Analysis of Rainfall-Runoff Relation in Paddy Fields by Diffusive Tank Model

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## Abstract

Due to the occurrence of pounding during the period of rice growth, the analyses of rainfall-runoff in paddy fields are different from those in general lands. The diffusive tank model has been successfully applied in rainfall-runoff simulations in paddy fields because it can well describe the features of the local water flow. In most of the applications of this model, although the determination of the related model parameters is important, detailed investigations on each individual parameter are definitely needed to improve the accuracy of the results.

In the study, an improved procedure is proposed to determine certain variables involved in the diffusive tank model and the application is conducted in a field area in Taiwan. In the application, the roughness of the river channel was assessed according to the actual field conditions. Instead of using the observed water levels in each rainfall event, the notch width of the rectangular contracted weir per unit area was evaluated by direct field measurements to calibrate the discharge coefficient. Test results from the selected field in six rainfall events showed that the local average value of the notch width of the rectangular contracted weir per unit area was 1.025 m/ha. Compared to the results of field measurements, the relative errors of the predictions were within 3% in all tests of rainfall events. In addition, for different types of catchment partitions, it was found that the corresponding weir discharge coefficients remained roughly unchanged.

KEY WORDS drainage analysis; diffusive tank model; paddy field

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