# Growth and Instability of Groundnut Area, Production and Yield In the area of Combined Andhra Pradesh

Dr.V.Mary Madhuri
*Lecturer in Economics, K.S.N Government Degree College for Women (W)(A), Anantapur, Andhra Pradesh*

**Abstract- The importance of agriculture in the economic development of any country is borne out by many reasons. Agriculture, most primarily, provides adequate food and nutrition supplies to the fast growing population. The farm sector has to supply the raw materials for growing manufacturing industries. The agricultural sector with unlimited supply of manpower has to release the labour force for industrialization. The agricultural sector creates demand for more and new industrial goods. As agricultural development takes place, the precipitate farm income will improve. The development and dissemination of new technology is an important factor determining the future of agriculture. Agriculture has always been in a transformation mode. A revolution in agricultural technology is the need of the times. Although Productivity increase is vital, environmental protection is equally important. Also technologies must be both affordably by and geared to the needs of the poor and undernourished people. In India, Andhra Pradesh is one of the most important agrarian economies. Above 65 percent of the total population engaged in agriculture and allied activities in Andhra Pradesh. Groundnut is the most important oilseed crop accounting for about 20 percent of the total cropped area in the state of Andhra Pradesh. In the present study, it is proposed to examine the status of Groundnut Crop in entire the state of Combined Andhra Pradesh. To study the trends and growth Groundnut crop, it is considered to estimate the compound growth rates of Area, Production and Yield of the crop. Therefore, the main objectives of the study are to find out the trends in area, production and yield of the Groundnut Crop in Combined Andhra Pradesh and to study the reasons for variations in area, production and yield of Groundnut In Andhra Pradesh.**

**Key Words: AGRICULTURE, GROWTH, TECHNOLOGY, YIELD**

The importance of agriculture in the economic development of any country is born out by many reasons. Agriculture, most primarily, provides adequate food and nutrition supplies to the fast growing population. In the early stages of economic growth, the income elasticity of demand for food, in under developed countries is estimated to be 0.6 or higher which is twice or thrice as much as that in Europe, U.S and Japan. In an under developed country like India, with low nutritional standards any rise in income is likely to increase the demand for food and more diversified food.

The farm sector has to supply the raw materials for growing manufacturing industries. The agricultural sector with unlimited supply of manpower has to release the labour force for industrialization. The agricultural sector creates demand for more and new industrial goods. As agricultural development takes place, the precipitate farm income will improve. Then the farmers would be in a position to buy more of modern agricultural inputs and consumer goods from the industrial sector. The improved inputs enhancing productive efficiency in agriculture, leading to a move of marketable surplus can be exchanged for goods and services in the industrial sector.

Agriculture contributes to capital formation, which is essential for economic growth. Increased agricultural productivity leads to lower food prices, increased farm output may generate higher levels of farm income and a part of it may be saved. These savings may be utilized for further investment purpose for overall economic development and taxing the agricultural sector can derive capital.

The development and dissemination of new technology is an important factor determining the future of agriculture. Agriculture has always been in a transformation mode. Generally, technology has been defined as “The knowledge being applied by human beings to improve production of marketing process”,

in other words, it is the operative knowledge used to produce goods and services. The term technology is derived from 'technique' and 'obgy'. Technique has been in use with us for a long time in handicraft agriculture and other allied fields. The dimensions of the technology are many and the important ones are functions, fabrication, fuel, communication and control, algorithm.

The technology that is well suited for a particular industry or firm at a particular point of time may become outmoded at another time, when new inventions and innovation take place. These occur due to various reasons, which can be classified in to two broad categories.

(1) To reduce cost, increase output and profit

(2) To provide substitutes for the factors, which are scare and priced heavily.

A revolution in agricultural technology is the need of the times. Although Productivity increase is vital, environmental protection is equally important. Also technologies must be both affordably by and geared to the needs of the poor and undernourished people. Major technological changes, which have come to play a vital role in Indian agriculture, can be grouped under six broad heads.

1. Introduction of new plants
2. Plant breeding
3. Use of fertilizers and pesticides
4. Irrigation
5. The use of inanimate power on the farm that in use of tractors, electric motors and pumping engines and lastly
6. Improved cultivation practices.

The impact of technology can be judged from the productivity figures of oilseeds for 1985-86, 2002-03 and 2003-04, which was 570, 691, and 1067 kg/hectare, respectively. The year 1985-86 (Pre-TMO period) was fairly normal year, while 2002-03 was a severe drought year, still, the oilseed productivity substantially improved from 570 to 691 kg/hectare, which was mainly the result of technological inputs. The year 2003-04 was a normal one for oilseeds, where the productivity increased to more than one tonne/hectare (1067 kg/hectare).For the country as a whole, oilseeds production between 1985-86 and 2003-04 increased by 66.7 percent due to 19.8 percent increase in oilseeds area and 38.2 percent increase in oilseeds productivity. The expansion in area under oilseeds was hitherto a major source of growth in oilseeds production during the last two decades. Nearly 38 percent of the increase in oilseed production since 1985-86 was contributed by area expansion and 62 percent by productivity improvement.

