself most willingly.

APPENDIX IV **COST OF CULTIVATION OF SUGARCANE.***

(These are the figures as furnished by the various parties and the Committee takes no responsibility for them)

Particulars.	Vuyyur : from		Samalkot : from		Anakapalle : from		Bobbili : from		Nellikuppam from		Kodaikanal Road : from		Pugalur : from		Hospet : from	
	Ryots.	Factory.(h)	Delta.	Upland.	Ryots.	Ryots.	Ryots.	Ryots.	Ryots.	Factory.	Ryots.	Ryots.	Ryots.	Ryots.	Ryots.	Ryots.
I	2	3	4	5	6	7	8	9	10	11	12					
1. Preparatory Cultivation.	Rs.a.p. 57-0-0	Rs.a.p. 38-15-3	Rs.a.p. 56-0-0	Rs.o.p. 25-0-0	Rs.a.p. 57-0-0	Rs.a.p. 33-0-0	Rs.a.p. 29-8-0	Rs.a.p. 41-10-8	Rs.a.p. 59-0-0	Rs.a.p. 70-0-0	Rs.a.p. 94-8-0(c)					
2. Seeds & (b) Planting.	146-14-0	150-1-6	165-12-0	165-12-0	150-0-0	76-0-0	136-12-0	21-11-9	115-0-0	189-8-0	106-0-0					
3. After Cultivation. Prepping & Weeding.	40-0-0	31-4-11	125-0-0 520-13-4(c)	91-4-0	45-0-0 270-0-0(c)	81-0-0	86-2-0	77-8-0	44-0-0	73-0-0	52-4-0					
4. Manures & Manuring.	265-0-0	217-1-3	172-8-0	109-0-0	139-0-0	148-0-0	406-8-0(d)	289-4-0	297-4-0	317-4-0(d)	204-0-0					
5. Irrigation (e).	15-0-0	17-10-3	15-0-0	25-0-0	144-0-0	23-0-0	180-0-0	175-5-7	67-0-0	20-0-0	37-8-0					
6. Harvest.	91-0-0	101-12-0	157-8-0	87-8-0	122-8-0	44-0-0	52-8-0	49-13-11	67-8-0	140-0-0	56-0-0					
7. Transport (f).	130-0-0	92-8-0	180-0-0	125-0-0	140-0-0	110-0-0	210-0-0	90-5-0	150-0-0	280-0-0	126-0-0					
8. Lease (g).	400-0-0	...	400-0-0	300-0-0	300-0-0	200-0-0	220-0-0	113-14-9	200-0-0	500-0-0	375-0-0					
9. Supervision watch and fencing.								48-4-4								
Yield in tons per ac.	1,144-14-0	649-5-2	1,792-9-4	928-8-0	1,367-8-0	715-0-0	1,321-6-0	907-14-0	999-12-0	1,589-12-0	1,051-4-0					
Cost per ton of cane	30	36.95	45	25	35	22	30	27.12	30	45	28					
	38-2-7	17-9-3	39-13-4	37-2-3	39-1-2	32-8-0	44-0-9	33-10-0	33-5-2	35-5-3	37-8-8					

COST OF CULTIVATION OF SUGARCANE—Continued.

EXPLANATORY NOTES.

- (*) The growers' figures do not include (i) watchman and supervision charges (ii) interest on working capital (iii) depreciation on machinery, (iv) compensation for failure of crops.
- (**) To the cost of cultivation furnished by S. I. Cane Growers' Association add (a) Rs. 30 for binding, propping and fencing, (b) Rs. 50 for supervision, (c) Rs. 50 interest on working capital, (d) Rs. 25 for depreciation on equipment and machinery, (e) Rs. 25 for clearance of field, (f) Rs. 75 compensation for failure of crop and (g) Rs. 10 towards other charges, bringing the total to Rs. 1,565-8-0 for 30 ton crop.
- (a) Includes Rs. 60 towards cost of fencing and watching.
- (b) Though in most areas ryots use their own material, the figures herein are merely for costing purposes.
- (c) This practice is confined to the Godavari Delta and S. Vizagapatam district.
- (d) The comparatively high cost of manure in these areas deserve notice.
- (e) Note the comparatively high costs where lift irrigation is employed as in Nelikippam and Anakapalle. Irrigation in Deltaic areas is much cheaper.
- (f) Being non-agricultural in character and hence not conducive to either yield or quality early attempts should be made to reduce expenditure under this head.
- (g) The lease amounts for commercial crops are high as compared to those for staple crops.
- (h) The figures exclude charges towards supervision and land rent. The farm is situated at a mile from the factory.

APPENDIX V.

COST UNDER DIFFERENT CULTURAL OPERATIONS AS PERCENTAGE TO TOTAL COSTS (TENANT CULTIVATORS).

