



**Agribusiness  
and Economics  
Research Unit**

**A Lincoln University Research Centre.**  
New Zealand's specialist land-based university.

# **The Wheel of Water: The Contribution of the Agricultural Sector in Selwyn and Waimakariri Districts to the Economy of Christchurch**

**Meike Guenther  
Glen Greer  
Caroline Saunders  
Paul Rutherford**

**Report prepared for Aqualinc**

**Research Report No. 335  
July 2015**



***Research to improve decisions and outcomes in agribusiness, resource,  
environmental, and social issues.***

The Agribusiness and Economics Research Unit (AERU) operates from Lincoln University providing research expertise for a wide range of organisations. AERU research focuses on agribusiness, resource, environment, and social issues.

Founded as the Agricultural Economics Research Unit in 1962 the AERU has evolved to become an independent, major source of business and economic research expertise.

The Agribusiness and Economics Research Unit (AERU) has four main areas of focus. These areas are trade and environment; economic development; non-market valuation, and social research.

Research clients include Government Departments, both within New Zealand and from other countries, international agencies, New Zealand companies and organisations, individuals and farmers.

**MISSION**

To exercise leadership in research for sustainable well-being

**VISION**

The AERU is a cheerful and vibrant workplace where senior and emerging researchers are working together to produce and deliver new knowledge that promotes sustainable well-being

**AIMS**

- To be recognised by our peers and end-users as research leaders for sustainable well-being
- To mentor emerging researchers and provide advanced education to postgraduate students
- To maintain strong networks to guide AERU research efforts and to help disseminate its research findings
- To contribute to the University's financial targets as agreed in the AERU business model

**DISCLAIMER**

---

While every effort has been made to ensure that the information herein is accurate, the AERU does not accept any liability for error of fact or opinion which may be present, nor for the consequences of any decision based on this information.

A summary of AERU Research Reports, beginning with #235, are available at the AERU website [www.lincoln.ac.nz/aeru](http://www.lincoln.ac.nz/aeru)

Printed copies of AERU Research Reports are available from the Secretary.

Information contained in AERU Research Reports may be reproduced, providing credit is given and a copy of the reproduced text is sent to the AERU.

# **The Wheel of Water: The Contribution of the Agricultural Sector in Selwyn and Waimakariri Districts to the Economy of Christchurch**

**Meike Guenther**

**Glen Greer**

**Caroline Saunders**

**Paul Rutherford**

**Report prepared for Aqualinc**

**Research Report No. 335**

**July 2015**

**Agribusiness and Economics Research Unit  
P O Box 85084  
Lincoln University  
Lincoln 7647  
Christchurch  
New Zealand**

**Ph: (64) (3) 423 0372  
[www.lincoln.ac.nz/AERU/](http://www.lincoln.ac.nz/AERU/)**

**ISSN 1170-7682 (Print)  
ISSN 2230-3179 (Online)  
ISBN 978-1-877519-39-0**



# Table of Contents

|   |             |
|---|-------------|
| <b>LIST OF TABLES</b>   | <b>vii</b>  |
| <b>LIST OF FIGURES</b>  | <b>viii</b> |
| <b>EXECUTIVE SUMMARY</b>  | <b>ix</b>   |
| <b>CHAPTER 1 INTRODUCTION</b>   | <b>1</b>    |
| 1.1 Background  | 1           |
| 1.2 The Research  | 2           |
| 1.3 Organisation of the Report  | 2           |
| <b>CHAPTER 2 METHODOLOGY</b>  | <b>3</b>    |
| 2.1 Introduction  | 3           |
| 2.2 Methodology of the farm and household expenditure study   | 3           |
| 2.3 Methodology of the rural business expenditure study   | 7           |
| 2.4 Methodology of the annual variability study   | 10          |
| 2.5 Methodology of the food processing sector study   | 14          |
| 2.6 The contribution of expenditure by employees  | 17          |
| 2.7 The contribution of the Christchurch agricultural sector  | 17          |
| <b>CHAPTER 3 RESULTS OF THE FARM EXPENDITURE FLOWS ANALYSIS</b>   | <b>19</b>   |
| 3.1 Direct expenditure in Christchurch by farm households and businesses  | 19          |
| 3.2 The total (direct, indirect and induced) effects of farm expenditure on the Christchurch economy                              | 24          |
| 3.3 Employment associated with farm expenditure flows   | 26          |
| 3.4 Local farm business and farm household expenditure  | 28          |
| 3.5 Expenditure flows from farm employees   | 29          |
| 3.6 The contribution of the Christchurch agricultural sector  | 29          |
| <b>CHAPTER 4 RESULTS OF THE RURAL BUSINESS EXPENDITURE FLOWS ANALYSIS</b>   | <b>31</b>   |
| 4.1 Direct expenditures in Christchurch by businesses in Selwyn and Waimakariri districts   | 31          |
| 4.2 Direct, indirect and induced effects of business expenditures in Selwyn and Waimakariri districts on the Christchurch economy | 33          |
| 4.3 Employment associated with business expenditure flows from farm purchases into Christchurch                                   | 34          |
| 4.4 Linkages to Christchurch's food manufacturing sector  | 36          |

