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Impacts of Organic and Non-organic Paddy Farming Practices on Surface Water Quality in Selected Areas

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Abstract

Paddy (*Oryza sativa* L.) cultivation plays major role in Sri Lanka. Mainly Organic and Non-organic paddy farming methods are conducted. Organic paddy farming method only used organic fertilizers and non-organic paddy farming method used chemical fertilizers which are Urea, Triple Super Phosphates. Therefore, farming practices can be affected to the surface water quality creating various health hazards. The study was conducted from November 2021 to February 2022 (Maha season) to assess the impact of organic and non-organic paddy farming practices on surface water quality in Wallewala, Homagama, and Kottawa paddy agricultural lands by analyzing pH, EC, TDS, DO, BOD, COD, total hardness, nitrate, nitrite, phosphate, sulfate, chloride, potassium, zinc, and chromium. Wallewala is newly created environment sensitive agricultural land in less human influence. Both organic and non-organic paddy lands are in that area. Kottawa paddy lands are cultivated only chemical fertilizers and the Homagama paddy lands are cultivated by organic fertilizers. Randomly, six and nine surface water samples were collected from paddy irrigated systems in Wallewala area represent to organic and non-organic paddy lands respectively. Randomly, five and six surface water samples were collected from paddy irrigated systems in Homagama Organic, and Kottawa non-organic paddy lands respectively. The water from both paddy systems, min pH (5.25 ± 0.04), max EC ($315 \pm 1.00 \mu\text{Scm}^{-1}$), min DO ($6.13 \pm 0.06 \text{mgL}^{-1}$), max BOD₅ ($2.82 \pm 0.06 \text{mgL}^{-1}$), max sulfate (205.76 ppm), max chloride (45.91 ppm), max K (5.63 ppm), and max Zn (0.12 ppm) were found, while the study revealed that all the water quality parameters were not exceeded the reported ambient water quality standards for inland waters in Sri Lanka for irrigation purposes. Further EC, TDS, COD, total hardness, sulfates, chloride, potassium, and zinc were greater in non-organic paddy lands in both Wallewala and Kottawa areas. According to the obtained data, there was no water pollution from the paddy cultivation in respective areas. But these results indicate that water quality parameters vary with the utilized fertilizers.

Keywords: Paddy cultivation, Water quality, Organic paddy farming, Non-organic