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RESEARCH PAPER

Economic analysis of groundnut cultivation in Chitradurga district of Karnataka state

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Abstract: The study was conducted by personal interview of sample cultivators with a specially designed schedule. For this study 80 groundnut cultivators were selected randomly from two taluks *viz*., Hiriyur and Challakere of Chitradurga district. Applied cost concepts were used to analyse the economics of groundnut cultivation. The farmers were grouped into irrigated and rain fed. The per hectare cost of cultivation was marginally more in irrigated condition and was found to be ₹ 51,448.56 and ₹ 55,207.42 under rain-fed and irrigated area respectively. The productivity of the groundnut crop was more in irrigated area (22.98 q/ha.) when compared to rain fed area (20.45 q/ha) with a yield difference of 11.01 per cent. It was noticed that the higher gross returns were received by irrigated farmers (₹ 117419.55/ha) than the rain fed farmers (₹ 104515.55/ha) by 10.98 per cent. The farm business income over Cost-A_1, family labour income over Cost-B_2 were also higher by 14.69 per cent and 16.90 per cent in irrigated area when compared to rainfed area. The net returns realized per hectare were more by 22.10 per cent for irrigated farmers (₹ 35092.77/ha) than the rain fed farmers (₹ 27336.03/ha). The benefit cost ratio was 1.42 for irrigated farmers while it was 1.35 for rainfed farmers.

Key words*:* Cost, Groundnut, Returns

Introduction

Oilseeds are the backbone of the Indian agricultural economy with substantial conditions in the country offering opportunities for cultivation of wide range oilseed crops across states. Thus, large varieties of oilseeds are cultivated here. India ranks fourth in vegetable oil economy in the world followed by the USA, China and Brazil. The main oil seeds grown in India are peanuts, rapeseed and mustard, castor seeds, sesame seeds, nickel seeds, linseed, safflower, sunflower and soybean**.**

Groundnut (*Arachis hypogaea* L.) is an important oil seed crop not only in the world but also in India. It is a member of the Faboideae subfamily of the *Fabaceae* family, an important edible oil seed crop in the world. It is grown in all the three seasons, namely, *kharif, rabi* and *summer.* It was introduced to India by the Portuguese in the first half of the 16th century. Groundnut is a native crop of Brazil.

Globally groundnut covers 295 lakh hectares with the production of 487 lakh tonnes and the productivity of 1647 kg per hectare (FAOSTAT, 2019). China stands first in terms of production with 49.20 per cent share followed by India, Nigeria and the USA. Groundnut is the major oilseed crop of India. India ranks first in groundnut acreage and is the second largest producer of groundnut in the world with 101 lakh tonnes with a productivity of 1816 kg per hectare in 2020-21 (groundnut outlook report, 2021). India exports groundnut to countries like Indonesia, USA, Pakistan, Russia worth ₹ 5,444.33 crore in the year 2016-17 (Anonymous, 2018).

India is second among the top groundnut producing countries in the world despite having the largest area under groundnut cultivation. The crop survey findings released during IOPEPC (Indian Oilseed and Produce Export Promotion Council), Global Oilseed Conference (IGOC) 19th- 21st October, 2019 at Hotel Hyatt Regency, Deira, Dubai which gives the total area under *kharif* groundnut was 39,31,700 hectares, the estimated production was 68,60,205 tonnes and yield obtained was 1,745 kg / ha. (Source: iopepc.org).

The Major peanut producing states in India are Gujarat, Rajasthan, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Madhya Pradesh, Orissa and Uttar Pradesh. Three largest groundnut producing states in India are Gujarat with production of 3.94 million tones contributing 42.88% of total groundnut production (Anonymous, 2018). Rajasthan with production of 1.26 million tonnes and Andhra Pradesh with production of 1.04 million tonnes during the year 2017-18.

