

TECHNICAL EFFICIENCY OF PADDY FARMERS UNDER MINOR IRRIGATION SCHEME: A CASE OF *KURUNEGALA* DISTRICT

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The government's rice policy emphasizes increasing productivity by enhancing farmers' efficiency. While extensive studies on paddy production efficiency have been conducted in major irrigation areas, research in minor irrigation areas accounting for one-fourth of Sri Lanka's total paddy extent remains limited. Improving production efficiency in these areas is crucial for enhancing national production, uplifting rural households' livelihoods, and ensuring food security. This study was conducted in the *Kurunegala* district which has the largest extent of paddy under minor irrigation. This research aimed to evaluate the technical efficiency using the Cobb-Douglas stochastic production frontier function. Primary data were collected through interviews with randomly selected farmers using a semi-structured questionnaire. Production efficiency results show that land, labor and fertilizer were positively related and agrochemicals were negatively related with production at $p < 0.05$ significant level. Input elasticities show that fertilizer use has the highest impact on production. The return to scale of 1.46 indicates a potential to increase output by changing the scale of production. The variance ratio indicated that 62% of the discrepancies between observed output and the frontier output are due to technical inefficiency factors such as experience, education, land ownership and weather shocks. The mean technical efficiency of 0.62 suggests that production can be increased by 38% under the existing technology and without additional inputs through owner cultivation, farmer education and promoting climate-smart agricultural practices. In addition, as revealed in the production efficiency model increasing land extent, fertilizer use, and labor use; and decreasing agrochemical use enhance the production efficacy. The study concludes that paddy production efficiency in the study area is low. It recommends introducing a soil health card system for efficient fertilizer use, promoting agricultural mechanization to address labor shortages, and strengthening extension services to enhance farmer education.

Keywords: Cobb-Douglas stochastic production frontier function, Input elasticities, Return to scale, Scale of production, Soil health card