An Economics Analysis of Production and Marketing of Groundnut in Porbandar District of Gujarat

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ABSTRACT

The study was conducted in Porbandar districts of Gujarat. The objective of study also examines trends, costs and returns structure, resource use efficiency in Porbandar district of Gujarat. The study was based on the primary data of 45 groundnut cultivators for the year 2014-15 The secondary data on area, production and productivity for period 1991-92 to 2013-14. The functional analysis was also carried out by using Cobb-Douglas type of production function. Further the study revealed that area, production and productivity in case of *kharif* groundnut decline. The per hectare cost of cultivation for *kharif* groundnut was ₹ 50,434.33. Total benefit cost ratio of *kharif* groundnut was 1.12. The results of production function analysis indicated that the selected seven variables jointly explained 0.78% variation in production under *kharif* groundnut. The human labour(X_1), manures(X_4) and phosphorus (X_6) fertilizer in *kharif* groundnut are significant variables. This indicates that there is scope to increase the use of these resources to increase the production. The results of resource use efficiencies indicated that the MVPs of human labour, manures and phosphorus in *kharif* groundnut were more than unity. It indicates that, there is scope to increase input level of these resource variables to maximize the output. Per quintal marketing cost of groundnut was ₹ 389.22 and the major items marketing cost of packaging charges and transport charges. The study revealed that the farmers were not fully aware of some of the components of groundnut production improved technology. To increase their yield levels, there is a need to increase adoption of recommended technologies like use of HYV and hybrid varieties, fertilizers, plant protection and other technologies given by the Universities for increasing the groundnut productivity. There was a scope for extension agencies to educate the farmers for adopting recommended technologies.

Keywords: Growth rates, resource use efficiency and marketing cost

Groundnut (*Arachis hypogaea*), is a species in the legume or "bean" family Fabaceae. It is known by many other local names such as earthnuts, ground nuts, goober peas, monkey nuts, pygmy nuts and pig nuts. It's history is a journey from South America to Asia, east across the Atlantic Ocean and back again to North America. The groundnut plant probably originated in Peru or Brazil in South America. Dr. George Washington Carver is considered by many to be the father of the groundnut industry. He suggested to farmers that they rotate their cotton plants and cultivate groundnuts.

Groundnut oil has a very important position in the India diet. The oil content of the seed varies from 44.00 to 50.00% depending upon the varieties and agro-climatic condition. It contributes 67.00% to the total edible oils used in India. Groundnut contains protein, vitamin, amino acid, calcium, iron, Zinc and Boron. Kernels are also eaten row roasted or sweetened. It is an important protein supplement in cattle and poultry ration. It is also consumed as confectionary product. The cake can be used for manufacturing artificial fibre. The halms (Plant stalk) are fed (green, dry or silage) to livestock. All parts of this plant can be commercially used. Being a leguminous crop, groundnut is also valuable rotation crop with root nodules. It maintains the soil fertility and help in reducing soil erosion.

India occupies the first place, both in regard to the area and the production in the world. Seventy percent of the area and seventy five percent of the production has been concentrated in the four states of Gujarat, Andhra Pradesh, Tamil Nadu and Karnataka. Andhra Pradesh, Karnataka, Tamil Nadu and Orissa have irrigated areas primarily during the *rabi* season. In Gujarat, groundnut is a dominant oil seed crop, during the year 2014-15, the area under this crop was 71,800 ha with the total production of about 1,36,000 tones. Porbandar is one of the leading districts in groundnut cultivation in state.

Therefore, the present study was undertaken to analyze the "Economics of Production and Marketing of *Kharif* Groundnut in Porbandar District of Gujarat", keeping the view its socio-economic importance in the people of the state.

RESEARCH METHODOLOGY

Growth rates in area, production and productivity of *kharif* groundnut

The data obtained for the period of 23 years from 1991-92 to 2013-14 was divided into two sub periods and one overall period as indicated below:

Period- I   :   1991-92 to 2002-03

Period-II   :   2002-03 to 2013-14

Overall   :   1991-92 to 2013-14

$$Y = ab^t$$

Where,

Y = Area / Production / Productivity,

a = Constant,

b = Trend value,

t = Time period in years,

$$CGR\ (\%) = (Antilog\ b-1) \times 100$$

The significance of the estimated compound growth rates were tested with the help of Students "t" test.

