CHAPTER IV
CHAPTER IV

WATERSHED DEVELOPMENT PROGRAMMES IN ANDHRA PRADESH- AN OVERVIEW

PROFILE OF ANDHRA PRADESH

4.1 Physical Features

The state of Andhra Pradesh is situated in a tropical region between the latitudes
13º-20º North and the longitudes 77º - 85º East and is bounded by the Bay of Bengal in
East with a coastal line of 960 k.m. The other boundaries to the State are Orissa, Madhya
Pradesh and Maharashtra in North, Karnataka in West and Tamil Nadu in South. The
state has an area of 2.75 lakh hectares forming 8.4 per cent of the total geographical area
of the country. As per 2011 censuses, the population of the state is 8.46 crores and 73 per
cent of the populations are living in the rural areas.

Agriculture is the main occupation of the people and 70 per cent of the people are
depending on agriculture and allied activities. The state consists of 23 districts and has
been divided into three regions, viz., Rayalaseema, which consists of 4 districts, Coastal
Andhra, which comprises of 9 districts, and Telengana, which covers 10 districts.

Andhra Pradesh is endowed with a variety of soils ranging from poor coastal sands
to highly fertile deltaic alluviums. Red soils occupy over 66 per cent of the cultivated
area and are mostly situated in Rayalaseema and Telangana districts. These soils have a
low nutrient status. Red soils can be sub classified as (a). Dubba soils (loamy sands to
sandy loams) (b) Chalkas (sandy loam soils) (c) sandy clay loams (d) loams including
silty soils (e) deep loamy sands and (f) sandy loams with clay sub soil. Chalkas occur mostly in the Telangana districts, while red loams combined with sands are presented in the upland regions of coastal districts. Black soils cover nearly 25 per cent of the cultivated area and are generally associated with poor drainage. They are also called as Regurs or Vertisols and are of two types. The first category is in-situ soils while the other one is transported soils. While the first category can be noticed in the coastal districts and parts of Telangana and Rayalaseema, the second category occurs in the valley regions of the slopes with calcareous concentrations. The in-situ soils are generally heavy in texture and high salt concentration. The alluvial loamy clay soils found in Krishna and Godavari deltas covers 5 per cent of the cultivated area. The coastal sands occupy only 3 per cent while the remaining 2 per cent is covered by laterite soils in certain corners of the State. Forested areas, which cover about 23 per cent of geographical area Andhra Pradesh, yield timber products such as teak, eucalyptus, cashew, casuarina, softwoods and bamboo.

4.2 Demographic Features

The demographic aspects influence economic development of any region. The population of the State are 8,46,65,533 enumerated in the 2011 census constituting about 7 per cent of India’s population, Andhra Pradesh is the fifth most populous state in India even in 2011 Census. Out of the total population, the male population is 4,25,09,881 and the female population is 4,21,55,652 representing 50.21 and 49.79 per cent respectively. The density of the population is 308 per sq. km. as against the India’s density of 382 per sq. km. as per 2011 Census. District-wise, literacy rate of the State is depicted. The
Percentage of literacy of the State is 67.66 while literacy of the country is 74.04 per cent as per 2011 Census.

Table-4.1: Demographic Particulars and Land use pattern of the Sample Districts (2011-2012)

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Indicators</th>
<th>Name of the District</th>
<th>Andhra Pradesh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ananthapur</td>
<td>Kadapa</td>
</tr>
<tr>
<td>1</td>
<td>Population</td>
<td>4081148</td>
<td>28,84,524</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Andhra Pradesh</td>
<td>8458077</td>
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<tr>
<td>2</td>
<td>Male</td>
<td>2064495</td>
<td>14,54,136</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Andhra Pradesh</td>
<td>4244214</td>
</tr>
<tr>
<td>3</td>
<td>Female</td>
<td>2016653</td>
<td>14,30,388</td>
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<tr>
<td></td>
<td></td>
<td>Andhra Pradesh</td>
<td>4213863</td>
</tr>
<tr>
<td>4</td>
<td>literates</td>
<td>2310960</td>
<td>17,45,178</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Andhra Pradesh</td>
<td>5055676</td>
</tr>
<tr>
<td>5</td>
<td>Male</td>
<td>1338474</td>
<td>10,12,105</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Andhra Pradesh</td>
<td>2825124</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>972486</td>
<td>7,33,073</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Andhra Pradesh</td>
<td>2230551</td>
</tr>
<tr>
<td>7</td>
<td>Illiterates</td>
<td>1770188</td>
<td>8,25,891</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Andhra Pradesh</td>
<td>3402401</td>
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<tr>
<td>8</td>
<td>Male</td>
<td>726021</td>
<td>2,78,660</td>
</tr>
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<td></td>
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<td>Andhra Pradesh</td>
<td>1419090</td>
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<tr>
<td>9</td>
<td>Female</td>
<td>1044167</td>
<td>5,47,231</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Andhra Pradesh</td>
<td>1983311</td>
</tr>
<tr>
<td>10</td>
<td>Forest Areas Sq. Kms</td>
<td>413</td>
<td>3,375</td>
</tr>
<tr>
<td>11</td>
<td>Barren land</td>
<td>1,67,469</td>
<td>2,22,099</td>
</tr>
<tr>
<td>12</td>
<td>Net irrigated area</td>
<td>1,42,386</td>
<td>1,60,688</td>
</tr>
<tr>
<td>13</td>
<td>Total Geographical area</td>
<td>19,130</td>
<td>15,359</td>
</tr>
</tbody>
</table>

As per 2001 Census, most of the population in the State is living in rural areas (73 per cent) while the percentage of population living in urban areas is 27 only. The working population of the State is 348.94 lakhs, of which 78.61 lakhs are cultivators and 138.31 lakhs are agriculture workers representing 10.31 and 15.25 per cent of the total population respectively. Andhra Pradesh is predominantly an agriculture based economy and around 19 per cent (average contribution) of the state GDP is from agriculture. Agriculture sector in the state provides employment to around 65 per cent of the state’s population. The state is one of the India's main rice-producing States.

