OPEN ACCESS

Annual Rainfall Variability Trend In Solapur District : A Geographical Study (MH)

*Dr. Sikandar M. Mulani and **Mr. Vikas Milind Ubale*

Department of Geography, D. S. Garad Mahavidyalaya, Mohal, Solapur (MH)
**Research Scholar, Department of Geography, D. S. Garad Mahavidyalaya, Mohal, Solapur (MH)*

Abstract :

Rainfall is a prime important factor, considered by influences the agricultural economy of the region. The last few years have seen many fluctuations in the weather in Solapur district. This has had a direct and indirect effect on the cropping pattern and agricultural production of Solapur district. Due to erratic rainfall in the drought prone areas of the district, agriculture is considered as a gamble. Therefore, this topic has been chosen for research. The present research attention on the variability of annual average rainfall trends of Solapur district during the period 2003-2019. Here, calculation 17-year annual rainfall average, S.D. And coefficient of rainfall variability shows by line graph.

Keywords: *Agricultural, Rainfall, Variability, Coefficient.*

Introduction :

Due to the changing climate, the problem of water is also becoming serious. The demand for water is increasing along with agriculture for industry, irrigation, hydropower generation and other daily necessities of human activity. An agrarian country like India with 70% of its population engaged in agribusiness. Indian agriculture is totally dependent on rain water and the south-west monsoon in India is unpredictable. Rainfall varies according to the season of the year. With the exception of Assam, Jammu and Kashmir and the South Peninsula, more than 75% of India's annual rainfall falls during the southwest monsoon season, June to September (P. JAGANNATHAN et. al 1972).

Solapur district is facing constant drought. Because Solapur district is one of the rain shadow area districts in Maharashtra. This area has frequently experiencing erratic movement of monsoon, water scarcity and drought condition, because the trend of rainfall is changed in this area (Dr. V. V. Patil et. al. 2020). Solapur district has been hit the hardest by the worst drought in 2019, with 250 villages and 1,613 hamlets and small villages facing drought. In Solapur, 5, 65,794 people have been affected by the drought (Hindustan Times 2019).

Study Region :

Solapur district is an administrative one of the important district in Pune division of Maharashtra State in India. The geographical extension of Solapur district is 17° 06' 50" N to 18° 33' 29" N latitude and 74° 36'54" E to 76° 24'

OPEN ACCESS

Original Research Article

43" E longitude. Solapur district is the third largest district in the state of Maharashtra with an area of 14895 sq. Km. divided into 11 tehsils and total population of 43, 17,756.as per 2011 census. The annual average rainfall is 678 mm in Solapur district. Climate of Solapur district is dry as daily mean maximum temperature range between 30ºc to37ºc and minimum temperature range between 18ºc to 21ºc with the highest temperature about 45ºc in the month of May.
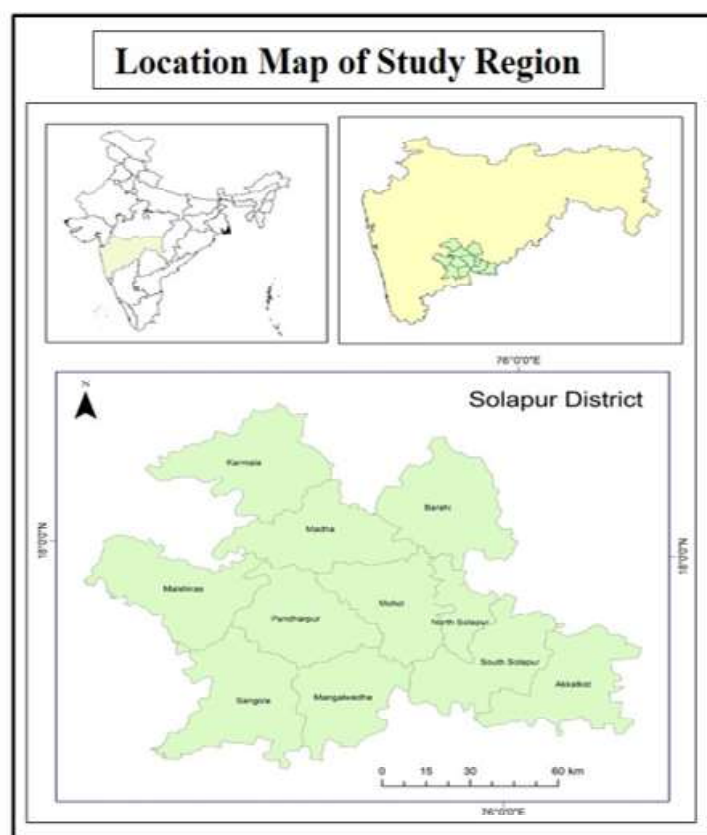
(Fig. No. 1)

Objectives:

The present study has been undertaken with following specific objectives.