|   |           |
|---|-----------|
| <b>CHAPTER 5 RESULTS OF THE ANALYSIS OF ANNUAL VARIABILITY IN EXPENDITURE FLOWS INTO CHRISTCHURCH</b>                                       | <b>37</b> |
| 5.1 Direct farm expenditure flows   | 37        |
| 5.1.1 Impacts of revenue changes on expenditure flows   | 39        |
| 5.2 The scenario analysis   | 40        |
| 5.3 Impacts of revenue changes on employment in Christchurch  | 41        |
| <b>CHAPTER 6 RESULTS OF THE FOOD MANUFACTURING BUSINESS EXPENDITURE ANALYSIS</b>  | <b>43</b> |
| 6.1 Food manufacturing businesses in Selwyn and Waimakariri districts   | 43        |
| 6.2 Expenditure patterns of Selwyn and Waimakariri food manufacturing businesses  | 44        |
| 6.3 The direct value of business expenditure by Selwyn and Waimakariri food manufacturing businesses on the Christchurch economy            | 44        |
| 6.4 Total effects of business expenditures by Selwyn and Waimakariri food manufacturing businesses on output and employment in Christchurch | 47        |
| 6.4.1 Total effects on the value of output  | 47        |
| 6.4.2 Total effects on employment in Christchurch   | 48        |
| <b>CHAPTER 7 SUMMARY AND CONCLUSIONS</b>  | <b>49</b> |
| <b>REFERENCES</b>   | <b>53</b> |
| <b>APPENDIX 1 STATISTICS NZ: NUMBER OF FARMS BY TYPE AND AREA, YEAR ENDED JUNE 2011</b>   | <b>55</b> |
| <b>APPENDIX 2 EXPENDITURE FLOW COEFFICIENTS</b>   | <b>56</b> |
| <b>APPENDIX 3 FARM QUESTIONNAIRE</b>  | <b>58</b> |
| <b>APPENDIX 4 BUSINESS QUESTIONNAIRE</b>  | <b>62</b> |
| <b>APPENDIX 5 CONSUMER PRICE INDEX – ALL GROUPS (BASE =JUNE 2014)</b>   | <b>66</b> |
| <b>APPENDIX 6 CANTERBURY FARM MONITORING DATA 2010/11<sup>1</sup></b>   | <b>67</b> |
| <b>APPENDIX 7 STATISTICS NZ: HOUSEHOLD EXPENDITURE DATA</b>   | <b>69</b> |
| <b>APPENDIX 8 FARM EXPENDITURE FLOWS</b>  | <b>71</b> |
| <b>APPENDIX 9 SECTOR MAPPING &amp; MULTIPLIERS FOR FARM SURVEY</b>  | <b>83</b> |
| <b>APPENDIX 10 SECTOR MAPPING &amp; MULTIPLIERS FOR BUSINESS SURVEY</b>   | <b>84</b> |
| <b>APPENDIX 11 EMPLOYMENT MULTIPLIERS CHRISTCHURCH</b>  | <b>85</b> |
| <b>APPENDIX 12 OCCUPATION BY INDUSTRY, IN CHRISTCHURCH 2006</b>   | <b>86</b> |