Particulars.	Vuyyur.	Samalkot.		Anaka- palle.	Bobbili.	Nelli- kuppam.	Kodai- kanal Road.	Pugalur.	Hospet.
		Delta.	Upland.						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Preparatory cultivation ...	5.0	3.0	2.7	4.2	4.6	2.2	5.9	4.4	9.0 (1)
2. Seeds and planting (2) ...	12.8	9.2	17.9	11.0	10.7	10.4	11.5	12.0	10.0
3. After cultivation ...	3.5	7.0	9.8	3.3	11.3	6.5	4.4	4.6	5.0
Wrapping & Propping		29.0 (3)		19.7 (3)					
4. Manures and manuring ...	23.1 (4)	10.0	11.7	10.2	20.7	30.8 (4)	29.7 (4)	19.9	19.4
5. Irrigation (5) ...	1.3	0.7	2.7	10.5	3.2	13.5	6.7	1.3	3.6
6. Harvest ...	7.9	8.6	9.4	9.0	6.1	4.0	6.8	8.8	5.3
7. Transport (6) ...	11.4	9.9	13.5	10.2	15.4	15.9	15.0	17.6	12.0
8. Lease (7) ...	35.0	22.6	32.3	21.9	28.0	16.7	20.0	31.4	35.7
Total ...	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Amount ...	1,144-14-0	1,792-9-4	928-8-0	1,367-8-0	715-0-0	1,321-6-0	999-12-0	1,589-12-0	1,051-4-0

Remarks against foot note items, (1), (2), (3), (5) & (6) are the same as in the preceding table.

(4) The highest percentage for manuring are in Nellikuppam, and Kodaikanal Road closely followed by Vuyyur.

(7) It will be seen that in some cases the lease amount is about a third of the total costs of the cane grown.

APPENDIX VI

PROFITS OF SUGAR FACTORIES AS PERCENTAGE OF CAPITAL.

Name of factory	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48
Deccan	...	...	34.79	8.81	22.18	6.65	—16.90	64.23
E.I.D.	...	...	43.88	54.78	65.71	98.45	77.15	17.47
I.S.R.	...	...	21.46	55.74	25.73	14.34	21.43	76.74
K.C.P.	...	...	1.08	9.18	19.61	30.81	41.31	82.85

(From Tariff Board Report, 1950.)

APPENDIX VII

DIVIDENDS DECLARED BY SUGAR FACTORIES.

	Name of the Company.	Year.	Preferential shares.	Ordinary shares.	Deferred shares.
	I	2	3	4	5
1.	The East India Distilleries and Sugar Factories, Ltd., Nellikuppam.	1946/47 1947/48 1948/49	10% 10% 7%	17½% 17½% A B 10% 10%	
2.	The Deccan Sugars & Abkari Co., Ltd., Samalkot and Pugalur ...	1946 1947 1948	7% 7% 7%	10% ... 22½%	
3.	The K.C.P., Ltd., Vuyyur ...	1946/47 1947/48 1948/49	5% 5% 5%	7½% 7½% 7½%	7½% 7½% 7½%
4.	The India Sugars and Refineries, Ltd., Hospet ...	1946/47 1947/48 1948/49	7½% 7½% 7½%	9% 8% 12½%	
5.	Vizagapatam Sugars and Refineries, Ltd., Thummapala...	1946/47 1947/48 1948/49	— — —	— 5% 5%	— — —

This justifies the finding of the Tariff Board, 1950, "that the share-holders of the sugar Mills have received satisfactory dividends" (-933-34 to 1947-48).

APPENDIX VIII

STATISTICS ON WORKING OF SUGAR FACTORIES IN MADRAS, 1947-48.

Particulars.	Pugalur.										
	Vuyyur.	Samal-	Thumma-	Etikopa-	Bobbili.	Seetha-	Nelli-	----- Hospet.			
	kot.		pala.	paka.	nagaram.	kuppam.	Main.	Secondary.			
I	2	3	4	5	6	7	8	9	10	11	

