Spatial and Temporal Variation in Input Oriented Technical Efficiency of Paddy Cultivation in Sri Lanka

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Around 2.7 million tons of rice is produced in the country annually which is sufficient to fulfill 95 per cent of the domestic rice requirement. Demand for rice is projected to increase 1.1 per cent per year (Department of Agriculture, 2018). To meet this demand, rice production must grow at a rate of 2.9 per cent per year (Department of Agriculture, 2018). In order to achieve this production target, national average yield should increase. Introduction of inorganic fertilizer, pesticide and weedicide were useful to increase agricultural productivity. However, intensive use of these inputs causes severe environmental problems like pollution, biodiversity loss and changes in the ecosystem. Many claims that inputs in paddy cultivation are over used. Thus, the objective of this study is to disaggregate input over usage in Sri Lanka spatially and temporally. Panel data collected from costs of cultivation publications from 2000 Yala to 2016/2017 Maha were used. Input oriented technical inefficiency was calculated for 13 paddy cultivating districts in Sri Lanka using Stochastic Frontier approach. Cobb - Douglas functional form was selected to express the production relationship. According to the results, hypothesis about time varying nature of inefficiency was rejected. This shows that there's no temporal variation in input oriented technical inefficiency. Estimated input orientated technical inefficiency values shows that, there's a spatial variation in input over usage in paddy cultivation. Highest input over usage (72%) was in Batticoloa district while the lowest is (6%) in Mannar. Mean input oriented technical inefficiency of all 13 districts was 37 per cent relative to the most efficient paddy cultivating district in the data set. On average, input oriented technical efficiency of these areas should improve by 37 per cent to reach full efficiency. Curbing this overuse is important because, it not only increase cost of production but also damages environment as well. Field extension activities should develop to encourage farmers to use inputs in optimum amounts. How ever further research should be done to find out reasons for inefficiency in these areas.

Keywords: Input oriented technical inefficiency, Panel data, Stochastic frontier