## List of Tables

|   |    |
|---|----|
| Table 2-1: Distribution of farm types among respondents   | 4  |
| Table 2-2: Responses by industry sector   | 8  |
| Table 2-3: Irrigated and potentially irrigable areas (hectares) in Selwyn and Waimakariri districts   | 12 |
| Table 2-4: Per hectare returns under irrigation (real \$2014)   | 14 |
| Table 2-5: Number of food processing businesses in Selwyn and Waimakariri districts   | 15 |
| Table 2-6: Numbers of employees in Selwyn and Waimakariri food processing businesses  | 15 |
| Table 2-7: Food processing businesses identified in Selwyn and Waimakariri districts  | 16 |
| Table 2-8: Farm employees on Selwyn and Waimakiri farms   | 17 |
| Table 3-1: Direct expenditure in Christchurch by farm type <sup>1</sup>   | 20 |
| Table 3-2: Expenditure (\$2014) flows from farms <sup>1</sup> in Waimakariri and Selwyn into Christchurch for selected categories by farm type  | 21 |
| Table 3-3: Direct, indirect and induced effects <sup>1</sup> from farm expenditure in Christchurch  | 25 |
| Table 3-4: Expenditure flows from Waimakariri and Selwyn businesses as FTEs <sup>1</sup> in Christchurch by industry sectors affected by farm expenditure   | 27 |
| Table 3-5: FTEs associated with total expenditure flows from Selwyn and Waimakariri farms by occupation <sup>1</sup> for selected sectors in Christchurch   | 28 |
| Table 3-6: Local expenditure flows from Selwyn and Waimakariri district farms and their households  | 29 |
| Table 3-7: Farms in Christchurch City 2013  | 30 |
| Table 4-1: Expenditure flows from Waimakariri and Selwyn businesses into Christchurch by industry sector  | 32 |
| Table 4-2: Direct, indirect and induced effects from business expenditure <sup>1</sup> in Christchurch by industry sector   | 33 |
| Table 4-3: Expenditure flows from Waimakariri and Selwyn businesses <sup>1</sup> as FTEs in Christchurch by industry sector   | 34 |
| Table 4-4: FTEs by occupation <sup>1</sup> for selected industry sectors in Christchurch (associated with direct, indirect and induced effects of rural business expenditure <sup>2</sup> from Waimakariri and Selwyn businesses) | 35 |
| Table 4-5: Christchurch gross output for food and beverage manufacturing (\$2014)   | 36 |
| Table 5-1: Change in expenditure flows to Christchurch associated with \$1 change in revenue by farm type   | 40 |
| Table 5-2: Changes in production values and expenditure flows 2018 (\$ million)   | 41 |
| Table 5-3: Output and employment responses in Christchurch to a million dollar change in the value of output at the farmgate  | 42 |
| Table 5-4: Increase in FTEs in Christchurch as a result of irrigation development in Selwyn Waimakariri districts   | 42 |

|   |    |
|---|----|
| Table 6-1: Real (\$2014) annual expenditures by Selwyn and Waimakariri food manufacturing businesses (excluding raw materials)    | 46 |
| Table 6-2: Direct, indirect and induced effects from food manufacturing business expenditure in Christchurch                      | 47 |
| Table 6-3: Impacts of food manufacturing expenditures on total employment in Christchurch   | 48 |
| Table 7-1: Total impacts of farm and rural business expenditures of the economy of Christchurch                                   | 50 |
| Table 7-2: Contribution of the Christchurch agricultural and food manufacturing sectors to the Christchurch economy (2014 prices) | 51 |

## List of Figures

|  |    |
|--|----|
| Figure 1-1: Map of Canterbury districts  | 1  |
| Figure 2-1: Population and sample distributions of farms in Selwyn and Waimakariri                                   | 3  |
| Figure 2-2: Population and sample distributions by district  | 4  |
| Figure 2-3: Geographic location of respondent farms by farm type   | 5  |
| Figure 2-4: Stages in the estimation of expenditure flows into Christchurch from farm businesses and farm businesses | 7  |
| Figure 2-5: Analysis of rural business expenditure flows from farm purchases into Christchurch                       | 9  |
| Figure 2-6: Distribution of farm types in Selwyn and Waimakariri districts 2001/02 to 2011/12                        | 11 |
| Figure 2-7: Assumed distribution of enterprises on additional irrigated land   | 13 |
| Figure 3-1: Proportions of farm and farm household expenditure by location of goods/service provider                 | 23 |
| Figure 3-2: Expenditure categories as a proportion of total farm business expenditures in Christchurch by farm type  | 24 |
| Figure 5-1: Real direct expenditure flows from Selwyn and Waimakariri farms into Christchurch 2001/12 to 2011/12     | 38 |
| Figure 5-2: Drymatter production and producer price indices 2001/02-2011/12  | 38 |
| Figure 5-3: Total impacts of farm expenditure on Christchurch (\$2014 terms)   | 39 |
| Figure 6-1: Expenditure categories by location of services   | 44 |
| Figure 6-2: Value of business expenditures (\$2014) (excluding raw materials) by source of goods and services        | 46 |



