CHAPTER -3

The Growth and Instability of Oilseed Crops
3.1 INTRODUCTION:

The study of growth and instability of agriculture is an important concept in estimating the future production, yield and Area. With the help of these estimates, it is possible to take policy decisions to meet the future demand of the country. The increasing population creates demands to agriculture commodities. To meet the future demand of agricultural production, it is essential to study the growth and instability of major oilseed crops namely groundnut, castor, sesamum, coconut and linseed in Andhra Pradesh as a whole and Andhra Pradesh Regions in particular.

To fulfill the first objective it is proposed to estimate linear and compound growth rates of area, production and yield of five oilseed crops namely groundnut, castor, sesamum, coconut and linseed in Andhra Pradesh. Here the data relating to area, production and yield was collected, from published books issued by the Director Bureau of Economics and Statistics for the period of 30 years i.e., from 1976-77 to 2005-06.

The collected data was fed with the equation (1) & (2) (given in Methodology), the parameters were estimated by Ordinary Least Squares Method (OLS). The estimated equation of each crop in each region is shown in functional form. The t-values, linear growth rates along with the co-efficient of variation were given.

3.2 Groundnut - Costal Andhra:

Area:
The estimated linear regression equation of area under the groundnut crop in coastal Andhra region is

\[ Y = 273366.91 - 2606.56X \]

\[ (1.589) \]

\[ \text{LGR} = -1.1189; \quad \text{C. V} = 34.24 \]

*Figures in the parenthesis are t-value*
In the above estimated equation, the Co-efficient of time is negative and insignificant. An insignificant decreasing trend in groundnut area in Costal Andhra was observed. Every year 2606.56 hectares of groundnut area is decreasing during the study period. The linear growth rate is -1.12. A negative growth rate was recorded in the case of groundnut area is decreasing in Coastal Andhra Region. It expresses that the annual growth rate in groundnut area is decreasing. The value of intercept term is 273366.91.

The estimated co-efficient of variation is 34.24 percent. Thus it is noticed that the instability in groundnut area is 34.24 percent.

The estimated equation of exponential form is

\[ y = (12.5316) (0.0151)^x \]

\[ (2.078) \]

CGR = -1.499

* Significant at 5 percent probability level.
Figure in parenthesis are t-value

The co-efficient of time is 0.0151. It indicates a decreasing trend. The average annual decrease in groundnut area over the previous is 0.015 units. The compound growth rate of groundnut area in Costal region is -1.50. It expresses that a decreasing trend in groundnut area in Costal region.

Production:

The estimated linear regression equation of production under the groundnut crop is

\[ Y=271605.72 - 669.875 X \]

\[ (0.337) \]

LGR = -0.2564; C.V= 34.25

In the above fitted equation, the co-efficient of time is (669.88) negative and insignificant, i.e. an insignificant decreasing trend in groundnut production is noticed in Coastal Andhra of Andhra Pradesh. Every year, 669.88 qntls of groundnut production is decreasing. The linear growth rate is (-0.26) negative. It indicates that the average annual
growth under groundnut production in Coastal Andhra is negative. The value of intercept term is 271605.72.

The value of co-efficient of variation is 34.25 percent. Hence, it is noticed that the instability in groundnut production is 34.25 percent.

The estimated equation of exponential form is

\[ Y = (12.4572) \cdot (0.0030)^x \]

\[ \text{CGR} = -0.301 \]

The compound growth rate of production of groundnut crop is -0.30. It expresses that the decrease in the average annual growth of production under the groundnut crop over the previous year is 0.30 quintals. The co-efficient of time is 0.003. The average annual decrease in groundnut production is 0.3 percent.

**Yield:**

The fitted linear regression equation of yield is

\[ Y = 916.963 + 13.813 \cdot X \]

\[ \text{LGR} = 1.2212, \quad \text{C.V} = 14.97 \]

* Significant at 5 percent probability level.

In the above fitted equation, the regression co-efficient of time is 13.813. It is positive and significant at 5 percent probability level. The average annual groundnut production is increasing significantly during the study period. At an average, every year 13.813 Kilo grams of groundnut yield is increasing. The estimated growth during the study period is 1.22 percent. The value of intercept term is 916.963.

The computed co-efficient of variation is 14.97. The instability in groundnut yield in the Coastal Andhra region was recorded 14.97 percent.
The estimated equation of exponential form is
\[ Y = (6.8334) (0.0121)^x \]
\[ (5.842) \]
\[ \text{CGR} = -1.216 \]

The compound growth rate of yield of groundnut crop in Coastal Andhra region is -1.22. It expresses that the decrease in the average annual growth rate of groundnut crop yield is 1.22 Kilo grams.

**Groundnut - Rayalaseema:**

**Area:**

The constructed linear regression equation for Groundnut area in Rayala- Seema is
\[ Y = 776571.31 + 27940.947 \times X \]
\[ (4.750) \]
\[ \text{LGR} = 2.3098; \quad \text{C.V} = 29.49 \]

* Significant at 5 percent probability level

The estimated equation reveals that the co-efficient of time is positive and significant. It expresses that there is a significant increase in the area under the groundnut crop during study period. Every year 27940.95 hectares of groundnut area is increasing. It is observed that there is 2.31 percent growth in area of groundnut. This shows that the average annual growth in groundnut area during the entire period is 2.31 percent. The value of intercept is 776571.31. The estimated value of co-efficient of variation reveals that there is 29.49 percent of variation in groundnut area during this period. Therefore the instability in groundnut area is 29.49 percent.

The estimated equation of exponential form is
\[ Y = (13.4495) (0.0304)^x \]
\[ (3.144) \]
\[ \text{CGR} = 3.090 \]

The compound growth rate of area under groundnut crop in Rayalaseema is 3.10. It expresses that the average annual growth rate of groundnut crop area over the previous year is 3.10 hectares.
Production:
The estimated linear regression equation of production under the groundnut crop is

\[ Y = 794216.880 + 12794.92 X \]

(1.542)

\[ \text{LGR} = 1.2891; \quad \text{C.V} = 38.30 \]

The above estimated equation reveals that the co-efficient of time is positive and insignificant. It means every year 12794.92 quintals of groundnut production is increasing. This increase is not a significant increase. The linear growth rate is 1.29 percent. It shows that the average annual growth during the study period is 1.29 percent. The value of intercept is 794216.89.

The estimated co-efficient of variation is 38.30. Hence, the instability in groundnut crop production is 38.30 percent.

The estimated equation of exponential form is

\[ Y = (13.4943) (0.0150)^X \]

(1.749)

\[ \text{CGR} = 1.508 \]

The compound growth rate of production of groundnut crop is 1.51. It indicates that the increase in the average annual growth rate of groundnut production over previous year is 1.51 quintals.

Yield:
The estimated linear regression equation is

\[ Y = 876.179 - 5.521 X \]

(1.234)

\[ \text{LGR} = -0.6984; \quad \text{C.V} = 25.98 \]

The estimated regression co-efficient of time is negative (-5.521) and it is not significant. It reveals that there is a decreasing trend in groundnut yield in Rayalaseema region under study period. On average 5.521 Quintals of groundnut yield was decreased every year during the study period. But this decrease is not significant. The linear growth rate is estimated and it is -0.70. It indicates that the average annual decrease in groundnut yield is 0.70 percent. The value of intercept term “A” is 876.179. The estimated co-
efficient variation is 25.98 percent. During the study period 25.98 percent of instability was noticed in groundnut yield.

The estimated equation of exponential form for groundnut yield is

\[ Y = (6.7569) (0.0078)^x \]

\[ \text{CGR} = -0.777 \]

The compound growth rate of groundnut yield is -0.78 percent. It expresses that the decrease in the average annual growth of yield in the groundnut crop is 0.78 percent.

**Groundnut – Telangana:**

**Area:**

The constructed linear regression equation for groundnut crop area is

\[ Y = 357410.84 - 2043.292 X \]

\[ \text{LGR} = -0.6273; \quad \text{C.V} = 27.9573 \]

Figures in the parenthesis are t-values

In the above equation, the co-efficient of time is negative and insignificant i.e., an insignificant decreasing trend in groundnut area is noticed in Telangana region of Andhra Pradesh. Every year, at an average, 2043.292 hectares of groundnut area is decreasing. It expresses that a negative growth in groundnut area was recorded. Nearly, 0.63 percent of negative growth in area was noticed. The value of constant/Intercept term is 3577410.84. The calculated co-efficient of variation is 27.96 percent. It is noticed that the instability in groundnut area is 27.96 percent.

The estimated exponential form for groundnut area is

\[ Y = (12.7711) (0.0076)^x \]

\[ \text{CGR} = -0.756 \]

The compound growth rate of area under the groundnut crop is -0.76. It expresses that the decrease in average annual growth rate of area under the groundnut crop over the previous year is 0.76 hectares.
Production:

As per the groundnut crop production concerned, the estimated linear regression equation is

\[ Y = 262826.470 + 1359.927 X \]

\[ \text{LGR} = 0.4790; \quad \text{C.V} = 30.8791 \]

The above estimated equation reveals that the co-efficient of time (1359.927) is positive and insignificant. It means there is an insignificant positive relationship was established between production and time. The co-efficient of time variable reveals that the average annual increase in the production under groundnut crop in Telangana region, during the study period is 1359.93 quintals. This increase is not significant. The estimated linear growth is 0.48. The average annual growth in the production under groundnut crop is 0.48 percent. A negligible growth rate was recorded in the region. The value of intercept terms is 262826.47.

The value of co-efficient of variation is 30.88 percent. It expresses that 30.88 percent of instability in groundnut production was noticed in the region. It is known that almost 69 percent stability was recorded in Telangana region.

The estimation of exponential equation is

\[ Y = (12.4181) (0.0059)^X \]

\[ \text{CGR} = 0.591 \]

The value of compound growth rate of groundnut production in Telangana region is 0.59. It expresses that the increase in the average annual growth rate of groundnut crop production over the previous year is 0.59 percent.

