



## Assessment of Growth/Recession of Major Crops in Chittoor District, Andhra Pradesh-An Economic Study

### KEYWORDS

Area under food and non-food crops and area under important cereals, PGRP: Pre Green-Revolution Period, GRP: Green Revolution Period, Total Period. Area-Productivity-Production principal crops such as rice, groundnut and sugarcane, Pre-Green Revolution, Green Revolution Phase-I, Green Revolution Phase-II, Green Revolution Phase-III or Liberalization period, Green Revolution Period and Total period Compound Growth Rates, significant and non-significant

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**Introduction:** Major cereals grown in the district are rice, jowar, ragi and bajra. However, rice is considered as the most important staple food crop grown in the district during both kharif and rabi seasons, mostly as an irrigated crop. The major commercial crops raised are groundnut, sugarcane, chillies, fruits and vegetables. In western mandals short and medium duration varieties are grown, while in eastern mandals long and medium duration varieties are raised. Next to rice, jowar is sown in both the seasons and bajra is grown mainly during Kharif under rainfed conditions. Though ragi is cultivated in both the seasons, it is raised mostly in kharif season. In this paper an attempt is made to measure the growth or recession of crops such as area under food and non-food crops, jowar, bajra, ragi, total cereals and rice, sugarcane and groundnut in respect of variables area, yield and production of crops in Andhra Pradesh. The following are main objective of the paper.

### Objectives:

- to measure the growth/recession of major crops
- to suggest suitable measure in this regard

### Methodology:

Besides simple averages and percentages, compound growth rates have been computed in order to study the long-run rate of growth in the area food and non-food crops, important cereals and area, productivity and production of important crops viz., rice, groundnut and sugarcane in Chittoor District of Andhra Pradesh.

$$Y = AB^X \text{ or}$$

$$\log Y = \log A + X \log B$$

Where Y = Area/ Production/ Yield of Major Crops  
X = Time

'A' and 'B' are constants

Compound growth rate = anti-log of (B-1)\*100

For testing the significance of Compound Growth Rate, the following test has been employed.

$$t = \frac{B}{SE(b)}$$

$$\text{Where } SE(b) = \frac{1}{n-2} \left[ \frac{S_{yy} - \frac{(E y)^2}{n}}{S_{xx}} \right]$$

$$S_{yy} = E \log^2 Y - \frac{(E \log Y)^2}{n} \text{ and}$$

$$S_{xx} = E x^2 - \frac{(E x)^2}{n}$$

### Results and Discussion

**Table.1**

**Growth of Area under Food Crops and Non-Food Crops (per cent)**

Crops Name	PG.R.P		G.R.P		Total Period	
	CGR	't' Value	CGR	't' Value	CGR	't' Value
Food Crops	-0.046	0.065@	-1.081	7.518**	-1.041	10.906**
Non-Food Crops	4.050	3.964**	0.086	0.323@	1.157	5.042**
Total Crops	1.134	2.228*	-0.551	4.288**	-0.165	1.649@

**Note:** \*\* : Significant at 0.01 Per cent Level

\* : Significant at 0.05 Per cent Level

@ : Not Significant

**P.G.R.P :** Pre Green Revolution Period (1955-1956 to 1965-1966)

**G.R.P :** Green Revolution Period (1966-1967 to 2008-2009)

**Total Period :** (1955-1956 to 2008 to 2009)

**C.G.R :** Compound Growth Rate

**Source :** Computed Using the Data

**Source:** 1) *Compendium of Area and Land use Statistics of Andhra Pradesh (1955-56 to 2004-2005) Directorate of Economics and Statistics Government of Andhra Pradesh*  
2) *Government of Andhra Pradesh, Season and crop Reports (2005-06 to 2008-09) Bureau of Economic statistics*

The area under food crops declined at a compound rate of -0.05 per cent during pre-green revolution period and -1.081 per cent during green revolution period. The negative growth rate was highly significant during the later period. The area under non-food crops on the other hand, recorded positive and significant growth (4.05 per cent) during pre-green revolution period. During green revolution period, although the growth was positive, it was very low (0.09 per cent) and insignificant. Similar trend is found during the total period, covering both pre-green revolution and green revolution periods. The cropped area rose at the rate of 1.13 per cent, which is significant at 5 per cent level during PGRP. However, during green revolution period we notice a significant negative growth (-0.55 per cent). For the overall period, there was negative growth, which is not statistically significant.

