Shevgaon, Jamkhed and Karjat tahsils. Mann Kendall method, Sen's slope method, moving average method and Least square method showed increasing trend in Kopargaon, Akole, Pathardi, Newasa, Rahata, Sangamner, Parner and Shrirampur tahsils. Moving average method showed decreasing trend for Nagar and Shrigonda tahsils. Least square method didn't exhibit any trend for Karjat tahsil, whereas it showed decreasing trend for Kopargaon tahsil.

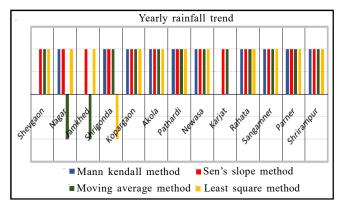


Fig. 6 : Method-wise analysis of annual rainfall trend

Conclusion:

This paper deals with the variability and long-term trends in monthly, seasonal and annual rainfall over Ahmednagar district. It belongs to khandesh and northern maharashtra region. Annual mean precipitation of the study region from 1980-2012 was found to be 499.85 mm. Average seasonal rainfall during *Kharif* season in Ahmednagar district ranges from 413 to 658 mm. July and August months contribute the highest amount of rainfall in all tahsils. The lowest co-efficient of variation (CV) was observed during July followed by August and the highest co-efficient of variation (CV) was observed during October month. Akole, Kopargaon, Nagar, Newasa, Parner, Pathardi, Rahata, Sangamner, Shrigonda, Shrirampur tehsil has increasing trend onannual rainfall while Jamkhed, Karjat and Shevgaon tehsil has no trend.

REFERENCES

Allen, R.G., Pereira, L. S., Raes D. and Smith, M. (1998). Crop evapotranspiration. Guideline for computing crop water requirements. *FAO Irrigation and Drainage, United Nations Food and Agricultural Organization, Rome, Italy,* **56** : 1-15.

Bemal, S., Singh, D. and Singh, S. (2012). Rainfall variability

analysis over Eastern agro- climatic zone of Haryana. J. Agro Meteorology, **14**(1): 88-90.

Choudhury, B. U., Anup, D., Ngachan, S. V., Slong, A., Bordoloi, L. J. and Chowdhury, P. (2012). Trend analysis of long term weather variables in mid-altitude Meghalaya, northeast India. J. Agric. Physics., 12 (1):12-22.

Das, Sevak, Patel, P. H., Chaudhary, M. G. and Desai, A. I. (2018). Variability and trend analysis of rainfall for crop planning and management. *Internat. J. Agric. Sci.*, 10 (6): 5554-5557.

Jain, S.K., Kumar, V. and Saharia, M. (2012). Analysis of rainfall and temperature trends in Northeast India. *International J. Climatol.*, **33**: 968–978.

Kendall, M. G. (1975). *Rank correlation methods*, Charles Griffin, London, United Kingdom.

Mann, H.B. (1945). Non-parametric test against trend. *Econometrical.*, 13: 245-259.

Mann, H.S. and Singh, R.P. (1977). Crop production in Indian arid zone. In: *Desertification and its control*, ICAR Publication, New Delhi, India, pp. 215-224.

Rao, K. and Wani, S. P. (2011). Evapotranspiration paradox at a semi-arid location in India. *J. Agro Meteorology*, **13**(1): 3-8.

Reddy, G.V. S., Bhaskar, S. R., Purohit, R. C. and Chittora, A. K. (2008). Markov chain model probability of dry, wet weeks and statistical analysis of weekly rainfall for agricultural planning at Bangalore, Karnataka. *J. Agric. Sci.*, 21(1): 412-418.

Salmi, T., Maatta, A., Attila, P., Ruoho, A. T. and Amnell, T. (2002). Detecting trends of annual values of atmospheric pollutants by the Mann-Kendall test and Sen's Slope estimates -the excel template application MAKESENS. Finnish meteorological institute publications on air quality No. 31, Helsinki, Finland.

Sen, P. K. (1968). Estimation of regression co-efficient based on Kendall's test. *J.American Statist. Assoc.*, 63:1379-1389.

Upadhyaya, A. (2016). Comparison of different methods to estimate mean daily evapotranspiration from weekly data at Patna, India. *Irrig. & Drain. Syst. Engg.*, **5** (3): 10-16.

Vaidya, V. B., Karande, B. I., Pandey, V., Lunagaria, M. M. and Shekh, A.M. (2008). Rainfall probability analysis for crop planning in Gujarat state. *J. Agro Meteorol.*, **10**(1):183-185.

Vanitha, S. and Ravikumar, V. (2017). Weekly rainfall analysis for crop planning using Markov's chain model for Kumulur. *Internat. J. Agric. Sci.*, 9 (42): 4679-4682.

Venkatesh, H. (1998). Rainfall studies of Bijapur. *A climatic appraisal, Karnataka J. Agric. Sci.*, 11(2): 492-494.