## Executive Summary

- The impacts of expenditure flows from rural districts on the economy of Christchurch have been calculated as part of a broader research project, “The Wheel of Water”, led by Aqualinc Research Ltd. and funded by the Ministry of Business, Innovation and Employment (MBIE).
- In 2013, the AERU developed and tested a methodology for identifying and quantifying the socio-economic impacts of expenditure flows from the rural sector on adjacent urban areas. The impacts of expenditure flows from farms, farm households, rural-servicing businesses and food processing businesses located in the Selwyn and Waimakariri districts on the Christchurch economy have been estimated during three stages of the study. In the first stage the methodology was developed and the expenditure flows from farms and rural-servicing businesses were estimated. In the second stage, the inter-annual differences in farm expenditure flows, and the potential impacts of increasing irrigation development were examined, and lastly the contribution of the food processing sector in Selwyn and Waimakariri districts to economic activity in Christchurch was estimated.
- A three-step process was used to estimate the total expenditure flows from farms, farm households and rural-servicing businesses into Christchurch from the two adjoining districts. A postal survey of farms was carried out to obtain information about the proportions of farm and farm household expenditure spent locally, in Christchurch, and elsewhere by expenditure category. Estimation of the expenditure by all farms and farm households was undertaken by overlaying the survey data with data from the Statistics New Zealand Household Economic Survey and the Ministry of Primary Industries Farm Monitoring data. A web-based survey of rural businesses to acquire information on where they purchased supplies was conducted, and the survey results and secondary data were used to estimate the total value of rural business expenditure in Christchurch. Output and employment multipliers for Christchurch were used to estimate the total effects of agricultural expenditure on gross output and employment in the city.
- The analysis showed that in the 2010/11 year the average farm in the Selwyn and Waimakariri districts spent \$73,137 in Christchurch on goods and services for the farm household and business. The largest proportion of that expenditure was spent on fertiliser and lime. The value of direct expenditure from all farms in the two districts in Christchurch was estimated to be \$255 million (in \$2014 terms), and the total contribution of farm expenditure to the value of gross output in Christchurch (direct, indirect and induced) to be \$645 million. The impact on employment in the city was estimated to be 4,277 FTEs. In addition it was estimated that spending by farm employees accounted for \$3 million of the value of output in Christchurch and generated 464 FTEs.
- Businesses in the Selwyn and Waimakariri districts also purchase many of the goods and services they require in Christchurch, and it was estimated that 18 per cent of this was associated with farm purchases from those businesses. The value of direct expenditure in Christchurch by rural businesses, associated with their provision of goods and services to farm households and businesses, was estimated to be \$433 million (2014 prices) in 2010/11, and the total value of expenditure (direct, indirect and induced) to be \$974 million. The employment impact associated with rural business expenditure was estimated to be 7,012 FTEs.

- Investigation of the inter-annual variability in farm expenditure flows into Christchurch was based on secondary data supplied by Beef and Lamb New Zealand and DairyNZ, and included only the impacts of changing farm output levels on the business expenditures of sheep/beef, dairy and arable farms. As time-series data were not available on other farm types, nor on household expenditures, only the business expenditure flows from these three farm types were included in the analysis.
- In order to determine the impact of changes in water availability, and land-use changes, on the economic activity of the city, regression analysis of time-series data was used to estimate the relationships between farm revenues and expenditure flows into Christchurch. The results of this analysis showed that if dairy farm output in Selwyn and Waimakariri districts increased by \$1 million, direct expenditure flows into Christchurch would increase by \$86,000 and the total (direct, indirect and induced) impact of the expenditure flows on the Christchurch economy would be \$220,000. If the value of output in the sheep/beef sector increased by \$1 million, direct expenditures in Christchurch would be expected to increase by \$105,000 and the total impact by \$290,000. An increase in arable output would lead to direct expenditure increases in Christchurch of \$122,000 (total impact, \$330,000).
- Expenditure flows from Selwyn and Waimakariri farms into Christchurch were found to have increased relatively steadily over the period 2001/02 to 2011/12 from \$100 million to \$170 million during the period 2001/02 to 2011/12 in real (2011/12) terms. The main driver of that growth has been the increasing contribution of the dairy sector to the regional agricultural economy as a result of dairy conversion following irrigation development.
- Using regression analysis, the impact of irrigation development on expenditure flows into Christchurch was assessed. Two scenarios (Scenario 1: 50 per cent of potentially irrigable land in Selwyn and Waimakariri districts would be developed during the next five years; Scenario 2: 25 per cent of potentially irrigable land would be developed over five years) were used to determine the effects on output and employment in Christchurch of land-use change following irrigation development. Under Scenario 1, the increase in direct expenditure flows was estimated to be \$25.3 million and the total expenditure flows (including the indirect and induced expenditures), to be \$66 million. The total additional jobs created in Christchurch as a result of these increases was estimated to be 429 FTEs. Under Scenario 2 the increases were estimated to be \$12.6 million in direct expenditure flows; \$33.1 million in total expenditure flows; and 223 FTEs.
- Personal interviews were held with representatives from 14 of the 23 food processing businesses identified in the two districts. A similar approach to the methodology developed for the rural business survey was used to determine the impacts of food processing businesses in Selwyn and Waimakariri districts on the Christchurch economy, and showed these to be relatively small. The direct annual expenditure flow was valued at \$66 million, and the total effects, at \$154 million in 2014 prices. This reflects the fact that raw material purchases dominate the input costs for these businesses, and almost all of these are purchased from the rural districts of Canterbury. Expenditure flows from Selwyn and Waimakariri food processing businesses into Christchurch accounted for just over 600 FTES in the city.
- While the study included only the two rural districts closest to Christchurch, both farms and businesses in other districts of Canterbury purchase goods and services in Christchurch. In the districts to the north of the city, particularly Hurunui district, local towns are small (Amberley, Kaikoura) and provide limited access to the goods and services needed by farm

households and businesses. In the South, Ashburton and Timaru offer wider choice and it is likely that a relatively high proportion of farm purchases are made in these centres.

