

## **Long Term Weather Forecasting for Planning Yala Season Paddy Cultivation in Kurunegala District**

**W.R.S.S. Dharmarathna<sup>1</sup>, S.B. Weerakoon<sup>1</sup>, U.R. Rathnayake<sup>1</sup> and S. Herath<sup>2</sup>**

<sup>1</sup>*Department of Civil Engineering, Faculty of Engineering, University of Peradeniya*

<sup>2</sup>*United Nations University – Institute for Sustainability and Peace, Tokyo, Japan*

Understanding future weather patterns is useful for planning paddy cultivation. The air temperature, as one of the governing forces for the growth of rice plants, would be a crucial factor since it is already reaching the threshold condition. In addition, the erratic patterns of rainfall increase the uncertainty over the water availability for paddy cultivation. Kurunegala district in the Northwestern Province which is one of the major paddy cultivating districts using 25 major irrigation schemes with over thousand small village tanks and diversions based storage irrigation systems was selected for the present study.

In this study, a Statistical Downscaling Model (SDSM 4.2) was used to downscale the General Circulation Models (GCMs) data for forecasting daily rainfall, daily maximum and minimum temperatures. Forty years of observed daily weather data from 1961 to 2000 were collected from the Department of Meteorology, Colombo and used for calibration and verification of SDSM with National Centre of Environmental Prediction (NCEP) reanalysis data. GCM data from the Hadley Centre experiments for the A2 (medium-high emissions) and B2 (medium-low emissions) scenarios projected by the Intergovernmental Panel on Climate Change (IPCC) were used for scenario generations of daily rainfall and daily maximum and minimum temperatures in the district up to year 2099.

The forecasted daily maximum temperature shows increasing trends of 0.049 °C and 0.031 °C per year under A2 and B2 scenarios respectively. The forecasted daily minimum temperature also shows increasing trends under both A2 and B2 scenarios while the rate of increasing is less than that of daily maximum temperature. The future rainfall in Kurunegala district shows an erratic pattern with a slightly increasing trend under the A2 scenario and a constant pattern under the B2 scenario. The cropping calendar could be prepared according to the predicted future weather conditions in order to minimise the risks of damages and losses that can occur due to the adverse impacts of climate change.