

ANALYSIS OF PADDY PRODUCTIVITY AND WATER USE EFFICIENCY OF *PERIYA KALILLUPAI* TANK IN THE *KATTARU* TANK CASCADE SYSTEM

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Abstract: Sri Lanka's paddy production plays a pivotal role in ensuring food security while supporting the livelihoods of the rural communities. Paddy is one of the leading water consumers globally, and there is a looming concern that the average water use for paddy cultivation in Sri Lanka is almost twice that of other rice-growing countries. Sri Lanka has almost exhausted its irrigation potential, and the prospects of developing additional land and water resources for irrigation are limited. There is little or no choice but to increase yields to meet its growing food demand. In light of these challenges, the government's ongoing efforts to modernize agriculture and enhance irrigation infrastructure remain crucial for the sustainable growth of the paddy sector in Sri Lanka. However, the impact of climate change has introduced new obstacles to paddy cultivation in various regions across the country. Addressing these issues necessitates an increase in paddy productivity and water use efficiency. This study examines the variability in paddy productivity within the 53-hectare command area of the Periya Kalillupai tank and evaluates the efficiency of water use. Data on seasonal paddy production, rainfall, temperature, tank water levels, and evaporation were collected. Results revealed that the average water use efficiency during the Yala and Maha seasons were 5.65 kg m⁻³ and 4.35 kg m⁻³, respectively. The average paddy productivity of the Yala and Maha seasons were 4.126 mt ha⁻¹ and 3.439 mt ha⁻¹, respectively. However, it is concerning that both paddy productivity and water use efficiency showed a decreasing pattern under the Periya Kalillupai tank. Therefore, it is imperative to emphasize the urgent need for improving water use efficiency and paddy productivity. This can be achieved through cultivating drought-tolerant rice varieties, rehabilitating irrigation structures, and adopting efficient water management techniques. These measures can potentially enhance water use efficiency, ultimately ensuring the sustainability and growth of paddy production in Sri Lanka.

Keywords: Climate change; Irrigation; Maha season; Paddy production; Yala season