

CHAPTER 1

INTRODUCTION

Any one familiar with the panoramic landscape of Kerala with its evergreen forests, backwaters and scenic splendour of the majestic ghats, would agree that the God who created this should have green fingers. It is a land where nature in all its pristine beauty still holds her own inspite of industrialisation, urbanisation and related population expansion. The State hailed as 'God's own country', lies in the south-western part of India along the West Coast. The State supports a population of 29,098,518 (Census of India, 1991), which is about 3.44% of the country's population, though it occupies only 1.18% of the total geographical area. The high population density (749 persons per sq.km.) and the resultant demand on the three natural resources - land, water and atmosphere - of the State has increased the need for proper planning and management for their judicious exploitation. There exists close inter-relationships among these basic resources, as is evident from the fact that the water supplies over the land comes from the atmosphere. Therefore it is necessary that these inter-relationships are properly understood before embarking on planning any developmental projects for the region.

The State of Kerala is essentially agriculture based with the cultivated area (including the fallow lands) being more than 60 % of the total geographical area. However, the land area of the State is limited and confined to a narrow strip bounded between the steep slopes of Western Ghats and the Arabian Sea. Such a physiography is one of the dominant causes of the abundant rainfall received by the State during the southwest

monsoon season. It is also a constraint for exploitation of available water resources for agriculture and other land use.

A variety of climates is observed over the State due to the diversity of physical features. The most dominant factor of the climate is the South West Monsoon along with all its vagaries and spatial and temporal variations. In fact, the monsoon is the dominant control of agriculture of the State. The inter-annual and intra-annual variability of the rainfall influences the water budget components of the region, which in turn influences the land use of the State in general and agricultural land use in particular.

The land use pattern of any region is dependent on a variety of factors, many of them physical and some of them socio-economic. Therefore, for planning an optimum land use pattern for a region, a detailed study of the climate and physiographic features of the area are essential. In this context, a study of the climatological features of the region along with an appraisal of the water balance of the State becomes relevant and necessary. The derived parameters of water balance project vital information necessary in agricultural planning, such as choice of crops, scheduling of farming operations, assessing of irrigation potentials as well as irrigation scheduling.

Fluctuations of rainfall affect agricultural production adversely to varying degrees depending on the intensity, timing and duration of these fluctuations, even though irrigation facilities, where ever available, deduce its risk in agricultural operations. Prolonged deficits in rainfall and associated droughts affect the irrigation system itself. A detailed study of the fluctuations in rainfall and the variations in the water budget of different areas is, therefore, necessary and relevant. Fluctuations

in rainfall and hence in other hydrometeorological parameters could affect production and yield of crops grown in the region. This would lead to changes in cropping pattern and crop combination resulting in changes in the agricultural economy of the region. Hence a detailed study of the agricultural land use and its variations over the State due to fluctuations in rainfall is also a pre-requisite in agricultural planning.

In the present study, the land use over Kerala State and its spatial and temporal variations, spatio-temporal variations of water budget elements, climatic shifts, incidence of droughts and the influence of inter-annual fluctuations of rainfall on area, production and yield of selected crops, have been studied in detail. The thesis consists of seven chapters including the introduction. The first section of the Second Chapter deals with the importance of agroclimatological studies in general and its application in agricultural land use in particular. It also gives an overview of the short term climatic fluctuations, water balance studies, crop weather relationships, land use patterns and various agricultural indices. This includes a detailed review of available literature in this field. The basic concepts, data used and the methodology adopted in the study forms, the second section of this Chapter.

The Third Chapter gives the details of the physical features of the State such as the relief, geology, geomorphology, soils, drainage, and vegetation.

The agroclimatology of the State is discussed in detail in Chapter Four. The first Section presents annual and seasonal variations of temperature and rainfall of the State along with a discussion on the water balance of the State. The second

Section of this Chapter deals with the influence of rainfall and water balance elements on various crops.

The district-wise general land use pattern of the State and its spatio-temporal variations are discussed in Chapter Five.

The first Section of Chapter Six gives an overview of the agricultural land use pattern of the State, cropping patterns, cropping intensity, crop combination and their spatio-temporal variations. The inter-annual variability of water balances of various stations of the State computed using the method of Thornthwaite (1948) and Thornthwaite & Mather (1955) is presented in the second Section of Chapter Six. This also includes a discussion of how the climatic shifts have occurred over the State and the influence of variations of climatic and water balance elements on the crops.

The Seventh Chapter gives the summary of the work carried out and the results obtained from the study. Interpretations of the results, conclusions and suggestions made, based on the observations of the study are incorporated in this Chapter.