CHAPTER 1
INTRODUCTION
STATEMENT OF THE PROBLEM

Even after four decades of planned growth and industrial development, agriculture continues to be the crucial platform for the overall economic development of India. The Indian agriculture has undergone a metamorphosis due to the expansion of irrigation facilities combined with the modern agro-technology of mid 60's involving high yielding variety seeds, fertilizers and pesticides. It was estimated that during the first half of the present century, total agricultural output increased at a paltry rate of about 0.8 per cent per annum and that of food grains output remained stagnant during the same period. Compared to this between 1950 and 1975 both total agricultural output and food grains output recorded an annual growth rate of 2.6 per cent. It was further estimated that between 1970-71 and 1984-85, the growth rate of food grains production was 2.70 per cent. Apart from the improvement in the growth rate another achievement was that during the pre-independent India

even normal droughts, floods and other such natural calamities resulted in frequent famines. But the confidence achieved during the severe drought years of 1980 and 1988 in meeting the food-grain requirements from the internal stocks have helped in a favourable situation that, the country has now the strength and confidence to avoid widespread famine and misery which used to frequently visit the pre-independent India.\(^3\)

However, in all these favourable signs, few critical areas remain as sore points. The self-sufficiency of food grains noted above was partly due to the lack of effective demand for want of sufficient income from among the poor and weaker sections in India. Again, the average per capita calorie intake is much lower in India as compared either to the minimum requirements suggested or the present calorie intake rate in many developed countries. The productivity rates of different crops are far higher in many advanced countries as compared to India. Further, agricultural productivity rates were uneven between regions depending on the resource status of the respective regions. For instance, the average yield per hectare of rice in Punjab was 2967.5 kgs as compared to 918.0 kgs in Madhya Pradesh during 1987-89 (annual average). Even with regard to the average yield of total grams, it was highest in Uttar Pradesh.

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State (i.e. 818.0 kgs) and lowest in Himachal Pradesh (i.e. 312.5 kgs). Likewise, in the case of sugarcane, the yield per hectare was highest in Tamil Nadu with 10624 kgs and was only 3970 kgs, the lowest in Madhya Pradesh.

Other crucial aspect that needs to be recorded is that the growth rate of agriculture was also very distressingly unequal. For example, growth rates in food grains production between 1970-71 and 1984-85 was estimated to be 6.23 per cent per annum in Maharashtra and 5.92 per cent in Punjab as compared to the growth rate of -0.64 per cent in Tamil Nadu and -0.38 in Kerala.

These crucial factors of unequal crop productivity and growth rates are to be pondered over, as it is not sufficient if substantial growth is achieved in few resource rich areas by leaving the rest of the country agriculturally underdeveloped. Moreover, the dry land agriculture has also to contribute significantly to achieve greater self-sufficiency in overall agricultural growth. This is more so, when the country's industrial production is heavily dependent on the raw material stock from agricultural sector. Which means, the less resource endowed regions have also to contribute their share optimally for cruising along the right path of overall agricultural development.

Rayalaseema region consisting of Anantapur, Chittoor, Cuddapah and Kurnool districts in Andhra Pradesh is part of the deccan plateau which has been less endowed on the resource front. The famines and droughts have occurred in the region frequently during the pre-independent period. But due to the preventive methods adopted by the Government, the famines have not been heard in post-independent period in the region. On the other hand, droughts have remained frequent obstructions on the smooth path of agricultural development in the region. The present study aims to analyse the issues and problems of agricultural development in the resource poor region of Rayalaseema.

Moreover, the agricultural growth rates are to be critically studied at frequent intervals so as to identify the factors responsible for the growth and/or inhibiting factors for the same. This helps in taking appropriate measures for smooth and successful agricultural development. Several studies were taken up by researchers at different points of time to examine these aspects. Few researchers have undertaken aggregate agriculture or groups of crops for assessing growth rates for the country as a whole.  

Few others have computed the growth rates of individual crops at All India level. Some other studies have concentrated at regional and district level in estimating the growth rates of individual crops. But the aggregate growth rate of agriculture either at regional level or at district level was not attempted in a scientific way covering the drought prone Rayalaseema region of Andhra Pradesh in recent years. The present study is meant to measure the aggregate growth rates of agriculture at regional and at district levels.

