exploratory analysis of rainfall data in India for agriculture

Abstract :

Changing rainfall has significant effect on water resources, agricultural output and hence economy. To understand the variability in rainfall, a spatio-temporal analysis of Indian rainfall was taken up.

The objective for the present analysis was to identify trends in amount of Indian   at various spatial scales. Daily gridded rainfall data (10 X 10 spatial resolution) for the period 1951-2010 corresponding to season and monthly rainfall data at meteorological sub-division level for 1901 - 2010 were analysed.

From the gridded data, a series of rainfall at agroclimatic regions was constructed. The analysis was based on linear trend analysis. Both parametric and non-parametric methods were used. From statistical analysis of data it was concluded that there is a decreasing trend in all-India Indian   rainfall.

Northeast India is one big cluster having highly decreasing trend. Also, there is a strong agreement between gridded and meteorological subdivision based rainfall.

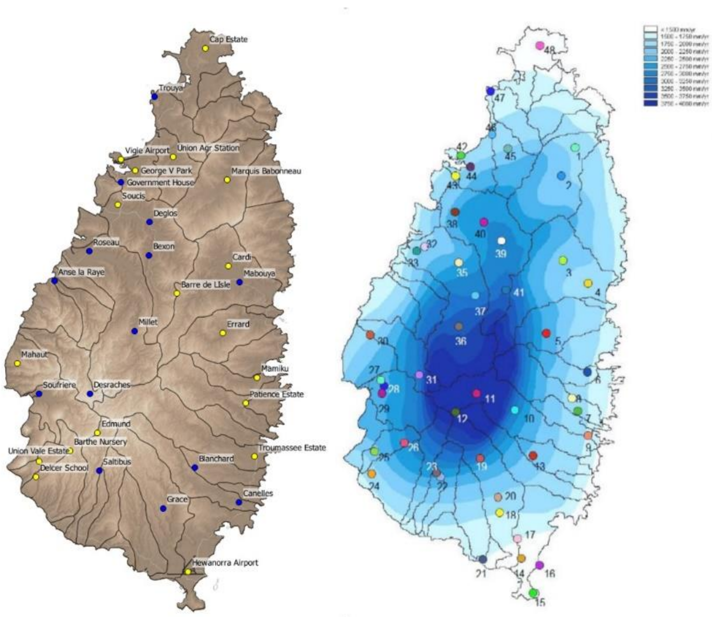

Fig : 1

Technique of rainfall data analysis:

The agriculture data and finding optimal parameters to maximize the crop production techniques like PAM, COARA, wing data mining tochaiques like DBS CAN and Multiple Regression.

The large amount of existing Minning the large amount and analysing coop soil and climatic data, and I non - expertmental dala optimizes the production and makes agriculture more resilient an to climatic change.

For statistical analysis **rainfall data from a single series should ideally possess property of homogeneity** - i.e. properties or characteristics of different portion of the data series do not vary significantly. Rainfall data for multiple series at neighbouring stations should ideally possess spatial homogeneity

