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An analysis of growth rate performance of oilseed crops in Karnataka state

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ABSTRACT

The present study was to analyse growth in area, production and productivity of oilseed crops in the Karnataka state for the period 2000-01 to 2014-15. The data required for the study were collected from secondary sources. For analyzing the data growth rate and coefficient of variation analyses were employed. The study found that out of nine oilseed crops grown in the state soybean was the only crop that showed positive growth rate in area and productivity to the extent of 10.50 and 12.36 per cent respectively whereas all rest of the crops showed negative growth. The highest negative growth was observed in case of Niger seed crop (-7.83%), the highest negative growth rate of productivity in linseed (-7.00%) and highest negative growth rate of production in case of Niger seed (3.22%) crops.

Keywords: Oilseeds; soybean; Niger seed; linseed; growth rate

INTRODUCTION

Oilseeds constitute a very important group of commercial crops in India. The oil extracted from oilseeds form an important item of our diet. Oilcake which is residue after oil extraction from the oilseeds forms an important cattle-feed and manure. Edible oils occupy a unique place in Indian society, culture, dietary patterns and economy of the country. India is one of the largest vegetable oil economies in the world next to USA, China, Brazil and Argentina (iasexamportal.com/civilservices/the-gist/sample/kurukshetra-january-2017). Due to diverse agro-climatic conditions and geographical locations farmers are able to grow all the annual oilseeds viz groundnut, rapeseed-mustard, soybean, sunflower, sesame, safflower, Niger seed, castor and linseed.

In India oilseeds are the second most important crops after cereals sharing 14 per cent of the country's gross cropped area and accounting for nearly 3 per cent of the gross domestic product (GDP). Value-wise oilseeds constitute nearly 6 per cent of the value of all agricultural products. India grew oilseeds on an area of nearly 27 Mha with productivity of 1108 kg per hectare during 2013-14. Consumption/demand of vegetable oils is increasing steadily because of the lifestyle changes in dietary pattern and increasing per capita income. According to estimates to meet the per capita demand of nearly 17 kg per year India will require 28.51 MT of vegetable oils in 2050. In other words country will have to produce about 94.94 MT of oilseeds by 2050 from the existing production of 32.75 MT to achieve near self-sufficiency in oilseeds. India needs a three-fold increase in the oilseeds production in the next nearly 35 years. Interestingly India is also largest cultivator of oilseeds in the world and paradoxically meets into more than 50 per cent requirement through imports from various countries. This gap is likely to increase unless more vigorous efforts are made to increase production and productivity of oilseeds.

Oilseeds area and output are concentrated in the central and southern parts of the country mainly in the states of Madhya Pradesh, Gujarat, Rajasthan, Andhra Pradesh and Karnataka. Among different oilseeds groundnut, rapeseed-mustard and soybean accounted for about 80 per cent of area and 87 per cent of production of oilseeds in the in the country (Jha et al 2011).

There have been large scale regional variations in area, production and productivity changes in oilseeds. Only a few states like Haryana, Madhya Pradesh, Rajasthan and West Bengal increased their oilseed production both through area expansion and productivity improvement. States like Maharashtra, Tamil Nadu and Himachal Pradesh increased their oilseed output mainly through productivity improvement. In some states like Orissa productivity and production declined sharply.

In Karnataka the total area under oilseed crops was 13.73 lakh hectares and total production was 9.59 lakh tons during 2014-15 (http://raitamitra.kar.nic.in/KAN/Document/agriprop.pdf). Addisu (2000) studied the growth performance of major oilseed crops viz groundnut, sunflower, safflower and sesamum in terms of area, productivity and production in major oilseeds producing districts of Karnataka. The results revealed that in case of groundnut Tumkur, Kolar and Ckitradurga districts registered significant growth both in area and production except Dharwad and Belgaum districts. Safflower and sesamum experienced an impressive growth but there was a deceleration in recent years. Safflower registered a galloping of area and production across all the study districts. Ninan (1987) analyzed the growth behaviour and factors influencing supply response of edible oilseeds in India particularly groundnut and rapeseed-mustard which account for bulk of our edible oilseeds output. Acharya et al (2012) examined the growth in area, production and productivity of different crops in Karnataka for the period of 26 years from 1982-83 to 2007-08 and found that the production of oilseeds and commercial crops registered insignificant positive growth. Productivity of oilseeds recorded 0.04 per cent moderately positive growth.

The present study was aimed at examining the performance in terms of growth rate in area, production and productivity of oilseed crops in the state of Karnataka.

