A Perspective on the Theme:

Agriculture is one of the most complex expressions of human economic activity performed and no other economic activity can match agriculture in importance in the developing countries like India. About 70 per cent of India's working population seek livelihood from this primary economic activity and it is the most important single use of land resource of the country. It is pertinent to state that the agricultural resources like soil, water, land, crops and livestock are vital which play a significant role in determining economic, social and cultural progress of the farming community. The use of agricultural resources is central to all discussions of problems and prospects of agriculture in the regions where agriculture form crux of the regional economy. A striking growth of population and increasing demand for foodgrains on one hand, and the improvements made in socio-economic and technological environments on other hand have been pressing viable demand for the optimum use of every hectarage of agricultural land.

Obviously, the new agro-technology has brought about a revolutionary change in the scenario of Indian agriculture. Albeit,
the development of agriculture in dry areas is still unstable and spatially variable causing considerable hardship to the peasantry. In arid and semiarid regions, the development of agriculture is virtually associated with climate, edaphic and hydrological conditions namely, rainfall distribution, soil fertility, soil moisture, rate of evapotranspiration and ground water potential. In these areas the soil and climate predominantly influence the distribution of crops, their production and seasons of cropping (Subramanyam, 1984). Agriculturally these areas are of marginal character. "The ecological balance in the arid and semiarid ecosystem is delicate and gets easily disturbed. The effect of drought on the total ecosystem specially on vegetation, soil moisture regime, landuse, animal life and human habitation is profound and far reaching" (Reddy & Reddy, 1981, p. 116). The erratic behaviour of the monsoon, frequent occurrences of drought and prolonged dry spells and unsuccessful efforts in the last several years to find permanent solution to drought are the most disquieting and hampering features to agricultural backwardness in the dry tracts. Advances made in irrigation and dry farming technology have but touched the fringe of the problem and the monsoon is still a powerful factor to be reckoned with in all calculations of agricultural planning.

The development of any agriculturally backward region has now become an important social objective. Regional disparities in the level of agricultural development are common place in the country but they are further accentuated especially after the advances in Green Revolution. If such disparities in the agricultural development are allowed to persist it is bound to result in marked in-equalities in socio-economic groups and regions. "Regional imbalances in agricultural
development can not only affect food production but also lead to grave social tensions" (Batra, 1969, p.5). It is significant to state that agriculture is not only a major contributor of the economy of the country but also it is proved that a major contributor to regional disparities. Hence, the identification and a comprehensive evaluation of agriculturally backward regions are of paramount importance in planning and development. Planning involves a detailed analysis of existing regional agricultural structure. This is best expressed in the spatial arrangement and association of agricultural phenomena. "In the arid and semi-arid areas of India the problems seem to be more of the management of resources rather than those of scarcity of resources. There is enough evidence that if the available resources are properly and effectively managed, they hold the potentials no less than of sub-humid areas" (Quereshi, 1983, p. 261). Therefore, a critical study of the spatial distribution of agricultural phenomena like climate, soil, water, land, cropping and animal husbandry, and their changes are well as trend provides a comprehensive evaluation of the agricultural formations and performances in the dry areas and serves as an aid to future orientation of farming on right lines as well as to improve the total ecosystem. It is in this perspective the present study on regional agriculture is attempted.

The Conceptual Framework:

The present research theme falls under the purview of agricultural geography and within the broad spectrum of economic geography. However, it overlaps over other discipline like Agro-climatology, Agricultural Economics, Agricultural science, Regional Planning and Rural Development.
Agriculture is a complex and dynamic enterprise but highly spatial variable. A further significant characteristic of agriculture is its great diversity of practice, products and organisation (Grigg, 1969, p. 95). It is hardly surprising that there is such a variety in agricultural practice, even over very small distances and the agricultural geographer attempts to recognise these variations at various levels and to attempt to explain them very comprehensively (Tarrant, 1974, p. 14). Thus, the underlying theoretical assumption is that all spatial as well as temporal variations in the distributional pattern of agricultural formations and the trends of agricultural development are a function of a complex interplay between physico-socio-economic and technological environments and each environment acquires its specificities as components in an interacting system over time. In agrogeographical studies, the diversity of agriculture will be matched by the diversity of farmer's reactions to a variety of physical, social, economic and technological constraints.

'Agriculture' has been the subject of study at various area levels. Regional studies in geography concerning with the geography of agriculture of specific areas discuss the agricultural distributions in terms of their locale. The geography of agriculture attempts to examine the spatial differences in the characteristics of agricultural phenomena at various levels, and attempts to explain agrogeographic relationships and also the changes therein. The spatial differences, relationships and temporal variations in agricultural attributes have received much attention in agrogeographical investigations. Not surprisingly, it was well stated by Grigg (1969) that "the spatial
variations in agriculture have received much attention from geographers, partly because of the great areal and occupational importance of the industry, partly perhaps because geographical methods of study are peculiarly suited to the analysis of agriculture."

In the study of geography of agriculture, the regional approach has the longest history and is in many ways a viable and comprehensive approach for understanding the complex mosaic of agriculture. "Regional approach would be needed for the preparation of agricultural production plans and in their implementation because the administrative units like States and the Districts in India are too large and heterogenous in terms of their physical environment and cropping patterns and· there are distinct regional cropping systems or crop-associations which could provide a basis for evaluating crop and livestock production potentials and in estimating requirements or major inputs and other infrastructural investments" (Rao and Bhat, 1972, p. 115). Thus the present study examines the regional character of agriculture with a view to provoke more detailed and indepth consideration of optimum utilisation of agricultural resource base for overall development of the region.

