CHAPTER II

FARM RESOURCES IN STUDY AREA
Adequate farm resources are imminent in raising farm production. Still more important is how they effectively used. In other words, availability of farm resources and their effective use with proper attention enhance the production of the farm sector. To understand the farm resources and their potentiality is utmost significant in the economy of the farm sector. Hence, an attempt is made to study the farm resources, and their significance in the farm sector with reference to the district of Cuddapah in Rayalaseema region of Andhra Pradesh which is the study area.

Location

Cuddapah district lies in the heart of the tract of land that forms the Southern Deccan plateau popularly called Rayalaseema of Andhra Pradesh. Till 1953, it was a part of the Madras province and one of the eleven Telugu speaking districts which formed the new State of Andhra on 1st October, 1953. On 1st November 1956, a full-fledged State of Andhra Pradesh was formed.

The Cuddapah district lies between 13° 43' and 15° 14' of the Northern latitude and 77° 55' and 79° 124' of the Eastern longitude. It is surrounded on the north by Kurnool district, on the east by Nellore district, on the south by Chittoor district and on the west by Anantapur district.
Administration

The Cuddapah district is administered through three revenue divisions and 50 mandals comprising 958 villages.

Physiography

The district spreads over an area of 15,356 sq.km (15,35,600 hectares) which forms 5.5 per cent of total area of the State. Absence of high mountains, rich forest and mineral resources are the main features.

Climate

Variations in water, air and sunlight are well connected with climate. Profitable farming majorly depends upon the climate. The heat waves in summer are injurious to crops as cold waves in winter. Dry climate prevails almost throughout the year. The hottest months are March, April and May. The pleasant months are from September to January. Humidity varies from 55 to 75 per cent. Temperature varies from 24 to 47 degrees Celsius.

Rainfall

Timely onset, proper amount and suitable distribution of monsoon rains in the season plays a crucial role for effective operations of agriculture. Synchronising the major agricultural operations with monsoon rains is favourable factor. So, predicting the
monsoon date and its likely performance during the season would support sound management of operations of agriculture.

The average annual rainfall in the district of Cuddapah is 696 mms. The region enjoys the benefits of both the monsoons, south-west and north-east; and it receives about 288.7 mms of rainfall from the south-west monsoon and 344.7 mms from the north-east monsoon; the winter and summer period contributes only 3.3 mm, 58.5 mm respectively. The minimum need of rainfall for the successful crop is 660 mms. The district has been subjected to untimely and inadequate rains which periodically affect the operations of agriculture and its production.

Soils

Soil is one of the key requisites of successful agriculture. It is the natural medium which supports the growth of plants on the surface of earth. Plants derive their most essential nourishment from the soil. In other words, it (a) serves as a reservoir of food materials and water needed by the plants and (b) provides a mechanical anchorage for them. A thin layer of earth containing complex mineral compounds, organic matter, water, air and living organisms like bacteria, fungi, worms, etc., is referred to soil. Because of these, soil is a key factor in growing of plants and crops.
Soil development majorly depends upon the climate particularly on rainfall. The incorporation of vegetable matter or animal remains increases the crop-production power of soil. Black cotton soil name is derived from its colour and its eminent suitability to the growing of cotton. It is highly retentive of moisture. It is fairly fertile and well suited to the cultivation of cotton, cereals and oil-seeds like linseed and sunflower. Vegetables of different kinds and fruits of the citrus variety can also be grown successfully. Because of high water-soluble salts content, the black soils are considered unsuitable for heavy irrigation. Red soil is fairly rich in iron oxide minerals and suitable to grow a large variety of crops under rainfed or irrigated conditions.

The predominant soils in the Cuddapah district are black cotton soil and red soil. These two together occupy more than 70 per cent of total area sown in the region. These soils are rich and responds for well cropping. Successful cropping depends not only on the knowledge of properties of soil but on the aspect of soil management. This would help to know which crop and in which season to be grown on the soil. Though the soil management differs with the nature of soil, the climatic conditions and the types of crops to be grown, there are certain factors which should govern the choice of soil management practices in the study area or else where in the country. The guiding principles in good soil management are:
(1) Selection of the right crops for a given soil or the right soil for a given crop.

(2) Maintenance of soil which provides suitable conditions for growing of selected crops.