The rainfall seasons in Andhra Pradesh are the Southwest monsoon period (June to September) and Northwest monsoon period (October to December). The total rainfall in the state in 2011–12 was only 612 mm as compared to 940 mm in normal years (decreased by about 35%). Figure 1 compares the actual monthly rainfall during the monsoon periods in 2012 with the rainfall during normal years (calculated as average of last 5 years). It can be seen that the rainfall was erratic, especially during the critical months of July to September where it was very low than the normal. The gross cropped area during 2011–12 declined by about 9.4% (from 12.7 million ha to 11.5 million ha). Consequently, the production of food grains decreased to 10.65 million during 2011–12 from 14.83 million in 2010–11 (a decrease of 28.2%).
Table- 4.2: Source-wise Irrigation in the sample Districts (Area in Hectares)

<table>
<thead>
<tr>
<th>Sources of Irrigation</th>
<th>Anantapur</th>
<th>Kadapa</th>
<th>Prakasam</th>
<th>Srikakulam</th>
<th>Mahabubnagar</th>
<th>Khammam</th>
<th>Andhra Pradesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanks</td>
<td>1288</td>
<td>1814</td>
<td>957</td>
<td>7340</td>
<td>6151</td>
<td>2758</td>
<td>72830</td>
</tr>
<tr>
<td>Canals</td>
<td>15984</td>
<td>6466</td>
<td>14819</td>
<td>15128</td>
<td>35847</td>
<td>28134</td>
<td>1683415</td>
</tr>
<tr>
<td>Groundwater (Tube Wells, Dugwells and other wells)</td>
<td>30283</td>
<td>32415</td>
<td>12933</td>
<td>36377</td>
<td>42327</td>
<td>38589</td>
<td>954446</td>
</tr>
<tr>
<td>other sources</td>
<td>929</td>
<td>878</td>
<td>11903</td>
<td>5284</td>
<td>11880</td>
<td>17218</td>
<td>184810</td>
</tr>
<tr>
<td>Gross irrigated Area</td>
<td>128890</td>
<td>155763</td>
<td>136419</td>
<td>29450</td>
<td>250037</td>
<td>120971</td>
<td>3841428</td>
</tr>
</tbody>
</table>


Figure: 4.1 Sourse-wise Irrigation in the Sample Districts
The major source of irrigation in all the six districts is groundwater though Prakasam, and Khammam benefits from canal irrigation (Nagarjunasagar Right l & Left Canal ) In Anantapur, Kadapa, Srikakulam, and Mahabubnagar districts groundwater irrigation accounts for 87.9 and 75.6 percent respectively while in Prakasam groundwater irrigates 39.2 percent to total irrigated area . This indicates that these four districts need rainwater conservation and harvesting as the exploitation of groundwater is high (the rate of depletion of groundwater table is very high).

To combat the frequent recurrence of drought in the state, the Drought Prone Area Programme (DPAP) was introduced during the year 1975, as a centrally sponsored scheme with a matching state funding share of 50%. The Integrated Wasteland Development Programme was introduced during 1991 with 100% central government assistance. The Department of Panchayati Raj and Rural Development under the central government implemented both programs.

4.3 Profile of the sample Districts

The study was undertaken in twenty four sample villages in six districts, namely, Anantapur, Kadapa from Rayalaseema region, Prakasam, Srikakulam from Costal Andhra region and Mahabubnagar, Khammam, from Telangana region for the purpose of impact assessment. The total population of the districts is 4.8, 2.8, 3.9, 2.7, 4.0, and 2.7 percent of the state respectively. All the six districts have lower sex ratios. Anantapur (977/1000), Kadapa (984/1000), Prakasam (981/1000), Srikakulam has the highest sex ratio (1015/1000), followed by the Mahabubnagar (977/1000), and Khammam
 Whereas the state average is 992/1000. In all the six districts male literacy rates are higher than that of female literacy rates. While Anantapur (10.30), Mahabubnagar (16.45), and Srikakulam (11.76) have lower proportion of forest area when compared to state average (23.20), Prakasam (25.10) and Khammam (52.64) percent of its geographical area under forests. The area forest has been decreasing over the decades in all the six sample districts.

4.4 ANDHRA PRADESH REGIONS

4.4.1 Coastal Andhra Region

The Coastal districts are well developed and enjoy a greater degree of affluence than the other two regions of the State. This region is the most prosperous and is also rich in terms of its natural bounty. Among the three regions of the State, Andhra region is comparatively more developed due to geographical advantages. This region, which has fertile lands, is often described as the “granary of the State”. Large perennial rivers like the Godavari and the Krishna pass through the region and form rich deltas. This region consists of nine districts with a total area of about 93,000 sq. k.m. The districts falling in this region are: Srikakulam, Vizianagaram, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Prakasam and Nellore. The largest district in this region is Prakasam, while the smallest is Srikakulam. As a corollary Visakhapatnam, Vijayawada and Guntur have emerged as major urban complexes.
4.4.2 Rayalaseema Region

Rayalaseema region with a total area of 67,000 sq. km. has four districts, namely, Anantapur, Kurnool, Kadapa and Chittoor. The largest one is Anantapur, which is also the largest district in the State, with an area of 19,000 sq. km., followed by Kurnool, Kadapa and lastly Chittoor. The Rayalaseema region, the stalking ground of famines, is a sparsely populated and economically vulnerable part of the State. This region is close to the coastal districts and here rainfall is less than in the coastal districts and drought conditions prevail sometimes. The region is characterized by dry tracts, rocky soils and scanty rains.

