

# Prospecting for Unconventional Phosphate Sources in Lake Sediments around Eppawala Phosphate Deposit, Sri Lanka

\*Dushyantha NP, Hemalal PVA, Jayawardena CL, Ratnayake AS and Ratnayake NP

Department of Earth Resources Engineering, University of Moratuwa, Sri Lanka

\*Corresponding author - nimila.dush@gmail.com

## Abstract

Phosphate fertilizer is an important input in agriculture, in the scenario of increasing food demand with the population increase. Global rock phosphate reserves are finite and exhaustible. This leads to the search for unconventional forms of phosphate. In Sri Lankan conditions, this aspect leads to a systematic study of lake sediments for locating secondary phosphate deposition in the area around Eppawala Phosphate Deposit. A total of 41 sediment samples from lake sediments upstream and downstream of the Eppawala Phosphate Deposit was analyzed to determine the respective phosphate content. Average concentrations of  $P_2O_5$ , CaO and  $K_2O$  in downstream lake were respectively 0.80%, 0.44% and 0.25%. In upstream lake sediments, the respective values were 0.45%, 0.26% and 0.12%. Correlation analysis of downstream sediments shows a significant positive correlation ( $r \geq 0.70$ ) between  $P_2O_5$  and CaO. Environmentally hazardous elements such as Cd and As were also analyzed in each sample to assess the impact of the excessive and long term usage of fertilizers in the area. Average concentrations of Cd and As in the downstream lake were 76.2 ppb and 28.8 ppb respectively and in the upstream lakes, the values were 396.8 ppb and 845.2 ppb, respectively. Each sample was analyzed to determine the 2% citric acid solubility. Results show that 29% from available total  $P_2O_5$  in the upstream lake sediments and 44% from available total  $P_2O_5$  from downstream lake sediments were soluble in 2% citric acid. The study reveals that the lake sediments especially in downstream have more soluble phosphate than in the Eppawala Rock Phosphate. This leads to the fact that downstream sediments have relatively higher amount of phosphate which is more soluble than in the Eppawala Rock Phosphate. Therefore, downstream lake sediments can be used as phosphate fertilizer for short term farming. Further studies on agronomic efficiency of downstream sediments are recommended.

**Keywords:** Eppawala Phosphate Deposit (EPD), Lake sediments, Nutrients, Phosphate