CHAPTER VII
SUMMARY OF CONCLUSIONS

The study area is Chittoor taluk, having an area of 1011 sq.Km. It lies between north latitudes 13° 0' 42" and 13° 26' 29" and between east longitudes 78° 52' 26" and 79° 17' 56" falling in the survey of India topographic sheets of 57 k/15, 16, 0/3, 4,7 and 8 on a scale of 1:50,000. It is one of the backward taluks in Chittoor district, Rayalaseema region, Andhra Pradesh State and South India. An attempt has been made to study the land and water resources including the artificial resources, with a view to examine the scope for all round development of the taluk by optimum exploitation of land resources to get maximum return out of land and achieve overall prosperity to the entire population in the quickest possible time.

The various natural and artificial resources studied include geographical formations, structure, mineral resources, landforms, drainage, climate, soil resources, surface water resources, groundwater resources, forest resources, human resources, agricultural land resources, communications, spring channels, minor and medium irrigation reservoirs, doruvu wells, dug wells, dug-cum-bore wells, bore wells, tube wells, livestock, and electric power.

A methodology has been followed to indicate the availability of various resources with village, revenue mandal, and taluk as units so as to know the status of the taluk with reference to its actual resources and level of development of
resources and the regional imbalances within various parts of the taluk so that, a planned development of every small region in the taluk can be attempted.

Although the present study is aimed at studying the resources of the taluk, it has been found that availability of water of adequate quantity and quality is the single largest constraint for the rapid and planned development of the taluk. As agriculture is almost the only avocation in the taluk, optimum exploitation of water resources for providing water for domestic supplies and agriculture round the year in adequate quantities will go a long way in the planned development of all other resources in an equally big way.

The following conclusions have been drawn for achieving the goals for which this work has been undertaken.

1. In view of the preparation of detailed village maps of the taluk during the British rule with scope to identify various features, including the innumerable field plots both in the field and in the map, a wealth of micro level data on land resources can be obtained, if the data collected by various workers such as, geologists, geographers, geophysicists, geochemists, pedologists, agricultural scientists, hydrologists, hydrogeologists, and drillers and plotted on these village maps accurately and the maps showing all such details are made available to all those who require them, it goes a long way in the planned development of the land resources. It is essential that government takes urgent necessary steps in this regard so that
the bottlenecks and the constraints developing every small region can be studied in an effective manner.

2. In view of the reported occurrence of steatite in Gangadhara Nellore revenue mandal, it is essential to take up the detailed studies including the exploration to prove the existence of the deposit which could be economically exploited and used in the fertiliser and glazing industries and preparation of the slate pencils in the cottage industries.

3. In view of the occurrence of massive grey, and pink granitic rocks and dolerite dykes (black granites), it is essential to explore the possibility of quarrying large blocks of grey, and pink granitic rocks and black granite, which can take good polish for marketing them both within the country and in foreign countries, where such stones fetch very high unit value.

4. In view of the rugged topography with high relief and steep slopes, very coarse texture of the drainage with low stream frequency and low drainage density, and restriction of rainfall of high intensity to a few days in a year, the taluk is characterised by flash floods with high flood damage for a short duration and severe shortages of water both for domestic supplies and agriculture leading to extensive drought damage of very long duration. The present practice of government in spending millions of rupees every year for providing temporary relief for flood and drought damages is a waste. There is an urgent need to tackle these twin problems on a permanent basis, so that the government could mobilise funds for creating durable artificial assets for improving the quality of life in the taluk.
5. There is only 18.7 percent of the taluk land is covered by reserved forests which is 14.6 percent less than the area fixed by the government of India under National Forest Policy resolution of 1952. It is necessary to increase the land under forests to a much greater extent by declaring many of the hilly tracts in the area as reserved forests. Most of the reserved forest carry scrub vegetation of no economic value except serving as a fuel for cooking purposes. There is an urgent need to improve the quality of vegetation and to convert the forest product into a more value-added commodity.

6. In view of the salubrious climate of the taluk, there is good scope for developing sericulture industry on a big scale by growing mulberry plantations, taking up rearing of silk worms, and producing silk on a big scale so as to improve the standard of living of people in the taluk.

7. Although use of Landsat imageries and aerial photographs is of definite help in assessing the land resources in a fairly reliable way, caution has to be exercised in arriving at sweeping conclusions without adequate field checks.

8. Although the soils of the taluk are primarily represented by red sandy loam of good drainage and are best suited for agriculture, provided water and fertiliser of requisite quantity and quality are applied, there are a few isolated pockets where the soils are tending to become more and more alkaline due to faulty irrigation practices. There is an urgent
need to rectify this situation: gypsum treatment and provision of adequate drainage and also to see that the factors responsible for the formation of sodium carbonate and its cumulative accumulation in the soil are corrected.

9. Water for drinking once obtained by step wells and draw wells, is presently being obtained by deep bore wells fitted with hand pumps. This task has become particularly difficult due to the people in taluk live in more than 1054 scattered settlements with an average population of 308 per settlement. It is desirable to reduce the number of settlements to provide better amenities to people. For bigger settlements including Chittoor town, water is being obtained from tube wells or infiltration wells in river beds and water so pumped is conveyed through public and private taps. There is still scarcity of drinking water in most of the settlements, including Chittoor town, and it is necessary to manage the funds earmarked more efficiently to see that such shortages are not felt in future. Although the shallow sandy aquifer associated with certain rivers is presently able to supply large quantities of water, this source of water can become undependable when large-scale exploitation is taken up to obtain irrigation water and it is necessary to see that high yielding deep bore wells alone are used to serve as a source of drinking water. In the larger interests of providing assured sources of drinking water to the growing population, it is essential to ban use of deep groundwater for irrigation near settlements and towns, where scarcity of drinking water is felt.
10. Many spring channels do not function due to lowering ground water levels. It is essential to take up large-scale pumpage of ground water from the sandy aquifers in the river beds wherever there are indication of spring water.

