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Economics of Cotton Cultivation in the Madras State

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Introduction : Cotton is a major commercial crop of the Madras State, covering an area of 11·2 lakh acres with a total annual production of 3·6 lakh bales of lint. It comprises chiefly two commercial types-Karunganni, a variety of *desi*, almost invariably grown with the rains and Cambodia, a variety of American Cotton, first introduced from Indo-China in 1905. The latter is grown both under irrigated and rainfed conditions.

The farming systems in cotton admit division into six distinct zones or tracts based on agro-climatic complexes. The various tracts together with their acreage, regions of growth, cropping season and suitable cultivated strains are given below.

Name of the Tract	Estimated area in acres (1958–59)	Major regions of growth (Districts)	Season	Cultivated strain
A. *Cambodia :*				
1. Irrigated Winter Cambodia	2,00,000	Coimbatore, Salem, Tiruchirapalli & parts of Madurai	August-Sep. to March April	M.C.U. 1
2. Unirrigated Cambodia	2,76,400	Parts of Madurai, Coimbatore & Salem.	October-November to April-May.	M.C.U. 1
3. Summer Cambodia	65,900	Ramanathapuram, Tirunelveli, Madurai and South Arcot.	February-March to July-August, December January to June - July (in South Arcot)	M.C.U. 2

Name of the Tract	Estimated area in acres (1958–59)	Major regions of growth (Districts)	Season	Cultivated strain
4. Cotton in rice-fallows	7,400	Tiruchirapalli, Thanjavur, South Arcot and Chingleput.	February-March to June-July	P. 216 F
B. *Karunganni :*				
1. Central Karunganni Tract	1,76,700	Coimbatore, Salem, Tiruchirapalli & Madurai.	October-November to May-July.	K. 5
2. Southern Karunganni Tract	3,96,600	Ramanathapuram, Tirunelveli & parts of Madurai	October-November to May-June.	K. 2

(Based on Fifth and Final Forecast Report 1958–59, Madras State).

Note : The area under cotton in rice-fallows offers scope for extension.

The cost of cultivation in each tract is discussed in the article giving suggestions for enhancing the net income by reduction in the cultivation charges and/or by effecting increase in yield. The costs of cultivation were gathered from the cultivation sheets maintained in Government Farms and by enquiry among cotton growers.

Cost of Cultivation : The cultivation charges vary depending upon the agro-climatic complex of the cotton zones and the variety of cotton grown. The details on the cost of cultivation and the net monetary return realised in each zone are given in Table 1.

Among the four categories of Cambodia zones, the summer Cambodia yields the highest monetary return mainly on account of (1) the better quality lint of MCU. 2 which is valued higher than either MCU. 1, cultivated in the Winter Cambodia Tract or P. 216 F cotton raised as an off-seasonal crop in the rice-fallows; (2) the shorter crop period of MCU. 2 compared to MCU. 1 which results in the saving of one or two irrigations and (3) the Summer Cambodia cotton crop not being manured heavily as in the case of irrigated Winter American.

The net return of Rs. 292·72 per acre for the irrigated Winter Cambodia in Table 1 is the mean of the Tract, comprising the four recognised sub-zones viz., (1) early planted sub-zone of medium fertility; (2) late planted fertile sub-zone; (3) late planted droughty sub-zone represented by Avanashi Tract gives the highest yield (vide Table II) and the seed cotton is also much sought after in trade and goes by the special name *Avanashi Cambodia* and is valued high. In the late planted droughty zone representing the taluks of Palladam and Udamalpet and parts of Gobichettipalayam, Erode and Dharapuram in Coimbatore District and the whole of Salem District, the yield is comparatively low on account of drought and the need for frequent irrigation. Further, the seed cotton from the Salem District known in trade as *Salem Vattagai* lacks strength of fibre and fetches lower price. (4) The crop yield from the Lower Bhavani Project Area is low, on account of the infertile soil; the irrigation charges are the lowest, compared to other sub-zones of the Winter Cambodia Tract, on account of flow irrigation from the Lower Bhavani Project Canal System. It is not uncommon in the early planted sub-zone of Coimbatore District to manure heavily, even upto 80 to 100 cart loads of compost or Farm Yard Manure per acre, to push up the yield. The costs of manures and manuring are, therefore, high here.

