RESEARCH ARTICLE

GROWTH RATE OF AREA, PRODUCTION AND YIELD OF GROUNDNUT IN RAIGARH DISTRICT OF CHHATTISGARH STATE

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Abstract: Groundnut is an important oilseed crop provides significant sources of cash through the sales of seed, cakes, oil and haulms. Groundnut plays an important role in the diets of rural populations. An attempt has been made in the study to estimate growth in area, production and yield of groundnut in Raigarh district and Chhattisgarh state (1993 to 2013). The growth rate was worked out by using exponential analysis. The area of groundnut in Raigarh district increased by 15.62 hectares from 15.20 hectares in 1993-94 to 30.82 hectares in 2012-13 similarly in case of the state area of groundnut cultivation is decrease by 10.9 hectares from 1993-94 to 2012-13. Actually the good growth by area of this crop may be observed only after 2002 in the district. In the Raigarh district production of groundnut is increased from 20.40 metric tons to 38.28 metric tons during this period of 20 years. Similarly in the state production of groundnut is decreased by 7.2 metric tons during the period of 20 years. The yield of groundnut in Raigarh district and Chhattisgarh state was estimated as 1019 kg and 910 kg during 1993-1994 periods. The yield of this crop is increased about 400 and 550 kg/ha up to year 2012-2013. The compound growth rate of area over the period of 20 years is estimated as 4.837 per cent in the Raigarh district which is significantly increased.

Keywords: Area, Groundnut, Production, Oilseed, Growth rate

INTRODUCTION

India is the third largest edible oil producing country in the world after the united nation and china. It occupies a distinct position not only in terms of area under oilseeds with agro-ecological conditions favorable for growing nine major oilseeds indicating seven edible oilseed i.e. groundnut, rapeseed, mustard, soybean, sunflower, safflower, sesame, niger and two non-edible sources namely castor and linseed apart from wide range of other minor oilseeds and oil bearing tree species. The country's demand of the vegetable oils is expected to increase from the current level of the 13 million tones to14.8, 18.3 and 21.8 million tons by 2010, 2015, and 2020, respectively. (Oilseed situation of India).The total oilseeds area, production and productivity was 22.7 million hectares, 18.4 million tons and 810 kilogram per hectare respectively during 2000-01, which increased to 27.6 million hectares, 27.7 million tons and 1006 kilogram per hectare during 2008-09. It is heartening to note that the significant growth in production is coming from the yield effect. It is welcoming sign as the area for cultivation is limited. The advance estimates reveals that the kharif oilseed production will meet the set targets of the year 2010-11. (Narayan P. *et al* 2011).The significant improvement in annual growth in area and yield under total nine oilseed crops during 2000-01 to 2008-09 as compared to period of 90s has resulted in increase in the annual growth rate of production of oilseed, but at the same time the import of oilseeds oil hovering between 40-50 per cent of total agricultural imports by India.

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This gap is likely to increase unless more vigorous efforts to increase production and productivity of oilseeds are made. In order to reduce the import and to ensure reasonable level of self-sufficiency, the current growth rate needs to be maintained.

Groundnut (Arachis hypogaea L.) is the 6th most important oilseed crop in the world. It contains 48-50% oil, 26-28% protein and 11-27 % carbohydrate, minerals and vitamin. Groundnut is grown on 26.4 million hectare worldwide, with a total production of 37.1 million metric tons and an average productivity of 1.4 metric tons /ha. Developing countries constitute 97% of the global area and 94% of the global production of this crop (FOA, 2011). The production of groundnut is concentrated in Asia and Africa, where the crop is grown mostly by smallholder farmers under rain-fed conditions with limited inputs). Nigeria was the third highest producer of groundnut in the world after china and India with a production of 16,114,231, 6,933,000 and 2,962,760 tons respectively in 2011. There has been a dramatic change in the oilseeds scenario of the country during the last 25 years.(NAERL 2011)

India changed from net importer status in the 1980s to a net exporter status during 1989–90, which was again reversed later during 1997–98 when the country had to spend huge foreign exchange to meet the domestic needs of vegetable oils. The gap between export earnings and import costs started narrowing down during the last 10 years, and during 2007–08, the oilseeds sector became a net earner of foreign exchange, which however, could not be sustained for long. During 2010–11, the country imported about 9.2 Mt of vegetable oils costing

around Rs 38,000 crores, whereas export earnings were a little less than just Rs 21,000 crores. (D.M.Hedge 2012).

