

## ABSTRACT

A MICROCOMPUTER-BASED MODEL FOR SURFACE RUNOFF PREDICTION  
FROM SMALL AGRICULTURAL WATERSHEDS IN TRINIDAD

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This thesis deals with the development and evaluation of an event-oriented microcomputer-based model for predicting surface runoff from small agricultural watersheds in Trinidad. This microcomputer model contains three algorithms for determining surface runoff volume, namely, the SCS runoff curve number equation, the Green-Ampt infiltration equation and the Philip two-parameter infiltration equation. For a particular rainfall event the corresponding discharge hydrograph can be generated either through the use of the SCS unit triangular hydrograph which is coupled to the SCS runoff curve number equation or through the use of the single linear reservoir model which can be coupled to either the Green-Ampt or Philip infiltration equations.

The microcomputer model was used to evaluate the SCS curve number model on two small agricultural watersheds in Trinidad. For the first watershed, located in Talparo, the evaluation was carried out using 3 years of rainfall-runoff data collected on the watershed during the rainy seasons of 1987, 1988 and 1989. In the case of the second watershed, located in Lopinot, the

evaluation was carried out using two years of data collected during the rainy seasons of 1988 and 1989. The performance of the SCS runoff curve number model in predicting runoff volume was investigated by varying its parameters and comparing its predictions with the corresponding measured values. Best performance of the model was achieved by adjusting the curve number to reflect antecedent moisture condition III and setting the initial abstraction equal to zero for all events. The failure of the SCS triangular unit hydrograph to predict 2 summary output variables of the discharge hydrograph, namely, peak flow rate and time to peak was investigated by varying its parameters.

The microcomputer model was also used to evaluate both the Green-Ampt and Philip infiltration models in predicting surface runoff volumes using the data collected on both watersheds. Both models gave good overall performance on both watersheds. Moreover, the single linear reservoir model coupled to each of the infiltration equations also performed well in predicting peak flow rates and times to peak on both watersheds.