

Agro-climatical zoning using temporal satellite data and GIS

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An Agro-climatic zone is a region with a characteristic inter-relationship between agronomy/farming systems and climate. In this study a modest attempt has been made to divide the study area into homogenous climatic zones. The study was conducted in Pathanamthitta district which is a part Western Ghat ecosystem and is situated between 76° 29' to 77° 01' E longitude and 9° 06' N to 9° 30' N latitude. Terra MODIS data products i.e., Terra/MODIS Surface Reflectance and Terra/MODIS Land Surface Temperature were used for the study other than ancillary data. Agro-climatic zones were based on criteria of agro-climatic parameters viz. Temperature, Rainfall, Potential Evapotranspiration, Thermal index and Moisture index. Regression analysis to assess the relationship between elevation and temperature indicates strong negative trend and the coefficients were found significant. The data clearly reveals that with increase in elevation there is corresponding decrease in temperature.

Key words : Agro-climatical, Zoning, Kerala gis.

INTRODUCTION

As a result sustainable agricultural development planning is increasingly being based on agro-ecological zones. In this process agro climate zoning has become very popular (Krishnan, A 1988). Agro-climatic zone is a region with a characteristic inter-relationship between agronomy/farming systems and climate.

Agro-climatic zones were based on criteria of agro-climatic parameters viz. Temperature, Rainfall, Potential Evapotranspiration, Thermal index and Moisture index. The agro-climatic regime map is prepared by GIS aided integration of thermal regimes, rainfall zone, moisture index zone and biomass regimes map layers.

The overall objective of the present effort was to demonstrate the usefulness of Remote Sensing and Geographical Information System technology for delineating agro climatic zones based on thermal index and moisture index and to assess elevation based spatial variation in climate over Pathanamthitta district of Kerala.

GENERAL DESCRIPTION OF STUDY AREA

Geographical Setting :

The study area for Agro-climatical zoning is Pathanamthitta district which is a part Western Ghat ecosystem. The study area is situated between 76° 29' to 77° 01' E longitude and 9° 06' N to 9° 30' N latitude. The total area of the district is 2642 sq. km., of this 1390.73 sq.km., comes under forest. The study area extends to nearly 124498 Ha.

DATA USED

Satellite Data:

Terra MODIS data products were used for the study and the details are given in the table 1.

Meteorological data:

Minimum temperature, maximum temperature, rainfall, relative humidity, wind speed and sunshine hours of six met station within and surrounding the study area were collected and used for the study purpose.

Table 1 : Data used for the study

Data	Period	Spatial Resolution
Terra/MODIS Surface Reflectance	January to December (8 daily composite)	250m
Terra/MODIS Land Surface Temperature	January to December (8 daily composite)	1000m

Table 2 : Terra MODIS surface reflectance data set

EDG Data Set Name					Granule Shortname
MODIS/Terra Surface Reflectance 8-Day L3 Global 250m SIN Grid					MOD09Q1
SDS	Units	Data Type-bit	Fill Value	Valid Range	Multiply by Scale Factor
Surface Reflectance for band 1 (620-670 nm)	reflectance	16-bit signed integer	-28672	-100 - 16000	0.0001
Surface Reflectance for band 2 (841-876 nm)	reflectance	16-bit signed integer	-28672	-100 - 16000	0.0001
*Surface reflectance 250m quality control flags	Bit field	16-bit unsigned integer	65535	0-4294966531	

Source: <http://edcimswww.cr.usgs.gov>

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