A Review of Regional Studies on Agriculture:

Studies in regional agriculture have gained considerable importance from the first quarter of twentieth century, as is evident from the volume of scintillating researches made by scholar of different discipline, who sought to identify the probable relationships between the agricultural phenomena and the prevailing physical and
socio-economic conditions. The pioneering works in this direction produced by eminent scholars as Baker (Agricultural Regions of North America 1926-33); Jonasson (Agricultural Regions of Europe, 1925-26); Jones (Agricultural Regions of South America, 1928-30); Van Valkenburg (Agricultural Regions of Asia, 1931-36); Taylor (Agricultural Regions of Australia, 1930) and Shantz (Agricultural Regions of Africa, 1940-43). Prior to the fifties, agricultural geographers had been almost obsessively preoccupied with explanations for distribution pattern derived from the study of the physical environment alone (Morgan and Munton, 1971). But it is the fact that most of these studies ranging from small areas of minor political units to large sections of the country or sometimes the entire country etc., have been in the nature of superficial investigations of extensive areas based on observation (Jasbir Singh, 1984). Later the need for more research on geography of agriculture at micro-level with a scientific framework of quantification and mathematical explanation was well recognised by the geographers. Weaver's (1954) study of 'changing patterns of crop-landuse in Mid-West U.S.A.' was a pioneering work in this direction and he may be credited to provide a scientific framework to such studies. Coppock's (1964) work on "Agricultural Atlas of England and Wales" indicates not only the magnitude of agricultural data that is available but also the scope for scientific processing of such data for agricultural planning. The purposeful studies of Kostrowicki (1969) on agricultural typology and crop-landuse patterns are rather classic in the nature of agricultural geography. A good number of studies on similar lines were attempted by many geographers all over the world to examine the regional patterns of agriculture e.g., Scott (1957),
Indian geographers have long been attracted to study the problems and prospects of Indian agriculture at various levels ranging from village to district, river basin, state and the country as a whole. Geographical writings for almost two decades prior to Independence have been mostly confined to regional agriculture. Ramakrishna (1930), Sourirajan (1931), Rajamanikkam (1933), Garu (1934), Srinivasan (1935), Gopalan (1937), studied the agricultural geography of Coimbatore, Malabar, Madurai and Trichinapalli, Visakhapatnam, Anantapur and Tanjore districts. Deshpande (1942) made a descriptive study of the agricultural geography of the districts of Belgaum, Bijapur and Dharwar. Mukerjee (1942) made a study of the agricultural geography of Uttar Pradesh. Bhat (1956) studied some aspects of agriculture in the Lower Khumbi Valley in the district of Kolhapur in Maharashtra. Mukerjee (1956) examined the agricultural geography of the upper Ganga-Yamuna Doab of Uttar Pradesh. Sen (1957) discussed the evolution of agriculture in Andamans. Kaushik (1962) discussed the patterns of agriculture in Himalayan Ganga Basin. Misra (1963) studied the agricultural geography of Himachal Pradesh. But all these studies brought out the spatial distribution of principal crops, crop rotations, crop production, practices of cultivation, tenure systems, irrigation facilities etc., and also attempted to analyse the
influence of physical environment on agricultural phenomena. (Shafi, 1972, p. 3-18). Recently the studies are shifting towards the application of quantitative techniques in the analysis of various agricultural phenomena. Bhatia's (1965) 'Location Quotient Method' to ascertain the crop concentrations in a region is worth mentioning in this connection as it was trend-setting. He investigated the regional character of crop distribution in India and determined the dominance of crops in each region. Shafi's (1972) works on various aspects of agricultural geography of Uttar Pradesh are profound in the analysis and worth mentioning in this direction. The publication of 'An Agricultural Atlas of India' and 'Agricultural Geography of Haryana' by Jasbir Singh (1974) may be considered as outstanding works in this direction. In recent times, good number of studies on similar lines were attempted by many Indian geographers to examine the regional character of agriculture. Vijaya Ram Singh, Guru Bachan Singh, Moonis Raja, Jhujar Singh, N.E.K. Reddy, Majid Hussain, Ali Mohammad, Noor Mohammad, Mukherjee, Amani, Ganguli, Prakash Rao, Vithal Reddy, Roy, Ramanaiah, Sinha, Subramanyam, B.B.Singh, Subbaiah and others made valuable contributions in this field.

The Significance of the Study:

Agricultural development calls for greater attention to be paid to the dry areas. The potential for agricultural prosperity in the drought-prone areas is considerable if the available agricultural resources are effectively and scientifically managed with a proper package of technical and credit inputs. It is in this perspective, the present study on regional agriculture entitled "The Geography of
Agriculture of Cuddapah District, Andhra Pradesh" is attempted. It is hoped that this diagnostic study will immensely help to evolve both prophylactic and curative measures ultimately to improve the agricultural economy of the district.

