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Technical efficiency in the agricultural sectors of selected CARICOM countries

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Abstract

The Caribbean Common Market (CARICOM) countries are investing in agricultural development with limited knowledge of the technical efficiencies emanating from recent changes within the sector. Hence, it is important to investigate whether agricultural efficiencies in Caribbean agriculture are enhanced through resource allocation, and whether growth in related sectors fosters linkage development with agriculture. We employ a stochastic production frontier, log-linear, and Tobit models, using cross-sectional time series data from 1960 to 2006 for eleven CARICOM countries to examine factors influencing Caribbean countries' efficiency of agricultural contribution to Gross Domestic Product (GDP) per labor. The probability of the χ^2 is 0.0001 indicating that the model is appropriate to measure the production frontier. The gamma ($\gamma = 0.963$) indicates that the efficiency, or inefficiency, is related to the explanatory variables, while only 3.7 percent is due to random errors. Cropland per arable land per agricultural labor force, pastureland per arable land per agricultural labor force, fertilizer per crop land, and pasture land per agricultural labor force positively influence agriculture per labor force contribution to GDP, while tractors per crop land per agricultural labor force negatively influence agricultural contribution to GDP per labor. The technical efficiencies of these countries' agriculture vary from 30 percent for St. Vincent to 95 percent for the Dominican Republic. Dominica and St. Lucia have efficiencies of 32 and 33 percent, respectively, whereas Haiti and Barbados have 93 and 94 percent, respectively. Jamaica has 80 percent while Guyana has 57 percent. All other CARICOM countries (Trinidad and Tobago, Suriname, and Belize) have less than 50 percent efficiency. Industrial growth and sugar production reduce levels of technical inefficiencies, while urban population growth rate positively influences inefficiency in the sector. The CARICOM countries must examine the factors that influence agricultural efficiency both at the micro and macro levels, and use a holistic approach that encompasses the involvement of other sectors that provide linkages to the agricultural sector. The governments can develop programs to limit the urban population and industrial growth rates, which enhance agricultural inefficiency.

Keywords: Technical efficiency, agricultural sectors, CARICOM