To study the relative impact of different input factors on crop production we adopted the adaptive expectation model. This model is based on the behaviours hypothesis of the farmers which stated the present level of output depends not on the perfect price level but the expected price level. After the incorporation of the expected prices the final regression model is given in methodology (equation –13). The traditional relationship between crop output and some important variables is shown in equation. ----(6).

The time series data for the period 1970-71 to 2000-2001 has been used to the present study. The data related to each crop in each Region of Andhra Pradesh and the Andhra Pradesh state as a whole was fed to the equation(6). The parameters were estimated by adopting O.L.S (Ordinary least squares) method and results were expressed in equation form for each crop. Both the linear and log-linear models were estimated and it is observed that the log-linear model yields the better estimates comparing to the linear model. The analysis is based on log-linear model.

RAYALASEEMA REGION

Groundnut

The estimated regression equation for Groundnut production is:

\[ Y_t = -9.3448 + 1.4549 \times A_t - 0.1698 P_{t-1} + 0.5871 R_t \]

\[ R^2 = 0.7329, \quad F= 24.71 \]

In the above equation, the area under the Groundnut crop was found to be positive and significant at 5 per cent probability level in Rayalaseema region.
This means the quantity of Groundnut output was significantly and directly influenced by its area. The positive co-efficient of area explained the positive relationship between the crop output and crop area. For every one unit increase in area 1.46 units of output may be increased. The co-efficient of lagged price is having negative sign and it is insignificant. It means their exists insignificant negative relationship between output and lagged price. The lagged price effects is not found on Groundnut output in the region. For every one unit increased lagged price will decrease groundnut output by 0.17 units. The co-efficient of rainfall is positive and significant. This indicates that there is a direct and significant relationship between Groundnut output and rainfall. Hence, one can say that Groundnut output is influenced by rainfall significantly. For every one unit increase in rainfall will increase the output nearly 0.6 units. The collective effect of all independent variables (At, Pt,1 and Rt) on Groundnut output is expressed by multiple correlation coefficient (R²). The value of R² is 0.733. This shows that all independent variables explained about 73.29 percent of variation on total Groundnut output. F-test was carried out to test whether the combined effect of all independent variables on the dependent variable is significant or not. It is inferred that the combined effect is significant on Groundnut output. Hence, it is concluded that Groundnut output is not responded by lagged price and it is influenced by rainfall and area.

**Sugarcane**

The fitted log-linear regression equation of sugarcane output in Rayalaseema region is
\[ Y_t = 4.6498 + 0.5877 \times A_t + 0.0990 \times P_{t-1} + 0.1630 \times R_t \]

(0.2261) (0.0622) (0.1990)

\[ R^2 = 0.5668 \quad F = 11.7734 \]

From the above equation, it is observed that the coefficient area under the sugarcane crop is positive and significant at 5 percent probability level in Rayalaseema region. This means that the quantity of the cane output is significantly and directly influenced by area under the sugarcane crop. It explains, there is a positive relationship between the output of the crop and the area under the crop. For every one unit increase in area 0.59 units of output may be increased. The coefficient of lagged price is having positive relationship with crop output in the case of sugarcane crop. But it is not significant. This indicates that the sugarcane output is insignificantly influenced by the lagged price. For every one unit increase in lagged price will increase sugarcane output by 0.10 units. The coefficient of rainfall is positive and it is insignificant. This shows that there is a direct and insignificant relationship between sugarcane output and rainfall i.e., the sugarcane output is influenced by rainfall insignificantly in Rayalaseema region. For every one unit increase in rainfall will increase sugarcane output by 0.16 units. The combined effect of all independent variables. Area, lagged price and rainfall, in cane production i.e., value of \( R^2 \) is 0.5668. It means all independent variables explained about 56.6 per cent of variation in total sugarcane output. F-test was carried out to test whether the combined effect of all independent variables on the dependent variable is significant or not. It is inferred that the combined effect is significant on
sugarcane output. It is concluded that sugarcane output is responded by area significantly. The lagged price and rainfall effect is not significantly effect on cane production.

**Cotton**

The calculated regression equation of cotton production is

\[
Y_t = 3.5972 + 0.5328^* A_t + 0.6807^* P_{t-1} - 0.4499 R_t
\]

\[
\begin{array}{ccc}
(0.1465) & (0.0924) & (0.3781)
\end{array}
\]

\[R^2 = 0.7177^* \quad F = 22.8846\]

In the above estimated equation, the area under the cotton crop was found to be positive and significant at 5 percent probability level in Rayalaseema Region. It indicates that the quantity of cotton output was directly and significantly influenced by area under the crop. The positive coefficient of area explained direct relationship between the cotton crop output and crop area. For every one unit increase in area will increase the cotton output by 0.53 units. The coefficient of lagged price is positive and significant. It means, there is significance positive relationship between cotton output and lagged price. It shows that output is directly and significantly influenced by lagged price. For every one unit increase in lagged price will increase the cotton output by 0.68 units. The coefficient of rainfall is negative but not significant. It means there exists an insignificant negative relationship between output and rainfall. It may observed that the rainfall effect is not found on cotton output in Rayalaseema region. For every one unit increase in rainfall will decrease cotton output by 0.45 units. The collective effect of all independent variables i.e., $A_t$, $P_{t-1}$ and $R_t$ on
cotton production is expressed by multiple correction coefficient $R^2$. The value of $R^2$ is 0.718. This shows that all independent variables on the dependent variable is significant or not. This shows that all independent variables effect is about 71.8 percent on cotton output. F-test was carried out to test whether the combined effect of all independent variables on the dependent variable is significant or not. This shows that the collective effect of selected variables on cotton production is significant. Hence, it is concluded that cotton output is not responded by rainfall and it is responded by area and lagged price.

**COASTAL ANDHARA REGION**

**Ground Nut**

The computed log linear regression equation of Groundnut production in coastal Andhra region for the study period is:

\[
Y_t = -4.6766 + 1.2488^* A_t + 0.3530^* P_{t-1} - 0.0966 R_t
\]

\[
(0.4082)\quad (0.1443)\quad (0.6936)
\]

\[
R^2 = 0.4020^* \quad F = 6.049855
\]

In the above estimated equation, the co-efficient of area under the Groundnut crop is positive and significant at 5 percent probability level in coastal region. It means the quantity of Groundnut output was directly and significantly influenced by area under the crop. The positive coefficient of area expresses that the positive relationship between the crop output and cropped area. For every one unit increase in area will increase the Groundnut output by 1.25 units. This increase is significant. The coefficient of lagged price is positive and significant. A significant and direct relationship between Groundnut output
and cropped area were observed in coastal region. The lagged price effect on groundnut production was noticed. For every one unit increased lagged price will increase Groundnut output by 0.35 units. The coefficient of rainfall is negative and insignificant. This shows there is insignificant and negative relationship between rainfall and Groundnut output. The rainfall effect is not found on Groundnut output. For every one unit increase in rainfall will decrease output by 0.10 units. The combined effect of all independent variables on the dependent variable Groundnut output i.e., the value of $R^2$ is 0.4020. This shows that all independent variables effect on dependent variable is 40.2 percent. Nearly 40 percent of variation in total output of Groundnut was noticed by the variables. F-test was carried and it is found to be significant. It inferred that the combined effect of all variables is significant on Groundnut output. Hence, it is concluded that Groundnut output is not responded by rainfall and it is influenced by area and lagged price.

