# ESTIMATION OF SPATIAL FLOW PATTERN OF SURFACE WATER USING A GIS BASED MODEL: A CASE STUDY OF DAMBULU OYA SUB CATCHMENT OF KALA OYA BASIN

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Hydrological prediction, when data is available, is relatively easily achieved albeit subject to significant uncertainties. However, the problem of un-gauged basins presents considerable difficulties. Over recent decades, there has been a continual decline in hydrological gauging networks, reducing the accuracy of hydrological predictions whilst increasing the uncertainty associated with predictions and management of water quantity and quality. Most of the developed countries usually use a number of models to estimate hydrological parameters. Soil Water Assessment Tool (SWAT) is a commonly used hydrological model to estimate surface runoff in the sub basin level and SWAT model interface with GIS. Kalaoya river basin is situated in the Western part of Sri Lanka covering four administrative districts. It falls about 76% within dry zone and about 24% in the intermediate zone. It is approximately between latitude $7^0$ 69' N to $8^0$ 42'N and longitude $79^0$ 83' E to $80^0$ 77' E. Basin area is about 2870 sq km. The objective of this study was to apply SWAT to estimate the flow pattern at the major outlet in the Kalaoya sub catchments.

Preparation of basic data in this model needed land use map, digital elevation model (DEM), soil map, stream network and meteorological data. The land use map and the digital elevation model covering the study area were derived with the help of Geographical Information System and digital elevation model was created by using SRTM data. The physical soil properties were found in the literature. According to the availability of stream flow data, finally the model was calibrated using monthly stream flow from 1985-1991 period to Dambulu Oya sub catchments. Manual calibration was done by changing carve number (CN) and groundwater dearly (GW delay) in the model. Carve number changed up to 75 and GW delay (days) changed up to 10. According to this change, final manual calibration shows good result. Arrangement between observed and simulated stream flow data under the above changes, model was validated by comparing the observed and simulated stream flow data at the basin out let for the period of 1992-1998 and showed a good arrangement. Therefore, SWAT model can be used to predict surface runoff in Dambulu oya sub catchments in the future.