



# Drought Assessment Mapping for Coimbatore City using GIS

S.D.Anitha SelvaSofia, V.Parthiban, V.K.S.Gogul, A.Balaji, S.Aravind

**Abstract:** Drought is the maximum complex however least understood of all herbal dangers. it's miles extensively described as "severe water scarcity". Low rainfall and fall in agricultural manufacturing has mainly brought on droughts. A droughts effect constitutes losses of life, human suffering and damage to economy and environment. Droughts had been a ordinary feature of the Indian weather therefore take a look at of ancient droughts may assist within the delineation of important regions facing drought danger and thereby management plans may be formulated by the government authorities to address the disastrous effects of this hazard. In latest years, Geographic records technology (GIS) and far off Sensing (RS) have played a key function in reading extraordinary kinds of risks either natural or guy-made. This examine stresses upon the usage of RS and GIS inside the area of Drought danger assessment. we've got decided on the Coimbatore district for our drought assessment reason. we're the use of the GIS for the prediction of drought in the decided on area. we've selected 20 vicinity with accurate latitude and longitude for our assessment from 2015-2017. The factors taken into consideration for drought tests are temperature, wind pace, humidity and rainfall. The facts of the factors are collected with the Georeferencing and mapping the use of those statistics. From the mapping we have concluded that the drought assessment for Coimbatore district from 2015-2017 may be anticipated easily the use of GIS. The drought are anticipated in taluk clever inside the Coimbatore district and so the authorities has to take several steps to govern the drought in affected taluks.

**Keywords:** GIS, RS.

## I. INTRODUCTION

Dry spells haven't any fashionable definition. As dry season definitions are vicinity express, reflecting contrasts in climatic characteristics just as joining various bodily, organic and financial factors, it's miles usually tough to transport definitions inferred for one district to any other.

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besides a portion of the everyday meanings of dry season can be stated as below: The Director of common Wealth Bureau of Meteorology in 1965 proposed an expansive meaning of dry spell as "extreme water lack".

Definition given through Palmer expresses that "Dry season is an period in-between of time, through and huge of the request for long durations of years in time period, all through which the real dampness supply at a given spot as a substitute reliably misses the mark concerning the climatically

predicted or climatically fitting dampness deliver (Palmer, 1965).

As indicated by means of Mc Mohan and Diaz area (1982), "Dry spell is a time of surprisingly dry climate adequately for the absence of precipitation to purpose a proper hydrological irregularity and conveys implications of a dampness lack as for man's use of water. any other definition given via Flag deserves referencing "Dry spell is a time of precipitation lack, stretching out over months or year of one of these nature, that yields and pasturage for stock are really prompted, if no longer definitely stuck fire and demolished, water supplies are genuinely drained or evaporated and sheep and dairy farm animals die". As per Hangman (1984), "Dry season is taken into consideration by way of severa people to be the most unpredictable yet least comprehended of every unmarried characteristic peril influencing a extra number of people than a few different threat." (Wilhite, 2000).

A dry season is a perplexing marvel that can be characterized from a few points of view. Wilhite and Glantz classify dry season definitions into applied (definitions figured by and large terms) and operational. Calculated definitions figured by and large terms; assist individuals with understanding the idea of dry spell however these ordinarily don't give quantitative answers. Operational definitions then again help recognize the dry season starting, end and level of seriousness. By contemplating the above definitions, it ca be comprehended that dry spell is essentially worried about the lack of water which thus influences accessibility of nourishment and grub consequently prompting removal and misfortune to economies all in all.

### 1.1 Problem Statement

Dry season is one of the major ecological catastrophes, which have been happening in practically all climatic zones and harm to the earth and economies of a few nations has been broad and loss of life of animals remarkable. Dry spell harms are increasingly articulated or noticeable in regions where there is an immediate risk to vocations.



