PHYSICAL AND FINANCIAL EVALUATION OF A GROUP OF HIGH PRODUCING DAIRY FARMS IN NEW ZEALAND

A thesis presented in partial fulfilment
of the requirements for the degree of

Master of Applied Science (MApplSc)

in
Pastoral Science

Institute of Natural Resources
Massey University
Palmerston North, New Zealand

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2002

This thesis is dedicated to my parents

José Eduardo Salles and Teresinha V. Regasso Salles

ABSTRACT

Salles, P. V. (2002). *Physical and financial evaluation of a group of high producing dairy farms in New Zealand.* MApplSc Thesis, Massey University, Palmerston North, New Zealand.

Traditionally, New Zealand dairy production has been based on high pasture utilisation at high stocking rates, which resulted in low animal performance. Recently, a group of farmers (AGMARDT – Dairy Farm Monitoring Programme) gradually changed their production policy to a high production per hectare system achieved through high animal performance. The system is based on pre and post grazing herbage mass targets, strategic use of supplements to overcome pasture deficit and moderate stocking rates (2.7 cows/ha). This project evaluated the physical and financial characteristics of nine case study farms in the Southern North Island of New Zealand, involved in these changes. A one-year system study was conducted (2000/2001) in which physical and financial data were obtained to identify factors affecting farm production, efficiency and profitability. The results showed that the systems were effective and profitable, under the conditions in the 2000/2001 year. Average annual milksolids production per cow (411 kg MS/cow/year) and per hectare (1,100 kg MS/ha/year) for the case study farms were 33% higher than the national average. Average annual total intake for all farms was 5,257 kg DM/cow, 14,035 kg DM/ha, 59,656 MJ ME/cow and 159,232 MJ ME/ha. Mean economic farm surplus per ha for all case study farms (NZ$ 3,077/ha) was higher than regional averages (by 62% to 84%) and comparable to the industry's top 10% farms. Milksolids production per cow (R^2 = 0.71) and per hectare (R^2 = 0.74) were closely correlated with pasture intake. Supplements (24% of total annual ME intake) were used to overcome pasture deficits, so their effects were related to long term influences on maintaining both pasture and animal potentials. Differences between pasture intakes from farmer's visual assessment and plate meter readings (adjusted data) in summer, suggested that farmers were underestimating intake and/or the adjusted data, relying on standardised national equations, were overestimated. The measured ME intakes were higher than the theoretical requirements for all farms, suggesting measured intake overestimation and/or feed waste. Feed conversion efficiencies (6.0 to 7.4 g MS/MJ ME intake) increased with decreases in intakes, not with increases in milk yields. On-farm techniques used to measure feed intake, particularly from pasture, should be improved; and farmers' skill in increasing feed efficiency should be optimised, mainly in the systems achieving higher animal performance. Since the milk payment of NZ$5.00/kg MS will probably not remain in the future, control of production costs should receive more emphasis, particularly supplement costs.

Keywords: dairy system, pasture management, feed quality, pasture intake, supplement intake, animal performance, stocking rate, feed conversion efficiency, cost of milksolids production, profitability.

ACKNOWLEDGEMENTS

This was a multidisciplinary case study involving knowledge of the entire dairy system. The excellent advice from my supervisors was essential for the accomplishment of this work. First, I would like to express my utmost appreciation and deepest gratitude to my chief supervisor, Professor John Hodgson, for his inspiration, advice, patience and encouragement. It was an honour for me to have the opportunity of studying under his supervision, in the last two years before his retirement. His expression of knowledge and wisdom, always in a modest manner, have been invaluable to me and to this project. Thank you Professor for ALWAYS being ready to listen and help.

I am also deeply grateful to my other supervisors, Professor Colin W. Holmes, Ms. Nicola M. Shadbolt and Mr. Parry N. P. Mathews. Colin's unique knowledge of pastoral dairy systems has been incredibly important to the completion of this work. I honestly cannot imagine this thesis without Colin's correction of my drafts full of comments and useful suggestions. He was ALWAYS keen to listen and assist. Colin, I very much appreciate all the guidance and advice you gave me. Thank you for always challenging me to achieve my best. I am indebted to Mr. Parry N. P. Matthews (Consultant of Dairy Team) for giving me the opportunity to participate in the AGMARDT- Dairy Farm Monitoring Programme. Parry, your knowledge, criticism and useful comments were invaluable to me. I am sincerely thankful to Ms Nicola M. Shadbolt (Senior Lecturer), who persuaded me to perform the financial analysis which enriched this project. Nicola, without your encouragement, critical analysis and valuable experience this would not have been accomplished. I am a very fortunate student who had a such wonderful team of supervisors. From them I have learnt discipline, persistence and patience. To my special friends and counsellors, obrigada do fundo do meu coração.

