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AN ANALYSIS OF RAINFALL CONDITIONS ON REDUCED INFLOW TO THE HESARAGHATTA AND THIPPAGONDANAHALLI RESERVOIRS: A STUDY ON ARKAVATHY CATCHMENT



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INTRODUCTION :

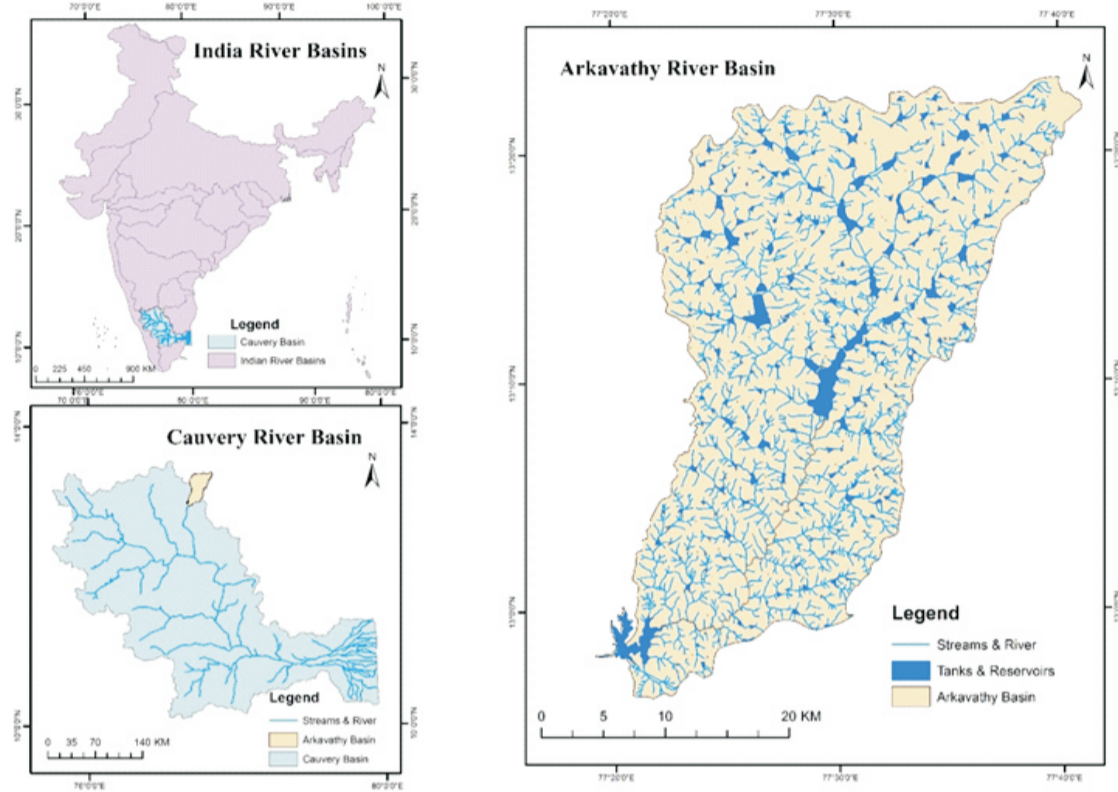
Arkavathy is the tributary of river Cauvery, which supplied water for the Bangalore from past 100 years. Nowadays this river is drying and both the reservoirs constructed to this river have started drying gradually, and the inflow of these reservoirs also reduced. To understand the reasons for this rainfall conditions of the Arkavathy catchment is studied. Rainfall is the source of surface and ground water, it determines the condition of the surface and ground water status,

Location Extent

The Arkavathy is the tributary river which flow through the Bangalore Urban and Bangalore rural. The Arkavathy river Catchments lies between latitude 12°55'44.505" N to 13°22'47.346" N and longitude 77°19'26.11" E to 77°41'16.047" E, The Survey of India Toposheet Number 57 G/7, 57 G/8, 57 G/11, 57 G/12 and 57 H/5 covering an area of 987.58 Km². The study area covers parts part of Doddaballapur, Devanahalli, Nelamangala, Magadi, and Bangalore North.



