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Trend Analysis of Annual Rainfall in Coastal Stations of Kerala

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Abstract: ***Knowing the variations in the rainfall patterns of coastal stations is a vital to understand the water budget and climate change in the area. The present study examined the general rainfall pattern in coastal stations such as Thiruvanathapuram, Ernakulam and Kozhikode using annual rainfall data for 12 years collected from Indian Meterological department, Pune. From the study annual rainfall of coastal stations ahows a significant decreasing trend. The decreasing trend in annual rainfall shows the area also affect the climate change.***
Keywords: Coastal stations, Kerala, annual rainfall, Trend analysis, Climate change

I. INTRODUCTION

The climate of earth is changing. It is very dangerous to these days because the pollution of the soil, water and air increasing so fast no life will survive on the earth is not too distant a future. Evidences of changes are prominent in the environment through the increase in global and regional temperatures and perceptile changes in the hydrological cycles in many parts of the worl including India [1]. Earth's climate has been changing both on global and regional scales. Temperature and rainfall plays an important role in the climate change. Rainfall, wind speed and temperature etc., are important weather factors which affect the life of flora and fauna as well as planet earth. Annual trend in rainfall pattern has been examined extensively by different researchers from various part of the world [2]. Rainfall is one such important feature, understanding the trends and changes of which will help to solve uncertainties and provide knowledge for decision making on broad series of local issues related with agriculture, industry, irrigation and other human activities [3]. Ramesh and Goswamy reported that the shrinking of the Indian summer monsoon in terms of total rain days as well as in total area of rainfall [4]. Kerala is the entry point of Southwest monsoon. The main seasons in kerala are Southwest monsoon, Northeast monsoon, pre-monsoon and winter monsoons. Winter monsoon months are low clouding and low rainfall month [5]. The present study focuses on the annual trend analysis of rainfall of coastal stations with reference to climate change.

II. DATA AND METHODOLOGY

The available meteorological data for the study period 2000-2012 with respect to annual rainfall data have been collected from Indian Meteorological department, Pune. The location selected for the study periods are Thiruvanathapuram, Ernakulam and Kozhikode. The method of linear trend model has been used for performing the trend analysis of annual rainfall. The correlation between the variables can also be studied using the trend line. Trend line is a line of best fit which can draw to study the relation between variable.

III. RESULT AND DISCUSSION

A. Annual Rainfall trend analysis of Thiruvanathapuram

Thiruvanathapuram is located in 8.5°N 76.9°E on the west coast and Southern tip of mainland. The west of the city is bounded by Laccadive Sea and east to its Western Ghats. The average elevation of the city is 64msl above the Sea level.

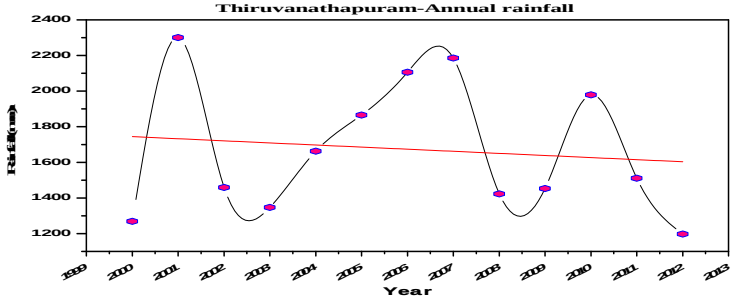


Fig.1 Annual rainfall trend of Thiruvanathapuram

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From the fig. 1, shows a decreasing trend in annual rainfall. For the twelve year study the maximum rainfall (2301mm) and the minimum rainfall (1198mm) obtained the years 2001 & 2012. The decreasing trend in annual rainfall shows that the impacts of climate change in the coastal station Thiruvanathapuram. The annual and seasonal trends of rainfall in most region of Kerala are also found to be decreasing significantly. The decreasing trend may be related to global anomalies as a result of anthropogenic green house gas emission due to increased fossil fuel use, land-use change due to urbanisation and deforestation, proliferation in transportation associated atmospheric pollutants

B. Annual Rainfall trend analysis of Ernakulam

Ernakulam is situated in the central portion of Kerala. It is located in 9.98^0N 76.28^oE. The district has an average elevation 3msl so it is also known as a coastal station. The maximum average temperature of the district is 33^oC and minimum temperature is 22.5^oC. Ernakulam is an industrial capital of Kerala.

