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Rainfall Trend in Satara District of Maharashtra in India

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Abstract

In this paper the present study disclose the annual rainfall trend in Satara District of Maharashtra State during 2000 to 2022.The rainfall is one of the basic substantial parameter among the climate for the advancement of society is concern and it also determines the scarcity as well as the environmental factors for the particular region. We know that annual rainfall conditions vary from region to region. The average annual rainfall is the Satara district is 473 mm. The downfall of monsoon has had a harmful effect on the district's agriculture sector and a large part of the population relying on agricultural for employment.This studies focus on the Satara district. This article aims to studies related to trends in rainfall Satara district in Maharashtra. There are changes in the results of the studies and a clear and rational picture of rainfall region. In aSatara district study on trend analysis had decreasing trend in annual rainfall.

Keywords: Annual Rainfall, Rainfall Variability, Climate Change, Trend.

Introduction

To meet the various water demands of agriculture, industry,irrigation, hydroelectric powergeneration, and other human activities in district water budget is important factor. More than 70 per cent of the population in India is engaged in agricultural activities. The problem of raising ample food for millions is of crucial importance. Indian economy is completely associated with the monsoon and its prosperity is fully dependent on amount of rainfall receive during monsoon. The success or failure of crops in any year is closely related with the behaviour of the monsoon most of the states of India receive 90 to 95 per cent rain from south-west monsoon. Effective utilization of water resources is of prime importance in order to increase agricultural production. The rainfall variations are largely because of relief variations, contracted conditions, movement of the monsoon through. Rainfall in the greater part of India is uncertain, irregular and unevenly distributed. Rainfall is the huge parameter affecting agriculture activity of man. Rainfall is the powerful single weather element influencing the intensity and location of farming system and the choice of enterprise. Recent studies show that in some part of India the amount of rainfall is constant over last few decades but the duration of rainfall is reduced. Therefore it also becomes critical to store this water or most of its parts go waste in runoff. It also causes hazards like flood conditions arise. In Satara district an average annual rainfall is lot of closeness. The highest rainfall reported in western part of the Satara district in Mahabaleshwar tahsil. The rainfall generally decreases first rapidly and then slowly from the Western Ghats towards the eastern boundary of the Satara district. This attempt has been made 2000 to2022 annual rainfall tabulation and use help of mean, rainfall trend calculation and variation of rainfall in Satara district.

Study Area:

The Satara district is one of the important districts of the Maharashtra state well known for agricultural development. Inaddition, the agricultural and rural based cultural wisdom and closeness of the author, with all these motivated the researcher to undertake the present study.

The Satara district is situated in west part in Maharashtra state. This district consist eleven tahsil with 1,727 villages. The total area is covered with 10,480 sq.km and extending between 170 5' and 180 11' North latitudes and 730 33' to 740 54' East longitudes. According to the census of 2011 Satara district has a population of 3,003,741, nearly equal to the democracy of Albania or the US state of Mississippi. This gives it a positioning of 122nd in India (in association with a total of 640). The district has a population density of 287 occupants per square kilometre (740/sq. Mi). The population growth rate of Satara district was 6.93% over the decade 2001-2011. The climate ranges from the rainiest in the Mahabaleshwar region, which has an average annual all of over 6000 mm to the driest in Man tahsil where the average annual rainfall is about 500 mm.

Objectives:

The present study has been undertaken with following specific objectives.

1. To study the average annual rainfall during the year 2000to 2022.
2. To find out trends of rainfall and coefficient of variations.

Data Base and Methodology:

The current study is based on the rainfall data collected from Indian Metrological Department for 22years. Agricultural Statistical Information State, Socio Economic Review Satara District and Agricultural District Office, The data has been collected from 2000 to 2022. The trend of rainfall is calculated and represent by mean, Standard Deviation, and Coefficient of Variation in percentage of rainfall in Satara District shows the presentation of result chart, graph method is used. For the data analysis following formula has been used.

$$C.V. = \frac{S.D.}{Mean} \times 100$$

Where,

C.V. = Coefficient of variability of Rainfall

S.D. = Standard Deviation of Rainfall

Mean = Mean of Rainfall

Annual Rainfall Distribution:

Rainfall is a key factor, studied by influences the agricultural economy of the locality. It also determines the cropping pattern, performance of various agricultural and cultural habits. The analysis of rainfall for the period 2000 – 2022 tells that the normal annual rainfall over the district varies from 66.86mmto about 762mm. The average rainfall data for the period (2000-2022) are presented in 5230.751,8454.024, 6874.76,4201.96.

Table1

The average annual rainfall for Satara district is 762 mm. It is found that high rainfall recorded in month of July 307.2 mm, Medium rainfall in 224.8mm.

