Volume - 5, Issue- 5, May 2017 IC Value : 56.46 e-ISSN : 2347 - 9671| p- ISSN : 2349 - 0187
EPRA International Journal of Economic and Business Review SJIF Impact Factor(2016) : 6.484
ISI Impact Factor (2013): 1.259 (UAE)

Research Paper

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AN EMPIRICAL ANALYSIS OF COTTON CULTIVATION IN DISTRICTS OF TAMIL NADU

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ABSTRACT

Cotton acreage is significantly responsive to price in pre and post reform periods in Tamil Nadu state. However, this needs to be substantiated with empirical investigation made in the current reform period. For this purpose ten villages from ten major cotton growing districts were identified and the farmers in this study area were grouped into small, semi medium and medium to form an effective sample of 120 to analyse the general factors that influence cotton acreage response of the sample farmers in three sized groups. The study results reveal that there is variation of the resource position of the farmers in different size groups. The economic geography of cotton cultivation has shown that the total area under cotton cultivation in black soil and heavy alluvial soil, yield the best results when cotton is cultivated. Profitability increases as the size of farm increases. On account of this cotton becomes a preferred crop with constant rate of return to attract more area under its cultivation in districts of Tamil Nadu State.

KEYWORDS: *Cotton acreage, crop, cropping pattern, cotton cultivation, farmers*

INTRODUCTION

Cotton crop is popular on account of its all round and remunerative usefulness both in the sphere of agriculture and industry. At present considerable emphasis has been given to increase the production and productivity of this crop. Presently as many as 80 countries in the world grow cotton on a commercial scale. About 65 percent of the crop is grown in leading cotton producing countries like USA, China and U.S.S.R. The remaining crop of about 35 percent is grown in countries like India, Pakistan, Turkey and Egypt.

India has the distinct pride of having the largest cotton growing area namely one- fourth of the World's cotton area and the largest producer of extra-long staple cotton. Cotton is one of the important cash crops grown in many states over an area of about 11.8 million hectares in India. Among the states Gujarat, Punjab, Andhra Pradesh and Tamil Nadu registered the highest yield of cotton in India. Recently cotton is cultivated in an area of 1.29 lakh hectares of land and producing about 2.80 lakh tonnes in Tamil Nadu. The state registered a productivity growth of 659 Kg / hectare in 2015-16. In view of these facts Tamil Nadu appears to be one of the major cotton producing states in India.

THE DATA AND SAMPLE

Within the state, inter-district variations in area, production and yield exist on account of variations in resource endowments, seasonal conditions, varieties grown and the nature of the soil.

The present study investigates the economic potential of cotton cultivation of the study area of Tamil Nadu through field investigation.

For the purpose of the present study, ten major cotton producing districts viz., South Arcot, Salem, Dharmapuri, Coimbatore, Erode, Tiruchirappalli,

Madurai, Ramanathapuram, Tirunelveli, Thoothukudi for a period of one year namely 2015 have been selected and the data have been collected from the sample farmers through personal interview with the help of a structured questionnaire. A total number of 120 farmers are selected from villages of ten districts to form an effective random sample on the basis of cotton crop cultivation. The farmers in each village were grouped with respect to size of holding. It was then divided into three categories viz., small (less than 2.5 acres), semi medium (2.5 to 5 acres) and medium (above 5 acres). Four farmers were then selected in a random manner from each of these three groups making a total sample size of twelve in each village. Thus, in all, 10 villages were selected from ten chosen districts and the data obtained from 120 farmers formed the effective sample.

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THE SELECTED VILLAGES FROM TEN DISTRICTS ARE

Districts	Villages
South Arcot	Adanur
Salem	Periya Seeragapadi
Dharmapuri	Nallampalli
Coimbatore	Puliyakulam
Erode	Chittode
Tiruchirappalli	Adikudi
Madurai – Dindigul	Ilamanur
Ramanathapuram (Kamarajar, Pasumpon Muthuramalingam)	Ekkakudi
Tirunelveli	Vettuvankulam
Thoothukudi	Angamangalam

FINDINGS

Some general factors that influence acreage response of the sample farmers in three size groups are presented in Table No. 1

A perusal of the Table 1 shows that net area sown is larger in the case of medium compared to semi medium and small farms. With the exception of small farms, the unirrigated area per farm is more than the irrigated area. If the percentage of irrigated area per farm to net area sown is taken into account, it works out to 55.62 percent for small, 45.26 percent for semi medium and 47.25 percent for medium farms. This gives rise to the presumption that the existing potential is not sufficiently adequate making the farmers to take the cultivation of rainfed crops too.

There is a little deviation with respect to average size of the farm family. Again, in the investigation factors like pair of bullocks per farm and the cultivated land per permanent worker exhibit an upward trend with an expansion in the size of the farm. All other factors reveal that there is variation of the resource position of the farmers in different size groups.

