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Research Article

THE COST AND RETURNS STRUCTURES OF MAJOR GROUNDNUT BASED CROPPING SYSTEMS IN PAVAGADA TALUK OF TUMKUR DISTRICT IN KARNATAKA

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Abstract- The study was undertaken with an objective to quantify the comparative economics of Groundnut based Cropping Systems in Pavagada Taluk of Tumkur District in Karnataka. A sample of 96 farmers was selected using multistage stratified random sampling method and data was collected through personal interview method. The Tabular analysis were employed for analysis of data. Cropping System (CS)-I (Groundnut+Redgram+Greengram+Cowpea), CS-II (Groundnut+Redgram), CS-III (Groundnut sole), were the three important Groundnut based Cropping System (CS) followed in the study area. Under rain fed condition, it was found that, per acre total variable cost was high in CS-I (Rs. 7,864.13/acre), followed by CS-III (Rs. 7,653.73/acre) and CS-II (7426.58/acre). The acre total fixed cost was high in CS-II (Rs. 1800.58/acre), followed by CS-III (Rs 1791.69/acre) and CS-I (Rs. 1740.08/acre). The maximum net returns were found under CS-I (Rs. 8512.79/acre), followed by CS-II and CS-III (Rs.6805.06 and Rs.5857.23/acre, respectively).It was found that Returns per rupee of investment was found to highest in CS-I (1.89), followed by CS-II and CS-III with values of 1.74 and 1.64 respectively. The results of the study through light on and enable the farmers and extension agencies to plan for the appropriate Cropping System.

Keywords- Groundnut, Cropping Systems and Cost and Returns

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Introduction

Groundnut (*Arachis hypogea L.*) crop assumes significant importance in terms of food and income shares of the households cultivating this crop. It provides livelihood security to farmers of the Groundnut cultivating regions in the country [3]. India second largest producer of Groundnut in the world next to China. Groundnut predominantly cultivated as a dry land crop in the Districts of Tumkur, chitradurga and Kolar. Productivity of Groundnut in Karnataka state is low as compared to other Groundnut growing states. Pavagada is major Groundnut growing Taluk in the Tumkur District the average productivity of crop is only 450 kg per acre. Cropping system refers to the principle and practices of cropping and interaction with farm resources, environment. It is one of the very important tool to augment the Agricultural production and stabilize the farm income [2,4,5].

Materials and Methods

For the present study, Pavagada Taluk of Tumkur District of Karnataka was selected purposively as it is one of the major groundnut intercrop-growing Taluk in Tumkur District. In Pavagada, Groundnut is grown as a major field crop by majority of the farmers on dry land during *kharif* season. Pavagada Taluk consist of four Hoblies *viz*., Nagalamadike, Y.N. Hosakote, Nidagal and Kasaba Multi stage stratified random sampling technique was adopted for the selection of the villages and sample respondents for collection of information required for the study.

Among the different Groundnut based intercropping systems identified by conducting a pilot survey in the study area, three major Groundnut based intercropping systems were selected. Based on the highest area under Groundnut intercrop cultivation. From each Hobli 4 villages were selected randomly, from each village 6 farmers totalling the Sample size to 96 farmers. It constitute 32 Marginal (up to 2.5 acres), 32 small (>2.5 to 5 acres) and 32 large (>5 acre) farmers respectively.

Three major cropping systems identified in the study area were

1. Cropping system-I Groundnut + Red gram +green gram + cowpea
2. Cropping system-II Groundnut + Red gram and
3. Cropping system-III Groundnut sole crop

The Economics of different groundnut based cropping systems of the farmers was analysed by using measures of central tendencies like mean, percentages etc.