The Green Revolution has given a big-push in enhancing the food grains output in India. Many studies have assessed the growth rate of individual crops drawing a dividing line between pre-Green Revolution and Green Revolution periods. This was done mostly with the aim of assessing the impact of the Green Revolution. But, it is of crucial importance to re-assess the contribution of Green Revolution. The present study tries to estimate the impact of Green Revolution with two different base periods. This has to be done to estimate the impact of Green Revolution at two levels, (a) when it was mainly confined to few crops (rice and wheat) and regions (resource rich areas like Coastal Andhra and Punjab) at earlier period and


8. For instance, N.S. Jhodha and V.S. Vyas's study on Rajasthan Agriculture; Y. Mahadra Reddy and Parathasarathy's Study on A.P. Agriculture.
(b) when it was spread to larger number of crops and areas at a later period. This later base calculations may also help us in understanding whether Green Revolution continues to have the same impact at present as compared to the initial periods of introduction of Green Revolution. Further, it may help to understand whether, productivity of the crops with presently available HYV seeds and cultural practices reached any stagnation levels.

OBJECTIVES

The following are the main objectives of the present study.

1. To examine the overall agricultural growth in four districts of the region and the region as a whole.

2. To examine the growth rates of area, production and productivity of 12 selected crops in four districts of the region and region as a whole.

3. To find out the impact of Green Revolution during the initial years of its introduction and also at present.

4. To assess whether the Green Revolution has reached a saturation point in attaining higher yield levels with the currently available HYV seeds and cultural practices and

5. To assess the contributing factors for the agricultural growth.
LIMITATIONS OF THE STUDY

Any study covering overall agricultural growth of any region will have to face data limitations. The present study is no exception. When the area covered is as vast as Rayalaseema region covering four districts, secondary data collected and published by Government of Andhra Pradesh are the only source. The study do not go into the details of accuracy or otherwise of data published by Government of Andhra Pradesh. Though the present study is conceived to assess the overall agricultural growth rate, due to time and resource constraints and also data constraints, only 12 crops are taken into account. These crops account for about only 85.0 per cent of the total cropped area. The other major limitations are that, the area and production figures of horticulture crops such as banana, mango, citrus fruits are not available for the entire study period. The data relating to mulberry and sunflower crops are also not available for the entire period of our study. Due to these problems, figures relating to these crops have not been included while computing overall agricultural growth rate. The exclusion of these crops are not expected to create any distortion in arriving at the trend rates as they are raised only in a limited extent of area.

DATA AND METHODOLOGY

The study period covers 35 years of planned development starting from 1956-57 to 1990-91. The year 1956-57 was chosen
as the base year for the study due to certain reasons. It was neither an abnormal year of shortage and adverse seasonal conditions nor one of bumper crop production aided by favourable monsoon, as can be noted from Season and Crop Report of Andhra Pradesh, 1956-57. Which means we have a normal base for growth rate calculations. This year happens to be the first year of the formation of the State of Andhra Pradesh of which Rayalaseema is one of the three regions. From this year comparable official statistics are available for the four districts of Rayalaseema region. The present study covers 12 crops which account for about 85.0 per cent of the total cropped area of the region. The crops so chosen are rice, jowar, bajra, ragi, redgram, greengram, horsegram, groundnut, castor, cotton, sugarcane and tobacco.

The entire study period was divided into three sub-periods viz., (1) the pre-Green Revolution period (1956-57 to 1970-71), (II) the Green Revolution period; Phase - 1 (1971-72 to 1980-81) and (III) the Green Revolution period: Phase II (1981-82 to 1990-91). The results are obtained and analysed for the overall period (1956-57 to 1990-91) also.

A word of explanation is necessary for making our period of study into three sub-periods as compared to the conventional two sub-periods of pre-Green Revolution period and Green Revolution period.

Revolution period. The pre-Green Revolution period conventionally ends up with 1964-65. But in the present study the pre-Green Revolution period was extended upto 1970-71 for two important reasons. Firstly, though the HYV seeds were introduced in 1965-66, three subsequent drought years have not allowed the Green Revolution to settle on a sound note in Indian Agriculture. The agriculture of that period stabilised to some extent only at the far end of that decade. If 1965-66 was taken as base year, we may be arriving at a higher growth rate of agriculture due to the lower base of agricultural production owing to three successive severe drought years at the beginning of the period. Again, if these drought years are left-off of the study, that would not have given the overall process of agricultural growth.