The present study area, Cuddapah District is situated in the southern part of Andhra Pradesh state and is identified as drought-prone area as well as one of the agriculturally backward regions of Andhra Pradesh State. The economy of Cuddapah district is predominantly agricultural and the cornerstone of the socio-economic development of the district lies in the development of its agricultural economy. The district represents poorer agrarian conditions but with its varied agricultural phenomena as well as diversified agro-climatic and socio-economic set up has indeed provided an appropriate setting for this study.

In view of the presence of many hill ranges, only 35 per cent of the geographical area of the district has been brought under plough. About one-third of the crop land is provided with irrigation. The district is the third largest producer of groundnut in the State. Millet cultivation, fruit farming, spices cultivation and intensive paddy farming are the flourishing agricultural formations in the district. The district has considerable strength of both bovine and ovine population. The major river system namely, Pennar and many tributaries have been draining a large portion of the district. It is worth while to mention that more than 70 per cent of working population in the district depends on agriculture for their livelihood. It is clear from the above facts that the district has substantial
agricultural resource base. In short, the present problems and prospects of the economy of rural people are intimately related to the development of agriculture.

Objectives of the Study:

The present study is made to bring out a synthesized account of the regional geography of agriculture of Cuddapah district which is essential to understand the main problem and constraints that hinder the development of agriculture in the district. To provide a comprehensive plan for the development of agriculture in this backward and drought prone district, the present study examines and evaluates the changing spatial pattern of various agricultural phenomena.

To be more explicit, the present research study includes,

1. spatial distribution of rainfall, rainfall intensity, rainfall ratio and rainfall variability,

2. drought occurrence, intensity, spread and frequency of drought years,

3. the soil types, soil forming environment, soil problems, potentials and management,

4. assessment of surface and ground water potentials, water balance and utilisation pattern and water management,

5. spatial pattern and dynamics of land use, land use orientation and agricultural land use efficiency,

6. changing distribution pattern of crop farming,

7. identification of crop combination types, crop regions and the measurement of crop diversification,

8. measurement of the trend in the yield levels of principal crops with the help of regression equation.
9. types of livestock and their spatio-temporal distribution and development,

10. study the pattern of landuse, land capability, cropping pattern and crop productivity of selected sample villages to understand the ground truth information about the structure of agriculture at micro level,

11. assessment of the impact of rainfall on various agricultural phenomena viz., water balance, arable landuse, crop distribution and crop yield levels and

12. problems of agriculture and suggestions for appropriate agricultural planning in the district.

**Data Base:**

The present study is heavily based on secondary data. However, some primary data have also been used. The secondary data pertaining to rainfall, soil fertility, irrigation, landuse, cropping and livestock etc., were collected from different sources particularly from the Government records. The primary data for the sample villages were generated through field work. The sample villages were selected on the basis of purposive sampling method. The secondary data were collected for the triennium 1986-89 at 'mandal' level to delineate the spatial distributional aspects of agriculture. Since there was no 'mandal' administrative system earlier to 1985, the secondary data were collected to study the changes and trends at 'taluk' level for trienniums 1962-65, 1972-75 and 1982-85. In order to correct the distortions, a three year average is taken for the purpose of analysis. The primary agricultural data for the sample villages were generated for the agricultural year 1988-89. The rainfall data were collected for the last 88 years.
Methodology:

The spatio-temporal analysis of agriculture in the study is made with the help of both cartographic and quantitative techniques. Most of the data have been mapped by thematic mapping techniques. The quantitative techniques such as water balance, surface run-off techniques of Barlow's table and Khosla's formula, Kostrowicki's landuse orientation, land capability classification, arable landuse efficiency, crop combination and crop diversification techniques have been employed. A number of statistical methods namely, averages, standard deviation, correlation, regression, coefficient of determination, compound growth rates and sampling procedure have also been used in this study.

The Plan and Design of the Thesis:

A comprehensive plan and design of the study is detailed hereunder:

1. A perspective and the setting
2. The Spatial Analysis of Rainfall
4. Types and Distribution of Soil Resources
5. Potential and Development of Water Resources
6. Spatial Pattern and Dynamics of Landuse and Arable Landuse Efficiency.
7. Changing Distributional Pattern of Crop Farming.
8. Crop Regionalisation and Crop Combination Types.
10. Taxonomy and Spatial Distribution of Livestock and Their Combinations.

11. Landuse and Cropping Systems of Sample Villages.

12. Summary and Conclusion.

Limitations of the Study

The geography of agriculture at region level is the study of various agricultural phenomena and their formations from the point of ecological as well as spatio-temporal context. There are hundreds of aspects which come within the purview of geography of agriculture, but considering the time and resource constraints, the present study is rather limited to a few aspects of geography of agriculture namely, climate, soil, water, landuse, cropping and animal husbandry. Of course, there can always be a difference of opinion in opting what is important.