Resource use structure

The requirements of major inputs for *kharif* groundnut have been worked out on per hectare basis.

Production function analysis

The data were therefore, subjected to functional analysis by using the following Cobb-Douglas type of production function,

$$Y = aX_1^{b_1} X_2^{b_2} X_3^{b_3} \dots\dots X_n^{b_n} e^u$$

Where,

Y = Output of main produce (q),

a = Intercept,

X_1 = Human labour (man days),

X_2 = Bullock labour (pair days),

X_3 = Seed (kg/ha),

X_4 = Manures (q),

X_5 = Nitrogen (kg / ha),

X_6 = Phosphorus (kg / ha),

X_7 = Potash (kg/ha),

X_8 = Cost of irrigation (₹/no. of irrigation),

bi^s = Elasticity of production of respective factors,

e^u = Error term.

Estimation of marginal value product

The MVP of individual resources was estimated by using the following formula,

$$\text{Marginal value product of } X_i = b_i = \frac{\overline{Y}}{\overline{X}} P_y$$

Where,

b_i = Elasticity of production of ith input.

Y = Geometric mean of output.

X_i = Geometric mean of ith input.

P_y = Per unit price of output.

Total marketing cost

$$C = C_f + Cm_1 + Cm_2 \dots\dots Cm_n$$

Where,

C = Total Marketing cost.

C_f = Cost paid by the producer from the time the Produce leaves the farm till he sells it.

Cm_1 = Cost incurred by its middleman in the process of buying and selling the product.

Problems in production and marketing

The problems in production and marketing were estimated with help of percentages.

RESULTS AND DISCUSSION

Compound growth rates of area, production and productivity of *kharif* groundnut

Table 1 reveals that, at the overall period, the compound growth rates of *kharif* groundnut area, production and productivity was negative and significant, while productivity was positive but non-significant. It can clearly indicate that the production of *kharif* groundnut was declined only due to decline in area during the overall period in Porbandar district of Gujarat. Among the different period the same trends was observed the findings were in the line with Sharma and Kalita (2008); Sharma (2013a); Sharma (2014). The production of kharif groundnut was declined only due to the decline in area. The productivity was increased but not significant in both period. In Porbandar districts during this period the on and often the drought conditions affected the production of *kharif* groundnut in the district.

Cost of cultivation of *Kharif* groundnut

It can be observed from the Table 2 that at the overall level, per hectare cost of cultivation of *kharif* groundnut i.e. Cost 'C' was ₹ 50434.33. Amongst the different items of cost, seed was the major item of cost which accounted for ₹ 11803.83 (23.40%) followed by rental value of land ₹ 10,134.02 (20.09%), hired human labour ₹ 8801.74 (male plus women), family human labour ₹ 4,875.91 (9.66%), bullock labour ₹ 3,709.09 (7.35%), machine power ₹ 2,964.98 (5.88%), depreciation on farm implements ₹ 921.15 (1.83%), manures ₹ 1,167.71 (2.32%), interest

on fixed capital ₹ 1,598.94 (3.17%), phosphorus ₹ 560.55 (1.11%). and nitrogenous fertilizers ₹ 415.27 (0.82%). Of the total cost of cultivation of *kharif* groundnut, Cost 'A' was ₹ 33.825.45 (67.08%) and Cost 'B' was ₹ 45,558.42 (90.34%). Among the size groups of there has been no specific trend was found in Cost 'C'. The per quintal cost of *kharif* groundnut showed more trend for small size group of holdings as compared to small and large group of holding findings were in line of Sharma (2011).

