Time series model for predicting rainfall and temperature in Dar es salaam Tanzania

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Time series models have been used as one of methods of generating the framework of future climate change (Rainfall and Temperature). The aim of this study is to simulate and model the climate variables such as monthly rainfall and temperature. A time series of 53 years rainfall data and 31 years temperature data of Dar es Salaam region in Eastern Tanzania have been used in this study. The data were obtained from Tanzania. Meteorological Agency (TMA) and the analysis relied on Seasonal ARIMA models. Box and Jenkins approach was employed in developing the models. Based on diagnostic tests, stability and reliability SARIMA (2,1,1)(1,1,1)12, SARIMA (1,1,2)(1,1,1)12 and SARIMA (2,0,2)(1,1,1)12 were found to be the appropriate models for monthly rainfall, minimum temperature and maximum temperature in Dar es salaam Tanzania, respectively. After model evaluation and validation, the forecasting was made for the upcoming ten (10) years, for rainfall from 2015 to 2024, and for maximum and minimum temperature from 2016 to 2025. In view of the forecasting, there is slight decrease in the amount of projected rainfall than in recent years. Also by considering temperature, forecasting result reveals an increase in maximum and minimum temperature.The increase in temperature together with decrease in rainfall suggests that climate change could continue to have negative impacts on different economic sectors including tourism in Dar es salaam community and this call for increased adaptive capacity to the community. Higher temperatures have effects on droughts, changing rainfall patterns and availability of surface water whose consequences range from less food supply to general fewer water supplies in Dar es Salaam region.