**Sugar Cane**

The estimated log-linear equation for sugar cane production is

$$Y_t = 7.0637 + 0.6211 A_t + 0.0265 P_{t-1} - 0.1255 R_t$$

$$(0.1540) (0.0518) (0.1725)$$

$R^2 = 0.5670^*$  $F= 11.7830$

In the above estimated equation, the coefficient of area under the sugar cane crop was found to be positive and significant at 5 percent probability level in coastal region. This means the quantity of sugarcane output was directly and significantly influenced by area under the crop. The positive coefficient of area...
explained the direct relationship between the crop output and cropped area. For every one unit increase in area will increase the cane output by 0.62 units. The coefficient of lagged price is positive. The quantity of output was positively influenced by lagged price. Therefore there is a direct and insignificant relationship between sugarcane output and lagged price. For every one unit increase in lagged price will increase sugarcane output by 0.03 units. This increase in cane output by price is not significant. The coefficient of rainfall as negative and insignificant. A negative relationship between output and rainfall was noticed. For every one unit increase in rainfall will decrease output by 0.13 units. The collective effect of all independent variables on sugar cane production is expressed by multiple correlation coefficient (R^2). The value of R^2 is 0.567. It reveals that all explanatory variables effect on explained is about 56.7 percent. All most 57 percent of variation in cane output was observed. From F-test statistic is inferred that this combined effect is significant on sugarcane output. Hence, it is concluded that sugar cane output is not responded by rainfall and responded by cane area and lagged price.

**Cotton**

The fitted regression equation for cotton production is

\[
Y_t = -2.2598 + 1.5023 A_t - 0.1157 P_{t-1} - 0.3472 R_t
\]

\[
(0.1896) \quad (0.1831) \quad (0.5561)
\]

\[
R^2 = 0.8039 \quad F = 36.887
\]

In the above fitted equation, the coefficient of area under the crop is positive and significant at 5 percent probability level in coastal Andhra Region.
This means the quantity of crop output was significantly and directly influenced by area under the crop. The positive coefficient of area explained the positive relationship between output of the crop and the area under the crop. An increase in area, will increase the cotton production by 1.5 units. The coefficient of lagged price is having negative relationship with the crop output. It indicates that the cotton output is not influenced by the lagged price of crop. For every one unit increase in price will decrease the production by 0.12 units. A negative price impact was noticed on cotton output. The coefficient of rainfall is negative and insignificant. A negative relationship effect has been observed on cotton output. Therefore cotton output is not influenced by rainfall. For every one unit increase in rainfall will decreased output by 0.35 units. The combined effect of all independent variables ($R^2$) is 0.804. This reveals that the independent variables explained about 80.4 percent of variation in total output. F-test was carried out for significant of multiple correlation coefficient. It is inferred that the combined effect is significant on cotton output. Hence, it is influenced by area and it is not responded by lagged price and rainfall.

**Tobacco**

The calculated regression equation of tobacco in coastal Andhra region is

$$Y_t = 3.0763 + 0.7134 A_t + 0.0309 P_{t-1} + 0.0250 R_t$$

(R2 = 0.4932, F= 8.7584)

From the above equation, the coefficient of area under the crop is positive and significant at 5 percent probability level in Coastal Andhra region. That is,
the quantity of tobacco output was directly and significantly influenced by area under the crop. The positive coefficient of area explained the positive relationship between the crop output and cropped area. For every one unit increase in area will increase the tobacco output by 0.71 units. The coefficient of lagged price is positive. It means lagged price is positively influencing the tobacco output in coastal region. For every one unit increase in lagged price will increase the tobacco output by 0.04 units. The coefficient of rainfall is positive and insignificant. It shows that rainfall is directly influencing the crop output, but not significantly. For every one unit increase in rainfall will increase the output by 0.03 units. The collective effect of all independent variables on Tobacco output \((R^2)\) is 0.493. This shows that all independent variables explained about 49.3 percent of variation, in total tobacco output. F-test statistic is inferred that the combined effect is significant on tobacco output. Hence, it is concluded that tobacco output is responded by all independent variables like area, lagged price and rainfall positively. Finally it is inferred that the tobacco output is responded by price, area and rainfall but area responsive is significant.

**TELANGANA REGION**

**Groundnut**

The estimated log-linear regression equation for Groundnut output is

\[
Y_t = 1.1379 + 0.8849 A_t + 0.1282 P_{t-1} - 0.0980 R_t \\
(0.1316) \quad (0.0448) \quad (0.0857)
\]

\[
R^2 = 0.7226^* \quad F= 23.4382
\]

In the above estimated equation, the coefficient of area under the Groundnut crop is positive and significant at 5 percent probability level in
Telangana Region. It means the quantity of Groundnut output was directly and significantly influenced by area under the crop. A positive and significant area effect was noticed on Groundnut output. For every one unit increase in area will increase the 0.88 units of output. The coefficient of lagged price is positive and significant. It reveals that there is direct and significant relationship between lagged price and output. Therefore, one can say that the Groundnut output is significantly influenced by lagged price. For every one unit increase in lagged price will increase Groundnut output by 0.13 units. The coefficient of rainfall is negative and insignificant. It means there is an insignificant negative relationship between output and rainfall. It expresses that the rainfall is not positively effecting the Groundnut output. For every one unit increase in rainfall will decrease Groundnut output by 0.10 units. The combined effect of all independent variables ($R^2$) is 0.723 percent. This shows that all the independent variables collectively explained about 72.3 percent of variation in total Groundnut output. F-test was carried out to test the significance of multiple correlation coefficient. It is noticed that the combined effect of all independent variables on the Groundnut output is significant. Hence it is concluded that Groundnut output is not responded by rainfall and it is responded by area and lagged price.

**Sugarcane**

The estimated regression equation of cane production in Telangana region is

$$Y_t = 7.4659 + 0.5056A_t + 0.0078P_{t-1} - 0.0421R_t$$

\(R^2 = 0.2182\) \(F= 2.5125\)
From the above estimated equation, the coefficient of area under the sugarcane crop was found to be positive and significant at 5 percent probability level in Telangana region. The quantity of sugarcane output was directly and significantly influenced by area under the crop. For every one unit increase in area will increase in output by 0.57 units. This increase in output is significant. The coefficient of lagged price is positive and insignificant. The positive coefficient of lagged price expresses a insignificant positive relationship between cane output and lagged price. For every one unit increase in lagged price will increase in cane output by 0.01 unit. The coefficient of rainfall is negative and insignificant. It means cane output is not influenced by rainfall. For every one unit increase in rainfall will decrease the output by nearly 0.04 units. The collective effect of all independent variables on sugar cane output is expressed by multiple correlation coefficient ($R^2$). The value of $R^2$ is 0.218. It shows that all independent variables explained about 21.82 percent of variation in sugarcane output. F-test was carried out to test the significance of multiple correlation. It is inferred that the combined effect is not significant on sugar cane output. Hence, it is concluded that sugarcane output is responded by Area and lagged price but not rainfall.

