



RAINFALL ANALYSIS USING Z-SCORE TECHNIQUE FOR IDENTIFY CLIMATE CHANGE

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ABSTRACT:

Climate change is crucial issue in the drought prone zone of Maharashtra, any change in climatic parameters mainly in rainfall which negatively affecting the rural economy. In the present study rainfall data of Newasa has been analysed during 1998 to 2019 to investigate the variation in rainfall for identifies the climate change. The Z-score test was applied and result show that 2002, 2003, 2018, 2001, 2005, 2007, 2000, 2012, 2009, 2016 and 1998 (11 years) were recorded low rainy days than normal rainy days (33 days). Whereas, 2019 (22 years), 2003, 2018, 2002, 2007, 2001, 2015, 2011, 2005, 2012, 2014, 2009 and 2013 (12 years) were recorded low rainfall from normal rainfall (540.63mm).

Key words:- climate change, rainfall, rainy day, Z-score

INTRODUCTION:

Climate change is burning issue in whole world, change in climatic parameters mainly in rainfall which negatively affecting the rural economy. Maharashtra has been facing frequently drought in rain shadow zones, the rainfall variability is increasing recently which impacts on water availability therefore, agriculture sector highly damage. Most part of Maharashtra is receives rainfall in south-west monsoon season (June-September) rainfall variation in begging and end of rainy season is playing key role in rainfed agriculture of Maharashtra. Rainfall trend and variability is changing in the rain shadow zone of Ahmednagar district is signifying negative during last two decades (Sasane S. B. 2016a). As well as there is increase in frequency of drought year since last three-four decades due to climate change in Ahmednagar district (Sasane S. B. 2016b). Z-score is also called standard score, commonly used as standardize precipitation of a station by dividing the difference in precipitation from the mean for a specific time period with its standard deviation.

Several researchers used statistical Z-score as Standard Precipitation Index (SPI).

The frequency of scanty rainfall is increasing which rigorously affecting the agriculture production. Hence, it is need to hours to study of climate change for better agriculture planning and to tackle the drought problem. Therefore, present study has been focus on investigating climate change through rainfall analysis using Z-score technique for Newasa.

DATABASE AND METHODOLOGY:

The rainfall data of Newasa was obtained from Agriculture Department, Ahmednagar District. The collected rainfall data was arranged in tabular format and mean and standard deviation was calculated with the applying Excel software. Rainy day and rainfall variation from normal was calculated using Z-Score technique. Rainy day and rainfall variations result represent by charts generated in excel software.

RESULTS AND DISCUSSIONS:

The present study investigates the rainfall change at Newasa during 1998 to 2019 period. The annual rainfall has been analyzed, lowest rainy days 21 was found in 2002 whereas highest rainy day 56 was recorded in 2010. While minimum rainfall 265 mm was recorded in 2003 whereas, the highest 904 mm was recorded 2010. In present study the main objective is to find out the climate change through rainfall variability applying Z-score technique during 1998 to 2019 at Newasa of rain shadow zone of Ahmednagar district. It has been observed that during 1998 to 2019 (22 years) 2002, 2003, 2018, 2001, 2005, 2007, 2000, 2012, 2009, 2016 and 1998 (11 years) were recorded low rainy days than normal (33 days). While 2004, 2011, 2008, 2014, 2006, 2015, 2013, 2017, 1999, 2019 and 2010 years were recorded higher rainy days than normal.

It has been observed that amount of rainfall changing during 1998 to 2019 (22 years), 2003, 2018, 2002, 2007, 2001, 2015, 2011, 2005, 2012, 2014, 2009 and 2013 (12 years) were recorded low rainfall from normal rainfall (540.63mm) while 2004, 2000, 2008, 2016, 1999, 2019, 1998, 2017 and 2010 years recorded highest rainfall than normal. It indicates that rainy days and amount of rainfall are highly changing, hence, for better agriculture planning the study of climate change is needed.

CONCLUSION:

In the present study rainfall data of Newasa has been analysed during 1998 to 2019 to investigate the variation in rainfall for identify the climate change. The Z-score test was applied and result show that 2002, 2003, 2018, 2001, 2005, 2007, 2000, 2012, 2009, 2016 and 1998 (11 years) were recorded low rainy days than normal rainy days (33 days). Whereas, 2019 (22 years), 2003, 2018, 2002, 2007, 2001, 2015, 2011, 2005, 2012, 2014, 2009 and 2013 (12 years) were recorded low rainfall from normal rainfall (540.63mm). The frequency of scanty rainfall is increasing which rigorously affecting the agriculture production. Hence, it is need to hours to study of climate change for better agriculture planning and to tackle the drought problem.

