



## **Analysis on Spatial Variation of Rainfall and Groundwater Fluctuation in Hebballa Watershed, Mysore District, Karnataka, India**

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### **ABSTRACT**

In this study examine the groundwater and rainfall variability, seasonal variation of rain fall using gis technics, The maximum rainfall was recorded at Harohalli 71.80%, having the monthly and annual average respectively. Similarly the minimum rainfall was at Dharmapuri in 61% average value. The monthly rainfall curve has its peak during October and lowest point during January. SW monsoon and NE monsoon almost play an equal role in their rainfall contributions, whereas the post monsoon rainfall occurrence is negligible in this region.

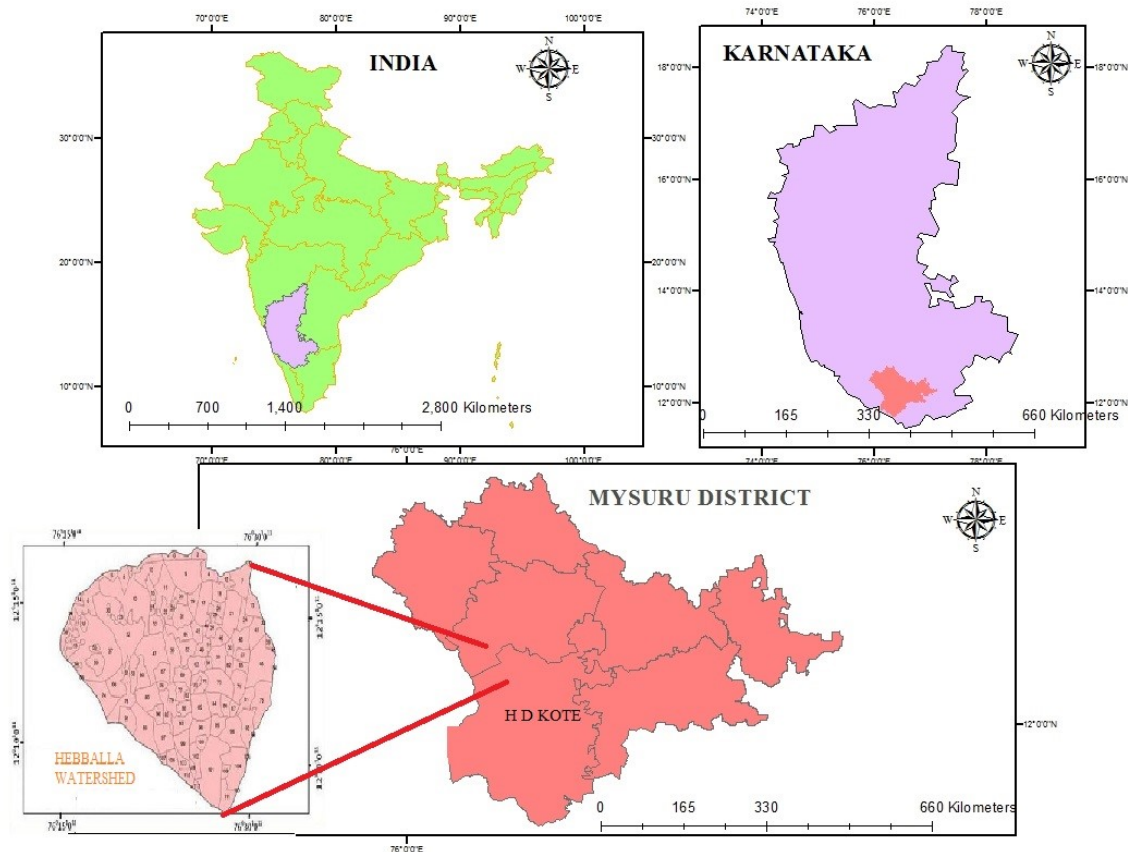
deprive millions of people of the access to safe drinking water. Since the intensity of monsoon rainfall is erratic and uneven both in space and time, it results in drought over major parts of Karnataka during the non-monsoon periods. Hence it is a necessity to analysis the occurrence of rainfall and groundwater level fluctuations during various seasons for evolving a system which can address these issues.

