

## **Sediment clues in flood mitigation: the key to determining the origin, transport, and degree of heavy metal contamination**

### **ABSTRACT**

This study seeks to identify sediment sources, quantify erosion rates, and assess water quality status via sediment fingerprinting, the Modified Laser Erosion Bridge (MLEB) method, and various pollution indices (PIs), respectively, in the humid tropics (Malaysia). Geochemical elements were used as tracers in sediment fingerprinting. Erosion rates were measured at 3,241 points that encompass high conservation value forests (HCVFs); logged forests (LFs); mature oil palm (MOP); and mature rubber (MR) plantations. Annual erosion rates were 63.26–84.44, 42.38, 43.76–84.40, and 5.92–59.32 t ha<sup>-1</sup> yr<sup>-1</sup> in the HCVF, LF, MOP, and MR, respectively. Via sediment fingerprinting, logging and agricultural plantations were identified as the major contributors of the sediment. PIs also indicated the highest level of pollution in those catchments. This study highlighted three main messages: (i) the feasibility and applicability of the multiproxy sediment fingerprinting approach in identifying disaster-prone areas; (ii) the MLEB as a reliable and accurate method for monitoring erosion rates within forested and cultivated landscapes; and (iii) the adaptation of PIs in providing information regarding the status of river water quality without additional laboratory analyses. The combination of these approaches aids in identifying high-risk and disaster-prone areas for the prioritisation of preventive measures in the tropics.