Yield: The computed linear regression equation is

\[ Y = 683.223 + 12.859^X \]

\[ \text{LGR} = 1.4570; \quad \text{C.V} = 20.9246 \]
In the above equation, the co-efficient of “B” (12.859) is positive and significant. It reveals that there is an increasing trend in groundnut yield in Telangana region of Andhra Pradesh. Every year, an average, 12.86 Kilograms of groundnut yield is increasing. This increase in groundnut yield is significant at 5 percent. The estimated linear growth rate is 1.46. The average annual growth in groundnut yield is 1.46 percent. The value of intercept term is 683.22.

The value of co-efficient of variation is 20.92. It shows that 20.92 percent of variation in groundnut yield during the study period.

The estimated non-linear is

\[ Y = (6.5548) (0.0135)^X \]

\[ \text{CGR} = 1.357 \]

* Significant at 5 percent probability level

The compound growth rate of groundnut crop yield is positive and significant. It is 1.357. It reveals that annual growth rate of groundnut yield over the previous year is 1.36 Kilograms.

**Groundnut – Andhra Pradesh:**

**Area :**

The calculated linear regression equation of area under groundnut in Andhra Pradesh is

\[ Y = 1480528.880 + 20990.139X \]

\[ \text{LPG} = 1.1623; \quad \text{C.V} = 22.50 \]

* Significant at 5 percent probability level

Figures in Parenthesis are t-value

From the above equation, the co-efficient of time i.e. the value of “B” is positive and significant. A significant increasing trend has been observed in Andhra Pradesh during the study period in case of groundnut area. Every year an average 20990.14 hectares of groundnut area is increasing. The increase is significant at 5 percent probability
level. The linear growth rate is estimated and it is 1.16. This shows that, the average annual growth in area under groundnut crop in Andhra Pradesh is 1.16 percent. The value of intercept term is 1480528.88.

The co-efficient of variation is 22.50. It means 22.50 percent of instability in groundnut area was recorded in Andhra Pradesh.

The calculated equation of exponential form is

\[ Y = (14.1699)(0.0136)^x \]

\[ \text{CGR} = 1.369 \]

The compound growth rate of groundnut crop area in Andhra Pradesh is positive and significant. It is 1.37. It expresses that average annual growth in groundnut area is 1.37 percent during the study period.

**Production:**

The computed linear regression equation of groundnut crop production is

\[ Y = 1310110.25 + 16437.156 X \]

\[ (1.444) \]

\[ \text{LGR} = 1.0504; \quad \text{C.V} = 35.11 \]

From the above equation, the co-efficient of time is (16437.16) positive and insignificant. It means there is an insignificant positive relationship was established between production and time. The co-efficient of time variable reveals that the average annual increase in groundnut crop production of Andhra Pradesh, during the study period 16437.16 quintals. This increase is not significant. The estimated linear growth rate is 1.05. The average annual growth in groundnut crop production is 1.05 percent. A negligible growth was recorded in the region. The value of intercept term is 13101100.25.

The value of co-efficient of variation is 35.11 percent. It expresses that 35.11 percent of instability in groundnut production was noticed in the state of A.P.
The estimated exponential equation is

\[ Y = (14.0128) (0.0120)^X 
(1.564) \]

\[ \text{CGR} = 1.210 \]

The compound growth rate of groundnut crop production in Andhra Pradesh is positive and insignificant. It is 1.21. It reveals that an increase in the average annual growth rate of groundnut crop production over the previous year is 1.21 percent.

**Yield:** The calculated linear regression equation of groundnut yield in Andhra Pradesh is

\[ Y = 865.747 - 0.923 X \]

\[ (0.254) \]

\[ \text{LGR} = -0.1085; \quad \text{C.V} = 19.95 \]

In the above equation, the co-efficient of time is negative and insignificant, i.e. a decreasing trend in groundnut yield is noticed in Andhra Pradesh. Every year, at an average, 0.923 Kilograms of groundnut yield is decreasing. It expressed that a negative growth in groundnut yield was recorded. Nearly, 0.11 percent of negative growth in yield was noticed. The value of constant/intercept term is 865.747. The calculated co-efficient of variation is 19.95 percent. It is noticed that the instability in groundnut yield is 19.95 percent.

The estimated exponential form is

\[ Y = (6.7528) (0.0017)^X \]

\[ (0.378) \]

\[ \text{CGR} = -0.166 \]

The compound growth rate of groundnut yield in Andhra Pradesh is -0.17. It expresses that the decrease in the average annual growth of groundnut yield is 0.17 percent.

**3.3 Castor - Costal Andhra:**

**Area:**

The calculated linear regression equation is

\[ Y = 27711.900 -276.649 X \]

\[ (1.551) \]

\[ \text{LGR} = -1.1811; \quad \text{C.V} = 36.97 \]

Figures in the Parenthesis are t-values.
From the above estimated regression equation, the co-efficient of time, i.e., the value of ‘B’ is 276.649. It is negative and insignificant. It reveals that a decreasing trend in area of Castor was recorded. But this decrease in Castor area is not significant. On an average, every year, 276.65 hectares of area is decreasing. The estimated linear growth rate is -1.81. It shows that the annual growth of Castor Area in Costal Andhra Region is -1.18 percent. The value of intercept term is 27711.90.

The value of co-efficient of variation is 36.97. The instability in Castor area is 36.97 percent.

The estimated exponential equation is

\[ Y = (10.2218) (0.0147)^x \]

\[ \text{CGR} = -1.462 \]

In the above equation, the compound growth rate of Castor crop Area in Costal Andhra is -1.46. It expresses that a decrease in annual growth is 1.46 percent.

Production:

The computed linear regression equation of Castor crop production in Costal Andhra region is

\[ Y = 6345.658 - 27.879 X \]

\[ \text{LGR} = -0.4714; \quad \text{C.V} = 52.77 \]

The estimated value of “B” is negative (-27.879) and it is not significant. The negative value indicates that there is a decreasing trend in castor production during the study period. An average, -27.879 quintals of castor production is decreasing every year. But this decrease is not significant.

The estimated linear growth rate is -0.47. It reveals that the average annual decrease in castor production is 0.47 percent. The value of intercept term is 6345.66. The computed co-efficient of variation is 52.77. It indicates the instability in castor crop production is 52.77 percent.
The computed exponential equation is
\[ Y = (8.6871) (0.0083) X^{(0.746)} \]
\[ \text{CGR} = -0.824 \]
The compound growth rate of production under the castor crop is similar to the castor area in Costal Andhra. It is -0.824. It expresses that the decrease in the average annual growth rate of production is 0.824 percent.

Yield:

The fitted linear regression equation is
\[ Y = 215 + 2.503 X \]
\[ \text{LGR} = 0.9863; \quad \text{C.V} = 31.61 \]
In the above equation, the co-efficient of time is 2.503. It is positive but not significant at 5 percent probability level. On an average, every year 2.50 Kilograms of castor yield was increasing during the study period. This increase is not significant. The estimated linear growth is 0.99. It reveals that the average annual growth in yield of castor is 0.99 percent. The value of intercept term is 215.

The co-efficient of variation in castor yield is 31.61 percent during the study period. The recorded instability in castor yield is 31.61 percent.

The calculated exponential equation is
\[ Y = (5.3475) (0.0089) X^{(1.299)} \]
\[ \text{CGR} = 0.897 \]
The compound growth rate of castor yield is 0.90. It reveals that the increase in the average annual growth rate of castor yield is 0.9 percent approximately.

Castor - Rayalaseema:

Area:

The estimated linear regression equation of castor area is
\[ Y = 5283.849 + 218.461 X \]
\[ \text{LGR} = 2.5197; \quad \text{C.V} = 73.16 \]
From the above equation, the regression co-efficient, i.e. the value of ‘B’ is 218.461. A positive and insignificant trend in castor area was recorded in the region. It
shows that on an average, 218.46 hectares of Castor area is increasing every year during the study period. The estimated linear growth rate is 2.52 percent, i.e. the average annual growth rate in castor area is 2.52 percent.

The value of intercept is 5283.849. The calculated value of co-efficient of variation reveals that there is 73.16 percent of variation in Castor area during the study period. I.e., the instability in Castor production is 73.16 percent.

The calculated equation of exponential form is

\[ Y = (8.7627) (0.0087)^X \]

\[ \text{CGR} = 0.874 \]

The compound growth rate of Area under the castor crop is positive, i.e. 0.87. It tells that an increase in the average annual growth rate of castor area is 0.90 percent.

**Production:**

The estimated linear regression equation of castor production of Rayalaseema region is

\[ Y = 208.618 + 154.887 \times X \]

\[ \text{LGR} = 7.0656; \quad \text{C.V} = 118.42 \]

In the above equation, the co-efficient of time is 154.887. It is positive and significant. A significant increasing trend is recorded in castor production in Rayalaseema. On an average, every year 154.887 quintals was increasing in Rayalaseema during the study period. The linear growth rate is 7.0656. The average annual growth, during the entire period is 7.07 percent. The value of intercept term is –208.618.

The co-efficient of variation is 118.42; it means percent of variation in Castor crop production was observed.

The calculated exponential equation form of castor production is

\[ Y = (6.5883) (0.0442)^X \]

\[ \text{CGR} = 4.516 \]

The compound growth rate of castor production in Rayalaseema is positive and significant. It reveals that the average annual growth of castor production 4.52 percent.
Yield:

The estimated linear regression equation is

\[ Y = 101.342 + 7.898 \times X \]
\[ (3.901) \]

LGR = 3.5297; C.V = 52.37

In the above fitted equation, the co-efficient time is 7.898. It is positive and significant. A significant increasing trend in Castor yield was recorded in Rayalaseema region. It means every year 7.90 Kilograms of castor yield is increasing during the study period. The computed growth rate is 3.53. The average annual growth during the study period is 3.53 percent. The value of intercept term is 101.342.

