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Modelling of Paddy Production in Sri Lanka: Evidence from ARDL Bound Testing Approach

S.R. Ginige^{1*}, W.M.C.M. Weerawanni²

¹Department of Decision Sciences, University of Sri Jayewardenepura, Nugegoda, Sri Lanka

²Sapugaskanda Maha Vidyalaya, Makola, Sri Lanka

*snginige@sjp.ac.lk

Paddy is the staple food and occupying around 27 percent of the total agricultural lands in Sri Lanka. Paddy sector provides livelihood for more than 1.8 million farmers, and many of the farmers are either directly or indirectly engaged in paddy farming. Even though achieving a near self-sufficiency ratio in rice since last few years, it is projected that the demand for rice will increase more than 1.1 percent per year due to the reported average population growth in Sri Lanka which is approximately 1.1 percent per year. To meet the demand of rice in Sri Lanka, the rice production should grow at the rate of 2.9 percent per year. Increasing the cropping intensity and national average yield are the options available to achieve this production target. The fact that Sri Lanka does not have additional areas to be brought under rice, the only logical solution is to improve yield levels. Fertilizer subsidy, guaranteed price and various measures are being implemented by the government to improve the paddy production in the country. Therefore, the main objective of the study is to identify the factors which are highly effective in paddy production in the country with special reference to fertilizer usage and guaranteed paddy price. For this study, data of the six districts namely; Ampara, Anuradhapura, Polonnaruwa, Batticaloa, and Kurunegala which are producing around 60 percent of the total paddy production were collected over the period from 1979 to 2017. An auto regressive distributed lag (ARDL) approach were used to assess long run and short run relationship between paddy production with fertilizer usage and guaranteed paddy price for each district. Prior to employing the ARDL approach, the study performed by the Augmented Dickey-Fuller unit root test to ensure that none of the variables are I(2). In this study, the ARDL approach to co-integration was used to examine both long-run and short-run relationships between paddy production, fertilizer usage and guaranteed paddy price for six districts. Co-integration relationship among variables is examined using the ARDL bound test procedure and results indicate the existence of long-run relationship among the variables, except for Ampara district. The study found the speed of convergence to long run equilibrium to be moderate. The models developed for each district do not suffer from serial correlation, heteroscedasticity or non-normality of residuals. It also passed the CUSUM of recursive residuals tests which imply that the estimated coefficients are stable. The results indicate that the most of the long-run and short-run coefficients were significant in explaining paddy production. From the results, fertilizer usage, has positive impact on paddy production in Anuradhapura and Polonnaruwa districts in the long-run while results indicate negative impact on Hambantota, Kurunagala and Polonnaruwa in the short-run. Guaranteed paddy price has shown positive and significant impact on all the districts except Ampara in the long-run. Further results indicate that the guaranteed paddy price has positive impact on Hambantota and Kurunagala districts while negative effects are indicated on Anuradhapura and Batticaloa districts in the short-run.

Keywords: Paddy Production, Fertilizer usage, ARDL, Co-integration, Guaranteed paddy price