1. To study the annual rainfall during the year 2003 to 2019.
2. To find out Standard Deviation and coefficient of variation and shows the line graph.

Data Base and Methodology:

The present study is based on sixteen years of secondary rainfall data, compiled from the Maharashtra Department of Agriculture and the Indian Meteorological Department. The data has been collected from 2003 to 2019.The trend of yearly rainfall is calculated and represent by mean, Standard Deviation and Coefficient of Variability of Rainfall in Solapur district shows the presentation of result Line graph method. For the data analysis following formula has been used.

OPEN ACCESS

Original Research Article

Formula = C.V. = $\dfrac{\text{S.D.}}{\text{Mean}} \times 100$

Where, C.V. = Co-efficient of variability rainfall.

S.D. = Standard Deviation of rainfall.

Mean = Mean of Rainfall

Annual Rainfall Analysis :

In the investigation of drought, rainfall analysis plays the most significant role. Rainfall is generally considered to be an important factor of the agricultural economy in the study Region. Due to uneven rainfall variation determine the cropping pattern, performance of different agricultural and cultural practices. Clear differences in its yearly distribution have led to inequality in agricultural development. Analyzing rainfall from 2003 to 2019, the annual distribution of rainfall varies from year to year, with average range between 251.2 cm in 2015 and 815.9 mm in 2010. In the rest of the year, the average annual rainfall does not fluctuate much so much. The average annual rainfall for the 17 years from 2003 to 2019 is 528.59 mm.

The average annual rainfall much lower found in year 2003, 2015, 2018 it is 278.71, 25 1.18, 257.05 respectively. In this three years Solapur district suffering worst drought. These three droughts affected different Talukas of the district in different years. In 2003, Malshiras, Karmala, Mohal. All the Talukas in the district in 2015. In 2018, Karmala, Mangalweda, Madha and Malshiras Talukas seem to be most affected.

Solapur district was the most affected district in western Maharashtra during the 2018 drought. 250 villages in 11 Talukas and 5, 65,794 people were affected by the drought. Solapur district were getting water supply from 290 tankers. All of this reveals the devastation of famine.

| Tehsil / Years	N. Solapur	S. Solapur	Akkalkot	Barshi	Pandharpur	Mangalweda	Sangola	Malshiras	Madha	Mohal	Karmala	Total	Mean	SD	CV
2003	300.2	300.2	344	338.4	254.6	322.2	377.8	107	308.9	217.6	194.9	3065.8	278.7	25.34	23.87
2004	603.8	603.8	445.7	488.9	532.8	711.4	379	388.5	469	429.5	522.4	5574.8	506.8	46.07	17.20
2005	697.6	697.6	588.6	757.5	519.7	656.4	369.6	324.3	631	538.2	571.3	6351.8	577.4	52.49	18.36
2006	453.1	453.1	551.1	659.6	474.8	623.9	560.6	437.2	487.3	588.1	508.8	5797.6	527.1	47.91	23.94
2007	582.9	582.9	542.4	916.3	605.3	954.7	716.5	651.1	917.4	638	340.2	7447.7	677.1	61.55	21.93
2008	634.3	634.3	424.8	670.3	469.2	529.5	499.3	596.5	600.3	595	715.7	6369.2	579	52.64	17.22
2009	680.9	680.9	567.2	706.9	730.8	736.9	683.6	788.7	632.8	519.1	556.3	7284.1	662.2	60.20	17.70
2010	756.2	756.2	717.2	1030.3	672.1	604.9	615.9	791.2	1118.7	948.8	963.4	8974.9	815.9	74.17	24.80
2011	610.2	610.2	618	505.6	395.8	309	330.1	436.8	389.5	508.6	538.9	5252.7	477.5	43.41	22.02
2012	472.8	472.8	556.3	551.6	361.8	287.5	393.8	350	434.5	318.1	258.7	4457.9	405.3	36.84	28.89
2013	534.7	502.4	601.4	540.1	566.2	437.9	463.5	589.5	591.3	527	510	5864	533.1	48.46	25.10
2014	393.9	387.6	433.3	392.2	371.3	373	492.9	326	340.4	335	384.6	4230.2	384.6	34.96	22.75
2015	272.98	228.17	246.86	238.58	278.33	227.93	272.46	215.29	289.97	230.2	262.26	2763	251.2	22.83	19.15
2016	547.94	534.86	456.67	593.68	375.01	310	448.09	436.7	535.47	318.3	419.62	4976.3	452.4	41.13	22.02
2017	410.68	454.13	379.62	769.47	511.36	446.68	568.43	530.52	613.4	518.9	567.45	5770.7	524.6	47.69	25.23
2018	257.5	273.7	465.1	360.6	235.4	182.4	241.6	209.5	191.9	238.6	171.3	2827.6	257.1	23.37	40.84
2019	628.8	645.8	598.5	589	415.6	560.5	468.4	581.1	509.4	552.7	475.3	6025.1	547.7	49.79	19.57

