Comparative Economic Analysis of Production and Marketing of *Kharif vs* Summer Groundnut in Satara District of Maharashtra

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Abstract: *Groundnut is an important oilseed crop in India. Groundnut is cultivated in kharif and summer seasons. The present study was undertaken to analyze thecomparative economics past performance, cost of cultivation, resource use efficiency, marketing cost and the problems faced by the farmers in the cultivation and marketing of kharif and summer groundnut in Satara district of Maharashtra. The study was based on the primary data of 45 for kharif and 45for summer groundnut cultivators for the year 2014-15.The secondary data on area, production and productivity for period of 23 years beginning with 1990-91 to 2012-13.*

Results of the study revealed that, the area, production and productivity in kharifgroundnut decline, while in case of summer groundnut significantly increases during different period.The comparison of per hectare cost of cultivation for summer groundnut farming was higher (₹61,162.58) than the kharif groundnut (50,434.33) farming. However, the yield was more in summer groundnut (21.20 q/ha) than that ofkharifgroundnut (17.07 q/ha). Total benefit cost ratio is also more in case of summer groundnut (1.30) as compare to that of kharif groundnut (1.12). The results of production function analysis inkharifgroundnut andsummer groundnut of human labour, manures and phosphorus were significant. This indicates that there is scope to increase the use of these resources to increase the production. Thecomparison of per quintal cost of marketing was more in kharifgroundnut farming (389.22) than summer groundnut farming (328.60). The major problem of production and marketing of kharif and summer groundnut cultivators were reported by farmers in non availability of labours, high cost of inputs, high wage rates, lack of technical knowledge, high tarsportation and commission charges, and low prices to the produce.

The study revealed that the farmers had 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.*

INTRODUCTION

Groundnut (*Arachishypogaea L.*) is an important oilseed crop in India. Groundnut oil has a very important position in the India diet. The oil content of the seed varies from 44 to 50 per cent depending upon the varieties and agro-climatic condition. 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.

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Groundnut occupies first rank in oilseed crop in India with respect to area and production. In India the area under groundnut is 8000 million hectares with production of 7500 million tonnes and productivity of 938 kg per hectare (Anonymous, 2009). Generally groundnut is taken in all seasons to meet the deficiency of edible oil.In Maharashtra, groundnut is a dominant oil seed crop, during the year 2013-14 the area under this crop was 81,000 ha with the total production of about 1,19,000 tones. Satara is the leading district in groundnut cultivation in state. Area, production and productivity of *kharif* Groundnut in Satara District was 462 ha, 572 tonnes, 1238 kg/ha during 2012-13 (Anonymous, 2013).This crop is cultivated practically in all the districts of the state. The yield level of *kharif* groundnut is 15-20 quintals per hectare and summer groundnut produces about 25-30 quintals per hectare.

Therefore, the present study was undertaken to analyze the comparative economic analysis of production and marketing of *kharifVs*summer groundnut in Satara district of Maharashtra.

METHODOLOGY

I. Growth Rates in Area, Production and Productivity of *Kharif vs* Summer Groundnut

The data obtained for the period of 23 years from 1990-91 to 2012-13 was divided into two sub periods and one overall period as indicated below (Sadeesh,*et al.,*2007).

Period-I: 1990-91 to 2001-02 , Period-II: 2002-03 to 2012-13 and Overall: 1990-91 to 2012-13

$$Y = ab^t$$

Where,

Y = Area/Production/Productivity

a = Constant

b = Trend value

t = Time period in years

CGR(%) = *(Antilog b-1) × 100*

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

II. Resource Use Structure

The requirements of major inputs for groundnut have been worked out on per hectare basis (Jadhav, *et al.,* 2007).

III. Production Function Analysis

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

$$Y = aX_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} .... X_n^{b_n} e^u$$

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

IV. Estimation of Marginal Value Product

The MVP of individual resources was estimated by using the following formula (Taru, *et al.,* 2008),

Marginal value product of Xi = $b_i \dfrac{\overline{Y}}{\overline{X}} P_y$

Where,

bi = Elasticity of production of i[th]input

Y = Geometric mean of output

X_i = Geometric mean of ofi[th]input

P_y = Per unit price of output

V. Modes of sale of groundnut

In case of groundnut following types of marketing channels were observed

(i) Producer – Wholesaler

(ii) Producer – Consumer

Table 1
Compound growth rates in area, production and productivity of *kharif* and summer groundnut

		Period-I 1990-91 to2001-02			Period-II 2002-03 to2012-13			Overall period 1990-91 to2012-13		
Sr. No.	Season	A	P	Y	A	P	Y	A	P	Y
1.	*Kharif*	–2.313*	0.316[NS]	2.046[NS]	–3.141***	2.036[NS]	2.376[NS]	–1.511***	–1.332*	0.181[NS]
2.	Summer	0.512[NS]	5.596***	–3.536**	2.737[NS]	-0.428[NS]	–3.153**	3.828***	1.976**	–1.874*

CGR (%)

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

VI. Total Marketing Cost

The Marketing cost was estimated using following marketing function (Rajput, *et al.,* 2000).