TABLE 1
GENERAL FEATURES OF THE SAMPLE FARMS

Sl. No	Particulars	Small (Less than 2.5 Acres)	Semi Medium (2.5 Acres to 5 Acres)	Medium (Above 5 Acres)	Average
1	Number of farms studied	40	40	40	40
2	Average size of farm (Gross) in acres	1.56	3.8	5.2	3.52
3	Average size of farm (Net) in acres	1.22	3.09	4.11	2.80
4	Irrigated area per farm in acres	0.64	1.44	2.01	1.36
5	Unirrigated area per farm in acres	0.58	1.65	2.10	1.44
6	Average size of farm family	4	3	5	---
7	Economically active adult family members per farm	3	2	4	---
8	Permanent workers per farm*	1	2	2	2
9	Bullock pairs per farm	1	2	3	2
10	Cultivated land per permanent worker	1.22	1.55	2.01	1.59
11	Area per pair of bullocks in acres	1.22	1.55	2.01	1.59
12	Permanent workers per pair of bullocks	1	1	1	1

* Includes both Hired permanent workers and family workers
Source: Field Investigation

TABLE 2
INTENSITY OF CROPPING IN THE SAMPLE FARMS

Sl. No	Size of Farm	2015
1	Small	127.86
2	Semi Medium	122.98
3	Medium	126.52
4	Average	125.79

Source: Field Investigation

The degree and the extent of the unit of land used for cropping purposes over a specified time period is described as cropping intensity which is calculated by dividing the gross area by net area and multiplying the quotient with hundred. It is evident from the table that there has been a downward trend in the intensity of cropping pattern with an increase in the size of the farms. This perhaps reveals the awareness of small farmers to adopt a more intense cultivation pattern in response to incentives to earn more income in absolute terms.

TABLE 3
EXTENT OF GROSS CROPPED AREA IN SAMPLE FARMS (In Acres)

Sl. No	Size of Farm	2015
1	Small	62.4
2	Semi Medium	152
3	Medium	208.11

Source: Field Investigation

It can be seen from Table 3 that there are varied trends in the extent of gross cropped area for different sizes of farms under consideration. The analysis reveals that small, semi-medium and medium farmers have been able to experience an increase in gross cropped area during the study period. These observations on the general nature of the select farms are meant to help in drawing inferences on decision making with reference to cotton for the sample farms. Against this background, the analysis of cotton cultivation by various farmers is considered.

TABLE 4
AREA UNDER COTTON BY SIZE OF FARMS

Sl. No	Size of Farm	2015
1	Small	43.10
2	Semi Medium	135.43
3	Medium	188.12

Source: Field Investigation

A scrutiny of the Table 4 shows that there has been a steady increase in the area under cotton in all the farms irrespective of their size. The area under cotton has shown an increase in this size of farm during this period. Thus, it could be inferred that the area change in favour of cotton is more, bearing testimony to the farmer's preference to this crop under all circumstances.

TABLE 5
PERCENTAGE OF AREA UNDER COTTON TO TOTAL CROPPED AREA BY SIZE OF FARMS

Sl. No	Size of Farm	Percentage
1	Small	78.21
2	Semi Medium	81.31
3	Medium	79.04

Source: Field Investigation

The encouraging trends in favour of cotton area further substantiated in 5 indicate the percentage of area under cotton to total cropped area by size of farms in terms of two years average. It is clear from table values that larger the size of the farm, the more is the percentage of area under cotton. The difference in this percentage of area under cultivation is very conspicuous between the semi medium farms on the one hand and small and medium farms on the other. Though the semi medium and medium farmers allocate more than 75% of their area for cotton, the percentage difference between them is marginal.

TABLE 6
PERCENTAGE OF AREA UNDER COTTON TO TOTAL CROPPED AREA OF DIFFERENT SOIL GROUPS

Sl. No	Size of Farm	Black Soil	Heavy Alluvial Soil
1	Small	52.19	26.02
2	Semi Medium	53.58	27.73
3	Medium	54.48	24.56

Source: Field Investigation

The economic geography of cotton cultivation has shown that the total area under cotton cultivation in black soil and heavy alluvial soil, yield the best results when cotton is cultivated. Black soil constitutes the major portion followed by heavy alluvial soil. The percentage of land having black soil is more for medium farms compared to small and semi medium farms.

Cotton is cultivated both as an irrigated and rainfed crop. For this purpose, the percentage of irrigated area to the total cropped area is taken into account.

TABLE 7
PERCENTAGE OF COTTON CROPPED AREA UNDER IRRIGATED AND UNIRRIGATED CONDITION TO THE TOTAL CROPPED AREA

Sl. No	Size of Farm	Irrigated Area	Unirrigated Area
1	Small	59.53	40.47
2	Semi Medium	55.52	44.48
3	Medium	32.59	67.41

Source: Field Investigation

Table 7 reveals that irrigated area under cotton constitutes 59.53 percent for small, 55.52 percent for semi medium and 32.59 percent for medium farms. This higher percentage of irrigated area for small farm is mainly due to its viability arising from size. The corresponding decline in the percentage of irrigated area for semi medium and medium farms is responsible for higher percentage of area under rainfed cotton under these two categories.