OPEN ACCESS

Original Research Article

Table No.1: Tehsil wise Annual Rainfall in Solapur District (in mm)
Source: www.agri.mah.nic.in
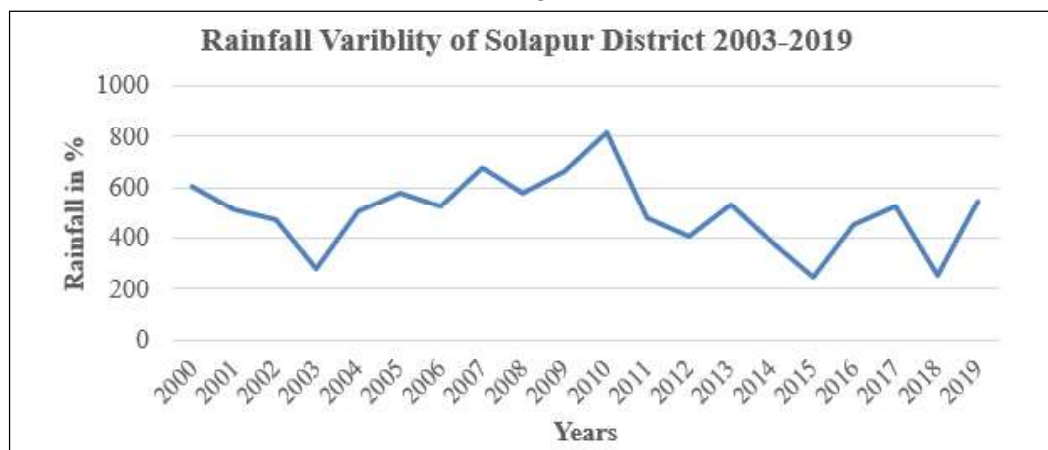
(Fig. no. 2)

In the three years 2007, 2009 and 2010, the rainfall was much better than the average. 2010 was a very good year in terms of rainfall over the last 17 years. The average annual rainfall this year is 815. M.M.
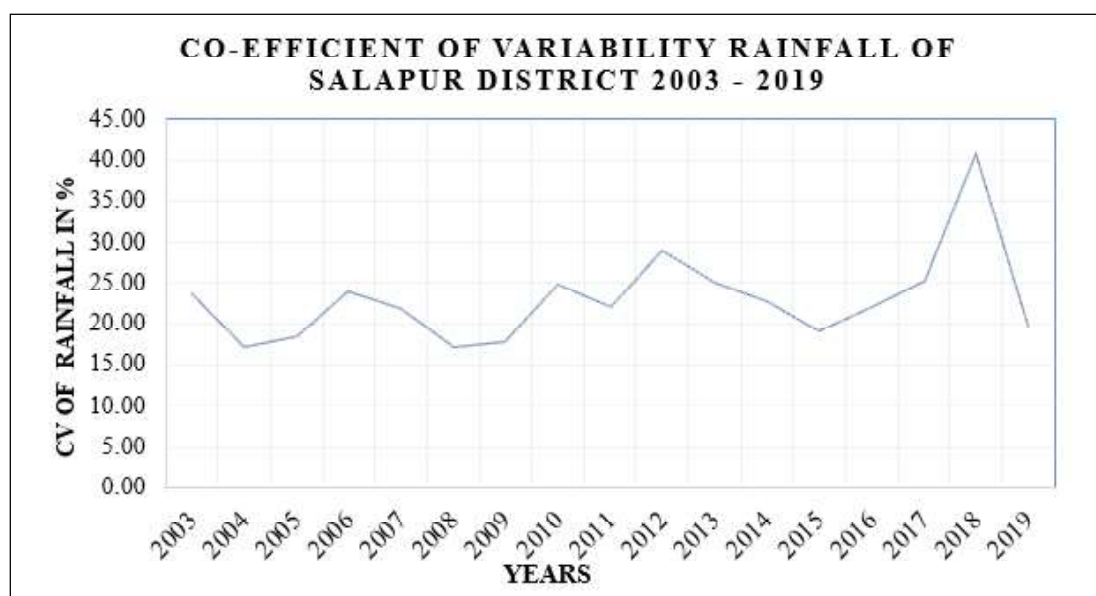
(Fig. no. 3)

