Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.
EXPLORING THE CONVERSION PROCESS IN ORGANIC DAIRY FARMS:

The case study of organic dairy farmers in New Zealand

Carolina Schweikart Vial

2005
EXPLORING THE CONVERSION PROCESS IN ORGANIC DAIRY FARMS: 
THE CASE OF ORGANIC DAIRY FARMERS IN NEW ZEALAND

A thesis presented in partial fulfilment of the requirements for the degree of Master 
Applied Science in Natural Resource Management at Massey University, New 
Zealand

Carolina Schweikart Vial

2005
Errata sheet for:


p. 12 line 7 of the last paragraph: should read “1 million litres per day at the peak of the season.”

p. 38 line 3 of paragraph 2: should read: “whereas no nitrogen was applied...”

p. 42 line 6 of the third paragraph: should read “yield after 305 days lactation was...”

p. 52 line 11 of paragraph 3: should read “ammonium-N, nitrate-N or mineralizable-N, but...”

p. 106 line 1: should read “we maybe gross $300,000...” and line 2: should read “Our premium based on 50,000 kgMS...”
ABSTRACT

This research explores how organic dairy farmers manage the process of conversion. In particular, it identifies the main problems that dairy farmers face during conversion and the strategies that they employ to overcome them. Further, this research examines farmers' perceptions of the implications of conversion for the social, environmental, and financial performance of the farm. An initial mail survey was sent to 65 certified and uncertified organic dairy farmers to provide a general picture of the impacts of conversion at the farm level and to generate an initial description of organic dairy systems in New Zealand. Secondly, semi-structured interviews were conducted with eight respondents of the survey in order to investigate in more depth their experiences with conversion and capture their practical knowledge of the conversion process. Interviewees were selected based on a range of criteria (e.g., diversity of location, stage in the conversion process, and farming system characteristics), with the intention of increasing the applicability of the findings.

Results suggest that organic dairy farmers conceive of conversion as a learning process, in which by capturing information and then by building experience, farmers are able to utilize external information sources for the development of personal skills and effective management practices that aim at preventing potential problems. In particular, observation of the cows' appearance and behaviour, together with providing a favourable environment for the animals appears fundamental in preventing animal health problems. Analyses of the survey indicated that sourcing organic inputs is the only significantly important problem for organic dairy farmers. However, mastitis, feed shortfalls and weed control are also concerns expressed in the interviews. Common recommendations for managing conversion include applying organic fertilisers in advance, having extra supplements on hand, increasing the rotation length, delaying calving dates, and reducing stocking rates. Organic dairy farms are mostly grass, spring calving and self contained operations. Milk production per cow in organic systems appears to be similar to the average values for the district. However, milk production per hectare on organic farms was significantly lower than average values for the respective district (p<0.1). This probably resulted from a decline in pasture production requiring farmers to reduce their stocking rates. In general, milk production, both per cow and per hectare, declined in early stages of conversion but rebounded as conversion progressed. Finally, it is expected that New Zealand pastoral-based seasonal dairy systems to follow a relatively easy transition to organic farming, without experiencing as much of a reduction in productivity.
ACKNOWLEDGEMENTS

I would like to acknowledge the NZAID for giving me the possibility to study in New Zealand and spend two awesome years in this beautiful country. Living in New Zealand did not only let me develop my professional life but allow me to grow personally in many aspects, especially by interacting with people from all over the world and by travelling through this incredible country.

I would like to acknowledge my chief supervisor Dr. Terry Kelly for his interest, advice and meticulous feedback through all this long research process. I also would like to express my appreciation to Prof. Colin Holmes, whose wisdom and caring words were always encouraging. A big thanks to Gareth Evans, who was continuously feeding me with his practical experience, ideas, and positive words.

Special thanks to Dr. John Holland, for his advice from the first day that I arrived at Massey and for his assistance in the beginning of this research. I also wish to express my utmost gratitude to Dr. Nicolas Lopez-Villalobos, who was an invaluable help during the analysis of my results and for being so enthusiastic about my research.

I would like to acknowledge the farmers who participated in this research, to the respondents of the survey and to those who gave up their time to share their experiences with me. Thank you very much for your openness and hospitality.