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Coimbatore city with a populace of around 16.36 lakhs according to the figures of the 2015 evaluation is an agrarian state, where two-third of populace is occupied with horticulture and gain work straightforwardly from this occupation. In addition, farming gives circuitous work to enormous part of populace in agro-based occupations. Subsequently, thriving and prosperity of individuals in Coimbatore are firmly connected with horticulture and partnered exercises. Farming advancement in the city is to a huge degree subject to accessibility of water.

## II. STUDY AREA

Coimbatore is located on the western coast of Tamil Nadu between 11.004556 and 11.017363 north latitudes and 76.961632 and 76.958885 east longitudes. It incorporates of 6 taluks with overall geographical place of 642.12 km<sup>2</sup>. Coimbatore shares a boundary with Nilgiris within the north west, Erode in the east and Dindigul in the south and south east. Its western boundary paperwork the state boundary with Kerala.

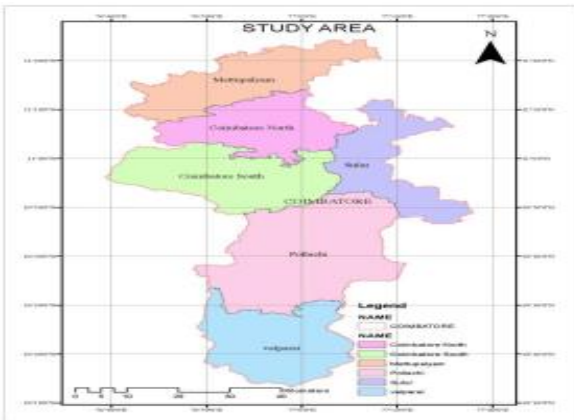


Figure 1 : Study Area

## III. METHODOLOGY

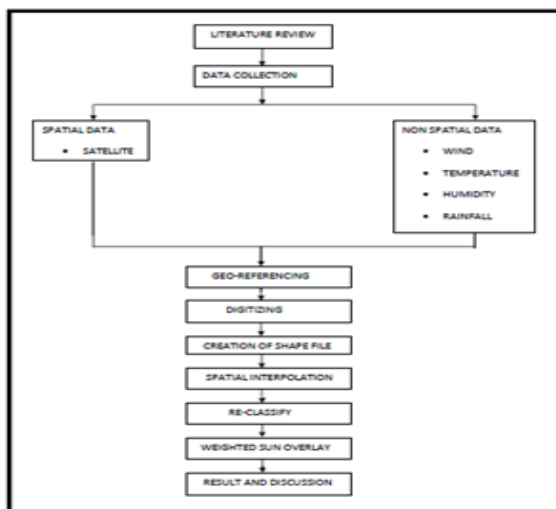


Figure 2: Methodology Layout

## IV. RESULT AND DISCUSSION

### 4.1 Rainfall

Rain is liquid water inside the form of droplets that have condensed from atmospheric water vapor and then grow to be heavy enough to fall underneath gravity. Rain is a prime

thing of the water cycle and is liable for depositing most of the fresh water on earth. It offers suitable conditions for many sorts of ecosystems, as well as water for hydroelectric power flowers and crop irrigation.

Precipitation, specially rain, has a dramatic effect on agriculture. All flora want at least a few water to survive, consequently rain (being the most effective approach of watering) is crucial to agriculture. while a everyday rain pattern is usually important to wholesome vegetation, an excessive amount of or too little rainfall can be dangerous, even devastating to vegetation. Drought can kill plants and boom erosion, whilst overly wet climate can purpose harmful fungus boom. vegetation need various amounts of rainfall to continue to exist. as an instance, positive cacti require small quantities of water, even as tropical plants may want as much as hundreds of inches of rain in keeping with year to live on.

The rainfall of the region is the main factor to be considered in drought assessment. The analysed rainfall data of the Coimbatore region is shown in figure.

