STUDY ON GROWTH ANALYSIS OF GROUNDNUT IN RAYALASEEMA REGION OF ANDHRA PRADESH

A. MOUNIKA

Faculty, Dept of Gentics and plant breeding

Bharatiya Engineering Science & Technology Innovation University, Andhra Pradesh, India.

Abstract: An attempt was made to study the growth in area, production and yield of groundnut in Rayalaseema region of Andhra Pradesh state as the four districts of Rayalaseema viz., Ananthapur, Chittoor, Kurnool and Y.S.R Kadapa are contributing major groundnut area in the state. The study was based on crop area, production and yield data covering the years of 1967-68 to 2019-20 divided into three parts i.e., Part I includes 1967-68 to 1985-86, part II includes 1986-87 to 2000-01 and part three includes 2001-02 to 2019-20 based on the Pre Technology mission on oilseeds (TMO), TMO period and post liberalization period, Compound growth rate and decomposition analysis was employed. The results revealed that, the growth performance of groundnut in Rayalaseema region was declined over the years, particularly in Period III due to frequent drought spells, change climate scenario, crop shifts *viz*., redgram, castor and cotton etc.

Keywords: Compound Annual Growth Rate (CAGR), Decomposition Analysis, Groundnut crop, Rayalaseema region.

1. Introduction

Groundnut i.e., king of Oilseeds is an annual legume crop is the third major oilseed crop of world and is cultivated in subtropical and tropical regions. Groundnut is the world's fifth major important source of edible oil and vegetable proteins. It contains 44 to 56 per cent of oil and rich source of minerals like phosphorus, calcium, magnesium and potassium and vitamins like E, K, and B-group. In India, during the year 2019-20, Groundnut alone occupied an area of 4825 thousand hectares with production of 9952 thousand tonnes and productivity of 2063 kg ha^{-1}. Further, 70 per cent of area and 75 per cent of production are concentrated in four states namely Gujarat, Rajasthan, Tamil Nadu and Andhra Pradesh (Source.des.ap.gov.in). Andhra Pradesh ranked fourth state in India with a share per cent 32.7 of area *i.e.*, 661 thousand hectares and 8.8 per cent of production *i.e.,* 881 thousand tonnes with productivity of kg ha^{-1}. Rayalaseema region is the major groundnut producing region in

Andhra Pradesh during the year 2019-20, it accounts a share of 95 per cent of an area i.e., 633 thousand hectares and a share of 87 per cent of production i.e., 767 thousand tonnes with the productivity of 1210 kg ha^{-1} (Source: www.indiastat.com).

2. Materials and Methods

The time series data on area, production and yield of Groundnut in Rayalaseema region of Andhra Pradesh, which was collected from season and crop reports published by Directorate of Economics and Statistics for the present study. The total period from 1967 -68 to 2019-20 was divided into three sub-periods *viz*., Period I (1967-68 to 1985-86), Period II (1986-87 to 1999-2000) and Period III (2000-01 to 2018-19). Significance of the time periods selected for the study were, Period I is pre–Technology Mission on Oilseeds (TMO) period, Period II is from TMO implementation to liberalization and Period III is post liberalization period.

Table1. Time periods selected for the study Time period Significance Selected years

Time Period	Significance	Selected years
Period I	Pre Technology Mission on Oilseeds (TMO) period	1967-68 to 1985-86
Period II	TMO implementation to liberalization	1986-87 to 1999-2000
Period III	Post liberalization period	2000-01 to 2019-20

2.1 Estimation of Compound Annual Growth Rate (CAGR):

To estimate compound growth rate (CAGR),
The exponential function $Y = ab^t$ was fitted.

Compound annual growth rate (r) = (antilog b -1)*100
The compound growth rates were tested for their significance by the student's' test.

2.2 Estimation of Decomposition Analysis:
To measure the contribution of area and productivity towards increasing production of groundnut decomposition analysis was used.
$P = A_0 (Y_n - Y_0) + Y_0 (A_n - A_0) + \Delta A \Delta Y$
Where,
P = change in production
A_0 = Area in base year
Y_0 = yield in the base year
Y_n = yield in the current year

A_n= area in the current year
ΔA = change in area $(A_n - A_0)$
ΔY = change in the yield $(Y_n - Y_0)$
Where, the first term is the productivity contribution, second term is the area contribution and the last term is the interaction effect.