4.4.3 Telangana Region

Telangana region is of the former princely state of Nizam's Hyderabad, which is close to Maharashtra's Marathwada region and some parts of Karnataka. This region is the largest region in Andhra Pradesh with an area of 1,15,000 sq. kms. spread over 10 districts, namely, Rangareddy, Hyderabad, Nizamabad, Medak, Mahabubnagar, Nalgonda, Warangal, Khammam, Karimnagar and Adilabad. This region has a princely heritage having been ruled by Nizams for centuries. This region is relatively well developed industrially as compared to the other two regions. This development could largely be attributed to the presence of the capital and metropolis of Hyderabad. However, a feature typical of urban – based development in third world countries can be noted wherein the polarized Hyderabad exists with no positive relationship to its rural hinterland.
Figure: 4.2: Map of Andhra Pradesh with Regions
4.5 ANANTAPUR DISTRICT

4.5.1 Geography

As per 2011 census, Anantapur district has a population of 40.83 lakhs and a population density of 190 persons/sq. km which is growing at a decadal growth rate of 12.16 per cent. District is largely dominated by rural population comprising of 71.19 per cent of the total district population. The district has an average literacy rate of 56.1 per cent, which is lower than the average literacy rate of the state (average literacy rate – 61 per cent). Male population with nearly 68 per cent literacy rate dominates the literate population in the district. According to the 2011 census, Anantapur has nearly 7.8 lakh households with an average household size of five members.

4.5.2 Topography

Anantapur District lies between 13°-40° Northern Latitude and 76°-50° and 78°-30° Eastern Longitude. It is bounded by Bellary, Kurnool District on the North, Cuddapah and Kolar Districts of Karnataka on South-East and North respectively. The District is roughly oblong in shape, the longer side running North to South with a portion of Chitradurg District of Karnataka State intruding into it from west between Kundurpi and Amarapuram Mandals.

4.5.3 Climate

Anantapur district is the driest part of the country with the second lowest average rainfall of 552 mm. after Jaisalmer district in the state of Rajasthan and is classified as tropical arid with and aridity index of 72.5. The rainfall is highly erratic. Normally
southwest monsoon favours with 60 per cent of the total rainfall (310.8 mm.) and being far away from east coast. Northern monsoon will not be vigorous in the district (147 mm.). Intermittent dry spell ranging from 4 to 6 weeks in the crucial stage of crop growth period coupled with high velocity winds often result in low productivity of crops. 32 rainy days in a year yield meager precipitation of 520.4 mm. but this too is not realized many a year. The altitude varies from 990' above MSL (Mean Sea Level) at Tadipatri to 2000' above MSL in Madakasira taluk. The temperature in the range of 20.1 to 38.4 degrees Celsius recorded during the months of December-January to April-May, November and January are the cooler months with a minimum temperature of 17.2 degrees Celsius.

4.5.4 Rainfall

The Geographical position of the Peninsula renders it, the driest part of the State and hence, Agriculture conditions are more often precarious. Monsoons also evade this part due to its unfortunate location. Being far from the East coast, it does not enjoy the full benefits of North East Monsoons and being cut off by the high western Ghats, the South West Monsoon are also prevented from penetrating and punching the thirst of these parched soils. It is therefore seen; the district is deprived of both the monsoons and subjected to droughts due to bad seasons. The normal rainfall of the district is 553.0 MMs. by which it secures least rainfall when compared to Rayalaseema and other parts of Andhra Pradesh. The normal rainfall for the South West Monsoon period is 338.0 MMs. which forms about 61.2% of the total rainfall for the year. The failure of the rains in this South West monsoon period of June to September will lead the District to
drought by failure of crops. The rainfall for North East monsoon period is 156.0 M.Ms. only, which forms 28.3% M.Ms. of the total rainfall for the year (October to December). The other months are almost dry, March, April and May are warm months when the normal daily maximum temperature ranges between 29.1 C to 40.3 C. November, December and January are cooler months when the temperature falls about 15.7 C, Hindupur, Parigi, Lepakshi, Chilamathur, Agali, Rolla and Madakasira Mandals being at High Elevation are more cooler than the rest of the Mandals in the District.

4.5.5 Land Utilization

During the year 2011-12 the cultivable land was 3,56,654 ha, 61.10% of the total geographical area of the district. Net area sown represents 2,84,644 ha accounting for 48.76% of the total. Forest area in the district during 2011-12 is 68641 ha; 11.76% of the total geographical area.

4.5.6 Forest

The Forests in the District are thin and scanty. The Muchukota Hills about 35 KMs. in length, run from North of Gooty Town upto extreme Southern Corner of Tadipatri and Yadiki Mandals. Another line of Hills starts from West of Gooty Mandal and run 80 kms. Called by name Nagasamudram Hills. The Mallappakonda Range begins at Dharmavaram and runs into Karnataka State.
4.5.7 Sample villages

In the Anantapur district the study was undertaken in Narasapuram, Sangala, Jonnakothapalli, and Ramarajupalle watersheds. Details of the selected watershed villages are presented in figure: 4.3.

Figure: 4.3: Anantapur District Watershed Villages map
4.6 Y.S.R KADAPA DISTRICT

4.6.1 Geography

The Geographical area of the District is 15,359 Sq.Kms. with 3 Revenue Division, 51 Mandals, 804 Gram Panchayats, 965 Revenue villages and 4954 Habitations. The Y.S.R. District is surrounded by Kurnool District on the North, Chittoor District on the South, Nellore on the East and Anantapur on the West. The district is situated in topical region between $13^0-43^0$ to $15^0-14^0$ Northern latitude and $77^0-55^0$ to $79^0-29^0$ eastern longitudes.

4.6.2 Climate

It is too hot in summer. Y.S.R Kadapa District summer highest day temperature is in between $32^\circ$ C to $43^\circ$ C. Average temperature of January is $25^\circ$ C, February is $25^\circ$ C, March is $29^\circ$ C, April is $33^\circ$ C, May is $36^\circ$ C.