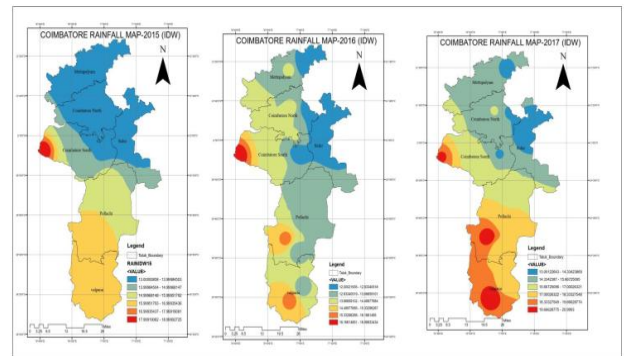


Figure 3: Coimbatore rainfall map-2015, 2016 & 2017(IDW)

In the above weighted sum overlay map the rainfall data of 2015, 2016 and 2017 are consolidated according to map west zone of Coimbatore South 32 taluk has the high rainfall in the consecutive three years. Similarly east part of Mettupalayam taluk and Suler taluk has the minimum rainfall. Thus above map gives the entire rainfall data of Coimbatore in 2015 to 2017.

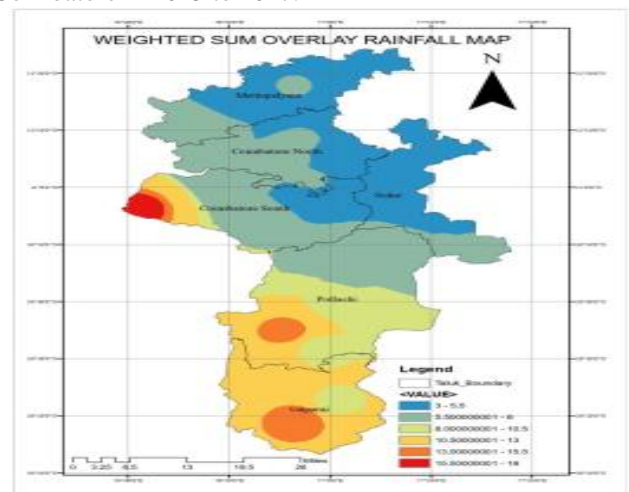
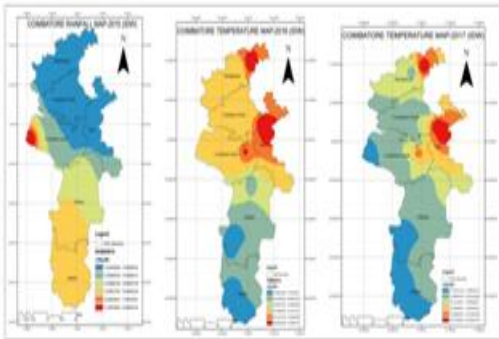


Figure 4: Weighted Sum Overlay Rainfall Map

**4.2 Temperature**

Temperature is a physical amount expressing hot and cold. it's miles measured with a thermometer calibrated in one or greater temperature scales. The maximum commonly used scales are the Celsius scale (previously known as centigrade) (denoted °C).

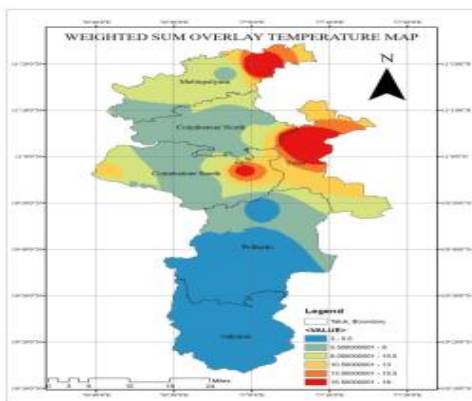
The effect of temperature in the region is the important factor in the drought consideration. When the temperature of the region increases the moisture content in the land decreases as a result it gives way to the water shortage. This may lead to the less crop production, shortage of water in the reservoirs and so this may lead to the water scarcity of water for the drinking and the necessary use. Due to the scarcity of water ground water table also get reduced so that agriculture works tends to fall. As a result the drought comes to existence. Thus the effect of temperature also plays a important role in the drought of the region. The following temperature map give a detain explain and the characteristics of temperature in Coimbatore for the consecutive three years 2015 to 2017.



