A time-series modelling approach
for understanding the behavior of rainfall patterns
in the Anuradhapura district

B. Yogarajah,

Department of Physical Science,

Faculty of Applied Science,

University of Jaffna,

Vavuniya Campus

Keywords: Climate, rainfall, time-series, uni-variate autoregressive model

Understanding the behavior of the climatic parameters of a geographical area is a prerequisite for any effort towards developing the agriculture sector. Influence of stochastic and seasonal elements driving climatic dynamics pose a challenge to the physical geographer who is trying to build up a model of understanding as such. Of particular concern in these regards is the need to comprehend the rainfall patterns in the dry-zone regions of Sri Lanka, which also happen to be extensive paddy producing regions. This paper focuses on a case study of the Anuradhapura district, and provides a time-series modeling approach to understand the behavior of rainfall patterns for the period of January 1989 till December 2004.

Adopting a singularly focused approach as per the Occam's Razor Test in scientific logic, this paper explains the development of a uni-variate autoregressive model for analyzing the temporal behavior of historical rainfall data, with the ultimate aim of arriving at a methodology for forecasting rainfall trends to aid in agricultural-decision making in the Anuradhapura District. This approach provides the analyst the advantage of treating the system as black box to evaluate the apparent-predominant functional behavior without knowing another inter-connective and circular factors which influence the system.

Key findings indicate that the rainfall patterns in the study area are non auto-regressive, as such - they do not depend on the past history of rainfall; but are predominantly depending on nonlinear trend and a seasonal pattern of order 12. This indicates that in order to arrive at a comprehensive forecasting model for rainfall in Anuradhapura, the need to focus on the influences of non-endemic and regional to global climate phenomena is apparent.