METHODOLOGY

In order to study the growth rate performance of oilseed crops in Karnataka state the study was exclusively dependent on the secondary data pertaining to the area, production and productivity of major oilseed crops grown in the state. The data from 2000-01 to 2014-15 were sourced from the Directorate of Economics and Statistics (DES), Bangalore, Karnataka, State Department of Agriculture, Bangalore, Karnataka and Economic Survey of Karnataka. The data were analysed by employing growth rate analytical techniques and coefficient of variation.

Analysis of growth of oilseeds: The compound annual growth rate analysis was employed for assessing the growth rate of the oilseeds grown in the state. An exponential function of the following type was fitted to estimate the growth rates:

$$Y = ab^t$$

The above equation was converted into the following log linear form for applying ordinary least square (OLS):

$$\ln (Y) = \ln (a) + t \ln (b)$$

Denoting ln (a) as 'A' and ln (b) as 'B', the above equation can be further expressed as:

$$Ln (Y) = A + Bt$$

The compound growth rate in Y (oilseeds area, production and yield etc) is calculated as:

$$[\text{antilog}\,(B) - 1] \times 100$$

Coefficient of variance (CV): The extent of variability in area, production and yield of oilseed crops was analysed through CV as per below:

$$CV = \frac{\text{Standard Deviation}}{\text{Mean}} \times 100$$

RESULTS and DISCUSSION

The growth rates of area, production and productivity of oilseeds in Karnataka for the period 2000-01 to 2014-15 have been depicted in the Table 1. Out of the nine oilseed crops grown in the state only soybean showed positive growth rate in area and productivity of 10.51 and 12.36 per cent respectively at one per cent level of significance and rest of the crops showed negative growth. The increase in soybean crop area could be attributed to shift in cultivation of crops like groundnut, green gram, black gram, cotton etc to soybean. Other reasons could be better economic benefit realization, ease in cultivation, better price realization etc in case of soybean. The increase in yield could be attributed to introduction of high yielding varieties from various research institutes.

Table 1. Growth rates of area, production and productivity of oilseeds in Karnataka (2000-01 to 2014-15)

Crop	Growth rate		
	Area (lakh ha)	Production (lakh tons)	Productivity (kg/ha)
Groundnut	-2.93**	0.18	-2.76
Sesamum	-3.71*	0.39	-3.39
Sunflower	-5.53	2.01	-3.63
Castor	-4.63**	-2.54*	-6.97**
Niger seed	-7.83**	3.22	-4.73
Mustard	-7.40**	0.30	-5.07**
Soybean	10.51**	1.66	12.36**
Safflower	-6.59**	1.26	-5.45**
Linseed	-7.70**	0.22	-7.00*

Source: Directorate of Economics and Statistics, Bangalore, Karnataka (2016)
*Significant at five per cent, **Significant at one per cent

Table 2. Mean and coefficient of variation of area, production and productivity of oilseed crops in Karnataka (2000-01 to 2014-15)

Crop	Mean			Coefficient of variation (%)		
	Area	Production	Productivity	Area	Production	Productivity
Groundnut	8.23	5.53	708.33	16.93	32.81	22.63
Sesamum	0.75	0.38	525.93	26.95	48.21	27.47
Sunflower	7.93	3.39	474.80	46.65	41.52	19.86
Castor	0.19	0.16	885.13	27.14	47.14	21.03
Niger seed	0.26	0.06	250.13	35.34	40.22	27.89
Mustard	0.05	0.01	294.87	37.85	36.22	15.33
Soybean	1.41	1.14	840.60	42.42	58.39	27.87
Safflower	0.71	0.51	759.13	28.82	28.82	17.90
Linseed	0.12	0.04	309.73	34.24	50.08	29.02

Source: Directorate of Economics and Statistics, Bangalore, Karnataka (2016)
Area in lakh ha, production in lakh tons and yield in kg/ha

