Study of statement on temperature and rainfall of Maharashtra, year 2022

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ABSTRACT

In dry farming areas, rainfall is considered to be an important ecological input to determine the farming types as well as its efficiency. This weather element also describes the surface and sub surface water resources of a region. In view of deterministic influence exerted by rainfall on agriculture especially in dry areas, the present paper attempts to present the rainfall and temperature distribution in Maharashtra. The analysis has been made at rain-gauge station level for the year 2022.

Keywords: *Rainfall, Temperature, SPI*

I. INTRODUCTION

Rainfall is an economic and ecological parameter to agriculture. In any region where agriculture is rain fed, rainfall influences the practices, types, systems and productivity of farming. It is also the dominant single weather element used systematically to assess the surface water resources as well as the drought situation of a region in addition to inflation runoff and recharge. It acts as an important parameter for water balance studies. Therefore, a careful analysis of this parameter is important for water resource planning and crop and land use management. The supply through precipitation has been systematically studied by Indian geographers at regional and basin levels by Bhargava et.al (1964), and Dixit (1979). Sridaram and Ramachandran (1970) and Thimme Gowda (1979) have attempted to the relation between rainfall and cropping pattern.

In the present study an attempt is made to describe the spatial distribution of rainfall, rain intensity, temperature taken for various climatic stations and analysed data during year 2022. Various instruments are used in the observatory to monitor air temperature, air pressure, wind speed, precipitation, humidity, and cloud cover. In 1864, British established the first observatory in India at Shimla.The observatory at Shimla was shifted to Pune in 1918 and established as the main observatory of the country. There are around 350 observatories in India. There are 5 groups of listening observatories. In the first group, air pressure is measured. The second and third groups do not have automatic machines. The fourth group receives the rainfall records and the fifth group sends the records to the head office.

Maximum and minimum thermometers, addition thermometers, temperature recorders, hygrometers, air velocity meters, air pressure meters, barometers, rain gauges etc. are used to record the air. Radar - Radars installed at various locations study

different types of precipitation - rain, hail, snow, etc. with the help of radio waves. The pulse Doppler type radar can record wind speed and direction. Instruments on sea water - instruments attached to floating objects such as helipads on sea water record the behaviour of both water and wind. Some of the man-made satellites orbiting the Earth in space are specially designed for weather monitoring and keep an eye on the changes. Apart from this, special recording planes are launched to study the cyclones by circling them from a safe distance. These planes are a kind of flying weather observatory.

Meteorology is the science that studies the changing behaviour of phenomena such as storms, clouds, rain, lightning, etc., caused by the interaction of air temperature, atmospheric pressure, wind speed and direction. The main task of meteorologists is to observe and study these developments in the atmosphere, accordingly making predictions about the near and far future climate. 23rd. March is celebrated as World Meteorological Day.

II. ABOUT STUDY AREA
Maharashtra is the third largest state (in area) in India after Rajasthan and Madhya Pradesh. It covers an area of 307,713 km^2. Maharashtra has coastline of 720 km. The Arabian Sea makes up Maharashtra's west coast. The State lies between 15°35' N to 22°02' N latitude and 72°36' E to 80°54' E longitude.
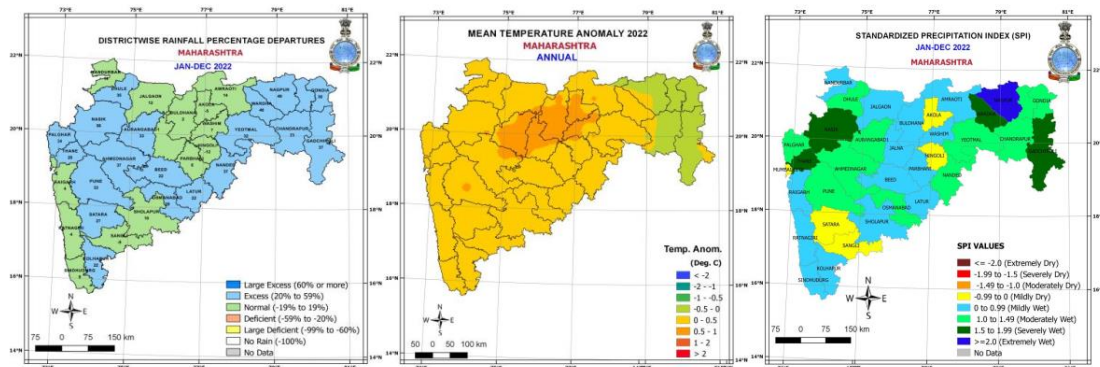

Objectives of the study:
1) To analysis the data of state temperature.
2) To analysis the rainfall statistics and extreme weather during the year 2022.