### **STUDY AREA DESCRIPTION**

### **INTRODUCTION**

Maximum of the annual rainfall occurs during the monsoon periods in Karnataka. The main component of the water cycle is rainfall which is the prime source of water. In India, the distribution of rainfall varies from place to place due to different physiographic and climatic setting. Hence, it throws an enormous challenge to the management of water resources. Improper or ineffective management could lead to fresh water crisis and environmental degradation, and

Hebballa watershed found in the two taluks of Mysuru District such as hunsure and h d kote The total area is about 390.80sq.kms. Its situated between Latitude 12o 19'12''N and 12o 06'36'' N and Longitude 76o .16'12''E and 76o.31'12''E covered under the Survey of India (SOI) toposheet numbers are 57D/7, 57D/11, 57D/12 and 57D/8 on 1:50,000 scale, average elevation 694mts. in North by Hunsur taluk, in the South by Kodagu district, in the East by Nanjangud and Mysuru taluk. are surrounded The climate of Hunsur and H.D.Kote taluk may be described as semi arid climatic zone which is a product of the interplay of the two opposing air-masses of the southwest and northeast monsoons.



**LOCATION MAP OF THE HEBBALLA WATERSHED**

## **MATERIALS AND METHODS.**

Survey of India topographical maps are used to delineate the watershed boundary. water level, and its variability purpose the water level data of 2005-2014, 10 years of rain fall data for The water level fluctuation was analyzed for the four seasons such as Pre monsoon, South west monsoon and the North east monsoon. In this present, estimating the trend of groundwater level and there after the water level fluctuation and the trend and the increase or decrease in rainfall from the trend of the rainfall data was calculated using spss. using ArcGIS.

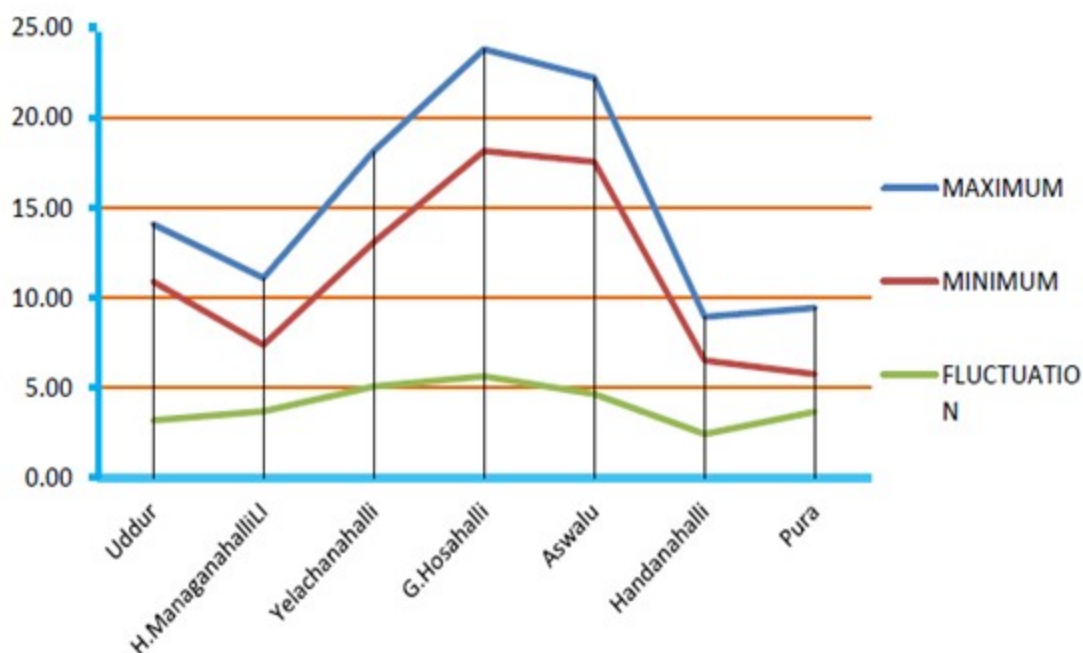
## **RESULTS AND DISCUSSION**

The annual average rain fall of the study area is 714.80mm; the annual mean varies from 211 mm to 210mm explains the variation of annual average rainfall over a period of ten years. Harohalli and Kythanhalli Received rainfall of 71 %mm and 69%mm respectively in the year 2005-2014 which recorded the lowest rainfall. Likewise Chamanahalli and Dharmapuri received rainfall of 61% respectively of the year 2005-2014 with the highest rainfall of the study period. Southwest and northeast monsoon shares

