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Water Quality in Selected Locations of the Kalu Ganga

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Abstract

Out of the 103 rivers in the country Kalu Ganga is one of the main rivers in Sri Lanka with a length of 129 km and a drainage area of 2720 km^2. It has the highest discharge volume with a mean annual discharge volume to sea totaling to 8183 mcm. Kalu Ganga originates from the central hills of mountain Sri Pada situated 2100 m above sea level and falls to the sea in Kalutara.

The purpose of this research is to analyze the current water quality situation of the Kalu Ganga River and its suitability for human consumption purposes (by comparing with the CEA and SLS standards). It is also the purpose of this research to locate the areas where the river is exposed to massive degradation in water quality and identify the main sources of pollution in those areas.

The research study was conducted in the middle and lower reaches of the Kalu Ganga basin. The study was conducted in two phases, the feasibility phase and the detail phase. The water quality of the river was tested using physical, chemical and biological parameters. The water samples from the relevant sampling points were obtained and analyzed in the period between February 2012 and August 2012.

For the feasibility study, 13 sampling locations were selected along the main river and at locations where certain tributaries fall to the main river. The sampling points were in a stretch from Ratnapura to Kalutara with approximate distance of about 6-8 km from each sampling point to another. The sampling points for the feasibility study was selected based on criteria such as regional population, land use pattern along the river basin, water intake points of the NWS&DB and previous studies. The parameters tested in the feasibility study were temperature, turbidity, TDS, E. Conductivity, pH, Chloride, Floride, Nitrate, Nitrite, Sulphate, Total Iron, Total Phosphate, Total hardness, Alkalinity, Heavy Metals, COD, BOD, DO, Total coli form and *E.coli.* The detail study was conducted based on the results of the feasibility study.

Based on the results obtained the temperature of the river had an average value of 24° C and the pH values were within the range allowed in the CEA standard in most of the locations. The DO levels of the water was greater than the standard values while the BOD values in the river was lower than the standard value prescribed by the CEA standards. The COD values were comparatively higher in the river outfall (46.2mg/l) and in the Nathupana bridge (14.4mg/l) due to the industries located in the surrounding area, but the values were within the standard prescribed by the CEA. The river was not polluted much with the presence of heavy metals. The total coliform count was well below the standard level, while the fecal coliform count was above the standard level especially during the high flow period mainly in sampling points near tributaries.

Based on the results obtained from the feasibility study it was decided to concentrate the detail study in the lower reaches of the middle basin and the lower basin of the main river. The sampling points were

located in areas from Horana to Kalutara. When selecting sampling points major effluent discharging industries in the river basin were selected as additional sampling points, to identify the affect of the final effluent on the water quality of the river. In total 11 sampling points were selected for the detail study. In the detail study certain parameters tested in the feasibility study was excluded due to tested results being lower than the minimum allowable levels in the standards. New parameters were included in the detail study based on the industries selected. The newly included parameters were free ammonia, color, sulphides, TOC, oil and grease, surfactants, phenolitic compounds and PAH.

Keywords: Water quality, BOD, COD, industry effluents