III. METHODOLOGY
The rainfall and temperature data collecting and calculating from each rain gauge station for all the months i.e. January to December, 2022.
Discussion:
Rainfall Distribution in the region:

In the reference of the above map highlights districtwise rainfall percentage in Maharashtra from January to December,2022. excessive rainfall receives in between   20%-59% at Dhule, Pune, Aurangabad, Ahmednagar, Beed, Latur, Nanded and Yavatmal. Large excessive rainfall means more than 60% receives at Palghar, Thane, Nasik, Bhandara, Chandrapur, Gondia and Gadchiroli. Normal rainfall which is 19% seen at Sindhudurg, Ratnagiri, Raigad, Jalgaon, Buldhana, Hingoli, Amravati, Akola, Nandurbar.

Temperature distribution in the region:
With the data of temperature and their distribution of its mean mean basic temperature Anomaly in between 0 to 0.5 degree. C. at Nandurbar, Dhule, Jalgaon, Nashik, Pune, Thane, Raigad, Ratnagiri, Sindhudurg, East of Ahmednagar, Solapur, Latur, Nanded regions. At Buldhana, Akola, Ahmednagar, Chandrapur, Bhandara, Gondia, and Gadchiroli average temperature anomaly is -1 to -0.5 Degree.C.

SPI (Standardized Precipitation Index):
With the help of SPI values in the period of January to December, 2022 is -0.99 to 0 (mildly dry) at Satara, Sangali, Hingoli, and Akola. SPI valus 0 to 0.99 (mildly wet) at Ratnagiri, Raigad, Sindhudurg, Solapur, Latur, Beed, Jalna, Jalgaon, Buldhana, Parbhani, Wasim, Amravati. SPI values 1.00 to 1.49 (moderately wet) at Palghar, Yavatmal, Chandrapur and Gondia. SPI values1.5 to 1.99 (severely wet) at Gadchiroli, Pune, Nashik, and Amravati.

Maximum temperature anomaly year 2022:
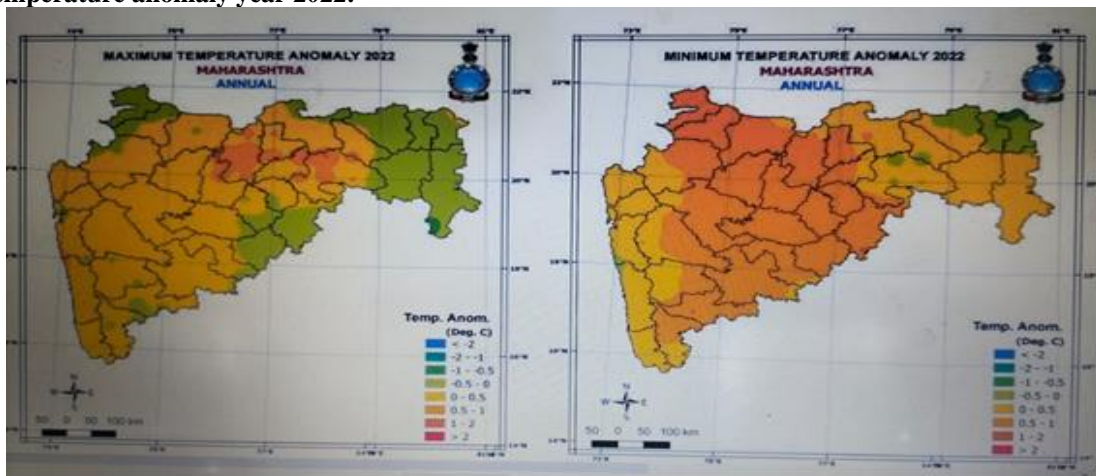
Temperature anomaly I degree.C. 0 to 0.5 degree.C. at Raigad Ratnagiri, Thane, Sindhudurg, Pune, Satara, Solapur, Ahmednagar, Washim. At Nandurbar, Nagpur, Gadchiroli, Gondia, temperature anomaly is -0.5 to 0. Degree.C.Temperature anomaly record 0.5 to 1 degree.C. at Bhadara and Bhuldhana.

Minimum Temperature Anomaly, year 2022
At Mumbai, Palghar, Thane, Ratnagiri, Raigad, Gadchiroli, Nagpur, Bhandara, Sindhudurg, Kolhapur temperature anomaly is 0 to 0.5 degree.C. At NAndurbar, Jalgaon, Ahmednagar, Parbhani, Yavatmal, Wasim temperature anomaly is 0.5 to 1 degree.C.

