

Short Communication

Analysis of rainfall trend of Parbhani, Maharashtra using Mann– Kendall test

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The information the rainfall variability and its trends is an important inputs for the policy makers for agricultural planning, water resource assessment, hazard mapping, flood frequency analysis *etc.* Several studies have been conducted by researchers in order to know the spatial and temporal variability of rainfall. Singh *et al.* (2018) reported trend of rainfall for N-W region comprising Punjab, Haryana, Delhi, Himachal Pradesh and J.K. State of India. Rao *et al.* (2011) reported that there was differences in trends of rainfall computed using grided rainfall and station data in some districts of Andhra Pradesh. Jedhe *et al.* (2018) analysed rainfall trends at different locations of Konkan region of Maharashtra. No such work is reported for Parbhani, hence this study was undertaken.

The rainfall data of 30 year period (1987-2016) collected from All India Coordinated Project on Agrometeorology (AICRPAM), VNMKV, Parbhani was used to analyse the rainfall trends on monthly annual and seasonal basis following Mann-Kendall test (Mann,1945; Kendal,1995) and Sens slope estimation (Sen,1968). The four seasons classified were Pre-monsoon (March-May), monsoon (June-September) and Post-monsoon (October-December), winter (January-February).

The results revealed that the monthly rainfall significant 5 percent rising trends in month of January, February, March, April, July, September, November and December while falling trend was found in May, June, August and October. The Sen’s slope estimate analysis of

Table 1: Mann-Kendall seasonal trend analysis and Sen’s slope estimator of rainfall at Parbhani(1987- 2016)

Month	Average rainfall	Kendall’s tau	S- statistics	P value	Sen’s slope	Trends
Jan	6.7	0.057	21	0.697	0.000	Rising
Feb	4.2	0.100	35	0.492	0.000	Rising
Mar	13.9	0.215	83	0.122	0.000	Rising
Apr	9.8	0.122	51	0.367	0.026	Rising
May	19.2	-0.170	-72	0.202	-0.153	Falling
Jun	156.2	-0.272	-118	0.037	-3.814	Falling
July	236.7	0.067	29	0.617	0.850	Rising
Aug	227.2	-0.203	-88	0.121	-5.164	Falling
Sep	173.1	0.207	90	0.112	4.081	Rising
Oct	84.6	-0.058	-25	0.668	-0.444	Falling
Nov	21.0	0.051	21	0.716	0.000	Rising
Dec	8.6	0.026	8	0.877	0.000	Rising
Pre-monsoon	42.9	0.113	49	0.392	1.000	Rising
Monsoon	793.6	-0.214	-93	0.101	0.279	Falling
Post-monsoon	105.7	-0.030	-13	0.830	-8.000	Falling
Winter	18.6	0.014	6	0.928	0.238	Rising
Annual	960.8	-0.129	-56	0.326	0.000	Falling

monthly rainfall revealed that rising trends were in May, July and September months falling trend was recorded in June, August and October months (Table 1). The Kendall's tau test and Sen's slope indicated the rainfall has falling trend in monsoon, post-monsoon seasons and rising trends in seasons (Table-1). However, most of the trends were non-significant at 5 per cent confidence levels. Among the positive trends, two significant trend was observed at the 5 per cent confidence levels. Annual trends of precipitation obtained by the Mann-Kendall test and the Sen's slope estimator was found to have non significant decreasing trend.

From the analysis, it is concluded that, rainfall during monsoon and post monsoon season has non significant decreasing trend, while in pre monsoon and winter season it has increasing trend but non significant.

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