https://doi.org/10.29321/MAJ.10.A03994

Mixed cropping with unirrigated *deshi* cotton (*Gossypium arboreum*) in *Tinnies* tract of the Madras State*

by

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Synopsis: Mixed cropping with unirrigated *deshi* cotton (*Gossypium arboreum*) is the most common feature in the black soil tract of the Tirunelveli District. Detailed enquiries were made with the cotton farmers of the tract for three years and useful data collected and discussed in this paper. This practice helps to combat the vagaries of seasonal influences and prevent total crop failure, and also affords economically distributed resources from the field. An additional income ranging from Rs. 25 to 45 is obtained from the mixed crop over that of the pure cotton crop.

Introduction: An extensive area of about 4 to 4½ lakh acres is annually cropped under unirrigated *karunganni* or *deshi* cotton in the black cotton soils of Tirunelveli, Ramanathapuram and parts of Madurai Districts of the Madras State. In trade, this typical *deshi* cotton area is popularly called as *Tinnies* tract. The unirrigated cotton of this tract is mostly cultivated as a mixed crop with three or more crops of shorter durations on the same field simultaneously. By adopting this mixed cropping practice, the ryots of this tract not only derive an extra income of Rs. 25 to 45 per acre, but also have an insurance against the inclemencies of weather and consequent failure of one of the component crops. Since no details about this interesting method of cultivation have so far been published, an attempt has been made to furnish the details in this paper, after effecting intensive enquiry for three consecutive seasons.

Methods and Materials: The ryots of the tract usually cultivate the following crops (ranging from 1 to 5) along with the main crop of cotton

(1)	Black gram	...	(*Phaseolus mungo*,
(2)	Horse gram	...	(*Dolichos biflorus*)
(3)	*Tenai*	...	(*Setaria italica* Beauv.)
(4)	Groundnut	...	(*Arachis hypogaea* Linn.)
(5)	Coriander	...	(*Coriandrum sativum*)
(6)	Castor	...	(*Ricinus communis* Linn.)
(7)	Gingelly	...	(*Sesamum indicum*)

Detailed enquiry was made with many cotton farmers of this tract representing the early, normal and late sown areas as indicated below :—

Centres	*Nature of Area*	*No. of ryots enquired*	*No. of seasons*
Sattur	Early sown	Four	Three
Koilpatti	Normal sown	Four	Three
Kadambur	Late sown	Four	Three

* Received for publication in October 1961.

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The study was started in 1957–'58 and completed with the 1959–'60 season. The particulars gathered for the three consecutive years are presented and discussed in this paper.

Results : *Selection of mixed crops :* Black gram is the most common crop in the mixture since it is a very nutritious pulse crop used in various household preparations. In poor black cotton soils, horse gram is grown, whose haulms are used as very good fodder. In deep, heavy, black soils, coriander is sown in large proportions. Castor is sown as a border crop as well as a mixed crop. To a very small extent bengal gram is also grown as one of the mixed crops during the cold weather period (November - December) after cessation of North East Monsoon rains.

Preparatory cultivation : Three to four ploughings are given during August-September and sowings are taken up during the first week of October on receipt of North East Monsoon rains.

Seeds and sowing : The seeds of other component crops like coriander, *tenai* etc. are mixed with cotton seeds in the required proportions, sown by broadcasting and covered by the country plough. But the black gram crop which is the main component, is sown in lines of 4 to 10 feet apart, behind the country plough, after the completion of cotton sowings by broadcast. In line sown crops of cotton, the black gram crop is sown for every 4 to 8 rows of cotton, depending upon the local practice and field conditions.

An additional expenditure of Rs. 5 to 7 is usually incurred under "seeds and sowings" for the mixed crop over that of the pure crop, as seen in Table I presented below :—

TABLE I.
Details of Expenditure

Details of Expenditure	Pure Crop			Mixed Crop		
	1957—'58	1958—'59	1959—'60	1957—'58	1958—'59	1959—'60
	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.
Preparatory cultivation ...	20·00	18·75	21·00	20·00	17·00	20·75
Seeds and sowing ...	5·55	7·43	7·40	10·18	14·88	14·53
Manures and manuring ...	20·00	30·13	28·42	20·00	24·60	27·00
After cultivation ...	13·00	13·31	13·43	13·50	12·15	13·95
Harvest ...	15·00	18·55	22·18	21·15	25·12	28·25
Total ...	73·56	88·17	92·43	84·83	93·75	101·48

For the whole period of the crops, an additional expenditure of Rs. 6/- to 12/- per acre is incurred for the mixed crop over that of the pure crop.

