"Assessment of Meteorological Drought Intensity in Ahmednagar District"

Mr.Vaibhav Chagan Wardule
(Assistant Professor)
Department of Geography
Dada Patil Mahavidylaya, Karjat,
Dist- Ahmednagar. [MS]
E.mail. vcwardule@gmail.com

Mr.Dhananjay Shivaji Kadam
(Assistant Professor)
Department of Geography
Dada Patil Mahavidylaya, Karjat,
Dist- Ahmednagar.[MS]
E.mail. dskadam5005@gmail.com

Abstract:

In India Agriculture are Basic activity and more than 60 percent population engaging in these sector. These are the Prime sector of country. Agricultural activity total depend up on monsoon rainfall. The Indian subcontinent receiving seventy percent rainfall during June to September in these four month monsoon period. A various factor affecting the Monsoon rainfall such as global temperature, wind pressure, ocean current etc. The Monsoon rainfall is highly variable so highly impact on agricultural production. Drought condition occur in India due to monsoon rainfall is bad. The ground water level in monsoon period is crucial when rainfall is low and monsoon rainfall time is short then soil absorb low level of water as well as moisture. In drought period the area has deficiency of water but it depends on yearly rainfall. If onset of monsoon rainfall is good and other month rainfall is less then water deficiency occur that area after onset of monsoon.

Keywords: Meteorological Drought, Rainfall, Deviation index, Drought intensity.

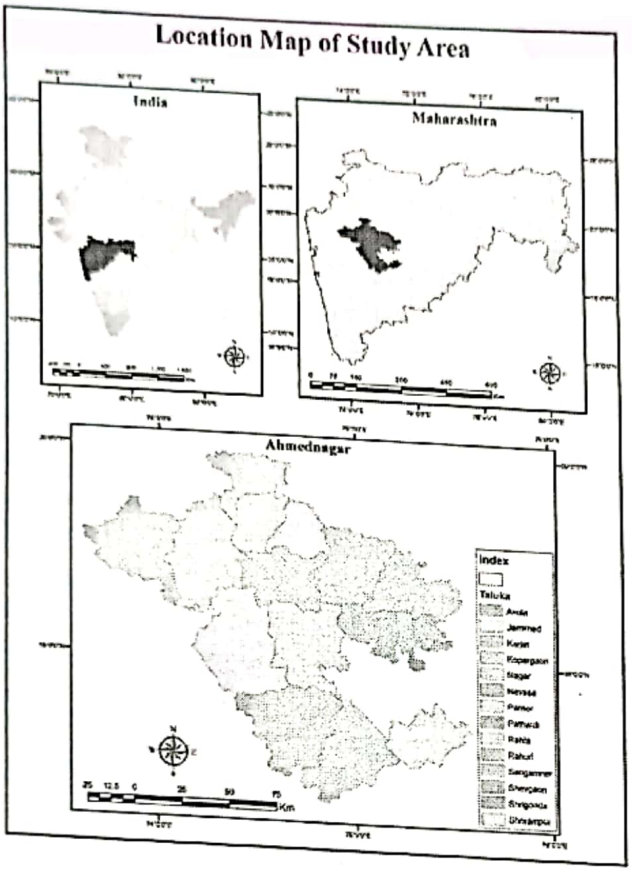
Introduction:-

Drought is meteorological hazards because rainfall is lower than normal. Indian Meteorological department consider meteorological drought when rainfall is less than 25 percent or more average of long term. Indian country two third geographical areas has receiving low rainfall with uneven distribution from place to place that way more cultivated areas suffering drought prone condition. In last four five decade drought frequency and intensity increase because impact of climate change.

The rainfall information is crucial factor to determine strategies and planning for agricultural sector. The Maharashtra State has Suffering drought frequently. The Ahmednagar district comes under western Maharashtra zone which is known as rain shadow zone. The annual average rainfall of Ahmednagar district is 345 mm. Ahmednagar district more area growing sugarcane crop but drought impact on sugarcane production so it effect on district economy. The majority Ahmednagar district farmer taken cash crop in Kharif season and food grains in rabbi season if south west Monsoon rainfall is less then impact on food grain crops. In some tahsil of Ahmednagar district is very poor irrigation facility and rainfed dependable agriculture cultivation .In Many indices of drought used now a day such as, severity index, crop moisture Index Standardized precipitation index. Generally does not any method available which applied for drought prediction.**Study area-**

The geographical area of Ahmednagar is17418 sq. it indicate the larger district of Maharashtra state. Latitude and longitude of Ahmednagar is 18° 2' to 19° 9'N latitude and 73° 9'

to 75° 5' E longitude. Ahmednagar district has 14 tahsil. In the district three type of landform covered which is western hilly region, central plateau and northern and southern plain.



Objective –

The present study has been undertaken with following objectives.

1. To the study metrological condition in Ahmednagar District.
2. To find out drought intensity with the help of Standard Deviation.
3. To understand Rainfall Variation in Ahmednagar District.