4.6.3 Rainfall

The District gets its major portion of rainfall (around 60%) during June-September period through South-West Monsoon. More than 30% of its average rainfall comes from North-East Monsoon during October-December. It gets its remaining 10-15% of its rainfall during Winter Period (January & February) and in Hot Weather Period (March-May). Among the 51 Mandals of this district, Rajupalem, Duvvur, Kalasapadu & Porumailla Mandals get maximum rainfall from South-West Monsoon, while Chitvel, Kodur & Obulavaripalle Mandlas gets from North-East Monsoon.
4.6.4 Land Utilization

The total Geographical area of Y.S.R District is 15359 hectares which constitutes an extant of forests is 500961 Ha, Barren & Uncultivable land is 221994 Ha, Land put to Non-agricultural uses is 181028 Ha, Cultivable Waste is 46048 Ha, permanent pastures and other Grazing Lands is 9674 Ha, land under Miscellaneous Tree Crops & Groves not included in Net Area Sown is 6836 Ha, current Fallows is 93563 Ha, other fallow lands is 72468 and Net Area Sown 72468 Ha, during the year 2010-11.

4.6.5 Irrigation

The major source of irrigation is under K.C Canal. There is a major irrigation project on Penna at Mylavaram. Pincha Project, lower Sagileru project, Upper Sagileru project, Annamaya Project, Brahma Sagar Project and Pulivedla Branch Canal are Medium Irrigation Projects in the districts.

4.6.6 Forest

The Forest 5,00,295 Hectares of land is under forest in the district. The forests of the Kadapa district are of a dry deciduous type. Its most important species is the famous pterocaropus santalinus or red sanders. Since this is the only district of the country in which this species occurs, a positive conservation to extend them has been evolved. These forests fall under three zones wise those of Teral, Fuel, Forests upto an elevation of 100 feet, hill forests or Red sanders lying between the elevation of 800 and 2000 feet and shoreaeugenla occupying elevations above 2000 feet.
4.6.7 Sample villages

In the Y.S.R. Kadapa district the study was undertaken in Muthukur, Godlaveedu, Sompalli and Jambapuram watersheds of Kadapa district. Details of the selected watershed villages are presented in figure: 4.4

Figure: 4.4: Y.S.R Kadapa District Watershed Villages map
4.7 PRAKASAM DISTRICT

4.7.1 Geography

Prakasam district came into existence on 02-2-1970 with the carving out portions of Markapur Revenue division from Kurnool, Ongole revenue division from Guntur and Kandukur revenue division from Nellore Districts. It was renamed as Prakasam District in 1972 in memory of the eminent freedom fighter, later Chief Minister of the composition of the Madras State and the first Chief Minister of Andhra Pradesh State, late Sri Tanguturi “Prakasam Panthulu, “Andhra Kesari” who was born at Vinodarayuni palem, a hamlet of Kanuparthi village of Naguluppala Padu Mandal of the district.

4.7.2 Topography

The Geographical, Topographic, Demographic aspects of Prakasam district are delineated hereunder.

<table>
<thead>
<tr>
<th>East</th>
<th>Bay of Bengal</th>
</tr>
</thead>
<tbody>
<tr>
<td>West</td>
<td>Kurnool District</td>
</tr>
<tr>
<td>North</td>
<td>Party by Gunntur and Mahabubnagar Districts</td>
</tr>
<tr>
<td>South</td>
<td>Party by Nellore and Kadapa Districts</td>
</tr>
</tbody>
</table>

The district is situated in topical region between 14°-57° to 16°-17° Northern latitude and 78°-43° to 80°-25° eastern longitudes. The central portion of the district contains large tracks of low shrubs and jungle diversification with rocky hills and stony plains, which is a peculiar feature of the district. The Markapur division drawn from Kurnool district is purely an upland area.
4.7.3 Climate

In the district the sea breeze renders the climate moderate both in winter and summer seasons in the coastal areas of the district. In the non-coastal areas of the district, the heat in the summer is severe especially in the tracks of upland areas and adjoining hills. The normal maximum and minimum temperature is usually recorded in the district are 39.2\(^{0}\) C and 19.3\(^{0}\) C respectively. The maximum temperature is usually recorded in the months April, May and June.

4.7.4 Rainfall

The district receives its rainfall mostly and prominently from South-West as well as North-East monsoon whose normal rainfall is 388.3 m.m and 393.7 m.m respectively. The receipt of actual rainfall during 2010-11 from South-West monsoon is 281.4 m.m while 272.2 m.m from North-East monsoon. The agriculture activity in the district is deplorable owing to gambling of monsoons and unreliable rainfall and much dependence on tanks and wells for irrigation.

4.7.5 Irrigation

An ayacut of 5.02 lakh of acres is under major irrigation and 6.09 lakhs acres of ayacut under medium, minor irrigation sources in the district. Nagarjuna Sagar project and Krishna Western delta are under major irrigation. Rallapadu reservoir, Mopadu reservoir, Paleru-Bitragunta Anicut, V.R.Kota Anicut and Cumbum tank are sources under medium irrigation. 957 minor irrigation tanks with an ayacut of 1.38 lakhs acres are under cultivation. Out of 957 minor irrigations tanks 589 tanks were taken over from Panchayat Raj Department.
4.7.6 Forest

The total forest area in the district accounts for 4,61,983 Ha. Forming 26.2% of the total geographical area. The famous Nallamala forest are formed mainly in Giddalur, Komarole, Ardhaveedu, Yerragondapalem, Pullalacheruvu and Dornala Mandals. In the Coastal areas orchids are abundantly grown with casuarinas and cashew plantations. According to records the Nallamala Forest was home to wild life and tiger population.