Based on the yield and monetary return realised therefrom, the sub-zones of the Irrigated Winter Cambodia Tract may be placed in the order of (1) the late planted fertile sub-zone; (2) the early planted sub-zone of medium fertility; (3) the late planted droughty sub-zone and (4) the Lower Bhavani Project Area. (Vide Table II.) When the soil of the Lower Bhavani Project Area is built up, by growing leguminous crops and ploughing them in and by the application of compost and other organic manures, the yield of the cotton crop there, is bound to rise up.

In the cultivation of P. 216 F cotton, which is raised as a summer crop after the harvest of paddy, as is the case with MCU. 2, the net return is less than that of MCU. 2 crop. The reasons are mainly (1) the early maturing habit of P. 216 F cotton results in comparatively low yields; (2) it fetches a low premium for its lint as compared to MCU. 2; and (3) P. 216 F cotton being a recent introduction in the rice-fallows, the rice-farmers have not acquired the habit of bestowing the care and attention required for the successful cultivation of cotton as their counterparts in the Southern Districts where the cultivation of MCU. 2 cotton after the harvest of paddy has become the main stay in the economics of the Tract. The after

cultivation charges for P. 216 F cotton in rice-fallows are high compared to other Tracts, since the normal practice is to dibble cotton seeds in paddy stubbles without any preparatory cultivation. The stiff clayey soil of rice fields demand a higher seed rate and more labour for hand dibbling. Hence, the expenses on seeds and sowings are higher. The one distinguishing feature in cultivation of cotton in rice-fallows is the availability of cotton residue to augment the supply of green matter to the succeeding paddy crop.

As the unirrigated cottons do not require elaborate preparation and much attention, the cultivation expenses are low. The crop yield and the monetary return are also accordingly low. While plant protection is a common measure in the cultivation of Cambodia cottons, irrigated or rain-grown, it is rare in the case of Karunganni cottons, as they are comparatively free from pests and diseases.

Among the rain-grown cottons the Unirrigated Cambodia gives the highest yield and more monetary return per acre. But, its cultivation has a limitation, as this could be successfully grown only in areas where there is a well distributed annual rainfall of about 40 inches, at least half of which should be received during the period of crop growth. The net monetary return from the Unirrigated Cambodia crop is about that of irrigated P. 216 F cotton in the rice-fallows. The main reasons are (1) the low cultivation charges and (2) the usual practice of leaving the Unirrigated Cambodia crop for the *kar* season or second flush.

Karunganni cotton is eminently suited to the black cotton soil regions of the State. But, of all the cotton growths, the net profit from the Karunganni cotton is the lowest. Though K. 2 and K. 5 show preferences to the Southern Karunganni and Central Karunganni Zones respectively, there is not much difference in the yield potentiality or in the monetary return between the two strains or the regions of growth.

(i) *Irrigated Cambodia : (Both Winter and Summer) :* Forming ridges and furrows saves irrigation water and enables the use of labour saving implements, resulting in reduction in cultivation charges. Closer spacing and early sowing contribute towards increased yield. The practice of manuring the crop heavily as is done in certain parts of Coimbatore District produces only rank crop growth without corresponding increase in yield. The manurial dose of 40 lb N, 15 lb P_2O_5, 15 lb K_2O and 5 tons of Farm Yard Manure is

generally found to be sufficient for irrigated cottons. Half the dose of Nitrogen and full dose of P_2 05 and K_2 0 may be applied at the last ploughing and the remaining half of nitrogen top dressed at the flowering stage.

Line sown cotton can be inter-cultivated with a bullock-drawn Junior-hoe which is economical than working with mammaties. The installation of electric pump-set will considerably reduce the irrigation charges compared to irrigation by mhotes. The following plant protection measures are recommended for American cotton. Dress seed with Agrosan or Ceresan at the rate of one oz., for 20 lb. of seed, just before sowing. This is necessary to control primary infection by black-arm. Spray with Endrin or Endrex at one ounce in six gallons of water when the crop is a month old. This is for checking jassid and other insects. Spray again with a combination of four ounces of Folidol and one lb of any copper oxychloride fungicide like Cupravit, Shell copper etc., in 40 gallons of water. This is to check boll worm and other insects and also for controlling secondary infection of black-arm. This may be given when the crop is about two months old.