Result

Table-1 *Costs and returns structure under Cropping System-I (Rs/acre)*

Sl. No	Particulars	Marginal	Small	Large	Average
	Area (acre)	2.30	4.50	19.60	8.80
1	Total variable cost	8956.00	7478.84	7157.54	7864.13
2	Total fixed cost	1544.84	1665.12	2010.29	1740.08
3	Total cost	10500.84	9143.97	9167.83	9604.21
4	Gross returns	17535.21	16193.58	20622.23	18117.00
5	Net returns	7034.37	7049.61	11454.40	8512.79
6	Returns per rupee of Expenditure	1.67	1.77	2.25	1.89

The details regarding per acre costs, gross returns and net returns in the cultivation under CS-I (Groundnut+ Red gram + Green gram+ Cowpea) inter-cropping are presented in [Table-1] and in [Appendix-I] among the three categories of the farmers, the total cost incurred by Marginal farmers was high (Rs.10, 500.84/acre) as compared to Large (Rs.9, 167.83/acre) and small farmers (Rs.9, 143.97/acre). Similarly, the share of total variable cost to total cost was found to be highest for Marginal farmers (Rs. 8, 956.00/acre) as compared to the small and Large farmers (Rs.7, 478.84/acre and Rs.7, 157.54/acre) respectively. The share of total fixed cost to total cost was found to be highest for large farmers (Rs.2, 010.29/acre) as compared to the Small and Marginal farmers with Rs. 1, 665.12/acre and Rs. 1544.84/acre, respectively. Net returns obtained per acre by large farmers was higher (Rs. 11, 454.40/acre) as compared to small and marginal farmers (Rs. 7, 049.61/acre and Rs. 7, 034.37/acre), respectively. The returns per rupee of expenditure were observed to be highest in the case of large farmers (2.25), followed by small farmers (1.77) and marginal farmers (1.67), the average of the three types of farmers returns per rupee of expenditure being 1.89.

Appendix-I ***Costs and returns structure under cropping system-I (Rs/ac)***

			Marginal			Small			Large		
Sl. No	Particulars	Unit	Qty	value	Percent	Qty	value	Percent	Qty	value	Percent
1	Bullock pair	BP	2.25	1875.00	17.86	1.36	1172.56	12.82	0.85	737.06	8.04
2	Human labour	Mandays	10.58	2080.84	19.82	6.90	1448.53	15.84	5.98	1265.35	13.80
3	Machine power	Rs/hr	0.92	664.58	6.33	0.38	272.00	2.97	0.88	649.22	7.08
4	Seed	Kg									
	Groundnut		33.33	2133.33	20.32	37.78	2504.67	27.39	39.04	2333.77	25.46
	Red gram		0.83	40.97	0.39	0.76	44.20	0.48	0.82	43.47	0.47
	Green gram		0.46	20.01	0.19	0.32	14.72	0.16	0.29	12.12	0.13
	Cowpea		0.46	20.01	0.19	0.32	14.72	0.16	0.29	12.12	0.13
5	Fym	Ton	0.33	450.00	4.29	0.44	600.00	6.56	0.52	724.87	7.91
6	fertilizers	Kg	37.50	700.00	6.67	31.11	593.70	6.49	30.46	602.03	6.57
7	Gypsum	Kg	5.00	11.67	0.11	5.33	12.44	0.14	4.57	10.66	0.12
8	Interest on working capital	Percent		959.57	9.14		801.30	8.76		766.88	8.36
9	Total variable cost	Rs		8956.00	85.29		7478.84	81.79		7157.54	78.07
10	Fixed cost										
	Rental value of land	Rs		1500.00	14.28		1500.00	16.40		1500.00	16.36
	Depreciation	Rs		44.84	0.43		165.12	1.81		510.29	5.57
11	Total fixed cost			1544.8	14.71		1665.12	18.21		2010.287	21.93
12	Total cost			10500.84	100.00		9143.97	100.00		9167.827	100.00
13	Yields										
	Groundnut Main product	Qtl	3.58	12960		3.24	11712.44		3.91	15291.41	
	Groundnut By product	Ton	0.58	1137.5		0.47	933.33		0.50	1023.02	
	Red gram	Qtl	0.47	1637.22		0.49	1752.67		0.60	2168.15	
	Green gram	Qtl	0.18	779.17		0.18	791.76		0.21	898.75	
	Cowpea	Qtl	0.20	1021.60		0.18	1003.38		0.23	1240.90	
14	Returns										
	Gross returns	Rs		17535.21			16193.58			20622.23	
	Net returns	Rs		7034.37			7049.61			11454.40	
15	Returns per rupee of expenditure			1.67			1.77			2.25	

