# TRENDS, GROWTH AND VARIABILITY OF GROUND NUT CROP IN ANDHRA PRADESH

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## ABSTRACT

*The main objectives of the study are to examine the trends in area, production and productivity of groundnut in Andhra Pradesh over a period of 1995-96 to 2010-2011. Compound growth rates of area, production and productivity were estimated by fitting semi log trend equation. Decomposition of output growth of groundnut was examined by fitting component analysis model. The study analyzed that area, production and productivity had decreased during the study period i.e. 1995-96 to 2010-2011. The compound growth rates of area production and productivity of ground nut over the period shows negatively non significant. The study also confirms the magnitude of variability in production of ground nut. The synchronized movements in area and productivity both was responsible for low instability / variability in ground nut of Andhra Pradesh. Further, the study conducted a decomposition analysis to determine the contribution of different components to the growth rate. The decomposition analysis revealed that in the total production of groundnut was completely due to the change in area under the crop as the yield and interaction effects were very small.*

***Keywords:*** Ground Nut, Compound Growth Rate, Decomposition Analysis

## INTRODUCTION

Oil seed production has fallen short of the requirement as a result of increasing per capita consumption in the recent past. This necessitated a heavy impact at the cost of huge foreign exchange.

Ground nut ranks first in India among oil seed crops. It covers 45% of area and accounts for 55% of production of the total oil seeds. India is rated as the third largest producer of groundnut in the world with annual production of over 5-6 million tons. Gujarat, Andhra Pradesh, Tamil Nadu and Karnataka are the leading producers in the country and accounts for nearly 75% of the total output. Groundnut contributes to nearly 25% of total oil seed production in the country. Nearly 75% output occurs in June-September and the rest during November-March known as kharif and rabi seasons respectively.

The studies undertaken by research workers at various times mostly related to cereal crops like paddy and wheat very limited work has been done on groundnut which is the major oil seed crop of the Andhra Pradesh. Thus, considering the importance and need, the present study has been taken. This is with the above consideration in view, that the present study has been taken up to analyze the trends in the production of groundnut in A.P.

## OBJECTIVES

The specific objectives of the study are as follows

1.  To study the trend and growth of area, production and productivity of groundnut in A.P.

2.  To examine the contribution of area productivity towards increasing the production; the magnitude and instability for the groundnut crop.

## MATERIALS AND METHOD

The present study utilizes the time series data (1995-96 to 2010-2011) on area, production and productivity of groundnut was collected from various publications and websites of Directorate of Economics and Statistics Government of India, Agricultural Statistics at a glance and Bureau of Economics and Statistics of Andhra Pradesh state.

The exponential function $Y = A\,B^t$ was fitted to the data to compute the compound growth rates.

Compound growth rate (r) = (antilog b -1)*100          (1)

The compound growth rates were tested for their significance by the student's' test.

The measurement of instability in time series data requires an explicit assumption of what constitutes the acceptable and unacceptable components. A systematic component which can be predicted does not constitute instability and hence, it should be eliminated from the data. The remaining unpredictable component represents the variability. There are a number of techniques available to measure the index of instability. Such techniques are found in Coppock (1962), Mac-Bean (1966), Weber and Sievers (1985), Massel (1970), Singh and Byerlee (1990) and Cuddy-Della Valle (1978). In this study the instability in area, production and productivity of Ground nut crop is measured in relative terms by the Cuddy-Della Valle index which is used in recent years by a number of researchers as a measure of variability in time series data. The simple coefficient of variation over estimates the level of variability in time-series data characterized by long-term trends whereas the Cuddy-Della Valle index corrects the coefficient of variation. The instability index IX, is given by the expression:

$IX = CV\,(1-R2)^{1/2}$                          (2)
Where CV = coefficient of variation (in percent)

R2= Coefficient of determination from a time trend regression adjusted by the number of degrees of freedom.

To measure the contribution of area and productivity towards increasing production of groundnut decomposition analysis was used.

$$P = A0 (Yn - Y0) + Y0 (An - A0) + \Delta A \Delta Y \qquad (3)$$

Where P = change in production      Y0 = Area in base year

     Y0 = yield in the base year      Yn = yield in the current year

     An = area in the current year      ΔA = change in area (An-A0)

     ΔY = change in the yield (Yn - Y0)

Where, the first term is the productivity contribution, second term is the area contribution and the last term is the interaction effect.

## RESULTS AND DISCUSSION

In order to overcome the problem of different units of physical output while analyzing the growth pattern of groundnut crop, index numbers were constructed. Table 1 shows the index numbers of area, production and productivity of groundnut of Andhra Pradesh during the period 1995-96 to 2010-2011 with the base year as the triennium 1995-96 to 1997-98.