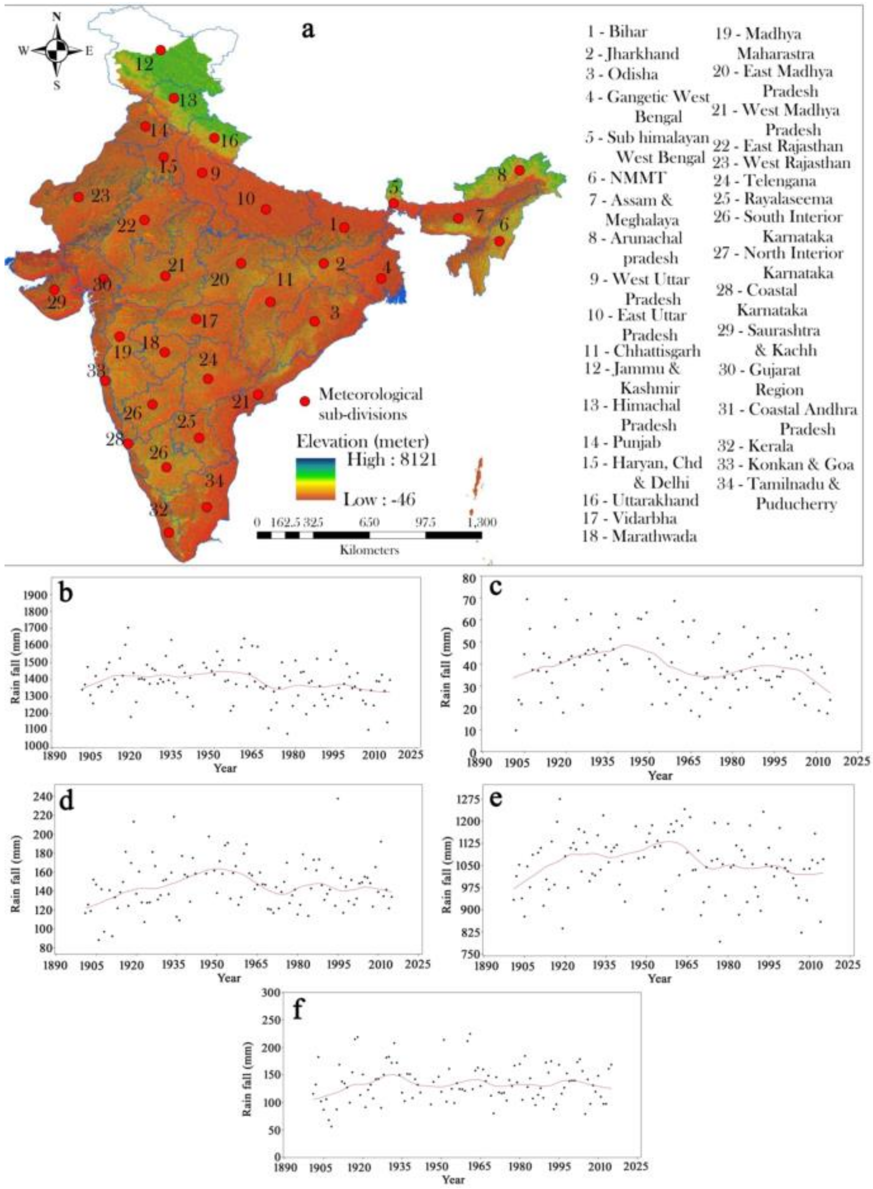

Fig : 2

Advantages :

Analysis of rainfall data is important as it **facilitates policy decisions regarding the cropping pattern, sowing date, construction of roads and providing drinking water to urban and rural areas**

Among other uses, precipitation and other Earth-observing datasets from NASA are used for forecasting tropical cyclones; monitoring soil moisture conditions and freshwater availability; and monitoring flood and drought conditions, landslide activity, crop yields, and water-related illnesses.

The literature shows several methods in identifying rainfall trends. However, **statistical trend analysis using Mann–Kendall equation and graphical trend analysis** are the two widely used and simplest tests in trend analysis.

Local rainfall data can be used for the purpose provided a good dataset with large number of station points are available within the region. Along with rainfall data, geographical location parameters (latitude, longitude, and elevation) need to be taken into account for getting a definite conclusion.

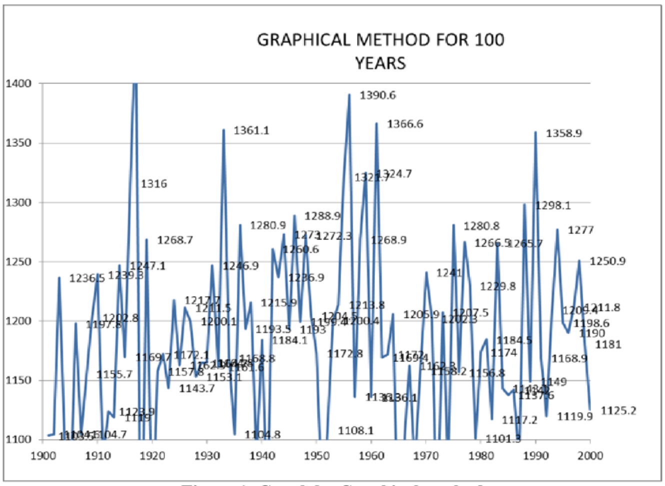

Figure 1: Graph by Graphical method

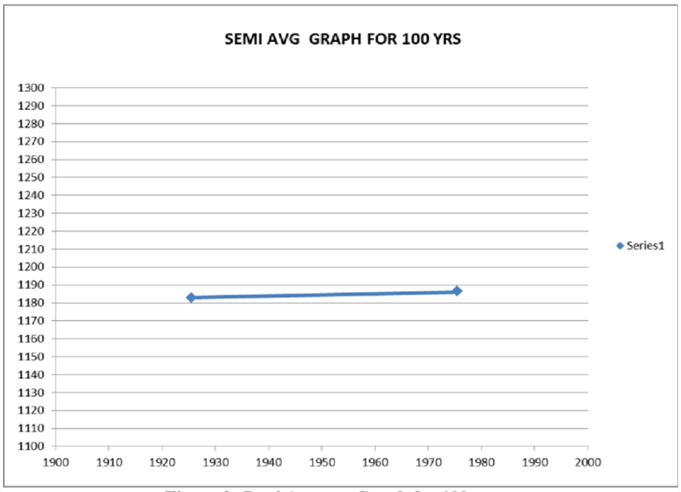

Figure 2: Semi Average Graph for 100 years

Fig : 3

Disadvantages:

Weather radar has the limitation of not being able to detect fog. This creates a gap in weather forecasting where an area that is likely to receive fog is not properly profiled.

