

IRRIGATION WATER QUALITY IN MAHAKANADARA WEWA, NUWARA WEWA AND NACHCHADUWA WEWA IN ANURADAPURA

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Mahakanadarawa Wewa, Nuwara Wewa, and Nachchaduwa Wewa are essential reservoirs for residents, farmers, and policymakers in Anuradhapura, Sri Lanka. Hence, this study investigated the impact of human activities, like chemical pollution of water from agricultural waste and seasonal climatic changes on the water quality of the particular reservoirs. Three water samples with three replicates were collected from three different locations in each reservoir. Similar samples were obtained from the two other reservoirs on two occasions in July and October 2024, representing both dry and wet seasons. pH, electrical conductivity (EC), total dissolved solids (TDS), Nitrate-Nitrogen (NO_3^- -N), Ammonium-Nitrogen (NH_4^+ -N), dissolved reactive phosphorus (DRP), alkalinity, and the total concentrations of Sodium (Na^+), Potassium (K^+), Calcium (Ca^{2+}), and Magnesium (Mg^{2+}) were analyzed for all water samples using standard analytical procedures. The concentrations of heavy metals and trace metals (Cd^{2+} , Pb^{2+} , As^{+3} , Cu^{2+} , and Zn^{2+}) as well as the Sodium Adsorption Ratio (SAR) and Sodium Percentage (Na%) were ascertained. The data were analyzed using paired t-test using Minitab software. All water quality parameters were within FAO irrigation guidelines, indicating high suitability for irrigation purposes. The results revealed that pH, EC, TDS, DRP, NH_4^+ -N, NO_3^- -N, Alkalinity, SAR, and Na% were significantly lower ($p < 0.05$) during the dry season than in the wet season. Conversely, total concentrations of Na^+ , K^+ , Ca^{2+} , and Mg^{2+} were significantly lower ($p < 0.05$) in the wet season compared to the dry season. Heavy metal concentrations were relatively lower in the wet season but increased under dry conditions. These findings confirm that seasonal rainfall patterns influence irrigation water quality in the selected reservoirs. However, further research is needed to clarify the impact of land use on irrigation water quality.

Keywords: Chemical characteristics, Irrigation water quality, Land use, Rainfall pattern, Water quality guidelines