I would like to express my special thanks to all the farmers involved in this project. Their help in collecting samples and providing accurate information was essential to the development of this project. Thanks for giving me the opportunity to learn so much from you. I very much appreciate it! My heartfelt thanks to Fulton Hughes who is doing a wonderful work as the technician of the AGMARDT – Dairy Farm Monitoring Programme. His very good suggestions and conclusions using the sentence "at the end of the day" is something I will always have with me. Fulton, thank you very much for your help, encouragement, good advices and friendship. My deepest gratitude to my lovely sister Graziela Salles and my dear friend Leonardo Molan, who helped with the animals' weighing and sample processing, as well as to Paul Downie, Giselda Ercolin, Luciano Monteiro, Pablo Navajas, Gustavo Sbrissa and Brian Stubbs. My especial thanks to Melissa, for sharing the work, farm visits, meetings and presentations with me; these years has been a very interesting journey, with many good and some sad moments, which we have learnt a lot from. All the best for you, Melissa!

I also would like to express my gratitude to Mr. Cory Matthew (Senior Lecturer) for his good ideas and discussion about my work and to Mr. John Gardner (Senior Lecturer), for his help in the financial analysis. My special thanks to Mr Alan Palmer (Senior Lecturer) for his kind attention in providing the soil information and to Mrs Iona McCarthy (Lecturer) for all her support with the property valuation. My gratitude to Mr Mark Osborne for his help with my laboratory work. My warmest thanks to all the secretarial and staff members of Pasture and Crops Group and Agricultural/Horticultural Systems & Management Group for their good mood and constant jokes that made my time at Massey really enjoyable. I am grateful to the Institute of Natural Resources (Pasture and Crops Group) at Massey University and the Agricultural Marketing and Research Development Trust (AGMARDT) which provided funds for this research. I also express my sincere gratitude to the New Zealand Official Development Assistance (NZODA) of the Ministry of Foreign Affairs and Trade for my scholarship.

Many thanks to Carlos & Karin Hug de Belmont, Wagner Beskow, Entin Daningsih, Gustavo Monaco, Fabio Moreno and Tara Pande, with whom I had many useful discussions about my project. Special thanks to Sila Carneiro da Silva, for helping me to achieve this objective. Dear Steve, my heartfelt thanks for all your support and care during my time in New Zealand, which I will never forget. Dora, my deepest gratitude for being my very special friend. To all my friends from New Zealand, Latin America and other parts of the world, thank you for all your support and enjoyable time spent with me; and to Prof John and Ms Margaret Ruth Hodgson, Prof Colin W. and Ms Dorothy A. Holmes and Mr Parry N. P. and Ms Frances I. Matthews for their special friendship and support throughout these years. Thank you very much to Brian and Anne Jenkins and Stuart, Michelle, Christopher and Laurel (in memory) Brander, for being my family during my first experience in New Zealand. To all my friends in Brazil, specially Alessandra, Cris, Everi, Flavinha, Flavia, Josiane, Katia, Musse, Patu, Paula, Roberta and Zaranha, from whom I was far away for a long time. To my special girl friends Daniela, Gabriela e Fabiana, who gave me lots of support during my time in New Zealand, thanks for your love and care. And, of course, to my lovely friend Vasco (Chupis), I did not forget about you. Thank you my dear friend for your CONSTANT humour and friendship; it was invaluable to me too.

Finally, I would like to express my immense gratitude to my family. My parents José Eduardo & Teresinha V. R. Salles and my sister Graziela Salles, who made a great effort to send me to New Zealand the first time, when I started my dream. Thank you very much for all your support, love, encouragement, and education throughout my life. I miss you so much, amo vocês! And to my love José, all my gratitude and love. Amorcito, your help in this project, your words of support when I was discouraged, your very good sense of humour and your smiling face, words cannot thank. Te quiero mucho!

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Vision without action is just a dream.

Action without vision is just activity.

Vision and action together can change the world.

Joel Barker
President
Infinity, Ltd.

