

Chapter – 1

Overview of the Project

1.1 Introduction:

The works done under the project entitled "**Determination of the Natural Extrema of Temperature in the Context of Assam**" can be classified into three broad areas. They are

- (1) Formulation of the technique of application of statistical theory in analyzing natural phenomena
- and (2) Analysis of meteorological data.

A picture of the works done in each of these two areas has been presented below. Background and overviews of the works done in this study have been outlined in each of the pictures presented below. Also, the notable findings obtained here have been mentioned in the respective presentations.

1.2 Works Proposed in the Project:

The work, proposed in the project, is an application of the theory of statistics (specially the theory of probability and the theory of statistical inference) in the field of Analysis of Meteorological Data (specifically data on temperature).

Temperature is one of the major factors that determine the weather and the climate of a location. Temperature of a location on the earth surface is a variable, which changes over time. It forms a time series where, usually, the period of the smallest periodic component is a day and the period of the highest periodic component is a year. It may or may not have cyclical component. Of course, the random component always effects upon it.

It is observed that the temperature in a location corresponds, in one year, to one maximum value and one minimum value that ought to be constants if the nature of the

location is not influenced by some unnatural factor/factors. Thus, there is necessity of a study on the natural maximum and of the natural minimum of temperature. In this project, it has been proposed to determine the **natural maximum temperature** and the **natural minimum temperature** corresponding to the locations covering the state of Assam.

Once the values of the natural maximum temperature and the natural minimum temperature in a location are known, it would be possible to know if the temperature of the location has been influenced by some unnatural factor/factors by analyzing the past and present scenario in respect of the temperature of the location. Accordingly, the followings objectives have been proposed in the project:

- (1) To determine the natural maximum and the natural minimum of temperature in the context of Assam.
- (2) To investigate whether the changes in temperature, in Assam, that are occurred is due to some unnatural cause or causes.

The works proposed in the project have been broadly divided into the following stages:

Stage – 1.1 (Collection of Data)

The sources the required data on temperature are

1. The meteorological centres situated at the different places in Assam
2. Indian Meteorological Centre at Pune.

It has been planned to collect the data, required in the study, from these sources.

Stage – 1.2 (Scrutiny and Tabulation of Collected Data)

In the next step, it has been proposed

- (i) to scrutinize the collected data by verifying the existence of outliers/inconsistent data
- and (ii) to convert and tabulate the scrutinized data as per the convenience for the analysis after extracting the outliers/inconsistent data from them if found..

Stage – 1.3 (Analysis of the Scrutinized Data)

After the completion of Stage-2, it has been proposed to analyze the converted and tabulated data in order to achieve the objectives of the study.

It has been proposed to apply the area property of normal distribution, also known as Gaussian distribution {*De Moivre* (1711 , 1718 , 1738 , 1756) , *Gauss Carl* (_____) , *Kendall* and *Stuart* (1977 , 1979) , *Walker* and *Lev* (1965 , 1985) et al}, which was discovered by a German mathematician *Carl Friedrich Gauss* in the year 1809 and also for whose discovery some authors credit to a French mathematician *Abraham De Moivre* who published a paper in 1738 that showed the normal distribution as as approximation to the binomial distribution discovered by *James Bernoulli* { *Bernoulli* (1713) , 1718) , *Chakrabarty* (2005 , 2008) et al} to determine the natural maximum and the natural minimum of temperature at a location.

1.3 Works Done in the Project:

For the purpose of obtaining at the objectives proposed in the project, attempt has been made to collect data on the maximum temperature and on minimum temperature from different locations covering Assam. The locations (called stations in meteorological terminology) covering (as per meteorological coverage) Assam are

1. Dhubri (Meteorological Index No. 42404)
2. Guwahati (Meteorological Index No. 42410)
3. Tezpur (Meteorological Index No. 42415)
4. Dibrugarh (Meteorological Index No. 42314)
5. Silchar (Meteorological Index No. 42819)

Though the data for the current period are available at these stations, the past data are not available there but available at the Indian Meteorological Department, Pane. That is why the past data have been collected from that department.

After collecting the data on the maximum temperature and on minimum temperature, these have been examined thoroughly. Then the highest maximum and the lowest minimum have been determined for different years and corresponding to each of the stations. The maximum values and the minimum values which have been obtained have been suitably tabulated for analysis.

**"Report of the Project: Determination of the Natural Extrema of Temperature in the Context of Assam",
by Dr. Dhritikesh Chakrabarty, Associate Professor of Statistics of Handique Girls' College, Guwahati.**

In the next step, the values of the natural maximum and the natural minimum corresponding to each of the stations have been determined by applying the area property of normal distribution.

In the next step, attempt has been made to investigate whether the changes in temperature corresponding to these stations have been occurred due to some unnatural cause or causes.