



## RESEARCH PAPER

# Time series analysis and development of simulation model for monthly rainfall using ARIMA model

P. A. Damor<sup>1</sup>, A. A. Mod<sup>2</sup>, Bhavin Ram\* and H. V. Parmar<sup>1</sup>

Department of Soil and Water Engineering, College of Agricultural Engineering and Technology, Junagadh Agricultural University, Junagadh (Gujarat) India (Email : [bhavinram@aaui.in](mailto:bhavinram@aaui.in))

**Abstract :** Rainfall holds critical significance for water resource applications, particularly in rainfed agricultural systems. This study employs the Autoregressive Integrated Moving Average (ARIMA) technique, a data mining approach commonly used for time series analysis and future forecasting. Given the increasing importance of climate change forecasting in averting unexpected natural hazards such as floods, frost, forest fires, and droughts, accurate weather data forecasting becomes imperative. The objective of this study was to develop a Seasonal Auto-Regressive Integrative Moving Average (SARIMA) model for forecasting monthly rainfall in Junagadh Station, Gujarat. Utilizing 50 years of historical data (1968 to 2016), the SARIMA model predicts weekly rainfall for the subsequent five years (2018 to 2022). Through comprehensive evaluation using ACF and PACF plots, AIC, SBC, MAPE, and MAE values, the study identifies SARIMA (1,0,0)(3,1,1)<sub>12</sub> as the optimal model, offering the most accurate prediction. The robust results affirm that the SARIMA model provides reliable and satisfactory weekly rainfall predictions. This research contributes valuable insights into the precision and efficacy of SARIMA models for rainfall forecasting, aiding in strategic water resource management in the Junagadh region.

**Key Words :** SARIMA, AIC, BIC, MAPE, SIC

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**\*Author for correspondence:**

<sup>1</sup>Junagadh Agricultural University, Junagadh (Gujarat) India (Email:[padamor@jau.in](mailto:padamor@jau.in))

<sup>2</sup>Gujarat Vidyapeeth (Anand Agricultural University), Ahmedabad (Gujarat) India