The details regarding per acre costs, gross returns and net returns in the cultivation under CS-II (Groundnut + Red gram) inter-cropping are presented in [Table-2] and in [Appendix-II] which revealed that the per acre total cost of cultivation for marginal farmers was maximum (Rs 9,897.29/acre) as compared to the large and small farmers (Rs. 9, 065.54/acre and Rs. 8, 718.65/acre, respectively). The share of total variable cost was highest in marginal farmers (Rs. 8, 313.85/acre) as compared to small and large farmers (Rs. 7, 077.36/acre and Rs. 6, 888.54/acre, respectively). With respect to total fixed cost large farmers was incurred highest cost (Rs.2, 177.01/acre) as compared to the small and marginal farmers who have incurred Rs. 1, 641.29 &Rs. 1, 583.44 respectively. Net returns per acre was highest to large farmers (Rs. 8, 612.84/acre) as compared to the small and marginal farmers with Rs. 6, 411.78/acre and 5, 390.57/acre,

respectively. The returns per rupee of expenditure were found to be more in large farmers (1.95) followed by small farmers (1.74) and marginal farmers (1.54), for the average of all the farmer category the returns per rupee of expenditure being 1.74.

Table-2 *Costs and returns structure under Cropping System-II (Rs/acre)*

Sl. No	Particulars	Marginal	Small	Large	Average
	Area (acre)	1.50	3.50	11.60	5.54
1	Total variable cost	8313.85	7077.36	6888.54	7426.58
2	Total fixed cost	1583.44	1641.29	2177.01	1800.58
3	Total cost	9897.29	8718.65	9065.54	9227.16
4	Gross returns	15287.86	15130.43	17678.39	16032.22
5	Net returns	5390.57	6411.78	8612.84	6805.06
6	Returns per rupee of Expenditure	1.54	1.74	1.95	1.74

Table-3 *Costs and returns structure under Cropping System-III (Rs/acre)*

Sl. No	Particulars	Marginal	Small	Large	Average
	Area (acre)	1.50	3.00	8.00	4.17
1	Total variable cost	9169.61	6981.57	6810.01	7653.73
2	Total fixed cost	1606.88	1611.98	2156.21	1791.69
3	Total cost	10776.49	8593.55	8966.22	9445.42
4	Gross returns	13851.87	14923.09	17132.98	15302.65
5	Net returns	3075.38	6329.54	8166.76	5857.23
6	Returns per rupee of Expenditure	1.29	1.74	1.91	1.64

The cost incurred and returns realized from CS-III (Groundnut sole crop) and their shares to total cost and returns were calculated and results are presented in [Table-3] and in [Appendix-III] among the three categories of the farmers, the total cost incurred by marginal farmers was high (Rs. 10, 776.49/acre) as compared to large and small farmers (Rs. 8, 966.22/acre and Rs. 8, 593.55/acre) respectively. The share of total variable cost to total cost was found to be highest for marginal farmers (Rs. 9, 169.61/acre) as compared to the small and large farmers (Rs. 6, 981.57/acre and Rs. 6, 810.01/acre, respectively). The share of total fixed cost was found to be highest for large farmers (Rs. 2, 156.21/acre) as compared to the small and marginal farmers with Rs. 1, 611.98 hectare and Rs. 1, 606.88 per hectare, respectively. Net returns obtained per acre by large farmers was (Rs. 8, 166.76/acre) high as compared to small and marginal farmers (Rs. 6, 329.54/acre and Rs. 3, 075.38/acre), respectively. The returns per rupee of expenditure were observed to be highest in the case of large farmers (1.91), followed by small farmers (1.74) and marginal farmers (1.29), the overall net returns per rupee of expenditure being 1.64.