(3) Improving the productive capacity of soil. Adequate organic matter and plant nutrients (fertilizers, legume crops and manures) are major issues in improving the productive capacity of soils. Many of a farmers in the study area are used manures which are available domestically. It improves soil fertility and meets the full requirements of crops to be grown. Besides manures, the increasing use of fertilizers with large quantity is also noticed in the district. Smaller bulk, easy transport, quick availability of plant food constituents and their application suited to the needs of different crops and soils are advantages of fertilizers. Relatively the price of fertilizers is high and also possible adulteration so that the farmers get more expenditure to that of manures. Because of close linkages between the crop husbandry and animal husbandry, it is worth consider to apply the manures in improving the fertility of soil and thereon successful cropping.

(4) Fertilizers use can be expanded where soil fertility is low and a large share of the population is food insecure.
River Source

The Pennar and its affluent tributaries of Chitravathi, Papagni, Kundu, Sagileru, Cheyyeru and Thummala drain are the rivers in the Cuddapah district. These rivers flowing through the rocky soil are torrential during the rainy season and dwindle to trickles at other times. The water of these rivers enters at Adinimmayapalli where an unicut was constructed to divert its water to the Kurnool-Cuddapah canal (K.C.canal). It irrigates an ayacut of 78,772 acres. A dam at Mylavaram on the river Pennar was constructed. It irrigates the agricultural lands in Pulivendla, Jammalamadugu and Proddatur. Further, it supplies water to the thermal station at Muddanur which produces 420 M.W. of electricity. Besides, there are 2,57,950 wells which support irrigation in the district.

Population

The Cuddapah district had a population of 26.50 lakhs in 2001. The sex ratio was 956 females for every 1000 males. In the district 18.10 lakhs people were living in villages and only 8.40 lakhs in urban areas i.e., 68.30 per cent and 31.70 per cent respectively. The density of population was 157 per sq.km., as against 242 for the State, Andhra Pradesh.
Literacy

Education is manifestation of innates of people existed in them. To carry out operations of agriculture particularly by adopting modern technology, the farmers need to have knowledge of the agricultural operations. Knowledge through means of education provides awareness and awakens the people lighting the directions in achieving the economic gains as well as social status. In other words, the farmers would need knowledge of crop husbandry and animal husbandry with object of improving productivity, raising quality of living and increasing the overall earnings. In educated youth crave for information which will enrich knowledge and fetch more dividend. Knowledge-intensive provides an ideal platform for launching precision-farming.

The rate of literacy in the district was 42.64 per cent (11.30 lakh literates) as against the State average of 44.09 per cent. The male literacy rate was 63.4 per cent while the female literacy was 28.1 per cent.

Occupational Pattern

Agriculture is the main occupation of the people in the district. The district Cuddapah according to Parthasarathy's report, is the second under-developed district in agriculture in the Rayalaseema region. The bulk of income of the district is generated from the farm
sector. The non-agricultural sector is insignificant in terms of the volume of employment. In non-agricultural sector, manufacturing, trade and commerce are important. Therefore, success of agricultural sector depends on the prosperity of rural people. The occupational classification of population in the district is presented in Table 2.1.

TABLE 2.1

OCCUPATIONAL PATTERN
(2000)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Population</th>
<th>% to population</th>
<th>% to Workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Workforce</td>
<td>12.70</td>
<td>47.92</td>
<td>-</td>
</tr>
<tr>
<td>B. Non-Workforce</td>
<td>13.80</td>
<td>52.08</td>
<td>-</td>
</tr>
<tr>
<td>Workforce:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivators</td>
<td>2.63</td>
<td>9.92</td>
<td>20.72</td>
</tr>
<tr>
<td>Agricultural labourers</td>
<td>6.88</td>
<td>25.97</td>
<td>54.17</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1.46</td>
<td>5.51</td>
<td>11.50</td>
</tr>
<tr>
<td>Trade &amp; Commerce</td>
<td>0.36</td>
<td>1.36</td>
<td>2.83</td>
</tr>
<tr>
<td>Livestock, Forestry and Fishing</td>
<td>0.22</td>
<td>0.83</td>
<td>1.73</td>
</tr>
<tr>
<td>Mine and Quarry</td>
<td>0.06</td>
<td>0.22</td>
<td>0.47</td>
</tr>
<tr>
<td>Construction</td>
<td>0.01</td>
<td>0.04</td>
<td>0.08</td>
</tr>
<tr>
<td>Transport &amp; Communication</td>
<td>0.13</td>
<td>0.49</td>
<td>1.02</td>
</tr>
<tr>
<td>Other Services</td>
<td>0.95</td>
<td>3.58</td>
<td>7.48</td>
</tr>
<tr>
<td>Total (A + B)</td>
<td>26.50</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Table 2.1 shows that population in the category of workforce is accounted for 12.70 lakhs whereas the non-workforce is accounted for 13.80 lakhs. They in relative terms are accounted for 47.92 per cent and 52.08 per cent respectively. The agricultural sector which created employment to the extent of 73.99 per cent comprising 20.72 per cent of workforce as cultivator and 54.17 per cent of workforce as agricultural labourers. In non-agricultural sector, manufacturing, trade and commerce are important.