Karnataka is also one of the most important groundnut growing states in the country standing fifth after Gujarat, Rajasthan, Andhra Pradesh and Tamil Nadu. Karnataka's total contribution in groundnut production is 381.4 thousand tonnes per annum. (Source: 2020, the indianblog.in)

Chitradurga district ranks first in groundnut production in Karnataka. As of 2010, groundnut production in Chitradurga district was 66,607 tonnes that accounts for 14.71 per cent of India's groundnut production (agricoop.nic.in). The top five groundnut growing districts are Kalaburagi, Vijayapura, Belagavi, Dharwad, and Tumkur which accounts for 47.62 per cent of groundnut production. Considering the importance of oilseeds in general and groundnut in particular it is imperative to investigate the economics of groundnut production. Therefore, the present study was undertaken to analyze the

cost and returns of production of groundnut in the major groundnut producing district namely, Chitradurga district in Karnataka.

Material and methods

The maximum area under groundnut cultivation is concentrated in Chitradurga district of Karnataka region therefore; Chitradurga district was selected purposively for the study, Hiriyur and Challakere taluks from Chitradurga district were selected on the basis of maximum area under groundnut cultivation. The groundnut samples were gathered from both Hiriyur and Challakere taluks of the study district. A total of 80 groundnut cultivators were selected from four villages in each taluk. From these, a sample of ten groundnut growers was obtained for each village. The data were collected by personal interview using pre-tested schedules from these cultivators. To study the profitability of groundnut cultivation, the selected sample cultivators were post classified into rain fed and irrigated cultivators of the crop. Simple statistical tools such as averages, percentages and ratios were used for meaningful interpretation. For working out the cost of cultivation, applied cost concepts *viz.,* cost-A_1, cost-A_2, cost-B1, cost-B2, cost- C_1, cost- C2 and cost- C_3 were employed.

Terms used in the study

The method adopted for computing the different cost concepts are described below:

Cost-A_1: All actual paid out costs for owner cultivator. This cost approximates the actual expenditure incurred in cash and kind and includes the following items.

a. Hired human labour
b. Owned and hired bullock labour
c. Seeds
d. Manures and fertilizers
e. Machine / Implement charges
f. Land revenue and other taxes
g. Plant protection chemicals and
h. Other miscellaneous charges.

It does not include items like rent paid, estimated rental value of owned land, interest on fixed capital and family labour.

Cost-A_2: Cost-A_1 + rent paid for leased-in land

Cost-B_1: Cost-A_1+ interest on value of owned capital assets (excluding land, interest on long term govt. floated loans or securities)

Cost-B_2: Cost-B_1 + rental value of owned land + rent paid for leased-in land

Cost-C_1: Cost-B_1 + imputed value of family labour

Cost-C_2: Cost-B_2 + imputed value of family labour

Cost-C_3: (Cost-C_2 + 10% of Cost C_2)

Income measures in relation to different cost concepts

Farm business income = Gross returns – Cost-A_1

Owned farm business income = Gross returns - Cost-A_2

Family labor income = Gross returns - Cost-B_2

Net income = Gross returns - Cost-C_2

Farm investment income = Net income + imputed rental value of owned land + interest on fixed capital

Seed: The cost of purchased seeds was based on the actual amount paid by the respondents. The value of farm produced seeds was imputed based on the prices, prevailed at the time of sowing.

Farm yard manure: The cost of purchased FYM was based on the actual amount paid by the respondents. The value of FYM generated on their farm was computed by considering the rates per tractor load prevailing in the study area at the time of its application.

Fertilizers and plant protection chemicals (PPC): The cost of fertilizers and plant protection chemicals was based on the actual prices paid by the sample respondents including the cost of transportation and other incidental charges.

Human labour: The cost of hired labour was calculated at the prevailing wage rates paid per day (8 hours) in the study area for men and women during the study period.

Machine labour: The cost of machine labour both hired and owned was calculated for differential rates for different type of operation prevailed in the study area considering the hired charges per hour.

Depreciation charges: Depreciation on each capital equipment and machinery owned by the farmers and used for cultivation of land was calculated for individual farmer based on the purchase value using the straight-line method and was apportioned per hectare.

$$Annual\ depreciation = \frac{Purchase\ value - Junk\ value}{Economic\ life\ of\ the\ asset}$$

Land revenue: Actual land revenue paid by the farmers was considered.