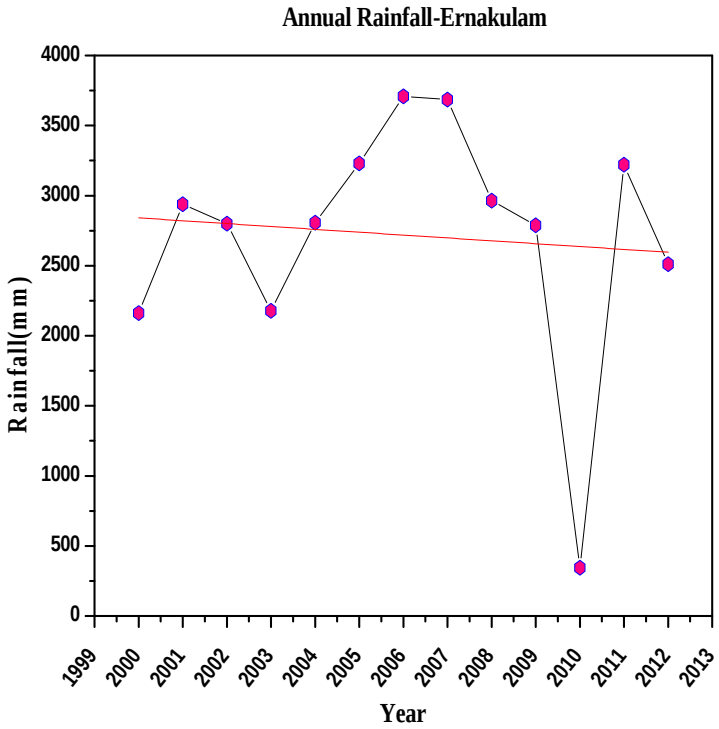


Fig. 2 Annual rainfall trend of Ernakulam

From the figure 2, shows a decreasing trend in annual rainfall. For the twelve year study the maximum rainfall of 3709mm and minimum rainfall of 344mm was seen during the years 2006 & 2010. The rainfall is one of the most important meteorological parameters that act as a main source for the recharge of ground water system besides other environmental impacts. The variation analysis of rainfall data of Ernakulam region reveals a decreasing trend that is resulting into depletion of ground water level. The depletion of ground water level may be assigned to seasonal variations in the static ground water levels, which are influenced by infiltration of rain water harvesting of ground water.

C. Annual Rainfall trend analysis of Kozhukode

The Kozhikode district is located in 11.25^oN 75.77^oE. It has an elevation of 3msl along the coast. Number of rivers is originating from Sahyadri run along the outer reaches of the city. Kallai River is the most important river in Kozhikode. The pre-monsoon Mangosho were hits the city during April. The major source of rain in the district is South West monsoon that set first week of June.

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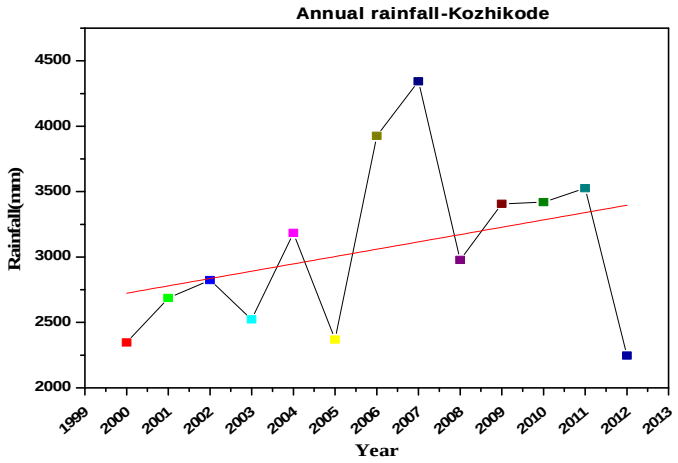


Fig. 3 Annual rainfall trend of Kozhikode

From the figure 3, it is understood to have an increasing trend in annual rainfall. The maximum rainfall of 4343mm and minimum rainfall of 2247mm were seen during the years 2007 & 2012. Kozhikode is the maximum rainfall received district in the Kerala State. For the twelve year study except the district shows an increasing trend in annual rainfall. The most prominent features of Kozhikode are seen from the Sea in the majestic hills of the Western Ghats raising some 60Km to the east of the coast. Several rivers originating in the Western Ghats or its foot hills flow through the district draining into the Seas.