Locational Aspects of Cuddapah District:

The Cuddapah district situated in the south-central part of Andhra Pradesh State, is one of the most backward and drought prone area of this country. Having an area of 15,378.41 sq.km., geographically the district forms the southern and south-eastern portion of the Deccan Plateau in peninsular India. Geomatically, Cuddapah district is located between the latitudes 13°43'N and 15°14'N and longitudes 77°55'E and 79°E. The district spreads towards north beneath the western slopes of the Eastern Ghats as a rough parallelogram bented deeply in its southern, western and northern boundaries. Out of 23 districts of Andhra Pradesh State, Cuddapah
<table>
<thead>
<tr>
<th>Mandal</th>
<th>Mandal</th>
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<tbody>
<tr>
<td>Cuddapah</td>
<td>Sidhout</td>
</tr>
<tr>
<td>Chennur</td>
<td>Ontimitta</td>
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<td>Khajipeta</td>
<td>Atlooru</td>
</tr>
<tr>
<td>Valluru</td>
<td>Porumamilla</td>
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<tr>
<td>Pendlimarri</td>
<td>Badvel</td>
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<td>Chinthakommadinne</td>
<td>Gopavaram</td>
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<tr>
<td>Kamalapuram</td>
<td>Narasapuram</td>
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<td>Yerraguntla</td>
<td>B. Koduru</td>
</tr>
<tr>
<td>Veerapunayunipalli</td>
<td>B. Mattam</td>
</tr>
<tr>
<td>Rayachoty</td>
<td>Proddatur</td>
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<td>Chinnamandam</td>
<td>Rajupalem</td>
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<td>T. Sundupalli</td>
<td>Chapadu</td>
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<td>Sambepalli</td>
<td>Mydukuru</td>
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<tr>
<td>Veeraballi</td>
<td>Duvvur</td>
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<tr>
<td>L.R. Palli</td>
<td>Jammalamadugu</td>
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<tr>
<td>Chakrayapeta</td>
<td>Peddamudium</td>
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<tr>
<td>Galiveedu</td>
<td>Muddanur</td>
</tr>
<tr>
<td>Ramapuram</td>
<td>Mylavaram</td>
</tr>
<tr>
<td>Rajampet</td>
<td>Kondapuram</td>
</tr>
<tr>
<td>Nandalur</td>
<td>Pulivendula</td>
</tr>
<tr>
<td>Penagalur</td>
<td>Simhadripuram</td>
</tr>
<tr>
<td>Kodur</td>
<td>Lingala</td>
</tr>
<tr>
<td>Chitvel</td>
<td>Thondur</td>
</tr>
<tr>
<td>Obulavaripalli</td>
<td>Vempalli</td>
</tr>
<tr>
<td>Pullampeta</td>
<td>Vemula</td>
</tr>
</tbody>
</table>
ranks seventh in areal size and it is bounded on the north by Kurnool, on the east by Nellore, on the south by Chittoor and on the west by Anantapur districts of Andhra Pradesh State. Administratively, Cuddapah district is divided into three Revenue divisions namely, Cuddapah, Rajampet and Jammalamadugu. This district previously comprised 9 taluks namely, Cuddapah, Rayachoty, Kamalapuram, Rajampet, Sidhout, Badvel, Jammalamadugu, Proddatur and Pulivendula. But in the year 1980, Lakkireddy Palli from Rayachoty, Kodur from Rajampet were administered as new taluks. Later in the year 1985, there was a complete change in the administrative unit system in the State. As a result, instead of 'taluks' "Mandal" as an administrative unit was introduced in 1985 and the Cuddapah district comprises of 50 mandals.

The Terrain:

This district is relatively elevated in the north and west and the altitude gradually declines from north-west to south-east. The district can be topographically divided into three natural divisions namely, Western plains, Eastern Valley, and Southern Plateau which will be useful for the study of relative socio-economic conditions in the different regions of the district.

The first division is the black cotton plain consisting of five taluks of Jammalamadugu, Proddatur, Kamalapuram, Pulivendula and Cuddapah. These plains are with similar black cotton plains of Kurnool and Anantapur Districts and can be called as 'Western Plains'.
The second division is the valley region between the Velikonda hills on one side and Seshachalam and Nallamalai hills on the other side covering the whole revenue division of Rajampet consisting the taluks of Rajampet, Kodur, Sidhout and Badvel. This division can be called as "Eastern Valley" region. The third division is the rainshadow region covering the area of Rayachoty and Lakkireddy Palli taluks situated on the edge of the Mysore plateau abutting the Chittoor district on the south and Anantapur district on the west. This division can be called as 'Southern Plateau' region. The district is characterised by rolling topography with deep fronted hill ranges, intervening valleys and plains. The important hill ranges are Nallamalais, Lankamalais, Velikondas, Palakondas and Yerramalais. About a dozen peaks are noticed in these hill ranges attaining a height of more than 800 meters. Especially the Velikonda-Palakonda hill ranges, four peaks attained a height of more than 1000 meters above the mean sea level. With an average elevation of 160 meters except in the southern plateau (Rayachoty region) where the 300 mts. contour line runs almost close to the scarped edge of the plateau forms the boundary between the plain and the plateau. This plateau covers about one-fourth of the total surface of the district. The district has a rugged topography except in Pulivendula basin (carved out by Papagni river), Nandyal valley (carved out by Kunderu river), Cheyyeru basin, Middle Pennar basin and Sagileru valley where the relief is almost plain.

The Velikonda ranges and Nallamalai ranges which run parallel to each other in north-south direction along the eastern
boarder of the district, are separated by Sagileru valley. These hill ranges are the extension of Eastern Ghats. Velikonda ranges which pass through the eastern side of Rajampet, Sidhout and Badvel taluks forming the boundary line between Cuddapah district and Nellore district. The maximum height of these ranges is about 825 mts. endowed with deciduous forest cover. The Seshachalam-Palakonda ranges run in north-east and south-west direction across the western taluks of the district. In the extreme south-west, the Mahendragiri hills (formed by the scarp faces of the Mysore Plateau) also contribute to the rugged relief of the district.

