Identification of Effect of Climate Change on Cultivation of Lowland Rice in Sri Lanka

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Abstract

Rainfall is the major climatic parameter that affects the Sri Lankan agriculture. In order to improve the water security by maximizing the rainfall usage for paddy cultivation in Sri Lanka, an analysis was carried out using rainfall and evaporation data for the last 33 years (1976-2008) representing different agro-climatic zones. The selected stations are namely Jaffna, Anuradhapura, Ampara, Angunukolapelessa, Lunuwila, Monaragala, Colombo, Ratnapura, Badulla, Matale, Bandarawela and Sitaeliya. Histogram analysis of mean weekly rainfall for four durations was used to find the onset of *yala* and *maha*. Probability plot analysis was done to ensure the accuracy in addition to the standard deviation values. Moreover Hargreaves Moisture Availability Index (MAI) at 75%, 70%, 65%, 60% probability rainfall was used to find the onset for both seasons.

Trends of changes of annual rainfall for all selected stations are not in significant level. Typical bimodal rainfall pattern couldn't be identified clearly in Jaffna and Ampara. Literature reveals that the rainfall onsets for yala and maha seasons are 13th and 40th weeks respectively. Based on histogram analysis and Hargreaves MAI method with different dependable rainfall probability levels, rainfall onset occurred on 13th-14th week for *yala* and 38th–42nd week for *maha*. The results indicated that the duration of rainfall in *yala* is not sufficient to cater the crop water demand for paddy while the rainfall duration in *maha* is adequate in most areas in the country for rain-fed paddy cultivation. There was an evidence of overlapping of *maha* harvest with the onset of *yala* with 40–50% probability for wet zone and below 35% probability for dry and intermediate zones.

Keywords: climate change, Hargreaves MAI and histogram, rainfall duration, rainfall onset