The co-efficient of variation is 52.37. It means 52.37 percent of variation in castor yield was observed i.e. the instability in castor yield is 52.37 percent.

The exponential function for Castor yield is

\[ Y = (4.7324) \times (0.0354) \times X \]
\[ (3.838) \]

CGR = 3.60

The compound growth rate of yield of castor crop is 3.60. It expresses that the increase in growth rate of castor yield is 3.60 percent.

Castor - Telangana:

Area:

The estimated linear regression equation of castor crop in Telangana is

\[ Y = 251387.156 - 428.922 \times X \]
\[ (0.451) \]

CGR = -0.1753; C.V = 18.16

The estimated value of ‘B’ is -428.922. The co-efficient of time is negative and insignificant. An insignificant decreasing trend in castor area was recorded in Telangana region during the study period. On average 428.922 hectares of castor area was decreasing every year. But this decrease is insignificant. The linear growth rate is estimated and it is (-0.1753) negative. This reveals that the average annual decrease in castor area is 0.18 percent. The value of intercept term is 251387.156. The co-efficient of variation in castor area is 18.16. It expresses that 18.16 percent instability was recorded in Telangana region.
The estimated exponential form is

\[ Y = (12.4101)^{0.0013} \times (0.303) \]

\[ \text{CGR} = -0.127 \]

The compound growth rate of castor area in Telangana is -0.127. It means a decreasing growth rate area was noticed i.e., 0.13 percent.

**Production:**

The fitted linear regression equation for castor production in Telangana region is

\[ Y = -208.618 + 154.887 \times X \]

\[ (3.266) \]

\[ \text{LGR} = 7.0656; \quad \text{C.V} = 118.42 \]

In the above fitted equation, the regression co-efficient of time is 154.887. It is positive and significant at 5 percent probability level. The regression co-efficient indicates that every year 154.887 quintals of castor production is increasing. The increase is also significant increase in Telangana region under the study period.

The linear growth rate is 7.07. It indicates that the average annual growth in production is 7.07 percent. The intercept term is -208.618. The value of co-efficient of variation is 118.42. It reveals that the instability of castor production during the study period is 118.42 percent.

The fitted exponential form is

\[ Y = (6.5883)^{0.0442} \times X \]

\[ (2.699) \]

\[ \text{CGR} = 4.516 \]

The compound growth rate of production of castor crop in Telangana is 4.52. It expresses that an increase in the average annual growth rate of castor crop production is 4.52 percent.

**Yield:**

The calculated regression equation of castor crop yield in Telangana is

\[ Y = 143.418 + 7.468 \times X \]

\[ (6.275) \]

\[ \text{LGR} = 2.8814; \quad \text{C.V} = 33.18 \]

From the above equation, the co-efficient of time is 7.468. It is positive and significant at 5 percent probability level. It means that the productivity of castor is
significantly increasing in Telangana region under the study period. A significant positive trend in castor was noticed. The average increase in castor yield is 7.47 Kilograms. The estimated linear growth rate is 2.89. The average annual growth during the study period is 2.89 percent. The value of intercept term is 143.418.

The value of co-efficient of variation is 33.18. It indicates that the instability in castor yield is 33.18 percent.

The calculated non-linear equation is
\[ Y = (5.0148) (0.0312)^X \\
CGR = 3.170 \\
\]
The compound growth rate is 3.17. It means, the increase in the average annual growth rate of yield under the castor crop is 3.17 percent.

.Caster - Andhra Pradesh:

Area:
The computed linear regression equation of Area under castor crop is
\[ Y = 282464.340 - 357.243 X \\
LGR = -0.1290; \quad C.V = 18.13 \\
\]
In the above equation, the regression co-efficient of time (-357.24) is negative and insignificant. It reveals that there is a decreasing trend in castor crop area was noticed. On an average, 357.24 hectares of castor crop area is decreasing every year during the study period. But this decrease is not significant. The linear growth rate is estimated and it is -0.13. It indicates that the average annual decrease in castor area is 0.13. The value of intercept is 282464.340. The estimated co-efficient of variation is 18.13 during the study period. It is stated that 18.13 percent of instability in castor area is recorded.

The computed exponential equation form is
\[ Y = (12.5373) (0.0014)^X \\
CGR = -0.143 \]
The computed growth rate is negative and insignificant. That is -0.14. It means a decrease in growth rate of castor is noticed and it is -0.14 percent.

**Production:**
The estimated linear regression equation of castor production of Andhra Pradesh is

\[ Y = 35881.508 + 2309.006X \]

\( (5.254) \)

\[ \text{LGR} = 3.2217; \quad \text{C.V} = 40.25 \]

In the above equation, the regression co-efficient of time is 2309.006. It is positive and significant at 5 percent. An increasing trend was observed in castor production in the Andhra Pradesh state. It means 2309 quintals castor production is increasing every year. The computed linear growth rate is 3.22. It reveals that the average annual growth in castor production during the study period is 3.22 percent. The value of intercept term is 35881.508.

Almost 40.25 percent of variation in castor production was observed during the study period in the Andhra Pradesh. It expresses that the instability in castor output is 40.25 percent.

The estimated exponential equation is

\[ Y = (10.6149)(0.0316)^X \]

\( (5.209) \)

\[ \text{CGR} = 3.209 \]

The compound growth rate of Castor production is positive and significant. It is 3.21. It explains that the average annual growth rate of Castor production is 3.21 percent.

**Yield:**
The computed linear regression equation of castor yield is

\[ Y = 133.738 + 7.533X \]

\( (7.915) \)

\[ \text{LGR} = 3.0072; \quad \text{C.V} = 31.85 \]

In the above equation, the regression co-efficient of time is (7.533) positive and significant at 5 percent probability level. It is noticed that the average annual increase in castor yield is 7.53 Kilograms. The increase in yield is significant. The linear growth rate is 3.01 percent. The value of intercept is 133.738. The estimated co-efficient of
variation is 31.85. The instability in castor yield in Andhra Pradesh state is recorded as 31.85 percent.

The estimated equation of exponential form is

\[ Y = (5.0051)(0.0303)^x \]

\[ CGR = 3.073 \]

The compound growth rate of castor crop yield is 3.073. It expresses that the increase in growth rate of castor crop yield is 3.073 percent.

### 3.4 Sesamum - Costal Andhra:

**Area:**

The estimated linear regression equation is

\[ Y = 91268.539 - 72.942 \]

\[ LGR = -0.0809; C.V = 20.27 \]

From the above estimated regression equation, the co-efficient of time, i.e., the value of ‘B’ is -72.942. It is negative and insignificant. It reveals that a decreasing trend in area of sesamum was recorded. But this decrease in sesamum area is not significant. On an average, every year, 72.942 hectares of area is decreasing. The estimated linear growth rate is -0.081. It shows that the annual negative growth of sesamum area in costal Andhra region is 8.1 percent. The value of intercept term is 91268.539. The value of coefficient of variation is 20.27. The variation in sesamum area was 20.27 percent. The instability in sesamum area is 20.27 percent.

The estimated non-linear equation is

\[ Y = (11.4368)(0.0031)^x \]

\[ CGR = -0.311 \]

In above equation the compound growth rate of sesamum crop area is -0.311. It is negative and insignificant. It means a decrease in the average annual growth rate of sesamum is observed and it is -0.31 percent.
Production:

The fitted regression equation of sesamum production is

\[ Y = 20545.373 - 77.697 \]  
\[(0.560)\]

LGR = -0.4017;  \quad C.V = 33.60

The regression co-efficient of time (-77.697) is negative and insignificant. It expresses that there is a decreasing trend in sesamum production was noticed. An average, 77.7 quintals of Sesamum production is decreasing every year during the study period. But this decrease is not significant. The linear growth rate is estimated and it is -0.40. It indicates that the average annual decrease in sesamum production is 0.40 percent. The value of intercept term is 20545.373. The estimated co-efficient of variation is 33.60 during the study period. In Costal Andhra region 33.60 percent of instability in sesamum production was recorded.

The fitted exponential equation is

\[ Y = (9.9460)(0.0089)^x \]  
\[(1.125)\]

CGR = -0.885

The compound growth rate of sesamum production is -0.89. It expresses that the decrease in growth of production is 0.89 percent.

Yield: The calculated linear regression equation is

\[ Y = 234.467 -1.206X \]  
\[(1.150)\]

LGR = -0.5591;  \quad C.V = 23.18

In the above calculated equation, the regression co-efficient is negative and insignificant. It reveals that there is a decreasing trend in sesamum yield in Costal Andhra region. Every year, an average 1.21 Kilograms of sesamum yield is decreasing. The linear growth rate is -0.56 percent. It means the average annual decreasing in growth in sesamum yield is 0.56 percent. The intercept term value is 234.467. The estimated co-
efficient of variation is 23.18 percent during the study period. The instability in sesamum yield in the Costal Andhra region of Andhra Pradesh is recorded by 23.18 percent.

The estimated exponential equation is

\[ Y = (5.4635)(0.0077)^x \]

(1.449)

CGR = -0.762

The compound growth rate of sesamum yield in Costal Andhra is -0.76. It means a decrease in the average annual growth rate of sesamum is 0.76 percent.

**Sesamum - Rayalaseema:**

**Area:**

The computed linear regression equation of sesamum area is

\[ Y = 11341.822 - 283.309x \]

(5.555)

LGR = -4.0761; C.V = 49.56

The regression coefficient of time i.e. the value of ‘B’ is -283.309. It is negative and significant at 5 percent probability level. A significant decreasing trend is recorded in sesamum area in Rayalaseema region on an average, every year, 283.309 hectares of sesamum area was decreasing in Rayalaseema region during the study period. The linear growth rate is -4.08. The average annual decrease in growth area during the entire period is 4.08 percent. The value of intercept term is 11341.82. The coefficient of variation is 49.56. It tells that 49.56 percent of variation in sesamum area was observed, i.e., the instability in sesamum area is 49.56 percent.