In India, Andhra Pradesh is one of the most important agrarian economies. Above 65 percent of the total population engaged in agriculture and allied activities in Andhra Pradesh. The share of agriculture in the State's Gross Domestic Product (28.6 percent) is higher than the corresponding figuring all India level (24 percent). In fact the state was known as the granary of South India till recently. Sustainable growth in agriculture sector is the "need of the hour" not only for the state of Andhra Pradesh, but also for the country as a whole. The state's economy continues to be predominantly agrarian. The share of state's rural labour force employed in agriculture was a high as 81 percent in 1991. Nearly, 58.72 percent of the agriculture workers are laborers.

Groundnut is a species in the legume family fabaceae native to South Africa. It grow best in light, Sandy, loam soil. They require five months of warm weather and an annual rainfall of 500 to 1000 mm or the equivalent in irrigation water. The principal uses of groundnut are salted, shelled nuts, Peanul butter, peanut brittle, candy bards and nuts that have been roasted in the shell salted groundnut is usually roasted in oil and packed in retail size, plastic bags or hermetically sealed cans. Dry roasted, salted groundnut is also marketed in significant quantities. Groundnut has a variety of industrial uses, paint, varnish, lubricating oil, leather dressings, and furniture. Polish and nitroglycerin are mode from groundnut oil. Groundnuts are a rich source of protein and monounsaturated fat.

Groundnut is the most important oilseed crop accounting for about 20 percent of the total cropped area in the state of Andhra Pradesh. The Total production of Groundnut in India, rank first both in are and production of groundnut in the country during 2004-05 as per the final forecast reports released by the Economic and Statistical Advise, Government of

India. Groundnut Crop is mostly raised as a rain fed crop during kharif and as an irrigated crop in Rabi Season. All the four districts of Rayalaseema and Mahaboobnagar district in Telangana region together accounted for about 68 percent of the total area under the crop in the state during 2004-05.

The area under groundnut increased to 1841133 hectares during 2004-05 from 1493259 hectares during 2003-04. The production of groundnut increased to 1639241 tonnes during 2004-05 from 985813 tonnes during 2003-04. The yield per hectare of groundnut increased to 8191 kgs/hectare during 2004-05 from 660 kgs / hectare during 2003-04.

In the present study, it is proposed to examine the status of Groundnut Crop in entire the state of Combined Andhra Pradesh. To study the trends and growth Groundnut crop, it is considered to estimate the compound growth rates of Area, Production and Yield of the crop. Therefore, the main objectives of the study are:

1. To find out the trends in area, production and yield of the Groundnut Crop in Combined Andhra Pradesh.

2. To study the reasons for variations in area, production and yield of Groundnut in Andhra Pradesh.

To fulfil the above objective of the study, i.e., to determine the trends, the compound growth rates of area, production and yield of the Groundnut Crop estimated by fitting exponential functions for both the periods before and after the green-revolution separately. The growth rates are estimated. The compound growth rate was calculated by adopting the following exponential function.

$$Y = AB^t$$

where Y = Area/ production/yield
A = Constant
B = Coefficient of time
t = time (Years)
r = Compound growth rate
The percentage of compound growth rate

$$r = (B-1)\ 100$$

To measure the instability in oilseed crops, coefficient of variation was calculated

$$CV = \frac{\text{standard devation}}{\text{Mean}} X100$$

DATA:

The data relating to area, production and yield under Groundnut Crop. The data was obtained from the various issues of Seasons and Crop Reports of Andhra Pradesh, Statistical Abstract of Andhra Pradesh, Hand Book of Statistics, issued by the Director Bureau of Economics and Statistics, Hyderabad. The present study was carried out for the three periods i.e.

(1) Pre-green revolution and green revolution period=1965-1985

(2) Post-green revolution and post TMO (Technology Mission on Oilseeds) period= 1985-2005

(3) Over all period = 1965-2005.

Andhra Pradesh – Groundnut

Area-Period I: The calculated exponential equation for the area under groundnut crop is

$\hat{Y}$ = (2.98E-10) (5.4818)*$^t$
(3.4684)
C.G.R= 448.1831, C.V=24.26

From the above exponential equation, the value of regression coefficient is 5.4818. It expresses that the average annual increase over the previous years is 5.48. Therefore the average annual growth in area under groundnut crop is 5.48 percent. The compound growth rate of groundnut crop's area during the period I is 448.1831. Hence, the growth in area under groundnut is increasing. It is also observed that the average annual increase in groundnut area is a significant increase. The coefficient of variation in groundnut area is 24.26 percent in the Ist period. Therefore, instability in groundnut area is 24.26 percent.