**Cotton**

The estimated log linear regression equation of cotton production is

$$Y_t = 2.9839 + 0.2040 A_{t-1} + 1.2796 P_{t-1} - 0.2920 R_t$$

$$R^2 = 0.8492, F = 50.6885$$
From the above estimated equation, the coefficient of area under the cotton crop is positive, but not significant. The quantity of output was insignificantly and directly influenced by area under the crop. The positive coefficient of area explained the positive relationship between the output of the crop and the area under the crop. Every one unit increase in area will increase the 0.20 units of output. The coefficient of price is positive and significant at 5 percent probability level. This means that the quantity of the cotton output was significantly and directly influenced by lagged price. For every one unit increase in lagged price may increase the output by 1.28 units. The coefficient of rainfall is negative and insignificant. It means on inverse relationship between cotton crop output and rainfall was noticed. It shows that the quantity of output was not influenced by rainfall. For every one unit increase in rainfall may decrease the production by 0.28 units. The collective effect of all independent variables are responded by $R^2$. The value of $R^2$ is 0.849. It expresses that all independent variables explained about 84.92 percent of variation in total cotton output. From f-test statistics it is inferred that the combined effect of variables is significant on cotton crop output. Hence, it is concluded that the cotton output is responded by lagged price and area the rainfall effect is negative.

**Tobacco**

The fitted log-linear model is

$$Y_t = 0.9821 + 0.6281 A_{t,1} + 0.3454^* P_{t,1} + 0.0536^* R_{t,1}$$

$$R^2 = 0.4136^* \quad F = 6.348$$
In the above fitted equation, the coefficient of area under the tobacco crop was found to be positive and significant at 5 percent probability level. It means the quality of tobacco output was directly and significantly influenced by area under the crop. For every one unit increase in area under the tobacco crop will increase the tobacco output by 0.63 units. The variable lagged price is expressed a positive and significant relationship with the output. It indicates that the tobacco crop is directly and significantly influenced by lagged price. For every one unit increase in lagged price will increase tobacco output by 0.35 units. The coefficient of rainfall is positive and insignificant. The positive coefficient reveals that there is a direct and insignificant relationship between tobacco output and rainfall. For every one unit increase in rainfall will increase the output by 0.05 units. The combined effect of all independent variables on tobacco output is expressed by multiple correlation coefficient ($R^2$). The value of $R^2$ is 0.414. All independent variables explained about 41.4 percent of variation in total tobacco output. F-test was carried out for significance of $R^2$. From f-test statistics it is inferred that the combined effect is significant on tobacco crop output. Hence, it may be concluded that the tobacco output is significantly responded by rainfall and lagged price and area is responded but not significantly.

**ANDHRA PRADESH**

**Groundnut**

The estimated log linear regression equation for Groundnut production

$$Y_t = 7.8631 + 1.3886 A_t - 0.0595^* P_{t-1} + 0.362435 R_t$$

(0.1792) (0.0573) (0.1818)

$R^2 = 0.8180^*$

F= 40.4402
In the above estimated equation, the area under the Groundnut crop was found to be positive and significant at 5 percent probability level in Andhra Pradesh state. The quantity of Groundnut output was directly and significantly influenced by area under the crop. The positive coefficient of area explained the positive relationship between the crop output and cropped area. For every one unit increase in area will increase by 1.39 units of output. The coefficient of lagged price is negative but not significant. An insignificant negative relationship was observed between output and lagged price. The lagged price effect is not found on Groundnut output in Andhra Pradesh state. For every one unit increase in lagged price will decrease groundnut output by 0.60 units. The coefficient of rainfall is positive but not significant. An insignificant positive relationship has been observed between groundnut output and rainfall. For every one unit increase in rainfall will increase in output nearly 0.36 units. The combined effect of all independent variables as expresses by multiple correlation coefficient ($R^2$). The value of $R^2$ is 0.818. This shows that all independent variables explained about 81.8 percent of variation in total Groundnut output. F-test was carried out to test the significance of $R^2$. It is inferred that the aggregate effect is significant on Groundnut output. Hence, it is concluded that the Groundnut output is negative responded by lagged price and it is influenced by area and rainfall.
Sugarcane

The fitted regression equation for sugar cane output in Andhra Pradesh state is:

\[ Y_t = 8.1825 + 0.4829 A_{t-1} + 0.05119 P_{t-1} - 0.0367 R_t \]

\[ R^2 = 0.4048 \quad F= 6.1198 \]

From the above equation, it is observed that the coefficient of area under the crop is positive and significant at 5 percent probability level. The quantity of the crop output is significantly and directly influenced by area under the crop. For every one unit increase in area may increase the cane output by 0.48 units. The co-efficient of lagged price is positive but not significant. A positive price effect is noticed by lagged price. For every one unit increase in lagged price will increase cane output by 0.05 units. The co efficient of rainfall is negative and insignificant. It indicates that cane output is not influenced by rainfall. For every one unit increase in rainfall may decrease the cane production by 0.37 unit. Therefore a negative rainfall effect was noticed on cane output. The combined effect of all independent variables on cane production is 40.48 percent, which was expressed by the value of \( R^2 \). All independent variables explained about 40.5 percent of variation in total cane output. From F-test statistic, it is inferred that the combined effect of variables is significant on cane output. Hence it may be concluded that cane output is responded by area only. The price effect is not observed significantly on sugarcane production.
Cotton

The calculated estimated equation of cotton output is

\[ Y_t = -16.5442 + 2.3668 A_t - 0.4241 P_{t-1} + 0.2019 R_t \]

\[ (0.6637) \quad (0.4294) \quad (0.1655) \]

\[ R^2 = 0.8019^* \quad F = 36.4340 \]

In the above estimated equation, the coefficient of area under the cotton crop was found to be positive and significant at 5 percent probability level in Andhra Pradesh state. The quantity of cotton output was directly and significantly influenced by area under the crop. For every one unit increased in area will increase the cotton production by 2.37 units. The coefficient of lagged price is negative. An insignificant negative relationship was noticed by the lagged price in the case of cotton. For every one unit increase in lagged price will decrease the cotton output by 0.42 units. Therefore, cotton production was not influenced by the price variable. The coefficient of rainfall is positive and significant. It revels that there is direct and insignificant relationship between cotton output and rainfall. Output of cotton was positive affected by rainfall. For every one unit increase in rainfall will increase in output nearly 0.20 units. The aggregate effect of all independent variables on cotton output i.e., the value of R^2 is 0.8019. It expressed that all independent variables explained about 80.2 percent of variation in total cotton output. The F-test statistic was found and it is inferred that the combined effect explanatory variables in the explained variable is significant. Finally it may be concluded that the cotton production is significantly responded by area but not price. Hence, it is concluded that cotton
output is responded by area and rainfall. The price effect is significantly negative.

