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# Water resource assessment of a cascade system in the intermediate zone of Sri Lanka for the past fifty two years through hydrological modeling

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Use of hydrological models in water resources management is a new approach to Sri Lanka. Therefore, a study was done with the objectives of evaluating the suitability of the HEC-HMS model for water resources assessment in a cascade system together with a water balance approach under a cascade system in the intermediate zone of Sri Lanka. A cascade system that consists of three village tanks; Hinduwa, Umagawa and Karangamuwa from the Katupotha Divisional Secretariat Division located in $IL_{1a}$ agro-ecological zone was selected. A hydrological model together with a water balance model was applied to simulate water flows along the cascade system and the command areas using long term daily rainfall data, monthly average evaporation data, crop evapotranspiration, seepage, percolation and evaporative losses from the tanks and command areas. Tank water availability on a daily basis for the past fifty two years (1961-2012) was analyzed. The number of days in which the reservoirs are emptied in the *Yala* and *Maha* cropping seasons are relatively higher in the period from 1985-1990 compared with the other periods. Among the three tanks in the cascade system Karangamuwa tank has the lowest number of days on which the reservoir is empty. The crops affected include the sum of totally as well as partially affected percentages of cropping seasons. Percentages of affected *Yala* seasons (59.4%, 48.9%, 42.8%) are much higher than that of the percentages of affected *Maha* seasons (13.3%, 25.8%, 13.0%) in all three command areas of the cascade system. The percentage of affected cropping seasons in the Karangamuwa command area (27.9%) is relatively lower than that of the other two command areas (36.3% and 37.3%). The results of the modelling approach agreed well with the information collected from the farmers. Therefore, this model can reliably be used in the water resource assessment in the studied cascade system.

Keywords: Water resources, modeling, cascade system, intermediate zone

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