The per hectare total cost of cultivation for one hectare of *kharif* groundnut was ₹ 49,908.07, ₹ 51,760.99 and ₹ 49,633.91 for small, medium and large size group of holdings, respectively. It has been observed that the variation in use of different inputs was high on all types of sample farms which has resulted into vast difference in cost of cultivation of *kharif* groundnut in all types of farms under study. It was higher for large size group of holdings, it is worth noting that as large size farmers have readily available cash at their hand and credit at banks leads to higher use of resources which ultimately results into higher productivity of crop than the other farmers similar were done by Sharma and Tungoe (2011).

Results of Cobb-Douglas type of production function

It can be revealed from the Table 3 that the value of co-efficient of multiple determinations was estimated 0.78 at the overall level.

In case of *kharif* groundnut human labour (X_1) significant at 10% level and manures (X_4), phosphorus (X_6) were significant at 5% level. This indicates that there is scope to increase the use of these resource to increase the output. While, bullock labour (X_2), seed (X_3) nitrogen (X_5), potash (X_7) were positively

Table 1: Periodwise annual compound growth rates in area, production and productivity of *kharif* groundnut in Porbandar district of Gujarat

Season	CGR (%)								
	Period-I 1991-92 to 2002-03			Period-II 2002-03 to 2013-14			Overall period 1991-92 to 2013-14		
	A	**P**	**Y**	**A**	**P**	**Y**	**A**	**P**	**Y**
Kharif groundnut	-2.313*	0.316[NS]	2.046[NS]	-3.141***	2.036[NS]	2.376[NS]	-1.511***	-1.332*	0.181[NS]

*, ** and *** indicates significance level at 10, 5 and 1per cent level, respectively

Table 2: Item wise cost of cultivation of *kharif* groundnut in Porbandar district of Gujarat (in ₹ / ha)

Sl. No.	Cost items	Small			Medium			Large			Overall		
		Qty	Value	Per cent	Qty	Value	Per cent	Qty	Value	Per cent	Qty	Value	Per cent
I.1	**Hired Human labour (Mandays)**												
	a. Male	31.96	5592.78	11.21	30.29	5300.72	10.24	32.19	5633.25	11.35	31.48	5508.92	10.92
	b. Female	41.86	4185.57	8.39	47.83	4782.61	9.24	9.10	910.29	1.83	32.93	3292.82	6.53
2	Bullock power (Pair days)	3.51	1752.68	3.51	6.41	2885.87	5.58	2.11	1055.41	2.13	5.93	2964.98	5.88
3	Machine power	9.21	4145.10	8.31	12.17	6086.96	11.76	9.10	4096.31	8.25	8.24	3709.09	7.35
4	Seed (kg)	103.09	11340.21	22.72	106.96	11765.22	22.73	111.87	12306.07	24.79	107.31	11803.83	23.40
5	Manures (q)	12.78	1278.35	2.56	10.14	1014.49	1.96	9.10	1210.29	2.44	10.67	1167.71	2.32
6	Fertilizers (kg)												
	N	24.38	394.71	0.79	22.65	366.70	0.71	29.92	484.40	0.98	25.65	415.27	0.82
	P	36.95	628.15	1.26	25.02	425.34	0.82	45.33	628.15	1.27	35.77	560.55	1.11
	K	23.87	429.66	0.86	20.70	372.60	0.72	23.61	424.98	0.86	22.73	409.08	0.81
7	Irrigation Charges (₹)		190.63	0.38		180.33	0.35		200.96	0.40		190.64	0.39
8	Plant protection charges (₹)		185.16	0.37		190.32	0.37		196.89	0.40		190.79	0.38
9	Incidental charges (₹)		150.60	0.30		140.65	0.27		200.63	0.40		163.96	0.33
10	Repairs (₹)		239.69	0.48		255.91	0.49		293.54	0.59		263.05	0.52
	Working capital (₹)		**30513.19**	**61.14**		**33767.72**	**65.24**		**27641.17**	**55.69**		**30640.70**	**60.77**
11	Int. on Working Capital	—	2223.98	4.46	—	2144.15	4.14	—	2357.08	4.75	—	2241.74	4.44
12	Depre. on farm implements	—	868.66	1.74	—	905.60	1.75	—	989.18	1.99	—	921.15	1.83
13	Land revenue and taxes	—	21.36	0.04	—	22.04	0.04	—	22.22	0.05	—	21.87	0.04
	Cost 'A'	—	**33627.19**	**67.38**	—	**36839.51**	**71.17**	—	**31009.65**	**62.48**	—	**33825.45**	**67.08**
14	Rental value of land	—	10163.35	20.36	—	9911.33	19.15	—	10327.39	20.81	—	10134.02	20.09
15	Int. on fixed capital	—	1529.90	3.07	—	1578.99	3.05	—	1687.94	3.40	—	1598.94	3.17
	Cost 'B'	—	**45320.44**	**90.81**	—	**48329.83**	**93.37**	—	**43024.98**	**86.69**	—	**45558.42**	**90.34**
16	Family labour												
	a.Male	17.73	3103.09	6.22	13.48	2358.70	4.56	23.48	4696.00	9.46	18.23	3385.93	6.71
	b. Female	14.85	1484.54	2.97	10.72	1072.46	2.07	19.13	1912.93	3.85	14.90	1489.98	2.95
	Cost 'C'		**49908.07**	**100.00**	—	**51760.99**	**100.00**	—	**49633.91**	**100.00**	—	**50434.33**	**100.00**
II	**Output (q)**												
	a. Main produce	17.06	53739.00	—	16.74	56079.00	—	17.41	57453.00	—	17.07	55757.00	—
	b. Bye-produce	9.00	720.00	—	10.14	912.60	—	9.48	853.20	—	9.54	828.60	—
III	Cost 'C' net of bye produce	—	49188.07	—	—	50914.76	—	—	47734.94	—	—	49279.26	—
IV	Per quintal cost	—	**2883.24**	—	—	**3041.50**	—	—	**2741.81**	—	—	**2888.85**	—

