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Research Article

ECONOMIC ANALYSIS OF GROUNDNUT AND COTTON IN RAJKOT DISTRICT

RABADIYA V.D.*[1], BHATT J.D.[2] AND THAKER N.M.[3]
PG Institute of Agribusiness Management, Junagadh Agricultural University, Junagadh 36200, India
*Corresponding Author: Email - rabadiyavandana15@gmail.com

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Abstract: India is one of the largest producers of oilseeds in the world and occupies an important position in the Indian economy. Groundnut and cotton are cultivated in India in all seasons. The study was carried out in Rajkot district of Gujarat state during the year 2018. Simple random sampling was used to select the samples for the study. The data were collected by personal interview method, analyzed through various appropriate statistical tools. Cost of production of *kharif* groundnut was estimated by using the cost of cultivation. Seed replacement rate formula was used for seed replacement rate of groundnut. Sample size was of 120 farmers and 30 dealers from Rajkot district. From the study, it was concluded that cost of cultivation of cotton is comparatively higher than cost of cultivation of groundnut. The seed replacement rate is highest in small land holding farmers followed by medium land holding farmers.

Keywords: *Seed replacement rate, Groundnut, Cost of cultivation*

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Introduction

Agriculture is the backbone of Indian economy and India ranks second worldwide in the production of groundnut and cotton after China. Agriculture provides food to more than one billion people and produces 51 major crops. In India, agriculture contributes around 13.7 percent to the gross domestic product while providing employment to around 60 percent of country's workforce. The role of the seed sector is to ensure adequacy, seed quality and varietal diversity. The groundnut which is also popularly known as peanut is one of the world's most popular and universal crops, cultivated in more than 100 countries on six continents. During 2008-09, groundnut occupied an area 24,590 thousand hectares with a production of 38,201 thousand tonnes in the world. Groundnut is mainly produced in Asian countries. India is among the largest groundnut producing countries of the world. During the year 2008-09, China was the largest producer of groundnut accounting for 37.71 percent of the total world production followed by India (21.03 percent). China and India together accounted for about 58.74 percent of world groundnut production. Nigeria (7.57 percent), USA (5.27 percent), Indonesia (3.86 percent) and Sudan (3.37 percent) were the other major groundnut producing countries. In the area, India ranked first with 30.23 percent share in the world, followed by China (19.37 percent), Nigeria (10.58 percent) and Sudan (7.18 percent). In a total area of groundnut cultivation increased from 6.8 million hectares (1980-81) to 8 million hectares (2006-07). Groundnut is mainly grown in five states, Andhra Pradesh, Gujarat, Tamil Nadu, Karnataka and Maharashtra and together they account for more than 90 percent of the crop's total area. Gujarat was the largest producer contributing 25 percent of the total production followed by Tamil Nadu (22.48%), Andhra Pradesh (18.81%), Karnataka (12.64%) and Maharashtra (10.09%) during 2006-07 [1,2]. The production and yield of cotton have undergone a sea-change after the cotton development programme was brought under Mini Mission II of Technology Mission on Cotton (TMC) since 1999- 2000. The cultivated area of cotton in the country, which was 93.42 lakh hectares in the Pre-TMC period (1998-99) eventually increased to 101.32 lakh hectares during 2009-10 and reached to 121.78 lakh ha in 2011-12. This marginally decreased to 119.80 lakh ha in 2012-13.

Mini Mission-II of TMC was merged with National Food Security Mission (NFSM) for implementation from 2014-15. During 2014-15, the area under cotton surpassed the coverage figure of 121.78 lakh ha and touched the figure of 128.19 lakh hectare. The same was all-time high area coverage in the cotton crop [3]. Since the release of Bt cotton technology, it has emerged as an effective alternative to traditional cotton varieties by inhibiting bollworm attack, thereby improving yield and income. This has resulted in fast adoption of Bt cotton over conventional cotton. Cotton production in India has accelerated more than 4 times and reached a peak of 359.02 lakh bales during 2013-14 as compared to 86.24 lakh bales in 2002-03. Introduction of Bt cotton has played a catalytic role in enhancing cotton production in India. Suitable climatic conditions, better farm practices, accelerated transfer of technology under MM-II of TMC has facilitated an increase in cotton area, yield and production in the country. However, the production of cotton during 2012-13 declined marginally to 342.20 lakh bales due to delayed /deficient rainfall in the country in the main cotton growing states of Maharashtra, Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka and Rajasthan. During 2013-14, the production of cotton received was 359.02 lakh bales which were an all-time high in cotton history. In 2014-15 and 2015-16, the cotton production kept reducing to 348.05 and 301.47 lakh bales respectively due to drought condition in Maharashtra in 2014-15 and pest infestation in some of the pockets of cotton producing zones, especially in north zone (Punjab) and drought in Maharashtra in 2015-16. The area under cotton receded drastically to 105 lakh hectares in 2016-17 due to fear of infestation of whitefly in the north zone, an infestation of pink bollworm in central and south zones including the decision of Andhra Pradesh and Telangana states for diversion of the cotton area to pulses and oilseeds. The average cotton yield increased from 186 kg/ha in 2001-02 to 510 kg/ha in 2013-14, but productivity decreased in 2014-15 and 2015-16. As per the first advance estimates of DES, the cotton season 2016-17 is likely to provide an all-time high yield in cotton history [4].

