Resource potential of a region plays a vital role in planning and development of that region. An inventory of all the resources available will come in handy for the planners for preparing a road map for development. The spatial and temporal variations in the resource base call for region specific database of various resources, so that the developmental plans can have a firm footing on reliable information. In India district is treated as basic unit for planning at national level. For preparing growth oriented developmental plans at national level an integrated analysis of all the available resources in the district vis-à-vis water resources available is very much essential.

In the present study Kurnool district in Andhra Pradesh has been selected for preparing a comprehensive inventory of all the resources available in the district and an attempt has been made to analyze the resource potential for preparing developmental plans for the district. An inventory of all the resources of Kurnool district has been prepared in .CSV format for using the data base in ArcGIS for the purpose of retrieval, analysis and so on.

Kurnool district is located in Rayalaseema region of Andhra Pradesh state. The district ranks 10th in population with 35,29,494 people accounting for 4.63% of the total population of the State as per 2001 population census. It occupies 3rd place in area with 17658 sq.km which accounts for 6.41% of the total area of the State. Kurnool district comprises of three revenue divisions, 54 revenue mandals, 53 mandal parishads, one municipal corporation, 4 municipalities, 898 gram panchayats, 926 villages and 647 hamlets.

Since water is a critical resource for development of other resources the assessment of water resources available and demand for water for various purposes i.e. agriculture, domestic and industrial use, is of utmost importance without which it is difficult to prepare any
developmental plan. The normal rainfall of Kurnool district is 670 mm per annum. Agriculture is the main activity and source of income for more than 68% of people out of 77% of the people living in rural areas. Paddy, sunflower, groundnut, jawar, bajra and korra are the principal crops grown in the district. About, 29.58% of cropping area is irrigated in this district. Kurnool district has got 19.2% of forest area and the net sown area forms 50% of the total geographical area.

The demand for consumption of various resources comes from population hence population dynamics needs to be studied to prepare plans for development.

In Kurnool district, 27.12 lakh people are living in rural areas, 8.17 lakh people are living in urban areas. Thus, nearly 77% of the population is living in rural areas. About 17.81% of the population in the district belong to scheduled caste community and 1.97% of the population belong to scheduled tribes.

50 mandals during 1992-93, 47 mandals during 1994-95, 42 mandals during 1997-98, 51 mandals each during 1999-2000 and 2002-03, 44 mandals during 2004-05 have received less than normal rainfall. 30 mandals in 1999-2000 and 26 mandals in 2002-03 have received less than 25% of normal rainfall. Similar spatial and temporal variations have been observed in the rainfall during south-west monsoon, north-east monsoon, winter period and hot weather period.

The average depth of ground water levels in Kurnool district varies from 7.48m in 2000-01 to 11.59m in 2004-05. The average ground water level during 2007-08 was 6.83m in the year in which the district has received highest average rainfall of 1081.3 mm whereas the average rainfall in the year 2004-05 was 541.6 mm only when the ground water level was the deepest i.e. 11.59 m during last 10 years.

The land use and land cover pattern across the 54 mandals in the district varies from mandal to mandal. While 95.75% of the geographical
area in Srisailam mandal is covered by forest, nine mandals have no forest cover at all. Velugodu, Mahanandi and Bandi Atmakur mandals have more than 50% forest cover. 36.5% of geographical area in Owk mandal is barren and uncultivable area. Kolimigundla, Bethamcherla and Orvakal mandals have more than 20% barren and uncultivable area of total geographical area. The percentage of the total agricultural land in the district is 7.85 of the total geographical area. Pagidyala mandal has 56.16% agricultural land and Halaharvi mandal has the lowest agricultural land of 2.22% of the total geographical area. 3.06% of the land in Krishnagiri mandal is under permanent pastures and other grazing lands. 1.50% of the land in Veldurthy is covered by miscellaneous tree crops and groves not included in net area sown.

Paddy is grown in Kharif season in almost all the mandals except in Srisailam mandal. The area under paddy in Gudur, Pathikonda and Aluru is only 7, 26 and 41 hectares during kharif season. It is grown in almost all the mandals in Nandyala division during rabi season covering an area of 20,788 hectares against 49,331 hectares during kharif season. In Adoni division also about 3,491 hectares area is covered under paddy during rabi against 17,396 hectares during kharif. The major crop in Kurnool district is groundnut with a total area of 2,46,143 hectares. Bengalgram comes next to groundnut with 2,24,086 hectares grown during rabi season. Bengalgram is grown in all the mandals except Srisailam mandal. The highest area under bengalgram is 15,690 hectares in Uyyalawada mandal. Atmakur and Mahanandi mandals have the lowest acreage of 5 hectares and, 8 hectares under bengalgram. Jowar and bengalgram are grown mainly during rabi season as far as food crops are concerned.