Manures and manuring : Sheep penning at 1,500 sheep per acre is given without any special attention for the proposed mixed cropping field.

After cultivation : No additional expenditure is incurred on this aspect since the usual 2 to 4 weedings and 1 or 2 hoeings are given depending upon the field conditions.

TABLE II.

Details of yield and value from the pure and mixed croppings

Year	Particulars	Pure Crop	Mixed Crop						Total
		Kapas	*Kapas*	Black-gram	Coriander	*Tenai*	Horse-gram	Ground-nut	Castor	
1957—'58	Produce (in lbs.) ...	333	255	123	103	88	—	—	—	
	Value in Rupees ...	119	91	36	17·50	11	—	—	—	155·50
1958—'59	Produce (in lbs.) ...	387	291	135	117	—	60	74	10	
	Value in Rupees ...	152·57	118	32·54	16·14	—	8·75	11·29	1·65	188·37
1959—'60	Produce (in lbs.) ...	415	340	159	156	—	66	103	24	
	Value in Rupees ...	168·10	137·67	38·10	18·11	—	9·25	17·08	4	224·21

N. B. :— The produces have been valued at the prevailing market rates of the concerned years.

Harvest : The labour for harvest is economically distributed in mixed cropping, since the harvest of each crop comes at different periods. Further, the farmer gets well distributed resources from his mixed crop field. Thus, the household requirements of agricultural produce and also financial help are derived by the farmer in a steady and periodical manner.

Additional expenditure of Rs. 6 to 7 only has to be incurred under this item for the mixed crop field as indicated in Table I.

Yield : Though the cotton yield is slightly lowered in the mixed crop field, the total income per acre is always higher than the pure crop field, as indicated in Table II.

The actual expenditure, receipts and extra income from pure and mixed crops are presented in Table III.

TABLE III

Abstract of expenditure, receipts and nett income

Year	Pure Crop			Mixed Crop			Extra income over pure crop
	Expenditure	Receipts	Income per acre	Expenditure	Receipts	Income per acre	
	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.	Rs. nP.
1957—'58 ...	73·56	119·00	45·44	84·83	155·50	70·67	25·23
1958—'59 ...	88·17	152·57	64·40	93·75	188·37	94·62	30·22
1959—'60 ...	92·43	168·10	75·67	104·48	224·21	119·73	44·06
Average for 3 years		—			—		33·17

From the perusal of the data furnished in the above table, it is clearly seen that an extra income of Rs. 25 to 44 can be obtained by adopting the mixed cropping with unirrigated *deshi* cotton.

Discussion : The practice of mixed cropping with unirrigated *deshi* cotton is widely prevalent in *Tinnies* tract and especially in Tirunelveli District. Out of 7 to 8 crops suitable for the mixture, black gram is very commonly grown, in rows, amidst the cotton crop.

With an extra expenditure of about Rs. 10/- per acre over the pure crop, the mixed cropping can be successfully cultivated.

Though the cotton yield is slightly lowered in the mixed crop, the addition of other produce increases the total value.

Thus, by adopting this practice, the following advantages are easily derived :

(a) It serves as an insurance against the inclemencies of weather and consequent failure of one of the component crops.

(b) The space in between the cotton plants is properly utilised without affecting the main crop. It also helps to conserve soil moisture in addition to being an anti-erosion device. The leguminous crops are more efficient in preventing soil erosion.

(c) It enables economic distribution of labour and resources to the cotton farmer.

(d) An extra income of Rs. 25/- to Rs. 45/- per acre can be achieved from mixed crop over that of the pure crop.

Hence, the cotton farmers of other areas can also profitably follow the mixed cropping practice to achieve the above benefits.