From the analysis, it is inferred that more than two-thirds of workforce or more than one-third of total population are dependent on agriculture. The fortune of these community reflects the changes in the agricultural economy. Therefore, it is considered that the acceleration of economy of the district would certainly need to adopt effective utilization of farm resources.

In order to ensure the benefits of farm resources, it is necessary that the farmers should be developed so as to improve skills and acquire knowledge on organisation and management of crops. This can be done by means of training to the farmers in different areas of production activities. But, no gainful training is given to the farmers of the Cuddapah district so far. Training on cropping system, use of inputs to improve productivity and developing new base for additional income, growing and preserving fruits, maintaining orchards and producing fruits and vegetables.
Land Use Pattern

The land continues to be the basic source to sustain and meet various kinds of needs of every increasing population and its requirements. Direct dependence on land based resources in developing countries like India continues to be very high as more than 70.00 per cent of the rural population is dependent on agriculture and allied activities.

Increasing demand, over the years, for land resources for both increasing population and its needs, the productivity and potential of the land resources have depleted considerably. In order to maintain balance between the availability and utilization of resources, it is essential that appropriate strategy should be adopted to develop land based resources. The land based resources can be divided into four categories. They are:

(a) culturable land,

(b) water resources,

(c) forest, and

(d) minerals.

The culturable land includes all types of productive uses of the land like agriculture, horticulture and sericulture. Water resources have multiple uses like drinking water, irrigation, fish production and water for industrial uses. The forests resources have many economies
to the country as well as balancing the ecological system. The water resources are available on the surface and below the surface. Minerals are also available both on the surface and below the surface. Development of culturable land particularly for agriculture and development of water resources for irrigation purposes are closely related.

Land use planning means utilization of land and different productive uses without effecting ecological order of the land. As long as ecological balance of land is properly maintained, the productivity and potential of land resources continues to be at optimum level. If equilibrium disturbs, it affects the productivity and potential of land resources; and starts diminishing. If the land resources are developed with the help of modern science and technology with regard to the ecosystem, the productivity and potential of the land resources could be increased to a considerable extent. An enormous pressure to produce more food from less land with shrinking natural resources is a tough task for the farmers. This calls for special effort to manage the key inputs without eroding the ecological assets and sound knowledge-base to sustain agricultural productivity and profitability. Data on land use pattern is presented in Table 2.2.

Table 2.2 shows that 32.81 per cent and 15.02 per cent of the geographical area of the district are under forests, and barren and uncultivable land respectively. These areas are not useful for raising
crops due to denudation by the monsoon, floods and filled with sand, rocks and boulders. Land put to non-agricultural uses is significant as it is accounted for 10.81 per cent of the geographical area. Cultivable waste is accounted for 4.12 per cent while current fallows and other fallows, it is 7.40 per cent.

TABLE 2.2

LAND USE PATTERN
(2000)

<table>
<thead>
<tr>
<th>Category</th>
<th>Area</th>
<th>Percentage to geographical area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forests</td>
<td>5.04</td>
<td>32.81</td>
</tr>
<tr>
<td>Barren and uncultivable</td>
<td>2.43</td>
<td>15.82</td>
</tr>
<tr>
<td>Land put to non-agricultural uses</td>
<td>1.67</td>
<td>10.81</td>
</tr>
<tr>
<td>Permanent pastures and other grazing lands</td>
<td>0.20</td>
<td>1.32</td>
</tr>
<tr>
<td>Miscellaneous tree crops and groves not included in net area sown</td>
<td>0.18</td>
<td>1.17</td>
</tr>
<tr>
<td>Cultivable waste land</td>
<td>0.63</td>
<td>4.12</td>
</tr>
<tr>
<td>Current fallows and other fallow lands</td>
<td>1.14</td>
<td>7.40</td>
</tr>
<tr>
<td>Net area sown</td>
<td>4.08</td>
<td>26.55</td>
</tr>
<tr>
<td>Total geographical area</td>
<td>15.36</td>
<td>100.00</td>
</tr>
</tbody>
</table>


Thus, the land under productive uses like crop cultivation, forest, and other important uses account for 61.85 per cent. This shows the land use in the district is very intensive, as only 38.15 per cent of land lying unproductive which includes uncultivable land, cultivable
waste and current fallows. The reason for areas lying cultivable waste and fallow is poor quality of soil.