Objectives of Study:

To estimate the cost of production of groundnut and cotton

To analyze the current status of groundnut seed replacement rate in Rajkot district

Review of Literature

Kathirvel (2007) studied cost and returns of banana cultivation in Tamil Nadu with special reference to Karur district [6]. The sample size was of 500 farmers. To find out returns to scale the Cobb- Douglas production function was used. It concluded that the agricultural growth strategy of the past has intensified the interclass inequalities. Except for the imputed value of family labor, the other things like cost of production, overall returns *etc*., are not favorable to the small farmers. Bahirat and Jadhav (2011) studied the cost, return and profitability of rose production in Satara district, Maharashtra [7]. The sample size was of 50 rose growers. It revealed that the cultivation of rose was profitable at all levels of cost, per hectare yield of rose was 2,24,166 and the gross value received was Rs. 3,80,242. Benefit-Cost ratio was found to be 1:1.29. Nannaware (2011) concluded that amongst the different items of costs, human labor and rental value of land was the major item of cost [8]. He also observed that per hectare cost of cultivation of maize (*i.e*. cost 'C') was worked out to Rs. 40624.50. Among the different item of costs, the rental value of land was the highest share (17.53 percent). The other important item of cost was male labor (19 percent), female labor (18.33 percent) followed by bullock labor (9.20 percent), interest on fixed capital (6.57 percent) and fertilizer (N) (4.22 percent). Thakare *et al*. (2011) studied the economics of production and marketing of cowpea in Anjangaon tahsils of Amravati district [9]. For study 100 farmers were selected and classified into four groups on the basis of their farm size. The tabular analysis was employed for analyzing the data. From study concluded that the output-input ratio was greater than unity indicating that cow pea is a profitable crop in the selected area. Human labor has accounted for 27 percent of total cost. Sidhu *et al*. (1998) studied the sources of seed, the rate of seed replacement for the wheat crop in Punjab [10]. They had worked out seed replacement rate separately for certified seed and quality seed. The study revealed that an overall level, seed replacement rate for wheat seed was 6.85 percent and 9.16 percent for certified seed and quality seed respectively as against the recommendation of 25 percent for the wheat crop. The study also revealed that there was no specific relationship between farm size and seed replacement rate. Chauhan *et al*. (2002) in their study on the adoption of quality seed estimated the demand and supply for a quality seed in Haryana state [11]. The study conducted the survey of 160 farmers. Seed replacement formula was used to find a seed replacement rate. The study revealed that adoption of quality seed was 11.69 percent, 16.24 percent and 28.94 percent in case of paddy, wheat, mustard and cotton respectively as against the recommendation 20 percent for cereal, 40 percent for mustard and 50 percent of cotton. Nalini *et al*. (2002) worked on sources of seed potato supply and replacement rate in West Bengal [12]. They pointed that the major source of potato seed was the self-retained seed of previous year crop. The seed replacement rate was only 9.5 percent of the certified seeds against the recommended rate of 25 percent for potato in West Bengal. The replacement rate for quality seed was 38.83 percent. Singh and Singh (2016) studied optimistic seed replacement rates in Jharkhand. The study discussed the constraints and strategies to enhance seed replacement rates (SRRs) including the impact of SRRs on crop productivity [13]. The study revealed that there was a critical role of seed replacement rate in enhancing production which should contribute to improving food security.