The estimated non-linear equation of sesamum area is

\[ Y = (9.3056)(0.0354)^x \]

(6.303)

CGR = -3.481

The compound growth rate of sesamum area is -3.48. It indicates that the decrease in the average annual growth rate of sesamum area is 3.48 percent.
Production:
The estimated linear regression equation of sesamum production in Rayalaseema is

\[ Y = 1744.800 - 16.052 X \]

\[ (1.247) \]

\[ \text{LGR} = -1.0730; \quad \text{C.V} = 41.19 \]

In the above equation, the regression coefficient of time (-16.052) is negative and insignificant. It reveals that there is a decreasing trend in sesamum crop production. On an average, 16.052 quintals of sesamum production is decreasing every year during the study period. But this decrease is not significant. The linear growth rate is estimated and it is -1.07. It indicates that the average annual decrease in sesamum production is 1.07 percent. The value of intercept is 1744.80. The estimated coefficient of variation is 41.19 during the study period. It expresses that 41.19 percent of instability in sesamum production is recorded.

The calculated exponential regression equation of sesamum production is

\[ Y = (7.3854) (0.0097)^X \]

\[ (0.934) \]

\[ \text{CGR} = -0.968 \]

The compound growth rate of sesamum production in Rayalaseema region is -0.978. It indicates that the decrease in the average annual growth of sesamum production is 0.98 percent.

Yield:

The computed linear regression equation of the sesamum yield in Rayalaseema is

\[ Y = 150.382 + 4.261 X \]

\[ (3.193) \]

\[ \text{LGR} = 1.9689; \quad \text{C.V} = 33.55 \]

In the above equation, the regression coefficient of yield is 4.261. It is positive and significant. A significant increasing trend in sesamum yield was observed in Rayalaseema region. The average annual increase in sesamum yield is 4.261 Kilograms.
The linear growth rate is estimated and it is 1.97 percent. It explains that the average annual growth in sesamum yield during the study period in Rayalaseema region is 1.97 percent. The value of constant intercept term is 150.382. The co-efficient of variation in sesamum yield is 41.19 percent. It shows that 41.19 percent of variation in sesamum yield was recorded during the study period.

The estimated equation of exponential form is

\[ Y = (5.0697)(0.0171)^x \]
(3.379)
CGR = 1.728

The compound growth rate of yield of sesamum crop in Rayalaseema is 1.73. It expresses that an increase in average annual growth rate of sesamum crop yield is 1.73 percent.

**Sesamum – Telangana :**

**Area:**

The estimated linear regression equation of sesamum area in Telangana region is

\[ Y = 64177.996 + 209.275X \]
(1.021)
LGR = 0.3104; C.V = 14.42

Above derived equation reveals that the co-efficient of time is positive and insignificant. It expresses that there is an insignificant increase in the area under the sesamum crop during the study period. Every year, 209.28 hectares of sesamum area is increasing. It is observed that there is 0.31 percent growth in area of sesamum. This shows that the annual growth in sesamum area during the entire period is 0.31 percent. The value of intercept is 64177.996. The estimated value of co-efficient of variation reveals that there is 14.42 percent of variation in sesamum area during this period. The instability in sesamum is 14.42 percent.
The calculated equation of exponential form is

\[ Y = (11.0312) \times (0.0048)^x \times (1.252) \]

CGR = 0.478

The compound growth of sesameum crop of area in Telangana is positive. It is 0.31. It expresses that an increase in the average annual growth rate of sesameum crop area is 0.31 percent.

Production:

The constructed linear regression equation of sesameum production in Telangana is

\[ Y = 3116.666 + 478.305 \times X \]

LGR = 4.5421; C.V = 51.13

The estimated equation reveals that the coefficient of time is positive and significant. It expresses that there is a significant increase in the production under the sesameum during the study period. Every year, 478.305 quintals of sesameum production is increasing. It is observed that there is 4.54 percent growth in production of sesameum. This shows that the annual growth in sesameum production during the study period is 4.54 percent. The value of intercept is 3116.666. The estimated value of coefficient of variation reveals that there is 51.13 percent of variation in sesameum production during this study period. The instability in sesameum production is 51.13 percent.

The calculated equation of exponential form is

\[ Y = (8.2980) \times (0.0525)^x \times (6.307) \]

CGR = 5.386

The compound growth rate of the sesameum production in Telangana region is 5.39. It expresses that an increase in the average annual growth rate of sesameum crop production is 5.386 percent.
Yield:
The fitted linear regression equation of yield is
\[ Y = 53.696 + 7.200X \]
\[ \text{LGR} = 4.3559; \quad \text{C.V} = 49.61 \]

In the above fitted equation, the regression coefficient of time is 7.200. It is positive and significant at 5 percent probability level. The average annual sesamum yield is increasing significantly during the study period. On average every year, 7.2 Kilograms of sesamum yield is increasing. The estimated linear growth rate is 4.36 percent. It reveals that the average annual growth during the study period is 4.36 percent. The value of intercept term is 53.696. The computed coefficient of variation is 49.61 percent. The instability in sesamum yield in the Rayalaseema region was recorded as 49.61 percent.

The computed equation of exponential form is
\[ Y = (4.3101)(0.0438)^X \]
\[ \text{CGR} = 4.482 \]

The compound growth rate of yield of sesamum is 4.48. It indicates that the increase in the average annual growth rate of sesamum yield is 4.48 percent.

Sesamum – Andhra Pradesh:

Area:
The estimated linear regression equation of sesamum area in Andhra Pradesh state is
\[ Y = 165109.328 - 82.376X \]
\[ \text{LGR} = -0.0503; \quad \text{C.V} = 14.48 \]

In the above estimated equation, the coefficient of time is negative and insignificant. An insignificant decreasing trend in sesamum area in the Andhra Pradesh was observed. Every year, 82.376 hectares of sesamum area is decreasing under the study period. The linear growth rate is -0.05. A negative growth rate was recorded in the case of sesamum area. It expresses that the average annual decrease in growth rate in sesamum area in Andhra Pradesh State is -0.05 percent. The value of intercept term is
The estimated coefficient of variation is 14.48 percent. Thus, it is noticed that the instability in sesamum crop area is 14.48 percent.

The estimated equation of exponential form is

\[ Y = (12.0123) (0.0011)^x \]

\[ \text{CGR} = -0.108 \]

The compound growth rate of Area under sesamum crop in Andhra Pradesh is -0.11. It expresses that the decrease in the average annual growth rate of sesamum crop area is 0.11 percent.

**Production:**

The calculated linear regression equation of sesamum production in Andhra Pradesh state is

\[ Y = 25137.924 + 350.502 X \]

\[ \text{LGR} = 1.1465; \quad \text{C.V} = 28.96 \]

The above estimated equation reveals that the coefficient of time is positive and insignificant. It means every year 350.502 quintals of sesamum production is increasing. This increase is not a significant increase. The linear growth rate is 1.15 percent. It shows that the average annual growth during the study period is 1.15. The value of intercept is 25137.

The estimated coefficient of variation is 28.96 percent. Hence, the instability in sesamum production is 28.96 percent.

The calculated equation of exponential form is

\[ Y = (10.1314) (0.0099)^x \]

\[ \text{CGR} = 0.997 \]

The compound growth rate of sesamum production in the Andhra Pradesh is 0.997. It shows that an increase in the average annual growth rate of sesamum crop production is 0.997 percent.
Yield:
The estimated linear regression equation of sesamum crop yield in Andhra Pradesh is

\[ Y = 152.837 + 2.155 \times X \]

\[ \text{LGR} = 1.1569; \quad \text{C.V} = 23.64 \]

In the above equation, the regression co-efficient of time is 2.155. It is positive and significant. A significant increasing trend in sesamum yield was observed in Andhra Pradesh state. The average annual increase in sesamum yield is 2.16 kilograms. The linear growth rate is estimated and it is 1.16 percent. It indicates that the average annual growth in sesamum yield during the study period in Rayalaseema region is 1.16 percent. The value of constant intercept term is 152.837.

The computed exponential form is

\[ Y = (5.0283)(0.0109)^{X} \]

\[ \text{CGR} = 1.01 \]

The compound growth rate of yield of sesamum crop is 1.10. It expresses that an increase in the average annual growth rate of sesamum crop yield is 1.10 percent.

3.5 Coconuts – Costal Andhra:

Area:

The estimated linear regression equation is

\[ Y = 25330.727 + 2643.257 \times X \]

\[ \text{LGR} = 3.9867; \quad \text{C.V} = 36.30 \]

The estimated regression co-efficient of time (2643.257) is positive and significant at five percent probability level. A significant increasing trend in coconut area in Telangana region was recorded. Every year, 2643.257 hectors of coconut area is increasing during the study period. The calculated linear growth rate is 3.99 percent. The average annual growth in coconut area is 3.99 percent. The value of intercept term is 25330.727. The co-efficient of variation is 36.30 percent. Therefore, the instability in coconut area under the study period in Costal Andhra is 36.30 percent.
The estimated equation of exponential form is

\[ Y = (10.3978) (0.0412)^x \]

\[
\text{CGR} = 4.203
\]

The compound growth rate of area under the coconut crop is 4.203. It expresses that the increase in average annual growth rate of Area under the coconut crop is 4.20 percent.

**Production:**
The calculated linear regression equation of production under the coconut crop in Costal Andhra is

\[ Y = 5830.500 + 40411.801 \times x \]

\[
\text{LGR} = 6.3921; \quad \text{C.V} = 64.04
\]

The estimated equation reveals that the co-efficient of time is positive and significant. It expresses that there is a significant increase in production under the coconuts crop during the study period. Every year, 40411.801 thousand nuts of coconut production is increasing. It is observed that there is 6.39 percent growth in production of coconut crop. It expresses that the average annual growth in coconut production is 6.39 percent. The value of intercept term is 5830.5. The co-efficient of variation is 64.04 percent. It shows that 64.04 percent of variation in coconut production was recorded during the study period.