Under non-food crops category tobacco is mainly a rabi season crop. Out of the total area of 5,42,446 hectares under food crops 2,17,219 hectares is in Nandyala division, 1,76,220 hectares is in Adoni division and 1,49,007 hectares is in Kurnool division. Out of 4,51,240 hectares under non food crops in the district, 2,33,751 hectares is in Adoni division, 1,71,095 hectares is in Kurnool division and 46,394 hectares is in Nandyala division. Out of 9,93,686 hectares of gross area sown during 2008-09, 4,09,971 hectares is in Adoni division, 3,20,102 hectares is in Kurnool division and 2,63,613 hectares is in Nandyala
division. Aspari mandal has got the highest gross sown area of 36,877 hectares in the district. Gross sown area in Srisailam mandal is 0 and Pagidyala mandal has got a gross sown area of 4,837 hectares which is the lowest in the district after Srisailam.

Given the resource base as discussed in the preceding paras in respect of Kurnool district, the following tasks have been performed using the inventory of resources on various parameters relating to the resources to analyse the resource requirement for the next ten to twenty years against the existing potential. The resource deficit estimates have been worked out to prepare appropriate plans to fill up the gaps in resource requirement.

The irrigation water demand for principal crops i.e. paddy, jowar, sun flower, groundnut, millet and cotton has been worked out for seven years from 2001-02. The percentage increase in crop water demand in seven years is highest in respect of jowar at the rate of 46.25. However, out of 1,43,575 ha.m of total crop water demand for the above six crops during the year 2007-08, major demand of 1,29,040 ha.m comes from paddy which is 90% of total irrigation water requirement with 53% of total area under paddy. The percentage increase in irrigation water requirement over a period of seven years from 2001-02 has been worked out as 37.12. The highest water demand for paddy comes from Nandyala sub division which is nearly 50% of the district irrigation water requirement for paddy.

The irrigation water requirement for groundnut, millet and cotton is showing a downward trend between 2001-02 and 2007-08. The net increase in irrigation water demand for the six major crops is 24.79% during this period.

The role of population growth in projected increase in water demand for agriculture and domestic use has been analyzed and it was found that the pressure on water is 2831 persons per flow unit. The total water demand for agriculture was estimated as 1435.75 MCM where as the domestic requirement was estimated to be 2446.34 lac liters in the
year 2008. However, the position has been improved from a water pressure of 3067 P/FU in the year 2001 to 2831. The reason for this improvement could be due to increase in ground water levels due to water harvesting programmes taken up by the government. While 44% of the gross area irrigated is under canals, 46% of the area is irrigated with tube wells, filter points and other wells. Further it is observed that the area under tube wells and filter points has been increased by 165.77% in 2008 – 09 when compared with the area under irrigation with tube wells and filters in the year 1994 – 95. According to ground water department estimates in 2002, the usage of ground water is of the order of 127 in command area and 2848 MCM in non - command area against net available resource estimated at 659 MCM and 960 MCM in command and non command areas respectively.

A detailed inventory of all the resources available in the district in GIS compatible format for easy retrieval and manipulation of data will help preparation of plans at district level which is the basic unit for planning in India. The domestic and crop water demands estimated can be used to assess potential imbalances in population and water demand and supply. It is demonstrated that an integrated analysis of water resources with spatial disaggregation will give an insight into vulnerable regions of the district in terms of water demand and availability. Utilization of existing ayacuts under various irrigation project will help improving supply side management by reducing demand side imbalances. In integrated resources management more focus is emphasized on supply side management. Hence water rights and entitlements with allocation strategies plays a major role in filling up the demand supply gaps with equity. As the seasonal rainfall variations are very high and actual crop water availability in the root zone is expected to be low which may result in considerable reduction in yield, crops with less and medium sensitivity to drought like groundnut, sorghum, cotton and sunflower are to be preferred. It is better to avoid crops with high sensitivity to draught like maize and beans. It is observed in the present study that there is abnormal increase in ground water usage for irrigation purpose through tube wells in the recent times. While increase in the area under irrigated water supply result in more production of agricultural produce it is to be ensured that the ground recharging takes place to avoid fall in ground water levels beyond tolerance. There is ample
scope for expansion of industrial base in food and agriculture based industries. District administration can make plans for establishment of more agriculture based industries. The live stock and cattle and also poultry can be developed to complement the agricultural incomes which will reduce pressure on water resources.

As the agricultural sector consumes major chunk of water available both surface and subsurface, appropriate technologies and management practices have to be adopted to reduce water usage for sustainable development as water is a finite resource.