A big thanks to all lecturers and staff members of the Institute of Natural Resources, who were always friendly and supportive, and specially to my friends in the computer lab, for their daily companion and happiness.

A huge thanks to all my friends in New Zealand, specially to Polly, John, Jo, Pauli and Nic, with whom I shared unforgettable adventures and endless conversations. To Elisa, Matias, Gonza, Javier, Ana, Vicky, Mirtha, Claudia, Warren, Maca, and Rene, with whom I shared lots of happy moments and who were my Latin family in New Zealand.
Special thanks to my parents, Dolores and Adalberto, and to my sisters, Andrea and Paula. From the distance, I always received your loving words and support in this adventure. I will keep good memories from our trip together in New Zealand.

Finally, I would like to dedicate my work to my husband, Alan. You encouraged me and gave me strength every day during these two years. Thanks for being there for me in every moment. Once again, we have climbed a big mountain together!! Thanks for walking this journey with me.
## TABLE OF CONTENTS

ABSTRACT .............................................................................................................. 1  
ACKNOWLEDGEMENTS .......................................................................................... II  
TABLE OF CONTENTS ......................................................................................... IV  
LIST OF FIGURES .................................................................................................. VIII  
LIST OF TABLES ...................................................................................................... IX  

### CHAPTER 1: INTRODUCTION ................................................................. 1

1.1 Background To The Research ................................................................. 2  
1.2 Problem Statement .................................................................................... 3  
1.3 Research Questions ................................................................................... 3  
1.4 Aim And Objectives .................................................................................. 3  
1.5 Methodological Approach ........................................................................ 4  
1.5 Thesis Layout .............................................................................................. 4  

### CHAPTER 2: ORGANIC AGRICULTURE IN NEW ZEALAND ................. 6

2.1 Introduction ................................................................................................... 7  
2.2 Organisations Involved In The Organic Sector In New Zealand .......... 7  
2.3. New Zealand Organic Certification Agencies ......................................... 9  
2.5 Access To Overseas Markets ..................................................................... 10  
2.4 Organic Market And Production In New Zealand ..................................... 11  
2.6 The Organic Dairy Sector .......................................................................... 12  
2.7 The Conventional Dairy Sector In New Zealand ....................................... 14  

### CHAPTER 3: LITERATURE REVIEW ...................................................... 16

3.1 Introduction ................................................................................................ 17  
3.2 Concept And Principles Of Organic Agriculture ..................................... 17  
3.3 Organic Agriculture Worldwide: Current Situation And Future Perspectives ......................................................................................................................... 20  
3.3.1 Land Area Under Organic Production ............................................. 20  
3.3.2 The Organic Global Market ............................................................ 22  
3.3.3 Regulations And Trade Of Organic Production .................................. 24  
3.4 The Conversion Process ............................................................................ 26  
3.4.1 Motivations For The Conversion To Organic Farming ..................... 26  
3.4.2 Personal Characteristics Of Organic Dairy Farmers ....................... 28
| 3.4.3 The Institutional Environment Affecting Conversion To Organic Farming | 29 |
| 3.4.3 Conceptual Frameworks For The Conversion To Organic Farming | 31 |
| 3.5 IMPLICATIONS OF CONVERSION FOR THE FARMING SYSTEM | 34 |
| 3.5.1 Pasture Production And Composition | 36 |
| Pasture Productivity | 36 |
| Seasonality Of Pasture Growth | 38 |
| Pasture Composition | 39 |
| 3.5.2 Changes In Stocking Rate In Organic Dairy Systems | 40 |
| 3.5.3 Milk Production In Organic Dairy Systems | 42 |
| 3.5.4 Animal Health In Organic Dairy Herds | 44 |
| Alternative Remedies | 46 |
| Mastitis Incidence | 48 |
| Metabolic Diseases | 49 |
| Reproductive Performance | 50 |
| Calf Diseases | 50 |
| 3.5.5 Soil Quality In Organic Dairy Systems | 51 |
| Nutrient Balance | 53 |
| 3.6 ENVIRONMENTAL IMPLICATIONS OF ORGANIC FARMING | 55 |
| 3.7 ECONOMIC IMPLICATIONS OF ORGANIC FARMING | 57 |
| 3.8 CONCLUSIONS | 61 |