The analysis given in Table 2.2 shows that the existing land use in the district is within the ecological norms. However, land under different uses cannot be considered ecologically balanced because the manner in which different sources are utilized is a matter of concern. It directly affects the economic potential of the resource. The proportion of land under agriculture is about one-fourth of the total area. Hence, the cultivation methods to be adopted should be such that, it is able to meet the economic needs of the people through means of better production.

About one-third area is reported under forest. The development of forest resources should be designed to take care of needs of the people and ecological factors. This would create more income and employment opportunities for the rural people, particularly for those who have meager asset base. The land lying under fallow and cultivable waste constitute a sizeable fraction of the total area. If developed/used that area for such purposes by means of soil conservation, afforestation, reclamation and land-slide protection, modern technology, it would become supplementary resource for the generating income and creating employment to rural people.
Cropping Pattern

Low productivity and high instability are the twin problems of agriculture. An essential pre-condition for the agricultural production and productivity is the creation of facility for the intensive and multiple cropping system. It means, getting the maximum output per acre of land with minimum soil deterioration. The cropping intensity depends upon the availability of irrigation facility. But, the cultivators of the Cuddapah district have been facing the problems of one bad year in a cycle of five years from the point of view of agricultural prosperity due to erratic rainfall. Division of the gross area sown by the net area sown and multiplication of it by 100 gives the cropping intensity.

The intensity of cropping is high in Sidhout (3.17%) followed by Rajampet (14.10%), Badvel (13.80%), Rayachoty (7.20%) and Cuddapah (4.00%). The intensity in these areas reflects low acreage of net area sown. The double and multiple cropping is not uncommon in Cuddapah district. But, only 4.89 per cent of total cropping area is under double or triple cropping.

In the survey it is observed that the cropping pattern is not scientific and no sound efforts taken for expansion of cropping system manipulation through intercropping with pulses. Pulse crops play an important part in agriculture economy. Besides being rich in protein,
they sustain the productivity of the cropping system. The ability of pulses to use atmospheric nitrogen through biological nitrogen fixation is economically more sound and environmentally acceptable. The common pulses are chickpea, couepa, mungabean, kidneypea, redgram. Scientists have demonstrated time and again on farmers’ fields that with the availability of technology the yield could be increased by 20-40 per cent depending upon the crop and the situation. Therefore, for achieving the desired productivity, focus is to be placed on pulses after cereals and oil seeds. Asthana, A.N., Ex-Director, Indian Institute of Pulses Research Centre said that “There has been a wrong notion that pulse crops are meant for poor and marginal farmers and can be grown without much care and inputs”.6 Since the Cuddapah district has less irrigational sources, the cultivation of pulses with focus on sprinkler and micro-irrigation system is suitable. Another area where sound pattern of cropping possible is coconut-based farming. This can accommodate a variety of crops in the inter-spaces without affecting the main crop or the environment.

Farm Machines

For raising better production, the engineering of farm operations is prerequisite on which better economic gains be achieved. The engineering of operations covers tillage of land to harvesting of crops. The soil surface is to be prepared in such a way the moisture contents should be at most desirable level for rapid germination of
seeds. This process is called 'tilth' which varies from soil to soil, crop to crop and also modified by the climate. An open and free-lining condition is very much required during the growing period of plants. So that the air and water are move freely through it and thereupon root development can takes place freely without any hindrance.

In the recent times, tractor farming has become a modest in the place of bullock. A modern tractor is a very versatile piece of equipment and can be used in different farm operations such as tilling, leveling both in dry and irrigation, sowing, harvesting, threshing. Beside this, traditional farm implements like plough, harrows, seed drills etc., are also used by the farmers by owning or hiring tractor for farm operations. Therefore, it is every need that farmers should be provided knowledge and skills in use of tractor for efficient farm operations. Farm mechanization goes, to a major extent, with tractorisation.

