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.
Nutrient Management Plans and their influence on the farm management practices of dairy farmers

A Thesis presented in partial fulfilment of the requirements for the degree of Masters of Environmental Management

Massey University, Palmerston North
Gavin Neal
2013
Abstract

Nutrient Management Plans (NMPs) are a relatively recent innovation in the New Zealand dairy industry, however due to their growing use in regional council policy, and initiatives such as the Dairying and Clean Streams Accord (2003), it is likely that NMPs will become mandatory for the dairy industry in the near future. There is currently limited information on the use and benefits of NMPs in the New Zealand context, and how dairy farm management practices have been influenced by the introduction of NMPs.

The main objective of this research was to investigate how the introduction of an NMP has influenced the farm management practices of dairy farmers. This was achieved through the use of two case studies within the Waikato and Otago regions. These regions have contrasting approaches to nutrient management; The Waikato Regional Council has incorporated the use of NMPs in regional policy and has supported a number of community initiatives regarding nutrient management. In comparison, at the time of the research, the Otago Regional Council, while stating that they promoted the adoption of nutrient management practices, had no current policy requiring NMPs.

Results indicated that the degree of NMP uptake varied amongst farmers, depending on a variety of influences with regards to the farmer’s own unique goals, circumstances and opinions. It was also found that while the reasons for NMP introduction varied amongst the farmers interviewed, the overall influences of NMPs on farm management practices were similar across both cases. The key influences of NMPs on farm management practices were; the increased precision and efficiency of fertiliser application, an increased appreciation and use of effluent as a nutrient source, and the identification and manipulation of other factors such as the effects of bought in feed and stock movement on nutrient flows on the farm.

There was a perceived lack of ongoing support and education for farmers regarding NMPs. This contributed to a general distrust amongst farmers of NMPs, in turn affecting their opinions, and uptake of NMPs. Furthermore NMPs were not being used to their full potential by the majority of farmers who participated in this research. The greater the involvement and support offered by the regional council and industry, the greater the trust and cooperation amongst the particular farmers with the relevant regional council and industry representatives.

Overall, while this research has found that NMPs do provide benefits to farmer’s management practices, further support and ongoing education is required to ensure NMPs are accepted and used to their full potential by dairy farmers.
Acknowledgements

I am incredibly grateful to everyone who has assisted me over the last 18 months within both the dairy industry and Massey University. Special thanks to those within the dairy industry, and all the farmers within the Waikato and Otago regions for giving up your valuable time to take part in my research. Without your generous cooperation this research would not have been possible.

To Scott Neal and family, thank you for providing me with accommodation and transport, and providing your invaluable assistance in organising the interviews in the Otago region. I would also like to thank Don Harford from the Waikato Regional Council, for your assistance and cooperation in not only detailing the stance of the Waikato Regional Council to nutrient management, but also for your help in contacting the majority of the Waikato farmers that took part in the interview process.

Special thanks to Janet Reid and David Horne, for all your patience, feedback and encouragement, while dealing with the difficulties of an extramural student. Our regular Skype conversations will be missed.

Finally, to my family and friends, thank you for all your support and encouragement. And to my partner May, thank you your constant encouragement and for getting me through the tough times, your days as a thesis widow are over.
# Table of Contents

Abstract ........................................................................................................................ ii

Acknowledgements ........................................................................................................... iii

Chapter 1  Introduction ............................................................................................... 1

1.1. Thesis Introduction ............................................................................................... 1

1.2. Background .............................................................................................................. 1

1.3. Definition of a Nutrient Management Plan ............................................................. 3

1.4. Problem Statement ................................................................................................... 4

1.5. Research Question and Objectives ........................................................................ 4

1.6. Research Question ................................................................................................... 4

1.7. Research Objectives ............................................................................................... 5

1.8. Thesis Structure ...................................................................................................... 5

Chapter 2:  Literature Review ....................................................................................... 6

2.1. Introduction .............................................................................................................. 6

2.2. Benefits of NMPs .................................................................................................. 6

2.3. New Zealand Literature ......................................................................................... 10

2.4. Factors influencing the uptake of NMPs by Farmers ............................................ 12

2.5. Summary ................................................................................................................ 17

Chapter 3  Methodology ............................................................................................... 20

3.1. Introduction ............................................................................................................ 20

3.2. Research Design .................................................................................................... 20

3.3. Selection Criteria ................................................................................................... 23

3.4. Data Collection ...................................................................................................... 25

3.5. Data Analysis ......................................................................................................... 26

3.6. Ethical Considerations ........................................................................................... 26

3.7. Summary ................................................................................................................ 27

Chapter 4  Contextual Information to Cases .............................................................. 29

4.1. Introduction ............................................................................................................ 29

4.2. Geography and Climate ....................................................................................... 30

4.2.1. Waikato ............................................................................................................ 30

4.2.2. Otago ................................................................................................................ 31

4.3. Policy ....................................................................................................................... 32

4.3.1. Waikato ............................................................................................................ 32
5.5.4. Influence on Management Practices ................................................................. 62

Chapter 6 Discussion................................................................................................. 64
6.1. Introduction ........................................................................................................... 64
6.2. Drivers contributing to the acceptance and use of NMPs by dairy farmers: ............... 64
6.3. Support and Awareness ....................................................................................... 66
6.4. Farmers opinions / concerns regarding NMPs...................................................... 68
6.5. Influence of NMPs in the management practices of dairy farmers.......................... 69
   6.5.1. The development and expansion of the farmer’s effluent block ....................... 71
   6.5.2. Increased precision and efficiency of the fertiliser application ......................... 72
   6.5.3. Consideration of other factors that can influence farm nutrient flows .............. 73
   6.5.4. Soil Tests ........................................................................................................ 73
6.6. Summary ............................................................................................................... 73

Chapter 7 Conclusions.............................................................................................. 76
7.1. Introduction ........................................................................................................... 76
7.2. Research findings summary .................................................................................. 76
7.3. Conclusions ........................................................................................................... 79
7.4. Implications for the Industry .............................................................................. 81
7.5. Research Methodology Assessment .................................................................... 82
7.6. Further Research ................................................................................................. 83

References 85

Appendices 89
Appendix 1: Participant Consent Form ...................................................................... 89
Appendix 2: Information Sheet .................................................................................. 90
Appendix 3: Interview Schedule for Farmers ............................................................. 92
Appendix 4: Interview Schedule for Key Informants ................................................ 94