4.7.7 Sample villages

In the Prakasam district the study was undertaken in Manikeswram, Chejerla, chennipadu and Pokur watersheds is Prakasam district, Details of the selected watershed villages are presented in figure: 4.5.
SAMPLE WATERSHED VILLAGES OF PRAKASHAM DISTRICT

Legend
- ● WATERSHED VILLAGES
- District Boundary

Figure: 4.5: Prakasam District Watershed Villages map
4.8 SRIKAKULAM DISTRICT

4.8.1 Geography:

Srikakulam district is the extreme Northeastern district of Andhra Pradesh situated within the geographic co-ordinates of 18\(^\circ\)-20\(^\circ\) and 19\(^\circ\)-10\(^\circ\) of Northern latitude and 83\(^\circ\)-50\(^\circ\) and 84\(^\circ\)-50\(^\circ\) of Eastern longitude. The Nagavali, Vamsadhara, Suvarnamukhi, Vegavathi, Mahendratanaya, Gomukhi, Champavathi, Bahuda and Kumbikota Gedda are the important rivers of the district.

4.8.2 Topography

The district is skirted to a distance by Kandivalasagedda, Vamsadhara and Bahuda at certain stretches of their sources white line of heights of the great Eastern Ghats run from North-East. Vizianagaram district flanks in the south and west while Orissa bounds it on the North and Bay of Bengal on the East. The district derived its name from Srikakulam its headquarters town. Srikakulam district was carved out in 1950 by bifurcating it from Vishakapatnam district; it remained unaffected in its territorial jurisdiction for quite some time.

4.8.3 Climate

The climate is characterized by humidity throughout the year. The Southwest monsoon which follows the summer lasts up to the second week of October. The Northwest monsoon starts from mid-October to the end of November.
4.8.4 Land utilization and soils

The soils in the district are sandy (42.7%), red soils (29.5%), clay (25.6%) and alluvial soils (2.2%). The total geographical area of the district is 5,83,702 ha. The net area sown is 268316 hectares formed 45.97% of the total geographical area of the district. The total area under forestry is 70,841 ha.

4.8.5 Irrigation

There are 422370 land holdings in the district covering an operational area of 355646 hectares as per 2011 agricultural census. The average size of the land holding is less than one hectare (0.73 ha). Number and area of operational holdings of Small and Marginal Farmers (i.e. less than 2.0 ha) formed 93% and 67% (237215 ha) of total number and holdings of the district respectively. Paddy is the main crop grown in the district (191000 ha) followed by Groundnut (35000 ha).

4.8.6 Forest

In the Srikakulam district the area under the forest is 68,641 hectares which constitutes 12% of the total geographical area of the district. The important products if the forest is tamarind, timber, turmeric, hill brooms, gum, cashew, pineapple, custard-apple, adda leaves, beedi leaves, nuxvomica, soap nuts, marking nuts etc.
4.8.7 Sample villages

In the Srikakulam district the study was undertaken in Burjuwada, Marrigadda, Janthuru, and Laveru watersheds in Srikakulam district. Details of the selected watershed villages are presented in figure: 4.6

Figure: 4.6: Srikakulam District Watershed Villages map
4.9 MAHABUBNAGAR DISTRICT

4.9.1 Geography

Mahabubnagar is one of the ten districts of the Telangana region of Andhra Pradesh. It has been declared as an economically and industrially backward district. It lies between 15°-55° and 17°-29° North latitude and between 77°-15° and 79°-15° East longitude. The district covers an area of 18432 sq kms, and is bounded on the East by Guntur district of AP, on the West by Gulbarga and Raichur districts of Karnataka, on the North by RR and Nalgonda districts of AP and on the south by Kurnool district of AP. It lies at an average 498m from the sea level.

According to the 2011 census Mahbubnagar district has a population of 4,042,191, roughly equal to that of Liberia or the US state of Oregon. This gives it a ranking of 55th most populous in India (out of 640). The district has a population density of 219 inhabitants per square kilometre (570 /sq mi). Its population growth rate over the decade 2001–2011 was 15.03%. Mahbubnagar has a sex ratio of 975 females for every 1000 males and a literacy rate of 56.06%

4.9.2 Topography

The district has no major hill ranges. The major rivers flowing through the district are river Krishna and river Tungabhadra. Dindi, Peddavagu and Chinnavagu are rivulets that flow through the district. The major soil type found in the district is red sandy soil. Loamy soils (dubba) are found in 13% of geographical area. The share of red sandy soil
(Chalka) is 67% and that of black cotton soil is 20%. In general, the soil quality is shallow and poor in fertility. There are large patches of saline and alkaline soils. Black cotton soil exists in narrow strips, along the banks of river Krishna and Tungabhadra, in Gadwal, Kollapur and Makthal areas.

4.9.3 Climate and Rainfall

The principal food grain crops in the Mahabubnagar district are rice, sorghum, finger millet and pearl millet while the principal commercial crops are groundnut and castor. Pigeonpea and green gram were the major pulse crops. Mahabubnagar district had the largest in the state under sorghum and castor during the 2011–12 cropping season. It accounted for 71% of the total castor production in the state. In Mahabubnagar district, the total rainfall in 2011–12 was only 536 mm as compared to 604 mm in normal years (decreased by about 24%). The rainfall was erratic, especially during July and September and was much less than the normal.

4.9.4 Land utilization

The geographical area of the district is 18.47 lakh ha (6.73% of state area), the second largest district in the state. Forest area is hardly 4.3% of corresponding area in the state, while area devoted to permanent pastures and other grazing lands is only 3.7%. The net cultivated area is 6.81 lakh ha (6.28% of state cultivated area) with a cropping intensity of only 108.2% About 6.76 lakh ha area is under different fallow lands needing proper attention.
4.9.5 Irrigation

Net area irrigated under different sources of irrigation in the district is 1,66,606 hectares accounting for as low as 3.8% of the state net area irrigated (43,92,303 hectares). Gross area irrigated is 2,11,454 hectares. Area irrigated more than once has registered as 26.9% of the net area irrigated in the district. Tube wells has emerged as dominant source of irrigation which has occupied a lion’s share of net area irrigated to the extent of 66.4% followed by canals (12.5%), other well (11%), tanks (6.7%) and other sources (3.4%). But, in the state as a whole, canals has occupied a major source of irrigation which has ranked first (35.8%) while tube wells (30.7%) and tanks (15.1%) have attained second and third positions, respectively. The cropping intensity of the district (107%) is lower than the state average (137%).