The estimated equation of exponential form is

\[ Y = (-11.76985) (0.0844)^x \]

\[
\text{CGR} = 8.804
\]

The compound growth rate of coconut crop production is 8.8. it indicates that the increase in the average annual growth rate of coconut production is 8.804 thousand coconuts.
Yield:
The fitted linear regression equation of coconut crop yield in Costal Andhra is
\[ Y = 3949.952 + 304.829^x \]
\[(4.750)\]
\[ \text{LGR} = 3.5140; \quad \text{C.V} = 46.31 \]

In the above fitted equation, the regression co-efficient of time is 304.829. It is positive and significant at 5 percent probability level. The regression co-efficient indicates that every year, 304.829 No. of coconuts yield is increasing. This increase is also significant increase in Costal Andhra region under the study period. The linear growth rate is 3.51. It indicates that the average annual growth in yield is 3.51 percent. The constant or intercept term is found to be 3949.952. The value of co-efficient of variation is 46.31. It reveals that the instability in coconut productivity during the study period is 46.31.

The estimated equation of exponential form is
\[ Y = (8.2786)(0.0432)x \]
\[(5.841)\]
\[ \text{CGR} = 4.420 \]

The compound growth of coconut crop yield in Costal Andhra region is 4.42. It is positive and significant. The average annual growth rate of coconut yield in Costal Andhra is 4.42 percent.

Coconuts – Rayalaseema:

Area:
The computed linear regression equation of coconut crop in Rayalaseema is
\[ Y = 909.802 + 149.596^x \]
\[(24.859)\]
\[ \text{LGR} = 4.6335; \quad \text{C.V} = 41.70 \]

In above equation, the co-efficient of time is positive and significant. It indicates that there is a significant increase in the area under the coconut crop during the study period. Every year 149.596 hectors of coconut area is increasing. It is observed that there
is 4.63 percent growth in area of coconuts. This shows that the annual growth in groundnut area during the study period is 4.63 percent. The value of intercept term is 909.802.

The estimated value of co-efficient of variation indicates that there is 41.70 percent of variation in coconut area during the period. The instability in coconut area is 41.7 percent. The computed non-linear equation of coconut area under Rayalaseema region is

\[ Y = (7.2166) (0.0498)^x \]

\[ (27.750) \]

\[ CGR = 5.106 \]

The compound growth rate of coconut area under Rayalaseema region is positive and significant. It is 5.106. It tells that the increase in the average annual growth rate of area under coconut crop in Rayalaseema region is 5.11 percent.

**Production:**

The calculated linear regression equation of coconut crop production of Rayalaseema region is

\[ Y = 5557.610 + 1046.083x \]

\[ (5.004) \]

\[ LGR = 4.8047; \quad C.V = 61.56 \]

From the above calculated equation, the regression co-efficient of time is 1046.083. It is positive and significant at 5 percent probability level. The average annual coconut production is increasing significantly during the study period. On average every year 1046.083 of thousand coconuts are increasing. The estimated linear growth rate is 4.8 percent. It reveals that the average annual growth during the study period is 4.80 percent. The value of intercept term is 5557.61. The estimated co-efficient of variation is 61.56. It shows that 61.56 percent of variation in coconut production was recorded during the study period.

The estimated equation of exponential form is

\[ Y = (8.7757) (0.0640)x \]

\[ (6.796) \]

\[ CGR = 6.612 \]
The compound growth rate of coconut production is 6.61. It indicates that an increase in the average annual growth rate of coconut production is 6.611 percent.

**Yield:**

The fitted linear regression equation of coconut crop yield in Rayalaseema region is

\[ Y = 5072.120 + 95.003X \]

\[ (1.558) \]

\[ \text{LGR} = 1.4516; \quad \text{C.V} = 45.25 \]

The estimated regression co-efficient of time is positive (95.003) and not significant. It is noticed that the average annual increase in coconut yield is 95.003 coconuts. But this increase is not significant. The linear growth rate is 1.4516 percent. The value of intercept term is 5072.120. The estimated co-efficient of variation is 45.25. The instability in coconut yield in Rayalaseema region is 45.25 percent.

The fitted exponential equation of coconut yield in Rayalaseema is

\[ Y = (8.4696) (0.0144)^X \]

\[ (1.611) \]

\[ \text{CGR} = 1.447 \]

The compound growth rate of yield of Rayalaseema coconut crop is 1.447. It indicates that the increase in the average annual growth rate of coconut yield is 1.45 percent.

**Coconut – Telangana:**

**Area:**

The estimated linear regression equation of coconut area in Telangana region is

\[ Y = -254.924 + 53.092 \times X \]

\[ (11.154) \]

\[ \text{LGR} = 9.3472; \quad \text{C.V} = 291.08 \]

In the above equation, the regression co-efficient of time (53.092) is positive and significant. It reveals that there is an increasing trend in coconut area was noticed. On an average 53.092 hectors of coconut area is increasing every year during the study period. The linear growth rate is estimated and it is 9.35. The average annual growth in coconut area is 9.35 percent. The value of intercept term is negative (-254.92). The co-efficient of
variation is 45.25. It reveals that the instability in coconut Area in Telangana is 45.25 percent.

The coconut area of Telangana, exponential equation form shown as below
\[ Y = (8.4696)(0.0144)X \]
\[ (1.611) \]
CGR = 1.447

The compound growth rate of area under coconut crop is 1.45. It expresses that the increase in average annual growth rate of area under the coconut crop is 1.45 percent.

Production:
The computed linear regression equation of coconut production is
\[ Y = -2553.819 + 559.120X \]
\[ (8.025) \]
LGR = 9.1471; C.V = 96.45

The regression co-efficient of time, i.e. the value of ‘B’ is 559.120. It is positive and significant at 5 percent probability level. A significant increasing trend is recorded in coconut production. On an average every year 15.58 hectares of coconut production was increasing in Telangana region during the study period. The linear growth rate is 9.15. The average annual growth, during the study period is 9.15 percent. The value of intercept term is -2553.819. The co-efficient of variation is 96.45. It means 96.45 percent of variation in coconut production was observed.

The exponential equation of coconut production in Telangana is
\[ Y = (4.0845)(0.2188)^X \]
\[ (11.979) \]
CGR = 24.453

The compound growth rate of coconut production in Telangana is 24.453. It indicates that the average annual growth of coconut production is 24.43 percent.

Yield:
The estimated linear regression equation of coconut yield is
\[ Y = 4054.323 + 292.377X \]
\[ (4.597) \]
LGR = 3.4052; C.V = 45.71
From above equation, the regression co-efficient of time is 292.377. It is positive and significant at 5 percent probability level. On the average, 292.377 coconuts are increasing annually, during the study period. This increasing is a significant increase. The linear growth rate is estimated and it is 3.41. It indicates that the average annual growth in coconut yield is 3.41 percent. The value of intercept term (A) is 4054.323. About 45.71 percent of variation in coconut yield was observed during the study period in Telangana region i.e. the instability in coconut yield is 45.71 percent.

The estimated exponential equation form of coconut yield is

\[ Y = (8.2888) (0.0421)^x \]

\[ (5.704) \]

\[ \text{CGR} = 4.305 \]

The compound growth of coconut yield in Telangana region is 4.31. It is positive and significant. The average annual growth rate of coconut yield over previous is 4.31 percent.

**Coconut s - Andhra Pradesh:**

**Area:**

The estimated linear equation is

\[ Y = 25991.879 + 2844.892^x \]

\[ (20.556) \]

\[ \text{LGR} = 4.0590; \quad \text{C.V} = 36.90 \]

From the above equation, the value of ‘B’ is 2844.892. It is positive and significant at 5 percent probability level. It reveals that there is an increasing trend in coconut area. The average annual increase in coconut area is significant during the study period. Every year 2844.892 hectors of coconut area is increasing. This linear growth rate is 4.06. It shows that the average annual growth during the study period is 4.06 percent. The value of intercept term is 25991.879. The co-efficient of variation is 36.9 percent during this period. The instability in coconut area in Andhra Pradesh state is recorded as 36.90 percent.
The estimated exponential equation is

\[ Y = (2.7519)(0.1745^*)^X \]

\[ (8.025) \]

CGR = 24.453

The compound growth rate of a Area of coconut crop in Andhra Pradesh state is 24.453. It expresses that an increase in the average annual growth rate of coconut crop area is 24.45 percent.

**Production:**

The constructed linear regression equation of coconut production of Andhra Pradesh State is

\[ Y = -14173.689 + 46117.148^X \]

\[ (8.441) \]

LGR = 6.581; C.V = 68.39

From the above equation, the regression co-efficient of time i.e. the value of ‘B’ is 46117.148. It is positive and significant at 5 percent probability level. It reveals that there is an increasing trend in production of coconut. Numerically an average, 46117.148 thousand nuts of production is increasing every year during the study period. The linear growth rate is estimated and it is 6.58 percent. This shows that the average annual growth in production of coconut is 6.58 percent. The value intercept term is -4173.689.

The value of co-efficient variation is 68.39 percent. It shows that 68.39 percent of instability in coconut production was recorded during the study period.

The calculated exponential function of coconut production in Andhra Pradesh is

\[ Y = (11.7929)(0.0878^*)^X \]

\[ (10.733) \]

CGR = 9.176

The compound growth rate of coconut production in the Andhra Pradesh is positive, i.e., 9.18. It expresses that an increase in the average annual growth rate of coconut production is 9.176 percent.
Yield:
The fitted linear regression function of coconut yield in Andhra Pradesh State is
\[ Y = 3697.305 + 337.355X \]
\[ (4.885) \]
LGR = 3.7793; C.V = 45.05

The above estimated equation reveals that the co-efficient of time is positive and significant. It means every year 337.355 coconuts yield is increasing. This increase is significant. The linear growth rate is 3.78 percent. It shows that the average annual growth during the study period is 3.78 percent. The value of intercept is 3697.305.

