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PEER-REVIEWED JOURNAL ARTICLES

Biomonitoring of pesticides in agricultural river catchments: a case study from two river catchments in tropical Sri Lanka

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ABSTRACT

Monitoring of pesticide pollution in aquatic systems is a complex process and often constrained by high costs and methodical complexities associated with pesticide measurements in many regions of the world. A trait-based Species at Risk (SPEAR) biomonitoring approach has been conducted to test the responsiveness of the SPEAR_{pesticides} index to pesticide effects in two tropical river catchments in Sri Lanka. The effects of pesticide toxicity ($TU_{(D.magna)}$), water quality parameters, channel quality (CQI), and landuse on SPEAR_{pesticides} index and other biotic indices, i.e., family richness of macroinvertebrates (FR) and %EPT (Ephemeroptera, Plecoptera, and Trichoptera) taxa in streams were tested using stepwise multiple linear regression analysis approaches. The analyses revealed that the SPEAR_{pesticides} index and FR respond favorably to the $TU_{(D.magna)}$ and CQI ($p < 0.05$). % EPT did not significantly respond to any of the measured instream variables. The catchment scale agricultural activities negatively affected the SPEAR_{pesticides} and FR, while riparian forest cover acted to improve both indices. The findings of the study suggest the possibility of using SPEAR_{pesticides} for pesticide impacts assessment in tropical regions.

About the Journal

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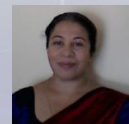
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BOOK CHAPTERS

Modeling soil erosion: Samanalawewa watershed, Sri Lanka

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SUMMARY

Soil erosion is a natural phenomenon that occurs on all types of terrain. It can happen at an alarming rate, resulting in significant topsoil loss. Some elements that can effect soil erosion in watersheds include land use (forest, agricultural, etc.); plant forms (meadow, shrub); climate; geology; topography; physical, chemical, and biological properties of soil. In Sri Lanka, soil erosion has drawn widespread attention since the 1990s, and it has been generally recognized as the most serious environmental problem especially in the upper watershed areas of the central mountain region of the country. Soil erosion is one of the most common causes of land degradation in Samanalawewa watershed in Sri Lanka, resulting in numerous environmental and socioeconomic consequences. The Samanalawewa watershed is particularly important in Sri Lanka because it contains the Samanalawewa reservoir, which is one of the country's most important hydropower generating reservoirs. The Walawe River was dammed at its confluence with a tributary, the Belihuloya, at an elevation of 400 m above sea level (MSL) to form this reservoir. The majority of paddy farmers in the downstream area rely only on this reservoir for irrigation. Samanalawewa hydroelectric scheme is the second largest project which includes a 100 m high rockfill earth core type embankment dam, after Mahaweli power and irrigation development project, one of the largest water resources scheme in the country. Thus, the aim of this study is to evaluate and map the rate of soil erosion of the Samanalawewa watershed (SWW). Twelve subwatersheds (Balangoda, Oluganthota, Imbulpe, Belihuloya, Hirikatuoya, Puwakgahawela, Thanjantenna, Diyawinna, Kuragala, Welioya, Rajawaka, Handagiriya) with 2nd or 3rd order tributaries draining through the Samanalawewa watershed were selected as sampling locations for the study. The study revealed that the current soil erosion of the catchment varies from 0 to 320 t/ha/year with an annual average of 12.51 t/ha/year. Comparison of the results of the current study with the results of the previous studies suggest that the current soil erosion rate in the Samanalawewa watershed has increased significantly in comparison to the rate of soil erosion estimated in 2008 for the same area possibly due to absence of proper soil and water conservation measures at farm level, and also due to frequent heavy rains.

About the Book

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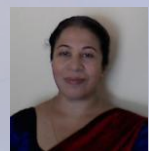




PHOTO STORY

NATURE CAPTURES



Photograph by Dr. Sandun J. Perera, M. I. Biol. (Sri Lanka)
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“Maha Eliya Tenna”, among the largest highland plateaus of Sri Lanka with a habitat mosaic of wet patana grasslands, cloud forests, and dwarf bamboo marshes, also known as the Horton Plains National Park, provides a pristine habitat for the largest deer species found in Sri Lanka, *Rusa unicolor unicolor* the sambar. The female on your right and the sub adult spike male with its velvet single tine antler shown here, makes a part of a twenty-five strong sambar herd one could only see grazing in the Maha Eliya Tenna, as the sambar is a predominant solitary browser elsewhere in the forests of Sri Lanka.



This photo story was published in the BioNews, the newsletter of Institute of Biology Sri Lanka.