

Comparative Analysis of Groundnut Growing States in Western India

M.K. Jangid*, M.B. Nikam, Latika Sharma and Sitaram Jat

Department of Agricultural Economics and Management, Rajasthan College of Agriculture, MPUAT, Udaipur, Rajasthan-313001, India

*Corresponding author: jangidmkindia2007@gmail.com

ABSTRACT

The research study entitled “Comparative analysis of groundnut growing states in Western India” is an attempt to determine the cost structure and changes in cost of cultivation and to identify which state in Western India is having comparative economic advantage in the production of groundnut. The study is based on secondary data collected from various published sources for the period under reference. Cost structure of the crop was analyzed by working out the share of each item of cost in total cost of cultivation. The changes in structure of cost of cultivation of groundnut over twenty years were assessed by comparing the cost structure of each crop during 2012-13 as compared to 1992-93. The states included in the study were Gujarat and Maharashtra. The results would help in planning the future strategies and policy direction for oilseed crop productivity in the states. Among the groundnut growing states, Gujarat state emerged with higher growth rate of 3.72 per cent per annum for the yield of groundnut during the period of 1992-93 to 2012-13. Gujarat state was found to have higher stability in the yield of groundnut, as the detrended cv (coefficient of variation) for the yield of groundnut was the lowest for Gujarat (2.17%). The total cost of cultivation of groundnut has increased in Gujarat by 567.21 per cent and in Maharashtra by 581.77 per cent during the study period. Over the years, the net income from groundnut has increased in Maharashtra by 1153.24 per cent and in Gujarat by 389.06 per cent.

Keywords: Groundnut, growth, stability, costs & returns, comparative advantage

In India, agriculture sector in general and oilseeds in particular are prone to high risk and uncertainties. Despite that, India is the largest producer of oilseeds in the world and this sector occupies an important position in the agriculture economy. Oilseeds stand next only to food grains in production and agricultural economy of the country.

During 1950-51, area under nine oilseed crops viz. groundnut, soybean, rapeseed and mustard, sesamum, castorseed, sunflower, safflower, linseed and nigerseed were just 10.73 million hectares raised to 28.53 million hectares in 2013-14, registering an annual compound growth rate of 1.50 per cent per annum. While the production of these oilseeds rose from 5.16 million tonnes to 32.88 million tonnes for the same period showing an impressive growth rate of 3.05 per cent per annum and the average yield registered a growth rate of 1.53 per cent per annum increasing from 481 kg/ha to 1153 kg/ha. The area, production and yield of oilseeds in India have registered steady increase since the inception of Technology Mission in Oilseeds and Pulses (TMOP)

in April 1986 and reached the peak of 28.53 million hectares in area, 32.88 million tonnes in production (2013-14) and 1193 kg/ha in productivity during 2010-11. The area and production of oilseed crops is concentrated in western and southern parts of India, mainly Rajasthan, Madhya Pradesh, Gujarat, Maharashtra, Karnataka and Andhra Pradesh.

Out of six major oilseeds producing states, four major states viz. Rajasthan, Madhya Pradesh, Gujarat, and Maharashtra belongs to Western India. Western India contributes about 65.13 per cent of the India's groundnut production of which Gujarat contributes 50.77 per cent followed by Rajasthan (9.39%), Maharashtra (3.41%) and Madhya Pradesh (2.06%) (Agricultural Statistics at a Glance, 2014). Groundnut is called as the 'king' of oilseeds. It is one of the most important food and cash crop of country. Being a valuable source of all the nutrients, it is a low priced commodity. Groundnut is also called as wonder nut and poor men's cashew nut. Almost every part of Groundnut has commercial value. Economically, groundnut is a very valuable oil seed crop of India

due to source of good quality edible oil. Groundnut oil is intensively used for cooking purposes both as refined oil and vegetable oil (Vanaspati ghee). Groundnut is widely used for table purpose as a snack. Groundnut is consumed as fresh, roasted, dried, boiled and in so many recipes. The study of economics and changes in cost structure over the years is also important to identify crops which have more cost effectiveness at different periods of time. Adequate knowledge of cost structure of principal oilseed crops was essential for working out programs for providing suitable incentives to the farmers. Beside the policy of guaranteed minimum prices of agricultural commodities also necessitated to have the idea of cost of production of different crops. Looking to such requirement of the data on cost of the production, it was necessary to work out estimates for comparable purpose between different states and hence uniformity of the concept and methodology was also ensured.

