

## Changes in Area, Production and Productivity of Sunflower in Northern Karnataka - A Compound Growth Analysis

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### ABSTRACT

In India, oilseeds contributed significantly to agricultural economy. Among the oilseed crops, sunflower occupies an important position next only to groundnut. In India sunflower is cultivated in an area of 3.00 million ha with and the production is 1.80 million tonnes (1994-95). The objective of the study was to assess the changes in area, production and productivity to sunflower. The study was conducted in Bijapur and Raichur districts of North Karnataka, where sunflower crop was concentrated in the state of Karnataka. For evaluating the foresaid objective the secondary data on area, production and productivity of sunflower were collected from both the districts over a period of 13 years from 1980-81 to 1993-94. The results showed that the growth rates with respect to area and production of sunflower were positive and significant, while the productivity showed negative and non-significant in both Bijapur and Raichur districts. It implied that the growth in production was mainly due to expansion of area under sunflower rather than productivity. Hence, any measures to increase the production of sunflower should contemplate the improvement in productivity, in the area.

In India, oilseeds contributed significantly to agricultural economy. The demand for edible oil is more than its supply and the country is facing shortages of edible oil at present, as a result of which India had to import the edible oils at the expenses of huge foreign exchange. India is one of the largest producer of oilseeds in the world, with about 25 million hectares of area under oilseed cultivation with a production of 20 million tonnes during 1993-94. Oilseeds economy in India had seen a series of significant developments in the past two decades.

Among the oilseed crops, sunflower occupies an important position next

only to the groundnut. It is being called 'champion' of oilseeds crops. In India sunflower is cultivated over an area of 3.00 million hectare with a production of 1.80 million tonnes in the year 1995.

Among the important states growing sunflower in the country, Karnataka is one, where it occupies an area of 8.85 lakh hectares with annual production of 3.62 lakh tonnes during 1994-95. In recent years, the sunflower crop has been gradually occupying a larger area by replacing other low yielding food crops in Karnataka in general and northern Karnataka in particular.

\* Part of M. Sc. Thesis, submitted by senior author to University of Agricultural Sciences, Dharwad.

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## MATERIAL AND METHODS

The study was conducted in Bijapur and Raichur districts of North Karnataka, which belong to dry region of the Deccan plateau of Karnataka, where sunflower is an important crop. The selection of the study area was mainly based on the dominance of the area under sunflower in the Bijapur and Raichur districts. The main objective is to study the changes in area, production and productivity of sunflower in the selected districts of North Karnataka. To evaluate the objective the secondary data on area, production and productivity of sunflower were collected from both the districts over a period of 13 years from 1980-81 to 1993-94 from the District Statistical Offices of the two districts selected.

To compute the average compound growth rates with respect to area, production and productivity, the following form of regression equation was used.

$$Y_t = AB_t V_t \dots\dots\dots (1)$$

Where,

$Y_t$  = data on area, production and productivity in the year "t"

A = intercept indicating 'Y' in the base period (t = 0)

t = Time period

$V_t$  = error term

B = (1 + g)

g = Average compound growth rate to be estimated

Equation (1) was converted into the logarithmic form in order to facilitate the use of linear regression.

Taking logarithms on both sides of the equation (1)

$$\ln Y_t = \ln A + t (\ln B) + \ln V_t$$

This was of the following form.

$$Q_t = a + b_t + V_t \dots\dots\dots (2)$$

Where,

$$Q_t = \ln Y_t$$

$$a = \ln A$$

$$b = \ln B$$

$$V_t = \ln V_t$$

The values of 'a' and 'b' were estimated by using Ordinary Least Square estimation techniques.

Later, the original 'A' and 'B' parameters in equation (1) were obtained by taking antilogarithms of 'a' and 'b' value as

$$A = \text{Anti } \ln a$$

$$B = \text{Anti } \ln b$$

Average annual compound growth rate was calculated

as :

$$B = 1 + g$$

$$g = B - 1$$

for appropriate comparison, the growth rates worked out with the help of equation (2) were multiplied by 100, to obtain the percentage increase of the variable concerned.

## RESULTS AND DISCUSSION

To document the growth in area, production and productivity of sunflower, the compound growth rates were calculated for both Bijapur and Raichur districts. The three growth rate equations, one each for area, production and productivity of sunflower were worked out. Thus, totally six growth rate functions were used for the study. The growth rates of area, production and productivity of sun-

Table I

Compound growth rates of area, production and productivity of sunflower during 1980-81 and 1992-93

Districts	Particulars	Constant term (a)	't' statistics	R <sup>2</sup>	Average annual growth rate (%)
Bijapur	Area	4.417	4.995	0.694	25.34 *
	Production	3.956	3.670	0.550	25.03 *
	Productivity	2.561	-0.104	0.001	-0.25 N.S.
Raichur	Area	8.727	5.400	0.726	36.29 *
	Production	8.003	4.450	0.643	34.89 *
	Productivity	6.256	-0.801	0.055	-1.54 N.S.

N.S. = Non significant

\* = Significant at 1 per cent level.

Source : District Statistical Office of Bijapur and Raichur districts.

flower in Bijapur and Raichur districts for the period from 1980-81 to 1992-93 are presented in Table I.

The area under sunflower both in Bijapur and Raichur districts showed significant and positive growth rates (i.e., 25.34 and 36.29 per cent in that order). This could be attributed to the high price that had prevailed for sunflower as well as the suitability of the crop to the dry tract.

Significant and positive growth in production of sunflower was observed in Bijapur and Raichur districts, the growth rates being 25.03 per cent and 34.89 per cent respectively. This was due to the effect of positive growth in area under sunflower.

However, the growth rate in productivity of both the districts was negative (i. e. -0.25 per cent and -1.54 per cent). The negative growth rate in productivity was mainly due to non-adoption of package of practices and lack of technical guidance in the production of sunflower.

#### SUMMARY AND CONCLUSION

The extension of area under sunflower without proper management practices will not further increase the production as indicated by the negative rate of growth in productivity. Hence, there is a need for extension activities to educate the farmers about the improved methods of cultivation of sunflower in order to increase the productivity and production further.