Research Article

Performance of cotton in traditional paddy fields of Uttara Kannada district, Karnataka

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SUMMARY : The study was under taken in Uttara Kannada district of Karnataka state. The two major taluks *viz.,* Mundagod and Haliyal where paddy has been largely replaced by cotton were selected for the study. From each taluk 30 farmers growing paddy and 30 farmers growing cotton were selected randomly for the study. The growth rates in area, production and productivity of cotton for Uttara Kannada district were 7.27 per cent, 17.01 per cent and 6.11 per cent, respectively. Whereas paddy registered a growth rate of -1.74 per cent in case of area, -2.16 per cent in production and -1.69 per cent in case of productivity. The cost of cultivation of cotton was higher than that of paddy but the gross returns were also higher in cotton cultivation resulting in higher net returns compared to these from paddy. Change in temperature (78.33% of farmers) and change in rainfall patterns (70.00% of farmers) were the major reasons for the farmers to shift over to cotton cultivation from their traditional paddy cultivation. Among the financial factors responsible for this shift in cultivation, the major ones were high income from cotton (76.67% of farmers) and low income from paddy (70% of farmers).

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BACKGROUND AND OBJECTIVES

Cotton is the most important agricultural and industrial commodity world wide. India has secured a place of pride at the global cotton scenario due to several distinctive features such as first rank in the world cotton acreage, second rank in textile processing capacity, third in cotton production, second largest producer of extra-long-staple cotton and native home for coloured cotton. Karnataka is one of the major cotton producing states in the country.

Rice is an important food crop of India and stands first in area and second in total food production. Among the rice growing countries, India has the largest area under rice in the world next only to China in the world with respect to production. Karnataka is one of the major rice growing states in India.

RESOURCES AND METHODS

The study was undertaken in Uttara Kannada district of Karnataka state. Uttara Kannada district is situated roughly in the mid-north-western part of the state. Uttara Kannada district is the major paddy growing area in the state of Karnataka. The late the paddy crop is being replaced by cotton in uplands of the district and hence the district was purposively selected for the study. The two major taluks *viz.,* Mundagod and Haliyal where paddy has been largely replaced by cotton, were purposively selected for the study. From each Taluk, 30 farmers growing paddy and 30 farmers growing cotton were selected randomly for the study. Thus, the total sample size selected for the study was 120 consisting of 60 paddy growers and 60 cotton growers. The primary data with respect to cost, returns in paddy and cotton cultivation and reasons or shifting over to cotton cultivation were collected from the sample farmers by personal interview method with the help of pre-strurtered schedule. The secondary data with respect to area, production and productivity of cotton and paddy

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were collected from the district Statistical Office of Uttara Kannada district.

In order to analyse the growth of area, production and productivity of cotton and paddy in each selected Taluk and the district, compound growth rates were computed using the method of least squares by fitting the Semi-Logarithmic function.

$$y_t = ab^t e^u$$

where,

y_t = dependent variable (area/yield/production)

a = intercept term

b = (1+r) and r is the compound growth rate

t = time trend

u = error term

In the logarithmic form the function could be expressed as;

$$Log\ y = log\ a + log\ b + log\ u$$

Log a and Log b were obtained using the ordinary least squares procedures, and the R^2 was computed for the goodness of fit. (Antilog of Log (b - 1))* 100 gave the per cent growth rate). Significance of the results was tested using 't' test.

The tabular presentation method was followed to estimate the costs and returns in cultivation of paddy and cotton and to study the reasons for shifting over from paddy to cotton cultivation. The averages and percentages were worked out.

OBSERVATIONS AND ANALYSIS

The main findings and discussion of the research were being presented theme wise below:

Growth performance of paddy and cotton in the district:

Growth rates of area, production and productivity of paddy and cotton crops in the selected taluks and Uttara Kannada district as a whole for the period of ten years 1999–2009 have been worked out and presented in the Table 1. It is seen from the table that negative growth in area, production and productivity of paddy was observed in both Haliyal and Mundgod Taluks and district as a whole where as positive growth was observed for area, production and productivity of cotton.

