

## LAND USE, TECHNICAL EFFICIENCY, AND FARM INCOME IN RICE FARMING UNDER MAJOR IRRIGATION SCHEMES IN SRI LANKA

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Scarcity of suitable lands is a major limitation in increasing the production of food crops other than rice. Per capita land extent available for annual food crop production is about 0.07 ha. Raising technical efficiency of rice farming increases factor productivity of rice and helps to release land for other food crops. The need for substitution for imports and expansion of exports, and maintaining agricultural income in the midst of a shrinking agricultural share of GDP, exerts pressure on agricultural land use in Sri Lanka. This study evaluates multiple factor input oriented technical efficiency, and single factor technical efficiency of land, in relation to potential land savings and farmer income changes in major irrigation schemes of Ampara, Anuradhapura, Hambantota, Kurunegala, Polonnaruwa districts and Mahaweli systems B, C, and H in the *Yala* 2009 season, and the above districts and Mahaweli systems plus Mannar district during the *Maha* 2009/10 season. Data on inputs and output of rice collected from 442 rice farmers in *Yala* 2009 season and 488 rice farmers in *Maha* 2009/10 seasons were used to estimate stochastic frontier production functions of Cobb-Douglas form with intercept dummies to represent differences of districts. The estimates of elasticity of production have expected positive signs and are highly significant for land, labour, and machinery services during both seasons. The sums of the elasticities of production indicate agricultural technologies, in general, represent mild increasing returns to scale in *Yala* 2009, and almost unity returns to scale in *Maha* 2009/10. The estimated average input oriented multiple factor technical efficiency indices for all districts are 0.76 for *Yala* season and 0.81 for *Maha* season. The estimated average land technical efficiency indices are 0.67 for *Yala* season and 0.76 for *Maha* season for all districts. The proportionate savings of all inputs would give the highest aggregate income gains to farmers, and the potential welfare loss due to following a strategy of maximizing land savings, when compared with savings of all inputs, is Rs 4.8 billion in the studied districts. The potential aggregate land savings associated with raising technical efficiency are 70,900 ha during *Yala* season and 58,820 ha during *Maha* season by proportionate saving of all inputs, and 99,290 ha during *Yala* season and 73,600 ha during *Maha* season by maximizing land savings.

**Keywords:** Land use efficiency, Single factor, Technical efficiency, Multiple factor, Technical efficiency