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Table 1: Variations in Rainy Days and Rainfall at Newasa – 1998 to 2019

Years	Rainy Days	Z-Score	Rainfall	Z-Score	Years	Rainy Days	Z-Score	Rainfall	Z-Score
1998	33	-0.04	673.5	0.91	2010	56	2.64	904	2.48
1999	40	0.77	647	0.73	2011	34	0.07	474	-0.45
2000	28	-0.62	569.4	0.20	2012	28	-0.62	502.5	-0.26
2001	26	-0.86	436	-0.71	2013	39	0.66	533.7	-0.05
2002	21	-1.44	344	-1.34	2014	35	0.19	512.6	-0.19
2003	22	-1.32	265	-1.88	2015	37	0.42	457	-0.57
2004	34	0.07	568	0.19	2016	33	-0.04	615.7	0.51
2005	27	-0.74	479	-0.42	2017	39	0.66	786.5	1.68
2006	37	0.42	629	0.60	2018	22	-1.32	331.5	-1.43
2007	27	-0.74	368	-1.18	2019	52	2.17	667.5	0.87
2008	35	0.19	603	0.43	Mean	33.36	--	540.63	--
2009	29	-0.51	527	-0.09	SD	8.59	--	146.67	--

1. (Source: Computed by Researcher)

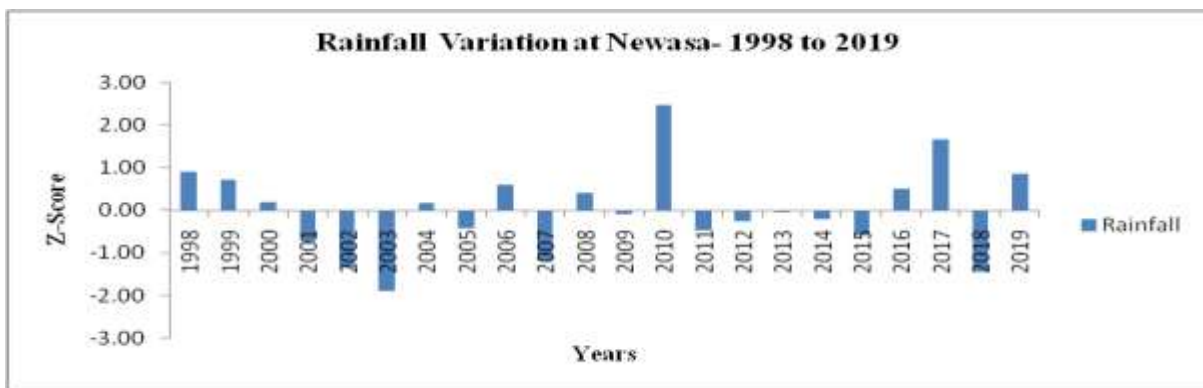
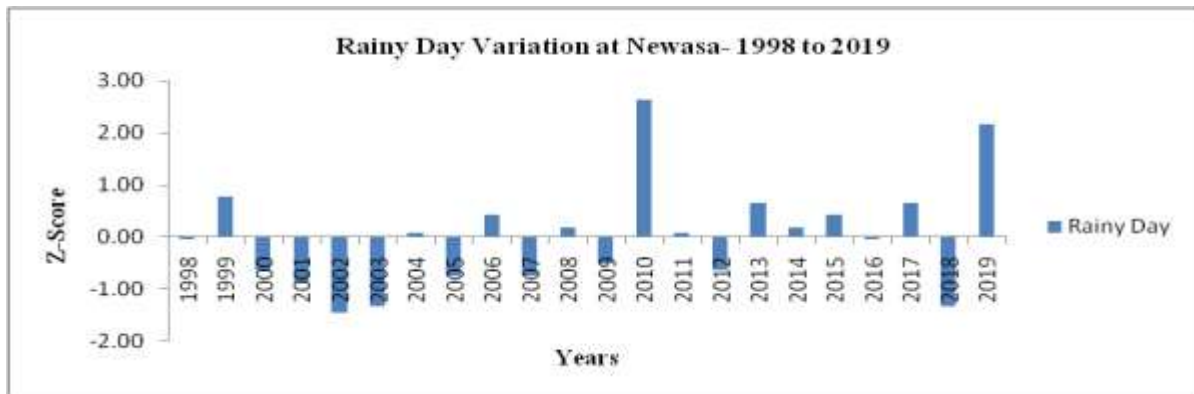


Fig. 1: Variations in Rainy Days and Rainfall at Newasa – 1998 to 2019