

Runoff Simulation in the Deduru Oya River Basin, Sri Lanka

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Hydrological modeling is a commonly used tool by water resources planners to simulate the hydrological response in a basin due to precipitation for the purpose of management of basin water. With the increasing demand for limited water resources in every basin, careful management of water resources becomes more important. The Deduru Oya river in Sri Lanka supplies water to number of new and ancient irrigation systems and the management of water resources in the Deduru Oya river basin which has an area of 2620 km² is important for optimum utilization of water for these irrigation systems. This paper describes a case study of continuous rainfall-runoff modeling in the Deduru Oya basin with intra-basin diversions and storage irrigation systems using the Hydrologic Engineering Center – Hydrologic Modeling System (HEC–HMS) version 3.0.1 to estimate runoff in the Deduru Oya river.

Long term daily rainfall data at several rain gauging stations , evaporation, land use and soil data in the river basin, daily river runoff at a stream gauging station, diversions from the river into a storage reservoir, irrigation releases from the reservoir and drainage flow returned to the river from irrigation systems were used to set up the HEC-HMS model. Five-layer soil moisture accounting loss method, Clark unit hydrograph transformation method, and recession base flow method of the HEC-HMS model were used. Temporally varying irrigation water uses, storages and losses in the basin were taken into account in the analysis. The model developed simulates the flow in the Deduru Oya basin satisfactory and it is a useful tool for water management in the Deduru Oya basin.

Key words— Deduru Oya basin, HEC-HMS, Hydrological Modeling, Irrigation