The area under paddy was decreasing at the rate of 2.17 per cent per annum in Haliyal taluk, 1.25 per cent per annum in Mundgod taluk and 1.74 per cent per annum in Uttara Kannada district. This might be attributed for erratic and uncertain rainfall, labour intensive nature and lower profitability of the crop. Negative and significant growth rates for productivity were recorded for both the Taluks and district. The productivity of paddy decreased at the rate of 0.8 per cent per annum in Haliyal Taluk, at the rate of 0.98 per cent per annum in

Mundgod Taluk and 1.69 per cent per annum in the district. This negative growth in productivity may be attributed to uncertain and erratic rainfall. The growth rates of production were also negative and significant for both the Taluks and district. Negative and significant growth rates for production might be due to greater magnitude of negative growth in area as well as negativity in yield factor.

While in case of cotton the growth rates for area were positive and significant for both the Taluks as well as the district. The area under cotton increased at the rate of 25.76 per cent per annum in Haliyal Taluk, 6.48 per cent per annum in Mundgod Taluk and at the rate of 7.27 per cent per annum in the district. This tremendous growth in the area of cotton might be due to its remunerative nature and less labour management in its cultivation. Growth rates for productivity of cotton were also positive. Productivity of cotton increased at the rate of 2.42 per cent per annum in Haliyal Taluk, 1.59 per cent per annum in Mundgod Taluk and at the rate of 6.11 per cent per annum in the district. The production of cotton also increased at the rate of 17 per cent per annum in the district, 20.65 per cent per annum in Haliyal taluk and 8.27 per cent per annum in Mundgod Taluk. Thus, this growth in production of cotton in the selected Taluks as well as the district in both area and productivity led growth.

Economic performance of paddy and cotton in the district:

The cost incurred and the returns realized from paddy and cotton cultivation were calculated and are presented in Table 2. The total cost incurred by the cotton farmers was high (Rs. 35186.98 per hectare) when compared to paddy farmers (Rs. 31656.61 per hectare). The total cost of cultivation for paddy on the sample farm was Rs. 31656.61 per hectare of which 75.35 per cent was variable cost and remaining 24.65 per cent was fixed cost. The distribution pattern of operational cost on various inputs in paddy revealed that human labour shared the highest per cent (14.82%) of the total cost followed by bullock labour that was 13.04 per cent and tractor power 6.76 per cent. The share of seeds, farm yard manure, chemical fertilizers, bio fertilizers and interest on working capital was 2.49 per cent, 12.40 per cent, 8.21 per cent, 2.81 per cent and 5.58 per cent, respectively. The plant protection chemicals shared the 9.24 per cent of the total cost of cultivation of paddy.

The share of the fixed cost in total cost of cultivation was Rs. 7804.73 accounting for 24.65 per cent for paddy farmers. The fixed cost included rental value of land, which was Rs. 6250 accounting for 19.74 per cent of the total cost of cultivation, land revenue Rs. 62.50 accounting 0.20 per cent, depreciation Rs. 758.48 accounting 2.40 and the interest on fixed capital Rs. 733.8 accounting for 2.32 per cent.

The total cost of cultivation of cotton crop on sample farms was Rs. 35186.98 per hectare of which 77.23 per cent

was variable cost and 22.77 per cent was fixed cost. The distribution pattern of operational cost on various inputs in cotton revealed that bullock labour cost shared the highest per cent (17.63%) of the total cost followed by human labour that was 16.89 per cent and tractor power 1.70 per cent.

The share of seeds, farm yard manure, chemical fertilizers and interest on working capital was 5.30 per cent, 15.14 per cent, 7.82 per cent and 5.57 per cent, respectively. The plant protection chemicals shared the 5.12 per cent of the total cost of cultivation of cotton. It was also noticed that the operational cost was higher (Rs. 27173.75 per hectare) for cotton farmers as compared to paddy farmers (Rs. 23851.88 per hectare). The share of the fixed cost in total cost of cultivation was Rs. 8013.23 accounting for 22.73 per cent for cotton farmers. The fixed cost included rental value of land, which was Rs. 6250 accounting for 17.76 per cent of the total cost of cultivation, land revenue Rs. 62.50 accounting 0.20 per cent, depreciation

Rs. 906.63 accounting 2.58 per cent and the interest on fixed capital Rs. 794.10 accounting for 2.26 per cent.

The average yield of paddy was 64.23q/hectare of main product and of by product 49.8 q/hectare (Table 3). The gross returns and cost of cultivation were Rs. 72.147 and Rs. 31656.61, respectively. The net return was Rs. 40490.39 per hectare. The B:C ratio obtained was 2.28.