- In total, the annual expenditure flows into Christchurch from farms and rural businesses including food processing businesses were estimated to account for \$2.4 billion (8.25 per cent) of the value of output in Christchurch, and the associated employment is estimated to be almost 12,000 FTEs. Farms and food processing businesses within the city boundaries contributed a further \$1.5 billion to gross output (5.4 per cent). Therefore the total contribution to the Christchurch economy is estimated to be \$3.9 billion (13.6 per cent of the value of output).



# Chapter 1

## Introduction

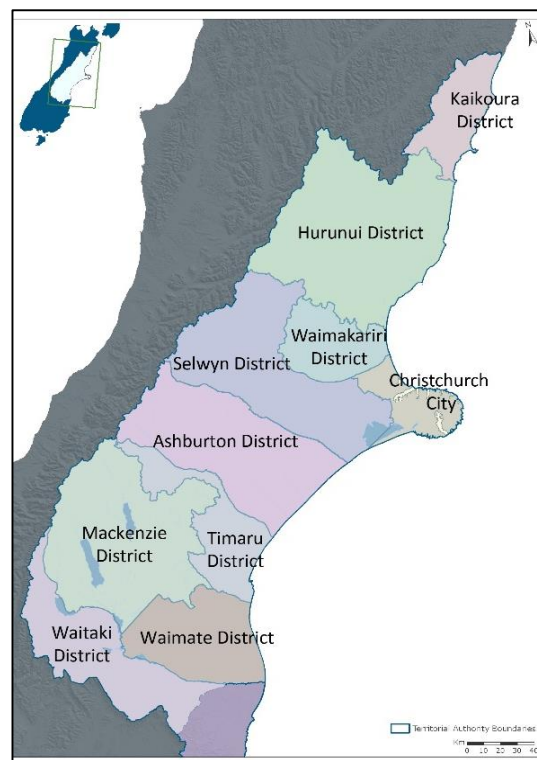
### 1.1 Background

Regional councils in New Zealand have been charged with the responsibility of making water resource management decisions that will directly affect the economic activities of the primary production sector. The impacts of those decisions on agricultural productivity have been the subject of many studies in a number of regions. It is recognised that farm expenditure can make an important contribution to the socio-economic well-being of urban communities but this has rarely been measured. Moreover, the flow-on effects of water resource management decisions (and other decisions that directly affect the productivity of the agricultural sector), on adjacent urban communities are not well understood. Without this information the potential implications of differing water management policies on the regional economy will not be fully recognised.

Consequently, the Agribusiness and Economics Research Unit at Lincoln University (AERU) was commissioned by Aqualinc to undertake a study with the objective of developing and testing a methodology for identifying and quantifying the socio-economic impacts of rural expenditure flows on adjacent urban areas. The work was undertaken as part of the research project “The Wheel of Water” led by Aqualinc Research Ltd., and funded by the Ministry of Business, Innovation and Employment (MBIE).

Christchurch was selected as the urban area for evaluation because there were no data to inform the on-going debate about the extent to which economic benefits from agricultural activity on the Canterbury Plains filters into Christchurch. The work was timely, since a new economic development strategy was being formulated as framework for post-earthquake redevelopment in the city. In the study, the nature and extent of the connections between the economy of Christchurch and the agricultural sector in Selwyn (to the south and west of the city) and Waimakariri (to the north) districts were examined. Although the research concentrated on Selwyn and Waimakariri districts, because they are the districts closest to Christchurch (see Figure 1-1), it is recognised that a proportion of the expenditure of farms and businesses in other districts in the Canterbury region (Kaikoura and Hurunui to the north and Ashburton, Timaru, MacKenzie, Waimate and Waitaki in the south), also occurs in Christchurch. However, distance almost certainly means that a much higher level of expenditure will occur in rural towns in these districts.