The estimated co-efficient of variation is 45.05. Hence, the instability in coconut yield is 45.05.

The calculated exponential function of coconut yield in Andhra Pradesh is

\[ Y = (8.2569)(0.0459)^X \]
\[ (3.023) \]
CGR = 4.694

The compound growth rate of coconut yield in Andhra Pradesh is 4.70. It expresses compounding growth rate of production is 4.7 percent.

3.6 Linseed - Costal Andhra:

Area:
The constructed linear regression equation of Linseed area in Costal Andhra region is

\[ Y = 75.680 - 2.227X \]
\[ (1.049) \]
LGR = -5.4090; C.V = 220.38

In the above equation, the co-efficient of time is negative and insignificant i.e., an insignificant decreasing trend in Linseed area is noticed in Rayalaseema region of Andhra Pradesh. Every year, on an average 2.227 hectares of Linseed area is decreasing. It expresses that a negative growth in Linseed area was recorded i.e., -5.41. The value of constant intercept term is 75.68. The calculated co-efficient of variation is 220.38 percent. It is noticed that the instability in Linseed Area is 5.41 percent.
The estimated equation of exponential form is

\[ Y = (8.3423) (0.7018)^{x} \]
\[ (6.089) \]
\[ \text{CGR} = -50.429 \]

The compound growth rate of Area under the Linseed crop is negative i.e., -50.43. It expresses that a decrease in the average annual compound growth of Linseed area 50.43 percent.

**Production:**

The estimated Linear Regression equation of Linseed production in Costal Andhra Region is

\[ Y = 13.329 - 0.398X \]
\[ (1.111) \]
\[ \text{LGR} = -5.5472; \quad \text{C.V} = 213.75 \]

The estimated regression co-efficient of time is negative (-0.398) and it is not significant. It reveals that there is a decreasing trend in Linseed production in Costal region under the study period. On average, 0.398 quintals of production was decreased every year during the study period. But this decrease is not significant. The linear growth rate is estimated and it is -5.55. It indicates that the average annual decreasing in Linseed production is 5.55 percent. The value of intercept term ‘A’ is 13.329.

The estimated co-efficient of variation is 213.75 percent. During the study period, 213.75 percent of instability was noticed in Linseed production.

The estimated equation of exponential form is

\[ Y = (6.0513) (0.6282)^{x} \]
\[ (6.015) \]
\[ \text{CGR} = -46.645 \]

The compound growth rate of Linseed production is -46.645. It indicates that the decrease in the average annual growth of linseed production is 46.65 percent.
Yield: 
The calculated linear regression function of Linseed yield of Costal Andhra region is

\[ Y = 237.087 - 7.343X \]

\[ (4.590) \]

LGR = -5.9572; C.V = 60.33

In the above function, the co-efficient of “B” is negative (-7.343) and significant. The negative co-efficient reveals that there exists negative relationship between the variables. This negative relationship exhibits that the average annual decrease in Linseed yield is 7.343 Kilograms. But this decrease in Linseed yield is significant. By this negative and significant co-efficient, one can say that there is a scope to raise the Linseed yield by providing better marketing facilities attractive prices etc, to its growers. The estimated linear growth rate is -5.96. It is negative. It means the average annual growth in Linseed yield is decreasing year to year. The value of the constant or intercept term is 237.087. The value of C.V is 60.33 percent. It shows that 60.33 percent of instability in Linseed yield was recorded during the study period.

The calculated equation of exponential form is

\[ Y = (11.1427) (0.7931)^X \]

\[ (6.312) \]

CGR = -54.758

The compound growth rate of yield of Linseed crop is -54.758. It indicates that the decrease in the average annual growth rate of Linseed yield over is 54.76 percent.

Linseed - Rayalaseema:

Area:

The constructed linear regression equation for Linseed Area in Rayalaseema

\[ Y = 85.975 - 1.499X \]

\[ (1.727) \]

LGR = -2.3902; C.V = 64.81
In the above estimated equation, the co-efficient of time is negative and insignificant. An insignificant decreasing trend in Linseed Area in Rayalaseema was observed. Every year, 1.499 hectares of Linseed area is decreeing under the study period. The linear growth rate is \(-2.39\). A negative growth rate was recorded in the case of Linseed area. It expresses that the average annual growth rate in Linseed area in Rayalaseema region is \(-2.39\) percent. The value of intercept term is 85.975. The estimated co-efficient of variation is 64.81 percent. Thus, it is noticed that the instability in Linseed crop area is 64.81 percent.

The estimated equation of exponential form is

\[
Y = (4.1609) \times (0.0152) \times X^{(1.043)} \\
LGR = -1.505
\]

The compound growth rate of Linseed Area is \(-1.51\). It is negative and insignificant. It means a decrease in the average annual growth rate of Linseed crop area is 1.51 percent.

**Production:**
The computed linear regression equation of Linseed production in Rayalaseema is

\[
Y = 16.540 - 0.375 \times X \\
LGR = -3.4904; \quad C.V = 74.53
\]

In the above fitted equation, the co-efficient of ‘B’ (-0.375) is negative and significant at 5 percent probability level. It indicates that on average, annually 0.375 quintals of Linseed production was decreasing. But this decrease in Linseed production is significant. A negative growth was recorded. From linear growth rate value, it is noticed that the average annual growth in Linseed production was decreasing by 3.49 percent. The value of intercept constant term is 16.54. The co-efficient of variation is 74.53. It
means 74.53 percent of instability in Linseed production was recorded in Rayalaseema of Andhra Pradesh state.

The calculated exponential function of Linseed production is
\[ Y = (2.5532)(0.0291)^X \]
\[ (1.889) \]
CGR = -2.872

The compound growth rate of Linseed production in Rayalaseema region is -2.87. It expresses that the decrease in the average annual growth rate of Linseed crop production is 2.87 percent.

**Yield:**

The estimated linear regression equation for Linseed yield in Rayalaseema region.
\[ Y = 200.956 - 1.961X \]
\[ (1.773) \]
LGR = -1.1495; C.V = 31.95

In the above estimated equation, the co-efficient of time is negative and insignificant, i.e., is an insignificant decreasing trend in Linseed yield is noticed in Rayalaseema region of Andhra Pradesh. Every year, on average, 1.961 Kilograms of Linseed yield is decreasing. It expresses a negative growth in Linseed yield. Nearly, 1.15 percent of negative growth in yield was noticed. The value of constant intercept term is 200.956. The calculated co-efficient of variation is 31.95 percent. It is noticed that the instability in Linseed yield is 31.95 percent.

The estimated exponential function of Linseed yield is
\[ Y = (5.3172)(0.0157)^X \]
\[ (1.960) \]
CGR = -1.553

The compound growth rate of Linseed yield in Rayalaseema is -1.55. It expresses that the decrease in the average annual growth rate of Linseed crop yield is 1.55 percent.
**Linseed -Telangana :**

**Area:**
The calculated linear regression function of Linseed crop Area under Telangana is

\[ Y = 23723.373 - 708.934X \]

(1.372)

\[ \text{LGR} = -5.5669; \quad \text{C.V} = 184.94 \]

In the above equation, the co-efficient of time is negative, and insignificant, i.e., a decreasing trend in Linseed crop area is noticed in Telangana region. Every year, on average, 708.934 hectares of Linseed area is decreasing. The estimated linear growth rate is negative i.e., -5.57. Therefore the average annual decreases in growth of Linseed growth is 5.57 percent. The value of intercept term is 23723.373. The calculated coefficient of variation is 184.94 percent. It is noticed that the instability in Linseed Area is 184.94 percent.

The calculated equation of exponential form is

\[ Y = (9.7390)(0.0468)^X \]

(3.671)

\[ \text{CGR} = -4.572. \]

The compound growth rate of Linseed Area in Telangana region is (-4.57) is negative. It expresses that the decrease in the average annual compound growth rate of Linseed area is 4.57 percent.

**Production:**
The computed linear regression equation of Linseed crop production in Telangana region is

\[ Y = 2365.515 - 54.674X \]

(3.385)

\[ \text{LGR} = -3.6016; \quad \text{C.V} = 56.64 \]

The estimated value of “B” is negative (-54.674) and it is significant. The negative value indicates that there is a decreasing trend in Linseed production during the study
period. On average 54.674 quintals of Linseed production is decreasing every year. This
decrease is a significant. The estimated linear growth rate is -3.60. It reveals that the
average annual growth in production of linseed is 3.60 percent. The value of intercept is
2365.515.
The co-efficient of variation in Linseed production is 56.64 percent during the study
period. The recorded instability in Linseed production is 56.64 percent.

The computed equation of exponential form of Linseed production in Telangana is

\[ Y = (7.7096) (0.0394)^x \]
\[ (2.622) \]
CGR = -3.868

The compound growth rate of Linseed production is -3.868. It reveals that the
decrease in the average annual growth rate of Linseed production is 3.87 percent.

Yield:

The calculated linear regression equation of Linseed yield in Telangana region is

\[ Y = 190.648 - 0.984X \]
\[ (0.632) \]
LGR = -0.569; C.V = 32.60

In the above equation, the co-efficient of time is negative and insignificant, i.e., an
insignificant decreasing trend in Linseed yield is noticed in Telangana region of Andhra
Pradesh. Every year, on average 0.984 kilograms of Linseed yield is decreasing. It
expresses that a negative growth in linseed yield

The linear growth rate of Linseed yield is -0.5609.
The value of constant intercept term is 190.648.
The calculated co-efficient of variation is 32.60 percent. It is noticed that the instability in
Linseed yield is 32.60 percent.
The calculated equation of exponential form is

\[ Y = (5.2834) (0.0129) X \]

\[ (1.451) \]

\[ \text{CGR} = -1.278 \]

The compound growth rate of Linseed yield is \(-1.28\). It indicates that the decrease in the average annual growth rate of Linseed yield is 1.28 percent.