**Tobacco**

The computed regression equation of tobacco output is:

\[
Y_t = 9.0865 + 0.1180 A_t + 0.0720 P_{t-1} + 0.1710 R_t \\
(0.2042) \quad (0.1414) \quad (0.5806)
\]

\[R^2 = 0.0267 \quad F = 0.2467\]

In the above equation, the coefficient of area under the tobacco crop is positive but not significant at 5 percent probability level. It indicates that there is a direct relationship between the quantity of output and area. The quality of tobacco output is directly influenced by area. An unit increase in area may be increase the tobacco output by 0.12 units. The coefficient of lagged price and rainfall are positive. The tobacco production was positively influenced by lagged price and rainfall variables. Each may rise the output by 0.07 and 0.17 units respectively. The collective effect of all independent variables on the dependent variable tobacco output is 0.027 percent. All independent variables explained about 2.7 percent of variation in total tobacco output. This aggregate effect of variables on tobacco production is not a significant effect. It is expressed by F-test statistic. Hence, it may be concluded that no selected variable is responsive to tobacco production in Andhra Pradesh state as a whole. It is also inferred that this commercial crop may not the price responsive.

Formers face problems in making production decisions in response to changing price and non-price factors. The expected normal prices will also effect
the former's decision in allocating the area to the particular crop. Hence expected prices instead of actual observed price may be used as an independent variable with the belief that the former's on crop output in a particular year will be covered by the price that they expect to get in that year, rather than by the past year's price. This suggests the use of an adaptive expectation model. The adaptive expectation model which is used in the study is given in the methodology (equation (8)) the data is fed to the equation (8) and the results for each crop in each region of the state may be given in equation form the estimated parameters of the variables of given explained.

**RAYALASEEMA REGION**

**Groundnut**

The estimated log-linear regression equation for Groundnut output in Rayalaseema region is

\[
Y_t = -2.9242 + 2.1690 A_t - 0.6541 A_{t-1} - 0.1283 P_t + 0.2194 R_t - 0.5246 R_{t-1} - 0.1212 Y_{t-1}
\]

\[
(0.3593) (0.4121) (0.0938) (0.2016) (0.2180) (0.1453)
\]

\[R^2 = 0.8637^*\quad F=25.3460\]

In the above equation, the coefficient of area under the Groundnut crop is positive and significant at 5 percent probability level. It reveals that the crop output is directly and significantly influenced by area under the Groundnut crop. For every one unit increase in area will increase groundnut crop production by 2.17 units. The coefficient of lagged area is negative and insignificant. The lagged area effect was not observed on groundnut output. For every one unit increase in lagged area will decrease 0.65 units output. The coefficient of
relative price is negative and insignificant in groundnut output. Hence, one can say that the relative price of groundnut is not influencing the groundnut output. For every one unit increase in relative price will decrease the output by 0.13 units. The coefficient of rainfall is positive but not significant. It indicates rainfall is directly influencing the groundnut output. For every additional unit of rainfall may increase 0.22 unit of groundnut output. The coefficient of lagged rainfall is negative and significant. For every one unit increase in lagged rainfall will decrease groundnut output by 0.52 units. The coefficient of lagged output is negative and insignificant. It reveals that lagged output is not influencing the output of the groundnut crop. The combined effect of all independent variables $A_t$, $A_{t-1}$, $P_t$, $R_t$, $R_{t-1}$ and $Y_{t-1}$ on groundnut output is expressed by multiple correction coefficient ($R^2$). The value of $R^2$ is 0.864. Therefore all independent variables explained about 86.4 per cent of variation in total groundnut output. F-test was carried out to test whether the combined effect of all independent variables on the dependent variables is significant or not. It indicates that the combined effect is significant on groundnut output. Hence, it is concluded that the groundnut output is not responded by lagged area, lagged rainfall and lagged output and it is responded by area only.

**Sugarcane**

The computed exponential function for cane production in Rayalaseema region

$$Y_t = 0.9891 + 0.6467A_t + 0.0290A_{t-1} + 0.0164P_t + 0.1745R_t + 0.0504R_{t-1} + 0.2300Y_{t-1}$$

$$R^2 = 0.5691^* \quad F= 5.2830$$
In the above estimated equation, the coefficient of area under the sugarcane crop is positive and significant at 5 percent probability level in rayalaseema region. There exists a positive and significant relationship between area and sugar cane output. For every one unit increase in cane area, will increase the cane output by 0.65 units. The coefficient of lagged area as positive but it is insignificant. It expressed that the crop production is responded by lagged cane area but the $A_{t-1}$ response is not significant. For every one unit increase in lagged area will increase cane output by 0.30 units. The coefficient of relative price is positive. It is noticed that the relative price of cane influences the cane output. Only 0.016 percent increase in cane production may be observed by relative price. The coefficient of rainfall is positive. It means the rainfall is positively related to cane output. For every one unit increase in rainfall may rise the output by 0.17 units. The coefficient of lagged rainfall is positive. It reveals that the cane output is influenced by lagged rainfall positively but not significantly. For every one unit increase in lagged rainfall may increase cane output by 0.0504 units. The coefficient of lagged output is positive. Hence, one can say, effects of lagged output on present cane output is directly and insignificantly. The combined effect of all independent variables are represented by $R^2$. The value of $R^2$ is 0.569. This value of $R^2$ explained about 56.9 percent of variation in total output of cane crop. F-test was carried out to test the significance of multiple correlations. It is inferred that the combined effect is significant on cane output. Hence sugarcane output is responded by the selected variables. But it is significantly responded by the area under the crop only.
Cotton

The fitted log-linear equation for cotton production is

\[ Y_t = -1.0246 + 0.7483 A_t - 0.2929 A_{t-1} + 0.3038 P_t + 0.1938 R_t + 0.1508 R_{t-1} + 0.4703^* Y_{t-1} \]

\( \text{(0.2016)} \quad \text{(0.2731)} \quad \text{(0.1943)} \quad \text{(0.4656)} \quad \text{(0.4648)} \quad \text{(0.2125)} \)

\[ R^2 = 0.6538^* \quad F = 7.5536 \]

In the above estimated equation, the coefficient of area under the cotton crop is positive and significant at 5 percent probability level in Rayalaseema region. It reveals that the cotton output is directly and significantly influenced by the area under the cotton crop. For every one unit increase in area may raise the cotton production by 0.75 units. The coefficient of lagged area is negative. For every one unit of output increase in lagged area will decrease the cotton output by 0.30 units. The coefficient of relative price is positive but it is insignificant. It expresses that the cotton output is directly influenced by the relative price. For every one unit increase in relative price will decrease the output by 0.3 units. The coefficient of rainfall is negative. There exists an inverse relationship between rainfall and cotton output. An unit increase in rainfall may decrease the cotton production by 0.19 units. The coefficient of lagged rainfall is positive. It reveals that the output of the cotton crop is directly influencing by lagged rainfall. For every one unit increase in lagged rainfall will rise the cotton output by 0.15 units. The coefficient of lagged output is positive and significant. It means that the lagged output is significantly influencing the output of the cotton crop. The collective effect of all independent variables on cotton output is expressed by multiple correlation coefficient \( R^2 \). The value of \( R^2 \) is 0.654. All
independent variables explained about 65.4 percent of variation in total cotton output. From F-test statistic, it is concluded that cotton output is mainly influenced by area and lagged yield. Therefore price effect was not observed on cotton production in Rayalaseema region.