**Figure 1-1: Map of Canterbury districts**



## **1.2 The Research**

The research was conducted in three stages. Each has been the subject of an individual report to Aqualinc, and this report is an updated and consolidated account of the three stages. In 2013 a methodology was developed and tested for identifying and quantifying the socio-economic impacts of the flows of expenditure into Christchurch from farms and their households; and of the secondary flows that occurred as a result of farm purchases from rural businesses (Guenther et al., 2013). This stage of the research involved separate surveys of farms and rural businesses to obtain data on expenditure flows, which were applied to secondary data on total expenditure, in order to estimate contribution of expenditure flows from farm households and businesses and rural businesses to output and employment in Christchurch. The study provided insights into the spatial flows of rural farming/household expenditure.

The second stage of the work was undertaken to investigate the impacts of inter-annual differences in expenditure flows, in order to estimate the potential impacts on the Christchurch economy of changes in water availability, including irrigation development, on the Canterbury Plains. The flow coefficients derived in the first stage of the research were applied to secondary data on farm incomes and costs in order to examine the likely impacts of differing irrigation scenarios for the Canterbury Plains on the economic performance of Christchurch (Greer et al., 2014).

In 2014/15 the final stage of the study examined the expenditure flows from food processing businesses in the Selwyn and Waimakariri Districts, which are an important part of the agricultural sector (Greer and Saunders, 2015).

## **1.3 Organisation of the Report**

The methodological approaches taken in each of the three stages are described in detail in Chapter 2, while the results of each are described in Chapters 3 to 6, and the overall conclusions from the study are presented in Chapter 7. The appendices include tables providing the underlying details of the analysis.

## Chapter 2

### Methodology

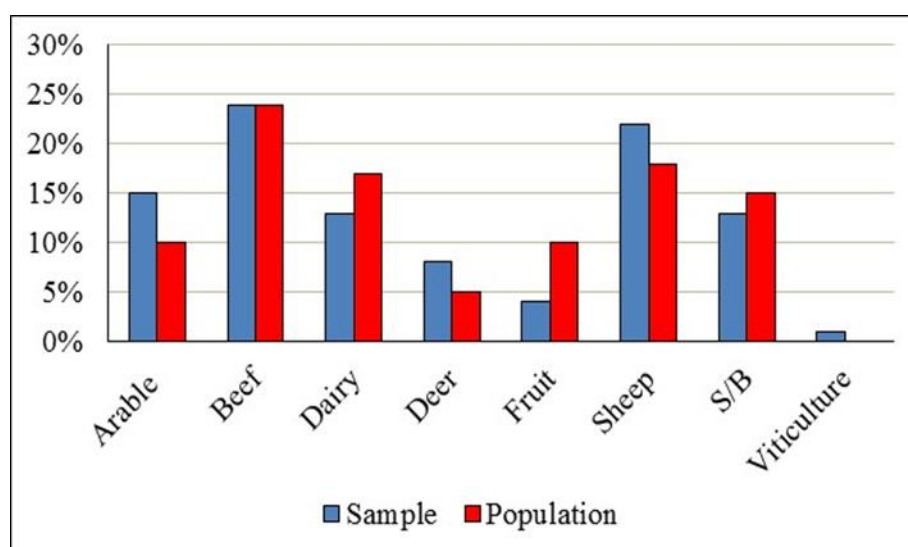
#### 2.1 Introduction

In this chapter the methodologies used for each of the three stages of the research are outlined. Primary data collection on farm and business expenditure flows into Christchurch and elsewhere (as proportions of total expenditure flows) was undertaken by means of three surveys conducted in Selwyn and Waimakariri districts. These included a postal survey of farmers, an email survey of rural-servicing businesses and a personal interview survey of food manufacturing businesses. A range of secondary data sources was used to estimate the values of expenditure in Christchurch by farm households and businesses, including Farm Monitoring data published by the Ministry for Primary Industries (MPI- formerly Ministry of Agriculture and Forestry) (MAF, 2011a-e); data from the Household Economic Survey (Statistics New Zealand, 2010); and the AERU/CDC Economic Development Model (Saunders, et al., 2010).

#### 2.2 Methodology of the farm and household expenditure study

The study of farm business and farm household expenditure was based on a postal survey of 1,591 farms in the Selwyn and Waimakariri districts. The sample of farms was purchased from AsureQuality and included the complete list of farms from the AsureQuality database (AgriBase™) comprising 907 properties in the Selwyn District and 684 in the Waimakariri District. Comparison of the sample with the official statistics on farm numbers for the 2011 year extracted from the Business Demography Statistics (BDS) (Statistics New Zealand, 2011) showed that the sample included 41 per cent of all farms in Selwyn District and 45 per cent of those in Waimakariri District in 2011. The sample and population distributions by farm type and district are shown in Figure 2-1: Population and sample distributions of farms in Selwyn and Waimakariri are shown in Figure 2-2, while Appendix 1 includes the population data from which these figures are derived.