METHODOLOGY

The study pertains to the states of Western India viz. Gujarat and Maharashtra and the study is based on secondary data collected from various published sources for the period under reference. To examine economic performance of groundnut crop, the published data of cost of cultivation of past years were used. The structural changes in cost of cultivation were analyzed by working out the difference in cost at two points of time, along with relative share to total cost. Cost structure of the crop was analyzed by working out the share of each item of cost in total cost of cultivation. The changes in structure of cost of cultivation of crops were assessed by comparing the cost structure of each crop during 2012-13 compared to 1992-93.

To identify the crops having comparative advantage, various cost groups were compared with the gross income. The profit over cost 'A₂' and cost 'C₂' for each crop was especially compared to identify crops having more comparative advantage in terms of farm business income and net income. It was assessed by two concepts:

Cost Concept

Costs were generated by following the standard cost concepts. These cost concepts and the items of costs included under each concept are given below:

Cost A1:

- i. Value of hired human labour
- ii. Value of hired bullock labour
- iii. Value of owned bullock labour
- iv. Value of owned machinery labour
- v. Hired machinery charges
- vi. Value of seed (both farm produced and purchased)
- vii. Value of insecticide and pesticides
- viii. Value of manure (owned and purchased)
- ix. Value of fertilizer
- x. Depreciation on implement and farm buildings
- xi. Irrigation charges
- xii. Land revenue, cesses and other taxes
- xiii. Interest on working capital
- xiv. Miscellaneous expenses (artisans, etc.)

Cost A2 : Cost A1 + Rent Paid for Leased-in Land.

Cost B1 : Cost A1 + Interest on Value of Owned Fixed Capital Assets (excluding land)

Cost B2 : Cost B1 + Rental Value of Owned Land + Rent Paid for Leased-in Land

Cost C1 : Cost B1 + Imputed Value of Family Labour

Cost C2 : Cost B2 + Imputed Value of Family Labour.

Income Concepts

The income concepts used in the study to make it possible to assess return over cost at various levels are:

Gross Income = Value of Main Product + Value of By-product

Net Income = Gross Income – Cost C2

Farm Business Income = Gross Income – Cost A2

Family Labour Income = Gross Income – Cost B2

Farm Investment Income = Gross Income – (Cost A2 + Imputed Value of Family Labour).

These income measures were used to identify state of comparative advantage in the production of groundnut. Identification for comparative advantage was made in terms of yield growth, yield stability,

cost effectiveness and profitability over time in Gujarat and Maharashtra.

RESULTS AND DISCUSSION

Cost Structure and Changes in Economics of Groundnut

The details of cost of cultivation of groundnut in Gujarat and Maharashtra for the years 1992-93 to 2012-13 are given in Table 1 and 2. The total cost of cultivation of groundnut in Gujarat (Table 1) has increased by 567.61 per cent from ₹ 7191.53/ha in 1992-93 to ₹ 48011.13/ha in 2012-13. During 1992-93, the variable cost and fixed cost were in ratio of 70:30 and during 2012-13, these were in the ratio of 78:22. It shows that the proportion of variable cost and fixed cost has change only marginally.

However, the absolute cost of cultivation of groundnut has gone up very high. The cost of family labour in Gujarat has gone up by 725.20 per cent and that of human labour (hired) by 798.31 per cent during the period. Cost of machine labour increased by 1552.25 per cent, bullock labour by 282.43 per cent, seed by 514.06 per cent, manure by 1472.05 per cent, insecticide by 1331.16 per cent, fertilizer by 616.55 per cent and irrigation charges by 548.69 per cent. The rate of change in variable cost has been higher (639.57 %) over the rate of change in fixed cost (397.27 %). About 79.21 per cent change in total cost of cultivation of groundnut in Gujarat is attributed to operational cost. The total cost of cultivation of groundnut in Maharashtra (Table 2) has increased by 581.77 per cent from ₹ 9330.22/ha in 1992-93 to ₹ 54280.57/ha in 2012-13. During 1992-93, the variable cost and fixed cost were in

Table 1: Cost Structure and Changes in Cost of Cultivation of Groundnut in Gujarat