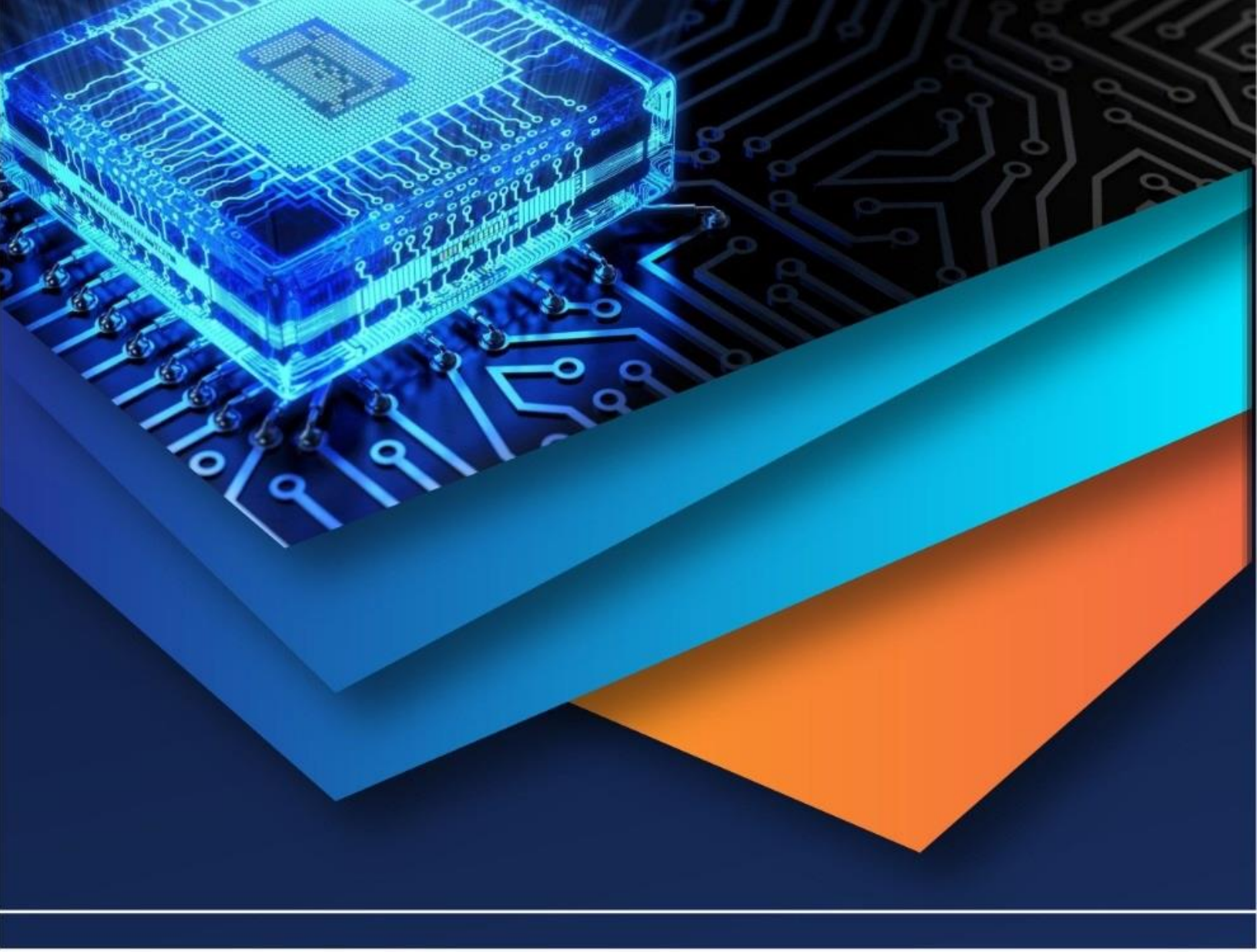
IV. CONCLUSIONS

For the twelve year study the two coastal stations thiruvanathapuram and Ernakulam shows a decreasing trend in the annual rainfall. Decreasing trend in annual rainfall is indicating the region affect climate change. For the twelve year study Kozhikode from the north Kerala shows an increasing trend in the annual rainfall. Kozhikode district received maximum rainfall of 4343mm during the year 2007. Kozhikode is the maximum rainfall received district in the Kerala state.

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