

A Preliminary Study on Surface Water Quality Variations in Negombo, Muthurajawela and their Coastal Region

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The coastal region of Negombo consists of the Negombo Lagoon, Muthurawajawela wetland and the coastal belt which highlights complex hydrological dynamics. The Negombo lagoon with brackish water opens into the Indian Ocean at a point close to the Negombo town. It receives water mainly from the Hamilton canal, Dutch canal, Dandugam oya and Ja-Ela. The Hamilton canal which runs in the north-south direction, situated to the left side of the Muthurajawela wetland, connects the southern periphery of the Negombo lagoon and the Kelani estuary. The Dutch canal on the other hand also runs parallel to the Hamilton canal on the right side of the same wetland, connecting the Kelani River and Ja-Ela. The main sources of fresh water to the lagoon are Dandugam Oya and Ja-Ela which discharge at the southern part of the lagoon. This interconnected water system in this area consists of multifaceted hydrological interrelations such as fresh, brackish and saline water. Water in the lagoon is almost still while waters in rivers and canals are flowing. This rare situation is created due to natural as well as man-made causes.

The present research study is conducted to identify the basis of quality variations of surface water in Negombo and Muthurajawela wetland and their parallel coastal region. For this study fifty (50) surface water samples were taken randomly from the periphery of the Negombo lagoon, Hamilton canal, Dutch canal, Dandugam oya and Ja-Ela during the period of January to April 2012. Preliminary study of the variation of water quality, in the study area was identified with respect to Electrical Conductivity (EC) and Temperature of water using a potable electrical conductivity meter. The locations of water sample sites were recorded using a Global Positioning System (GPS) and the collected data were analysed using Geographic Information System and MS Excel software.

The results of the analysis revealed that the surface water in each source is distinctive. EC in microsiemens per centimeter ($\mu\text{S}/\text{cm}$) values of the Negombo lagoon showed substantial variation along its periphery which fluctuated between $55500\mu\text{S}/\text{cm}$ and $14000\mu\text{S}/\text{cm}$. The highest EC values were recorded at the outlet area at its Northern tip. However, the southern part of the lagoon showed comparatively low EC values due to dilution and other geographical facts while south east quarter of the lagoon indicated comparatively higher EC levels. EC values of Hamilton canal varied between $25500\mu\text{S}/\text{cm}$ and $989\mu\text{S}/\text{cm}$ while the highest value $25500\mu\text{S}/\text{cm}$ of EC was recorded close to the Kelani estuary. This is due to the influence of intrusion of sea water through the Kelani River. A gradual decrease in EC with considerable variation could be found up to the third quarter of the Hamilton canal from the Kelani River and then a significant

increase could be seen towards the lagoon. EC of the Dutch canal was around 1903 $\mu\text{S}/\text{cm}$ while it recorded 18200 $\mu\text{S}/\text{cm}$ near the Kelani River. Both Dandugam oya and Ja-Ela recorded comparatively low EC levels. However, close to the lagoon the EC levels were higher than the other readings obtained to the land side of them. EC values fluctuated between 3500 $\mu\text{S}/\text{cm}$ and 4000 $\mu\text{S}/\text{cm}$ in Dandugam oya showing a decreasing trend towards the upper area of the catchment. According to the results obtained the temperature of surface water varied between 25.2°C and 26.8°C in the entire study area.

The results reveal that the values of EC variation in waters in the Negombo lagoon are directly influenced by the water flow from the sea, Hamilton canal, Dutch canal, Dandugam oya and Ja-Ela. On a spatial basis, the south east section of the lagoon revealed higher EC levels. This situation could have been due to factors such as nature of the terrain, geochemistry, climate and the anthropogenic activities. Overall it could be stated that each water source is unique, and that within each water source, as well, spatial variation exists. The results of the study did not reveal any significant variations in relation to the temperature of water in the area.