COASTAL ANDHRA REGION

Groundnut

The estimated exponential form is

\[ Y_t = -5.9255 + 1.1679A_t + 0.4212A_{t-1} + 0.4709^* P_t - 0.0570R_t - 0.2290R_{t-1} - 0.2003Y_{t-1} \]

\[ (0.8282) \quad (0.9366) \quad (0.1641) \quad (0.7224) \quad (0.6639) \quad (0.1957) \]

\[ R^2 = 0.482^* \quad F = 3.729 \]

In the above estimated equation, the coefficient of area under the groundnut crop is positive but not significant at 5 percent probability level. It reveals that the groundnut output is directly influenced by the area in coastal region. The positive effect of groundnut area is not significant on its production. For every one unit increase in area may rise the output by 1.168 units. The coefficient of lagged area is positive and insignificant. It is noticed that the lagged area is directly influencing the groundnut crop output. For every one unit increase in lagged area will increase the output by 0.421 units. The coefficient of relative price is positive and significant. It reveals that the relative price is directly and significantly influencing Groundnut output. For every one unit increase in relative price will increase the output by 0.47 units. The coefficient of rainfall and lagged rainfall are negative. It indicates that Groundnut output is not responded by rainfall and lagged rainfall. For every one unit increase in rainfall and lagged rainfall variables each may rise the output by 0.06 and 0.23
units respectively. The coefficient of lagged output is negative and insignificant. Groundnut production is not influenced by lagged output. For every one unit increase in lagged output will decrease Groundnut output by 0.2 units. The value of multiple correlation coefficient \( R^2 \) is 0.482. It explained 48.2 percent of variation by all in dependent variables in total Groundnut output. To test the significance of the combined effect of all independent variables, F-test was carried out. Hence, it may be concluded that the Groundnut output is responded by relative price only.

**Sugarcane**

The fitted log linear regression equation of cane production is

\[
Y_t = 3.9815 + 0.5576 A_t - 0.1576 A_{t-1} + 0.0004 P_t - 0.0793 R_t - 0.0862 R_{t-1} + 0.4490 Y_{t-1}
\]

\[
(0.1818) \quad (0.2146) \quad (0.5007) \quad (0.1702) \quad (0.1591) \quad (0.1895)
\]

\[
R^2 = 0.6598 \quad F = 7.7578
\]

In the above fitted equation, the coefficient of area under the sugarcane crop is positive and significant at 5 percent probability level. It indicates that the quantity of output was directly and significantly influenced by area under the crop. For every one unit increase in area may rise the cane output by 0.56 units. The coefficient of lagged area is negative. It means that the output is negatively influenced by lagged area. Every one unit increase in lagged area may decrease the 0.16 units of output. The coefficient of relative price is positive and insignificant. It means price is directly influencing the sugarcane output. A negligible price effect on cane output was noticed. The coefficient of rainfall and lagged rainfall is negative. The rainfall and lagged rainfall negatively
influencing the cane output. For every one unit increase in rainfall and lagged rainfall each may fall the cane output by 0.079 and 0.086 units respectively. The coefficient of lagged output is positive and significant. It reveals that the output is significantly influenced by lagged output. An unit increase in lagged output, may increase the cane output by 0.45 units. The aggregate effect of all variables on sugar cane output is expressed by multiple correlation coefficient ($R^2$). The value of $R^2$ is 0.660. This shows that all independent variables explained about 66.0 percent of variation in total sugar cane output. It is inferred that the combined effect is significant on cane output. Hence, it is concluded that cane output is responded by area and lagged output only. Therefore price effect is not noticed on sugar cane production.

**Cotton**

The computed regression equation for cotton production in Coastal Andhra region is

$$Y_t = 4.2206 + 1.0576 A_t + 0.0157 A_{t-1} - 0.0040 P_t - 0.5914 R_t - 0.4715 R_{t-1} + 0.2331 Y_{t-1}$$

$$R^2 = 0.8222^*$$

In the above function, the coefficient of area under the cotton crop is positive and significant at 5 percent probability level. It shows that the quantity of cotton output was directly and significantly influenced by area under the crop. An unit increase in area may increase that output by 1.06 units. The coefficient of lagged area is positive but not significant. It indicates that the cotton output was positively influenced by lagged area. Every one unit increase in lagged area will rise the output by 0.02 units. The coefficient of relative price is negative. It
is observed that the output is negatively influenced by relative price. For every one unit increase in price may reduce cotton output by 0.004 units. The coefficient of rainfall and lagged rainfall are negative. It indicates that the output is inversely influenced by these variables. For every one unit increase in rainfall variables will decrease the output by 0.59 and 0.47 units respectively. The coefficient of lagged output is positive but not significant. It reveals that the output of cotton is directly influenced by lagged output. For every one unit increase in lagged output may rise the cotton production by 0.233 units in Coastal Andhra region of Andhra Pradesh state. The combined effect of all independent variables i.e., \( A_t, A_{t-1}, P_t, R_t, R_{t-1} \) and \( Y_{t-1} \) are represented by \( R^2 \). The value of \( R^2 \) is 0.822. This shows that all independent variables explained about 82.2 percent of variation in total cotton output. F-test was carried out for the significance of \( R^2 \). It is noticed that the combined effect is significant on cotton output. Hence, it is concluded that cotton output is represented by area under the crop only.

**Tobacco**

The calculated multiple regression equation for tobacco production is

\[
Y_t = -0.7786 + 0.8842A_t - 0.3492A_{t-1} + 0.0706P_t + 0.045R_t + 0.0908R_{t-1} + 0.4129Y_{t-1}
\]

\[
(0.1665) \quad (0.2275) \quad (0.03832) \quad (0.1767) \quad (0.1678) \quad (0.1602)
\]

\[ R^2 = 0.6734^* \quad F = 8.2488 \]

In the above equation, the coefficient of area under the tobacco crop is positive and significant at 5 percent probability level in coastal region. This shows that tobacco crop output is directly and significantly influenced by area.
under the crop. A unit increase in area, will increase the output by 0.88 units. This is a significant increase. The coefficient of lagged area is negative. It expresses that the output is negatively influenced by lagged area. For every one unit increase in lagged area may reduce the output by 0.35 units. The coefficient of relative price is positive but not significant. It reveals that the quantity of tobacco output is directly influenced by relative price. Every one unit increase in relative price may raise the output by 0.07 units. The coefficient of rainfall and lagged rainfall are positive and insignificant. It means that output is directly influenced by these two variables. An unit increase in rainfall and lagged rainfall variables may raise the tobacco output by 0.05 and 0.09 units respectively. But tobacco output is not significantly influenced by these two variables in Coastal Andhra region. The coefficient of lagged output is positive and significance. It reveals that the quality of tobacco output is directly and significantly influenced by lagged output. Every one unit increase in lagged output will raise the output by 0.41 units. The combined effects of all independent variables under consideration are represented by $R^2$. The value of $R^2$ is 0.673. By this multiple correlation coefficient, all independent variables explained about 67.3 percent of variation in total tobacco output. F-test was carried out and it is noticed that the collective effect of all variables is significant on tobacco output. Hence it may be concluded that the tobacco production is represented by its area and lagged output significantly, only a positive response was observed by price and rainfall variables. Therefore the tobacco production is not significantly responded by its price variables.
TELANGANA REGION