District wise rainfall percentage, year 2022:
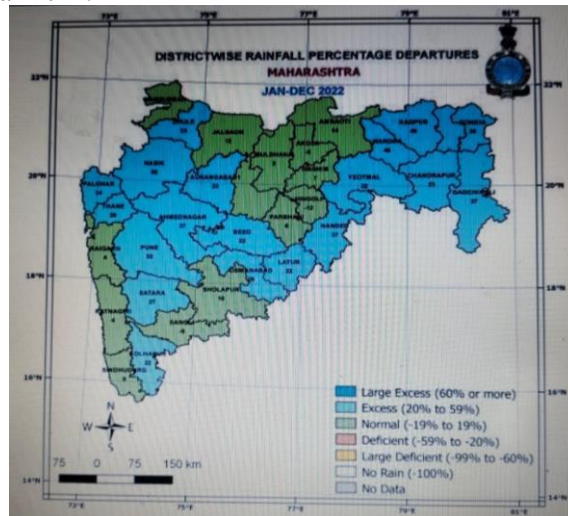
With reference to administrative division of Maharashtra rainfall departures. At Konkan in the month of January to December, 2022 at Palghar (24%) and Thane (28%). in north Maharashtra at Dhule (36%) rainfall. In   Pune division (33%) rainfall

departures. In Marathwada division at Aurangabad (33%) rainfall. In Vidharbha at Nagpur (49%) rainfall departures during January to December,2022. In dominant places are the Pune, Vidharbha, Konkan, and remaning places departure of rainfall intensity is less or Normal.

MONTH/SEASON	ACTUAL (MM)	CATEGORY
JANUARY	9.2	LE
FEBRUARY	0.3	LD
WINTER SEASON	9.5	E
MARCH	1.3	LD
APRIL	3.0	D
MAY	5.3	LD
PRE-MONSOON SEASON	9.6	LD
JUNE	146.1	D
JULY	528.0	LE
AUGUST	279.8	N
SEPTEMBER	265.9	E
MONSOON SEASON	1219.8	E
OCTOBER	132.3	LE
NOVEMBER	0.3	LD
DECEMBER	1.1	LD
POST-MONSOON SEASON	133.7	E
ANNUAL	1372.5	E

Table 1: Monthly, seasonal and annual rainfall statistics

CATEGORY	STATUS OF RAINFALL
LARGE EXCESSIVE(LE)	MORE THAN +60%
EXCESSIVE(E)	+20% TO +59%
NORMAL(N)	-19% TO +19%
DEFICIENT(D)	-59% TO-20%
LARGE DEFICIENT(LD)	-99% TO -60%
NO RAIN(NR)	-100%

Above table contains in Maharashtra large excess (LE) rainfall receive in the month of January, July, October. Large deficient (LD) rainfall receive in the month of February, March, May. Deficiency(D) rainfall receive in April and June. No rain (NR) receive in the month of August, and excessive (E) receives in the month of September and December. Very excess rainfall receives in the month of July.

EXTREMLY HEAVY RAINFALL IN MAHARASHTRA, YEAR 2022

DATE	STATION NAME	RAINFALL (MM)	DATE	STATION NAME	RAINFALL (MM)
21 JUNE,2022	PALGHAR	207.4	14 july,2022	DAHANU	225.7
26 JUNE	SHRIWARDHAN	207.0		JAWHAR	237.7
26 JUNE,2022	LANJA	275.0		PALGHAR	224.0
1 JULY,2022	RATNAGIRI	222.0		TALASARI	275.3
5 JULY,2022	COLABA	227.8		VIKRAMGAD	255.0
	MANGAON	230.0		WADA	242.0
	TALA	245.0		LONAVALA	232.0
	LANJA	342.0		MAHABALESHWAR	294.2
	MANDANGAD	205.0		KARJAT	206.8
5 july	DEVRUKH	210.0	15 july,2022	MATHERAN	354.2
	MALVAN	225.0		JAWHAR	222.0
	VAIBHAVWADI	230.0	7 Aug,2022	LONAVALA	205.2
	GAGANBAVDA	259.0		KANKAVLI	218.0
6 july	DAPOLI	224.0		VAIBHAVWADI	270.0
	MAHABALESHWAR	213.4	8 Aug,2022	MHASLA	213.0
8 july	MATHERAN	210.2		SHRIWARDHAN	245.0
	LANJA	214.0		CHIPLUN	205.0
	IGATPURI	240.0		DAPOLI	220.0
	MULCHERA	205.8		GUHAGAR	205.0
	JAWAHAR	285.0		LANJA	290.0
	MOKHADA	273.2		UMRER	207.2
	TALASARI	260.0	9&10 Aug,2022	TALA	210.0
12 JULY,2022	MAHABALESHWAR	253.0		LANJA	334.0
	AHIRI	209.4		MAHABALESHWAR	215.6
	MATHERAN	217.0		TIRORA	222.9
	KINWAT	210.0		MAHABALESHWAR	225.4
	MATHERAN		15 Aug,2022	AMGAON	222.0
	TALASARO	260.0		SALEKASA	235.9

Table 2: extremely heavy rainfall statics

Above table contains extremely heavy rainfall recorded over some stations of Maharashtra. At the various events i.e. lightning and thunderstorms, floods and heavy rains, heat waves and cold waves this also major extreme events during 2022 which caused loss of human lives in Maharashtra.

IV. CONCLUSION
In this study helpful to the reference of weather parameters like temperature and rainfall which has huge impact on various sectors like Agriculture, Health, Power, water management and many more. The information on severe weather analysis is also presented in this along with statistics which could be one of the important inputs for state for planning purpose, Disaster managements issues and over all the economic sustainability and growth.

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