1. Total days of actual crushing period	...	115	145	117	85	186	142	171	108	95	162
2. Total cane milled in tons	...	104,329	33,066	25,728	4,728	26,043	42,615	308,510	44,048	47,639	91,244
3. Total sugar bagged in tons	...	8,535	2,910	2,405	489	2,356	4,336	26,226	3,697	4,008	8,045
4. Molasses made in tons	...	4,119	1,904	...	196	949	1,509	14,401	2,439	2,296	3,571
5. Average production of molasses per 100 cane	...	5.95	5.76	3.41	4.15	3.59	3.54	4.67	5.61	4.84	3.93
6. Press cake—Percentage cane	...	2.55	2.88	2.27	2.43	2.09	2.14	1.35	1.25	1.35	1.36
7. Analysis of cane	...	...	...	...	...	...	...	...	...	...	...
Fibre %	...	11.80	11.98	15.20	15.86	15.45	14.83	14.11	13.08	12.76	14.15
Sugar %	...	10.49	12.21	11.91	13.67	11.74	12.42	10.87	11.09	10.87	11.26
Sugar percentage in molasses	...	31.14	32.39	31.68	35.95	30.03	30.74	30.86	30.24	31.34	31.49
Sugar % in begasse	...	3.13	3.66	3.84	4.38	4.09	3.34	2.83	3.20	3.15	3.78
Sugar % in press cake	...	6.36	8.19	3.63	8.15	4.95	4.11	3.65	3.63	3.38	4.04
Yield sugar percentage	...	8.186	8.80	9.33	10.35	9.05	10.18	8.50	8.41	8.35	8.81

APPENDIX VIII—(contd).

STATISTICS ON WORKING OF SUGAR FACTORIES IN MĀDRAS, 1948-49.

Particulars.	Vuyyur.	Samal- kot.	Thum- mapala.	Etikop- paka.	Bobbili.	Seetha- naga- ram.	Nelli- *kup- pam.	Pugalur.				Hospet.
								Main (1949).	Secon- dary (1949).	9	10	
I	2	3	4	5	6	7	8	9	10	11		
1. Total days of actual crushing " period	94	107	99	120	101	125	132	63	83	123		
2. Total cane milled in tons ...	94,475	27,794	23,951	7,404	17,557	39,175	229,663	29,109	43,469	74,185		
3. Total sugar bagged in tons ...	8,678	2,794	2,436	666	1,820	4,351	20,497	2,636	3,937	7,244		
4. Molasses made in tons ...	3,588	1,424	...	349	615	1,334	9,594	1,341	1,756	3,583		
5. Average production of molasses per 100 cane.	3.80	5.12	3.40	4.71	3.50	3.41	4.59	4.98	4.42	3.79		
6. Press-mud cake—percentage cane ...	2.33	2.68	1.99	2.5	2.04	2.01	1.48	1.24	1.66	1.40		
7. Analysis of cane—Fibre %	13.78	11.20	15.01	15.52	15.45	14.63	14.47	11.33	12.62	13.87		
Sugar % ...	11.40	12.30	12.69	12.48	11.74	13.30	11.28	11.56	11.38	12.19		
8. Sugar in molasses ...	...	34.68	31.29	33.78	30.12	30.58	30.60	31.11	30.94	31.68		
9. Sugar in regasse ...	3.0	3.38	4.07	4.21	4.49	3.38	2.79	3.35	3.25	3.85		
10. Sugar in press cake ...	5.72	7.06	3.79	7.34	5.08	4.14	3.65	3.27	3.34	4.51		
11. Yield sugar % cane ...	9.18	9.89	10.13	8.99	10.36	11.11	8.93	9.06	9.06	9.76		

APPENDIX VIII (Contd.)

STATISTICS ON WORKING OF SUGAR FACTORIES IN MADRAS, 1949-50.

Particulars:	Vuyyur.	Samal- kot.	Thum- mapala.	Etikop- paka.	Bobbili.	Seetha- nagam. kuppam.	Pugalur. Hospet			
							Main Secondary.			
I	2	3	4	5	6	7	8	9	10	11
Total days of actual crushing period	100	96	54	105	26°	80	147	91	..	136
2. Total cane milled	97,134	35,245	10,888	6,196	6,336	24,548	255,056	52,083	..	87,696
3. Total sugar bagged	9,634	3,407	981	543	553	2,701	24,227	4,673	..	9,376
4. Molasses made	3,653	1,572	...	289	231	851	9,662	2,524	..	3,374
5. Average production of molasses per 100 cane	3.79	4.46	3.68	4.61	3.65	3.45	...	4.85	..	3.84
6. Press cake—percentage cane	2.59	2.35	2.13	2.31	2.10	1.89	...	1.42	..	1.74
7. Analysis of cane—Fibre %	14.39	12.25	13.63	15.51	15.43	14.93	13.64	12.23	..	12.30
Sugar %	12.10	12.52	11.37	12.29	11.07	13.22	11.65	11.46	..	13.11
8. Sugar percentage in molasses	...	33.21	29.58	34.68	31.37	30.77	...	31.05	..	31.89
9. Sugar percentage in begasse	3.0	4.36	3.13	4.37	3.20	3.36	2.70	3.29	..	4.07
10. Sugar percentage in press cake	3.25	3.63	3.84	7.7	4.40	4.15	...	3.59	..	7.03
11. Yield sugar % cane	9.94	9.67	9.01	8.77	8.74	11.01	9.50	8.97	..	10.68

APPENDIX IX

LIST OF ROADS—i.e., VILLAGE ROADS RECOMMENDED BY M/s. PARRY & CO., FOR IMPROVEMENT IN THE FIRST FIVE YEAR PLAN OF THE POST-WAR ROAD DEVELOPMENT PROGRAMME.