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

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

VII. Problems in Production and Marketing

The problems in production and marketing were estimated with help of percentages (Pandey, *et al.,* 1993).

RESULT AND DISCUSSION

1. Comparison of Growth Rates of *Kharif vs* Summer Groundnut

It is observed from the Table 1, that thecompound 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 Satara district of Maharashtra.

The compound growth rates of area was highly significant at 1 per cent level and production was positive and significant at 5 per cent level, while the productivity was negatively significant,It clearly indicates that the production of summer groundnut was only increased by the area expansion during the overall period in Satara district of Maharashtra.

The comparing the *kharif*Vs summer groundnut, it is revealed that the production of *kharif* groundnut was increased and productivity of summer groundnut was decreased during overall period (1990-91 to 2012-13).

2. Comparison of Cost of Cultivation *Kharif vs* Summer Groundnut

It is observed form Table 2, the per hectare cost of cultivation for summer groundnut (61,162.85) farming was more than that of *kharif*groundnut(50,434.33.) farming. However, the yield was more in summer groundnut farming (21.20 q/ha) than that of*kharif*groundnut farming (17.07q/ha).

Per hectare resource use levels were also more in summer groundnut farming than *kharif* groundnut farming. Because in kharif groundnut less use resources like irrigation and labour charges.

From the forgoing discussion, it is observed that summer groundnut farming is more profitable than *kharif* groundnut farming. However, per hectare net returns were more in summer groundnut farming (18,106.18) than that of *kharif* groundnut farming (6,151.27). Total benefit cost ratio is also more in case of summer groundnut (1.30) as compare to that of *kharif* groundnut (1.12).

3. Comparison of Cobb-Douglas Type of Production Function of *Kharif vs* Summer Groundnut

It is seenfrom Table 3, the value of co-efficient of multiple determinations was estimated 0.78 of *kharif* groundnut higher than the value of co-efficient of multiple determinations was estimated 0.75 of summer groundnut.

Table 2
Itemwise cost of cultivation of *kharifand summer* groundnut (₹/ha)

Sr. No.	Cost items	Kharif			Summer		
I. 1.	Hired Human labour (Mandays)	Qty	Value	Per cent	Qty	Value	Per cent
	(a) Male	31.48	5508.92	10.92	38.29	7658.78	12.52
	(b) Female	32.93	3292.82	6.53	58.08	6969.77	11.40
2.	Bullock power (Pair days)	8.24	3709.09	7.35	8.52	3747.85	6.13
3.	Machine power	5.93	2964.98	5.88	7.42	3708.53	6.06
4.	Seed (kg)	107.31	11803.83	23.40	113.28	12460.83	20.37
5.	Manures (q)	10.67	1167.71	2.32	20.58	2057.59	3.36
6.	Fertilizers (kg)						
	N	25.65	415.27	0.82	39.15	626.34	1.02
	P	35.77	560.55	1.11	24.78	446.08	0.73
	K	22.73	409.08	0.81	9.27	157.49	0.26
7.	Irrigation Charges (₹)		190.64	0.39		1674.42	2.74
8.	Plant protection charges (₹)		190.79	0.38		251.66	0.41
9.	Incidental charges (₹)		163.96	0.33		151.41	0.25
10.	Repairs (₹)		263.05	0.52		254.84	0.42
	Working capital (₹)		30640.70	60.77		40165.59	65.67
11.	Int.on Working Capital		2241.74	4.44		2401.73	3.93
12.	Depre.on farm implements		921.15	1.83		855.61	1.40
13.	Land revenue and taxes		21.87	0.04		26.25	0.04
	Cost 'A'		33825.45	67.08		43449.18	71.04
14.	Rental value of land		10134.02	20.09		2401.73	21.14
15.	Int .on fixed capital		1598.94	3.17		855.61	1.91
	Cost 'B'		45558.42	90.34		57548.49	94.09
16.	Family labour						
	(a) Male	18.23	3385.93	6.71	12.50	2499.30	4.09
	(b) Female	14.90	1489.98	2.95	9.29	1115.05	1.82
	Cost 'C'		50434.33	100.00		61162.85	100.00
II	Output (q)						
	(a) Main produce	17.07	55757.00		21.20	77409.83	
	(b) Bye-produce	9.54	828.60		15.49	1859.20	
III	Cost 'C' net of bye produce		49279.26			59303.65	
IV	Per quintal cost		2888.85			2797.78	
V	B:C ration at cost 'C'		1.12			1.30	

(Figures in parentheses are percentages to the land holding)

In case of *kharif* groundnut human labour (X_1), manures (X_4) and phosphorus (X_6) were significant. While in case of summer groundnut bullock labour (X_2), manures (X_4) and phosphorus (X_6) were positive and significant. This indicates that there is scope to increase the use of these resources to increase the production.

