

# A Preliminary Evaluation of River Sediment Load: A Case Study of Maha Oya River in the Western Coast of Sri Lanka

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## Abstract

Rivers have a significant role in the coastal sediment budget as the primary sources of natural sediment. Furthermore, it's critical to understand the actual contribution of river sediment load to the littoral beach. Due to the practicality of the measures, the information regarding river measurements is scarce making this difficult. This study focused on the Maha Oya River, which is situated on a severely eroding coastline on Sri Lanka's western coast between Negombo and Chilaw. In this instance, the river sediment load was captured by two streamer-type sediment traps along the upper 2 km streams of the Maha Oya River, but only one of them was recovered. The sediment trap was retrieved for the months of December 2021–February 2022 (recovery 1) and March 2022–October 2022 (recovery 2). During two recovery periods, we concurrently collected forty-four beach samples from the swash zone and berm crest on either side of the Maha Oya River. For recovery periods one and two, the retained sediment weights are 3.7 and 726 grams, respectively. Additionally, the statistical properties of a grain size distribution, skewness, kurtosis, median grain size (D50) and the littoral cutoff diameter (LCD) value were investigated. Average D50 value on the beach was found to be 394  $\mu\text{m}$  of medium sand that was moderately sorted, symmetrical, and mesokurtic, compared to 655  $\mu\text{m}$  of coarse sand that was poorly sorted, fine skewed, and mesokurtic in river sediment. The LCD value on the beach under study was 141  $\mu\text{m}$  indicating that the river sediment below LCD may not have remained on the beach in any significant quantity. The literature states that river sand mining caused the sediment load via the Maha Oya River to decrease from 0.15 mcm/year in 1984 to 0.05 mcm/year in 2001. Our calculations show that in 2022, this number will be further decreased to 0.01 mcm/year. Thus, it is highlighted that there is a major shortage of river sand input into the coast, which may be the cause of the disastrous erosion occurring in the surrounding coastal cells.

*Keywords: Sediment budget; Littoral beach; Sediment trap; erosion; LCD*