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Sixteen years of Rainfall variability assessment in Salem District, South India

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ABSTRACT

The present study deals about to assess the rainfall variation during 1999 to 2014 in Salem district, South India, which makes to understand the rainfall fluctuation over a period of 16 years differences. Precipitation pattern analysis is very essential for the forecasting of any regions like agriculture or hazards. The analysis results shows that the mean winter season has contributed only 1%, summer season 19%, SW season 41% and NE season 39% of rainfall. The average rainfall in the study area is 829mm from 1999 to 2014. IDW has been used for prepare the spatial distribution maps.

Introduction

Rainfall is an essential component of economic development of an area or region, particularly in a country like India (Mahalingam et. al., 2014). Rainfall is a dynamic element which is not same in all years either spatial or temporal. It is varies from year to year. The distribution of precipitation is depending upon the various factors such as relief, climate, etc. (Jegankumar.2012). Most parts of India getting rainfall due to SW monsoon and the NE monsoon is also called retreating monsoon (Thilagavathi et.al. 2014). The study about the rainfall pattern is very important for the forecasting of environment like agriculture or hazards (Priyadharshini and Arucham 2015, Lilly Florence et.al.2012). The aim of the present study is to assess the rainfall variability from 1999 to 2014 in Salem district, South India. Remote sensing and GIS methods are very helpful to predict the rainfall conditions in regional scale. Especially, ArcGIS Interpolation methods mostly used to derive the spatial variation identification by using Inverse Distance Weighted method.

Materials Used

Base map preparation- Survey of India Toposheet (Salem district)

Data Used- The rainfall data has collected from State Ground and Surface water resource data center, Tharamani, Chennai. (1999 to 2014).

Software Used- ArcGIS software.

Study Area

The rainfall variability assessment concentrates on the Salem district, which is located in Latitude 11°39'52" and Longitude 78°8'45"; and total area covered by 5234 km^2. The average mean sea level is 278m. The study area surrounded by south side of Jarugumalai Hill, North side of Nagaramalai Hill, East side of Godumalai Hill, West side of Kanjamalai Hill, SW side of Kariyaperumal Hills and NE side of Shervaroy hills.

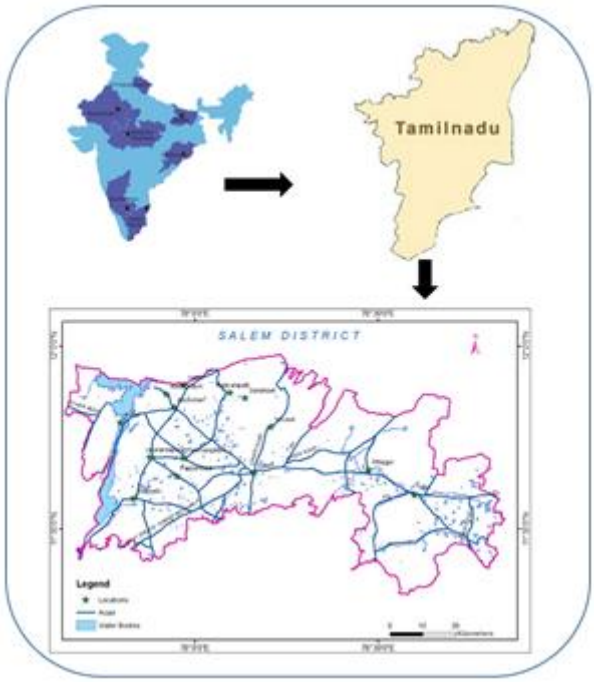

Fig 1

Methodology

The detailed methodology flow chart has shown in Fig.2.

Results and Discussion

Year wise rainfall assessment has been done form the year 1999 to 2014, as well as seasonal rainfall also has been calculated for every year. The result of the analysis is given table.1.

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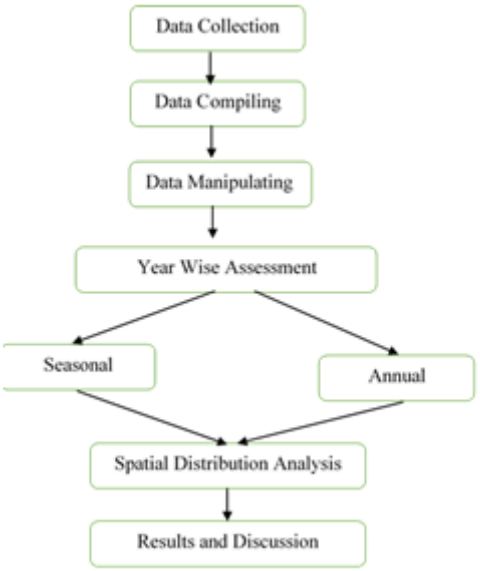

Fig 2

Over the period of 16 years, the annual average rainfall is 829mm and the maximum rainfall (1238mm) recorded during the year 2005, the minimum rainfall (563mm) recorded during the year 2012. The Fig.-3 is depicting the difference of season wise rainfall of 16 years. From the analysis the winter season has contributed 1% rainfall, summer season has contributed 19%, South West Season has contributed 41% and the North East season has contributed 39% of Rainfall. During the study period, NE and SW season has contributed more rainfall than other seasons. The NE and SW season was highly fluctuated by year to year than winter and summer seasons.