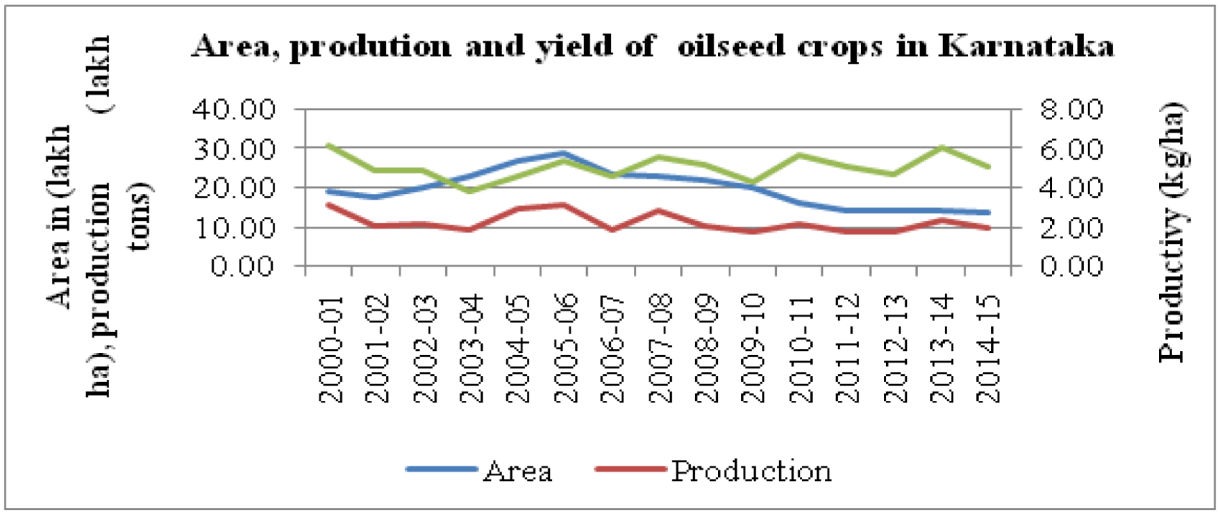

Fig 1. Trends in area, production and yield of total oilseed crops in Karnataka

The highest negative growth was observed in case of Niger seed (-7.83%) followed by linseed (-7.70%), mustard (-7.40%), safflower (-6.59%), sunflower (-5.53%), castor (-4.63%), sesamum (-3.71%) and groundnut (-2.93%). The cultivation of these crops was reduced over the period for the reasons like occurrence of diseases and pests, lack of availability of location specific high yielding varieties and lack of labour etc. Similar observations were made by Acharya et al (2012).

With respect to the productivity of oilseed crops in the state the highest negative growth was observed in case of linseed (-7.00%), caster (-6.97%), safflower (-5.45%), mustard (-5.07%), Niger seed (-4.73%), sunflower (-3.63%), sesamum (-3.39%) and groundnut (-2.76%).

In case of production except caster seed (-2.54%) rest of the oilseeds reported positive growth rate. Highest growth rate was observed in case of Niger seed (3.22%) followed by sunflower (2.01%), soybean (1.66%), safflower (1.26%), sesamum (0.39%), linseed (0.22%), mustard (0.30%) and groundnut (0.18%).

Table 2 explains the mean and coefficient of variation of area, production and productivity of oilseed crops in the state during the period 2000-01 to 2014-15. It was found that the major area was under groundnut (8.23 lakh ha) and sunflower (7.93 lakh ha). The major production of oilseeds was also in these two crops viz groundnut (5.53 lakh tons) and sunflower (3.39 lakh tons). The productivity was highest in case of castor seed crop (885.13 kg/ha) followed by soybean (840.60 kg/ha), safflower (759.13 kg/ha) and groundnut (708.33 kg/ha).

Sunflower (46.65%) and soybean (42.42%) showed higher fluctuation in the cultivation of crops followed by mustard (37.85%), Niger seed (35.34%) and linseed (34.24%). With regard to production, highest variation was seen in case of soybean (58.39%) followed by linseed (50.08%) sesamum (48.21%) and caster (47.14%). In case of yield variation, highest variation was seen in case of linseed, Niger seed, soybean and safflower to the extent of 29.02, 27.89, 27.87 and 27.47 per cent respectively.

The trends in the oilseeds area, production and yield from 2000-01 to 2014-15 have been depicted in Fig 1 which show that in the period 2000-01 to 2005-06 there was an increasing trend in area and production and after that there was a considerable decrease in both area and production.

CONCLUSION

Out of the nine oilseed crops grown in the state only soybean showed positive growth rate in area and productivity. The highest negative growth was observed in case of Niger seed. With respect to the productivity of oilseed crops in the state the highest negative growth was observed in case of linseed and castor. In case of production the highest growth rate was observed in case of Niger seed.

The production of oilseeds has always fallen short of our demand and there has always been a need to import oilseeds or their products for meeting the demand of our ever-growing population. India needs a three-fold increase in the oilseeds production in the next nearly 35 years.

The yield of oilseeds can be increased through participatory research and government's attention. There is need to strengthen technology dissemination. Along with extension efforts location and area specific varieties development and adoption should be done.

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