While dividing the entire conventional Green Revolution period into two sub-periods, the following reasoning was adopted. During the initial years of the package of High Yielding Variety Programme with new seeds, chemical fertilizers and pesticides it was confined only to rice and wheat crops and was raised in few pockets with better irrigation and other endowments which allowed intensive agriculture. Which means the Green Revolution was at a smaller part of the very big platform of Indian Agriculture. Any calculations of growth rates based on lower base would normally result in higher growth rates. That is why, the period between 1971-72 and 1980-81
was treated as Green Revolution period Phase - 1. This gives us two advantages. Firstly, initial low base level is avoided and secondly, by taking this base year (1971-72) we will not be missing the initial euphoria and impact of Green Revolution.

We believed that, a decade is a sufficient period for the Green Revolution to reach at least to majority of the crops and to most of the cropped area. This may serve as a better base year for the Green Revolution period. The third period estimations done with 1981-82 as base year is called Green Revolution - Phase II. Any assessment of the impact of the Green Revolution with this base helps to arrive at a clear picture about the impact of Green Revolution. Further, this third sub-period of our study may help to know, whether the Green Revolution has reached a saturation point of productivity levels. This has to be done as the productivity levels of new variety of HYV seeds have remained at the same levels as compared to the HYV seeds released at the beginning of the Green Revolution.

To arrive at the overall agricultural growth rate, the agricultural production of respective years were converted into monetary terms as is usually done in national income estimates. Again, the overall agricultural growth rates were calculated by adopting both (i) the constant prices and also the (ii) current prices. The constant prices were taken up for the reason to avoid inflationary pressures and also to get a picture in real
value terms. But this method has one important problem. A prominent crop with relatively higher prices and returns may end up as an insignificant crop with lower prices and returns and vice-versa within few decades. Farmers getting good return due to higher price of that particular crop in the mid 50's may be getting less returns due to lower prices at present. Which means, the current prices of mid 50's and the current prices of the present period have an impact on the farmers' income levels. Hence, the overall agricultural growth rates were computed by adopting both constant prices and as well as current prices. The constant prices used for the study are average of the three years (1971-72, 1972-73 and 1973-74). The current prices of different crops were collected from the published and unpublished sources from Bureau of Economics and Statistics, Government of Andhra Pradesh.

As in many other studies, the growth rates of area production and productivity have been worked out for the 12 crops of the study.

The statistical techniques adopted for our study in measuring the agricultural growth are detailed as under.

Exponential growth rates of area, production, productivity and overall agricultural growth rates are computed by using the log $y = a + bt$ formula, where
\[ y = \text{dependent variable} \]
\[ b = \text{coefficient of growth and} \]
\[ t = \text{time} \]

To identify the possible factors causing the growth, the following model have been used.

\[ y_t = b_0 + b_1 A_t + b_2 y_{t-1} + b_3 l_t + b_4 P_{t-1} + b_5 Swt + b_6 Net + u_t \]

where

\[ y_t = \text{production} \]
\[ A_t = \text{the actual area planted under the crop in hectares} \]
\[ y_{t-1} = \text{yield of the crop in Kg/hectare with one year lag} \]
\[ l_t = \text{area irrigated under the crop} \]
\[ P_{t-1} = \text{farm harvest prices of the crop with one year lag} \]
\[ Swt = \text{rainfall during June-September in millimeters} \]
\[ Net = \text{rainfall during October-December in millimeters} \]
\[ u_t = \text{error term}. \]

CHAPTER SCHEME

The study has been divided into six chapters. The Chapter 1 is devoted to highlight the problem, specify the objectives, explain the limitations and present the methodology. The review of literature in the relevant field is done in Chapter II. The different statistical techniques adopted by different researchers, was also explained in the same Chapter.
Chapter III is devoted to give the agricultural profile of the Rayalaseema region and the four districts of it. The agricultural profile analyses the changes that took place in agricultural scenario during the period of our study with relevant information. Chapter IV is confined to examine the agricultural growth rate and the impact of Green Revolution. The analysis of the individual crop growth rates and overall agricultural rate are the subject matter of this chapter. Chapter V is devoted to a detailed examination of factors responsible for agricultural growth. The final Chapter is meant to detail various conclusions and address the inhabiting factors for agricultural growth.