AN ANALYSIS OF RAINFALL CONDITIONS ON REDUCED INFLOW TO THE HESARAGHATTA



Objective

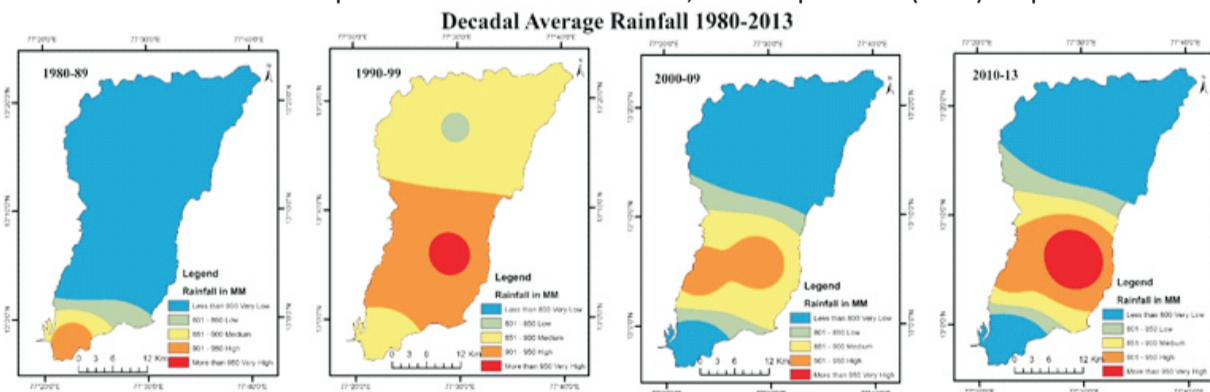
- To study the decadal and seasonal average rainfall pattern in the Arkavathy catchment
- To study the trend of inflow into the Hesaraghatta and Thippagondanahalli reservoir

Data Collection and Methodology

The rainfall data of Doddaballapur, Devanahalli, Nelamangala, Bangalore North and Magadi have been collected from Indian Meteorological Department Bangalore for 34 years. Decadal average and seasonal decadal average maps were prepared using IDW techniques using ArcGIS. Inflow of Hesaraghatta and Thippagondanahalli data were collected from BWSSB (Bangalore Water Supply and Sewerage Board).

Decadal Average Rainfall

In order to know the spatial distribution of rainfall, an interpolation (IDW) maps were

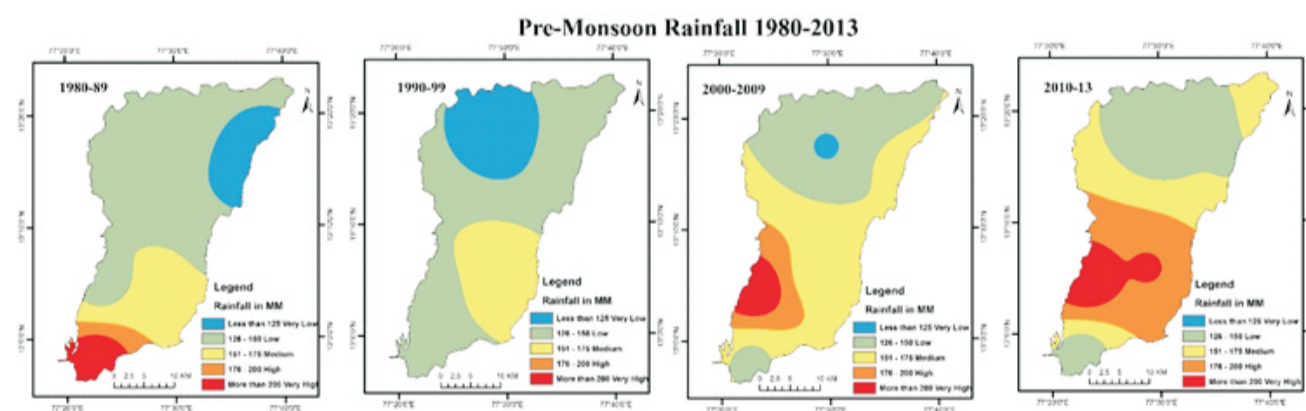


prepared using total rainfall recorded at different stations. The decadal average rainfall from 1980 to 2013 map shows that there increase in the rainfall, but where as in the case of Doddaballapur and Devanahalli average rainfall are 759 and 722 mm and it remains more or less same from 1980 to 2013. But in the case of southern portion (Nelamangala and Bangalore North) the Rainfall is increased from 865 and 836 mm to 902 and 916 mm respectively from 1980 to 2013.

