Towards Dairy Self-Sufficiency: An Evaluation of Technical Efficiency and Productivity Constraints in Sri Lanka's Dry Zone

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The dairy sector is a fundamental component of the rural economy in Sri Lanka. However, production in the Dry Zone is hampered by low productivity and suboptimal resource allocation. This study was conducted to evaluate the factors influencing the technical efficiency of dairy production across diverse farming systems in the Dry Zone and to identify potential productivity improvements within existing resource constraints. Primary data were gathered from a sample of 215 dairy farmers, selected through a stratified random sampling technique across the Kurunegala, Anuradhapura, Hambantota, and Jaffna districts, encompassing intensive, semi-intensive, and extensive management systems. A stochastic frontier production function, employing the Cobb–Douglas functional form, was utilised to estimate technical efficiency, while an inefficiency effects model was applied to determine the impact of farmer-specific characteristics. The results demonstrate that the mean technical efficiency of dairy farming in the Dry Zone is 0.60, indicating that milk output could be increased by approximately 40% through the enhanced utilization of current inputs. Key farm-level determinants of milk production included the number of milking animals, the quantity of concentrate feed, pasture availability, frequency of water supply, and the provision of cattle sheds. The dairy sector was predominantly managed by male farmers (93%), with 77% of respondents aged 30–60 years. While 82% had education only up to the G.C.E. (O/L) level, more than 60% possessed over 15 years of dairy farming experience. Furthermore, farmer experience and participation in training programmes were found to significantly decrease technical inefficiency. District variations were evident, with higher efficiency levels recorded in Kurunegala and Anuradhapura compared to Hambantota and Jaffna, where extensive management practices are more common. These findings suggest that prioritizing herd optimization, ensuring consistent feeding and water access, and strengthening extension services are vital for enhancing productivity. Improving technical efficiency can reduce production costs, raise farm incomes, and support national objectives for dairy self-sufficiency.

Keywords: Dairy Production and Resource Constraints, Dry Zone Dairy Farming, Evaluation of Technical Efficiency, Factors Affecting Technical Efficiency