The tractor population in the Cuddapah district both for commercial and agricultural purposes is accounted for 3980. As it is known that about 30.00 per cent of net sown area is irrigated, the scope for tractorisation is much less. At the same time, the scope and demand for power tillers may be more.
Area under Cultivation

Data on the break up of cultivated area with single and double crops is presented in Table 2.3. Table 2.3 discloses that 90.27 per cent irrigated area is under single crop and the remaining 9.73 per cent under double crop. The corresponding figures in rainfed area are 98.70 and 1.30 per cent respectively. This analysis discloses that the cropping pattern of the district is dependent substantially on irrigation but the sources of irrigation are not permanent as being indicated by the double cropping which is only 9.73 per cent. These sources may dry-off, due to failure of supply of electricity, high cost of pumping water and uncertainty in continuous supply of water by canals for the second crop due to potential bureaucratic mindset.

TABLE 2.3
AREA UNDER CULTIVATION
(2000)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Irrigated land</th>
<th>Rainfed land</th>
<th>Total land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single crop</td>
<td>153978 (90.27)</td>
<td>253749 (98.70)</td>
<td>407728 (95.34)</td>
</tr>
<tr>
<td>Double crop</td>
<td>16605 (9.73)</td>
<td>3339 (1.30)</td>
<td>19944 (4.66)</td>
</tr>
<tr>
<td>Total</td>
<td>170583 (100.00)</td>
<td>257088 (100.00)</td>
<td>427672 (100.00)</td>
</tr>
</tbody>
</table>


Figures in parentheses are percentages to total.
Agriculture cannot be viewed as the source of food alone, but it is also most important source for employment to nearly three-fourths of the total workers. Hence, a planning strategy for agricultural development depends on the crop used pattern by means of bringing additional land under plough as well as intensive cultivation.

Area under Principal Crops

The production of crops occupies the foremost place in farming system. The techniques of growing crops successfully by utilizing the potentialities of soil and climate to the best advantage is paramount to every farmer. It is also equally essential to the farmers engaged in improving the existing methods of cultivation, or initiating the new farmers in cropping techniques. Rice is a staple food of the people in the study area. Low-lying clay soils with the condition of high temperature and humidity and adequate supply of water are the essentials for growing rice. Jowar and bajra and other millets are grown wholly as a dry land crop with mixed or inter-cropping. Groundnut is an excellent cash crop by rotation. This crop thrives best on sandy loams and well drained black soils.

The economy of a district or region reflects by the type of the cropping pattern and the significance of the crop or crops grown in that area or region. Therefore, focus is made on the crops which are
grown in the Cuddapah district. Data pertaining to the principal crops grown in the district of Cuddapah is given in Table 2.4.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Kharif</th>
<th>Rabi</th>
<th>Total land under cultivation</th>
<th>Percentage of crops to the total area sown</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Food Crops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paddy</td>
<td>1,13,339</td>
<td>37,780</td>
<td>1,51,119</td>
<td>14.30</td>
</tr>
<tr>
<td>Jowar</td>
<td>64,107</td>
<td>2,671</td>
<td>66,778</td>
<td>6.32</td>
</tr>
<tr>
<td>Bajra &amp; other millets</td>
<td>25,149</td>
<td>6,036</td>
<td>31,185</td>
<td>2.95</td>
</tr>
<tr>
<td>Total cereals &amp; millets</td>
<td>2,02,595</td>
<td>46,487</td>
<td>2,49,082</td>
<td>23.57</td>
</tr>
<tr>
<td>Total pulses</td>
<td>22,107</td>
<td>5,052</td>
<td>27,159</td>
<td>2.57</td>
</tr>
<tr>
<td>Other food crops</td>
<td>66,798</td>
<td>19,646</td>
<td>86,444</td>
<td>8.18</td>
</tr>
<tr>
<td>Total</td>
<td>2,91,500</td>
<td>71,185</td>
<td>3,62,685</td>
<td>34.32</td>
</tr>
<tr>
<td>B. Non-Food Crops</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groundnut</td>
<td>4,02,989</td>
<td>57,091</td>
<td>4,60,080</td>
<td>43.54</td>
</tr>
<tr>
<td>Sunflower</td>
<td>2,162</td>
<td>1,63,057</td>
<td>1,65,219</td>
<td>15.63</td>
</tr>
<tr>
<td>Vegetables &amp; Fruits</td>
<td>48,595</td>
<td>13,223</td>
<td>61,818</td>
<td>5.85</td>
</tr>
<tr>
<td>Chillies</td>
<td>6,407</td>
<td>568</td>
<td>6,975</td>
<td>0.66</td>
</tr>
<tr>
<td>Total</td>
<td>4,60,153</td>
<td>2,33,935</td>
<td>6,94,092</td>
<td>65.68</td>
</tr>
<tr>
<td>Total (A + B)</td>
<td>7,51,653</td>
<td>3,05,124</td>
<td>10,56,777</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Table 2.4 shows the cropped area is accounted for 10,56,777 acres; of which 34.22 per cent and 65.68 per cent of cropped area are under food crops and non-food crops respectively. The principal crops grown in the district are (a) groundnut and sunflower among the commercial crops, (b) Jowar, paddy, pear millet (bajra) finger millets (ragi), pulses like horsegram among the food crops and (c) vegetables and fruits among the dry crops. Jowar, bajra, pulses and other cereal crops are the mostly raised crops. The crops raised in irrigated areas are paddy, vegetables and fruits. Groundnut is raised both in irrigated and unirrigated areas, but more in the former. Groundnut and paddy are major crops under irrigated area of the district.