In case of *kharif* groundnut bullock labour (X_2), seed (X_3) nitrogen (X_5), potash (X_7) and in case of summer groundnut human labour (X_1), seed (X_3),

Table 3
Results of Cobb-Douglas Production function of groundnut

Sr. No.	Variables	Kharif	Summer
1.	Intercept	0.7790* (0.3977)	0.8802** (0.3617)
2.	Human Labour in days (X_1)	0.2209* (0.1379)	0.0441^{NS} (0.1697)
3.	Bullock labour in days (X_2)	0.01536^{NS} (0.0153)	0.0896** (0.0101)
4.	Seed (X_3)	0.0293^{NS} (0.0655)	0.12194^{NS} (0.1577)
5.	Manures in q. (X_4)	0.03226** (0.0157)	0.0380* (0.0239)
6.	Nitrogen (X_5)	0.0137^{NS} (0.12073)	0.00704^{NS} (0.1274)
7.	Phosphorus (X_6)	0.0731** (0.0309)	0.1579* (0.08408)
8.	Potash (X_7)	0.00287^{NS} (0.0491)	0.00156^{NS} (0.0825)
9.	R^2	0.78	0.75
10.	Observations	45	45
11.	D.F.	37	37
12.	F- value	23.18	18.20

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

*, ** and *** indicates significance level at 10, 5 and 1percent level, respectively.

nitrogen (X_5) and potash (X_7) were positively non-significant for in the production function. This indicates that there is excess use of these resources at overall level.

4. Comparison of Resource Use Efficiencies of *kharif vs* Summer Groundnut

In case of *kharif* groundnut (Table 4) human labour (X_1), manures (X_4) and phosphorus (X_6),were greater than unity while in case of summer groundnut (Table 5) bullock labour (X_2), manures (X_4) and phosphorus (X_6) was more than unity for overall categories of cultivators. This implied that higher resource use efficiency was achieved in case of these variables. Profitability of *kharif* and summer groundnut production could be maximized by increasing the use of these resources.

5. Comparison of Disposal Pattern *kharif vs* Summer Groundnut

Table 6 depicted that, the marketable surplus of summer groundnut growers (73.96 per cent) is comparatively less than *kharif* groundnut growers (74.58 per cent). The use of groundnut for given kind of wages in case of summer groundnut growers (4.95 per cent) is more than *kharif*groundnut growers

Table 4
Resource use efficiencies of *kharif* groundnut in Satara district of Maharashtra

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
Resource use efficiencies of summer groundnut in Satara district of Maharashtra

Particulars	bi Value	MP	MVP	MC	MVP/MC
Human labour	0.0441	0.00726	27.57961	150	0.183864
Bullock labour	0.0896	0.185216	703.8223	450	1.564049
Seed	0.1294	0.020644	78.44883	120	0.65374
Manures	0.038	0.086244	327.7257	100	3.277257
N	0.00704	0.004132	15.70246	16.19	0.969886
P	0.1379	0.112759	428.4847	18.2	23.54311
K	0.00156	0.002478	9.417382	17	0.553964

Table 6
Per farm disposal pattern of groundnut(q/farm)

Sr. No.	Particulars	Kharif	Summer
1.	Total Production	17.07(100.00)	21.20(100.00)
2.	Given as kind wages	0.70(4.10)	1.05(4.95)
3.	Home consumption	0.97(5.68)	1.12(5.28)
4.	Used for oil extraction	0.82(4.80)	0.99(4.67)
5.	Kept for seed purpose	1.00(5.86)	1.46(6.89)
6.	Others (grantees)	0.85(4.98)	0.90(4.25)
7.	Total retention	4.34(25.42)	5.52(26.04)
8.	Marketable surplus	12.74(74.58)	15.68(73.96)
9.	Actually marketed	12.60(73.81)	15.53(73.27)

(4.10 per cent). All the per farm disposal pattern of summer groundnut was higher than the *kharif* groundnut disposal pattern

6. Modes of Sale of Groundnut

In case of groundnut following types of marketing channels were observed Channel (i) is mostly used in the marketing of groundnut in the locality

Table 7
Quantity of groundnut sold through different marketing channel (*q*)

Sr. No.	Marketing channel	Kharif	Summer
1.	(i) Producer — Wholesaler	10.55(83.73)	12.92(83.19)
2.	(ii) Producer — Consumer	2.05(16.27)	2.61(16.81)
3.	Total quantity marketed	12.60(100.00)	15.53(100.00)

(Figure in parentheses are the percentage to the total)

7. Comparison of Quantity of Groundnut Sold Through Different Marketing Channel of *kharif vs* Summer Groundnut

It is seen from the Table 7 that the summer groundnut growers preferred channel I (83.19 per cent), while in case of *kharif* groundnut growers (83.73 per cent), they mostly preferred channel I. The sale of produce directly to the consumer was highest in case of small farmers by the *kharif*and summer groundnut growers.