Slope:

The general pattern of slope of the landforms in Cuddapah district showed the most rugged feature in patches found in scattered distribution. The Lankamalai hill scarps descends abruptly with a steep slope of about 4° facing towards Cuddapah town and gradually merge into the western plain region. The Yerramalai hills, Palakonda hills and Nallamalai hill scarps also descend gradually with a slope of 3° and meet the west plain areas. In these areas the world famous mineral deposits are predominantly exploited. Now, in these areas 'derelict' surfaces are found with interspersed patches of level and symmetrical plains, thus giving the look of undulating topographical character of the landscape. Very steep slope in Sagileru valley in the centre of the Lankamalai hills, where rapids and cascades are found. Other steep slopes are found in Cheyyyeru basin and Pulivendula basin. The general slope that is below 1° is found in
plain area on western, southern and north-eastern parts of the district with the scattered conical hills.

**Drainage System:**

The Cuddapah district is mainly drained by the river Pennar and its numerous tributaries and many innumerable streams. The important northern tributaries to the Pennar river in the district are the Kunderu and the Sagileru. The Papagni, the Chitravati and Cheyyeru are the southern tributaries of the Pennar in Cuddapah district. Bahuda, Pincha, Mandavi, Pullangi and the Guntana are all affluents of the Cheyyeru and Tummalavanka flowing directly into the Pennar river.

**Pennar River System:**

The Pennar river rises in the Chennakesava hills, north-west of Nandidurg in Kolar district of Karnataka State. After passing through Anantapur district enters into Cuddapah district at the north-western corner near Tallaproddatur in Muddanur taluk and flows through Jammalamadugu taluk and cuts Yerramalai hill ranges at Gandikota and flows through Proddatur and Kamalapuram taluks where the river is joined by Papagni and Kunderu tributaries. Then it passes through Cuddapah taluk and enters Sidhout taluk where the river is joined by Sagileru and Cheyyeru. Then it bends eastward and enter into Nellore district through another gorge near Somasila. Although it is essentially seasonal rainfed and non-perennial in character, but fortunately its wide sandy bed is rich in ground water potential and
provide good irrigation to the district.

Chitravathi:

The Chitravati rises in Hari Hareswara Hills north of Nandidurg in Kolar district of Karnataka State. The river spreads out as it approaches the northern fringes of the Palakondas. The river enters Cuddapah district at Mustukota village and sweeps to north through this narrow Parnapalli strip of Pulivendula taluk and once again joins at Anantapur district and again it rejoins at Cuddapah district to join the Pennar near Gandluru in Muddanur taluk.

Kunderu:

The river rises in Kurnool and enters Cuddapah district at the northern top of Jammalamadugu and Joins Pennar near Adinimmaya Palli.

Sagileru:

The Sagileru rises near Cumbum in Bestavaripeta taluk of Prakasam district and enters Badvel taluk near Gangayapalli in the Cuddapah district. It is usually dry for more than ten months in a year. To the east of the Diguvatamballapalli it is spanned by the anicut of the upper Sagileru project and tanks like Badvel, Porumamilla and also other 12 tanks on the way. The river enters Sidhout taluk near Pullaya Palli village of Badvel taluk and runs along southwards and joins river Pennar at Malemaripalli village.
Cheyyeru:

The Cheyyeru, the name by which the Bahuda and the Pincha are known confluence at the village of Dayavaran in Rayachoty taluk. The Bahuda rises in Rayavaram in Kolar District and passes through Chittor district and enters Cuddapah district at Saripallavandla Palli in Rayachoty taluk. The village like Tummasamudram, T. Sundupalli and Moditedu along its banks benefit from the river, a little lower down below Rayavaram it unites with the Pincha to form the Cheyyeru.

Papagni:

It is another tributary of Pennar, enters Cuddapah district near Rayachoty taluk and runs northwards. The Mogamureku joins Papagni at Kamalapuram.

Table 1.1

Length and Catchment Area of Major River System in Cuddapah District

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the river</th>
<th>Length of the river in the district in km.</th>
<th>Catchment area (Sq. km.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pennar</td>
<td>100.0</td>
<td>4987</td>
</tr>
<tr>
<td>2.</td>
<td>Chitravati</td>
<td>25.6</td>
<td>330</td>
</tr>
<tr>
<td>3.</td>
<td>Papagni</td>
<td>78.0</td>
<td>2183</td>
</tr>
<tr>
<td>4.</td>
<td>Kunderu</td>
<td>60.0</td>
<td>1280</td>
</tr>
<tr>
<td>5.</td>
<td>Cheyyeru</td>
<td>98.0</td>
<td>4593</td>
</tr>
<tr>
<td>6.</td>
<td>Sagileru</td>
<td>83.0</td>
<td>2000</td>
</tr>
</tbody>
</table>
Soils:

The predominant soils of the district are red accounting for 53 per cent and black soils 47 per cent of the geographical area of the district. The spatial distribution of these soils showed that red loam and red clay soils are found largely in eastern valley region, red sandy soils in southern plateau region and the black soils in western plains of the district.