Consumption of oilseeds assuming normal conditions in marketing year 2013/14, total feed waste is expected to grow 6 percent to 11.9 million tons. This includes 3.8 million tons of cottonseed meal (mostly used for livestock feed), 3.2 million tons of soybean meal, 2.7 million tons of rapeseed meal, 1.5 million tons of peanut meal, and 700,000 tons of other oil meals.(grain report GAIN,2013/14) The consumption of edible oils is rising continuously, outstripping the domestic production resulting in huge imports. During 2011-12, the country imported about 9.2 million tons of edible oils which was about half of its domestic requirement. Edible oil demand is projected to reach 16.64 million tons by the terminal year (2016-17) of the XII plan.

MATERIALS AND METHOD

Sampling and Data Collection

Raigarh district contributes major share in total oilseeds and groundnut production in the state. Cultivation of groundnut is concentrated mainly in Baramkela block of Raigarh district. This district was purposively selected for the study due to area under this crop was the highest in the state.

To fulfill the data part the secondary data on groundnut crop have been collected from the department of Agriculture, Raigarh, Department of land record ,Directorate of Agriculture and Annual Agricultural Statistics, Chhattisgarh, A Statistical Compendium 2012, India, Directorate of Oilseeds Research, India, Directorate of economics and statistics ,Raipur, Commissioner Land Record and Settlement, Raipur, Chhattisgarh to work out the compound growth rate of area, production and yield of the crop.

Analytical Procedure

To estimate the compound growth rates of area, production and yield of groundnut crop is worked out in the Chhattisgarh state and Raigarh district by fitting an exponential function. The following formula is used for this purpose.

$$Y = A B^t$$

Taking log on both sides

$$\log Y = \log A + t \log B$$

Assuming $\log Y = y$, $\log A = a$, $\log B = b$

We get $y = a + bt$

Where t = 1, 2, 3 ……n

After regression between y and t

We have value of a and b

Where a = Constant

b = Regression coefficient

As $b = 1 + r$

Hence $r = b - 1$

Where,

r = Compound growth rate (Anti-log of B-1)*100

t = Time variable (t = 1,2 ……n)

y = Area/production/yield of groundnut.

RESULTS AND DISCUSSION

Area, production and yield of groundnut in Raigarh district and Chhattisgarh state

Table 1. Area, production and yield of groundnut in Raigarh district and Chhattisgarh state
(Area in '000 ha, Production in '000 metric ton and yield in kg/ha.

S.N.	YEARS	RAIGARH			CHHATTISGARH		
		AREA	PRODUCTION	YIELD	AREA	PRODUCTION	YIELD
1	1993-94	15.20	20.40	1019	37.70	46.00	910
2	1994-95	14.00	13.80	1342	37.10	38.30	912
3	1995-96	11.30	10.10	986	30.00	25.60	940
4	1996-97	11.20	11.80	894	31.10	31.40	1014
5	1997-98	11.30	10.80	1054	31.40	29.40	921
6	1998-99	11.00	10.20	956	32.50	29.80	872
7	1999-00	8.70	9.10	927	34.10	34.00	946

8	2000-01	10.50	11.30	1046	36.20	32.90	954
9	2001-02	16.90	15.10	1077	34.20	32.00	936
10	2002-03	27.58	8.01	894	43.55	33.80	985
11	2003-04	29.22	8.38	780	49.21	34.35	870
12	2004-05	23.45	11.86	1075	56.01	40.24	1207
13	2005-06	37.2	9.12	1240	54.75	34.09	1233
14	2006-07	33.97	8.29	1260	49.02	32.82	1171
15	2007-08	25.00	23.08	1280	34.20	32.10	1156
16	2008-09	19.00	11.28	1310	29.10	32.30	1219
17	2009-10	17.20	17.85	1400	28.90	35.80	1142
18	2010-11	20.30	21.56	1410	26.10	38.00	1256
19	2011-12	27.75	33.94	1400	26.90	39.10	1352
20	2012-13	30.82	38.24	1420	26.80	38.80	1462

Source: The data were obtained from Department of Agriculture, Raigarh, Commissioner of Land Records And Directorate of Economics and Statistics, Chhattisgarh.