S.No.	Name of Road.	Distance in miles.	Remarks.
<i>Cuddalore Taluk.</i>			
1.	Cuddalore—Chidambaram Branch Road to Theerthanagari	1	In very bad condition.
2.	Pillali Road from Main Road to Gadilam River	1-1/2	do
3.	From Veerappar Road to Sendanadu	5	do and culverts required.
4.	Cuddalore—Panruti Trunk Road to Veeranam (via) Nathamedu, Kalin- gikuppam, Karayamputhur	5	do to be metalled.
5.	Kanisappakkam, to Kollanur Road (via.) Chithraisaividi	1	To be metalled.
6.	Pudupet to Oraiyur	2-1/2	do
7.	Thiruthoraiyur to Thiruthoraiyur Railway Station	1	do and widened.
8.	Thiruthoraiyur Railway Station to Pulavanur (via) Kandarakottai	2-1/2	do
9.	do to Ackadavelli (via) Korathi	3	do
10.	do to Karumboor (via) Korathi	3	do
11.	Panappakkam to Kollanur Road	2	do
12.	Thirukan teeswaram to Visvanathapuram Road	1/2	do

13.	Thirumalikuli Road from Kodamangalam to Palur Road (connecting Cuddalore/Panruti road)	...	...	2	do and one culvert required.
4.	Nesapur Road from Main Road to Sundaravandi	...	...	1	do and 3 culverts required.
15.	Nathapet Road from Main Road to Pennar river	...	...	1-1/2	do
16.	Kondur Road—from Main Road to the village	...	...	3/4	do
17.	Nathavely Road—from Thiruvendipuram Main Road to Nathavely.	...	...	1-1/2	do
18.	Suba Uppalavadi Road from Pondicherry Road	...	...	2	do
19.	Cuddalore O.T. Main Road to Sellangupam	...	...	1/2	do
20.	Branch Road from the 6th mile in the Cuddalore/Panruti Road (via) Tiruvendipuram through Sundaravandi, Mettupalayam, Ammanankoil, Keelpattu, Melpathy connecting the Nellikuppam, A. Kuchipalayam Road.	...	...	2-1/2	do & 4 culverts required.
21.	Siruvathur to Veerappan Road	...	...	2	do & 1 culvert required
22.	From Alaganatham to Vadakkunatham	...	...	1	do & widened.
23.	do to Malaiyaperumal Agaram	...	...	1-1/2	do

Villupuram Taluk.

4.	Manjadipet to Madurapakkam	...	...	1	To be metalled and widened.
5.	Sathanor to Madras Bunk Road	...	...	2	do
6.	Melakondai to Vikravandi	...	...	2	do
7.	Mendiyanakkam to Orathur	...	...	1	do
28.	Iyure Aśram to Thennamadevi	...	...	2	do
29.	Elangaḍu to Valavanur Road	...	...	2	To be metalled.
30.	Tranasingapalayam to Kalthakuppam	...	...	2	do & one culvert required over Pambai channel.
31.	Valavanur to Pudupalayam (via) Arpisiyampalayam	...	...	2	do
32.	Valavanur to Madukarai	...	...	3	do
33.	Valavanur to Salayampalayam	...	...	2	Only cart-track. New road necessary.
34.	Chinnababusamudram village to railway station	...	...	1-1/2	To be metalled and widened.
35.	Vanathampalayam to Chinnababusamudram	...	...	1	do
36.	Dhalayanur to Serndanur railway station (via) Tirupachanur	...	...	2	do
37.	Panampet village to Villupuram-Pondy Road	...	...	2	do

Villupuram Taluk.—Contd.

38.	• Vadavambalam Village to Panruti trunk Road	...	3/4	do	flood damage.
39.	Kandamangalam to Maruthur	...	1	do	
40.	• Bethureddikuppam to Valavanur	...	2	do	
41.	Villupuram to Mambalapet	...	9	do	and widened.
42.	Venkatesapuram railway station to Kappur (vai) Vemeniyathur	...	4	do	& 2 culverts required
43.	• Perumpet to Perumbakkam	...	1	do	
44.	Kaungalipet to Perumbakkam	...	2	do	& 3 culverts required.
45.	Kaungalipet to Mambalapet Road	...	1	do	
46.	Pallandur to Mambalapet railway station	...	4	do	& 1 culvert required.
47.	Marangiyur to Mambalapet railway station	...	4	do	
48.	Veeranam to Thuluckanatham	...	1-1/2	do	
49.	Kangianur to Mambalapet road	...	2	do	& 1 culvert required.

