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## The effectiveness of riparian zones in mitigating water quality impacts in an agriculturally dominated river system in South Africa

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### Abstract

This study evaluates relationships between contrasting land uses representing an anthropogenic impact gradient in a coastal agricultural catchment, and riparian vegetation, as reflected in changes in nutrient dynamics and water quality. The objectives were to: 1) determine the water and sediment quality emanating from variations in land cover using runoff plots and 2) examine the influence and effectiveness of the riparian vegetation in mediating nutrient fluxes from adjacent pastures. The contrasting land covers generated different runoff volumes, nutrient concentrations and associated loads. The indigenous forest demonstrated the lowest runoff volumes, the highest TN concentrations, but the lowest cumulative TN loads over the study period. Agriculture and alien *Acacia mearnsii* trees had the greatest impact on nutrient loads. The highest nutrient loads were recorded from the pastures (TN: 84.8 g m<sup>-2</sup>; NH<sub>4</sub> +-N: 38.3 g m<sup>-2</sup>) and the alien invaded degraded riparian zone (TN: 100.7 g m<sup>-2</sup>; NH<sub>4</sub> +-N: 55.6 g m<sup>-2</sup>). The nutrient loading was dependent on land cover, land use, rainfall amount and intensity and the associated surface runoff and a decreasing trend in nutrient concentrations was observed from the pastures to the riparian zones and to the river at all sites.