Sl. No.	Items	Cost of Cultivation				Changes in 2012-13 over 1992-93		Share in total change
		1992-93	%	2012-13	%	₹/ha	%	(%)
		(₹/ha)		(₹/ha)				
(A)	Operational Cost							
1	Human Labour (Hired)	532.73	7.41	4785.58	9.97	4252.85	798.31	10.42
2	Family Labour	812.36	11.30	6703.62	13.96	5891.26	725.20	14.43
3	Bullock Labour	811.99	11.29	3105.29	6.47	2293.3	282.43	5.62
4	Machine Labour	215.33	2.99	3557.79	7.41	3342.46	1552.25	8.19
5	Seed	1741.15	24.21	10691.68	22.27	8950.53	514.06	21.93
6	Manure	188.79	2.63	2967.88	6.18	2779.09	1472.05	6.81
7	Fertilizer	346.34	4.82	2481.69	5.17	2135.35	616.55	5.23
8	Insecticide	46.09	0.64	659.62	1.37	613.53	1331.16	1.50
9	Irrigation Charges	232.34	3.23	1507.17	3.14	1274.83	548.69	3.12
10	Interest on Working Capital	128.59	1.79	930.01	1.94	801.42	623.24	1.96
	Sub-Total (A)	5055.71	70.30	37390.33	77.88	32334.62	639.57	79.21
(B)	Fixed Cost							
1	Land Revenue & Taxes	6.98	0.10	5.64	0.01	-1.34	-19.20	0.00
2	Depreciation on Implements and Farm Building	60.77	0.85	234.03	0.49	173.26	285.11	0.42
3	Rent Paid for Leased in Land	12.57	0.17	506.23	1.05	493.66	3927.29	1.21
4	Rental Value of Owned Land	1529.48	21.27	7591.9	15.81	6062.42	396.37	14.85
5	Interest on Fixed Capital	526.02	7.31	2283	4.76	1756.98	334.01	4.30
	Sub-Total (B)	2135.82	29.70	10620.8	22.12	8484.98	397.27	20.79
(C)	Total Cost (A+B)	7191.53	100.00	48011.13	100.00	40819.6	567.61	100.00

Sources: Cost of cultivation of principle crops in India. 2011-12, MOA, GOI, New Delhi.

Report of the commission for agricultural cost and prices for crops grown during 2013-14, MOA, New Delhi.

Table 2: Cost Structure and Changes in Cost of Cultivation of Groundnut in Maharashtra

Sl. No.	Items	Cost of Cultivation				Changes in 2012-13 over 1992-93		Share in total change
		1992-93	%	2012-13	%	₹/ha	%	(%)
		(₹/ha)		(₹/ha)				
(A)	Operational Cost							
1	Human Labour (Hired)	1102.36	11.81	13833.33	21.75	12730.97	1154.88	23.45
2	Family Labour	862.47	9.24	10111.92	15.90	9249.45	1072.44	17.04
3	Bullock Labour	819.32	8.78	2518.85	3.96	1699.53	207.43	3.13
4	Machine Labour	162.99	1.75	2395.52	3.77	2232.53	1369.73	4.11
5	Seed	2091.53	22.42	8778.49	13.80	6686.96	319.72	12.32
6	Manure	506.26	5.43	405.11	0.64	-101.15	-19.98	-0.19
7	Fertilizer	308.71	3.31	2736.16	4.30	2427.45	786.32	4.47
8	Insecticide	40.44	0.43	404.58	0.64	364.14	900.45	0.67
9	Irrigation Charges	242.69	2.60	2986.4	4.69	2743.71	1130.54	5.05
10	Interest on Working Capital	164.82	1.77	1064.33	1.67	899.51	545.75	1.66
	Sub-Total (A)	6301.59	67.54	45234.69	71.11	38933.1	617.83	71.73
(B)	Fixed Cost							
1	Land Revenue & Taxes	18.57	0.20	23.86	0.04	5.29	28.49	0.01
2	Depreciation on Implements & Farm Building	244.62	2.62	354.46	0.56	109.84	44.90	0.20
3	Rent Paid for Leased in Land	15.84	0.17	0	0.00	-15.84	-100.00	-0.03
4	Rental Value of Owned Land	2155.82	23.11	15431.29	24.26	13275.47	615.80	24.46
5	Interest on Fixed Capital	593.78	6.36	2566.49	4.03	1972.71	332.23	3.63
	Sub-Total (B)	3028.63	32.46	18376.1	28.89	15347.47	506.75	28.27
(C)	Total Cost (A+B)	9330.22	100.00	63610.79	100.00	54280.57	581.77	100.00

Sources: Cost of cultivation of principle crops in India. 2011-12, MOA, GOI, New Delhi.

