PREFACE

Water Balance as a comparative study of rainfall and evapotranspiration, plays an important role in many earth science fields, especially, agriculture and water resources development. The water supply to a region is primarily through precipitation and water loss is almost entirely due to evaporation and evapotranspiration. The wetness and dryness of a place is, therefore, determined by the relative magnitudes of precipitation and Potential Evapotranspiration, a term coined by C.W. Thornthwaite to denote the water need of any locality. Since Potential Evapotranspiration or the water need is a very difficult parameter to measure experimentally, Thornthwaite evolved a semi-empirical formulae for computation from records of air temperature and length of the day. The Potential Evapotranspiration has thus a double role to play in water balance, both as a thermal parameter as well as a moisture parameter.

Cropping pattern means the proportion of area under various crops at a point of time. Cropping pattern also is determined by the spread of crops expressed as a percentage of total area of crops cultivated. It includes identification of most efficient crops of the region and study of agronomic aspects, problems of fertility and fertility use, water use and soil management, land production, agricultural productivity, economic storage and marketing aspects.

In the present study an attempt is made to study the water balance element, land use, irrigation, cropping pattern, agricultural productivity and levels of agricultural development of Kurnool district covering an area of about 17,658 Km². The main objectives of the present study are to study the spatial distribution of rainfall
characteristics, water balance elements, soil moisture conditions and water availability and crop calender, to spatially map the concentration of land use, irrigation, cropping pattern, agricultural productivity and levels of agricultural development and to study the relationship between water balance elements, crop yields and crop production.

The thesis has been divided into ten chapters. The first chapter consists of introduction, study area, objectives, methodology, review of literature and organisation of the thesis. In the second chapter the profile of the district has been described. In the third, fourth and fifth chapters a detailed description on rainfall, water balance and soil moisture characteristics respectively have been carried out. In the sixth chapter the water availability days and crop calender has been described. A study on land use and irrigation has been dealt in seventh chapter. The cropping pattern of the Kurnool district was been described in eighth chapter. In the ninth chapter an attempt is made to study agricultural productivity, levels of agricultural development and relationship between water balance elements and crop yield and crop production. In the tenth chapter the conclusions drawn out the study carried out are summarized.