4.9.6 Forest

Forest forms 16.39% (3.02 lakh Ha) of the total geographic area of the district. The forests are spread over areas of Achampet and Mahbubnagar Mandals. The forest produce includes timber, bamboo, and beedi leaves.

4.9.7 Sample villages

In the Mahabubnagar district the study was undertaken in Damaganpuram, Gundepalle, Palukapalle, and Hemajipur watersheds is Mahabubnagar district, Details of the selected watershed villages are presented in figure: 4.7.
SAMPLE WATERSHED VILLAGES OF MAHABUBNAGAR DISTRICT

Legend

- WATERSHED VILLAGES
- DISTRICT BOUNDARY

Figure: 4.7: Mahabubnagar District Watershed Villages map
4.10 KHAMMAM DISTRICT

4.10.1 Geography

Khammam District in Telangana, India. It had a population of 2,79,7370 of which 19.81% were urban as of 2011 census. The present name of Khammam is derived its name after a local hill, which was called as 'Stambhadri'. The town was called with different names starting with Stambhadri, Kambhadri, Kambham mettu, Khammam mettu and then finally as Khammam. The Godavari River enters Khammam district from Warangal district and flows nearly 250 km across the district. Khammam district is one of the "Coal mining districts of India." The district has the Singareni Colleries head town, Kothagudem which is also called "Coal town of South India." It is currently a part of the Red Corridor.

4.10.2 Topography

It is Located at Latitude-17 °-2 °, Longitude-80° -1°. Khammam District is sharing border with East Godavari District to the East, Krishna District to the South, Nalgonda District to the west, Warangal District to the North, West Godavari District to the East, Bijapur District to the North, Dantewada District to the North. It is sharing Border with Chattisgarh State to the North. Khammam District occupies an area of approximately 16029 square kilometers. . It’s in the 97 meters to 103 meters elevation range. This District belongs to Southern India.
4.10.3 Climate

It is too hot in summer. Khammam District summer highest day temperature is in between 35 °C to 48 °C. Average temperatures of January is 26 °C, February is 26 °C, March is 30 °C, April is 33 °C, May is 37 °C, June is 32 °C.

4.10.4 Land Utilisation

Land is an important pre-requisite for industrial development. Out of total geographical area of 16,02,900 Ha. Land put to non-agricultural uses is 1,29,825 hectares; current fallow land is 46,808 hectares which is 2.92% of the total area available for enterprises. Similarly 5.6% barren of uncultivable land and 1.96% other follows are also available for industrial purpose. The net area sown for the year 2010-2011 is 4,79,345 hectares accounting 29.90% of the total geographical area.

4.10.5 Irrigation

Irrigation plays a vital role in the development of agriculture. The gross area irrigated during 2011-12 is 2.79 lakhs hectares with net area irrigated of 2.11 lakhs hectares. Total gross area irrigated to gross cropped area is 58.2%. The net area irrigated under canals is 89,340 hectares, tanks 58,522 hectares, tube wells & filter points 63,530 hectares, other wells 44,216 hectares, lift irrigation 18,845 hectares and other sources 4,598 hectares. As per minor irrigation census in Khammam district the available ground water sources are 63,080 and surface water and sources are 8,475. A major source of surface water irrigation in the left bank canal of Nagarjuna Sagar project with 2,00,637 hectares gross ayacut. The eastern part of the district is traveled by the river Godavari and
its tributaries viz., Sabari, Kinnerasani, Taliperu, and Munneru which cover two-thirds of the total area, while river Krishna and its tributaries viz., Paleru, Wyra and Kattaleru covers the remaining one-third area of the district in the Western part.

4.10.6 Forest

Khammam has the largest area under Forests. A total of 7.6 lakh hectares is under forest area. This works out to more than 47% of the total area. The forest area spreads over Bhadrachalam, Manuguru, Bergampahad, Kothagudem, and Yellandu. Important forest produce are teak, bamboo, eucalyptus, beedi leaves, honey, tamarind, nuxvomica etc.

4.10.7 Sample villages

In the Khammam district the study was undertaken in Mulakalapalle, Sattypalli, Punukulachelaka and Ulavanoor watersheds is Khammam, Details of the selected watershed villages are presented in figure: 4.8.
Figure: 4.8: Khammam District Watershed Villages map
4.11 WATERSHED DEVELOPMENT PROGRAMMES IN ANDHRA PRADESH

The total geographical area of our country is 3290.00 lakh hectares. While on one hand 50% of our lands are degraded, on the other, nearly 30% of our people are poor or below poverty line. With proper planning, scientific approach and efficient management it is possible to increase the productivity of degraded lands, while creating huge employment opportunities for the poor. It is now firmly believed that the development of degraded lands is an important input required for eradication of poverty.

In order to combat the frequent recurrence of drought in the state, Drought Prone Area Programme (DPAP) was introduced during the year 1975, as a Centrally Sponsored Scheme (CSS) with matching state share of 50:50. Integrated Wasteland Development Programme (IWDP) was introduced during 1991 with 100% central assistance. The wasteland development programmes taken up before April 1995 had not performed well, mainly because they had been planned and implemented on departmental basis by government officials and in isolated patches, without any regard for the complete micro-watershed principle or with people's participation.

