

## **Simulation of future daily rainfall scenario using stochastic rainfall generator for a rice-growing irrigation scheme in Malaysia**

### **ABSTRACT**

Rainfall is an important component in paddy water demand model for determining daily irrigation requirements. Knowledge of how it is likely to evolve in future is therefore indispensable for paddy farming. This paper presents a quantitative assessment of the possible changes in future rainfall performed by downscaling GCM simulations for the Tanjung Karang irrigation scheme in Malaysia. The stochastic rainfall generator model (WGEN), never applied in Malaysia before, was adopted for downscaling and simulation of future daily rainfall using 16 simulations developed from 10 GCMs driven by the latest Representative Concentration Pathways scenarios (RCPs), 6.0 and 8.5 for two future periods (2030s and 2060s). Change factors were computed from the GCMs using the delta change method which were used in perturbing model parameters for future simulation of rainfall. The results obtained show a wide spread among GCMs, although they all agree in the direction of future rainfall changes. Overall annual rainfall is predicted to increase by 6% and 14% for dry and wet seasons, respectively under RCP6.0 and 8.5 scenarios. Additionally, seasonal effective rainfall projections show a decreasing change of 5% during dry season under RCP6.0, while an increase change of 8 to 13% is predicted in wet season from moderate (RCP6.0) to the most severe (RCP8.5) scenarios respectively. This is an area of concern that farmers and water managers may need to keep alert so as to secure future paddy irrigation water. The projected changes in rainfall regime require further work before concluding whether these changes have negative or positive consequences for the paddy sector. The stochastic model will be adopted as a component in a future study aimed at developing a water management-support tool for modeling water allocations and irrigation schedules in paddy fields.

**Keyword:** Daily rainfall; Rainfall generator; Irrigation demand; GCMs; Paddy