

**A STUDY ON
ACCUMULATION OF HEAVY METALS IN THE SURFACE
SEDIMENTS OF SELECTED WATER BODIES IN THE GREATER
COLOMBO AREA.**

A. RAJARATNAM



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SRI LANKA.

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Abstract

The Greater Colombo Canal System consists of about 14 small canals and waterbodies which can be demarcated as being south of the Kelani Ganga, west of the Diyawanna Oya, north of Panadura Ganga and east of the Colombo coastline. A number of studies show that Beira Lake, Dematagoda Canal, St. Sebastian Canal, Heen Ela and Wellawatta Canal are highly polluted when compared to other canals (BKH, 1986; NARESA, 1992; Vitharana and Peter, 1992; Ministry of IP&H, 1983). The water quality of the above water bodies has deteriorated over the past three decades due to industrial and commercial activities in the catchment area of the above water bodies (BKH, 1986; NARESA, 1992); Vitharana and Peter, 1992; Ministry of IP&H, 1983).

Although several studies have been carried out by various government organizations, private institutions and several individuals, none of these studies investigate heavy metal accumulation in the sediment.

This study investigated the total and exchangeable concentrations, distribution, correlation and temporal variation of the heavy metals; Cadmium, Chromium, Iron, Lead, Nickel, Zinc and Copper in selected canals viz., Beira Lake, St. Sebastian Canal, Dematagoda Canal, Heen Ela and Wellawatta Canal.

In general, there was no significant correlation between total metal and the exchangeable metal except for cadmium in the Beira Lake and zinc in the Dematagoda Canal. Cadmium in the Beira Lake shows positive significant correlation between total cadmium and exchangeable cadmium and zinc in the Dematagoda Ela shows negative significant correlation between total zinc and the exchangeable zinc.

No significant variation of total metal and the exchangeable metal over the five month period were observed in the study. The study period may have been too short for a significant variation to be seen.

Of the total metal analyzed, the highest concentration of total Cd ($9.58 \pm 0.83 \mu\text{g/g}$ dry wt.) was observed in the Wellawatta Canal, but the highest concentration of the other metals namely Cr ($86.43 \pm 11.78 \mu\text{g/g}$ dry wt.), Fe ($44459.97 \pm 3453.02 \mu\text{g/g}$ dry wt.), Pb ($253.73 \pm 18.88 \mu\text{g/g}$ dry wt.), Ni ($315.51 \pm 50.57 \mu\text{g/g}$ dry wt.), Zn ($1220.88 \pm 156.50 \mu\text{g/g}$ dry wt.) and Cu ($199.45 \pm 6.31 \mu\text{g/g}$ dry wt.) were found in the Dematagoda Canal.

With the exchangeable metals, Cd ($0.25 \pm 0.04 \mu\text{g/g}$ dry wt.) and Fe ($137.91 \pm 6.73 \mu\text{g/g}$ dry wt.) in the Beira Lake, Zn ($11.16 \pm 2.93 \mu\text{g/g}$ dry wt.) in the St. Sebastian Canal, Ni ($5.26 \pm 4.04 \mu\text{g/g}$ dry wt.) and Cu ($7.29 \pm 3.33 \mu\text{g/g}$ dry wt.) in the Dematagoda Canal and Cr ($3.33 \pm 1.15 \mu\text{g/g}$ dry wt.) and Pb ($5.13 \pm 2.79 \mu\text{g/g}$ dry wt.) in the Wellawatta Canal were found in the highest concentrations. Heen Ela did not contain the highest concentration in any of the metal studied.

The high concentration metal in the Dematagoda Canal is most probably due to the discharge of industrial effluent containing heavy metals into the canal. Further the non point sources, particularly from urban runoff, also contribute to a certain extent to heavy metal pollution in the water bodies.

Under the National Environmental Act, waste containing cadmium, lead, zinc and copper are classified as "hazardous waste". Since the above heavy metals are present in the canals studied, due attention should be paid during the dredging of these canals and disposal of its sediment.