

Catchment based water quality evaluation of Pugoda Ela in Gampaha district, Sri Lanka

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Pugoda Ela is one of the main tributaries of Kelani River which is used for water supply to Colombo and Gampaha districts by National Water Supply and Drainage Board (NWSDB) in Sri Lanka. Limited recent studies are available on water quality of the catchment of this import tributary. Therefore Pugoda catchment was selected as the study area and was divided into four sub catchments defined as Sub catchment A, B, C, and D.

Main objectives of the study were to identify the point and non- point sources of pollution and evaluate each source by comparing water quality parameters such as temperature, pH, TDS, conductivity, BOD₅, COD, DO, NO₃-N and total Coliform. Sample collection was carried out twice a month from February to July 2011 to study the water quality including wet and dry period of the 'Yala' season. The only identified point source was South Asia Textile Industry. Agricultural lands and animal husbandry were the major non-point sources of pollution in the area. The study was also planned to investigate the contribution of inorganic fertilizer application of paddy cultivation on the water quality of Pugoda Ela, on sub catchment basis.

BOD₅ values in all sub catchments were significantly different from each other in wet and dry seasons ($P < 0.05$) and ranged from 6.9 ± 0.147 to 10.578 ± 0.513 mg/l in dry season and from 4.778 ± 0.368 to 8.233 ± 0.261 mg/l in wet season. COD values in sub catchment A, B and D were not significantly different from each other in dry season ($P > 0.05$) and catchments ranged from 8.032 ± 0.679 to 9.617 ± 0.346 mg/l in dry season and 8.517 ± 0.679 - 10.000 ± 0.318 mg/l in wet season. COD in sub catchment D was significantly the highest ($P < 0.05$) in both seasons of all sub catchments. NO₃-N concentration values in outlets of sub catchments ranged from 2.863 ± 0.721 to 7.969 ± 0.755 mg/l in dry season and ranged from 4.09 ± 1.160 to 7.514 ± 0.559 mg/l in wet season over the study period. NO₃-N concentration values in catchment A, B and C were not significantly different from each other in dry season ($P > 0.05$) and ranged from 2.863 ± 0.721 to 7.969 ± 0.755 mg/l in dry season and ranged from 4.09 ± 1.160 to 7.514 ± 0.559 mg/l in wet season. NO₃-N concentration values in sub catchment D was significantly highest ($P < 0.05$) in both seasons of all sub catchments. Total Coliform (MPN/ 100ml) values in outlets of sub catchments ranged from 220.8 ± 10.000 to 245.0 ± 17.100 (MPN/ 100ml) in dry season and ranged from 129.2 ± 13.600 to 258.3 ± 45.300 (MPN/ 100ml) in wet season over the study period. Total Coliform (MPN/ 100ml) values in all sub catchments were not

significantly different from each other in dry season over the study period ($P > 0.05$).

The highest amount of urea application 2050 tons per month was observed in sub catchment D where the highest extent of paddy cultivation occurs. The highest average load of total Coliform 450000 (MPN) was found in sub catchment B which had the highest population density. Although average level of COD of point source was high, the other measured water quality parameters were at permissible level of Sri Lankan inland surface water standards established by CEA. It is concluded that according to the CEA standards, Pugoda Ela consisted bathing quality water or with complete treatment it can be used as a source of drinking water.