Methodology-

The rainfall data has collected from Indian Metrological department of India. These data of Ahmednagar district duration is 35 year from 1981 to 2015. The average annual rainfall 20 to 60 percent indicate Moderate and if average rainfall more than 60 percent Scanty drought area. The Indian metrological department suggested criteria in 1971 which basis on percentage deviation of rainfall from its long term mean and
equation is

$$Di = (pi - \mu / \mu) * 100$$

Where **Di** indicate the percentage deviation from the long term mean,
Pi indicate the annual rainfall, mm and
μ is the long term mean of annual rainfall, mm.

Table. 1 Drought Deficiency Index of IMD (1971)

Drought Index	Drought intensity	Drought intensity code
-19% or above	No drought	M0
-20 to 59%	Moderate drought	M1
-60%	Severe drought	M2

Table 2 Intensity of drought in Ahmednagar district.

YEAR	RAINFALL	LTM	SDI	Code	YEAR	RAINFALL	LTM	SDI	Code
1981	531	520.28	2.060429	M0	1999	409	520.28	-21.3885	M1
1982	444	520.28	-14.6613	M0	2000	490	520.28	-5.81994	M0
1983	679	520.28	30.50665	M1	2001	372	520.28	-28.5	M1
1984	443	520.28	-14.8535	M0	2002	411	520.28	-21.0041	M1
1985	401	520.28	-22.9261	M1	2003	303	520.28	-41.7621	M1
1986	407	520.28	-21.7729	M1	2004	589	520.28	13.20827	M0
1987	553	520.28	6.288921	M0	2005	551	520.28	5.904513	M0
1988	694	520.28	33.38971	M1	2006	736	520.28	41.46229	M1
1989	673	520.28	29.35343	M1	2007	556	520.28	6.865534	M0
1990	697	520.28	33.96633	M1	2008	577	520.28	10.90182	M0
1991	468	520.28	-10.0484	M0	2009	510	520.28	-1.97586	M0
1992	435	520.28	-16.3912	M0	2010	771	520.28	48.18944	M1
1993	583	520.28	12.05505	M0	2011	488	520.28	-6.20435	M0
1994	501	520.28	-3.7057	M0	2012	383	520.28	-26.3858	M1
1995	470	520.28	-9.66403	M0	2013	591	520.28	13.59268	M0
1996	663	520.28	27.43138	M1	2014	382	520.28	-26.578	M1
1997	372	520.28	-28.5	M1	2015	301	520.28	-42.1465	M1
1998	776	520.28	49.15046	M1					

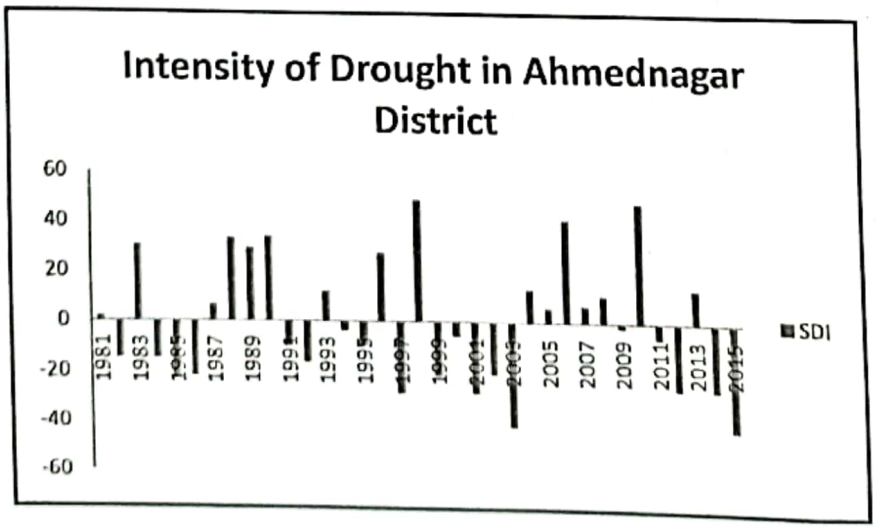
(Source- Indian Meteorological Department)

Whereas

LTM- Long Term Mean,

SDI- Standard deviation

Graph - Drought Intensity analysis of Ahmednagar District, Maharashtra



Result –

Statistical parameters which are mean, long term mean and standard deviation apply to table number two. In Ahmednagar district has received highest rainfall in 1998 it is 776 mm and lowest years in 2015 it are 301 mm. Interpretation of data of 35 year taken for analysis of drought intensity in the area. Here the study area in rainfall variation found. According to deficiency index every year categorized into three category i.e. Drought Deficiency index value is less-19% or above express No drought (M0), -20-59% is moderate drought (M1) and the value is more than- 60% represents severe drought (M2) (Table 1). The table number two show year wise intensity of drought analysis. In this table the intensity of drought was calculated on the based on long term Mean and Standard deviation index of rainfall data. After this analysis all years classified in three categories on the basis of Drought deficiency index of Indian Metrological Department of India. The Ahmednagar districted seventeen year, and eighteen years experienced No drought condition and moderate drought condition found respectively. Especially there was no severe drought found in this duration.

Conclusion-

The interpretation of rainfall data and drought frequency, Ahmednagar district in out of thirty five years data nearly fifty percent moderate drought condition found. Remaining years No drought situation found. In the thirty five year period severe drought is absent in Ahmednagar district. Uneven rainfall distribution seen in varies tahsil in Ahmednagar district.

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