The programmes of dry land development in Andhra Pradesh have undergone a major change from 1995-96 with the introduction of new watershed guidelines, based on the recommendations of Dr. Hanumantha Rao's Committee Report. The main principle adopted in the guidelines lays special emphasis on the active mobilization and participation of the stakeholders in the programme including planning, implementation and subsequent management.
A great opportunity exists for improving productivity, profitability and sustainability of dry farming areas through social mobilization. Rain fed agriculture to become productive, should be based on watershed as the unit of development. Watershed is not a technology but a concept which integrates conservation, management and budgeting of rain water through simple but discreet hydrological units. Simultaneously, a watershed supports a holistic framework which means the combined application of technologies on soil and water conservation with improved crop varieties, farming systems and agronomic management, taking into account both arable and non-farm land, water resource development, management, harvesting and equity in sharing form the nucleus of watershed development. With assured availability of water, farmers are motivated to accept more profitable, sustainable and innovative farming systems. Water availability has also catalyzed adoption and spread of value-added activities in the entire area of watershed such as horticulture. Cropping systems need to be tailored to suit different rainfall-cum-soil zones. Watershed development is the only solution to ensure drought proofing and to mitigate the distress caused by frequent droughts.

A massive programme for development of all the degraded lands in Andhra Pradesh in ten year-period was launched during 1997. The Ten Year Action Plan for development includes wastelands, degraded lands (i.e. dry lands which are being cultivated under rain-fed conditions) and degraded reserve forests. It is envisaged to develop 100 lakh hectares of degraded and wastelands (17.25 lakh ha. by forest Department, 4.55 lakh ha. by Agriculture Department and 78.20 lakh ha. by Rural Development Department) , with an outlay of about Rs.4000 crores from 1997 to 2007 at
the rate of 10 lakh hectares every year by the Department of Rural Development, Forest and Agriculture. About 54.03 lakh hectares have been covered through 12890 watersheds projects under Rural Development department. The following are the details of the watersheds:

4.11.1 Drought Prone Areas Programme (DPAP)

Drought Prone Areas Programme (DPAP) is the earliest area development programme launched by the Central Government in 1973-74 to tackle the special problems faced by those fragile areas, which are constantly effected by severe drought conditions. These areas are characterized by large human and cattle populations which are continuously putting heavy pressure on the already degraded natural resources for food, fodder and fuel. The major problems are continuous depletion of vegetative cover, increase in soil erosion and fall in groundwater levels due to continuous exploitation without any effort to recharge the underground aquifers.

**Objective of the scheme:** This is a centrally sponsored scheme funded by Centre and State on the ratio 50:50 basis up to IV batch i.e., 1998-99 and 75:25 basis from Vth batch i.e., 1999-2000 onwards. The period and cost of the project per each watershed was four years and Rs. 20.00 lakhs up to IV th batch. It is five years and Rs. 30.00 lakhs from V th batch onwards. It is aimed at developing the drought prone area with an objective of drought proofing by taking up of soil / land moisture conservation, water harvesting structures, afforestation and Horticulture programmes on a comprehensive micro watershed concept basis. So far 4242 number of watersheds have been taken up covering an area of 21.21 lakh hectares in 11 districts with 94 blocks.
**Strategy of implementation:** Developing waste lands / degraded lands on watershed basis. Overall economic development of resource poor. For Mitigation of drought, Employment generation and Poverty alleviation Scheme is being implemented by User groups, Self-help groups, through watershed committees under supervision of PIAs. Sharing Pattern (CSS): 50:50 up to IV th batch, 75:25 from Vth batch onwards.

4.11.2 Desert Development Programme (DDP)

The main object of the programme is to promote the economic development of the rural community through optimum utilization of natural resources like land, water, vegetation etc. with a view to mitigate the adverse effects of drought and prevent further ecological degradation. Special emphasis is being given to improve the economic and social condition of the poor having no access to resources and disadvantaged section through equitable distribution of the benefit of land and water resources. This programme is being implemented in 16 districts of the State. The programme is being funded by the GOI and GOR in the ratio of 75:25. Under this, 15,467 hectares of area has been treated with an expenditure of ` 1,439.77 lakh against the available fund of ` 8,268.87 lakh in the year 2012-13 upto December,2012.

**Objective of the scheme:** This is a centrally sponsored scheme funded by Centre and State on the ratio 75:25 basis. It is aimed at developing the drought prone area with an objective of drought proofing by taking up of soil land moisture conservation, water harvesting structures, afforestation and Horticulture programmes on a comprehensive micro watershed concept basis. So far 1054 watersheds were taken up covering an area of 5.27 lakh hectares in Anantapur district in all 16 blocks.
**Strategy of implementation:** Developing waste lands / degraded lands on watershed basis. Overall economic development of resource poor. For Mitigation of drought. Employment generation and poverty alleviation. The period and cost of the project for each Watershed was four years and Rs.22.50 lakhs respectively up to Vth batch. It is five years and Rs. 30.00 lakhs from VI th batch onwards.

**4.11.3 Integrated Watershed Management Programme (IWMP)**

During the Eleventh Plan, the three area development programmes, namely, Integrated Wasteland Development Programme, Drought Prone Area Programme and Desert Development Programme have been integrated and consolidated into a single programme called Integrated Watershed Management Programme (IWMP). This consolidation is for optimum use of resources, sustainable outcomes an integrated planning. The common guidelines for the Watershed Development Programme have been formulated and are effective from 1.4.2008. An amount of Rs.1825 crore has been allocated for IWMP during 2008-09. The ongoing projects sanctioned prior to 1.4.2008 under DADP, DDP, and IWDP would be continued to be implemented as per old guidelines.

The modified IWMP would adopt a three tier approach in which the upper reaches which are mainly forested and hilly would be treated with the support of Forest Department. For land situated intermediate slopes above the agriculture lands, the IWMP would address all the necessary issues of land treatment by adopting best possible options including cropping pattern, horticulture and agro-forestry etc. In the lower tire, which are
plains and mainly agricultural lands, the IWMP would be dovetailed with the employment generating programme such as National Rural Employment Guarantee Scheme (NREGS) and would fill the critical gaps of NREGS and vice versa.

Under the new programme, a cluster approach would be followed with a broader vision of natural hydro-geographical unit of average size of 4,000 to 10,000 ha. Comprising of clusters of micro-watershed to be selected as project area. The programme would be implemented by dedicated institutional agencies at state and central level. Professional support (in the form of multidisciplinary expert team) would be provided to support these institutions with proper fund allocation. A core GIS facility with spatial and non-spatial data augmented with satellite imagery data would be set up for giving Controlled access/distribution for local project planning.