Report of the commission for agricultural cost and prices for crops grown during 2013-14, MOA, New Delhi.

the ratio of 68:32 and during 2012-13, these were in the ratio of 71:29. It shows that the proportion of variable cost and fixed cost has changed substantially.

However, the absolute cost of cultivation of groundnut has gone up very high. The cost of family labour in Maharashtra has gone up by 1072.44 per cent and that of human labour (hired) by 1154.88 per cent during the period. Cost of machine labour increased by 1369.73 per cent, bullock labour by 207.43 per cent, seed by 319.72 per cent, fertilizer by 786.32 per cent, irrigation charges by 1130.54 per cent and insecticide by 900.45 per cent, but the cost of manure has been declined by -19.98 per cent during the period. The rate of change in variable cost has been higher (617.83 %) over the rate of change in fixed cost (506.75 %). About 71.73 per cent change in total cost

of cultivation of groundnut in Maharashtra is attributed to operational cost.

Values of Various Costs of Groundnut

The details of values of various costs for groundnut in Gujarat and Maharashtra from 1992-93 to 2012-13, are given in Table 3. The values of various costs like Cost A₂, Cost B₂, Cost C₂ and Cost A₂ + Imputed Value of Family Labour were used to calculate the farm business income, family labour income, farm investment income and net income. The Cost A₂ in Gujarat varied from ₹ 4323.66/ha in 1992-93 to ₹ 31436.13/ha in 2012-13 and in Maharashtra, it varied from ₹ 5718.14/ha in 1992-93 to ₹ 35501.09/ha in 2012-13. The Cost B₂ in Gujarat varied from ₹ 6379.15/ha to ₹ 41311.04/ha and in Maharashtra,

it varied from ₹ 8467.74/ha to ₹ 53498.87/ha during the same period. The Cost C_2 varied from ₹ 7191.51/ha to ₹ 48014.65/ha in Gujarat and in Maharashtra, it varied from ₹ 9330.21/ha to ₹ 63610.79/ha during the same period. Similarly, the Cost A_2 + Imputed value of family labour varied from ₹ 5136.02/ha to ₹ 38139.75/ha in Gujarat and in Maharashtra, it varied from ₹ 6580.61/ha to ₹ 45613.01/ha during the same period.

Table 3: Value of Various Costs of Groundnut in the Major Growing states of Western India at Two Point of Time

States Costs	Gujarat		Maharashtra	
	1992-93 (₹/ha)	2012-13 (₹/ha)	1992-93 (₹/ha)	2012-13 (₹/ha)
Cost A_2	4323.66	31436.13	5718.14	35501.09
Cost B_2	6379.15	41311.04	8467.74	53498.87
Cost C_2	7191.51	48014.65	9330.21	63610.79
Cost A_2 + FL*	5136.02	38139.75	6580.61	45613.01

* Imputed value of Family Labour

Gross Income and Net Income from Groundnut

The details of income measures of groundnut in Gujarat and Maharashtra states are given in Table 4. The gross return of groundnut in 1992-93 was from ₹ 9279.75/ha in Gujarat and ₹ 13077.00/ha in Maharashtra. It was ₹ 48352.40/ha and ₹ 92569.21/ha in 2012-13 in Gujarat and Maharashtra, respectively. The rate of increase in the gross income of groundnut has been higher in Maharashtra (607.88 per cent) and lower in Gujarat (421.05 per cent).

During this period, the farm business income of groundnut has increased by 241.32 per cent in Gujarat and by 689.14 per cent in Maharashtra. During 1992-93, the farm business income of groundnut has been lower in Gujarat (₹ 4956.09/ha) and higher in Maharashtra (₹ 7358.86/ha).

In 2012-13, also the farm business income of groundnut has been higher in Maharashtra (₹ 58071.50/ha) and lower in Gujarat *i.e.* ₹ 16916.27/ha. As far as net income which is the residual of gross return over total cost is concerned the state of Maharashtra recorded the highest increase in the net income of groundnut by 1153.24 per cent from ₹ 3746.79/ha in 1992-93 to ₹ 46956.20/ha in 2012-13 as compared to Gujarat state in which the net income increased by 389.06 per cent from ₹ 2088.24/ha to ₹ 10212.65/ha during the period. It is worth mentioning that the rate of increase in the net income of groundnut has been higher in Maharashtra.