**Table 1.** Area Production and Productivity of Groundnut of Andhra Pradesh Over the Period from 1995-2011 base year index triennium 1995-96 to 1997-98.

| Year | Area | % change over the year | Production | % change over the year | Productivity | % change over the year |
|---|---|---|---|---|---|---|
| 1995-1996 | 106.53 | | 135.17 | | 129.38 | |
| 1996-1997 | 105.47 | -0.991 | 105.30 | -22.095 | 101.71 | -21.386 |
| 1997-1998 | 88.00 | -16.561 | 59.53 | -43.472 | 68.90 | -32.258 |
| 1998-1999 | 95.59 | 8.615 | 110.97 | 86.419 | 118.34 | 71.746 |
| 1999-2000 | 86.13 | -9.890 | 56.08 | -49.466 | 66.39 | -43.900 |
| 2000-2001 | 89.92 | 4.401 | 110.35 | 96.786 | 125.23 | 88.633 |
| 2001-2002 | 81.14 | -9.765 | 64.37 | -41.671 | 80.82 | -35.459 |
| 2002-2003 | 70.54 | -13.069 | 42.22 | -34.400 | 61.14 | -24.357 |
| 2003-2004 | 71.64 | 1.565 | 50.77 | 20.244 | 72.18 | 18.068 |
| 2004-2005 | 88.34 | 23.309 | 84.40 | 66.227 | 97.45 | 35.000 |
| 2005-2006 | 90.02 | 1.901 | 70.34 | -16.656 | 79.62 | -18.294 |
| 2006-2007 | 64.01 | -28.891 | 38.26 | -45.608 | 60.92 | -23.489 |
| 2007-2008 | 86.13 | 34.558 | 134.09 | 250.471 | 158.48 | 160.144 |
| 2008-2009 | 84.74 | -1.616 | 50.10 | -62.634 | 60.26 | -61.974 |
| 2009-2010 | 62.43 | -26.331 | 51.85 | 3.494 | 84.65 | 40.472 |
| 2010-2011 | 77.83 | 24.673 | 75.03 | 44.687 | 98.21 | 16.021 |

These indices provide an idea about the growth in area, production and productivity of groundnut in Andhra Pradesh showed a decreasing trend over the study period i.e. 1995-96 to 2010-2011.The percentage change over the year during the study period for the area,

production and productivity of groundnut in Andhra Pradesh had negative values except 7 years i.e. 1998-99, 2000-01, 2003-04, 2004-05, 2005-06, 2007-08 and 2010-2011.

Compound growth rates and coefficients of variation clarified the disquieting trend in the production. Table 2 shows that the area, production and productivity of groundnut in A.P have significant negative trends of 0.019, 0.036 & 0.017 per cent per annum respectively over the study period.

**Table 2.** Compound growth rates of Area Production and Productivity of Groundnut of Andhra Pradesh Over the Period from 1995-2011

|  | Area | Production | Productivity |
|---|---|---|---|
| **CAGR Value** | -0.0194 | -0.0361 | -0.0171 |

The level of variability in Ground nut crop production is very important for sustainable production. Therefore we have estimated the relative variability in Ground nut crop in Table 3 using equation (2). Variability in area, production and productivity are estimated over the period i.e 1995-96to 2010-2011. It may be observed that the production (39.02) of ground nut recorded the highest degree of instability. It concluded that the fluctuations in production are the compound result of fluctuation in productivity and acreage.

**Table 3**. Decomposition analysis of Area Production and Productivity of Groundnut of Andhra Pradesh Over the Period from 1995-2011

| Area effect($\Delta A$) | Production effect($\Delta P$) | Yield effect($\Delta Y$) | Interaction effect |
|---|---|---|---|
| 7.693 | **0.60** | -5.484 | -1.606 |

In order to find out the contribution of area, production and productivity and the interaction of the two in increasing the production, decomposition analysis was carried out. The results are presented in Table 4. It is clearly observed from the table that, during the overall period, the in the total production of groundnut was completely due to the change in area under the crop as the yield and interaction effects were very small. Therefore, it is concluded that production growth in groundnut over the past 16 years has been slow & unstable with substantial temporal variation in the state.

**Table 4**. Instability in area, production and productivity of Ground nut in Andhra Pradesh (1995-96 to 2010-2011)

| Statistical tools | Area | Production | Productivity |
|---|---|---|---|
| AM | 17.56 | 15.03 | 0.836 |
| SD | 2.670 | 6.235 | 0.2651 |
| Instability Index(IX) | 11.06 | 39.02 | 31.33 |

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