Abstract No: MO-19   **Multidisciplinary Research**

Forecasting monthly household water consumption supplied by NWSD, Sri Lanka

M. L. D. M. Perera[1*] and A. P. Hewaarachchi[2]

[1]Department of Statistics & Computer Science,
Faculty of Science, University of Kelaniya, Sri Lanka
[2]University of Kelaniya, Sri Lanka
dmperera2@gmail.com

Water is an essential element for the survival of mankind and water supply is a pressing issue in this century. Household water use is generally the most important component of water consumption. In Sri Lanka, lack of freshwater has become a serious problem due to factors like population growth, overall expansion in economic activities, increased urbanization and changing climate patterns. Then as a country, managing water resources more efficiently has become a priority. This it is vital to forecast future monthly water consumption of households for planning purposes of further developments of the country.

In this research, we aim to determine a suitable model for monthly household water consumption supplied by National Water Supply & Drainage Board (NWSDB), Sri Lanka in order to forecast future household water consumption. We consider monthly household water consumption data in Sri Lanka for the period from January 2005 to August 2016. The data shows an upward trend which suggests that the series is non-stationary. Also, data displays increasing variability and there's a need to apply data transformation to stabilize the variance. Then, differencing techniques are applied to obtain a stationary series. Using Box-Jenkins methodology *SARIMA* (Seasonal Autoregressive Integrated Moving Average) model is identified as a reasonable model for the data. The result showed among several plausible ARIMA models, ARIMA $(2, 1, 0) (1, 0, 1)_{12}$ model was appropriate for forecasting future values as it has the smallest AIC (Akaike information criterion) value. As a model validation technique, this model is then used to forecast last 5% of observations of data set. The accuracy of forecast error was assessed by mean percent error (MPE), mean absolute squared error (MASE) and mean absolute percent error (MAPE). The measures were 0.488, 0.287 and 2.213 respectively.

As a future work it will be worthwhile to forecast water consumption for different regions. Also, to improve the accuracy of forecasts, models, which incorporate influential factors such as monthly precipitation, number of new connection will be considered.

Keywords: Monthly water consumption, forecasting, SARIMA