

MODELING THE INFLUENCE OF LARGE-SCALE CIRCULATION PATTERNS ON PRECIPITATION AND A MULTIVARIATE DROUGHT ANALYSIS FOR MAURITIUS

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ABSTRACT

Mauritius suffers from chronic water shortages that can severely impact its economy and the well-being of its population. For instance, in 1998-1999, the island faced a drought that resulted in a 40% decrease sugar production, and a drop of about MUR 2 billion in GDP. On the social level, the water deficit the country faces, and the resulting reduction in water supply, is a major problem for residents. Water availability in reservoirs and major aquifers are influenced by precipitation regimes, which are affected by large-scale circulation patterns such as the El Niño Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD). In this study we (i) investigate the relationship between both ENSO and IOD and precipitation, (ii) develop an Artificial Neural Network for precipitation prediction based on ENSO and IOD, (iii) develop statistical and time-series models for precipitation forecasting, and (iv) conduct a drought analysis based on multiple precipitation deficit variables (duration, severity and inter-arrival time). Monthly precipitation data for the period between 1961 to 2012 for the Vacoas station are used for the analysis. The findings from this study can help in more efficient planning and management of scarce water resources on the island. [*MRC Grant No.: MRC/RUN/AAP-1210*]