The area and production and yield of groundnut in Raigarh district and Chhattisgarh state are presented in table1. The area of groundnut in Raigarh district increased by 15.62 hectares from 15.20 hectares in 1993-94 to 30.82 hectares in 2012-13, similarly in case of the state area of groundnut cultivation is decrease by 10.9 hectares from 1993-94 to 2012-13. Actually the good growth by area of this crop may be observed only after 2002 in the district. In the Raigarh district production of groundnut is increased from 20.40 metric tons to 38.28 metric tons during this period of 20 years. Similarly in the state production of groundnut is decreased by 7.2 metric tons during the period of 20 years. The yield of groundnut in Raigarh district and Chhattisgarh state was estimated as 1019 kg and 910 kg during 1993-1994 periods. The yield of this crop is increased about 400 and 550 kg/ha up to year 2012-2013.

Compound growth rate of area, production and productivity of groundnut:

The compound growth rate of groundnut during period-I and period-II is presented in Table 2 and figure 1. It is clear from figures of growth rate that though, the growth rate of yield (-4.093 per cent) in period-I is significantly decreased, the significant and positive growth rate of area (6.102 per cent) is observed but production is no significant during period-II in the state of Chhattisgarh. In period II the growth rate of area (-10.541 per cent) is registered significantly decrease but in case of yield (3.026 per cent) significant and positive growth of this crop.

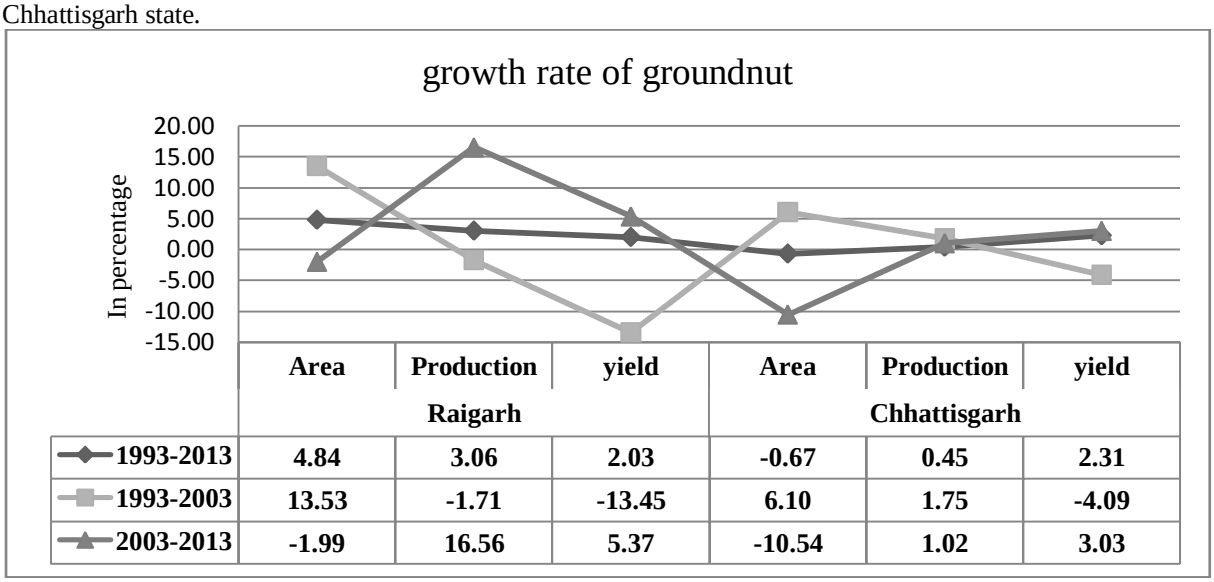
Table 2. Compound growth rate of area, production and yield of groundnut crop in Raigarh district and Chhattisgarh state

Note: Figures in the parentheses indicate the standard errors of regression coefficient.