Area -Period II: The computed non-linear equation of groundnut area for the period II is

$\hat{Y}$ = (8724.632) (0.6760)$^t$
(0.2294)
C.G.R= -32.3972, C.V=15.81

In the above-calculated equation, the value of regression coefficient 'B' is 0.6760. It shows that the average annual increase over the previous year is 0.68. Therefore, the average annual growth in area under groundnut crop is 0.68 percent. The compound growth rate of groundnut crop, during the period II is – 32.3972. It shows that the area under groundnut is decreasing. The negative growth in groundnut area is an insignificant one. The computed coefficient of variation during the period II is 15.81 percent. Nearly 16 percent of instability in groundnut area in Andhra Pradesh was recorded during the period II.

Area – Period III: The calculated exponential equation of area under groundnut crop is

$$\hat{Y} = (7.25E\text{-}14) \quad (10.0367)^{*t}$$

(132.8134)

C.G.R= 903.6734, C.V=23.51

From the above equation, the regression coefficient, i.e, the value of 'B' is 10.0367. It reveals that the average annual increase over the previous years is 10.04. So, the average annual growth in area under groundnut crop is 10.04 percent. The compound-growth rate of groundnut area during the period III is 903.6734. It is observed that the yield in groundnut is increasing during period III. In the state of Andhra Pradesh, during the period III, around 23.5 percent instability was noticed in groundnut area.

Observing the estimates, during the I$^{st}$ and III$^{rd}$ periods, i.e, Pre-green revolution and green-revolution periods and over all period, a significant growth was recorded. This is because of land in Andhra Pradesh is favourable to grow the groundnut crop and favourable irrigation facilities. It may leads to increase area under groundnut. But during the period II, an insignificant growth was recorded, because of adverse weather conditions and improper usage of machinery.

Andhra Pradesh -Groundnut

Production-Period I: The estimated exponential equation of groundnut production in period I is

$$\hat{Y} = (2.05E\text{-}09) \quad (4.9219)^{*t}$$

(13.1433)

C.G.R= 392.1902, C.V=24.11

In the above computed exponential function, the value of regression coefficient is 4.9219. It expresses that the average annual increase over the previous years is 4.92. So, the average annual growth in production of groundnut crop is 4.92 percent. The calculated compound growth rate of groundnut production during the period I is 392.1902. The production under groundnut is increasing and also observed that the average annual increase in groundnut production is a significant increase. The coefficient of variation is 24.11. It means, the instability during the period I is 24.11.

Production-Period II: The fitted exponential equation for groundnut production for the period II is

$$\hat{Y} = (530.1845) \quad (0.8183)^{t}$$

(0.2150)

C.G.R= -18.1691, C.V=29.67

From the above fitted equation, the regression coefficient, i.e, the value of 'B' is 0.8183. It shows that the average annual increase over the previous years is 0.82. So, the average annual growth in production of groundnut crop is 0.82 percent. The compound growth rate of groundnut production during the period II is negative (-18.1691). This negative growth in groundnut output is an insignificant. The coefficient of variation in production of groundnut is 29.67 during the period II. i.e, the instability is 29.67 percent.

Production - Period III: The estimated exponential equation for groundnut production in Andhra Pradesh during the period III is

$$\hat{Y} = (8.58E\text{-}08) \quad (3.8533)^{*t}$$

(83.1507)

C.G.R= 285.3256, C.V=37.09

In the above equation, the regression coefficient, i.e, the value of 'B' is 3.8533. It expresses that the average annual increase over the previous years is 3.85. Therefore the average annual growth in production of

groundnut crop is 3.85 percent. The compound growth rate of groundnut production during the period III is 285.3256. It is a significant growth. The estimated value of Coefficient of Variation reveals that there exists 37.09 percent of variation in groundnut production during the period III, i.e, the instability in groundnut production was 37.09 percent.

Comparing the three periods, period I and period III shows a significant growth. This is due to favourable groundnut marketing prices and implementation of new technology. But during the period II, an insignificant growth was noticed, because of adverse weather conditions, excess use of new agricultural technology.

Andhra Pradesh - Groundnut

Yield-Period I: The estimated exponential farm of groundnut yield for the period I is

$\hat{Y} = (0.0045) \quad (12.3761)^{*t}$

(17.2855)

C.G.R= 1137.614, C.V=16.90

In the above fitted equation, the regression coefficient, i.e, the value of 'B' is 12.3761. It expresses that the average annual increase over the previous years is 12.38. Therefore, the average annual growth in yield of groundnut crop is 12.38 percent. The compound growth rate of groundnut yield during the period I is 137.614. It shows that the yield under groundnut is increasing. It is also observed that the average annual increase in groundnut yield is a significant increase. The coefficient of variation in yield of groundnut is 16.90 during the period I . It means the instability recorded during the period I was 16.90 percent.

