



## CHANGE IN SEASONALITY INDEX OF RAINFALL IN SANGLI DISTRICT

**M. K. Patil**

Padmabhushan Vasantiaodada Patil Mahavidyalaya, Kavathe Mahankal, Dist : Sangli, India .

**Abstract :** In this paper we consider rainfall data of 32 years (1981-2012) collected over ten stations of Sangli District in Maharashtra State. A seasonality index of a monthly rainfall among the months of the year is computed. We also compute seasonality index for monsoon season and other than monsoon for the available data. In our study it is observed that seasonality index of rainfall in different stations of Sangli district for all months is in the range 0.87 to 1.04. It results in markedly seasonal with a long dry season and most rainfall in less than three months. Most of the rainfall occurs in monsoon period. The seasonality index for monsoon season is computed and is varies from 0.0665 to 0.3529. It results in rainfall spread throughout the year, but with a definite wetter season. Some interesting findings are discussed.

**Key words:** Rainfall regimes, Seasonality index, mean rainfall, coefficient of variation.

### 1. INTRODUCTION

Rainfall seasonality is related to the temporal distribution of rainfall on a monthly basis. Rainfall seasonality can be estimated by the *Walsh and Lawler* (1981) index. The method aims to characterize the distribution of precipitation throughout the year and to classify the climate of an area. For example the climate of an area can be characterized as rather seasonal with a short dry season or marked seasonal with a long dry season, depending on the distribution of rainfall during the year.

The calculation of rainfall seasonality requires climatic data. Therefore, the spatial scale of the index requires regionalization according to the method proposed for the raw climatic data. A period of at least 30 years data is necessary. Data required for the calculation of the rainfall seasonality index are: (a) average monthly rainfall, and (b) average annual rainfall.



**GRT**

## STATISTICAL ANALYSIS OF RAINFALL DATA OF SANGLI DISTRICT

M. K. Patil

Padmabhushan Vasantraodada Patil Mahavidyalaya, Kavathe Mahankal, Dist : Sangli , India .

**Abstract:**-In this paper we report statistical analysis of the rainfall for different stations of Sangli district. We consider rainfall data of 32 years (1981-2012) collected over ten stations of Sangli District in Maharashtra State. Descriptive statistics were obtained for these ten stations for rainy days. It includes average rainfall, median rainfall, maximum rainfall, minimum rainfall, number of rainy days and coefficient of variation of rainfall over these stations. We also study the season wise distribution of rainfall in the study area. Distribution of rainfall in winter season, pre-monsoon, monsoon and post monsoon is studied. The distribution of dry days and rainy days is also studied. Some interesting findings are discussed.

**Keywords:**Rainy days, Dry days, coefficient of variation.

### 1. INTRODUCTION

Rainfall has potential impact on biodiversity and human life. Now-a-days rainfall has become a major issue for research, since the crop pattern is mainly depends upon it. Our study area is Sangli district of Maharashtra state. Sangli district is divided in to ten Tehsils viz. Shirala, Walwa, Miraj, Tasgaon, Kavathe Mahankal, Jath, Khanapur, Atpadi, Kadegaon and Palus. Out of these Kavathe Mahankal, Jath, Khanapur, Atpadi, Kadegaon and Palus and east region of Tasgaon are draught prone areas. There is lot of variation in the rainfall and it results in to variation in the crop pattern also. Since some of the Tehsil of the Sangli district are drought prone, state government initiated some water schemes for the purpose of irrigation. For example Maihshal Scheme, Tembu scheme, Arphal scheme and Wakurde scheme. Some of the schemes are completed and some of the schemes are in progress.

It is in the interest of society to investigate trend in the rainfall in Sangli district. Data recorded by India Meteorological Department Pune, is used. Based on the data exploratory data analysis is carried out.

### 2. DATA AND METHODOLOGY

Day wise rainfall data for 32 years, for the period 1981 to 2012 are collected from India Metrological Department, Pune, recorded at ten stations of Sangli district namely Shirala, Islampur, Kasegaon, Sangli, Miraj, Tasgaon, Jath, Kavathe Mahankal, Palus and Atpadi. The mean rainfall values of all ten stations were considered to represent the rainfall of the district. Table 1 gives the status of availability of daily rainfall data of each station of Sangli station.