3. Results and Discussions:

3.1 Compound Annual Growth Rate (CAGR)
The results from table 2 revealed that during Period I, the growth rates of area and production of groundnut were positive and area was statistically significant at 1 per cent level and 5 per cent level respectively but production was statistically non- significant. However, the growth rate in yield was recorded to be negative and statistically non-significant during this period.

Table 2. Compound annual growth rates of area production and yield of Groundnut in Rayalaseema region of Andhra Pradesh.

CAGR	Area (%)	Production (%)	Yield (%)
Period I	1.37***	1.26[NS]	-0.11[NS]
Period II	0.9[NS]	-0.01[NS]	-0.9[NS]
Period III	-4.01***	-2.26[NS]	1.83[NS]

*** Significant at 1 per cent level** Significant at 5 per cent level,
NS-Statistically non-significant

In Period II, the growth rate of area was positive and statistically non- significant, while the growth rates of production and yield were negative also statistically non-significant.
In Period III, the growth rate of area and production were negative, area was statistically significant at 1 per cent level, while growth rate of production was non-significant and however, the growth rate of yield was positive but statistically non-

significant. Inter-period comparison among the growth rates of area under groundnut revealed that Period I witnessed the growth rate with 1.37 per cent, followed by Period II 0.9 per cent and Period III -4.01 per cent respectively.it was observed that the growth rates of area over three periods period I is positive and significant. Inter-period comparison among the growth rates of production of groundnut revealed that the growth rate was highest in Period I with 1.26 per cent, followed by Period II (-0.01%) and Period III (-2.26%). It production observed that among all the growth rates of production in the three periods under the study, the growth rate of production in Period I was only positive but statistically non-significant. Inter-period comparison among the growth rates of yield in groundnut showed that the Period I witnessed the highest growth rate with 1.83 per cent, but Period II (-0.9 %), and Period I (-0.11%). Growth rates of yield for all the periods under the study were found to be statistically non-significant.

3.2 Decomposition Analysis:

Effect of the area, productivity and their interaction on change in groundnut production in Rayalaseema region was carried out using decomposition analysis and presented in the Table 3 and by the inspection, it can be noticed that in Period I, yield effect was dominant contributor to the change in production with 128.25 per cent, followed by interaction effect (-7.51 per cent) and area effect -20.74%), while in Period II also yield effect was the profound contributor to the change in production with 43.98 per cent, followed by area effect (38.20 %) and yield effect (17.81 %). In Period III, change in production was highly influenced by yield effect (566.24 %), followed by interaction effect (504.42 %) and interaction effect (-970.67 %).

Table 3. Decomposition analysis in area production and yield of Groundnut crop in Rayalaseema region of Andhra Pradesh.

Periods	Change in production	Area effect	Yield effect	Interaction effect
period I	183556	-20.74	128.25	-7.51
Period II	854275	38.20	43.98	17.81
Period III	-77532	-970.67	566.24	504.42

The analysis revealed that, during Period I and period II, yield effect had contributed to the change in production, while during Period III, the change in production was negative and the effects of area was also negative (-90.67 %) followed by yield and interaction effects were positive i.e., (566.24%), (504.42%) respectively. This can be concluded that the production of groundnut was negative in period III compared with period I and Period II.

4. Conclusions

The growth performance of groundnut in Rayalaseema region was declined over the years, particularly in Period III, *i.e.,* Post liberalization period. Compound Annual Growth Rate (CAGR) and decomposition analysis of area, production and yield of groundnut in three periods under the study revealed that there was accelerated growth rates of area in Period I and Period II, which could be mainly attained due to oilseeds development programmes ie.,TMO implementation, where in focus was laid on transfer of latest technology to the farmers, supply of High Yielding Varieties (HYVs), in time supply of inputs *etc*., However, this increase in growth rates of the area was not sustained over the periods, led to decrease in growth rates of groundnut area, production and yields, which could be attributed to frequent drought spells, changing climate scenario, crop shifts *viz*., redgram, castor and cotton etc.

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