Climate:

Climate is the principal ecological element of the physical environment affecting agriculture. The characteristics of soils, the medium for plant growth, are largely the product of the present and past climates and vegetation. Cuddapah district has the monsoon type of tropical climate. This region comes under the semi-arid type climate of the Deccan plateau. High temperature, high evapotranspiration and low precipitation are the chief characteristics of semi-arid climate of this region. In view of low development of irrigation in the district, the low amount of rainfall with high variability, uneven and uncertain characteristics still plays a significant role in the agricultural economy of the district. In other words it may be stated that the agriculture in the district may be considered as gamble in monsoons.

On the basis of temperature, rainfall and of atmospheric disturbances; four climatic seasons are found in a year. These seasons are :(i) summer season ranges from March to May followed by (ii) south-west monsoon season from June to September; (iii) northeast monsoon season from October to November and (iv) cold season from
December to February. The mean daily maximum temperature varies from 38.2°C to 40.8°C in summer and 29.9°C to 34.5°C in winter seasons respectively. The average annual rainfall in the district is 686.4 mm. which is 215 mm. less than the average rainfall of Andhra Pradesh State as a whole.

Humidity:

The relative humidity in the summer season is about 50 to 60 per cent in the morning and 35 to 40 per cent in the afternoon and in the rest of the year it varies from 50 to 75 per cent. The evapotranspiration losses in the district range from 209.6 mm. to 103.0 mm. from summer to winter season.

Clouds:

During the period from June to November, the sky is clouded to overcast. Rest of the year the sky is clear with thin clouds.

Winds:

Winds are generally light to moderate with some strengthening in the southwest monsoon season. During the period from October to May, the winds in the morning are often calm and from May to September, the winds are low from the directions of southwest to north-west. Rest of the year the direction of winds are from east to south-west.
Vegetation:

Cuddapah is one of the important districts of the State in respect of the forest cover. The forest cover accounts for 31.3 per cent of the total geographical area of the district. The forests are mainly noticed on the principal hill ranges viz., Seshachalam, Velikonda, Palakonda, Lankamalai and Nallamalai hills of Badvel, Sidhout, Rajampet, Cuddapah and Proddatur taluks. Isolated patches of forest are found in Pulivendula, Jammalamadugu and Rayachoty taluks.

The forests of the district are divided into 'dry deciduous' and 'tropical thorny' forests. The dry deciduous forests formed the bulk of forest tract of the district and showed considerable diversity in composition, density, quality and floristic distribution. Red sander is the important forest product followed by timber in the district. In the entire State, red sander is abundantly found in the forests of Cuddapah district and which has a great economic value. The tropical thorny forests are noticed in the outer edges of the hill slopes but they are in a transitory stage and are giving way to grasslands.

Population:

As per the 1981 Census, the total population of the district was 1,933,306. Of which the rural population was 1,558,803 which accounts for 80.6 per cent to the total population where as 374,503 was the urban population which accounts for 19.4 per cent to the total population of the district. The density of the population of the district was 126 persons per sq. km.
compared to 103 in 1971. The highest population density was in Cuddapah (650 persons per sq. km.) while the lowest in B. Mattam (66 persons per sq. km.) mandals. The female population was 959 for every 1000 males in the district.

Table 1.2

Variation of Population in Cuddapah District 1901-1981

<table>
<thead>
<tr>
<th>Year</th>
<th>Total population</th>
<th>Variation of population</th>
<th>Percentage growth</th>
<th>Density of population/sq. km.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901</td>
<td>880,891</td>
<td>-</td>
<td>-</td>
<td>57</td>
</tr>
<tr>
<td>1911</td>
<td>894,807</td>
<td>13,916</td>
<td>1.58</td>
<td>58</td>
</tr>
<tr>
<td>1921</td>
<td>888,791</td>
<td>(-) 6,016</td>
<td>(-)0.67</td>
<td>58</td>
</tr>
<tr>
<td>1931</td>
<td>950,542</td>
<td>61,751</td>
<td>6.95</td>
<td>62</td>
</tr>
<tr>
<td>1941</td>
<td>1,057,576</td>
<td>107,034</td>
<td>11.26</td>
<td>69</td>
</tr>
<tr>
<td>1951</td>
<td>1,162,888</td>
<td>105,312</td>
<td>9.96</td>
<td>76</td>
</tr>
<tr>
<td>1961</td>
<td>1,342,015</td>
<td>179,127</td>
<td>15.40</td>
<td>87</td>
</tr>
<tr>
<td>1971</td>
<td>1,577,267</td>
<td>235,252</td>
<td>17.52</td>
<td>103</td>
</tr>
<tr>
<td>1981</td>
<td>1,933,306</td>
<td>356,037</td>
<td>18.41</td>
<td>126</td>
</tr>
</tbody>
</table>

From the table 1.2, it is noticed that there has been a steady decadal growth of population in the district from 1901 to 1981 except during 1911-1921 decade. During 1911-1921 the growth of population was declined to the tune of 0.67 per cent was due to wide spread influenza which affected the population throughout the State. There was a upward trend in the remaining decades. There was a sudden
increase in the decennial growth rate from 6.95 per cent to 11.26 per cent during 1931-41 and again declined to 9.96 per cent during 1941-51. During 1951-61, there was a significant increase in the population growth from 9.96 per cent to 15.4 per cent which all due to improvements in health care, production and other infrastructural facilities after country's Independence. From 1961 to 1981 the rate of population growth was steady but normal in the district.