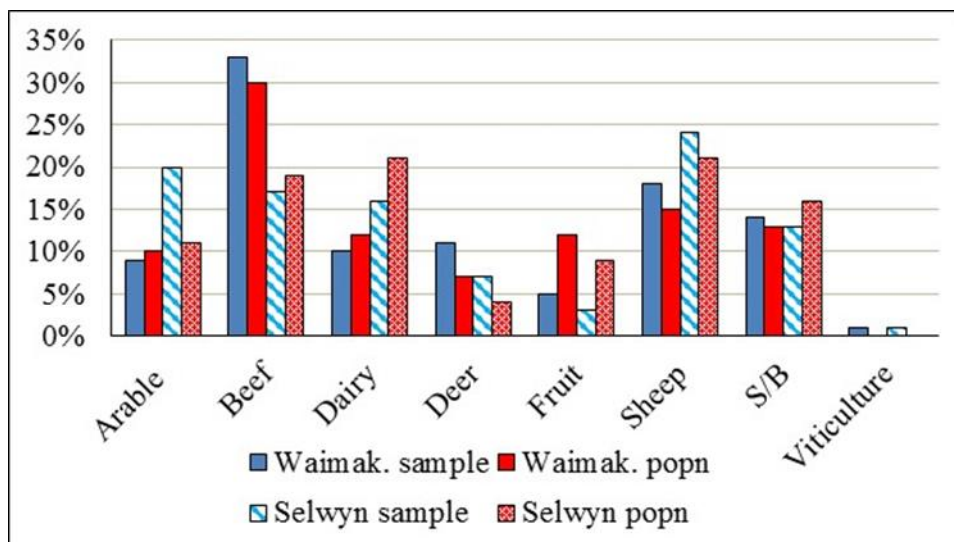
**Figure 2-1: Population and sample distributions of farms in Selwyn and Waimakariri**



As Figure 2-2 shows, the majority (almost 60 per cent) of farms in these two districts combined are beef, sheep and sheep/beef farms, followed by dairy (17 per cent) and arable (10 per cent).

Waimakariri District has a considerably higher proportion of beef farms relative to the proportions of sheep and sheep/beef farms than Selwyn District, higher proportions of deer and fruit farms, but lower proportions of dairy and arable farms.

**Figure 2-2: Population and sample distributions by district**



Although a total of 1,591 surveys were sent out to farms in Selwyn and the Waimakariri districts, 86 were unable to be delivered to the address provided or were returned by recipients who were no longer farming. Consequently the final sample size was 1,505, from which 315 valid responses were received. Table 2-1 shows the distribution of farm types from which responses were received. The farm categories defined in the questionnaire sent to respondents were mapped to those for which data were available from the Farm Monitoring Programme (MAF, 2011a-e), so that survey information on expenditure proportions could be directly overlaid on farm expenditure data. Consequently, it is not possible to align survey responses by farm type perfectly with official data on numbers of farms. As Table 2-1 shows, sheep/beef farms were slightly under-represented in the responses, while deer farms and others were over-represented. The geographic distribution of properties from which responses were received is shown in Figure 2-3 to be well-distributed throughout the Selwyn and Waimakariri districts.

**Table 2-1: Distribution of farm types among respondents**

| Farm type                    | No of responses | % of total responses | % of farms in the two districts |
|------------------------------|-----------------|----------------------|---------------------------------|
| Dairy                        | 38              | 12%                  | 12%                             |
| Sheep/beef                   | 164             | 52%                  | 37%                             |
| Mixed cropping and livestock | 68              | 22%                  | 7%                              |
| Deer                         | 29              | 9%                   | 4%                              |
| Other                        | 16              | 5%                   | 40%                             |
| <b>Total</b>                 | <b>299</b>      | <b>100%</b>          | <b>100%</b>                     |



Figure 2-3: Geographic location of respondent farms by farm type



A questionnaire was designed to collect data on the expenditure by farm businesses and farm households in Christchurch. The questionnaire, which is included in Appendix 3, examined farm expenditure using the categories defined in the MPI Farm Monitoring reports (MAF, 2011a-e), and household spending using categories used in the Household Economic Survey from Statistics New Zealand (2010). Only information on the proportions of expenditure was sought from respondents, as secondary data on the values of expenditure were used to determine total expenditures in Christchurch and elsewhere. The only exception to this was that respondents were asked the amount they had spent on vehicle and machinery purchased, as this information was not available from secondary sources.

In the survey, respondents were asked to estimate the proportions of goods and services in each category that were purchased locally (in Canterbury but not in Christchurch); in Christchurch (the greater Christchurch area including suburbs); and elsewhere (rest of New Zealand, overseas, internet etc.). They were then asked whether their expenditure patterns had changed since the Canterbury earthquakes of 2010/11 and, if so, what the proportions had been before that time. Finally, respondents were asked to indicate their main farming activity using the Farm Monitoring farm types, which were: dairy; sheep/beef breeding and finishing; sheep/beef hill country; deer; and mixed cropping and livestock finishing.

