

A Note on the Effect of Cultivating Cotton in Rice Fallows on the Yield of Succeeding Paddy Crop

by

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Introduction: During the past seven years attempts are being made to fit in a short duration American cotton for the deltaic rice lands of Tanjore, as a well irrigated crop in summer, and capable of recording good yields of the order of 800 lbs. or more of kapas per acre, with a quality of lint suitable for spinning 36 counts. For this purpose, the imported variety P. 216F from punjab, with a duration of five months, was found to be suitable. This cotton has now spread over an area of about 6,000 acres in the districts of Tiruchirappalli, Madurai, Tanjore, North Arcot, South Arcot and Chingleput. Although the practice of growing cotton in the tankfed rice lands after harvest of paddy is popular with the cultivators of the Ramanathapuram, Tirunelveli and Madurai yet certain cultivators of the deltaic areas of Tanjore and other centres feared that the cultivation of cotton might depress the yield of paddy. Observations were therefore made for a period of three years on the yield of paddy in the rice fallows where cotton was grown during summer, at Aduthurai, Palur and Coimbatore representing deltaic, coastal and non-deltaic rice lands, with different durations of fallow periods. The purpose of this note is to record the results of the observations.

Observations: After the harvest of paddy, the land is usually left fallow in summer. Some cultivators however sow green gram or blackgram immediately before the harvest of paddy. The raising of green manure crops like *Sesbania* in the fallow period in order to augment the supply of green leaf to the paddy crop is also common. In the experiments discussed below some of the above treatments were included and the yield of the succeeding paddy crop was observed in each case. The observations were made during the years 1953 to 1956 at the Agricultural Research Station, Aduthurai and Palur and also the wet lands of the Central Farm at Coimbatore. The results of the trials conducted in 1953 - '54 at Palur have been summarised by Kalyanaraman and Rangaswamy (1955) who have concluded that the yield of paddy after cotton is not depressed

provided the usual manures are given to the paddy crop in addition to the cotton residue. In 1954-'55, trials were conducted at Aduthurai and Coimbatore. The summary of the results are given below:

TABLE I

Year	Centre of Trial	Grain yield of paddy in lb/acre	
		'After Fallow'	'After Cotton'
1953—	Palur	2293	2396
1954	(Percentage on control-Fallow)	160	104
1954—	(a) Aduthurai	2317	2283
1955	(Percentage on control-Fallow)	100	99
	(b) Coimbatore	1640	3215
	(Percentage on control-Fallow)	106	139

It is seen that the yield of paddy is not depressed by growing cotton as a summer crop in all the three centres in both the years.

With a view to have further critical information, observations were continued in all the three centres in 1955-'56. Three major treatments namely (1) paddy after fallow, (2) paddy after cotton (3) paddy after pulse i. e., greengram or *Sesbania* were adopted. In the case of minor treatments, the procedure adopted for the two major treatments "after fallow" and "after-pulse" were:—

(a) Application of green manure alone at 5,000 lb of *Sesbania* per acre.

(b) Application of artificials only, i. e., superphosphate at 150 lb per acre plus ammonium sulphate at 100 lb per acre.

(c) Green manure plus artificials at the doses mentioned in (a) and (b).

(d) 'No manure' treatment.

In the case of the major treatment "after-cotton", to the three manurial doses (a), (b) and (c) mentioned above, a supplementary quantity of 6,000 lb per acre of cotton residue was incorporated into the soil after pulling out the cotton plants, and instead of the sub-treatment 'no manure', the treatment "cotton-residue alone" which received 6,000 lb of residue per acre was substituted, as item (d). In addition, ammonium sulphate was applied at 150 lb per acre instead of 100 lb at Coimbatore. The treatments were replicated four times and the experiment was laid out on a split plot design and was statistically analysed.

Planting of paddy was done after the harvest of cotton in September at Aduthurai and Coimbatore and in October at Palur. Observations were made on the strain Co. 25 at Aduthurai with a duration of 186 days and on ADT. 25 with a duration of 176 days at Coimbatore and Palur. The harvesting of paddy was completed by end of January at Aduthurai, by the first week of February at Coimbatore and by the end of February at Palur. In the case of the major treatment, 'after greengram' a deviation had to be made at Palur where *Sesbania* was grown instead of greengram as an off-seasonal crop between 24-3-'55 and 10-10-'55, and paddy was planted between 11-10-'55 and 13-10-'55. This deviation was done since green gram is not normally grown in the tract. The *Sesbania* crop gave an acre yield of 68,340 lb of green matter and only 5,000 lb were incorporated in the required plots. In the case of green gram at Aduthurai and Coimbatore harvesting was completed by the end of April and the residue was utilised as busa for cattle, after collecting the grain which recorded 134 lb per acre at Aduthurai and 430 lb at Coimbatore.

The results of the three major treatments in the three centres of trial viz., Aduthurai, Palur and Coimbatore representing the rice fallows of deltaic, coastal and non-deltaic areas of the State, respectively, are given in Table II below :

TABLE II
Mean grain field of paddy per acre in lbs. in 1955-'56
Major treatments

Centre of trial	After fallow 1	After cotton 2	After pulse (greengram) or <i>Sesbania</i> 3	Mean
Aduthurai	4865	4950	5107	4974
Palur	2419	2741	2728	2629
Coimbatore	1757	1726	1848	1777
Mean of three centres	3014	3139	3228	3127
Percentage on control. (fallow)	100	104	107	...
Percentage of general mean (3127 lb/acre)	96	100	103	...

