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Measuring performance in farming: A comparative analysis of dairy production systems in New Zealand and Chile

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Abstract

The purpose of this work was to identify, examine, and compare the key performance indicators and drivers of success of pasture-based dairy systems in New Zealand and Chile. Key similarities and differences between dairy farming systems in these countries were identified by analysing data provided by *DairyBase* and, its Chilean counterpart, *TodoagroBase*. Comparable observations were nested using country-specific classification systems based on existing knowledge, followed by the estimation of efficiency scores for each individual observation within these classes using Data Envelopment Analysis (DEA). Efficiency scores were then attached to the original datasets and used as the response variable in several country-specific Regression Partitioning Trees. This procedure identified the most relevant benchmarks in each country and showed that there are various pathways to high efficiency. Knowledge gains provided by this research are expected to influence farming practices and management, research and extension, and to encourage future cooperation between the two countries.

Dairy farmers in New Zealand and Chile benefit from low-cost production advantages because of their favourable environment for pasture-based dairying, efficiently and profitably producing milk at a lower cost than the world's average. However, a large variability in farming systems within the countries was identified, as were different benchmarks. In New Zealand, herd productivity and labour played key roles in defining efficiency, while in Chile, herd productivity and supplements fed per litre of milk produced were key indicators explaining efficiency. In New Zealand, operating cost per kg of milk solids, return on Assets (ROA), operating profit margin (OPM), operating profit per hectare, and asset turnover (ATR) were also major indicators. In Chile, gross farm revenue per cow, cost of production per litre of milk produced, wages per litre, operating profit per cow and ATR were also highlighted. The absence of indicators such as ROA in Chile was noticeable.

Reasons for different key performance indicators occurring in each country stem from history to geography, and have resulted in differences in values and goals. New Zealand farmers are profitability and cost-focused, looking alternatively to both OPM and the capital invested. Chilean farmers are revenue-focused and respond strongly to milk:feed price ratio and to the efficiency in the use of supplement. In both countries, the systems are evolving in similar ways, gradually increasing intensification levels and specialisation. In both countries, consistently high performing farms are efficient at producing both milk and revenue, and are more likely to have higher herd productivity and labour efficiency than poorer performers. In New Zealand, consistently efficient farms also had significantly better asset use as reflected by their ROA and ATR. In Chile better performers used significantly less supplement per litre of milk produced.

Keywords: pasture-based, farming system, efficiency, benchmarks, New Zealand, Chile

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