AREA OF THE STUDY
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The area of the present study is South India that includes the political states of Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and the Union Territory of Pondicherry (Fig. 1). Geographically the area falls between 8° and 20° North latitudes and 74° and 85° East longitudes. It covers an area of 4,67,186 sq.km. and is bordered on the north by Maharashtra, Madhya Pradesh and Orissa, on the east by Bay of Bengal, on the south by Indian Ocean and on the west by Arabian sea.

South India includes two major botanical provinces, the Deccan and the Malabar. The Deccan is the great table land of the Peninsular India, stretching from the Aravallis, the Malwa, the Vindhyas, Satpura and the Chota Nagpur hills in the North and almost right down to the southern end of the main land Kanyakumari (Cape Comorin). The Eastern and Western Ghats border the eastern and western sides of the plateau. The northern part of the plateau slopes westwards while the southern part slopes towards the south east. The eastern costal plains of the Deccan plateau is a broad strip running parallel to the coast of Bay of Bengal (Coromandel coast) and gradually rising from it. It includes the fertile coastal plains mainly formed by the deltas of Cauveri in Tamil Nadu, Godavari and Krishna in Andhra Pradesh and a number of small rivulets and streams. The Eastern Ghats, run along the eastern side of the Deccan plateau, consists of a series of hills
that are cut into small groups. The Eastern Ghats is broken by the great rivers Godavari and Krishna cut across them from west to east.

Malabar is a long and narrow strip of land running parallel to the Arabian Sea, west of Western Ghats and south of Konkan region. This region is floristically rich and consists of coastal plains and a series of hill ranges of Western Ghats. The more or less continuous hill range has major discontinuity at the Palghat gap separating the Nilgiri ranges from Anamalais. The Ghats descend steeply in the west facing the Arabian sea, where as they merge gradually through a series of hills with the Deccan plateau in the east.

The Western Ghat mountain ranges have an average altitude of 1550m but rises to 2000-2500m peaks here and there. Anamudi, the highest peak (2697 m), south of Himalayas, flanks on the Western Ghats in Kerala. These mountain region is cris-crossed with many fast flowing rivers, form a narrow coastal belt which overtook the Lakshadweep sea and catches the full force of the south west monsoon winds precipitating heavy rains on the west coast. By virtue of its geographic location, topography, high rainfall from both south-west and north-east monsoon, it supports tropical moist evergreen forest and moist deciduous forest of the total of 1300 species of Indian ferns. More than 300 species of ferns and fern allies are recorded from this region (Manickam & Irudayaraj, 1992; Nayar & Geevarghese, 1993) and well over 200 of them are found in the middle region of the west coast where the rain fall is high.
The Malabar and Deccan regions provide a wide variety of climatic and edaphic zones with mountain ranges, hillocks, valleys, swamps, marshy lowlands, sea coasts, fresh water streams, rivers, ponds and backwaters on the sea-front and harbours diverse type of vegetation.

The prominent South Indian hills having an altitude of more than 1800 m are the Palani hills (Kodaikanal, 2328 m) Bababudangiri (1925 m), Anamudi (2697 m) and Cardamom hill ranges (2016 m) and Nilgiri Hills, Dodabeta (2621 m) as recorded by Mehr-Homji (1967). On account of the comparatively low temperature prevailing during the winter months, the climate of these areas are often referred to as the temperate type. However, Mehr-Homji (1965) described the climate of this region as tropical mountain type.

Rainfall is the chief climatic factor that controls the distribution of vegetation including ferns. South India receives both North-East monsoon (October-December) and South-West monsoon (June-September). The former predominates in Tamil Nadu, Pondicherry and Andhra Pradesh, while the latter is more vigorous in Kerala and coastal Karnataka. Before the South-West monsoon opens in full force in June, there are intermittent rains during April-May that is the pre-monsoon showers. The South-West monsoon starts on the west coast of South India at about the beginning of June. The rainfall is erratic, unevenly distributed and varies from place to place. The west coast of South India receives the heaviest rainfall with more than 220cm annually, whereas Andhra Pradesh and Tamil Nadu receive only
100-200cm rainfall, and the southern parts of Andhra Pradesh gets only 50 cm annually. The prevalence of mist during the rainless winter mornings (October-March) is an important source of moisture. During this season, the mist helps to keep the evergreen nature of the forest of the Western Ghats. The rainfall during the retreating monsoon period (October-December) considerably influences the number of frosty days during these months; if the rains are above normal, the frosty days are fewer in number (Meher-Homji, 1971). The average length of the dry season is six months and the mean temperature of the coldest month is over 20°C.

The major rivers of south India originate in the Western Ghats and flow to the east coast and finally empty into the Bay of Bengal are Krishna, Cauvery and Godavari. The small rivers Netravathi, Bharatapuzha, Pampa and Periyar originate in the western ghats, flow westwardly and pour into the Arabian sea. These rivers are mainly rainfed and many of them shrink into rivulets during summer.

The mature soils of Peninsular India consist of black soils, laterite soils and red soils. Black cotton soils is the predominant soil type occurring in the Deccan of Andhra Pradesh, Karnataka and Tamil Nadu. The foothills of Western Ghats in Kerala and Karnataka and summit hills of Deccan contains laterite soil. Red soils with high percentage of iron compounds occur in Tamil Nadu, North-east Andhra Pradesh and some parts of Kerala.
The banks of rivers such as Cauvery and Godavari have alluvial soil. Soil texture varies from clay to clay loam. Peaty soil with low pH (3-6) is found in the low lands of Kerala.

The climate in South India is uniformly megathermal (Subramanyam et al., 1965; Rao et al., 1972). Chowdhury and Sarwade (1982) classified the homoclimatic regions of India into five categories, namely arid regime, semiarid region, sub humid region, humid region and super humid region on the basis of the ratio of rainfall to evapo-transpiration. Among them, south India falls under four homoclimatic types. The coastal districts of Andhra Pradesh, interior Karnataka and some districts of Tamil Nadu come under semi-arid climate. Northern coastal Andhra pradesh, Southern districts of Karnataka and northern Tamil Nadu experience dry, sub humid climate. The humid regime predominates in southern districts of Kerala and at higher elevations around Coonoor and Ootacamund in Tamilnadu, whereas super humid regime occupies only at Kodaikanal (Tamil Nadu).