71.6 % of rainfall and summer contributes by 25.5 % and winter shares 2.9%. The spatial variations in rainfall The study area receives rainfall from southwest monsoon from June to September and northeast monsoon from October to December. Overall on an average, there are 73 normal rainy days,. As per one decade or last ten years (2005-2014) rainfall data of Hebballa watershed area was analyzed. The precipitation during SW monsoon season study area receives 298.58 mm (average of 10 years) and during northeast monsoon it is 274.30 mm (average of 10 years). October is the wettest month in the year. Average annual rainfall for the one decade or last ten years Hebballa watershed receives 784.10 mm. The Hebballa watershed is moist during the rainy and winter season and comes under semi arid area. There are six rain gauge stations are present in Hebballa watershed and received the average annual rainfall 784.10 mm. Average annual and The seasons in the study area has been classified as pre monsoon (jan-May), SW monsoon (June-September), NE monsoon (October – December) and Post monsoon. The percentage of seasonal rainfall contribution during each station has also been computed. The contribution among the

seasons are: the southwest monsoon of 38.8% (298.58), northeast monsoon of 33.5% (274.30), Pre monsoon of 25.5% (211.22 mm) and the post monsoon of 3% (27mm) of the total mean annual rainfall. During South west monsoon period, the station Harohalli recorded the maximum average rainfall Dharmapuri recorded the minimum.

Water level data of Max, Min, and Fluctuation (Average Monthly and Yearly)							
Hebbahalla Watershed -2005-2014							
	Uddur	H.Managana halli	Yelachana halli	G.Hosa halli	Aswalu	Handana halli	Hura
MAXIMUM	14.08	11.09	18.15	23.78	22.21	8.94	9.44
MINIMUM	10.89	7.38	13.08	18.15	17.55	6.51	5.74
FLUCTUATION	3.19	3.70	5.07	5.63	4.66	2.43	3.67



Source (Shodganga)

## CONCLUSION

The month of January the water level starts lowering and by the month of May, the water level declined to 10m. Although there is substantial amount of rainfall in the south eastern region where the water level is near surface conditions during August, the average depth to water level also deepens by the month of May. This may be due to the hard rock terrain in the region which does not allow water to infiltrate into the deeper aquifer zones, and hence most of the water escapes as runoff and partially gets absorbed into the ground to sustain shallow aquifers. The entire study area can be divided into five groups based on their average annual rainfall distribution. The study of various data series viz., annual, monthly and seasonal indicated that northern part of the state receives higher annual, monsoon and July month rainfall. However, during December, the eastern and the western part of the state receive higher rainfall.

Monthly rainfall analysis shows that maximum rain showers are recorded during the month of October and the lowest rainfall intensity is usually recorded during January at all the rain gauge stations located in the study area. From the analysis of seasonal rainfall, it is found that the percentage contributions of rainfall during various monsoon periods are in the following order: SW monsoon (38.87%) > NE monsoon (33.5%) > Pre-monsoon (25.5%) > spatial distribution pattern of rainfall indicates that the magnitude of rainfall increases towards central portion of study area during all the three monsoon (NE monsoon, pre-monsoon and post-monsoon) seasons. However, the magnitude decreases towards north easterly direction during SW monsoon period. Though the contribution of post-monsoon is too minimum, the rainfall intensity is higher in the North portion. As the study area is a hard rock terrain, it is observed that some of the places have deeper water levels during pre-monsoon season. Groundwater starts to replenish the shallow aquifers during SW monsoon season and reaches high during NE monsoon period when plants are dormant and evaporation rates are less. The groundwater levels remain stable for the entire season and a few locations there is a variation of levels due to rainfall variation during pre-monsoon season.

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