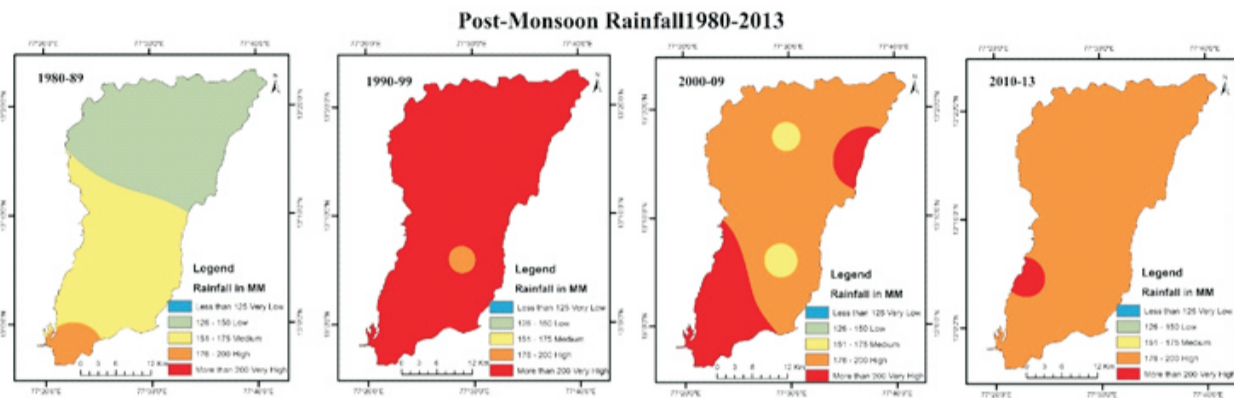
Seasonal Distribution

As far as the rainfall is concerned, the year is divided into three seasons. Those are January – May (Pre Monsoon Season), June – September (Monsoon Season), October – December (Post Monsoon Season). Seasonal distribution of rainfall in Arkavathy catchment receives 18% of rainfall during pre-monsoon, 57.47% in monsoon and 23.94% of rainfall during post monsoon seasons. The monsoon season closely follows the southwest monsoon with rainfall occurring during September. During post monsoon season, which closely follows south east monsoon, more rainfall occurs during October and November months. The analysis reveals that the maximum (80%) rainfall occurs during June to November and the area receives good amount of rainfall during the summer months of April and May. December to February is the cold and dry season. Graph 4.11 indicates decadal seasonal rainfall distribution in the study area.

Pre monsoon decadal average rainfall is slightly increasing from 1981 to 2013, during 1980-89, and the decadal pre monsoon average rainfall was 150.52 mm in Bangalore North, 109.09 mm in Devanahalli, 143.97 mm in Doddaballapur, 141.36 mm in Nelamangala and 220.92 mm in Magadi. During 1990-99, the decadal pre monsoon average rainfall was 169.90 mm in Bangalore North, 142.64 mm in Devanahalli, 110.04 in Doddaballapur, 138.81 in Nelamangala and 144.11 in Magadi. 2000-09, the decadal pre monsoon average rainfall was 161.08 mm in Bangalore North, 153.38 mm in Devanahalli, 123.07 mm in Doddaballapur, 226.14mm in Nelamangala and 143.72 mm in Magadi. 2010-13, the pre monsoon average rainfall was 201.72mm in Bangalore North, 149.20 mm in Devanahalli, 132.63 mm in Doddaballapur 219.35 mm in Nelamangala and 137.05 mm in Magadi