11. As most of the tanks in the taluk get breached due to flash floods and cause a flood damage which is more severe than that what would have been in the absence of these tanks, there is an urgent need to make a through study of all the tanks in the taluk, demolish those tanks which serve no useful purpose at all besides causing flood damage, construct recharge wells in those tanks which serve no purpose other than recharging groundwater, and strengthen the bunds of those tanks which are really providing adequate surface water for irrigation.

12. Based on pumping tests, it is noted that the sustained discharge of wells ranges from zero to 91 kl/hour with transmissibility ranging from zero to 14,468 m²/day. Sandy alluvium with high effective size and median and highly weathered and fractured granitic rocks are those which generally show high transmissibilities. The high variability in the transmissibility values is because of anisotropic nature of aquifers showing high variation in hydraulic characteristics both along lateral and vertical directions.

13. Although groundwater quality is mostly satisfactory for domestic, irrigation and industrial purposes, certain wells constructed in grey granitic rocks pose high salinity and sodium hazards and are unsuitable or becoming gradually unsuitable for
irrigation. This is attributed mainly to the bad irrigation practices. Because of urban pollution, due to domestic sewage and industrial effluents, groundwater in Chittoor town carries high concentration of dissolved solids and other disease carrying organisms. It is necessary to take adequate steps to check poor quality of groundwater because of bad irrigation practices and urban pollution.

14. The taluk is backward with a density of population of 321 persons per Sq.km as against 195 persons per Sq.km for Andhra Pradesh state as a whole and a low population growth of 19.6 percent during 1971-81 as against 23.2 percent in Andhra Pradesh state. Except for Chittoor town, which is getting rapidly urbanised, there appears to be little scope for any other settlement to grow sufficiently big for becoming a town in near future. The low growth rate of population is attributed to poor quality of life, leading to high rate of emigration and low rate of immigration.

15. In view of the small size of land holdings and more than 79 percent of the workers engaged in agricultural operations, the prosperity of the taluk is dependent upon optimisation of return out of agricultural land. The high agricultural density of 197 per Sq.km as against the corresponding figure of 79 per Sq.km for India as a whole, indicates high pressure of primary population on agriculture. The percent cultivable land to village land is around 65, the percent cultivated land to cultivable land is around 75, and
percent irrigated land to cultivated land is around 37. The only way to provide prosperity to the taluk is by converting as much village land as possible into cultivable land, as much cultivable land as possible into cultivated land, and as much cultivated land as possible into irrigated land and get as high a return as possible from irrigated land by improved farming techniques.

16. The density of livestock units in the taluk is 299 per Sq.km of cultivated land as against the corresponding figure of 304 for Rayalaseem region and 381 for India as a whole. The poor density of livestock is attributed to lack of fodder, particularly in summer months. As livestock provides a source of supplementary income to the primary population, it is essential to take steps to grow irrigated fodder.

17. Based on groundwater budgeting it is estimated that the balance of groundwater available for exploitation is around 3500 ha.m. This water could be exploited by construction of 10,000 wells if animal power is used to lift water or around 3300 wells if water in all the existing wells and proposed wells is lifted by pumpsets. As only about 85 percent of irrigation wells are fitted with pumpsets, it takes a long time to provide electric power even to the existing irrigation wells.

18. A method of calculation of strip resistivities from the resistivity data obtained from vertical electrical sounding taken by the wenner alignment has been proposed as an alternative to the traditional curve matching method. The method proposed requires no preparation of field curves and strip resistivity
between any two electrode spacings can be calculated by a simple equation and no special expertise is required for interpretation of data. Although strip resistivities may not be same as the true resistivities, they give a fairly good comparative picture between an existing well and a new site where a well is proposed to be constructed. It is also possible to know from this method when there is lateral heterogeneity and suitable corrections can be made to avoid the effect of any lateral heterogeneity.

19. The land resources are so unevenly distributed in the taluk that a wide disparity is noted in the development of different villages and mandals in the taluk. By taking into account various factors as indices of development, the mandals arranged in the increasing order of development are Penumur, Gangadhara Nellore, Puthala Pattu, Yadamari, Chittoor and Gudipala.

20. The entire surface and subsurface runoff from the taluk passes through the narrow valley of Poini river. The quantum of groundwater flowing through the shallow alluvial aquifers underlying this river bed is estimated to be around 10,000 ha.m. By constructing a relatively small number of high-yielding wells, in the valley portions of this river and its tributaries, it is possible to tap very large quantities of groundwater. This water can be pumped out and conveyed by pipeline to upland areas for providing water for irrigation. The depleted aquifers along this river and its tributaries could be filled up with flash floods in these streams by constructing check
dams and subsurface dams across these streams at regular intervals and recharge wells in the upstream-side of the check dams. By this strategy, the havoc caused by floods and droughts is considerably reduced.