Density of Population:

According to 1981 Census, the density of population in Cuddapah district was 126 persons per sq. km. as against the State density 195 persons per sq. Km. This indicates that in Cuddapah district the population is thinly distributed. The high density of population is noticed in the central plains and valleys while the low density is found in the mountainous stretches in all over the district particularly in eastern region. The highest density of population of 630 persons per sq. km. in Cuddapah mandal followed by Rayachoty mandal 351 persons, Chennur 317 persons, Chapadu 279 persons, Kodur 260 persons, Pulivendula 253 persons. The lowest density of population is noticed in B. Mattam mandal.

Literacy:

The bulk of the district's population were illiterates. The percentage of literates to the total population was 31.1 per cent which was more than the percentage of State's literacy rate of 29.7 per cent. The literacy rate among males was 43.78 per cent and in females 17.7 per cent. The highest percentage of literacy is noticed
in Rayachoty (49.8%) mandal followed by Cuddapah (48.9%), Proddatur (43.9%), Simhadripuram (43.2%) Pulivendula (38.3%) Nandalur (38.5%). The lowest percentage of literacy is noticed in Mydukur mandal (17.9%).

Distribution of Agricultural Population:

"Man and land are the ultimate elements of human society so that the number of people in proportion to the amount of land is a fundamental consideration" (Trewartha, 1953). To understand the actual pressure of population on agricultural land, it is essential to have a broad perspective on the distribution of agriculture population and their man-land ratio. In the areas of agricultural importance, the distribution of agricultural population and agricultural population density play a significant role in transforming the agricultural landscape into varied agricultural formations. In Cuddapah district agriculture is the most predominant economy of the people for their livelihood. It is evident from the fact that as much as 71.4 per cent of the total working population in the district has been engaged in agriculture, indicating the importance of agriculture in providing employment opportunities to the population in the district. The proportion of agricultural workforce in Cuddapah district is significantly higher than the State's average of 69.2 per cent (1981). It shows that the present economic development of the district largely depends on the capitalisation of agricultural population.

Here, the agricultural population includes both cultivators and agricultural labourers. It may be noted that the distribution of
CUDDAPAH DISTRICT
Distribution of agricultural population

INDEX
(as percentage of total Working population)

\[
\begin{array}{c|c|c|c|c}
& \leq 60 & 60 \text{--} 70 & 70 \text{--} 80 & > 80 \\
\hline
0 & 30 & Km
\end{array}
\]

FIG: 17
agricultural population is uneven. It ranges from a maximum of 98.8 per cent in Chakrayapet mandal to a minimum of 20.1 per cent in Cuddapah mandal. A high percentage of (more than 80%) of agricultural population to the total working population is found in as many as 28 mandals distributed in all over the district where the landscape is completely rural. A moderate percentage (70-80%) of agricultural population is found in 11 mandals distributed largely in the central and eastern parts of the district where some urban functions are prevailing. The low (60-70%) and very low (less than 60%) percentages of agricultural population noticed in 11 mandals. But all those mandals which consisted low agricultural workforce are belonged to the urban landscape.

As per the 1981 Census, out of the total workers in Cuddapah district, the cultivators were accounted 33.2 per cent compared to 32.1 per cent in 1971 showing an increase of 1.1 per cent. But the agricultural labourers were accounted for 38.2 per cent in 1981 compared to 40.4 per cent in 1971 showing a decrease of 2.2 per cent. On the whole there was a decrease of 1.1 per cent in agricultural workforce to the total workforce from 1971 to 1981 in the district. This small decrease may largely be due to increase in the activities of mining and industry which have significant potentials in the district.

Out of the total agricultural work force, the proportion of agricultural labourers is higher (53.5%) than the cultivators (46.5%) in the district. The proportion of agricultural labourers is an edge over than the cultivators found in as many as 32 mandals. The
highest percentage of agricultural labourers to the total agricultural work force found in Chennur mandal (79.2%) followed by Cuddapah (78%), Pulivendula (66.9%), Duvvuru (64.7%), C.K. Dinne, B. Mattam (63.5%) and Vallur (63.1%) etc. The highest percentage of cultivators noticed in Rajampet (69.4%) mandal followed by Sambepalli (64.4) and T. Sundupalli (61.9%) mandals. The spatial distribution of cultivators and agricultural labourers has revealed that high concentration of agricultural labourers are largely noticed in the areas of Paddy and other intensive crops cultivation. Low concentration of agricultural labourers found in the groundnut dominated areas of southern plateau and south-eastern regions.

**Density of Agricultural Population:**

"Agricultural density provides one with means to make a comparison between agricultural population and cultivated area. It is a better approach to the question of land use in agricultural countries where heavy reliance is placed on farming" (Jasbir Singh, 1984, p. 128). It is true that the heavy population pressure, the high literacy rate and increase of agricultural population are instrumental in bringing about agricultural change in any agrarian society. The relationship between the density of agricultural population and crop land use is close. Agricultural density calculated on the basis of the total arable land and total agricultural population.