TABLE 8
CHI-SQUARE TEST BETWEEN SIZE OF FARMS AND CROPS GROWN BY THE FARMERS

Sl. No	Size of Farm	Cotton Crop Only	All Crops	Total
1	Small	36	4	40
2	Semi Medium	34	6	40
3	Medium	32	8	40
	Total	102	18	120

Sl. No	O	E	(O – E)	$(O – E)^2$	$(O – E)^2 / E$
1	36	28	8	64	2.29
2	4	12	-8	64	5.33
3	34	28	6	36	1.06
4	6	12	-6	36	6.00
5	32	28	4	16	1.33
6	8	12	-4	16	2.00
Total					18.01

Chi-Square at 5% level of significance = 3.85 (Table Value)
The Calculated value is more than the Table value
Source: Field Investigation

A Chi-square test was employed to find out the relationship between the number of crops grown and the size of the farms as shown in Table 8. The result of the test is highly significant. It is therefore concluded that the size of the farm is associated with number of crops grown. It is evident from field investigation that 8 farmers holding medium farms, cultivate all crops when compared to only 6 in the semi medium and 4 farmers in the small category. The number of mono crop farms for cotton declines with increase in the size of the farm. Out of the 120 sample farms, 102 farmers cultivated only cotton crop and 18 farmers cultivated all crops including cotton. The study also reveals that in the allocation of land by small farmers the priority is always in favour of cotton.

TABLE 9
AVERAGE PERCENTAGE OF AREA UNDER COTTON ACCORDING TO SIZE OF FAMILY

Sl. No	Size of Farm	1 – 2 Members	2 – 4 Members	Above 4 Members
1	Small	38.31	26.36	13.53
2	Semi Medium	25.27	27.08	28.97
3	Medium	21.39	24.94	32.71

Source: Field Investigation

It could be discerned from Table 9 that in the case of small farms there has been a decline in the percentage of area under cotton as the size of the family increases. On the other hand, such relationship is hardly found in semi medium and medium farms. These diverse trends help to rule out the influence of the size of the family in decision making in favour of the crop or otherwise.

TABLE 10
PERMANENT LABOUR AVAILABILITY ON FARM

Sl. No	Size of Farm	Number of Workers	Cultivated Area per Worker (Acres)
1	Small	120	1.22
2	Semi Medium	240	1.55
3	Medium	240	2.01

Source: Field Investigation

Table 10 shows the number of workers and the area operated per worker on sample holdings. It is a well known fact that permanent and hired labour constitute the two types of labour in agricultural operations. In the first category are included the family farm workers and workers hired on permanent basis, normally for one year. From Table 1 it is clear that permanent worker per farm is 1 for small, 2 for semi medium and 2 for medium size farms. In the present Table 10 it is clear that the number of workers increases with increase in farm size groups.

In small farms hiring of permanent labourers is kept to a minimum as the size of the farm is small and as most of the farm operations are done by the family members themselves. On the other hand in semi medium and medium farms utilisation of family labour is maximum and there is also more employment of permanent farm workers. Thus availability of labour does not limit farmer's choice and allocation of areas to different crops. So much so labour availability need not be a constraint for farmers responding to price changes through acreage allocation, more so in a crop like cotton.

TABLE 11
COSTS AND RETURNS OF COTTON (PER ACRE)
IN SELECT SAMPLE AREA

Value in Rupees

Sl. No	Particulars	Small	Semi Medium	Medium	Average
1	Human Labour	17302	19046	20565	18971
2	Land Preparation	2932	4415	5866	4404
3	Seeds and Sowing	3383	2648	3170	3067
4	Fertilizers and Manures	3298	3987	4742	4009
5	Plant Protection	3722	1712	2255	2563
6	Post Cultivation	2040	2578	3143	2587
7	Irrigation	760	3113	3638	2504
8	Harvesting	4090	5125	8047	5754
9	Total Cost	37527	42624	51426	43859
10	Gross Income	46980	53360	64380	54907
11	Net Income	9453	10736	12954	11048
12	Yield – Kgs/Acre	810	920	1110	947

Source: Field Investigation

Cotton is stated to be the most profitable crop. Hence it is essential to consider the relative profitability of cotton cultivation. Table 11 shows costs and returns of cotton in select sample farms. It is evident from the table that human labour constitutes the single major item for all the three size categories. This is followed by higher harvesting costs, fertilizers and manures costs and land preparation costs in all farm sizes. All other costs do not significantly influence the production decision. Per acre gross income is Rs. 46980 for small, Rs. 53360 for semi medium and Rs. 64380 for medium farms. In terms of net income it varies from Rs. 9453 for small farmers to Rs. 12954 for medium farmers. Thus profitability increases as the size of farm increases. Profitability may be measured in terms of net income asa percentage of total value of output which works out to 20.12 percent on an average for these different sizes of farms. Here again this percentage remains more or less constant with increase in size. On account of this cotton becomes a preferred crop with constant rate of return to attract more area under its cultivation.

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