Materials and Methods

Sampling technique was adopted purposively as per the objectives of the study. On basis of agricultural activity and cropping pattern, samples were taken in Rajkot districts. Farmers were surveyed in the Rajkot district. Total 120 respondents selected randomly. The respondents were contacted at their home, community places or on their farms. Primary data were collected through the personal interview of farmers using well-structured questionnaires. Questionnaire is a formalized instrument for asking information directly from the farmers. Information related to socio economic profile, improved cultivation practices for cotton and groundnut, operation cost and adoption of improved cultivation practices, information sources used and constraints faced in adopting improved cultivation practices *etc*. was collected from farmers.

Cost Concept

The cost concept and the items of costs included under each concept are given below [5].

Cost	Items included	Procedure for calculating the cost
Cost A	= Cost of hired human labor	The actual wage paid (including kind payments evaluated at market prices)
	+ Cost of bullock labor (owned/hired)	As per the prevailing market rate
	+ Cost of seeds (owned/purchased)	As per the prevailing market rate
	+ Cost of manure (owned/purchased)	As per the prevailing market rate
	+ Cost of fertilizer	Actual paid
	+ Cost of pesticides and insecticides	Actual paid
	+ Cost of Irrigation (owned/purchased)	As per the prevailing market rate
	+ Charges for machinery (owned/hired)	As per the prevailing market rate
	+ Miscellaneous paid out the cost if any	Actual paid
	+ Land revenue and other taxes	Actual paid
	+ Depreciation (on farm building, bullock-cart, and tools)	Kutcha building @ 5% Pucca building @ 2% Bullock-cart @ 10% Small tools/implements @ 20% Proportionate to the area and duration of crop
	+ Rent paid for leased land (If on lease)	Actual rent paid
	+ Interest on working capital (working capital means total cost up to now)	To be calculated @ 12% per annum (for the duration of crop only)
Cost B	= Cost A	
	+ Rental value of owned land (In case of owned land only)	As per the prevailing market rent or @ 16% of gross income
	+ Interest on fixed capital	To be calculated @ 10% per annum. (for the duration of crop only)
Cost C1	= Cost B	
	+ Imputed value of family labor	As per the prevailing wage rate
Cost C2	= Cost C1	
	+ Management charges	To be calculated @ 10% of cost C1

Seed Replacement Rate

The seed replacement rate (SRR) for groundnut was calculated using following formula [14].

$$SRR = \frac{C \times 100}{A \times K}$$

Where,

SRR=Seed replacement rate for the groundnut crop,

C = Certified seeds used by the farmers,

A = Area under the groundnut crop,

K = Seed rate per unit of area

Results

Cost of cultivation in cotton

Detail of cost of cultivation and yield of cotton is given in Table 4.1. It can be observed from the table that the average total cost (Cost C2) per hectare of cotton was Rs. 54.083.62. The share of operating cost (Cost A) in the total cost was 47.29. The break-up of the cost component indicated that the cost of rental value of owned land ranked first (31.74 percent) in the total cost, followed by human labour (18.73 percent), family labour (9.00 percent), fertilizer (6.31 percent), seed (3.42 percent) *etc*. A minimum share was bullock labor (1.61 percent). Cost B occurred was Rs. 44301.76 with 81.91 percent share. That covered Cost A, the rental value of own land (31.74 percent share) and interest on fixed capital (2.87 percent share).

Cost C1 occurred was Rs. 49166.93 with 90.90 percent share. That covered Cost B and imputed value of family labor (9.00 percent share). A sum of cost C1 and 10 percent management charge (Rs.4916.69) is equal to a Cost C2 (Rs. 54083.62).

Table-1 *Cost of cultivation in Cotton, (n=60)*

SN	Items	Physical Unit	Value (Rs./ha)	% of Cost C2
1	Human labor			
	A. Hired labor (man days)	71.33	10129.92	18.73
	B. Family labor (man days)	30.13	4865.17	9.00
2	Bullock labour (pair days)	3.50	875.00	1.61
3	Seeds (bag)	2.50	1853.00	3.42
4	Manure (trolley)	1.79	909.17	1.68
5	Fertilizer (kgs)	76.33	3414.08	6.31
6	Pesticide/Insecticide		1541.67	2.85
7	Irrigation		975.87	1.80
8	Machinery charge		1169.87	2.16
9	Miscellaneous cost		1133.34	2.09
10	Depreciation cost		979.23	1.81
11	Rent pay for leased land		1183.33	2.18
12	Interest on working capital		2010.72	3.71
13	Rental value of own land		17167.90	31.74
14	Interest on fixed capital		1556.96	2.87
15	Management charges		4916.69	9.09
16	Cost A		25576.90	47.29
17	Cost B		44301.76	81.91

