

## Comparative Evaluation of the Treated Municipal Wastewater and Water in Boo Ela in Kurunegala Town on Paddy Productivity: A Case Study

U.M.W.H.K. Herath<sup>1</sup>, S. Wijetunga<sup>1\*</sup>, I.R. Gamage<sup>2</sup> and A.G.P.N. Lakmal<sup>2</sup>

<sup>1</sup> Department of Agricultural Engineering, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka

<sup>2</sup> Greater Kurunegala Water Treatment Plant, Ayurvedha Junction, Colombo Road, Kurunegala, Sri Lanka

### Abstract

Kurunegala Sewage Treatment Plant (STP) is treating both grey and black water from the houses, hospitals and the commercial buildings around the city. The treated effluent is releasing to the nearby Boo Ela, after meeting the quality standards of the Central Environmental Authority (CEA). Objectives of this study were (a) to determine the irrigation water quality of treated municipal wastewater and Boo Ela water and (b) the effect of water quality of these water sources on the growth and yield of paddy. Selected irrigation water quality parameters such as pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Chloride, Sodium Adsorption Ratio (SAR) and Nitrate-nitrogen in treated wastewater, Boo Ela (before adding treated wastewater), and mixed water (Boo Ela water + treated wastewater) were determined. Three sources of water namely Boo Ela (BW), treated wastewater (TW) and mixed water (MW) were used for determine of effect on growth and yield of paddy (BG 305) as treatments. The rice experiment was laid out according to the Complete Randomized Block Design (CRBD). Seed germination percentage (%), plant survival percentage (%) (first week), paddy plant height (cm) (5 day intervals), number of leaves in a one plant (5 day intervals), number of tillers per plant (5 day intervals), tiller panicle length (cm) (last week), number of seeds given by each plant (per pot) (at the end of three months), weight of the seeds (g) (at the end of the three months) were measured. Irrigation water quality parameters of pH (5.5-9.0), EC (2250  $\mu$ S/cm), TDS (2100 mg/L), chloride ion (600 mg/L) and SAR were within the recommended limits and Nitrate-nitrogen was in suitable range according to the standards provided by the Food and Agricultural Organization (FAO). The highest and lowest seed germination percentages were obtained in BW water and TW, respectively. The seed germination percentages are significantly affected by sources of water ( $p < 0.05$ ). The survival percentage, the plant height, number of leaves, number of tillers, panicle length, number of seeds and seeds weight were not significantly different under three different types of irrigation water. Based on this study, the irrigation water quality of three sources of irrigation water were suitable for irrigation of paddy and it can be concluded that the growth and development of paddy were not affected by the prevailing water quality of three sources of water.

**Keywords:** Growth parameters, Irrigation water quality, Paddy, Treated wastewater

**Corresponding Author:** swije@ageng.ruh.ac.lk