Table-4 *Comparative cost and returns under different cropping systems in study area*

Sl. No	Particulars	CSI	CSII	CSIII
	Area (acre)	8.80	5.54	4.17
1	Total variable cost	7864.13	7426.58	7653.73
2	Total fixed cost	1740.08	1800.58	1791.69
3	Total cost	9604.21	9227.16	9445.42
4	Gross returns	18117.00	16032.22	15302.65
5	Net returns	8512.79	6805.06	5857.23
6	Returns per rupee of Expenditure	1.89	1.74	1.64

Comparative cost and returns under different cropping systems in study area

The total cost incurred, gross returns generated and net returns realized in different cropping systems were computed and are presented in [Table-4] The per acre cost of cultivation was high for cropping system I The share of total variable cost to the total cost was also higher in the case of cropping system I (Rs.7, 864.13/acre), followed by cropping system III (Rs. 7, 653.73/acre) and cropping system II (Rs. 7, 426.58/acre). This may be due to the higher cost incurred for labour by the cropping system I. The net returns were high for cropping system I (Rs. 8, 512.79/acre) than cropping system II and cropping system III, due to the higher gross returns. The returns per rupee of investment were high for cropping system I (1.89) as compared to cropping system II (1.74) and cropping system III (1.64) over total cost. This could be attributed to higher yields, better management of the farm.

Discussion

Costs and returns structure under Cropping System -I

Per acre variable cost to the total cost was high [Table-1] in Marginal farmers (Rs. 8, 956.00/acre) as compared to the small and large farmers (Rs. 7, 478.84/acre and Rs. 7, 157.54/acre) respectively. This may be attributed to use of more labour and bullock pair by marginal farmers. Least cost of cultivation, coupled with higher gross returns resulted in higher profit over variable costs in the case of large farmers (Rs. 11,454.40/acre) as compared to small farmers (Rs. 7, 049.61/acre) and marginal farmers (7034.37/acre). The large farmers realized relatively higher levels of net returns due to their better management practices and efficient utilization of family labour. B: C ratio was high for large (2.25), followed by small (1.77) and marginal (1.67) farmers. These findings are in contrast with the findings of [6] on cropping systems in Bidhar district of Karnataka and studies by the [7] of rice based cropping systems.

Costs and returns structure under Cropping System -II

The per acre cost of cultivation was high for marginal farmers [Table-2] the share of total variable cost to the total cost was also higher in the case of marginal farmers (Rs. 8, 313.85/acre), followed by small farmers (Rs. 7, 077.36/acre) and large farmers (Rs. 6, 888.54/acre). Is this because of their preoccupation in farming when even they have no other work, output has not increased so much because they have used less inputs other than their own labour. The net returns were high for large farmers (Rs. 8, 612.84.21/acre) than small and marginal farmers, due to the lower variable cost and higher gross returns. The returns per rupee of investment were high for large farmers (1.95) as compared to small (1.74) and marginal farmers (1.54) over total cost. This could be attributed to lower variable cost incurred by large farmers.

Costs and returns structure under Cropping System –III

It was observed [Table-3] that in the sole crop of groundnut, marginal farmers had comparatively higher total variable cost (Rs. 9, 169.61/acre). This may be due to higher cost incurred for labour. The net returns was high for large farmers (Rs. 8, 166.76/acre) as compared to small farmers (Rs.6, 329.54/acre) and marginal farmers (Rs. 3075.38/acre). This may be due to per rupee of expenditure by large farmers was higher than small and marginal farmers. The returns per rupee of expenditure were observed to be more in large farmers (1.91), followed by small farmers (1.74), marginal farmers (1.29) and this may be due to higher yields.

Comparative cost and returns structure under different cropping Systems in the study area

The results [Table-4] revealed that, in the study area, CS-I was considered as the best among the cropping systems studied, as it contributed higher returns per rupee of expenditure (1.89) due to the high price and high productivity. Whereas, returns per rupee of expenditure in CS-II was 1.74, and CS-III (1.64). These findings are in line with the findings of [1] on Economics of sugarcane production in Vidarbha Region of Maharashtra State and studies by the [8] on paddy farming systems.