**Figure 5 : Coimbatore Temperature Map-2015-2017 (IDW)**

The Fig-5 gives the temperature data of Coimbatore in 2015, 2016 & 2017. In 2015 the temperature range has minimum difference and according to that result west zone of Coimbatore south taluk and sulur taluk has the high temperature. Valparai taluk and Pollachi taluk has the minimum temperature range. In the year 2016 the high temperature is recorded at sulur taluk and east zone of mettupalayam taluk. The minimum temperature is recorded at south zone of valparai taluk.

In the year 2017 the high temperature is recorded at central zone of sulur taluk and east zone of mettupalayam taluk. The minimum temperature range is recorded at west zone of Coimbatore south taluk and west zone of valparai taluk.



**Figure 6 : Weighted Sum Overlay Temperature Map**

The above map is the weighted overlay temperature map of Coimbatore in 2015 to 2017. This map gives us a conclusion of which region has the high temperature record in these above three years. According to that the maximum temperature has recorded in sulur taluk and east zone if mettupalayam taluk. Minimum temperature has recorded in valparai and south zone of pollachi taluk.

**V. CONCLUSIONS**

The dry season in the Coimbatore is evaluated with the assistance of GIS programming with its comparing influencing factors. The elements are temperature and precipitation. For the above components, map is created as needs be. As indicated by the above mapping and appraisal taken Coimbatore has a specific scope of variety in dry spell likely from least to greatest, with the goal that this can be plainly executed by giving the outcome in taluk astute. So the legislature and other social association can find a way to control the dry season in the influenced regions, by improving the water funneling frameworks, planting more trees, improving water gathering framework, stockpiling of water in the storm time frame that can be utilized for future cost and so on., According to the appraisal sulur taluk and north-east zone of mettupalayam taluk will in general have most extreme dry season contrasted with other taluk. The dry season happen additionally because of the nearness of seemai karuvelam tree (*Prosopis juliflora*) in huge territories, because of this nearness there is a depletion of ground water. Furthermore, this prompts the event of dry season. The legislature and regions should find a way to tidy up these trees and that can lessen the dry spell event in these regions.

**REFERENCE:**

1. Adewusi Adeniran Adekunle, Drought risk assessment using GIS and remote sensing: A case study of Nigeria.
2. Ali Ahmed Ali Dhaifallah, Noorazuan Bin MD. Hashim, Azahan Bin Awang, Volume 118 No. 24 2018, Drought Assessment using GIS and remote sensing in Yemen. International Journal of Pure and Applied Mathematics.
3. Antigua & Barbuda and St. Kitts & Nevis, April-2001 Volume-1, Drought Hazard Assessment and Mapping for Nevis.
4. Nezar Hammouri and Ali El-Naqa, Drought Assessment Using GIS and Remote Sensing in Amman-Zarqa Basin, Jordan.
5. Parul chopra, Jan, 2006 Volume-1, Drought Assessment using GIS and Remote Sensing: A case study of Gujarat.
6. Sandeep V. Gaikwad, Karbhari V. Kale, Sonali B. Kulkarni, Agricultural Drought Severity Assessment using Remotely Sensed Data.
7. <https://power.larc.nasa.gov/data-access-viewer/>

**AUTHORS PROFILE**



**Anitha Selvasofia** completed her U.G Degree in Civil Engineering in the year 2004 in Karunya Institute of Technology, Coimbatore. She completed her M.E Geo-Informatics in the year 2007 at College of Engineering, Guindy. She obtained her Ph.D. Degree on 'Identification of accident prone zone and minimizing the traffic congestion flow using GIS' in 2019 under Anna University, Chennai. She has published 11 papers in International Journals and 2 papers in International Conference and 3 papers in National conferences. At present she is working as Assistant Professor (Sr.Gr) at Sri Ramakrishna Engineering College, Coimbatore .

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