

NUTRIENT LOADING TO VICTORIA RESERVOIR VIA HULU GANGA, DRAINING INTENSIVELY LAND USED WATERSHED IN THE KNUCKLES REGION

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Hulu Ganga (river), of which the major catchment is confined to 1500-1800 m amsl in the upper montane forest and grasslands of the Knuckles range of mountains, the second largest mountain massif in Sri Lanka that drains an area of 122 km², of which 37.8 % is under tea plantations. This tributary discharges into Victoria, the deepest hydropower reservoir which has been constructed by damming the Mahaweli, the largest river in the island. A study was conducted to examine the status of micro nutrients in the Hulu Ganga with a view to determining the temporal pattern and annual flux of total inorganic nitrogen and total phosphorous loading into the Victoria reservoir. Some physicochemical characteristics (e.g., temperature, pH, electrical conductivity and alkalinity), phosphorous (dissolved and total) and nitrogen (e.g., nitrite-N, nitrate-N and ammonia-N) contents were determined monthly for ten sampling sites from headwaters to downstream for a period of one year. In addition, data obtained for monthly discharge of Hulu Ganga, rainfall and the land use of the watershed, from relevant government institutions. Slightly acidic Hulu Ganga waters did not show marked rainfall-bound seasonal pattern with respect to day time temperature, pH, alkalinity and electrical conductivity. The concentrations of nitrate-N coincided with two rainfall peaks but the concentrations of nitrite-N and ammonia-N were extremely low and non-seasonal. No apparent patterns were found also for dissolved and total phosphorous content, however, with higher upper limits for total phosphorous. On the contrary, loading of total inorganic nitrogen (TIN) and total-P (TP) were significantly high during the rainy months. The results clearly demonstrate that Hulu River that drains the tea cultivated-watershed transports 23.6 t and 4.2 t of TIN and TP respectively into Victoria reservoir. This contributes 30 and 5 µg l⁻¹ TIN and TP to the reservoir respectively at full supply level. The loading of nutrients into the Victoria reservoir may lead to an outbreak of non-nitrogen fixing cyanobacteria when N:P ratio is high and other environmental conditions are favourable.