Conclusion

It was found that per acre total variable cost was found to be highest for Marginal farmers in all cropping systems. With respect to the total fixed cost it was found that large farmers had incurred highest total fixed cost in all cropping systems. As

far as total cost is concerned Marginal farmers incurred highest total cost in all cropping systems.

Appendix-II *Costs and returns structure under cropping system-II (Rs/ac)*

			Marginal			Small			Large		
Sl. No	Particulars	Unit	Qty	value	Percent	Qty	value	Percent	Qty	Value	Percent
1	**Bullock pair**	**BP**	2.32	1987.30	17.67	1.96	1751.92	16.65	0.81	710.13	7.83
2	**Human labour**	**Mandays**	11.72	2297.23	20.43	9.08	1808.95	17.19	4.53	978.68	10.80
3	**Machine power**	**Rs/hr**	0.62	439.58	3.91	0.20	149.90	1.42	0.83	613.04	6.76
4	**Seed**	**Kg**									
	Groundnut		36.16	2343.31	20.84	42.23	2852.37	27.11	39.32	2511.59	27.70
	Red gram		1.14	56.76	0.50	0.64	38.62	0.37	0.73	38.23	0.42
5	**Fym**	**ton**	0.54	745.95	6.63	0.64	799.18	7.60	0.53	739.94	8.16
6	**fertilizers**	**kg**	37.84	737.84	6.56	27.10	518.29	4.93	27.18	544.60	6.01
7	**Gypsum**	**kg**	7.57	17.66	0.16	4.07	9.49	0.09	6.12	14.27	0.16
8	**Interest on working capital**	**Percent**		1035.07	9.21		951.45	9.04		738.06	8.14
9	**Total variable cost**	**Rs**		8313.85	85.92		7077.36	84.40		7426.54	75.99
10	**Fixed cost**										
	Rental value of land	**Rs**		1500.00	13.34		1500.00	14.26		1500.00	16.55
	Depreciation	**Rs**		83.44	0.74		141.29	1.34		677.01	7.47
11	**Total fixed cost**			1583.44	14.08		1641.29	15.60		2177.01	24.01
12	**Total cost**			9897.29	100.00		8718.65	100.00		9065.54	100.00
13	**Yields**										
	Groundnut Main product	**Qtl**	3.50	12101.84		3.44	12886.27		3.83	14333.13	
	Groundnut By product	**ton**	0.54	1070.27		0.41	802.85		0.46	941.14	
	Red gram	**Qtl**	0.50	1618.70		0.41	1441.31		0.67	2404.11	
14	**Returns**										
	Gross returns	**Rs**		15287..86			15130.43			17678.39	
	Net returns	**Rs**		5390.57			6411.78			8612.84	
15	**Returns per rupee of expenditure**			1.54			1.74			1.95	