Repeat the combination spray described above when the crop is about three months old. If pests or disease still persist, a fourth round of spray (combination) may be given when the crop is 4 to 4½ months old. Too many sprayings with pesticides induce rank crop growth and cause the shedding of buds and flowers. Judicious plant protection measures are, therefore, necessary to push up the yield. Irrigation given immediately after spraying pesticides is found to enhance the yield.

Kapas yields in the Lower Bhavani Project Area can be increased by improving the tilth and fertility of the soil by growing a leguminous green manure crop with application of phosphate and ploughing it in, growing cotton early in September and adopting close spacing.

Sowing the new strain 9030 G (renamed as MCU. 3 Pongal) in the Irrigated Winter Cambodia Tract is found to give increased lint yield resulting in more monetary return.

(ii) *Unirrigated Cambodia :* Application of Standard Mixture No. 1 at 150 lb per acre at the time of last ploughing, in addition to five tons of Farm Yard Manure or compost increases the yield. The net income can be increased by mixed cropping with coriander, tenai *(Setaria italica)* and/or black gram.

(iii) *Cotton in rice-fallows :* The heavy expenditure involved in the inter-cultural operations may be curtailed by the use of labour saving implements. By training the labourers in the method of cotton picking and by proper guidance and supervision, the picking charges may be reduced. Ensuring efficient germination and good stand, close spacing of the plants at 2' x 6" with two plants per hole and application of 75 lb. Nitrogen per acre in two split doses during the fourth and eighth weeks after sowing have been found to increase the yield of P. 216 F cotton and the net monetary return per acre.

(iv) *Karunganni cottons : (Both Central and Southern Tracts) :* Deep ploughing is not essential. Ploughing twice or thrice according to the condition of the field is sufficient. Thorough preparatory cultivation and inter cultivation are necessary only when the field is infested with weeds.

In areas receiving more than 30 inches of rain, Standard Mixture No. 1 at the rate of 150 lb per acre may be applied at the time of last ploughing, in addition to five tons of Farm Yard Manure.

The recently released strain K. 6 (Pandyan) is found suitable for both the Central and Southern Karunganni Tracts, yielding more revenue.

Mixed cropping yields more revenue to the cultivator than sowing Karunganni cotton as a pure crop. Karunganni cotton lends itself to mixed cropping with a variety of crops like coriander, blackgram, greengram, horsegram, tenai *(Setaria italica)*, groundnut, gingelly, castor and indigo. The economics of mixed cropping as compared to pure cropping are furnished below :—

Details of cultivation.	Pure Crop.	Mixed Crop.
A. *Cultivation expenses.*	Rs.	Rs.
1. Preparatory cultivation	20.00	20.00
2. Manures and Manuring	20.00	20.00
3. Seeds and sowing	5.56	10.18
4. After cultivation	13.00	13.50
5. Irrigation	Nil	Nil
6. Plant protection	Nil	Nil
7. Harvesting	15.00	21.15
Total expenses	73.56	84.83

Details of cultivation.	Pure Crop.	Mixed Crop.
B. *Receipts :*		
Yield of kapas	333 lb.	255 lb.
Cost of kapas	136.77	104.73
Value of cotton stalks	5.00	4.00
Black gram 41 M. Ms. at 87 N. P. per M. M.	...	36.00
Coriander 35 M. Ms. at 50 N. P. per M. M.	...	17.50
Tenai 22 M. Ms. at 50 N. P. per M. M.	...	11.00
Total receipts	141.77	173.23
Deduct expenses	73.56	84.83
Net profit	68.21	88.40
Therefore, extra profit in mixed cropping	... Rs. 20.19	

For all cottons, whether Cambodia or Karunganni, whether irrigated or rainfed, sowing seeds in lines is advantageous (1) for reduction in seed rate and the cost thereof; (2) for uniform placement of seeds and efficient gap filling; (3) for ensuring uniform stand and increase in crop yield; and (4) for use of labour saving implements and reduction in the cost of cultivation. Picking kapas early in the morning, grading good and bad kapas even at the time of harvest, gathering kapas at frequent intervals, picking kapas only from well burst bolls and drying for a while in shade before storage, improve the grade and quality of kapas and therefore fetches a better price. Instead of selling the kapas in piecemeal as and when harvested, it is advantageous to pool together all the harvested produce and then market it in one lot when the prices are favourable.