Table 1.1 Average Annual Rainfall in mm – Satara District 2000 to 2022

Year	June	July	August	September
2000	157.8	298.9	211.9	137.8
2001	152.8	331.5	193.9	194.5
2002	286.6	186.1	346.3	106.0
2003	270.4	244.8	173.3	77.0
2004	417.5	202.1	560.9	186.66
2005	421.3	671.5	529.5	363.3
2006	339.5	762.7	586.5	193.8
2007	483.8	464.3	393.3	198.2
2008	212.5	188.0	425.3	264.8
2009	83.8	595.1	212.3	197.9
2010	305.0	408.2	244.1	240
2011	251.4	391.6	315.2	268.3
2012	114.2	271.5	278.2	123.9
2013	236.0	326.9	150.1	230.2
2014	68.9	452.5	319.0	108.6
2015	274.4	100.4	60.4	104.3
2016	124.5	372.8	345.8	135.1
2017	167.8	332.8	127.1	241.3
2018	170.4	401.5	213.4	68.5
2019	163.6	463.4	454.2	251.1
2020	185.6	164.3	405.9	183.0
2021	264.351	439.125	66.86	124.1
2022	78.6	384.0	261.3	203.6
TOTAL	5230.75	8454.02	6874.76	4201.96
MEAN	227.42	367.56	298.90	182.69
S.D.	113.25	161.42	148.70	72.12
C.V.	49.79	43.91	49.75	39.47

It can be easily found that very high rainfall two decade in mean annual rainfall Standard deviation come result 123.87mm.Medium rainfall recorded 148.70mm in the Satara district. Normal rainfall is studied during the year 2000 to 2022.

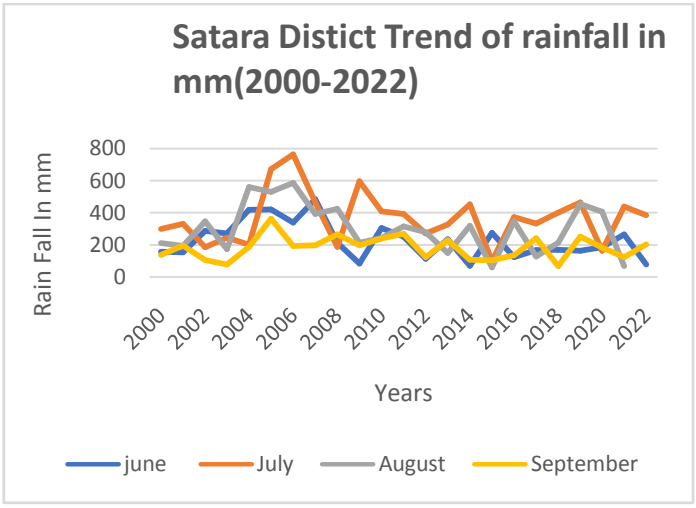

Figure 1: Average Annual Rainfall Trend in Satara District (2000-2022)

The above figure of the trend of rainfall variability is indicated curve trend line and actual line is variation then, it is clear that balanced rainfall in this study region. These results also indicated that for the analysed time period, there was no climate in the region of Satara district.

Conclusion:

The study has represented a detailed breakdown of rainfall variability and trend of rainfall in the Satara district. By using 22 years recoded of rainfall inSatara district. the temporal and spatial variation of rainfall in Satara district. The main recordings of the study are summarized below.

1. Annual rainfall in the Satara district varies from about 123.87mm to about 762.50mm
2. Trend analysis of annual average rainfall indicators shows fluctuations in 22years. During the period of 2002, 2003, 2006, 2007, 2010, 2011, 2015 and 2018 shows decreasing trends in region. In 2000, 2001, 2003, 2004, 2005, 2008, 2009, 2012, 2013, 2014, 2015, 2016, 2017, 2019, 2020, 2021 and 2022 shows pattern of increasing trends in heavy rainfall in part of the study region.

The main focus in this study has been to understand rainfall variability as a basis for improving the understanding of crop to climate relationships in this drought prone region. In a follow up paper, I analyse impacts of rainfall variability of yields of staple crops and investigate the benefits of rainwater harvesting as a livelihood strategy. In conclusion, this study has shown that there are significant intra-regional differences in rainfall amount, variability and trend. In general, rainfall amount is higher and its variability lower, in the western part of the region than in the eastern part. The observed trends in some of the results are thus mainly dependent on local scale climatic controls, rather than large scale climatic forcing. The results also suggest the need for further investigation local anthropogenic intervention in the environment, which could be one of the major causes of climate change in regions.

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