CHAPTER 1

GENERAL INTRODUCTION

The primary objective of dairy production systems is to produce high quality dairy products for human consumption by utilising the ability of the grazing ruminant animal to consume and transform feeds that are not suitable for human nutrition into milk. Milk should be produced at competitive prices for the consumer, as well as being profitable for the producers. This implies that the inputs and outputs of the system should be precisely adjusted.

Low milk production costs in New Zealand grazing systems are based on growing and utilising large amounts of grazed pasture. Effective feeding of the herd in a grazing system must ensure that feed demand is matched by the supply of pasture throughout the year (Holmes *et al.*, 1987). The success of New Zealand dairy production over the past years has been based on the increased amount of pasture harvested as a consequence of better pasture utilisation resulting from high stocking rates (Holmes, 1998; Matthews, 1995), combined with genetic improvement, which increased milk production and feed conversion efficiency per animal (Holmes & Matthews, 2001). Traditionally, dairy systems have adjusted herbage intakes to overcome feed deficits, and pasture limitations have resulted in low animal performance (Matthews, 1994). When the objective is to increase production per cow, high pasture allowances are required in order to achieve high animal intakes. However, greater herbage allowance could increase herbage wastage, leading to a conflict between pasture utilisation and forage intake (Hodgson, 1990; Matthews, 1995).

When aiming at high intakes per animal, supplementary feed may replace the cow's function as the buffer of the system. The input of supplements reduces variation in farm production levels, but supplementary feed inputs and farm profitability vary between seasons (Matthews, 1995), depending on the amount of supplement required and the relative price of supplements and milk.

After identifying that high pasture utilisation leads to a certain degree of animal underfeeding, a group of farmers have gradually changed their production policy from a focus on high production per hectare through high stocking rate to a strategy based on high production per hectare through improved animal performance. They concluded that this objective could be obtained by decreasing stocking rate and utilising supplements strategically, while still maintaining efficient pasture utilisation.

Accordingly, a three-year Dairy Farm Monitoring Programme was established (see Chapter 3) on twelve farms in the Southern North Island of New Zealand. All farms were attempting to improve per cow nutrition in order to improve farm productivity and profitability. This study shows an analysis of the results of the third year of the project, and focuses on the physical and financial components influencing the performance of these dairy systems. The specific objectives of this study are:

- to understand and identify factors affecting productivity, efficiency and profitability of the case study farms;

- to compare the physical and financial performance among the case study farms and with industry data;

- to identify opportunities for further improvement in the efficiency of both physical and financial management of the case study farms;

These objectives were accomplished through a series of biological and financial analyses. This thesis is presented in seven chapters. Chapter 2 is a review of literature reporting relevant physical and financial information. It covers the topics of New Zealand dairy production, feed conversion efficiency, supplementary feed utilisation and tools for the analysis of financial data.

The Dairy Farm Monitoring Programme is described in Chapter 3. It contains information regarding the background of the project, objectives, project benefits and outcomes for the 1999/2000 season. Chapter 4 describes the methodology used to monitor the case study farms. It covers the biological measurements and calculations, as well as the statistical and financial analyses.

Chapter 5 provides a general description of the farms followed by information on feed consumption, feed conversion efficiency, factors influencing milksolids production and financial results for individual farms. The main findings and their implications are considered in a general discussion (Chapter 6) and conclusions (Chapter 7).

CHAPTER 2

LITERATURE REVIEW

2.1. INTRODUCTION

Milk production in New Zealand is mainly based on grazed pasture. Grazing production systems are characterised by relatively short lactations determined by the seasonal nature of pasture growth. Consequently milk production is mainly restrained by the availability of feed throughout the year. The possibility of extending lactation through the use of supplementary feed has been widely demonstrated throughout New Zealand. However, the biological and economic efficiency of this approach has shown great variation when supplements are included in the system, due to numerous variables affected by their utilisation. Herd, pasture, reproduction and nutrition management and costs of production play an important role in the efficiency and profitability of a dairy farm. All these factors must be adjusted to take full advantage of the system's potential. This literature review aims to outline the key points of New Zealand dairy production; the main factors related to feed conversion efficiency and supplementary feed utilisation and the importance of production function and financial key performance indicators.

2.2. NEW ZEALAND DAIRY PRODUCTION

Less than 10% of the total milk produced in the world originates from grazing systems (Steinfeld & Maki-Hokkonen, 1995), including most dairy farms in New Zealand. The reason for the low proportion of milk production from grazing systems is the difficulty