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Assessment of soil nutrients availability across selected land use types in the *Katupotha* tank cascade system, Mihintale, Sri Lanka

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The knowledge regarding the variation in soil nutrient availability across different land use types in dry zone landscapes is essential for evaluating soil fertility and ensuring sustainable land management. This study aimed to assess the current status of available forms of nitrogen and phosphorus, in soils collected from forest, shifting cultivation lands, and paddy fields within the *Katupotha* Tank Cascade System in Mihintale (KTCS), Sri Lanka. A total of 100 surface soil samples (0–15 cm depth) were collected using the stratified random sampling; 16 from shifting cultivation (SC), 54 from paddy (PF), and 30 from forest lands (FL). Soil pH, electrical conductivity (EC), and available macronutrients (nitrate, ammonium, and phosphate) were analysed using standard methods. The results indicated that PF recorded the highest soil pH and EC values (7.40 and 66.88 µS cm^{-1}), followed by FL (6.97 and 37.26 µS cm^{-1}), and SC (6.85 and 32.10 µS cm^{-1}). Ammonium concentrations were the highest in PF (38.90 µg g^{-1}), followed by SC (23.97 µg g^{-1}) and FL (15.51 µg g^{-1}). Conversely, nitrate levels were the greatest in SC (12.56 µg g^{-1}), followed by FL (8.90 µg g^{-1}) and PF (1.92 µg g^{-1}) showing the lowest value. Phosphate content was also high in SC (5.01 µg g^{-1}), while FL and PF exhibited lower concentrations of 2.11 µg $g^{-1}$and 1.79 µg g^{-1}, respectively. These findings highlight the significant influence of land use on the distribution of available macronutrients in soils of KTCS. High ammonium contents in PF reflects its retention under flooded, anaerobic conditions, while higher nitrate and phosphate in SC lands result from increased anthropogenic nutrient inputs and continuous cultivation practices. FL show low nutrients due to limited input and possible losses from steep-slope erosion and leaching. These findings are vital for sustainable soil management practices in the dry zone agroecosystems, as they provide baseline data for developing nutrient management strategies to enhance agricultural sustainability.

Keywords: *Forest lands, paddy fields, selected macronutrients, shifting cultivation, sustainable land management*

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