The project period is proposed in the range of 5 to 7 years in three distinct phases, i.e. Preparatory, Watershed works and Consolidation phase. The consolidation phase will include livelihood activities, marketing, processing and value addition activities.

4.11.3.1 New Guidelines for Integrated Watershed Management Programme (IWMP):


- The salient features of these guidelines are as following.
• Cluster of micro watersheds covering an area of 1000-5000 ha will be treated as a project.
• Unit cost is raised from Rs.6000/ha to Rs.12000/ha.
• Fund allocation for Livelihoods for resource poor and Productivity Enhancement of Agriculture & Livestock.
• Project period is 4-7 years.
• Funding pattern is 90:10 (Central & State share).
• All new watersheds from 2008-09 onwards will be implemented under a single programme called IWMP.

4.11.4 Integrated Wasteland Development Programme (IWDP)

Objective of the scheme: Rapid depletion of green cover and vast stretches of marginal lands lying fallow, found to be causing enormous ecological imbalance. Productivity is also negligent on account of soil erosion and marginalization of lands. To arrest this, massive integrated wasteland development project was undertaken during 1991 with 100% central assistance. The programme of dry land development in Andhra Pradesh underwent a major change from 1995-96 with the introduction of new watershed guidelines prepared by Sri Ch. Hanumantha Rao. The Scheme is being implemented in 19 districts in A.P. in non- DPAP blocks of DPAP districts and in all non-DPAP districts, with 1638 (114 Projects) Watersheds covering an area of 8.02 Lakh hectares. The objective of the projects is to enable "Government of AP for checking of land degradation, sustainable and increased productivity of land based on watershed concept".
**Strategy of implementation**: Overall economic development of poor farmers, employment generation and poverty alleviation being implemented by user groups /self help groups and through watershed committees/GPs. Area treated with soil and moisture conservation works and rain water harvesting structures from ridge to valley concept. Afforestation of degraded forest and non-forest waste lands. The works are executed by user groups under the supervision of watershed committee. Sharing Pattern if any (EAP/CSS): Before March 2000 -> 100% share by GOI. After March 2000 -> 11:1 (GOI: GOAP)

4.11.5 Andhra Pradesh Rural Livelihood Project (APRLP):

Andhra Pradesh Rural Livelihoods Project (APRLP) is being implemented in five semi-arid and drought prone districts of Andhra Pradesh, viz. Ananthapur, Kurnool, Mahaboobnagar, Nalgonda and Prakasam. The objective of the project is to enable "Government of Andhra Pradesh to comprehensively implement pro-poor watershed based sustainable Rural Livelihoods in Five Districts of Andhra Pradesh ".

Coverage and total outlay of the project 500 APRLP funded new watersheds. 2000 ongoing watersheds 177 mandals in the five project districts. 1608 villages 2067 habitations 145 Project Implementing Agencies 40.30 lakh rural poor (7.60 lakh SCs and 2.71 lakh STs)

Total Outlay of the Project: 318.60 Crores Project Period: 7years i.e. from 1999 to 2006. Keeping the positive results of APRLP in view the approaches of APRLP are extended to all the watersheds in the state.
4.11.6 Indira Prabha (Comprehensive Land Development Project)

Indira Prabha scheme was launched by Andhra Pradesh government to see to it that the assigned land goes back to the intended sections at block level by identifying and transferring the land to the rightful owner. This move has won many laurels as it provides food security, livelihood, development of barren land with irrigation facilities besides providing transport facilities to market the yield. About 50 lakh acres was distributed among poor during the past, but hardly 20 per cent of the land came into the cultivation fold while in the rest there was not development due to poor literacy levels and various other reasons.

Objective of the scheme: The main objective of the scheme is to provide an Integrated and Comprehensive Livelihood options centered on Development of compact blocks of assigned lands owned by the poor to ensure these lands become productive assets for the poor. Government have sanctioned 8293 blocks under RIDF-IX and X Projects with financial outlay of Rs.448.91 crores in 22 districts to develop 3.85 lakh acres of assigned land belonging to 2.67 lakh families of SC,ST,BC and others. It is proposed to complete the project in 3 years of administrative sanction. Since inception of the project an amount of Rs.325.52 crores has been released by the Govt. So far and an amount of Rs.282.58 crores has been spent developing an extent of 3.25 lakh acres.

4.11.7 Andhra Pradesh Water, Land and Trees Act (APWALTA)

In view of the increasing drilling of bore wells, Ground Water is fast depleting. Added to it, unscientific and reckless drilling has resulted in failure of bores leading to
farmers incurring heavy losses. Keeping this in view, in the year 2004, Government of A.P has suitably amended the APWALTA Act and consequently through GOMs No. 339, PR &Rd Dept. Dt. 6.11.2004, comprehensive Rules-2004 are brought out for effective implementation. The most important are the introduction of single-window system for speedy clearance of the applications for new bore wells and insuring all new well to assist the farmers wherever bore wells fail.

**Single-Window System:** The farmers apply to village secretary or MRO. The MRO takes feasibility of electricity from the APTRANSCO and feasibility of water from the Ground Water Department. When both are feasible, the MRO gives permission for sinking of new well.

**Failed Bore well Compensation Scheme:** Under this, if any agricultural bore-well drilled by farmer, after securing permission from MRO fails compensation up to Rs. 10,000/- will be paid by the government. This comes into effect from September 2006. In the new Rules, Penal provision for violation of the provisions of APWALTA has been made stringent and fine not less than Rs. 1,00,000/- is incorporated to deter law breakers. The Status Watershed Development Programmes under different schemes in Andhra Pradesh is given in table 4.3.
### Statement showing the Completed & Ongoing Watersheds of various schemes

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