Conclusions : Cotton cultivation is of great importance both in the agricultural and industrial economy of the Madras State. It is a cash crop largely prized by the Central and Southern Districts of the State. It is an essential commodity of the textile industry and has largely contributed to the prosperity of the State and the people. The raw cotton produced in the State, meets in part only, the needs of the State. Out of the total quantity of about 8 lakh bales required by the mills in Madras State only 3.6 lakh bales are produced locally. It is, therefore, needless to point out the necessity of increasing the cotton production in Madras State. In any attempt to increase the cotton production, the net return per acre from the aspect of grower should not be lost sight of.

TABLE I.

PARTICULARS	CAMBODIA.				KARUNGANNI.	
	Irrigated Winter Cambodia (M.C.U. 1)	Irrigated Summer Cambodia (M.C.U.2)	Rice fallows (P. 216 F)	Unirrigated Winter Cambodia (M.C.U. 1)	Central Karunganni Zone (K. 5)	Southern Karunganni Zone (K. 2)
A. *Cultivation Expenses (Rs) :*						
1. Preparatory cultivation	37.00	25.25	...	18.00	14.62	20.00
2. Manures and Manuring	69.13	46.46	41.00	29.64	22.19	20.00
3. Seeds and sowing	7.28	5.61	12.50	4.98	2.59	5.56
4. After cultivation	37.85	21.57	48.25	14.16	12.22	13.00
5. Irrigation	53.94	42.25	30.00	...	...	...
6. Plant protection	25.63	22.75	22.00	15.00	...	...
7. Harvesting including pulling out stalks	46.94	48.36	42.38	22.75	18.12	15.00
Total expenses	277.77	212.25	196.13	104.53	69·74	73.56
B. *Receipts :*						
1. (a) Yield of kapas (lb per acre)	1,156	1,060	882	678	329	333
(b) Rate per podhi (280 lb) of kapas (Rs.)	136.00	140.00	120.00	125.00	120.00	115.00
(c) Value of kapas (Rs.)	561.49	530.00	378.00	302.68	141.00	136.77
2. Value of cotton stalks (Rs.)	9.00	8.00	20.00	6.00	5.00	5.00
Total receipts (Rs.)	570.49	538.00	398.00	308.68	146.00	141.77
Less expenses (Rs.)	277.77	212.25	196.13	104.53	69.74	73.56
Net income per acre (Rs.)	292.72	326.75	201.87	204.15	76.26	68.21

Note :— (i) The economics of cultivation for the Irrigated Winter Cambodia is the mean of the four sub-zones recognised in the Tract

(ii) Under rice-fallows, cotton residue is valued as green manure.

TABLE II.

PARTICULARS		Sub-zones of Irrigated Winter Cambodia Tract				
		Early planted sub-zones	Late planted fertile sub-zone	Late planted droughty sub-zone	Lower Bhavani Project Area	Mean of th Tract
A. *Cultivation Expenses (Rs.):*						
1. Preparatory Cultivation	...	25·00	32·50	46·50	44·00	37·00
2. Manures and Manuring	...	107·60	40·00	80·00	48·00	69·13
3. Seeds and Sowing	...	9·10	7·25	6·25	6·50	7·28
4. After Cultivation	...	30·98	45·50	32·50	42·40	37·85
5. Irrigation	...	45·00	60·00	84·00	26·75	53·94
6. Plant Protection	...	30·00	30·50	14·00	28·00	25·63
7. Harvesting including pulling out stalks	...	41·25	56·25	41·50	48·75	46·94
Total Expenses	...	288·93	272·00	305·65	244·40	277·77
B. *Receipts:*						
(a) Yield of kapas (lb. per acre)	...	1214	1458	1076	876	1156
(b) Rate per podhi (280 lb.) of kapas Rs.	...	140/-	140/-	130/-	135/-	136/-
(c) Value of kapas (Rs.)	...	607·00	729·00	500·00	422·00	561·49
2. Value of Cotton Stalks	...	10·00	10·00	8·00	8·00	9.00
Total Receipts	...	617·00	739·00	508·00	430·00	570·49
Less Expenses	...	288·93	272·00	305·65	244·40	277·77
Net income per acre	...	328·07	467·00	202·35	185·60	292·72