**CHAPTER 4: RESEARCH DESIGN** 63

| 4.1 INTRODUCTION | 64 |
| 4.2 SELECTION OF RESEARCH STRATEGIES | 64 |
| 4.3 THE EXPLORATORY SURVEY | 65 |
| 4.3.1 Survey Instrument: Self-Administered Questionnaire | 66 |
| Questionnaire Design And Data Collection | 67 |
| 4.3.2 Pilot Study | 68 |
| 4.3.3 Survey Sample | 69 |
| 4.3.4 Response Rate | 69 |
| 4.4 DESCRIPTIVE MULTIPLE CASE STUDY | 70 |
| 4.4.1 Case Study Sample | 71 |
| Selection Criteria | 72 |
| 4.4.2 Case Study Instrument: Semi-Structured Interview | 75 |
| 4.5 DATA ANALYSIS | 78 |
| 4.5.1 Survey Analysis | 80 |
| Univariate Analysis | 80 |
Bivariate Analysis ....................................................................................................................... 81
4.5.2 Case Study Analysis .................................................................................................................. 83
4.6 LIMITATIONS OF THE STUDY .................................................................................................... 83

CHAPTER 5: CONTEXT AND PERCEPTIONS OF THE CONVERSION PROCESS .......................................................... 85

5.1 INTRODUCTION .............................................................................................................................. 86
5.2 FACTORS THAT MOTIVATED CONVERSION FOR ORGANIC DAIRY FARMERS ................................. 86
5.3 SOCIAL AND INSTITUTIONAL FACTORS AFFECTING FARMERS IN CONVERSION ......................... 89
   5.3.1 Social Acceptability ...................................................................................................................... 89
   5.3.2 Institutional Support .................................................................................................................... 91
5.4 ARE FARMERS SATISFIED WITH THEIR ORGANIC OPERATION? ................................................... 93
5.5 THE MEANING OF CONVERSION FOR ORGANIC DAIRY FARMERS .............................................. 95
5.6 LEARNING AS A STRATEGY FOR PREVENTION IN ORGANIC DAIRY SYSTEMS ............................ 96
   Capturing Information ....................................................................................................................... 98
   Building Experience .......................................................................................................................... 100
5.7 FARMERS' PERCEPTION OF THE PERFORMANCE OF THEIR ORGANIC OPERATION ........................ 104
   5.7.1 Profitability Of Organic Dairy Farms .......................................................................................... 104
   5.7.2 Perceptions Of The Environmental Benefit Of Organic Farming .............................................. 106

CHAPTER 6: CHARACTERISING ORGANIC DAIRY SYSTEMS: PROBLEMS AND STRATEGIES DURING CONVERSION ............................................................... 110

6.1 INTRODUCTION .............................................................................................................................. 111
6.2 MAIN CHARACTERISTICS OF ORGANIC DAIRY SYSTEMS ................................................................ 111
6.3 PROBLEMS AND STRATEGIES DURING CONVERSION OF ORGANIC DAIRY FARMS ................. 115
   6.3.1 Survey Findings: Problems And Strategies During Conversion ................................................. 115
   6.3.2 Interview Data: Problems And Strategies During Conversion ................................................... 120
      Animal Health Issues On Organic Dairy Farms .................................................................................. 120
      Feed Shortfalls .................................................................................................................................. 125
6.4 PRODUCTIVITY OF ORGANIC DAIRY FARMING SYSTEMS .............................................................. 127
   6.4.1 Pasture Production ...................................................................................................................... 128
      Seasonality Of Pasture Growth ........................................................................................................ 131
      Stocking Rates .................................................................................................................................. 132
   6.4.2 Milk Production .......................................................................................................................... 135
      Changes In Milk Production During Conversion ............................................................................... 142

CHAPTER 7: SUMMARY AND CONCLUSIONS ......................................................................................... 145

7.1 INTRODUCTION .............................................................................................................................. 146
LIST OF FIGURES