S. No.	Parameter	Overall period 1993-2013	Period I 1993-2003	Period II 2003-2013
I	**Raigarh**			
	a. Area	4.837*** (0.0009)	13.533*** (0.008)	- 1.987 (0.415)
	b. Production	3.058* (0.062)	-1.707 (0.383)	16.562*** (0.0003)
	c. Yield	2.026*** (0.0009)	-13.453*** (0.005)	5.366*** (0.0005)
II	**Chhattisgarh**			
	a. Area	- 0.673 (0.430)	6.102*** (0.006)	- 10.541*** (0.0004)
	b. Production	0.453 (0.336)	1.754 (0.151)	1.022 (0.211)
	c. Yield	2.307 (2.48)	- 4.093*** (0.006)	3.026*** (0.007)

*** Significant at 1% level of probability.
** Significant at 5% level of probability.
* Significant at 10% level of probability.

Figure 1. Compound Growth rate of area, production and yield of groundnut crop in Raigarh district and Chhattisgarh state.



	Raigarh			Chhattisgarh		
	Area	**Production**	**yield**	**Area**	**Production**	**yield**
1993-2013	**4.84**	**3.06**	**2.03**	**-0.67**	**0.45**	**2.31**
1993-2003	**13.53**	**-1.71**	**-13.45**	**6.10**	**1.75**	**-4.09**
2003-2013	**-1.99**	**16.56**	**5.37**	**-10.54**	**1.02**	**3.03**

The compound growth rate of area over the period of 20 years is estimated as 4.837 per cent in the Raigarh district which is significantly increased. It is observed that the production (3.058 per cent) and yield (2.026 per cent) of this crop was also increasing during the overall period. During the period I the compound growth rate is of area(13.533) is significantly increased but in case of production and yield shows negative growth during the period I in the district. Figure of the period II clearly show the area of groundnut is decreasing but production and yield of the crop significantly increasing. These figures clearly show that farmers switched on groundnut cultivation from paddy crop as a result of diversification in the state.

CONCLUSION AND RECOMMENDATION

Chhattisgarh state consists 27 districts, Out of these Raigarh district contributes 13 percent in area and 16 percent production of oilseeds. The total area of groundnut crop in Raigarh district is 6979 hectare and Production is 8820 metric ton in the district. Farmers of groundnut and other oilseeds of the district need to the regulated market to they can sale at the rate of minimum support price this action will control the diversification of the oilseed growers from other less beneficial crop. On the other hand Oilseeds are the important agricultural commodity next only to cereals in the country. There is huge demand for edible oil in the country due to increase in the per capita oil consumption. To meet this demand and to reduce the huge foreign exchequer in importing edible oil, there is an urgent need to increase the domestic oilseed production of the country. An assessment of exploitable yield reservoir available in oilseeds implies that there is a scope for doubling the oilseed production of the country. However, this can be possible by complete adoption of improved oilseed production technologies by the oilseed growers. A thorough review on adoption behavior of groundnut growers reveals that there is scope for improving the adoption behavior of groundnut growers. This foot needs intensive transfer of technology efforts. However, there are certain lacunae exist in public sector in transfer of technology efforts. The strategies to improve transfer of technology efforts targeting groundnut are also suggested.

- The farmers should be motivated to participate more in the extension activates like training, demonstrations, exhibition, agriculture quiz programs and farmers fair etc., so that they may have opportunity to learn new technology related to oilseed production technology.
- The farmers should be motivated to adopt HYVs that are stable, hardy to adverse climate conditions and resistant to insect-pest and disease.
- The credit facility should be made available to the farmers on lower interest rate so that they can easily adopt the new technologies.
- The initiating of co-operative marketing is the answer to improve the bargaining power of groundnut producers in order to realize a good price of their produce.

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