ABSTRACT
EFFECTS OF RAINFALL AND SOIL MOISTURE INITIALIZATION IN THE DETERMINATION OF WATER YIELD OVER A RESERVOIR

Susan Espinueva
University of the Philippines, 2006

Adviser: Dr. Josefina Argete
Co-Adviser: Dr. Raquel Francisco
Reader: Dr. Amador Argete

A study on the effects of rainfall and soil moisture to compute water yield over the Angat multi-purpose reservoir have been carried out. Simulation experiments were done using the Blockwise Topography Model with Muskingum-Cunge Routing (BTOPMC), a continuous, semi-distributed rainfall runoff model which is based on the continuity equation and Darcy's law. By employing a 250-meter grid scale on the digital elevation model (DEM) of Angat, the BTOPMC was used to explore the effects of antecedent rainfall and soil moisture in the determination of water yield over the Angat reservoir.

The study will also investigate the following: 1) effects of land cover and soil type in the computation of inflow, 2) effects of having no trees in the watershed; 3) seasonal effect of rainfall in the watershed; 3) the potential of the model in forecasting the water yield. The hydrographs generated during the wet (high flow) and dry (low flow) months were likewise investigated in this study. Finally, the versatility of the model in inflow forecasting was tested using three years of independent data series. Results of the different experiments show that the soil parameters classified in terms of lateral transmissivities of the soil texture such as clay, sand and silt and the decay factor of the soil transmissivity are the more sensitive parameters affecting the simulated hydrograph or inflow. Based on the correlation between the observed and simulated inflows, the model performs better during the high flow months than during the dry months. Rainfall along the eastern portions of the watershed increases the inflow of the Angat reservoir by as much as 63% Using a separate series of data and the best fit parameters derived, results show that the BTOPMC model has good potential for application in forecasting the inflow of Angat reservoir.