Of the irrigated area, 73.47 per cent is under paddy, groundnut and sunflower. Remaining 26.53 per cent of the irrigated area is under bajra, ragi, vegetables, cotton and other crops. The pulses like redgram and horsegram are grown mostly under inter-cropping. The horticulture occupies an important place in the district and farmers grow banana, lime, satgoodi, water-melon, and mango. Most of the fruits are seasonal and perishable in nature. So, they have to find ready market. Otherwise the farmer may suffer due to unremunerative price. In the visit to Madanapalle in Chittoor district of Andhra Pradesh, Sri. Venkaiah Naidu, the Minister for Rural Development said that “He saw ‘mounds’ (12 kgs) of tomatoes on the roadside and the farmers sold them at 60 paise a kilogram. He
expressed that lack of storage or marketing facilities are the main reason for such distress sales.\textsuperscript{7}

Irrigation

The importance of irrigation to the predominantly agricultural economy of India needs no emphasis. For successful farming, irrigation is key in one form or other where the mean annual rainfall is less than 75 cms. It is indispensable for the economical use of land. If irrigation is provided (a) both land and labour can be put to profitable use, (b) crop yields can almost be doubled and money return increased by growing valuable cash crops.

Surface water and ground water are the two main sources of irrigation. The former is provided by flowing waters of rivers or from the still waters of tanks, ponds, lakes. The latter is trapped by digging or drilling wells. Water is carried to the fields by flow due to gravity. Hence, it is cheap. Land is to be irrigated through a system – canals, branch canals, distributaries, minors and outlets. On a typical water distribution system, the quantity of water finally reaches the field is about 55 per cent of water that enters the canal. Hence, it is every need to have a system of distribution which saves and conserves water.

Irrigation potential ultimately depends on the available water resources. A considerable part of the farm production areas will
continue on rainfed. Hence, proper utilization of rainfall and moisture conservation are very important. In high rainfall areas, the problem is to dispose the rain water without causing much damage to the land whereas in low rainfall areas, the problem is to conserve the rain water. Dry farming is a system of soil and water management practices suited to arid and semi-arid areas for conservation and efficient use of soil moisture. So, proper management of irrigation system is an important issue. Realising and recognition this, several measures have been initiated in the study area and elsewhere in the country. These measures include:

(1) Modernization and efficient operation of the irrigation system.

(2) Construction of field channels

(3) Land shaping and land leveling

(4) Lining of field channels.

(5) Exploitation of ground water through open wells, tube wells etc.

(6) Adoption of a suitable cropping pattern.

(7) Adoption of rostering system of distribution of water among farmers.

Irrigation plays a dominant role in modernization and development of agriculture; on which potential only, a sound agriculture plan can be formulated for acceleration of the agricultural
economy. Irrigation means application of water to plants for raising production. It is a key input in agriculture to bring about a revolution in agrarian sector. Irrigation, thus, can be described as 'preventor of semi-famine condition.' In other words of Jha, "minor irrigation plans are permanent feature of agricultural economy." Memoria has stated that, "Irrigation is the antidote to famine" and irrigation increases land productiveness at least six-fold and to great extent of the land productivity which otherwise would produce nothing or next to nothing."