Cost of Cultivation in Groundnut

Detail of cost of cultivation and yield of groundnut are given in Table 4.2. It can be observed from the table that the average total cost (Cost C2) per hectare of groundnut was Rs. 60231.12. The share of operating cost (Cost A) in the total cost is 51.37 percent. The break-up of the cost component indicated that the cost of rental value of owned land ranked first (25.18 percent) in the total cost, followed by human labor (16.81 percent), seed (11.94 percent), family labor (9.76 percent) *etc.* A minimum share was bullock labor (1.24 percent). Cost B occurred was Rs. 48871.56 with 81.14 percent share. That covered Cost A, the rental value of own land (25.18 percent) and interest on fixed capital (4.57 percent). Cost C1 occurred was Rs. 54755.56 with 90.09 percent share. That covered Cost B and imputed value of family labor (9.76 percent share). A sum of cost C1 and 10 percent management charge (Rs.5475.55) is equal to a Cost C2.

Table-2 *Cost of cultivation in groundnut, (n=60)*

SN	Items	Physical Unit	Value (Rs./ha)	% of Cost C2
1	Human labor			
	A. Hired labor (man days)	45.92	9964.96	16.81
	B. Family labor (man days)	15.78	5884.00	9.76
2	Bullock labour (pair days)	2.50	750.00	1.24
3	Seeds (bag)	4.65	7200.50	11.94
4	Manure (trolley)	2.58	-	0.00
5	Fertilizer (kgs)	68.02	2945.23	4.88
6	Pesticide/Insecticide		1606.00	2.66
7	Irrigation		893.52	1.48
8	Machinery charge		1349.26	2.24
9	Miscellaneous cost		1718.00	2.85
10	Depreciation cost		1296.87	2.15
11	Rent pay for leased land		1046.68	1.73
12	Interest on working capital		2010.72	3.33
13	Rental value of own land		15167.90	25.18
14	Interest on fixed capital		2756.96	4.57
15	Management charges		5475.55	9.07
16	Cost A		30946.70	51.37
17	Cost B		48871.56	81.14
18	Cost C1		54755.56	90.90
19	Cost C2		60231.12	100
20	Yield (Main-product)	17.21	5570.83	
21	Yield (By-product)	19.75	-	

Seed Replacement Rate

The selected farmer used four categories of seed *i.e.* certified seed, quality seed, local seed and self-retained seed. Seed replacement rate was calculated by considering group wise use of certified seed by the farmer. Per hectare, the seed was used 125 kgs. The seed replacement rate for certified seed was 1.72, 2.00, 1.98, and 0.87 percent for marginal, small, medium and large farmer respectively. At an overall level, the seed replacement for quality seed was 2.18 percent.

Table-3 *Seed replacement rate of groundnut in Rajkot district, (n=60)*

SN	Particular	Rajkot				
		Marginal	Small	Medium	Large	Overall
1	Area under groundnut crop	0.93	1.61	2.82	5.47	3.29
2	Seed used					
	Certified seed	2	4	7	6	19
	Other seed	2	8	18	13	41
3	Seed rate per ha. (kg)	125	125	125	125	125
4	Seed replacement rate	1.72	2.00	1.98	0.87	2.18

Conclusion

Cost of cultivation of cotton and groundnut was calculated and result showed that total average cost of cotton and groundnut was Rs. 54083.62 and Rs. 60231.12 respectively. Cost of cultivation of cotton is high than groundnut because cotton is long duration crop as compare to groundnut. Seed replacement rate was worked out for certified seed. It is observed from data that the total area under groundnut in Rajkot district was 0.93 ha, 1.61 ha, 2.82 ha and 5.47 ha in marginal, small, medium and large group respectively. The selected farmers used four categories of seed *i.e.* certified seed, quality seed, local seed and self-retained seed. Seed replacement rate was calculated by considering group wise use of certified seed by the farmer. Per hectare, the seed was used 125 kg. The seed replacement rate for certified seed was 1.72, 2.00, 1.98, and 0.87 percent for marginal, small, medium and large farmers respectively. At an overall level, the seed replacement for quality seed was 2.18 percent.

Application of research: For the social science and agricultural economics fellow to know seed replacement rate in Saurashtra region

Research Category: Agricultural economics

Abbreviations: SRR: Seed Replacement Rate

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Study area / Sample Collection: Rajkot districts, Gujrat

Cultivar / Variety name: Groundnut and Cotton

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