Land rent: The prevailing land rent for agricultural enterprises were imputed for the sample farmers, since all land holdings were observed to be owner operated.

Interest on working capital: This was calculated at the rate of 8 per cent for the six months on the total working capital.

Interest on fixed capital: Interest on fixed capital was calculated at the rate of 9 per cent. Then the amount so calculated was apportioned to the crop acreage based on duration of the crop.

Results and discussion

Cost of cultivation of Groundnut crop

The cost structure in groundnut cultivation in Chitradurga district is given in Table 1. The inputs used for groundnut production were converted into monetary forms for the purpose

Table 1. Cost structure of groundnut cultivation in the study area (Rs. /ha)

Sl. No.	Particulars	Rain fed (n=68)	Irrigated (n=12)	Percentage Change
a	Hired human labour	4,900.12(9.52)	5,100.12(9.24)	3.92
b	Machine labour / implement charges	8,518.84(16.55)	10,074.80(18.24)	15.44
c	Bullock labour	2,481.16(4.82)	2,520.20(4.56)	1.54
c	Seed (Rhizome)	10,139.36(19.71)	10,139.36(18.37)	-
d	Manures & fertilizers	14,981.78(29.12)	15,970.1(28.93)	6.19
e	Depreciation	3,023.83(5.88)	3,113.43(5.64)	2.88
f	Land revenue	47.48(0.09)	47.48(0.09)	-
g	PPC	2,986.77(5.82)	3,621.69(6.56)	17.53
h	Interest on working capital @ 8%	4,369.22(8.49)	4,620.24(8.37)	5.43
I	Total Cost (A1)	51,448.56(100.00)	55,207.42(100.00)	6.81
II	Cost-A2 (Cost-A1 + rent paid for leased in land)	58,632.97	62,391.83	6.02
III	Cost-B1 (Cost-A1 + Interest on assets owned except land @9%)	52,371.57	56,130.43	6.70
IV	Cost-B2 (Cost-B1 + rental value of owned land + rent paid for leased in land)	59,555.98	63,314.84	5.94
V	Cost-C1 (Cost-B1 + Imputed value of family labour)	62,978.79	67,657.21	6.91
VI	Cost-C2 (Cost-B2 + Imputed value of family labour)	70,163.20	74,841.62	6.25
VII	Cost-C3 (Cost-C2 + 10% of Cost C2)	77,179.52	82,325.78	6.25
Cost of production (Rs/q)		3,598.11	3,582.49	-0.44

Note: Figures in parentheses indicate percentages to respective

of calculating the per hectare cultivation cost and to assess the profitability across rain fed and irrigated production conditions. As such, both main product and by-product are converted into monetary values in order to determine the gross returns.

A comparison of costs under rain fed and irrigated production provided the composition of cost structure in groundnut production. Among the Cost-A_1, cost of manures and fertilizers (29.12 % and 28.93 %) accounted highest to the total cost in both rain fed and irrigated areas, respectively. This was followed by seed cost (19.71% and 18.37%) under two production conditions, respectively. The cost of machine labour was 16.55 per cent and 18.24 per cent in rain fed and irrigated areas, respectively. The cost on hired human labour was about 9.50 per cent across both production conditions. The other costs under Cost-A_1 namely, cost on bullock labour, PPCs, depreciation and interest on working capital ranged between 4.50 to 8.50 per cent under rain fed and irrigated conditions. The substantial difference in the Cost-A_1 between rain fed and irrigated groundnut production emerged due to the higher cost incurred by farmers in respect of PPCs (17.53 %) and machine labour (15.44 %) followed by manures and fertilizers and hired human labour,

The comparison of results on applied costs across rain fed and irrigated production conditions indicated that the farmers in irrigated areas incurred additional cost by 6.81, 6.02, 6.70, 5.94, 6.91 and 6.25 per cent over their rain fed counterparts, respectively w.r.t. every cost *i.e.,* Cost-A_1, Cost-A_2, Cost-B_1, Cost-B_2, Cost-C_1 and Cost-C_2 in that order.