The Cuddapah district has one major irrigation source, the Kurnool-Cuddapah (K.C.) canal and Mylavaram Dam. The other sources of irrigation are tanks, river channels and wells. Under the K.C. Canal scheme, only 155 villages and under Mylavaram Dam only 60 villages of the region are being benefited. In addition to this, a few riverlets, streams and tanks also provide irrigation facility through open-mouth channels. The remaining villages of the district are beyond the reach of the irrigation facilities. For them, canals and tanks as well as wells constitute the chief sources of irrigation in the district. The source-wise irrigated area in the district is shown in Table 2.5.
TABLE 2.5

SOURCE-WISE IRRIGATED AREA
(2000)

(Area in acres)

<table>
<thead>
<tr>
<th>Source</th>
<th>Irrigated area</th>
<th>Percentage to net area sown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canals</td>
<td>54,513</td>
<td>5.41</td>
</tr>
<tr>
<td>Tanks</td>
<td>63,853</td>
<td>6.34</td>
</tr>
<tr>
<td>Wells</td>
<td>2,57,950</td>
<td>25.60</td>
</tr>
<tr>
<td>Other sources</td>
<td>4,164</td>
<td>0.41</td>
</tr>
<tr>
<td>Total</td>
<td>3,80,480</td>
<td>37.76</td>
</tr>
</tbody>
</table>


Table 2.5 shows that in Cuddapah district as against 10,07,945 acres are sown, 3,80,480 acres alone are irrigated. It is accounted for 37.76 per cent of the net area sown. As regards the sources-wise, wells alone constitute 25.26 per cent of irrigated area to the net area sown. The canals and tanks constitute 5.41 per cent and 6.34 per cent respectively.

It is inferred that the farmers of Cuddapah district largely depend for irrigating their lands on the source of wells followed by tanks and canals. The effective use of land resources and other interrelated sources of manpower, bullocks are dependent on the wells and power supply without interruption. The power supply in the
recent past has become a phenomena of supplying only a limited time (say 8 or 9 hours in a day). Such unexpected conditions in arena of electricity supply certainly affects the farm economic prosperity. From the analysis given in Table 2.5 it is observed that raising crops under irrigation particularly under wells is putting farmer in the helpless state and looking for nothing.

Development of water resources in the district is very much essential as every little scope has been exploited. However, the following can be used as better means in using the existing water for irrigation purpose. A sizeable portion of water is in seepage while flowing through pools (channels) from water sources to the fields. Here to reduce or stop seepage and make good, pre-fabricated cement pipes or PVC pipes can be used. Flooding of fields by seepage is not only harmful to crops but also damages terrace bunds also. Use of sprinklers is another most suited for the district to protect the needs of irrigation.

Keeping in view land resource, workforce, irrigation resource, and cropping facilities, there is every need for the crop management in order to bring about better production in the district. The crop management refers to the suitability of a particular crop on a particular land considering water sources and its potential cropping mix (food grains, commercial crops, fruits and vegetables etc) plant protection measures.
Ownership Pattern

Participation of many farmers in cultivation would enhance the productivity due to mindset as a owner rather labour. The mindset of farmer as a owner of a piece of land would evince keen interest in using the piece of land effectively and also effectively using his family labour including himself. Perhaps, this could make the Government to implement land reforms so that reducing concentration of land in a few families and making many of farmers sticking to a piece of land. Data on ownership pattern and composition of farming community in the district of Cuddapah is presented in Table 2.6.

TABLE 2.6
CLASSIFICATION ACCORDING TO LAND HOLDING

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Below 2.50</th>
<th>2.50 to 5.00</th>
<th>5.00 to 10.00</th>
<th>Above 10.00</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of households (in lakhs)</td>
<td>1.42</td>
<td>0.65</td>
<td>0.33</td>
<td>0.23</td>
<td>2.63</td>
</tr>
<tr>
<td>Percentage to total</td>
<td>54.00</td>
<td>24.83</td>
<td>12.42</td>
<td>8.74</td>
<td>100.00</td>
</tr>
<tr>
<td>Extent of landholding</td>
<td>1,96,917</td>
<td>1,85,755</td>
<td>2,42,726</td>
<td>3,82,097</td>
<td>10,07,495</td>
</tr>
<tr>
<td>Per head land holding</td>
<td>1.39</td>
<td>2.84</td>
<td>7.42</td>
<td>16.60</td>
<td>3.82</td>
</tr>
</tbody>
</table>

Table 2.6 shows that the farmers with holdings of up to 2.5 acres of land are 1.42 lakhs cultivators which accounted for 54.00 per cent. Between 2.5 and 5.0 acres of land owned by 0.65 lakh cultivators which represented 24.83 per cent. The corresponding figures in case of land owned by the farmers ranging between 5.00 acres and 10.00 acres are 0.33 lakhs and 12.42 per cent. The number of farmers who owned land above 10.00 acres of land are 0.23 lakhs which accounted for 8.74 per cent.