Yield-Period II: The fitted exponential equation of yield under groundnut during the period II is

$\hat{Y} = (89.3431) \quad (0.8483)^{t}$

(0.1890)

C.G.R= -15.174, C.V=27.32

From the above fitted equation, the regression coefficient i.e, the value of 'B' is 0.8483. It shows that the average annual increase over the previous years is 0.85. Therefore, the average annual growth in yield of groundnut crop over the previous year is 0.85 percent. The calculated compound growth rate of groundnut yield during the period II is –15.174. It reveals that the yield under groundnut is decreasing and it is not significant decrease. The estimated coefficient of variation expresses that, there is, 27.32 percent of instability in groundnut yield during the period II.

Yield-Period III: The computed non-linear equation farm of groundnut yield for the period III is

$\hat{Y} = (4.5572) \quad (1.2053)^{*t}$

(1.5531)

C.G.R= 20.5283, C.V=23.01

From the above equation the regression coefficient i.e, the value of 'B' is 1.2053. It shows that the average annual growth over the previous years is 1.21. Therefore, the average annual growth in yield of groundnut crop over the previous year is 1.21 percent. The estimated compound growth rate of groundnut yield during the period III is 20.5283. It shows that the yield of groundnut is increasing over the previous year and it is a significant increase. The coefficient of variation is 23.01. Which shows 23.01 percent of variation in groundnut yield during the period III is observed. The instability is 23.01 percent.

Observing the estimates of yield under groundnut during the I, II and III periods, a significant growth was recorded. This is because of implementation of new technology applications of fertilizers and pesticides properly, and adequate irrigation facilities may leads to significant increase in the production of groundnut in Andhra Pradesh. But during the period II, an insignificant growth was recorded.

COEFFICIENT OF VARIATION IN AREA, PRODUCTION AND YIELD OF GROUNDNUT CROP IN ANDHRA PRADESH

| Groundnut | Period I | | | Period II | | | Percentage Change Over Period-I (CV) | Period III | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | CV | Mean | SD | CV | | Mean | SD | CV |
| Area | 13.19 | 3.20 | 24.26 | 19.96 | 3.16 | 15.81 | -34.83 | 16.92 | 3.98 | 23.51 |
| Production | 11.01 | 2.65 | 24.11 | 17.65 | 5.24 | 29.67 | 23.06 | 14.33 | 5.31 | 37.09 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Yield | 0.007 | 0.001 | 16.90 | 0.008 | 2.24 | 27.32 | 61.66 | 0.008 | 0.002 | 23.01 |

The estimated coefficient of variation of area under groundnut crop in Andhra Pradesh is 24.26 percent in first period and 15.81 percent in second period of the study. i.e., more instability was recorded during the first period, than the second period. Percentage change of period II over period I is (-34.83) negative. This may be due to implementation of new technology, TMO's operations may decrease the variation of groundnut area. Observing the production and yield variations, a positive and significant percentage change over period I was recorded. During the Pre-green revolution and green revolution period, production variation, i.e., instability in groundnut production is 24.11 percent. During the post-green revolution and TMO period, production variation, i.e., instability in groundnut production is 29.67 percent. So, the percentage change of period II, over period I is 23.06 percent. Hence, the instability in groundnut yield is 16.90 percent during the first period and it is 27.32 percent during the second period. The percentage change of period II, over period I is 61.66 percent. Because of lack of high yielding varieties, fertilizers, pesticides, lack of irrigation facilities and improper use of technology may leads to more production and yield instability in Andhra Pradesh.

REFERENCE

[1] Ashok Parikh and Pravin, Trivedi., "Impact of Irrigation and Fertilizers on the Growth of output in Andhra Pradesh", A Bayesian approach. Indian Journal of Agricultural Economics, Page No. 159-170.

[2] Archana Singh and Srivastava R.S.L., "Growth and Instability in Sugarcane production in Uttar Pradesh: A Regional study". Indian Journal of Agricultural Economics, Page No. 159-170.

[3] Dantwala M.C: "Future of Institutional reform and technological chance in Indian Agriculture development". Economic and political weekly Issue – 31-33, Vol ; XIII, 1978. Pp 1299.

[4] Jhala M.L; "Farmers response to economic incentives; An analysis of inter – regional Groundnut supply response in India", Indian Journal of Agricultural Economics, Vol:34, No:1, January – March 1979, Pp 55-57.

[5] Narasinham N.V, Van oppen M and Partha Sarathy Rao. P; "Consumer Preferences for groundnut Quality", Indian Journal of Agricultural Economics Page 524-535.

[6] Research Notes, "Economic Performance of groundnut marketing channels. A case study of Rayalaseema Region of Andhra Pradesh", Indian Journal of Agricultural Economics.