Groundnut

The estimated log-linear regression equation of Groundnut production in the Telangana region of Andhra Pradesh is:

\[ Y_t = 0.8073 + 1.1317 A_t^{0.4278} A_{t-1} + 0.1440 P_t + 0.0556 R_t + 0.1744 R_{t-1} + 0.0831 Y_{t-1} \]

\[ (0.2149) (0.3048) (0.0485) (0.0948) (0.0963) (0.2002) \]

\[ R^2 = 0.756^* \]

\[ F = 12.0394 \]

In the above estimated equation, the coefficient of area under the Groundnut crop is positive and significant at 5 percent probability level. It means that the quantity of Groundnut output is significantly and directly influenced by area under the crop. For every one unit increase in area will raise output by 1.13 units. The coefficient of lagged area and rainfall are negative and insignificant. It noticed that the output is negatively influenced by lagged area and rainfall. Every one unit increase in lagged area and rainfall variables may decrease the groundnut production by 0.43 and 0.06 units respectively. The coefficient of relative price is positive and significant. It reveals that the quantity of output is significantly and directly influenced by price. An unit increase in price will leads to raise the groundnut production by 0.144 units. The coefficient of lagged rainfall and lagged output are positive but not significant. It means that groundnut output is directly influenced by these two variables. For every one unit increase in lagged rainfall and lagged output may raise the Groundnut production by 0.17 and 0.08 units respectively. The value of multiple correlation \((R^2)\) is 0.76. It explained that 75.6 percent of variation in total output of
groundnut crop in Telangana region. To test the significant of the combined effect of all the independent variables included in the model, on dependent variable, f-test statistic was carried out. It is inferred that the collective effect is significant on groundnut production. Hence, it may be concluded that groundnut output is significantly responded by area and relative price only. Therefore the commercial crop groundnut production is responded by the relative price and area.

**Sugarcane**

The calculated regression equation of sugarcane production is

\[
Y_t = 2.6719 + 0.1130A_t + 0.0488A_{t-1} - 0.0241P_t + 0.1276R_t + 0.0918R_{t-1} + 0.5464Y_{t-1}
\]

\[
(0.2324) \quad (0.1994) \quad (0.0676) \quad (0.2220) \quad (0.21521) \quad (0.2162)
\]

\[R^2 = 0.4227^* \quad F = 2.9294\]

From the fitted equation it is observed that the coefficient of two variable area and lagged area are positive but not significant there exists positive relationship between the cane production and each of these two variables in the region. Therefore sugarcane production is positively influenced by these variables. An unit increase in each of these two variables may raise the cane production by 0.11 and 0.05 units respectively. This increase in output is not significant. The coefficient of relative price is negative. An inverse relationship was established by price variable. It is noticed that the cane output may be decreased by every one unit increase in relative price. But this decrease in output by price is not a significant decrease. If one unit of price increases leads to 0.024 unit of sugarcane output may be decreased. The regression coefficients of two rainfall variables are positive. It indicates that the sugar cane production is
increased by increasing these variables. For every one unit increase in each of these variables may raise the output by 0.13 units and 0.09 units respectively. The lagged output variable is also influencing the sugarcane output positively in Telangana region. The coefficient of $Y_{t-1}$ is positive and significant at 5 percent probability level. An increase in one unit of $Y_{t-1}$ will increase the cane output by 0.55 units. The constant intercept term value is 0.4227. It reveals that about 42.3 percent of variation in cane output by all independent variables in the model. To test the significance of this collective effect, F-test statistic was calculated. It observed that the aggregate effect of all variables is significant. Hence it is inferred that the cane production is not responded by the price variable and it is positively responded by area and rainfall variables. It is significantly responded by lagged output.

Cotton

The computed log linear regression equation of cotton production is

$$Y_t = 7.7421 + 0.1740A_t + 1.5233 \times A_{t-1} + 0.1017P_t - 0.0660R_t - 0.1372R_{t-1} - 0.0360Y_{t-1}$$

$(0.2216) \quad (0.5359) \quad (0.3107) \quad (0.2409) \quad (0.2409) \quad (0.2302)$

$R^2 = 0.8889 \quad F= 32.0025$

In the above estimated equation, the coefficient of area relative price of the crop are positive but they are insignificant. It means cotton output is directly influenced by area and relative price under the cotton crop in Telangana Region. For every one unit increase the each of these variables will raise the cotton production by 0.17 units and 0.1 units respectively. The coefficient of lagged area is positive and significant. It means there is direct and significant relationship between cotton output and lagged area. It reveals that the quantity of
output is significantly influenced by lagged area. For every one unit increase in lagged area, 1.52 units of output may be increased. The coefficient of rainfall, lagged rainfall and lagged output are negative but its effect is not significant on cotton production. An increase in each of these three units will decrease the cotton production, but this decrease in cotton production is not a significant decrease. For every one unit increase in each variable will decrease the cotton output by 0.07 units, 0.16 units and 0.04 units respectively. The value of multiple correlation coefficient is 0.8889. The aggregate effect of all independent variables in cotton production is 88.9 percent. It means, almost 88.9 percent of variation in total cotton output recorded by these variables under consideration. From F-test statistic, it is observed that the multiple correlation coefficient is significant at 5 percent probability level. Hence, it may be concluded that the cotton production is significantly responded by lagged area but not the output is positively responded by relative price. The positive price effect is not significant effect on cotton production.

**Tobacco**

The fitted exponential equation of the form for Tobacco output is

\[
Y_t = -0.6338 + 0.5594 A_t + 0.0959A_{t-1} + 0.3280 e^P_t + 0.0654R_t + 0.0326R_{t-1} + 0.1120Y_{t-1}.
\]

\[
R^2 = 0.4499^* \quad F = 3.2717
\]

From the above fitted equation, the coefficient of area under the crop is positive and significant at 5 percent probability level. The tobacco output is directly and significantly influenced by area. For every one-unit increase in area,
0.56 units of output may be increased. The coefficient of lagged area is also positive but not significant. It reveals that the output is positively influenced by lagged area. For every one-unit increase in lagged area, 0.1 unit of output may be increased. The coefficient of relative price is positive and significant. It indicates that the quantity of tobacco output is directly and significantly influenced by relative price. Every one unit increase in price may raise the output by 0.33 units. The coefficient of rainfall, lagged rainfall and lagged production variables are positive but not efficient effect on tobacco output is significant. Each of these three variable are expresses the positive effect on output. Every one unit increase in each of these variables may raise the total tobacco output by 0.06 units 0.03 units and 0.11 units respectively. The value of constant intercept term is negative (-0.6338). The collective effect of all independent variables like $A_t$, $A_{t-1}$, $P_t$, $R_t$, $R_{t-1}$ and $Y_{t-1}$ on tobacco output is expressed by multiple correlation of coefficient ($R^2$). The value of $R^2$ is 0.4499. This shows that all independent variables explained about 45.0 percent of variation in total tobacco output. F-test was carried out to test the significance of variables aggregate effect. It is inferred that the combined effect is significant on tobacco output. Hence it may be concluded that tobacco output is significantly influenced by its price and area under the crop. The remaining variables are positively influencing by crop production.