(Figures in parentheses are percentages to the land holding)

non- significant for in the production function at the overall level. This indicates that there is excess use of these resources at overall level (Sharma, 2012).

Resource use efficiency

It can be seen from Table 4 that MVP/MC ratio for the variables bullock labour (X_2), seed (X_3), Nitrogen (X_4) and potash (X_7) was less than the unity showing that optimum resource use efficiency was not achieved in case of these variables. The foregoing analysis revealed that profitability of *kharif* groundnut production at the overall level

Table 3: Result of Cobb-Douglas Production function in Porbandar district of Gujarat

Sl. No.	Variables	Regression coefficient of variable
1	Intercept	0.7790* (0.3977)
2	Human Labour in days (X_1)	0.2209* (0.1379)
3	Bullock labour in days (X_2)	0.01536[NS] (0.0153)
4	Seed (X_3)	0.0293[NS] (0.0655)
5	Manures in q. (X_4)	0.03226** (0.0157)
6	Nitrogen (X_5)	0.0137[NS] (0.12073)
7	Phosphorus (X_6)	0.0731** (0.0309)
8	Potash (X_7)	0.00287[NS] (0.0491)
9	R^2	0.78
10	Observations	45
11	D.F.	37

(Figures in parentheses are standard errors of respective regression coefficients)

(*, ** and *** indicates significance level at 10, 5 and 1 per cent level, respectively)

Table 4: Resource use efficiencies of *kharif* groundnut in Porbandar district of Gujarat

Particulars	bi Value	MP	MVP	MC	MVP/ MC
Human labour	0.2209	0.043922	153.7257	150	1.024838
Bullock labour	0.0153	0.065655	229.7921	500	0.459584
Seed	0.0293	0.004817	16.85981	120	0.140498
Manures	0.0322	0.094421	330.4726	100	3.304726
N	0.0137	0.00453	15.85648	16.19	0.9794
P	0.0731	0.03719	130.1662	18.2	7.151989
K	0.00287	0.002209	7.733073	17	0.454887

Table 5: Channel wise per quintal marketing cost of *kharif* groundnut (in ₹ / q)