## **GRT** PROBABILITY ANALYSIS OF DRY AND WET SPELLS AT SANGLI DISTRICT

M. K. Patil

Padmabhushan Vasantraodada Patil Mahavidyalaya, Kavathe Mahankal, Dist : Sangli , India .

**Abstract:**-The study is carried out for weekly rainfall for the period from 1981 to 2012 at ten stations of Sangli District. Markov chain probability model has been used extensively to determine the long-term frequency behaviour of wet and dry weather spells. The probabilities occurrence of two or more dry/wet weeks preceded by dry/wet weeks has been evaluated. The probabilities of two or more consecutive dry/wet weeks have been worked out. Some interesting findings are discussed.

**Keywords:** Markov chain model, Dry spells, Wet spells, Transitional probability, Initial probability.

### INTRODUCTION

In the present study, the weekly rainfall data from 1981 to 2012 were obtained from India Metrological Department, Pune, recorded at ten stations of Sangli district namely Shirala, Islampur, Kasegaon, Sangli, Miraj, Tasgaon, Jath, Kavathe Mahankal, Palus and Atpadi.

The Sangli District is one of the important district of Maharashtra state. It is situated between the latitudes 16°45' N and 17°33' N and longitudinal of 73°42' East and 74°40' East. Its east-west length is 205 km and north-south breadth is only 96 km. The total area of the district according to 2011 census is about 8572 Sq.km. The climate gets hotter and drier towards the east and humidity goes on increasing towards the west. The maximum temperature is 42° C while the minimum temperature is 14° C.

Transition probability matrix in Markov chain plays an important role in evaluating frequency behaviour of wet and dry weather spells. The Markov chain probability model [Pandharinath (1991)] has been used for drought and wet frequencies during rain periods. Robertson (1982) has used the 30 mm or more rainfall in 10 days duration as the criterion for deciding the spell as wet and less than 30 mm rainfall as a dry spell. Pandharinath (1991) and Das & Senapati (1992) have taken 20 mm or more rainfall in a week as a wet period and less than 20 mm a dry period. In the present study, based on Das and Senapati (1992), it is assumed that the week is wet if it receives 20 mm or more rainfall, otherwise dry.

### 2. DATA AND METHODOLOGY

Day wise rainfall data for 32 years, for the period 1981 to 2012 are collected from India Metrological Department, Pune, recorded at ten stations of Sangli district. Here, based on Das and Senapati (1992), it is assumed that the week is wet if it receives 20 mm or more rainfall, otherwise dry. Table 1 gives the standard meteorological weeks.



## DETECTION OF TREND IN RAINFALL DATA: A CASE STUDY OF SANGLI DISTRICT

M. K. Patil<sup>1</sup> and D. N. Kalange<sup>2</sup>

<sup>1</sup> Associate Professor, Padmabhushan Vasant-raodada Patil Mahavidyalaya, Kavathe-Mahankal, Dist: Sangli

<sup>2</sup> Assistance Professor, Arts, Commerce and Science College, Palus, Dist: Sangli

### ABSTRACT

In the present study, exploratory analysis of rainfall data is performed. This study aims to determine trends in winter, pre-monsoon, monsoon, post-monsoon seasons and annual at nine stations of Sangli district. The data used consists of season wise and station wise rainfall for the period 1981-2012. Non-parametric statistical tools such as *Sen's* estimator of slope and *Mann-Kendall* trend test was used to estimate the magnitude of trend. The post-monsoon time series of rainfall in Jath and Kavathe- Mahankal stations were observed to be statistically significant ( $p < 0.10$ ,  $p < 0.15$ ). The downward trends are observed at the Atpadi and Tasgaon stations, but these trends were statistically insignificant.

**Keywords:** *Rainfall time series, Trend analysis, Mann-Kendall Test, Sen's estimate of slope.*