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**Effects of paddy cultivation on the water and sediment quality of drainage canals of an anicut scheme, Sri Lanka**

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Paddy cultivation is a major and widespread agricultural practice in Sri Lanka. During the paddy cultivation, the water and sediment quality of nearby waterbodies can significantly change due to irrigation of paddy fields and agronomical practices. This research was conducted in a section of Morena Anicut Scheme, Gampaha, Sri Lanka to assess the changes of water quality, sediment quality and flow aspects of the drainage canals with reference to a selected major irrigation canal during different agronomical practices of Maha cultivation season. Water and sediment samples were collected from four sampling sites from September (2022) to February (2023) selected based on a judgmental sampling method. Different physico-chemical parameters of water samples (temperature, pH, DO, salinity, EC, TDS, TSS, transparency, NO<sub>3</sub><sup>-</sup> and PO<sub>4</sub><sup>3-</sup> concentrations), sediment samples (particle sizes and heavy metal concentrations) and flow aspects (water depth and flow velocity) were analyzed employing standard procedures. Significant spatial and temporal variations of water and sediment quality parameters were observed ( $p < 0.05$ , ANOVA) during the study period. The highest mean pH ( $6.61 \pm 0.50$ ), salinity ( $0.046 \pm 0.004 \text{ ‰}$ ), EC ( $95.21 \pm 6.95 \mu\text{S/cm}$ ), TDS ( $41.67 \pm 3.74 \text{ mg/L}$ ), TSS ( $484.0 \pm 220.0 \text{ mg/L}$ ), water depth ( $73.61 \pm 4.38 \text{ cm}$ ), flow velocity ( $1.96 \pm 1.81 \text{ m/s}$ ), PO<sub>4</sub><sup>3-</sup> concentration ( $1.865 \pm 0.750 \text{ mg/L}$ ), Cd<sup>2+</sup> concentration ( $0.626 \pm 0.293 \text{ ppm}$ ), total Cr concentration ( $5.62 \pm 3.46 \text{ ppm}$ ), Zn<sup>2+</sup> concentration ( $0.130 \pm 0.130 \text{ ppm}$ ) and Ni<sup>2+</sup> concentration ( $0.203 \pm 0.203 \text{ ppm}$ ) were recorded at sampling site 04 (end point of the major drainage canal). In spatial Principal Component Analysis, sampling site 04 was characterized by temperature, pH, salinity, EC, TDS, TSS, transparency, water depth, flow velocity, NO<sub>3</sub><sup>-</sup> and PO<sub>4</sub><sup>3-</sup> concentrations and heavy metal concentrations (Cd<sup>2+</sup>, total Cr, Ni<sup>2+</sup> and Zn<sup>2+</sup>). In Cluster Analysis, sampling site 04 was significantly different from all the other sites based on the water and sediment quality parameters and flow aspects. Therefore, among all sampling sites, site 04 was heavily degraded. In temporal Principal Component Analysis, February (After harvesting paddy) was characterized by temperature, pH, salinity, EC, TDS and TSS and October – 2 (Just after sowing and first major fertilization) and December (After the second major fertilization) were characterized by NO<sub>3</sub><sup>-</sup> and PO<sub>4</sub><sup>3-</sup> concentrations and heavy metal concentrations (Cd<sup>2+</sup>, total Cr, Ni<sup>2+</sup> and Zn<sup>2+</sup>). Therefore, except in September (prior to land preparation), the water and sediment quality were heavily degraded in all other sampling occasions. This study reveals that physico-chemical water and sediment quality parameters and flow aspects of drainage canals in the selected paddy-cultivation area are affected by irrigation and agronomical practices in the paddy fields. Water and sediment quality of the selected major drainage canal and minor drainage canal were degraded when compared to the selected major irrigation canal of the Morena anicut scheme.

**Keywords:** Agronomical practices, Anicut scheme, Drainage canal, Paddy irrigation, Water and sediment quality