**Linseed - Andhra Pradesh:**

**Area:**

The computed linear regression function of Linseed Area of the Andhra Pradesh is

\[ Y = 12698.184 - 260.343 X \]

\[ (4.821) \]

\[ \text{LGR} = -3.0053; \quad \text{C.V} = 32.56 \]

In the above equation, the co-efficient of ‘B’ is negative (-260.343) and significant. The negative co-efficient reveals the existence of negative relationship between the variables. This negative relationship exhibits that the average annual decrease in Linseed Area is 260.343 kilograms. But this decrease in Linseed Area is significant. By this negative and significant co-efficient, one can say that there is a scope to raise the Linseed Area by providing better marketing facilities, attractive prices etc..., to its growers. The estimated linear growth rate is \(-3.01\). It is negative. It means the average annual growth in Linseed Area is decreasing year to year. The value of the constant and intercept term is 12698.184. The value of co-efficient of variation is 32.56. It shows that 32.56 percent of instability in Linseed Area was recorded during the study period.

The calculated equation of exponential form is

\[ Y = (9.5001) (0.0330^*) X \]

\[ (5.376) \]

\[ \text{CGR} = -3.243 \]

The compound growth rate of Area Linseed crop is \(-3.24\). It indicates that the decrease in annual compound growth rate of Linseed Area is 3.24 percent.
Production:
The estimated linear regression function of Linseed production in Andhra Pradesh is
\[ Y = 2399.510 - 52.233X \]
\[ (3.483) \]
\[ LGR = -3.2853; \quad C.V = 52.32 \]

The estimated value of ‘B’ is negative (52.233) and it is significant. The negative value indicates that there is a decreasing trend in Linseed production during the study period. On average 52.233 quintals of Linseed production is decreasing every year. This decrease is also significant. The estimated linear growth rate is −3.29. It explains that the decrease in average annual growth in production of Linseed is 3.29 percent. The value of intercept is 2399.51. The co-efficient of variation in Linseed production is 52.32 percent during the study period. The recorded instability in Linseed production is 52.32 percent.

The estimated exponential form of Linseed production in Andhra Pradesh is
\[ Y = (7.7913) (0.0368)^X \]
\[ (3.537) \]
\[ CGR = -3.618 \]

The compound growth rate of Linseed productions is −3.62. It reveals that the decrease in the average annual growth rate of Linseed production year is 3.62 percent.

Yield:
The fitted linear regression equation of Linseed crop yield of Andhra Pradesh is
\[ Y = 177.062 + 0.519X \]
\[ (0.344) \]
\[ LGR = 0.2802; \quad C.V = 32.61 \]

In the above equation, the co-efficient of time is 0.519. It is positive and not significant. On average, every year 0.519 kilograms of Linseed yield was increasing during the study period. This increase is not significant. The estimated linear growth is 0.28. It reveals that the average annual growth in yield of Linseed crop is 0.28 percent. The value of intercept term is 177.062.
The co-efficient of variation in Linseed yield is 32.61 percent during the study period.
The recorded instability in Linseed yield is 32.61 percent.

The calculated exponential equation is

\[ Y = (5.2010) \times (0.0038)^{X} \times (0.418) \]

CGR = -0.379

The compound growth rate of Linseed crop yield is -0.38. It indicates a decrease in average annual compound growth of Linseed yield is 0.38 percent.

The growth rates and co-efficient of variation of groundnut crop for Area, Production and yield of three regions namely Costal Andhra, Rayalaseema and Telangana also state of Andhra Pradesh are exhibited in the Table 3.1.

3.7 Ground nut:

Table 3.1

<table>
<thead>
<tr>
<th>Region / State</th>
<th>LGR</th>
<th>CGR</th>
<th>Co-efficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Costal Andhra</td>
<td>-1.12</td>
<td>-1.50</td>
<td>34.24</td>
</tr>
<tr>
<td>Area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production</td>
<td>-0.26</td>
<td>-0.30</td>
<td>35.53</td>
</tr>
<tr>
<td>Yield</td>
<td>1.22</td>
<td>1.22</td>
<td>14.98</td>
</tr>
<tr>
<td>2. Rayalaseema</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>2.31</td>
<td>3.09</td>
<td>30.44</td>
</tr>
<tr>
<td>Production</td>
<td>1.29</td>
<td>1.51</td>
<td>40.55</td>
</tr>
<tr>
<td>Yield</td>
<td>-0.70</td>
<td>-0.78</td>
<td>27.07</td>
</tr>
<tr>
<td>3. Telangana</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>-0.63</td>
<td>-0.76</td>
<td>27.96</td>
</tr>
<tr>
<td>Production</td>
<td>0.48</td>
<td>0.59</td>
<td>30.90</td>
</tr>
<tr>
<td>Yield</td>
<td>1.46</td>
<td>1.36</td>
<td>20.92</td>
</tr>
<tr>
<td>4. Andhra Pradesh</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>1.16</td>
<td>1.37</td>
<td>22.50</td>
</tr>
<tr>
<td>Production</td>
<td>1.05</td>
<td>1.21</td>
<td>35.11</td>
</tr>
<tr>
<td>Yield</td>
<td>-0.11</td>
<td>-0.17</td>
<td>19.95</td>
</tr>
</tbody>
</table>

From the table it is noticed that there is a groundnut crop positive growth rate in Area under groundnut in Rayalaseema region but the growth in groundnut area is negative in remaining two regions Costal Andhra, and Telangana. The state of Andhra
Pradesh the growth rate of groundnut area is positive. In case of groundnut production, a positive growth rate in groundnut production was noticed in Rayalaseema and Telangana region, whereas the production growth rate is negative in Coastal Andhra region. The highest growth in production was recorded in Rayalaseema followed by Telangana region. In case of Andhra Pradesh state, the production growth rates are positive. Observing the groundnut yield growth, a highest growth rate is recorded in Telangana followed by costal Andhra. Though the growth in area and production is high in Rayalaseema, the growth in yield is negative. In the state of Andhra Pradesh, yield growth rate is negative.

The maximum instability (34.24 percent) in groundnut area was recorded in Costal Andhra followed by Rayalaseema, (30.44 percent), Telangana (27.96 percent) and 22.5 percent instability in entire state of Andhra Pradesh. Therefore, more stability in groundnut area was recorded in Telangana from coefficient of variation; The highest instability (40.55) in groundnut production was noticed in Rayalaseema followed by Costal Andhra (35.33 percent) and Telangana (30.91). The instability in groundnut production in State of Andhra Pradesh is 35.11 percent. In case of groundnut yield, the highest stability in groundnut yield was recorded in Costal Andhra region 85.02 (%) followed by Telangana 79.08 (%) and Rayalaseema 72.93 (%). Incase of Andhra Pradesh state as whole the stability in groundnut yield is (80.05 percent).
3.8 Castor Crop:

Table 3.2

GROWTH RATES AND CO-EFFICIENTS OF CASTOR CROP

<table>
<thead>
<tr>
<th>Region / State</th>
<th>LGR</th>
<th>CGR</th>
<th>Co-efficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Costal Andhra</td>
<td>Area</td>
<td>-1.18</td>
<td>-1.46</td>
</tr>
<tr>
<td></td>
<td>Production</td>
<td>-0.47</td>
<td>-0.82</td>
</tr>
<tr>
<td></td>
<td>Yield</td>
<td>0.99</td>
<td>0.90</td>
</tr>
<tr>
<td>2. Rayalaseema</td>
<td>Area</td>
<td>2.52</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>Production</td>
<td>7.07</td>
<td>4.52</td>
</tr>
<tr>
<td></td>
<td>Yield</td>
<td>3.53</td>
<td>3.60</td>
</tr>
<tr>
<td>3. Telangana</td>
<td>Area</td>
<td>-0.18</td>
<td>-0.13</td>
</tr>
<tr>
<td></td>
<td>Production</td>
<td>2.85</td>
<td>3.05</td>
</tr>
<tr>
<td></td>
<td>Yield</td>
<td>2.89</td>
<td>3.17</td>
</tr>
<tr>
<td>4. Andhra Pradesh</td>
<td>Area</td>
<td>-0.13</td>
<td>-0.14</td>
</tr>
<tr>
<td></td>
<td>Production</td>
<td>3.22</td>
<td>3.20</td>
</tr>
<tr>
<td></td>
<td>Yield</td>
<td>3.01</td>
<td>3.07</td>
</tr>
</tbody>
</table>

The table 3.2 explains that the Castor Crop growth rates of area under the Rayalaseema region are positive but the growth rate in the Castor crop area is negative in remaining regions namely Costal Andhra region and Telangana regions. The state of Andhra Pradesh, the growth rate of Castor area is positive. In case of production, a positive growth rate in Castor crop was noticed in Rayalaseema and Telangana regions where as the production growth rate is negative in Costal Andhra region. The Andhra Pradesh state is recorded a positive production growth rate in Castor crop. It was noticed that the highest production growth rate and yield growth of Castor crop was recorded in Rayalaseema region followed by Telangana region. In Case of Andhra Pradesh state, the production growth rate is positive. The Rayalaseema region, the growth rates of Area, production and yield are higher than all other regions. In case of Andhra Pradesh, the growth rate of production and yield are positive but negative in case of area.
The maximum stability (81.84 percent) in Castor area was recorded in Telangana followed by (63.3 percent) in Costal Andhra region and (26.84 percent) in Rayalaseema. In case of Andhra Pradesh state 81.87 percent stability was recorded. Therefore more stability in Castor crop area was recorded in Telangana from coefficient of variation. The highest stability (63.71 percent) in Castor production was noticed in Telangana followed by Costal Andhra (47.23 percent) and Rayalaseema (-18.42 percent). The stability in Castor production in the state of Andhra Pradesh is 59.75 percent. In case of Castor yield, the highest stability in Castor yield was recorded in Costal Andhra region 68.39 percent followed by Telangana region (66.82 percent) and Rayalaseema -18.42. As per Andhra Pradesh state as under the stability in Castor crop yield is 68.15 percent.