### Area under Important Cereals other than Rice

Major cereals grown in the district are rice, jowar, ragi and bajra. However, rice is considered as the most important staple food crop grown in the district during both kharif and rabi seasons, mostly as an irrigated crop. In western mandals short and medium duration varieties are grown, while in eastern mandals long and medium duration varieties are raised. Next to rice, jowar is sown in both the seasons and bajra is

grown mainly during Kharif under rainfed conditions. Though ragi is cultivated in both the seasons, it is raised mostly in kharif season. The area under jowar, bajra, and ragi in Chittoor district is shown in table .2

**Table.2 Growth of Area under Jowar, Bajra and Ragi**

Crops Name	PGRP		GRP		Total Period	
	CGR	't' Value	CGR	't' Value	CGR	't' Value
Jowar	1.607	1.040@	-6.256	12.849**	-5.042	13.763**
Bajra	-5.333	4.555**	-8.603	22.059**	-7.465	24.719**
Ragi	-1.221	2.049@	-4.914	20.946**	-4.285	24.076**
Total Cereals	-0.327	0.400@	-3.527	16.120**	-2.918	17.354**

**Note:** \*\* : Significant at 0.01 Per cent Level

\* : Significant at 0.05 Per cent Level

@ : Not Significant

**P.G.R.P :** Pre Green Revolution Period (1955-1956 to 1965-1966)

**G.R.P :** Green Revolution Period (1966-1967 to 2008-2009)

**Total Period :** (1955-1956 to 2008 to 2009))

**Table.3 Growth of Area under Rice, Groundnut and Sugarcane (Per cent)**

Crop Name	P.G.R.P		G.P.P-I		G.P.P-II		G.R.P-III		G.R.P		T.P	
	CGR	't' Value	CGR	't' Value	CGR	't' Value	CGR	't' Value	CGR	't' Value	CGR	't' Value
Rice	1.961	1.516@	0.219	0.219@	-2.557	0.766@	-4.544	4.316**	-2.381	.438**	-1.659	7.733**
G.N	6.870	3.795**	2.505	3.442**	2.797	3.076**	-1.815	0.883@	-0.131	.449@	1.159	4.249**
S.C	6.042	3.992**	1.828	2.106*	2.543	3.442**	-2.081	0.755@	2.960	9.873**	3.279	16.003**

**Note:** \*\* : Significant at 0.01 Per cent Level

\* : Significant at 0.05 Per cent Level

@ : Not Significant

**G.N :** Groundnut

**S.C :** Sugarcane

**P.G.R.P :** Pre Green Revolution Period (1955-1956 to 1965-1966)

**G.R.P :** Green Revolution Period (1966-67 to 2008-2009)

**G.R.P Phase-I :** Green Revolution Phase-I (1966-1967 to 1980-1981)

**G.R.P Phase-II :** Green Revolution Phase-II (1981-82 to 1989-1990)

**G.R.P Phase-III :** Green Revolution Phase-III (1990-91 to 2008-2009)

**Total Period :** Total Period (1955-56 to 2008-2009)

**C.G.R :** Compound Growth Rate

**Source :** Computed Using the Data

**Source:** (a) Government of Andhra Pradesh, Season and Crop Reports of various issues (1955-56 to 1987-88), Hyderabad, Bureau of Economics and statistics.

(b) Government of Andhra Pradesh, An outline of Agricultural Situation in Andhra Pradesh (1989-90 to 2008-09).