The average yield of cotton was 16.98 q/hectare of main product and 26 q/ha of by product. The gross returns and cost of cultivation were Rs. 85680 and Rs. 35186.98, respectively. The net returns were Rs. 50493.02/hectare. The B:C ratio obtained was 2.43. The B:C ratio obtained was higher in case of cotton (2.43) compared to paddy (2.28).

Reasons for shifting to cotton cultivation:

The reasons for shifting over from paddy cultivation to cotton cultivation were ascertained from the sample cotton

Table 1: Compound growth rates of paddy and cotton in Uttara Kannada district (period from 1999 – 2009)

Crops	Particulars	Haliyal Taluk	Mundgod Taluk	Uttara Kannada district
Paddy	Area	-2.17	-1.25**	-1.74*
	Production	-1.12**	-1.88	-2.16*
	Productivity	-0.8**	-0.98**	-1.69*
Cotton	Area	25.76*	6.48**	7.27*
	Production	20.65*	8.27**	17.01*
	Productivity	2.42*	1.59	6.11*

* and ** indicate significance of values at P=0.01 and P=0.05, respectively

Table 2: Cost of cultivation of paddy and cotton (Rs./ha)

Sr. No.	Particulars	Paddy		Cotton	
		Cost	Percentage	Cost	Percentage
	Variable cost				
1.	Human labour	4690.19	14.82	5941.67	16.89
2.	Bullock labour	4128.84	13.04	6203.23	17.63
3.	Tractor power	2139.48	6.76	596.77	1.70
4.	Seeds	788.00	2.49	1864.52	5.30
5.	Farm yard manure	3925.00	12.40	5322.58	15.14
6.	Chemical fertilizers	2600.00	8.21	2752.26	7.82
7.	Bio fertilizers	889.36	2.81	-	
8.	Plant protection chemicals	2924.20	9.24	1799.84	5.12
9.	Interest on working capital	1726.81	5.58	1958.47	5.57
	Sub total (I)	23851.88	75.35	27173.75	77.23
	Fixed cost				
1.	Rental value of land	6250.00	19.74	6250.00	17.76
2.	Land revenue	62.50	0.20	62.50	0.18
3.	Depreciation	758.43	2.40	906.73	2.58
4.	Interest on fixed capital	733.43	2.32	794.10	2.26
	Sub total (II)	7804.73	24.65	8013.23	22.73
	Total cost of cultivation (I + II)	31656.61	100	35186.98	100

Table 3: Returns from paddy and cotton cultivation

Particulars	Paddy	Cotton
(a) Main product (quantal/ha)	64.23	16.98
(b) By product (quantal/ha)	49.8	26
Gross returns (Rs./ha)	72.147	85680
Cost of cultivation (Rs./ha)	31656.61	35186.98
Net returns (Rs./ha)	40490.39	50493.02
B:C ratio	2.28	2.43

farmers and are presented in Table 4. The reasons quoted by the farmers are categorized into two groups, namely climatic factors and financial factors.

Table 4: Reasons for shift from paddy to cotton cultivation (n=60)

Sr. No.	Reasons	Frequency	Percentage
	Climatic factors		
1.	Change in temperature	47	78.33
2.	Change in rainfall	42	70.00
3.	Delay in monsoon	32	53.33
4.	Early onset of monsoon	7	11.67
	Financial factors		
1.	High income from cotton	46	76.67
2.	Low income from paddy	42	70.00
3.	High labour requirement of paddy during peak periods	41	68.33
4.	Low yield of paddy	39	65.00

It is evident from Table 3 that among the climatic factors, change in temperature (78.33%) and change in rainfall pattern (70.00% of farmers) were the major reasons for the farmers to shift over to cotton from their traditional paddy cultivation. The other climatic factors responsible for this shift were delay in monsoon (53.33 per cent of farmers) and early on set of monsoon (11.67 per cent of farmers).

Among the financial factors responsible for this shift in cultivation, the major ones were high income from cotton (76.67 per cent of farmers) and low income from paddy (70 per cent of farmers). The other financial reasons for this shift were high labour requirement for paddy during peak periods (68.33 per cent) and low yield of paddy (65 per cent). Shivakumar (1994) worked on the shift in general in cropping pattern in Karnataka. Rajendra Prasad et al., (2001) studied the cost and returns in cotton production with the completating crops in Andhra Pradesh. Similary Virendra Kumar et al. (2002) conducted the study on the changing cropping pattern in Himachal Pradesh. Gnana Elpinston and Cyril Kanmony (2010) made observations on chages in rainfall and cropping pattern.

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