### 3.9 Sesamum

<table>
<thead>
<tr>
<th>Region / State</th>
<th>LGR</th>
<th>CGR</th>
<th>Co-efficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Costal Andhra</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>-0.08</td>
<td>-0.31</td>
<td>20.27</td>
</tr>
<tr>
<td>Production</td>
<td>-0.40</td>
<td>-0.89</td>
<td>33.60</td>
</tr>
<tr>
<td>Yield</td>
<td>-0.56</td>
<td>-0.76</td>
<td>23.18</td>
</tr>
<tr>
<td><strong>2. Rayalaseema</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>-4.08</td>
<td>-3.48</td>
<td>49.56</td>
</tr>
<tr>
<td>Production</td>
<td>-1.07</td>
<td>-0.97</td>
<td>41.19</td>
</tr>
<tr>
<td>Yield</td>
<td>1.97</td>
<td>1.72</td>
<td>33.55</td>
</tr>
<tr>
<td><strong>3. Telangana</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>0.31</td>
<td>0.48</td>
<td>14.42</td>
</tr>
<tr>
<td>Production</td>
<td>4.54</td>
<td>5.38</td>
<td>51.13</td>
</tr>
<tr>
<td>Yield</td>
<td>4.36</td>
<td>4.48</td>
<td>45.61</td>
</tr>
<tr>
<td><strong>4. Andhra Pradesh</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>-0.05</td>
<td>-0.11</td>
<td>14.48</td>
</tr>
<tr>
<td>Production</td>
<td>1.15</td>
<td>1.00</td>
<td>28.96</td>
</tr>
<tr>
<td>Yield</td>
<td>1.16</td>
<td>1.10</td>
<td>23.64</td>
</tr>
</tbody>
</table>

From the table 3.3, it was observed that there is only a positive growth rate in area under sesamum crop in Telangana region. The growth rates of area/under sesamum crop of Costal Andhra, Rayalaseema are negative. The Andhra Pradesh state growth rate of
Sesamum is also negative. In case of Sesamum, production positive growth rate was recorded in Telangana region only where as the production growth rate is negative in Rayalaseema as well as Costal Andhra. The highest growth in production was recorded in Telangana. In case of Andhra Pradesh, the production growth rate is positive i.e., 1.00 percent.

The highest Sesamum yield growth is recorded in Telangana region that is 4.48 percent. It is followed by Rayalaseema region and the Costal Andhra. All the growth rates in Telangana are not only positive, but also higher than any other regions. As per Andhra Pradesh is concerned, the Sesamum crop yield growth rate is positive.

The maximum stability i.e. 85.58 percent in Sesamum area was recorded in Telangana region followed by Costal Andhra (79.73 percent), Rayalaseema (50.44 percent) and 85.82 percent stability in entire state of Andhra Pradesh. Therefore more instability in Sesamum crop was recorded in Rayalaseema.

From co-efficient of variation, the highest instability 51.13 percent in Sesamum production was noticed in Telangana followed by Rayalaseema (41.19 percent) and Costal Andhra region (33.60 percent). The instability in Sesamum production in state of Andhra Pradesh is 28.96 percent.

In case of Sesamum yield, the highest stability in Sesamum yield was recorded in Costal Andhra. The stability growth rate in Telangana yield is 76.82 percent followed by Costal Andhra (76.82 percent), Rayalaseema (66.45 percent), and Telangana (54.39 percent). In case Sesamum yields, in Andhra Pradesh state is 76.36 percent in stability.
3.10 Coconut Crop:

<table>
<thead>
<tr>
<th>Region / State</th>
<th>LGR</th>
<th>CGR</th>
<th>Co-efficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Costal Andhra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>3.99</td>
<td>4.20</td>
<td>36.30</td>
</tr>
<tr>
<td>Production</td>
<td>6.39</td>
<td>8.80</td>
<td>64.04</td>
</tr>
<tr>
<td>Yield</td>
<td>3.51</td>
<td>4.42</td>
<td>46.30</td>
</tr>
<tr>
<td>2. Rayalaseema</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>4.63</td>
<td>5.11</td>
<td>41.70</td>
</tr>
<tr>
<td>Production</td>
<td>4.80</td>
<td>6.61</td>
<td>61.56</td>
</tr>
<tr>
<td>Yield</td>
<td>1.45</td>
<td>1.45</td>
<td>45.25</td>
</tr>
<tr>
<td>3. Telangana</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>9.35</td>
<td>19.06</td>
<td>90.08</td>
</tr>
<tr>
<td>Production</td>
<td>9.15</td>
<td>24.45</td>
<td>96.45</td>
</tr>
<tr>
<td>Yield</td>
<td>3.41</td>
<td>4.31</td>
<td>45.71</td>
</tr>
<tr>
<td>4. Andhra Pradesh</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>4.06</td>
<td>4.30</td>
<td>36.90</td>
</tr>
<tr>
<td>Production</td>
<td>6.58</td>
<td>9.18</td>
<td>68.90</td>
</tr>
<tr>
<td>Yield</td>
<td>3.78</td>
<td>4.69</td>
<td>49.05</td>
</tr>
</tbody>
</table>

It is observed that the coconut crop area growth rates under the all regions are positive. Hence the growth rate area under Andhra Pradesh is also positive. The highest growth rate was recorded in Telangana region followed by Rayalaseema and Costal Andhra region. In case of Coconut growth production all the regions of Andhra Pradesh is positive. The highest coconut production growth was recorded in Telangana followed by Costal Andhra and Rayalaseema. From the regional Analysis of coconut crop study there is no need to say that the state growth rate is also positive. Where as observing the coconut yield growth, the highest yield growth is recorded in costal Andhra followed by Telangana and Rayalaseema. Andhra Pradesh yield growth rate is also positive.

The maximum instability of 90.09 percent in coconut area was recorded in Telangana region followed by Rayalaseema (41.70 percent) and Costal Andhra (36.30 percent). In case of Andhra Pradesh 36.90 percent instability was recorded.
From co-efficient of variation, the highest stability 43.44 percent in coconut production was noticed in Rayalaseema followed by Costal Andhra (35.96 percent) and Telangana (3.55 percent). The stability in coconut production in the state of Andhra Pradesh is 31.10 percent.

In case of coconut yield, the highest instability in coconut yield was recorded in Costal Andhra region (46.30 percent) followed by Telangana (45.71 percent) and Rayalaseema (45.25 percent). In case of Andhra Pradesh state as a whole the instability in coconut yield is 49.05 percent.

3.11 Linseed:

Table 3.5
GROWTH RATES AND CO-EFFICIENT OF VARIATION OF LINSEED CROP

<table>
<thead>
<tr>
<th>Region / State</th>
<th>LGR</th>
<th>CGR</th>
<th>Co-efficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Costal Andhra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>-5.41</td>
<td>-50.43</td>
<td>220.38</td>
</tr>
<tr>
<td>Production</td>
<td>-5.55</td>
<td>-46.65</td>
<td>213.75</td>
</tr>
<tr>
<td>Yield</td>
<td>-5.96</td>
<td>-54.76</td>
<td>60.33</td>
</tr>
<tr>
<td>2. Rayalaseema</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>-2.39</td>
<td>-1.51</td>
<td>64.81</td>
</tr>
<tr>
<td>Production</td>
<td>-3.49</td>
<td>-2.87</td>
<td>74.53</td>
</tr>
<tr>
<td>Yield</td>
<td>-1.15</td>
<td>-1.55</td>
<td>31.95</td>
</tr>
<tr>
<td>3. Telangana</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>-5.57</td>
<td>-4.57</td>
<td>184.94</td>
</tr>
<tr>
<td>Production</td>
<td>-3.60</td>
<td>-3.87</td>
<td>56.64</td>
</tr>
<tr>
<td>Yield</td>
<td>-0.56</td>
<td>-1.28</td>
<td>32.60</td>
</tr>
<tr>
<td>4. Andhra Pradesh</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area</td>
<td>-3.01</td>
<td>-3.24</td>
<td>32.56</td>
</tr>
<tr>
<td>Production</td>
<td>-3.29</td>
<td>-3.61</td>
<td>52.32</td>
</tr>
<tr>
<td>Yield</td>
<td>0.28</td>
<td>-0.38</td>
<td>32.61</td>
</tr>
</tbody>
</table>

It was observed that, there is a negative growth rate in area under Linseed crop in all regions. So in the state of Andhra Pradesh growth rate of Linseed crop area is also negative. In case of Linseed growth rates in production, the same trend is also observed in all regions of Andhra Pradesh. As per Linseed yield growth rate concerned, there is a negative growth rate in all regions of Andhra Pradesh. But in case Andhra Pradesh state
there is slight change in yield growth. Though linear growth rate of yield is positive yet compound growth rate is negative.

The maximum stability in Linseed area was recorded in Rayalaseema followed by Telangana (-84.94 percent), Costal Andhra (-120.38 percent) and 67.44 percent stability in entire state of Andhra Pradesh. Therefore more instability in Linseed area was recorded in Costal Andhra. From co-efficient of variation, the highest stability in Linseed production was noticed in Telangana followed by Rayalaseema and Costal Andhra region. The instability in Linseed production in state of Andhra Pradesh is 47.68 percent.

In case of Linseed yield, the highest stability in Linseed yield was recorded in Rayalaseema region i.e. 68.05 percent followed by Telangana (67.40 )and Costal Andhra(39.67 percent). In case of Andhra Pradesh state as whole the stability in Linseed yield is 67.39 percent.