**Table.4 Growth of Yield of Rice, Groundnut, Sugarcane (Per cent)**

Crop Name	P.G.R.P		G.R.P-I		G.R.P-II		G.R.P-III		GRP		T.P	
	CGR	't' value	CGR	't' value	CGR	't' value	CGR	't' value	CGR	't' value	CGR	't' value
Rice	0.293	0.273@	2.602	3.074**	1.498	0.763@	1.015	1.766@	1.404	8.567**	1.384	12.345**
G.N	-4.230	2.093*	-1.170	0.987@	-1.113	0.377@	-3.678	3.133**	-0.613	2.450*	-0.259	1.350@
S.C	6.042	3.992**	1.828	2.106*	2.543	3.442**	17.244	3.232**	2.252	4.519**	2.823	8.515**

Source: as a same in table no. 3

The yield of rice has grown at a compound rate of 0.29 per cent during PGRP, 2.60 per cent in GRP-I, 1.50 per cent in GRP-II and 1.02 per cent in GRP-III. In all the periods, except GRP-I in which the growth was highly significant, the growth rates were not statistically significant. For the GRP (1.40 per cent) and for the total period (1.38 per cent) covering both PGRP and GRP, the growth rates were highly significant. Our results suggest that the yield of rice registered a higher rate

**C.G.R :** Compound Growth Rate

**Source :** Computed Using the Data Furnished in Table. 4.11.

**Source:** A) Government of Andhra Pradesh, Season and Crop Reports (1955-06 to 1987-88), Hyderabad, Bureau of Economics and Statistics.

(B) Compendium of Area and Land Use Statistics of Andhra Pradesh (1988-89 to-2004-2005), Directorate of Economics and Statistics, Government of Andhra Pradesh.

(C) Government of Andhra Pradesh, Season and Crop Reports (2005-2006 to 2008-09), Hyderabad, Bureau of Economics Statistics.

The table shows that the area under jowar has grown at a compound rate of 1.61 per cent and the area under bajra and ragi has fallen at -5.33 per cent and -1.22 per cent respectively. The growth rates of area under jowar and ragi are not significant and that of bajra is highly significant during pre-green revolution period. During green revolution, all these crops, viz. jowar, bajra and ragi have shown significant negative growth.

tural Situation in Andhra Pradesh (1989-90 to 2008-09).

(c) www.indiastat.com (1) (Sugarcane) from (1955-56 to 2002-03) and

(2) Government of Andhra Pradesh, An outline of Agricultural Situation in Andhra Pradesh, (2003-04 to 2008-09).

The area under rice has grown at a compound rate of 1.96 per cent per annum before the advent of green revolution and at 0.22 per cent in GR phase-I. Both the growth rates are not statistically significant. There was negative growth in phase-II (-2.56 per cent) and phase-III (-4.54 per cent). While the growth in the former was insignificant, it was highly significant in the latter phase. GRP and overall periods exhibited negative growth (-2.38 per cent and -1.66 per cent respectively) which is highly significant. Groundnut experienced highly significant positive growth during PGRP (6.87 per cent) and also during GRP-phase-I (2.56 per cent) and GRP-II (2.80 per cent). We notice a negative growth which is not statistically significant in GRP-phase-III (-1.81 per cent). A similar trend is noticed in the case of sugarcane not only during PGRP but also during different phases of green revolution, entire GRP and overall period.

of growth not only during different phases of green revolution but also in the entire green revolution and the total periods, when compared to pre-green revolution period.

In the case of groundnut, the growth was negative in PGRP as well as in different phases of GRP. The negative growth rates found are -4.23 per cent in PGRP, -1.7 per cent in GRP-I, -1.11 per cent in GRP-II and -3.68 per cent in GRP-III. The

growth rates in PGRP and GRP-III were statistically significant and in phases-I and II they were not significant. As a consequence, GRP and total periods had negative growth, which is significant in former period and not significant in the latter.

The yield of sugarcane has grown at a little over 6 per cent during PGRP and varied between 1.83 per cent and 2.54 per cent during the first two phases of green revolution. During GRP-III it went up at the rate of 17.24 per cent. During green revolution period and total period the growth rates were 2.25 per cent and 2.82 per cent respectively. The growth rates are

statistically significant.