N. B : 'F' test is satisfied C. D. = 157 lb. per acre.
S. E. = 40 lb. per acre.

Conclusions : 3, 2, 1.

It is seen that when compared with fallow the yield of paddy 'after cotton' is not depressed in any way in all the three centres of work. The results are in agreement with the indications obtained in the previous two years (Table I).

The yields of paddy obtained in the three centres for four minor treatments under the three major treatments are given in Table III appended.

It is seen that 'no manure' treatment (d) in 'Fallow' has given the lowest yield. The treatment "green manure alone" in "fallow", "cotton residue" in the case of the major treatment "after cotton", and 'no manure' in the major treatment 'after green gram' have all given more or less equal yields and better than 'no manure' treatment in 'fallow'. Application of artificials alone or green manure and artificials have increased the yields of paddy in all the three major treatments. Application of cotton residue alone is not sufficient to bring the yield of paddy to the level recorded in the case of minor treatments 'green manure and artificials' in the major treatment "fallow", which condition represents the normal practice of the rice cultivators. It is therefore considered very necessary that in addition to cotton residue, the usual doses of artificials and green manure should also be applied to the paddy crop.

During the year 1956-'57, information was available on large sized observation plots ranging from 6 to 14 cents, at Palur and Coimbatore. Paddy strain Co. 19 was planted at Palur on 21-10-'56 and the crop was harvested on 12-3-'57. The crop received a basal dose of 150 lb of super and a top dressing 150 lb ammonium sulphate per acre in all the four treatments given below. The final acre yields recorded for the four treatments are as under :

Treatment		Yield of paddy (wet weight in lb/acre)
		Grain
1.	After cotton	2,954
2.	After <i>Sesbania</i>	2,214
3.	After cowpea	2,026
4.	After fallow	1,370

It is seen that the yield of paddy after cotton is not in any way depressed, when compared to the other treatments.

In the large sized plots laid out at Coimbatore, the Paddy strain Co. 2 was planted on 20—9—'56 and it was harvested on 2—2—'57. The paddy crop in the four treatments received uniformly 5,000 lb of Sesbania, 150 lb ammonium sulphate and 75 lb of triple-super, per acre, to supply 30 lb of N and P_2O_5 , per acre, respectively. The yield of paddy in the four treatments is as follows :—

Treatments	Yield of Paddy (grain) in lb. per acre (Dry Weight)
1. After cotton	2,549
2. After <i>Sesbania</i>	3,760
3. After green gram	2,574
4. After fallow	2,150

It is seen that the yield of paddy after cotton is not lowered when compared to 'fallow' and 'green-gram'.

It is clear that the above large scale observation of cotton as an off-seasonal crop in the rice fallows, will not in any way depress the yield of paddy, provided the paddy crop receives the manurial doses normally given to it. The available cotton residue only helps to augment the supply of green matter to the paddy crop.

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REFERENCES.

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TABLE III
Grain yield of paddy in lb. per acre.

Major treatments	I Paddy after fallow				II. Paddy after cotton				III. Paddy after green gram or Sesbania				Remarks.
	(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)	
Minor treatments	Green manure alone	Artificials alone	Green manure + artificials	No manure	Cotton resi- due and green manure	Cotton resi- artificials	Cotton resi- due and green manure and artificials	Cotton resi- due only	Green manure alone	Artificials alone	Green manure and artificials	No manure	
	(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)	
<i>Centre of trials:</i>													
Adukkur	4780	5136	4696	4750	4820	4834	5266	4880	5023	5271	5314	4821	
Palur	2400	2528	2700	2040	2662	2818	3065	2417	2710	2907	2935	2361	
Coimbatore	1585	1930	2073	1440	1560	1906	1976	1463	1732	2097	2073	1488	
Mean of three centres	2955	3198	3156	2745	3014	3193	3436	2913	3155	3425	3441	2890	
Percentage on (d) *	108	116	115	100	105	110	118	100	109	119	120	100	* In the respective major treatments.
Percentage on general mean 3127 lb/acre	94	102	101	88	96	103	110	93	101	110	110	92	
Mean of major treatments	3014				3139				3228				General mean = 3127
Percentage on general mean 3127 lb./acre	96				100				103				

DETAILS

I. (a) Green manure alone	II. (a) Cotton residue and green manure	III. (a) Green manure alone
(b) Artificials alone	(b) Cotton residue and artificials.	(b) Artificials alone
(c) Green manure and artificials	(c) Cotton residue and green manure and artificials	(c) Green manure and artificials
(d) No manure	(d) Cotton residue only	(d) No manure
N. B. MAJOR TREATMENTS:		
F. test satisfied	C. D. = 157 lb. per acre	S. E. = 55 lb. per acre
	S. E. = 40 lb. per acre	C. D. = 163 lb. per acre
Conclusions	III, II,	III (c), II (c), III (b), I (b), II (b), I (c), III (a), II (a), II (d), III (d), I (d).