**ANDHRA PRADESH STATE**

**Groundnut**

The estimated exponential equation for Groundnut production is
\[ Y_t = 6.8732 + 2.1847 A_t - 0.49 A_{t-1} - 0.03 P_t + 0.23 R_t + 0.0034 R_{t-1} - 0.3323 Y_{t-1} \]

\[
\text{(0.25) (0.35) (0.05) (0.14) (0.15) (0.15)}
\]

\[ R^2 = 0.905 \quad F = 38.095 \]

In the above estimated equation, the coefficient of area under the Groundnut crop is positive and significant at 5 percent probability level. It means the quantity of Groundnut output is directly and significantly influenced by its area. For every one unit increase in area under the crop, 2.18 units of output may be increase. The coefficient of lagged area and relative price of groundnut are negative but not significant. The groundnut production is negatively influenced by these variables. There exists a negative relationship between each of these variables. An unit increase in these two variables will decrease the crop production by 0.49 units and 0.03 units respectively. Therefore, the commercial crop groundnut is not responded by its price. The coefficient of two rainfall variables are positive but not significant. There exists a positive relationship between groundnut production and each rainfall variables in Andhra Pradesh state as a whole. Every one unit increase in each of these variables may raise the Groundnut production by 0.23 units and 0.03 units respectively. This increase in output by these rainfall variables are not significant. A negative relationship may be observed between the lagged output and groundnut output. A unit increase in lagged output may decrease the groundnut output by 0.33 units. The collective effect of all independent variables on groundnut is expressed by multiple correlation coefficient \((R^2)\). The value of \(R^2\) is 0.905. This shows that all independent variables explained about 90.5 percent of variation in total groundnut output. F-test was carried out to test
whether the combined effect of all independent variables on dependent variables is significant on groundnut output. Hence, it may be concluded that groundnut output is not responded by lagged area price and lagged output. It is influenced by the rainfall, lagged rainfall variables. Therefore it is concluded that the area is significantly responded to groundnut production.

**Sugarcane**

The calculated regression equation for sugarcane production is

\[ Y_t = 4.55 + 0.32 A_t + 0.03 A_{t-1} + 0.02 P_t - 0.08 R_t - 0.002 R_{t-1} + 0.41 Y_{t-1} \]

\[ \text{(0.22) (0.22) (0.05) (0.20) (0.19) (0.20)} \]

\[ R^2 = 0.496^* \quad F = 3.93 \]

It is observed that the coefficient of area lagged area and relative price of the sugarcane crop are positive but not significant. These three variables each will established a positive relationship with the sugarcane production i.e., the quantity of these variables increase. The production of sugarcane may be raised. Every one unit increase in each of these variables may increase the cane output by 0.32, 0.03 and 0.02 units respectively. But this increase in cane output by these variables, will not be a significant increase. The coefficient of two rainfall variables are negative but not significant. A negative relationship was observed between rainfall and cane production. An increase in rainfall will decrease the crop output. For every one unit increase in each of these two variables will decrease the cane output by 0.08 units and 0.002 units. It is noticed that the decrease in output is not a significant decrease. The coefficient of lagged output is positive but not significant. An unit increase in lagged output \( Y_{t-1} \) will raise the output by 0.41 units. The constant intercept terms is 4.55. The aggregate
effect of all independent variables on the dependent variable is called as the multiple correlation coefficient, it is denoted by $R^2$. From the above estimated equation, the multiple correlation coefficient is 0.496. Almost 49.6 percent of variation in total cane production was recorded by all selected explanatory variables. F-test statistic was computed. It is observed that the aggregate effect of all these variables of cane output is significant at 5 percent probability level. Finally it may be concluded that cane output is not significantly responded by price and area but this effect is positive on cane production. The rainfall variables effect is negative.

**Cotton**

The fitted log-linear regression equation for cotton production in Andhra Pradesh state is

$$Y_t = -6.48 + 0.981 A_t - 0.023 A_{t-1} - 0.26 P_t - 0.05 R_t + 0.08 R_{t-1} + 0.65 Y_{t-1}$$

$$R^2 = 0.901^* \quad F = 36.45$$

In the above equation, the coefficient of area under the cotton crop is positive and significant at 5 percent probability level. It indicates that there is direct relationship between quantity of output and area, i.e., the quantity of cotton output is directly and significantly influenced by area under the crop in Andhra Pradesh state. For every one unit increase in area 0.98 units of output may be increased. The coefficient of lagged area, relative price and rainfall variables are negative but not significant. An inverse relationship between the quantity of these each variables and cotton output. It explained that these variables are not influencing the cotton output positively. For very one unit
increase in each variable 0.23 units, 0.26 units and 0.05 units of output may be decreased. The coefficient of lagged rainfall is positive but not significant. Hence, this is directly influencing the output. For every one unit increase in lagged rainfall will increase the output by 0.08 units. The coefficient of lagged output is positive and significant. This shows that there is direct relationship between lagged output and current output. It indicates that lagged output is directly and significantly influenced to cotton output in Andhra Pradesh state. For every one unit increase in lagged output, 0.65 units output may be increased. The combined effect of all independent variables i.e., $A_t$, $A_{t-1}$, $P_t$, $R_t$, $R_{t-1}$ and $Y_{t-1}$ represented by $R^2$. The value of $R^2$ is 0.901 i.e., all independent variables explained about 90.1 percent variation in total cotton output. F-test was carried out to test whether the combined effect of all independent variables on the dependent variable is significant or not. It is inferred that the combined effect is significant on cotton output. Hence it is concluded that cotton output is not responded by price and rainfall. It is influenced by area lagged output mainly.

