

SE 03. FINANCIAL PROJECTIONS FOR THE EVALUATION OF TECHNOLOGICAL ALTERNATIVES IN THE MEXICAN DUAL PURPOSE PRODUCTION SYSTEM

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Resumen

Proyecciones financieras para el análisis de alternativas tecnológicas en el sistema de producción de doble propósito en México

El objetivo de este trabajo fue realizar un análisis económico del sistema de doble propósito en el Trópico Mexicano. Esto se logró mediante la obtención de prácticas y costos de producción a través de un panel agropecuario representativo para la creación de un esquema básico y la proyección de su comportamiento económico y financiero bajo diferentes alternativas tecnológicas, tales como el uso de Somatotropina Bovina (BST) y la adquisición de un tanque de enfriamiento de leche. Las proyecciones se realizaron para el periodo 1995-2000 con FLIPSIM, un modelo de simulación integral a nivel de firma desarrollado en la Universidad de Texas A&M. Para cubrir el costo de la BST, el hato en producción debe incrementar la producción en un rango de 21.38% a 18.65% a través del periodo de estudio. Conforme la inflación disminuye, una menor cantidad de leche producida es necesaria para cubrir el costo de la BST. La instalación de un tanque de enfriamiento de leche requiere que el nivel de ingresos se incremente en US\$12,500 con respecto al esquema básico durante el primer año debido al costo inicial del tanque y las instalaciones necesarias. A partir del segundo año el punto de equilibrio resultó de US\$ 4,000 a US\$ 5,700. Este punto de equilibrio, expresado en US\$/litro de leche producida, varió de 0.046 a 0.0123 durante el periodo de estudio.

Palabras claves: Doble propósito, economía, trópico, simulación, transferencia de tecnología.

Key words: Dual purpose, economics, tropics, simulation, technology transfer.

Introduction

Because of the large deficit in milk production (Gracia, 1996), dairying in the tropics has been perceived to have a great potential in Mexico (Simpson and Conrad, 1993; Gormley *et al.*, 1993). Tropical milk production, mainly based on crossbred cattle under grazing, seems to have a proportionally greater opportunity for improvement with relatively low costs in improved productivity than the large specialized dairies (Gormley *et al.*, 1993). Nicholson (1995) reported that some analysts supported the idea of a great potential that the tropics present for milk production given the opportunity to produce at a very low cost. On the other hand, others argue that the low productivity, lack of marketing infrastructure, seasonality in the availability of forage, and the low rate of adoption of technology will constrain growth for this system. The ultimate step in a technology transfer program is the economic and financial evaluation of the firm adopting the new technology under current and future market conditions. However, unstable financial conditions in Mexico make it difficult to assess the future economic performance of agricultural firms. Economic simulation models are useful to assess the potential financial viability at the firm level of the technology.

The overall objective of this work was to perform an economic analysis of technological alternatives for the dual purpose production systems under Mexico's tropical conditions. This major objective was accomplished by fulfilling the following specific objectives: 1) to obtain cost and production data to simulate a representative dual purpose farm in Veracruz, Mexico; 2) to develop economic baseline performance models of the representative dual purpose farm; and 3) to project the economic behavior of the representative dual purpose farm under alternative technologies and macroeconomic assumptions.

Materials and methods

Data was collected through a farm panel process from a representative tropical dual purpose farm panel in Veracruz, Mexico. The farm panel is a consensus building process which, through interactive and iterative

interviews with the panelists, provides existing production conditions, balance sheets, income statements and cash flow summaries for the baseline analysis of a representative dual purpose farm. The representative panel farm for the baseline analysis consisted of a 2x milking herd of 150 F1 Holstein-Zebu cows yielding 1,800 liters/cow-herd/year. This production unit was based on grazing 100 ha of improved species of grass and supplemented with Napier grass and corn silage during the dry season. Two alternative scenarios were analyzed: 1) the use of BST and 2) the purchase of a milk cooling tank. Changes in management, costs, and investments associated with the alternative scenarios were imposed upon this baseline in order to determine the performance of the enterprise under the adoption of the new technology and/or marketing conditions. A farm level, income and policy simulation model (FLIPSIM), developed at Texas A&M University (Richardson et al., 1993), was used to analyze the production and financial conditions of the production unit over a six year planning horizon (1995-2000). Technical and production characteristics of the representative tropical panel farm and the macroeconomic projections (interest and inflation rates) are described in greater detail by Dehesa (1996) and Ochoa (1997). Due to the lack of projections on milk prices in Mexico, inflation was applied to the production costs and the price of the milk was kept constant along the planning horizon. For this reason, the basis for the comparison across scenarios was the estimation of the break-even (BE) price of milk for the milk tank scenario and BE milk production for the BST scenario.

Results

The increment in the cost of production reflects only the cost of BST (no extra feeding or management were allowed). The results indicate that to pay for the use of BST, on average, the milking herd should increase milk production by 21.38 % for the first year in the planning horizon (Figure 1). As inflation decreases and financial conditions improve over time, smaller increments in milk production would be necessary to pay for the hormone. The range of BE milk production along the planning horizon decreased from 21.38% to 18.65%, which is equivalent to 1.58 to 1.38 liters/milking cow/day.

In a general, BE milk prices increased at a decreasing rate for the effects of the inflation (Figure 2). The initial investment necessary for the purchase and associated facilities for a milk cooling tank and operation costs associated to cooling the milk required the net income to increase to US\$ 12,500 over the baseline during the first year for the farm to break-even (Figure 2). The more dramatic effect is realized in the first year because of the 20% down payment assumed for the purchase and the facilities required to install the milk tank. After the first year, the extra income required for interest payments and operation of the machinery ranges from US\$ 4,000 to US\$5,700 over the rest of the planning horizon. The effect of this on the unitary BE milk price is a difference of US\$ 0.046 /liter of milk in the first year and a range of US\$ 0.015 - 0.0213 /liter of milk over the rest of the planning horizon.

Conclusions

The analysis of the use of BST was intended to determine the BE on milk production rather than on the price of milk. The extra amount of milk necessary to pay for the hormonal treatment was estimated ignoring any other extra nutrition requirement needed for the cows under treatment. More specific information based on animal research, which details proper nutrition and hormone dosage, should be carried out to estimate the net economic merit of BST under tropical conditions.

Marketing of milk has been a major constraint for dairy farms in the tropics. The use of milk cooling tanks should help to promote milk production in the tropical regions in two direct ways. First, by supporting higher price for higher milk quality and reducing milk loses because of the weather and handling. Second, by allowing the producers to increase the number of milkings per day and/or to milk more cows.

The approach proposed in this study provides insight into the financial impact of changes in the economic and production environments for animal production systems in the tropics. This procedure should allow a more informed decision making process based on the assessment of future economic performance of the production systems under specific management, economic, and financial conditions. Modeling and simulation techniques provide the advantage of testing the system well in advance of the implementation of alternatives. This allows the producer to re-orient their production practices towards a commercial discipline bringing sustained growth of the animal production system to the Mexican Tropics. In addition, this process could be instrumental in influencing policy makers to provide the best economic/policy environment for sustainable tropical agricultural production systems.

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