Comparative Advantage of Groundnut in Gujarat and Maharashtra

The details of parameters showing comparative advantage of groundnut and rapeseed and mustard in Gujarat are given in Table 5. In terms of yield growth, groundnut recorded growth rate as 3.72 per cent per annum in Gujarat against 0.016 per cent in Maharashtra. Hence groundnut could be considered as the major oilseed crop of comparative advantage in Gujarat in terms of yield growth rate. Growth with stability is required for the sustainable production of any crops.

As far as yield stability measure in terms of coefficient of variation of detrended yield is concerned, groundnut with coefficient of variation value with the 2.17 per cent emerged as the most stable oilseed crop for yield in Gujarat as compared to Maharashtra with coefficient of variation value of 10.80 per cent. Cost effectiveness is another important indicator for comparative advantage. Here, Gujarat state with the ₹ 31436.13/ha as cost A_2 (paid-out costs) could be considered as the more cost effective as compared to Maharashtra state (₹ 35501.09/ha). In Maharashtra, groundnut is the more cost demanding oilseed crop. As far as the total cost (Cost C_2) is concerned

Table 4: Income measures of Groundnut in the states of Western India

S. No.	State	Gujarat			Maharashtra		
		1992-93	2012-13	% Change	1992-93	2012-13	% Change
1	Main product value	7606.01	40946.69	438.35	11842.92	89213.37	653.31
2	By product value	1673.74	7405.71	342.46	1234.08	3355.84	171.93
3	Gross return (1+2)	9279.75	48352.4	421.05	13077	92569.21	607.88
4	Farm business income	4956.09	16916.27	241.32	7358.86	58071.5	689.14
5	Family labour income	2900.6	7041.36	142.76	4609.26	46486.33	908.54
6	Farm investment income	4143.73	337.75	-91.85	6496.39	36905.16	468.09
7	Net income	2088.24	10212.65	389.06	3746.79	46956.2	1153.24

again groundnut requires maximum cost of ₹ 63610.79/ha in Maharashtra state because of absolute increase in human labour, machine labour, irrigation charges etc. Net income and farm business income could be the other indicators of comparative advantage of oilseed crops. In this case, Maharashtra state with the net income of ₹ 46956.20/ha and farm business income of ₹ 58071.50/ha could be considered as the crop of maximum comparative economic advantage in terms of profitability compared to Gujarat state.

Table 5: Comparative Advantage of Groundnut in Gujarat and Maharashtra

Sl. No.	Particulars	Gujarat	Maharashtra
1	Yield Growth (%)	3.72	0.016
2	Yield Stability (%)	2.17	10.80
3	Cost A ₂ (₹/ha)	31436.13	35501.09
4	Cost C ₂ (₹/ha)	48014.65	63610.79
5	Farm Business Income (₹/ha)	16916.27	58071.50
6	Net Income (₹/ha)	10212.65	46956.20

CONCLUSION

Among the two major groundnut growing states, Gujarat state emerged with higher growth rate of 3.72 per cent per annum for the yield of groundnut during the period of 1992-93 to 2012-13. It was found to have maximum stability in the yield of groundnut, as the detrended cv (coefficient of variation) for the yield of groundnut was the lower for Gujarat (2.17 %). The total cost of cultivation of groundnut has increased in Gujarat by 567.61 per cent and in Maharashtra by 581.77 per cent during 1992-93 to 2012-13. Over the years, the net income from groundnut has increased in Maharashtra by 1153.24 per cent and in Gujarat by 389.06 per cent.

Thus, there is groundnut crop fulfills the criteria for adjudging the comparative advantage in Gujarat with growth and stability in yield but in case of profitability, the Maharashtra state emerge as profitable in terms of increase in farm business income and net income. The higher rate of increase in the operational costs of cultivation of groundnut in Maharashtra i.e. 617.83 per cent over gross return i.e. 607.88 per cent indicates that the production practices of groundnut are not cost effective in Maharashtra. Therefore, cost effective technologies for groundnut are warranted to increase the production of these crops in Maharashtra states.

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