### Production of Rice, Groundnut and Sugarcane

Generally, production is subject to area and yield effects. The spread of high-yielding varieties and the consequent increase in yield rates has led to increase in production of various crops in the districts, although the area under the crops such as rice, groundnut and sugarcane have shown a decreasing trend during the green revolution period. Production of rice, groundnut and sugarcane is shown in table-5.

**Table .5 Growth of Production of Rice, Groundnut and Sugarcane (Per cent)**

Crop Name	P.G.R.P		G.R.P -1		G.P.P-II		G.R.P -III		GRP		T.P	
	CGR	't' Value	CGR	't' Value	CGR	't' Value	CGR	't' Value	CGR	't' Value	CGR	't' Value
Rice	2.261	1.166@	2.690	1.608@	-3.362	0.879@	-3.005	2.116*	-1.052	2.660**	-0.369	1.322@
G.N	2.351	1.257@	1.848	1.216@	4.808	1.645@	-6.741	5.389**	-0.814	1.875@	0.891	2.392*
S.C	-3.299	0.636@	1.632	1.474@	0.572	0.428@	1.340	1005@	2.671	9.506**	3.286	10.992**

Source: same in table no.3

During PGRP, production of rice has grown at a compound rate of 2.26 per cent with the exception of phase-I during which production has grown at 2.69 per cent, it declined at the compound rates of -3.36 per cent in phase-II and -3.00 per cent in phase-III. The growth rate turns out to be negative for the entire green revolution period and for the whole period, covering both pre-green revolution and green revolution periods.

Groundnut experienced growth at the rate of 2.35 per cent in PGRP. 1.85 per cent in GRP-I and 4.81 per cent in GRP-II. During phase-III, it exhibited negative growth of -6.74, which is significant at 1 per cent level. The growth rate is negative (-08 per cent) and not-significant in GRP. A significant growth rate of 1.88 is found in the total period recorded.

During PGRP the production of sugarcane exhibited a negative growth of -3.30 per cent which is not significant. The growth rates of sugarcane were 1.63 per cent, 0.57 per cent and 1.34 per cent, which are not significant in three phases of green revolution. The growth in production of sugarcane was 2.67 per cent in GRP and 3.29 per cent in total period and both the rates are highly significant.

### Conclusion

Chittoor district is smallest in area but most populous among Rayalaseema districts of Andhra Pradesh. The net area sown to total geographical area rose from 25.46 per cent to 25.77 per cent between 1955-56 and 2008-09. Chittoor district looks better in the distribution of operated area when compared to state and the country. With the advent of new agricultural technology, the proportion of area under food crops in the total cropped area declined from over 70 per cent to 51 per cent, while that of non-food crops rose from 30 per cent to 49 per cent. The area under rice has grown at a compound rate of 1.96 per cent for annum before green revolution and at 0.22 per cent in phase-I of green revolution. There was negative growth in phase-II (-2.56 per cent) and phase-III (-4.54 per cent). A similar trend is noticed in the case of groundnut and sugarcane. Owing to increase in the area under high-yielding varieties, the use of modern inputs have gone up considerably. The adoption of new agricultural technology, has led to substantial increase in the yield and production of rice, groundnut and sugarcane grown in the district. There is need to follow recommended agronomic practices and give protection farmers in the farm of weather protection, crop insurance, irrigation facilitation, price guarantee scheme for stabilizing crops, introducing of subsidy to the marginal and small farmers through all developing programmes.

### REFERENCE

1. Ph.D thesis an entitled " Resource use and Production Efficiency in Indian Agricultural: A Comparative study of Wet and Dry land villages in Chittoor District" A.P. | 2. Government of Andhra Pradesh, Season and Crop Reports of various issues (1955-56 to 1987-88), Hyderabad, Bureau of Economics and statistics. | 3.. Government of Andhra Pradesh, An outline of Agricultural Situation in Andhra Pradesh (1989-90 to 2008-09. | 4. www.indiastat.com (1) (Sugarcane) from (1955-56 to 2002-03) and | 5.. Compendium of Area and Land use Statistics of Andhra Pradesh (1955-56 to 2004-2005) Directorate of Economics and Statistics Government of Andhra Pradesh |