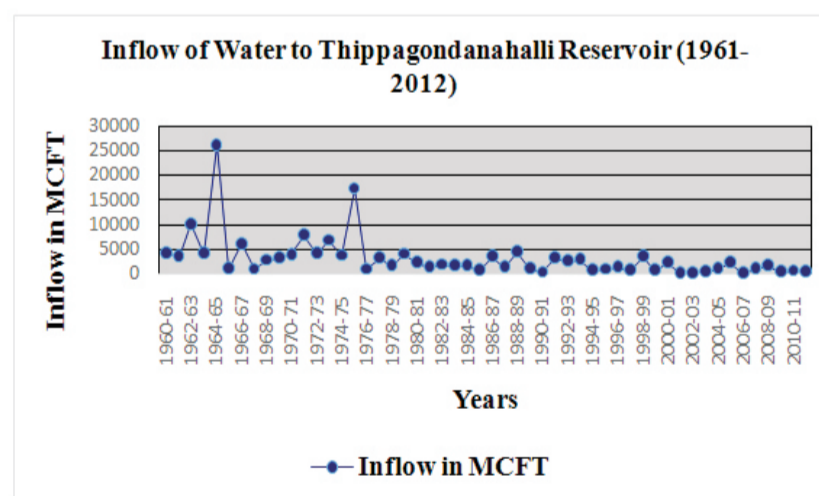
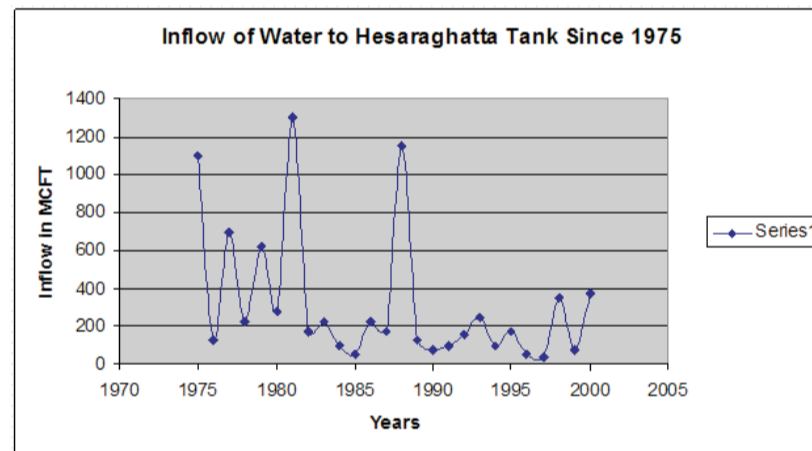


Monsoon rainfall was 480.83 mm in Bangalore North, 405.74 mm in Devanahalli, 394.36 mm in Doddaballapur, 458.38 mm in Nelamangala and 523.29 mm in Magadi during 1980-89. During 1990-99, 594.69 mm in Bangalore North, 490.21 mm in Devanahalli, 451.80 mm in Doddaballapur, 546.45 mm in Nelamangala and 523.55 mm in Magadi. During 2000-09, 593.55 mm in Bangalore North, 368.24 mm in Devanahalli, 268.10 mm in Doddaballapur,



Inflow of Hesaraghatta and Thippagondanahalli reservoir

The inflow line of the Hesaraghatta and Thippagondanahalli have been reduced. In the case of Hesaraghatta it started reducing from 1990 onwards it's because of Doddaballapur and its industrialisation the inflow in the Hesaraghatta reservoir has been reduced. Thippagondanahalli reservoir inflow started reducing 1980 onwards because from the Hesaraghatta reservoir water has to flow to Thippagondanahalli reservoir via Bangalore urban built-up area. Urban expansion of Bangalore city and along NH 4 causes the reduced inflow of the reservoir even though the rainfall is remains same.



CONCLUSION

The result of this study is decadal averages of annual and seasonal average rainfall are having increasing trend. That means in the Arkavathy catchment the rainfall overall trend is increased. But the inflow of water in to the streams, tanks and reservoirs got reduced due to the urban expansion, land use land cover changes, industrialisation.

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