Figure 2.1. Organisations involved in the organic sector in New Zealand .......... 8
Figure 2.2. Time-line for the development of the organic dairy sector in New Zealand .............................................................................................................. 13
Figure 3.1. Contribution of each continent to the total global land under organic management .......................................................................................... 21
Figure 3.2. Relative importance of institutional issues for organic dairy farming in New Zealand .......................................................................................... 30
Figure 3.4. Relative importance of technical issues for organic dairy farming in New Zealand .................................................................................................. 35
Figure 3.5. Comparative pasture growth rates in the 2003/2004 season ............ 38
Figure 3.6. Farm N turnover (kg N/ha/yr), N-Surplus and N-Efficiency in conventional and organic dairy farms in Denmark ....................................................... 54
Figure 4.1. Framework of Analysis (continues next page) ....................................... 76
Figure 4.2. Double examination of topics in the different data sets ..................... 79
Figure 5.1. Reasons for conversion to an organic system of production for dairy farmers (n=30) ....................................................................................... 87
Figure 5.2. Reasons contributing to reported satisfaction as a result of conversion to organic dairy farming (n=18) ................................................................. 94
Figure 5.3. Conversion in organic dairy farms through time (n=29) .................... 95
Figure 5.4. Recommendations given for other farmers interested in converting to organic farming (n=29) ................................................................. 97
Figure 5.5. A conceptual model of conversion as a learning process ............... 102
Figure 6.1. Main characteristics of organic dairy systems in New Zealand (n=32). 112
Figure 6.2. Rating of problems faced during conversion to organic dairying ..... 116
Figure 6.3. Rating of practices employed during conversion to organic dairying .... 118
Figure 6.4. Pasture eaten on farm calculated from animal performance (Appendix Seven) relative to district average pasture growth (Dexcel, 2004) ....... 130
Figure 6.5. Milksolids production per cow on organic farms relative to district average figures .................................................................................................. 139
Figure 6.6. Milksolids production per hectare on organic farms relative to district average figures .................................................................................................. 140
LIST OF TABLES

Table 3.1. Land area under organic management and number of farms on each continent. Fully converted land and in-conversion land in 2004 .......... 22
Table 3.2. Motives for conversion to organic farming ........................................ 27
Figure 3.3. Comparison of three approaches to sustainable agriculture .......... 33
Table 3.3: Milk production in the three first seasons of the Massey trial ............ 44
Table 3.4. Range per hectare of milk production and gross margin ................. 60
Table 3.5. Milk solids, cash farm expenditure and gross farm revenue for conventional and organic dairy farms ........................................ 60
Table 4.1. Selection criteria used in case study sampling ................................ 73
Table 4.2. Characteristics of the cases selected according the selection criteria..... 74
Table 6.1. Number of organic dairy farms with a grazing-off policy in New Zealand .......................................................... 113
Table 6.2. Estimated data for pasture eaten on-farm relative to average local pasture growth data from Dexcel (2004) ................................. 129
Table 6.3. Number of organic dairy farms in which milking cows have decreased, increased or remained constant in conversion and percentage change in the number of milking cows (n=18) ........................................ 133
Table 6.4. Average number of milking cows on organic dairy farms at different stages of the conversion process (n=18) ................................. 133
Table 6.5. Number of cases from the survey in which stocking rates were higher or equal to and lower than the national average .......................... 134
Table 6.6. Number and percentage of farms from the survey in which area for milk production was higher or equal to and lower than the national average ........................................... 134
Table 6.7. Milksolids per cow on organic farms relative to the average production on its corresponding location ........................................ 137
Table 6.8. Milksolids per hectare on organic farms relative to the average production on its corresponding location ........................................ 138
Table 6.9. Average milksolids production per cow on all organic farms surveyed and on all paired district farms ........................................ 141
Table 6.10. Average milksolids production per hectare on all organic farms surveyed and on all paired district farms ........................................ 141
Table 6.11. Changes in milksolids production per cow during the process of conversion; for a group of 15 farms ........................................ 142
Table 6.12. Number of organic farms in which milksolids per cow decreased, increased or remained constant during the conversion process; for a group of 15 farms .............................................................. 143

Table 6.13. Changes in milksolids production per hectare during the process of conversion; for a group of 14 farms .............................................................. 143

Table 6.14. Number of organic farms in which milksolids per hectare decreased, increased or remained constant during the conversion process; for a group of 14 farms .............................................................. 144