The Fig.-4 is illustrating the year wise rainfall fluctuations. The years 1999, 2000, 2001, 2004, 2005, 2006, 2007, 2008, 2010 and 2011 have received high rainfall than average rainfall. The rest of the years 2002, 2003, 2009, 2012, 2013, 2014 have received low rainfall than average rainfall. Which is clearly indicated that, during the year 1999 to 2014 rainfall was highly fluctuated by year to year.

The spatial distribution map of the all years has given in Fig-5. Those maps were prepared by using ArcGIS software with the help of IDW tool. These spatial distribution maps are very helpful to know the spatial distribution of the rainfall during research period.

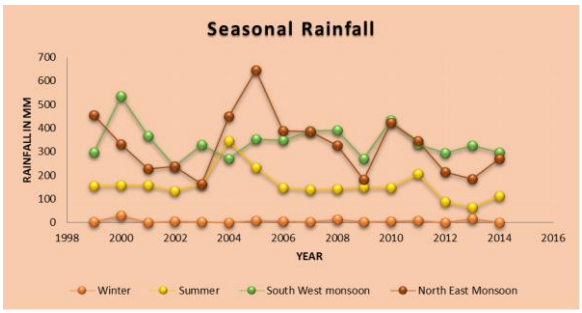

Fig 3

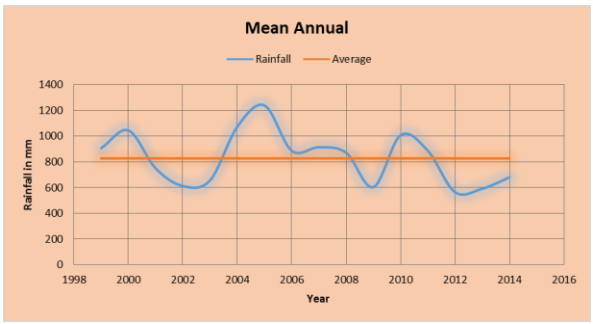

Fig 4

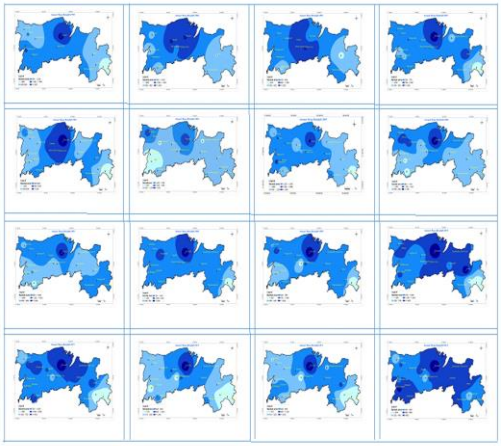

Fig 5

S.No.	Year	Winter	Summer	South West monsoon	North East Monsoon	Annual
1	1999	0.618182	155.2409	295.67	453.1764	904.7055
2	2000	29.36	157.196	535.844	330.111	1043.891
3	2001	0.118182	155.8818	365.43	225.6818	749.0573
4	2002	3.325	132.625	237.0206	237.3625	610.3331
5	2003	2.341176	161.3706	327.4606	163.0294	654.2018
6	2004	0	343.4824	268.6765	448.4647	1071.447
7	2005	7.352941	232.4776	353.2912	645.7371	1238.859
8	2006	3.605882	147.5824	346.5059	388.1729	885.8671
9	2007	1.276471	137.4147	387.8471	385.7929	912.3618
10	2008	11.67647	141.9929	389.7988	327.0918	870.56
11	2009	1.582353	149.6841	269.7853	180.3618	601.4135
12	2010	5.623529	145.9012	433.5459	421.3176	1006.506
13	2011	7.205882	204.0059	331.7153	343.3412	886.2682
14	2012	0	87.32647	293.0647	212.0247	563.0041
15	2013	14.44118	63.60706	326.8935	184.3706	589.3124
16	2014	0.176471	110.9412	296.7776	269.6118	677.4894
	Mean	5.54398244	157.9206	341.2079	326.0996	829.0798
	Percentage	1	19	41	39	

Conclusion

Rainfall is an efficient variable for Geo-environment. From the above discussion, the study area has received highest rainfall during the SW and NE season, Very less in Winter Season and Moderate in summer season. Over a period of 16 years, the study area rainfall highly fluctuating in year to year, which may be an evidence for climate change. Therefore, the analysis of rainfall is showing that the forecasting of study area status and improve the planning.

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