According to Census, the density of agricultural population in Cuddapah district was 110 persons per 100 hectares of arable land as against 100 persons in the State. It shows that the density of agricultural population in the district was comparatively high. It
CUDDAPAH DISTRICT
Density of Agricultural population
1981

INDEX
(as percentage of 100 ha.
of arable land)

\[
\begin{array}{c}
\text{\leq 100} \\
101 - 200 \\
201 - 300 \\
> 300
\end{array}
\]

0 \quad \text{Km} \quad 30

FIG 1-8
is due to scarcity of land for agricultural use in view of vast forest cover and other noncultivable lands. From 1971 to 1981 there was an increase of 10 persons per 100 hectares of arable land in the district.

The spatial density of agricultural population ranged between a maximum of 555 persons per 100 hectares of arable land in Pullampet mandal to a minimum of 52 persons in Pulivendula mandal. High density of agricultural population of more than 200 persons per 100 hectares of arable land found in 10 mandals distributed mostly in the south-eastern valley region. Although the land is limited for agricultural use in this valley region, the high carrying capacity of land with high rainfall and good irrigation facilities support large number of agricultural population. Moderate density of agricultural population (100-200 persons/100 hectares of arable land) is found in 23 mandals. Most of these mandals are distributed in southern plateau, eastern valley and central plain areas. Cultivation of paddy and other intensive crops under K.C. Canal irrigation in the central plains, extensive groundnut cultivation in southern plateau region and development of tank and well irrigation and scarcity of arable land due to extensive forest cover in north-eastern valleys are responsible for supporting moderate density of agricultural population. Low density of agricultural population of less than 100 persons per 100 hectares of arable land noticed in 17 mandals distributed mostly in the western plains. Availability of extensive lands suitable for agriculture but the low rainfall conditions and low development of irrigation and predominant cultivation of dry crops especially oil seeds
and millets are not favourable conditions for supporting high density of agricultural population in western plains of Cuddapah district. On the whole, it is observed that the spatial distribution of the density of agricultural population in Cuddapah district has close association with the potential status of the land, rainfall, irrigation, cropping pattern and topographical conditions.

**Distribution of Land Holdings:**

Land under agriculture in Cuddapah district is limited due to presence of extensive forest cover, numerous hill ranges presenting rugged terrain, and significant area under mining.

According to the 1981 Census, there were about 242 thousand land holders operating an area of about 501 thousand hectares. Of which about 169 thousand holders operating an area of about 145 thousand hectares belonged to marginal farmers and 30 thousand holders small farmers. Small and marginal farmers together accounted for 81.18 per cent of the total cultivators but they operate only 44.52 per cent of the total cultivated area in the district. It indicates that a large section of peasants (with low size of land holdings) owns small proportion of arable land. During the period of drought occurrence and crop failures, this uneven distribution of land holdings will greatly effect the larger number of small and marginal farmers.

**Mineral Wealth:**

Cuddapah district is rich in mineral wealth. Barytes, asbestos, limestone, clays and building materials are the important
minerals found in significant quantities. In India, Cuddapah district is the sole producer of high grade asbestos which is exportable quality. Vast reserves of limestone suitable to manufacturing cement are found in the district. The exportable quality of Barytes mineral is found in large quantities in different parts of the district near, Vempalli, Pulivendula, Kodur etc. Lead and copper are also found in Badvel and Pulivendula areas. The production of barium sulphate provides an ample scope for industrial progress in the district. Recently the geological survey found that diamonds occur near the banks of Pennar river near Chennur.

**Industry:**

The Cuddapah is one of the backward districts in the State as far as the industrial development is concerned. There are 13 large and medium industries and 2282 small scale industries functioning in the district. The agro and mineral based industries are playing a predominant role in industrialisation of the district. Large number of agro based industries are located in Cuddapah, Proddatur, Rayachoty, Rajampet and Kodur. The mineral based industries are located in Yerraguntla (3 Cement factories). Among the agro-based industries, the oil pressing and cotton ginning industries are important and located in Cuddapah, Proddatur and Rayachoty. Fruit canning industries are located in Rajampet and Kodur where fruit farming is significant aspect of agriculture.

A significant concentration of industrial establishment with 34 and odd industries are found in Proddatur followed by Kodur with establishment of 32 and more industries and Cuddapah got the third place with 18 industries.
INDEX
- District Headquarters
- Taluk Headquarters
- State Highways
- Railway Broadgauge
- Major Dist. Roads

CUDDAPAH DISTRICT
Important Road and Rail Routes

FIG: 19
Transport and Communication:

Good means of transport and communication facilities for the development of any area are very essential either for agriculture or industry or any other occupation in the district.

As Cuddapah district located in central part of the Southern Andhra Pradesh it has good accessibility either through road or rail networks. Cuddapah district is well connected by rail and road as well as air with the important cities like Hyderabad on the north and Madras on the south. Since Cuddapah, the district head quarters, is located at centre of the district, most of the roads passed through it in all directions, tending towards the other district centres. The total length of the roads in the district is 4954 kms.

An important railway line (broad gauge) is passing through the district and connecting Bombay on the north-west and Madras on the south-east. This railway line plays a significant role in trade and commence because of major industries like cement and agro-based industries are located in the towns of close proximity to the railway line.