Appendix-III *Costs and returns structure under cropping system-III (Rs/ac)*

			Marginal			Small			Large		
Sl. No	Particulars	Unit	Qty	value	Percent	Qty	value	Percent	Qty	value	Percent
1	**Bullock pair**	**BP**	2.381	1998.30	18.54	1.32	1140.25	13.27	1.02	919.15	10.25
2	**Human labour**	**Mandays**	10.75	2234.48	20.73	7.25	1476.82	17.19	5.41	1116.68	12.45
3	**Machine power**	**Rs/hr**	0.516	384.04	3.56	0.75	515.82	6.00	0.75	545.04	6.08
4	**Seed**	**Kg**									
	Groundnut		39.29	2517.09	23.36	40.00	2645.00	30.78	36.88	2364.89	26.38
5	**Fym**	**ton**	0.198	254.63	2.36	0.41	56.27	0.65	0.51	579.57	6.46
6	**fertilizers**	**kg**	41.67	784.72	7.28	20.34	379.66	4.42	27.66	542.13	6.05
7	**Gypsum**	**kg**	5.952	13.89	0.13	2.03	4.75	0.06	5.53	12.91	0.14
8	**Interest on working capital**	**Percent**		982.46	9.12		763.00	8.88		729.64	8.14
9	**Total variable cost**	**Rs**		9169.61	85.09		6981.57	81.24		6810.01	75.95
10	**Fixed cost**										
	Rental value of land	**Rs**		1500.00	13.92		1500.00	17.45		1500.00	16.73
	Depreciation	**Rs**		106.88	0.99		111.98	1.30		656.21	7.32
11	**Total fixed cost**			1606.88	14.91		1611.98	18.76		2156.21	24.05
12	**Total cost**			10776.49	100.00		8593.55	100.00		8966.22	100.00
13	**Yields**										
	Groundnut Main product	**Qtl**	3.587	12709.30		3.76	13804.45		4.37	16028.01	
	Groundnut By product	**ton**	0.575	1142.57		0.54	1118.64		0.54	1104.96	
14	**Returns**										
	Gross returns	**Rs**		13851.87			14923.09			17132.98	
	Net returns	**Rs**		3075.38			6329.54			8166.76	
15	**Returns per rupee of expenditure**			1.29			1.74			1.91	

It was found that, gross returns realized by large farmers were maximum in all cropping systems, as compared to Marginal and small farmers in the study area. Net returns obtained by large farmers were found to be highest in all cropping systems. Returns per rupee of investment were also found to be highest for large farmers in all cropping systems, followed by small and marginal farmers.

It was found that per acre total variable cost was high in CS-I (Rs. 7, 864.13/acre), followed by CS-III (Rs. 7, 653.73/acre) and CS-II (Rs. 7, 426.58/acre). The per acre total fixed cost was high in CS-II (Rs. 1, 800.58/acre), followed by CS-III (Rs. 1, 791.69/acre) and CS-I (Rs. 1, 740.08/acre). The maximum net returns were found to be high in CS-I with net returns of Rs. 8, 512.79/acre, followed by CS-II and CS-III with net returns Rs. 6, 805.06 and Rs.5, 857.23 /acre, respectively.

Returns per rupee of investment was found to be highest in CS-I (1.89) followed by CS-II and CS-III with value of 1.74 and 1.64, respectively.

Among the different cropping systems followed by the farmers, CS-I (Groundnut+ Redgram+Greengram+Cowpea) was found to be most profitable under rainfed condition, followed by CS-II (Groundnut+Redgram), and CS-III (Groundnut sole crop). Efforts should be made through Raitha Samparka and Krishi Vigyana Kendras to popularize these cropping systems to utilize farm resources rationally and to enhance productivity and profitability.

The results of the study through light on and enable the farmers and extension agencies to plan for the appropriate Cropping System.

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References

[1] Nagpure S. C., Jhakare A.B., Khandare A. P. and Patil R. K. (2004) *Rural India*, 67(6-7), 123-125.
[2] Olekar J.N. (1996) *M.Sc. (Agri) Thesis*(unpublished), University of Agricultural Sciences, Dharwad.
[3] Prasad H.K.P. (1993) *M.Sc. (Agri.) Thesis* (unpublished), University of Agricultural Sciences, Bangalore.
[4] Rajeshwari Y.G. (2004) M.Sc. *(Agri.) Thesis* (unpublished), University of Agricultural Sciences, Dharwad.
[5] Saikumar B.C. (2005) *M.Sc.(Agri.) Thesis*(unpublished), University of Agricultural Sciences, Dharwad.
[6] Sandeep Bogage (2002) *M.Sc. (Agri.) Thesis*(unpublished), University of Agricultural Sciences, Dharwad.
[7] Singh M. P., Singh R. P. and Rai B. (1994) *Indian Farming*, 44(1), 19-23.
[8] Tanveer Ahmed (2006)*M. Sc (Agri.) Thesis*(unpublished), University of Agricultural Sciences, Dharwad.