Fig. no. 3 express the coefficient of rainfall variability during the period of 2003 to 2019 in study region. There are many fluctuations in the rainfall coefficient in these 17 years. In the present research, variability coefficients are classified as low (below 20%), medium (20 to 30%), and high (more than 30%). It is found that there is frequent low rainfall in years 2003, 2015, and 2018 and coefficient of variability of rainfall is frequent low during the year of 2004, 2005, 2008, 2009, 2015, and 2019. Its coefficient of variability is below 20%.

OPEN ACCESS

Original Research Article

Considering the moderate rainfall variability coefficient, the variability coefficient of 10 years out of 17 years of research data remained between 20 and 30%. The special thing is ,4 years out of 7 years of research data of last decade (2001 to 2010) and in the current decade (with the exception of 2015) Consecutively 8 years 2011 to 2017 Rainfall variability coefficient has been medium (20 to 30%).

Throughout the research, 2018 is the only year in which rainfall decreased (257.05 mm) and the rainfall variability coefficient was very high. It was 40.83%.

Conclusion :

The present research is an attempts to evaluate study the definite annual rainfall variability of 17 years since 2003 to 2019 in Solapur district of Maharashtra. The study region received 678 millimeter annual average rainfall in the study region during this research period. Solapur district has received consistently below average rainfall from 2003 to 2019. In the years 2003, 2015 and 2018, Solapur district has experienced worst water scarcity and drought prone conditions. Solapur district recorded an average annual rainfall of highest 815.9 mm in 2010 and lowest 251.2 mm in 2015. The Solapur district coefficient of rainfall variation is lowest in year 2008 it is 17.22 % and very high in year 2018 it is 40.84 %. The rainfall coefficient of variability Solapur district has consistently lowest in year 2003, 2008 and 2009, at 17.20%, 17.22%, and 17.70%. The coefficient of variability of rainfall has changed significantly in the rest of the year, but in 2018 the coefficient of variability of rainfall has increased drastically to 40.84%. Variability in rainfall have affected crop patterns in Solapur district. The lowest rainfall in the district in 2003, 2015 and 2018 resulted in a significant decline in agricultural production. This created food shortage in some parts of the district. The government provided employment and food grains to the people under the Employment Guarantee Scheme

Referances:

1. Thiruvengadthan (1972): Poona District Rainfall. Indian Journal Metro

2. Soybam H.S. (1990): Rainfall Characteristics of Pune District M. Phil Unpublished dissertation, University of Pune

3. Mankar G. (2008): A study of rainfall characteristics of Satara District Maharashtra State. The Deccan Geographer Vol. 46, No.2 pp. 39- 48

4. Salave Ashok (2009): A study of Assured Rainfall characteristics in Pune District, Maharashtra State. The Deccan Geographer Vol. 46 No.2 pp. 81-88

5. Vibhute N.M., Mr. Agastirishi Bharat Toradmal, (2013), GIS Based Analysis On Rural Electrification (Rajiv Gandhi Gramin Vidyutikaran Yojana) In Maharashtra, "Rajarshi" A Refereed International (Multidisciplinary) Research Journal, ISSN: 2320-5881, Vol-3,Page-96-100

6. Barakade, A.J. Rainfall variability in Solapur district of Maharashtra: a geographical Study, Review of Research Vol.1, Issue. II /Nov; 11pp.1-4.

7. Barakade, A.J. (2014), Rainfall Trend in Drought Prone Region in Eastern Part of Satara District of Maharashtra, India European Academic Research Vol. II, Issue 1/ April 2014

OPEN ACCESS

Original Research Article

8.   Dr. Ramraje Shivajirav Mane-Deshmukh, Mr. Agastirishi Bharat Toradmal, (2019), Rainfall Trend in Drought Prone Region of Ahmednagar District of Maharashtra in India: A Geographical Study, 'Research Journey' International E- Research Journal, ISSN: 2348-7143 Special Issue 133- Agriculture and Rural Development Planning for Drought Prone Areas, Page 78-83.

9.   Dr. Vilas Vasant Patil Mr. Agastirishi Bharat Toradmal (2020), Assessment of Rainfall Variability trend in Solapur District of Maharashtra, AEGAEUM JOURNAL ISSN NO: 0776-3808 Volume 8, Issue 4, 2020