The per hectare cost of cultivation (Cost-C_3) of groundnut was more by 6.25 per cent in irrigated area (₹ 82,326/ha) compared to rain fed area (₹ 77,180/ha). The per quintal cost of groundnut production was almost on par in rain fed (₹ 3, 598.11/q.) and irrigated areas (₹ 3582.49/q.).

Returns obtained f rom groundnut cultivation

The results in Table 2 indicate the extent of returns obtained from the groundnut cultivation and returns over different cost structures namely, farm business income, family labour income, net returns and returns on every rupee spent in its production. The productivity of the groundnut crop was relatively more in irrigated area (22.98 q/ha.) compared to rain fed area (20.45 q/ha) with a yield difference of 11.01 per cent. The gross returns included the value of the main product and by product of the crop. It was noticed that the higher gross returns were received by irrigated farmers (₹ 117418.55/ha) than the rain fed farmers (₹ 104515.55/ha) by 10.98 per cent owing to the yield difference.

The farm business income over Cost-A_1, family labour income over Cost-B_2 were also higher by 14.69 per cent and 16.90 per cent in irrigated areas when compared to rain fed production. The net returns realized per hectare were more by 22.10 per cent for irrigated farmers (₹ 35092.77/ha) than the rain fed farmers (₹ 27336.03/ha). It can be noted that the returns per rupee of expenditure realized was also marginally more for irrigated farmers (1.42) over rain fed farmers (1.35). Similar results

Table 2. Returns obtained from groundnut cultivation in study district (Rs./ha)

Sl. No.	Particulars	Rain fed (n=68)	Irrigated (n=12)	Percentage Change
	Total Cost	77,179.52	82,325.78	6.25
a	Main product(Q/ha)	20.45	22.98	11.01
b	Value (Rs/Q)	5,100.00	5,100.00	-
c	By-product (cart load)	0.82	0.92	10.86
d	Value (Rs./load)	220.55	220.55	-
I	Gross returns (GR)	10,4515.55	11,7418.55	10.98
II	Farm business income (GR- Cost-A_1)	53,066.99	62,211.13	14.69
III	Family labour income (GR- Cost-B_2)	44,959.57	54,103.71	16.90
IV	Net returns (NR) (GR-C_3)	27,336.03	35,092.77	22.10
V	Returns per rupee (Cost-C_3)	1.35	1.42	-

were observed by Narayanamoorthy *et al.* (2014). In irrigated area, the gross returns, level of yield and returns per rupee of expenditure were higher than that in a rain-fed area. Thus, groundnut production was more profitable in irrigated and rain fed areas in the study district.

Per cost of cultivation (Cost-C3) of the groundnut crop (Table. 1) was higher in the case of irrigated area (₹ 82,325.78 /ha) than that of rain-fed area (₹ 77,179.52 /ha). Whereas the cost of production (cost per quintal) in irrigated areas was marginally (-0.44%) lower than in rain-fed areas. The reason for the higher cost of production in the case of the rain-fed area than the irrigated area was attributed to the lower productivity of the groundnut in the rain-fed area.

The per hectare gross returns obtained in irrigated area (₹ 1,17,418.55 /ha) was higher than the rain-fed area (₹ 1, 04,515.55 /ha). Accordingly, in irrigated areas the net returns per hectare was found to be 22.10 per cent higher (₹ 35,092.77/ha) than rain-fed area (₹ 27,336.03/ha). The returns per rupee of expenditure in irrigated and rain-fed areas were 1.42 and 1.35, respectively (Table 2). Similar results were observed by Narayanamoorthy *et al.* (2014). In irrigated areas, the gross returns, level of yield and returns per rupee of expenditure were higher than that in rain-fed areas. This was attributed to the fact that inputs were used efficiently in irrigated areas compared to rain-fed areas. Groundnut production was more profitable in irrigated areas when compared to rain-fed areas in the study region.

Conclusion

The per hectare cost of cultivation, gross returns, net returns and returns per rupee of expenditure on the groundnut crop cultivation were relatively higher in the case of irrigated area than rain-fed area. Whereas the cost of production is higher in rain-fed areas than in irrigated areas.

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