8. Comparison of Per Quintal Marketing Cost of *Kharif vs* Summer Groundnut

From table 8, it can be observed that, the per quintal cost of marketing was more in *kharif* groundnut

Table 8
Channel wise per quintal marketing cost of groundnut(/q)

Sr. No.	Particulars	Kharif	Summer
1.	Packaging charges	155.37(39.92)	110.00(33.47)
2.	Transport	110.00(28.26)	105.00(31.95)
3.	Grading charges	15.37(3.96)	17.72(5.39)
4.	Hamali	7.50(1.92)	5.00(1.53)
5.	Commission Charges	45.42(11.67)	55.32(16.84)
6.	Other	55.55(14.27)	35.55(10.82)
7.	Total marketing costs	389.22(100.00)	328.60(100.00)

(Figure in parentheses are the percentage to the total)

farming (389.22) than summer groundnut farmer (328.60). In kharif groundnut farming, the per quintal marketing cost of groundnut, the major items of packaging charges and transport charges while in summer groundnut farming the major items of cost are packing charges and commission charges.

On detail examination of the per quintal marketing cost, it is came to be know that, the marketing cost of the summer groundnut is less than *kharif*groundnut farming.

9. Comparison of Problems Faced by Sample Farmers in Production and Marketing of *kharif vs* Summer Groundnut

It is revealed from the Table 9, that in case of *kharif* groundnut major problems faced by farmer during production were non-availability of labour (80.00 per cent), high seed cost (57.78 per cent), lack of technique knowledge (51.11), while in case of summer groundnut major problems faced by farmer during production were non-availability of labour (80.00 per cent), high seed cost (60.00 per cent), lack of technique knowledge (55.56). In summer groundnut growers reported highest problems as compared to *kharif* groundnut growers.

In case *kharif* groundnut major problem faced by farmer during marketing were high transportation rate, price variation in market, faulty measures and weight, low price to produce, while in case of summer groundnut high transportation rate, price variation in market, high commission rate, faulty market management.

Table 9
Problems in production and marketing of groundnut (No.)

Sr. No.	Particulars	Production		Particulars Marketing		
		Kharif	Summer		Kharif	Summer
1.	Quality seeds are notavailable in time	19.00(42.22)	17.00(37.78)	Non availability of transport facility in time	16.00(35.56)	22.00(48.89)
2.	High cost of seeds	26.00(57.78)	27.00(60.00)	High transportation cost	36.00(80.00)	30.00(66.67)
3.	Pest and Disease infection	18.00(40.00)	18.00(40.00)	Lack of market intelligence	13.00(28.89)	12.00(26.67)
4.	Non availability ofpesticides and fungicides	13.00(28.89)	13.00(28.89)	Faulty market management	25.00(55.56)	27.00(60.00)
5.	Non availability of hired labours and bullocks in Time	36.00(80.00)	36.00(80.00)	Faulty measures and weights	31.00(68.89)	21.00(46.67)
6.	High wage rates	24.00(53.33)	25.00(55.56)	Problems in price variation in the market	39.00(86.67)	41.00(91.11)
7.	Non availability of crop loan in time	9.00(20.00)	12.00(26.67)	Low price to produce	30.00(66.67)	23.00(51.11)
8.	Non availability offertilizers in time	9.00(20.00)	9.00(20.00)	High commission rate	28.00(62.22)	24.00(53.33)
9.	Lack of technical knowledge	23.00(51.11)	25.00(55.56)	Payments are not made quickly	13.00(28.89)	14.00(31.11)
10.	Total number of Fanners	45.00(100.00)	45.00(100.00)	Total number of farmers	45.00(100.00)	45.00(100.00)

(Figure in parentheses are the percentage to the total)

CONCLUSIONS

1. The production of *kharif* groundnut was increased and productivity of summer groundnut was decreased during overall period (1990-91 to 2012-13).

2. The comparative analysis of cost of cultivation for *kharif* groundnut was less than that of summer groundnut (*i.e.* cost 'C'). The per quintal cost of cost of cultivation for *kharif* groundnut was more than that of summer groundnut, and Benefit cost ratio was greater than unity. Therefore, both kharif and summer groundnut crops are profitable enterprises. The functional analysis has indicated that variables *viz*;human labour,bullock labour,manuresand phosphorus fertilizer in kharifand summer groundnut are significant variables for which the output was responsive.Per quintal cost of marketing of *kharif* groundnut and summer groundnut was 389.22 and 328.60, respectively.

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