**Tobacco**

The computed exponential form for tobacco production in the state is

$$Y_t = -0.93 - 0.010 A_t + 0.086 A_{t-1} + 0.01 P_t + 0.15 R_t + 1.34 R_{t-1} + 0.16 Y_{t-1}$$

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>$A_t$</th>
<th>$A_{t-1}$</th>
<th>$P_t$</th>
<th>$R_t$</th>
<th>$R_{t-1}$</th>
<th>$Y_{t-1}$</th>
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</table>

In the above equation, the coefficient of area under the tobacco crop is negative and significant at 5 percent probability level. It means there is an inverse relationship between quantity of tobacco output and its area. It indicates
that the quantity of output is not influenced by area. For every one unit increase in area 0.01 units of output may be decreased. The area effects to be observed a negative effect. The coefficient of lagged area, relative price rainfall and lagged output are positive. But this is influenced on tobacco production is not significant. Each of these four variables will established a positive relationship with tobacco output in the state of Andhra Pradesh. An unit increase in each of these variables will increase the production by 0.09 units, 0.01 units, 0.15 units and 0.16 units respectively. It is noticed that the tobacco output is not significantly influenced by these variables. The coefficient of lagged rainfall is positive and significant at 5 percent probability level. An increase in lagged rainfall may raise the output by 1.34 units. This is a significant increase in tobacco output in the state. The combined effect of all independent variables is \( A_t, P_t, R_t, R_{t-1} \) and \( Y_{t-1} \) on tobacco output is expressed by \( R^2 \). The value of \( R^2 \) is 0.239. It means that all independent variables explained about 23.9 percent of variation in total output. F-test was carried out to test the significance of aggregate effect of all variables. It is inferred that the combined effect is not significant on tobacco output. Hence, it is concluded that tobacco output is not responded by area. It is positively influenced by lagged area, price, rainfall and lagged output. But a positive and significant influence was observed by lagged rainfall on tobacco production.
Table – 4.1
SIGNIFICANT COEFFICIENTS IN EQUATION (6)

<table>
<thead>
<tr>
<th>Region</th>
<th>Crop</th>
<th>A_t</th>
<th>P_{t-1}</th>
<th>R_t</th>
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Observing the significant estimated coefficients of equations 1 & 2 tables is noticed that the area under the crop is the major factor which influencing the crop output in almost all the regions of the state. The price variable influences on output are not observed much. It is concluded that the commercial crops production is mainly area responsive but not price responsive. It also reveals that the commercial crop price is not encouraging the crop growers in rising the crop production. It is suggested that the Government may be provide the minimum supporting prices to these selected commercial crops in the state. The effect of

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rainfall on crop production is totally absent. This is due to lack of rainfall or untimely rainfall. It leads the negative effect on crop production. It is also suggest that the providing irrigation facility to these crops the crop production may be increased. Finally the lagged output variable is also influencing the current crop output. From the present study it is noticed that nearly 40 percent lagged output variables effect is significant on current output. It is that the current production is also depending a lagged production. The combined effect of the variables in each equation is observed to be significant.

**Coefficient of Expectation**

The term expectation itself relates to the future events. To some extent this expectation depends on post events. In over present study, the ‘λ’ is the coefficient of expectation of agricultural prices. If the value of ‘λ’ is sufficiently high, there is grater possibility of the expected prices to the inaccurate. Since only the prices of recent year’s will be considered and the value of earlier year’s prices being negligible, will be ignored. Contrary to this, if the values of ‘λ’ is low, the value of the expected prices of earlier years can be included in computing expected prices and these will posses greater accuracy. In the case of higher values of ‘λ’, more importance is to be attached to the recent year prices than to earlier years prices. Thus, lower the value of ‘λ’, greater is the memory concerning the prices of earlier years. In short, the expectation coefficient indicates only the psychological behaviour of producer. If the value of ‘λ’ is grater than one, the over expectations takes place in future prices of the output. If λ = 0, the expectations of future prices are static, i.e., the expected value
adjusts period by period to the current observation and all previous history is irrelevant. If $\lambda = 1$, the expectations are realised immediately and fully, that is, in the same period. In other way, an expectation, once formed, continuous unchanged, irrespective of current or earlier observations. The positive fraction of $\lambda$ means that expectation are get adjusted each period by some proportion of the discrepancy between the latest observation and the expectation for that period.

The coefficient of expectation was calculated with the help of the estimated coefficient of the variable lagged output in equation (13), i.e., $b_6 = 1-\lambda$, $\Rightarrow \lambda = 1-b_6$. The calculated value of $\lambda$ are given in the following table 4.3.

<table>
<thead>
<tr>
<th>Rayalaseema</th>
<th>Coastal Andhra</th>
<th>Telangana</th>
<th>A.P. State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundnut</td>
<td>1.12</td>
<td>1.20</td>
<td>0.92</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>0.77</td>
<td>0.55</td>
<td>0.45</td>
</tr>
<tr>
<td>Cotton</td>
<td>0.53</td>
<td>0.77</td>
<td>1.04</td>
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<tr>
<td>Tobacco</td>
<td>-</td>
<td>0.59</td>
<td>0.89</td>
</tr>
</tbody>
</table>

**Rayalaseema**

From the table 4.3, it is observed that the value of ‘$\lambda$’ is grater than one increase of groundnut crop. It indicates the over expectation of groundnut growers about future prices of the groundnut output in Rayalaseema region of Andhra Pradesh.

In the case of sugarcane production, the cane growers are influenced by very recent years price for their future cane price expectation. Since that value of ‘$\lambda$’ is sufficiently large. Hence, it is inferred that the cane growers are taking
decisions on cotton output considering very recent year’s cane prices in their production process.

The value of $\lambda$, in case of cotton is 0.53. It is sufficiently less, there is a little possibility of the expected prices. Only the recent year’s prices will be considered for their future price expectations. Entire year’s prices being negligible for their price expectations in taking production decisions.

**Coastal Andhra**

The price expectation coefficient of groundnut crop in Coastal Andhra region is greater than unity (1.20). It reveals that the groundnut growers in the region one in over expectations about their future output prices. The groundnut growers had given importance to past year’s prices for future expectations of groundnut prices and accordingly the farmers were damaging their groundnut output decisions in the region.

In the case of cotton production, the value of ‘$\lambda$’ is 0.77. It is sufficiently high. The cotton growers are influenced by very recent years prices for their future cotton price expectations. The values of expectation coefficients, regarding sugarcane and tobacco are 0.55 and 0.59 respectively. These crop growers are considering the recent past year’s prices for their future expectations in taking production in decisions in case of these two crops.

**Telangana Region**

In the case of cotton crop, the value of ‘$\lambda$’ was greater one in Telangana region of Andhra Pradesh. This mean that the cotton growers were in over expectations of future cotton price. The coefficient of expectation regarding the
groundnut and tobacco was sufficiently high and less than one. It reveals the fact that the groundnut and tobacco growers in Telangana region were influenced by very recent year’s prices for their future price expectations. Hence, it is inferred that these crops growers were taking decisions on crop output considering very recent year’s groundnut and tobacco prices. In the case of sugarcane value of \( \lambda \) is very low i.e., 0.45. The cane growers had given the importance to past years prices for future expectations of paddy prices and accordingly the growing were changing their cane output decisions in Telangana region.

**Andhra Pradesh State**

From the table 4.3, it is observed that the value of expectation coefficient of groundnut in the state as a whole is greater than unity i.e., 1.33. It reveals that the groundnut growers were in over expectations in future prices in their groundnut production decision. In case of tobacco production in the state, the value of \( \lambda \) is sufficiently large but less than unity. It reveals that the tobacco growers were influenced by recent year’s prices for their future price expectation. It may be inferred that tobacco growers in Andhra Pradesh were taking production decision by considering very recent year’s tobacco prices. In case of sugarcane and cotton crops the value of \( \lambda \) is less than one (0.59 and 0.35). Therefore the crop growers are considering the recent past year’s prices for their future expectation about the production decisions.