Sl. No.	Particulars	Channel		
		I	II	Overall
1.	Packaging charges	150.40 (29.63)	160.35 (59.21)	155.37 (39.92)
2.	Transport	170.00 (33.49)	50.00 (18.46)	110.00 (28.26)
3.	Grading charges	30.75 (6.06)	—	15.37 (3.96)
4.	Hamali	15.00 (2.95)	—	7.50 (1.92)
5.	Commission Charges	90.85 (17.90)	—	45.42 (11.67)
6.	Other	50.65 (9.97)	60.45 (22.33)	55.55 (14.27)
7.	Total marketing costs	507.65 (100.00)	270.08 (100.00)	389.22 (100.00)

(Figure in parentheses are the percentage to the total)

could be maximized by increasing the use of human labour (X_1), manures (X_4) and phosphorus (X_6) similar findings were in the line of Sharma (2014).

Cost of marketing

It is observed from Table 5 that, at overall level per quintal cost of marketing worked out ₹ 389.22 in which packaging charges constituted highest share i.e. 39.92%, followed by transportation charges (28.26%) and commission charges (11.67%). Further, it was seen that total marketing cost worked out in marketing channels, I and II were ₹ 507.65, ₹ 270.08 respectively. In case of channel I and II cost on packaging contribute maximum share in total cost

Table 6: Problems faced by sample farmers in cultivation *kharif* groundnut (in no.)

Sl. No.	Particulars	Production	Sl. No.	Particulars	Marketing
1	Quality seeds are not available in time	19.00 (42.22)	1	Non availability of transport facility in time	16.00 (35.56)
2	High cost of seeds	26.00 (57.78)	2	High transportation cost	36.00 (80.00)
3	Pest and Disease infection	9.00 (20.00)	3	Lack of market intelligence	13.00 (28.89)
4	Non availability of pesticides & fungicides	13.00 (28.89)	4	Faulty market management	25.00 (55.56)
5	Non availability of hired labours & bullocks in Time	36.00 (80.00)	5	Faulty measures and weights	31.00 (68.89)
6	High wage rates	24.00 (53.33)	6	Problems in price variation in the market	39.00 (86.67)
7	Non availability of crop loan in time	9.00 (20.00)	7	Low price to produce	30.00 (66.67)
8	Non availability of fertilizers in time	9.00 (20.00)	8	High commission rate	28.00 (62.22)
9	Lack of technical knowledge	23.00 (51.11)	9	Payments are not made quickly	13.00 (28.89)
10	Total number of Fanners	45.00 (100.00)	10	Total number of farmers	45.00 (100.00)

(Figure in parentheses are the percentage to the total)

(29.63% and 59.21%, respectively. From the table it is observed that the total marketing cost was highest in channel - I i.e. ₹ 507.65. Commission charges contribute the highest share in total marketing cost in channel I (17.90%) similar research findings were carried out by Sharma and Tungoe (2011).

Problems faced by selected farmers in production and marketing of *Kharif* Groundnut

Table 6 reveals that the overall level major problems were reported by farmers for non availability of higher human labour and bullock labour in time, high seed cost, high wage rates and lack of technical knowledge. In case of marketing the problems regarding in price variation in the market, high transportation cost, faulty measures and weights, faulty market management, high commission rate and low price to produce reported by farmers similar research were in the line with Sharma (2011).

CONCLUSION

The compound growth rates of *kharif* groundnut area and production was negative and significant, while productivity was positive but non-significant. The per hectare cost of cultivation of *kharif* groundnut i.e. Cost 'C' was ₹ 50434.33 and it was 1.12B:C

ratio.. The major items of cost of cultivation in *kharif* groundnut were rental value of land, hired human labour charges, seed, bullock labour charges and family human labour. The functional analysis has indicated that 3 variables *viz;* human labour (X_1), manures (X_4), and phosphorus (X_6) fertilizer in *kharif* groundnut are significant variables for which the output was responsive. The resource use efficiency *kharif* groundnut shows the resources will increase the output if used additional quantity. Per quintal cost of marketing of *kharif* groundnut was ₹ 389.22 and major items marketing cost of packaging charges, transport charges and commission charges were reported high. Non-availability of labour and other inputs at peak period, high cost of key inputs, low price to produce and lack of technical knowledge were the major constraints faced by cultivators in *kharif* groundnut.

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