This is not known to detect wind independently unless with the use of additional remote sensing. This also creates a gap in weather forecasting.

This has a variety of limitations that makes it lack some of the most important forecasting principles. This means the radar is not entirely reliable in terms of weather forecasting.

There is a huge dataset associated with the weather radar that needs to be analyzed before any decision is made. This data is so big that it may take a considerable amount of time to analyze fully.

The weather is a phenomenon that changes all the time. This means that any delay in data collection may sometimes result in useless data.

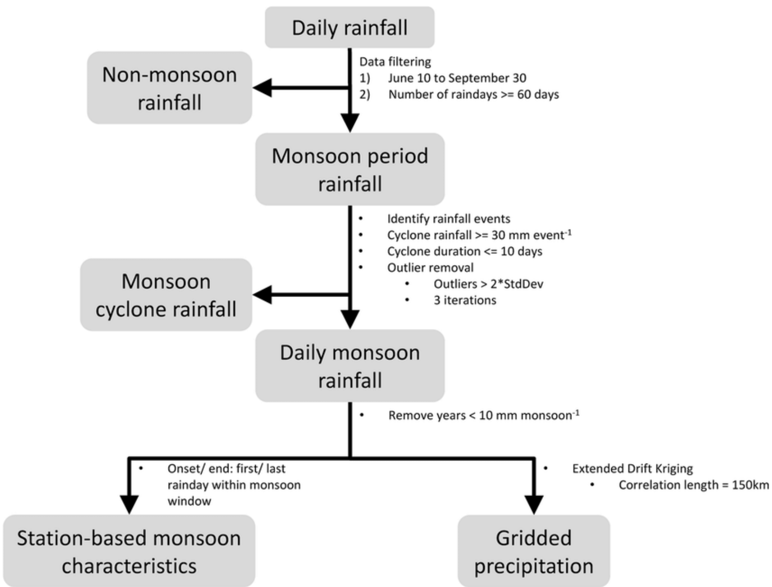

Fig : 4

Conclusions:

The conclusions challenge a popular notion that changing climate—increased drought and desertification—in the East Sahel may have already accelerated the deterioration of its water resources. The analysis here, however, shows that any evidence of a persistent and coherent regional trend of diminishing rainfall is minimal.

Quite the contrary, the evidence demonstrates that the fluctuations of climate and weather patterns over the ensuing decades of the past century—at all temporal scales from days to years to decades—profoundly overwhelm any suggestion of a large-scale, coherent decrease (or increase) in rainfall.

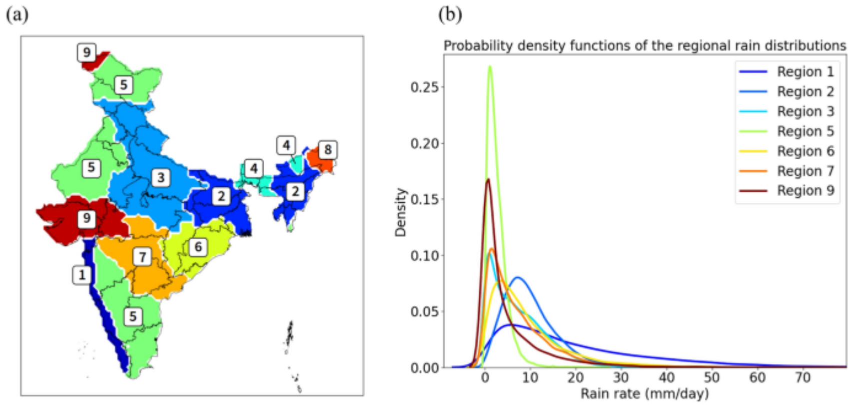

Fig : 5

The implication v John_Hermance@Brown.Edu is that—in terms of naturally induced threats to a community—it is not long-term change, but the highly localized interseasonal, interannual, and multiannual variability of rainfall that poses the greatest and most immediate risk to an agrarian economy struggling to survive in a climate that irregularly vacillates between years of drought and years of flooding

years of drought and years of flooding. The analysis is intentionally straightforward and uncomplicated, so that its results may be readily assessed and applied by the widest community. The statistics are quite basic.

What the data show for the East Sahel is that over the past century, as much as 96 % or more of the variance in annual rainfall totals is associated with interannual to multidecadal quasi-cyclic fluctuations, and any significant trend is lost in the remaining few percent of the overall variance.