IMPROVING CROP WATER SECURITY THROUGH AGRO-CLIMATIC APPROACH: A CASE STUDY IN ANURADHAPURA DISTRICT

K. Sarawanan, M.H.J.P. Gunarathna and M.K.N. Kumari

Department of Soil and Water Resources Management, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura.

In order to improve water security by maximizing the rainfall usage for paddy farming in Anuradhapura District, an analysis was carried out using daily rainfall data for 40 years (1971 - 2011) at different rain gauge stations, namely Anuradhapura, Mahailluppallama, Nochchiyagama, Kalawewa, Elayapaththuwa, Padaviya and Vavuniya. Pan evaporation data of Vavuniya and Mahailluppallama stations were also used. Hargreaves Moisture Availability Index (MAI) at 75% probability dependable rainfall, Markov chain procedure at 20 mm weekly rainfall at 75% probability level were used to find wet weeks. Probability level was reduced up to 50%, as wet weeks not found at higher probability levels. Three consecutive wet weeks after the dry period was identified as the onset. Based on forward accumulation method, the date, which accumulates 200 mm of rainfall after a dry period was taken as the crop commencement date. The irrigation requirement for different possible establishment weeks (found by the above- mentioned methods and by survey) were estimated using CROPWAT 8.0 software program. Markov Chain method and forward accumulation method recorded the least irrigation requirement. Week which reports the least irrigation requirement was selected as the best crop commencement time for both *Yala* and *Maha* seasons. Results revealed that, mean annual and annual dependable rainfall varies from 980.4 to 1518.4 mm and from 899.5 to 1294.1 mm, respectively. Best crop commencement time and irrigation requirements of paddy were 14th-18th week, 784.6 - 854.0 mm and 40th - 43rd week, 319.9 - 399.5 mm for *Yala* and *Maha* seasons respectively. It could save irrigation water up to 9% in *Yala* season and up to 38% in *Maha* season compared with existing crop commencement time.

Key words: CROPWAT 8.0, Forward accumulation method, Hargreaves MAI, Irrigation requirement, Markov Chain procedure