Farmers with holdings below 2.5 acres of land, between 2.5 and 5.0 acres of land, between 5.0 and 10.00 acres of land and above 10.00 acres of land groups owned 1,96,917 acres, 1,85,755 acres, 2,42,726 acres, and 3,82,097 acres respectively which constitute 1.39 acres of land, 2.84 acres of land, 7.34 acres of land and 16.60 acres of land per head respectively. About 40.00 per cent of land is owned by 8.74 per cent of farmers. Similarly 24.00 per cent of land possessed by 12.42 per cent of cultivators. Farmers representing 46.00 per cent of the total farming community possessed the land to the extent of 36.00 per cent only. The above analysis clearly shows a wide disparity existing in the land holding. It shows the land reform could not effect properly as expected by the Land Reforms. Commenting on land inequalities in Andhra Pradesh, Parthasarathy has viewed that 70.00 per cent of the farmers own less than a basic (upto five acres) holding.11
Supply of Inputs

Effective use of acreage, irrigation source, etc., warrant the Departments of the Government to come to the rescue of farming community with provision of supply service. The supply service includes fertilizers, pesticides, insecticides to be made effective distribution to the farmers through outlets either its own channel or private trade with fair price. In practice, it has been noticed that spurious activities like adulteration of pesticides and insecticides, fertilizers; and low quality of seeds by the traders adopted which resulted in uneconomies of farm operations or failure of crops which in turn push the farmer in debt-trap. Instances of suicides have been observed in the recent past. The extension services are also very weak. Improved customer relationship and better focused service are aimed with cost effective activity.

The provision of subsidy is also very much essential to protect and safe-guard the economic interest of farmers who are unable to make agriculture a sound pattern.

Marketing Service

Transforming the used resources in the form of input in raising farm output in monetary terms entirely depends upon the marketing service. Marketing service is sine-qua-non of raising better income for the rupee spent in the form of farm input. The way in which the
transactions for the disposal of produce takes place in the markets has assumed considerable importance not only for the farmers but for the country as a whole. The extremely low returns which the farmer gets for his produce, the inordinately large share of profit retained by intermediaries and the various malpractices in vogue, have focused the Government attention on marketing aspect of the farming business. It is understood that initiation is to be made by the Government in order to secure rupee worth income by the farmers for their efforts put in the form of input resources in raising farm output.

In the district of Cuddapah, marketing has been transacted a good amount of production as well as inputs of farms and farms inputs. To carry this phenomena, markets under the fold of cooperative, regulated and weekly system are operating. Further, there are a good number of dealers for distributing fertilizers, pesticides and other requirements of inputs of the farmers in the district.

Credit Institutions

In the district of Cuddapah, one Grameena Bank (with 67 branches) and 16 commercial banks (with 92 branches) are functioning for supply of credit – short-term, medium-term and long-term on the policy of productive basis. The Syndicate Bank which is the lead bank
in the district has taken all efforts in the District Annual Credit Plans for the development of agricultural economy.

Potential Areas

Notwithstanding a low trend of cross-breed milch animals and unpopularity of commercial dairy farming in the district, a large scale holdings and vast number of agricultural labourers, there is a need for promoting dairy farming, which involves cattle breeding and milk processing schemes. The culturable waste lands and fallow lands which constitute about 1.80 lakh hectares. The agro-climatic features prevailing in the district are conducive for the development of drought tolerant agro-forestry species such as tamarind, dirisanam, neem etc. Poultry farming is not popular due to lack of enterprising on the part of farmers. Favourable agro-climatic conditions exist for the development of sheep and goat rearing as the district is having permanent pastures and grazing lands to about 20,000 hectares. The Government has to take measures in using the above potentially viable areas for raising crops in order to improve the quality of life of farmers. Besides, storage including cold storages and market infrastructures would need for promoting agricultural marketing in the district.

To sum up, low average rainfall, inadequate supply service, less irrigated area on account of less in-flow of water, maximum hours of
electricity cut, inadequate marketing service, short of credit provision, less support services are the major issues which need to be remodeled so as to optimum and effective use farm resources. Creation of life-saving irrigational facilities for raising short-duration second crop, augmentation of supply services, improvement in credit and market facilities, extension of crop insurance to rainfed crops of the district are some measures need the utmost focus.
REFERENCES


10. Quoted in Memoria, C.B., Ibid.