The farm survey was posted out in August 2012<sup>1</sup>. A reminder was sent out three weeks later to 125 farms in Malvern, Kirwee and Selwyn–Rakaia, as the response rate to the initial survey in these areas was relatively low.

Estimation of the total values of farm business and farm household expenditure in Christchurch was a four staged process, using both survey data and data from secondary sources, which is summarised in Figure 2-4.

1. From the survey data the average proportional expenditures in Christchurch for each expenditure category by farm type and overall were calculated for both farm business and farm household expenditures.
2. The average annual expenditure in each expenditure category in Christchurch was calculated by applying the proportions estimated from survey data to the values of farm and household expenditure in 2010/11 for each farm type. The values of farm business expenditure were derived from Farm Monitoring data (MAF, 2011a-e), and the values of household expenditure in Selwyn and Waimakariri districts were derived from the Household Economic Survey (Statistics New Zealand, 2010).
3. The average levels of expenditure by category and by farm type were aggregated to the district level using data on farm numbers published in the BDS (Statistics New Zealand, 2011, see Appendix 1).
4. Multiplier analysis was used to calculate the total effects, including the direct, indirect and induced effects, of the expenditure flows from the farm businesses and households in the Selwyn and Waimakariri districts into Christchurch. In addition to the direct flow of farm and farm household expenditures into the businesses in Christchurch that supply goods and services in return, the expenditures also result in flow-on effects to other sectors of the Christchurch economy that are referred to as “indirect effects” and “induced effects”. The

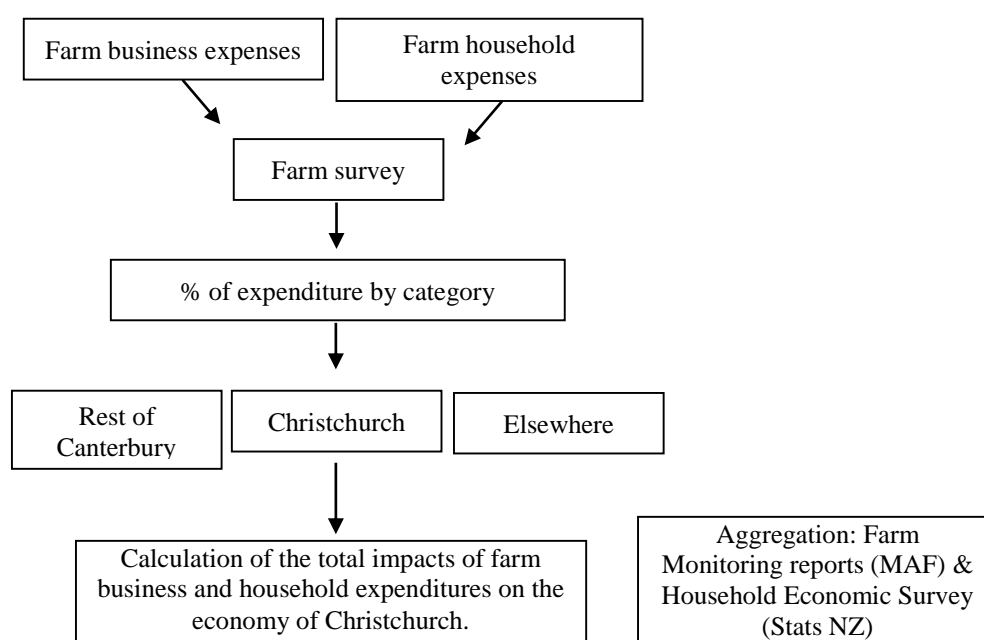
---

<sup>1</sup> The AERU research team sought and received approval from the Lincoln University Human Subjects Ethics Committee in July 2012 before the farm survey was administered.

indirect effects are the effects on firms supplying the businesses from which farms purchase goods and services. The induced effects are the effects of changes in the household expenditures, which occur as a result of the direct and indirect effects of changes in farm expenditure on output of, and employment in, other Christchurch businesses. The indirect and induced impacts were estimated using multiplier tables for Christchurch developed by Market Economics (2004 values) for the AERU/CDC Economic Development model (Saunders et al, 2010). These are presented in Appendix 9. The sum of the direct, indirect and induced effects provides an estimate of the total contribution of expenditures by farms and farm households in the Selwyn and Waimakariri districts to the output of the Christchurch economy.

A limitation of the analysis is that the multipliers are based on input-output data collected before the Canterbury earthquakes, and do not reflect any changes in the structure of the Christchurch economy that have occurred since that time.

**Figure 2-4: Stages in the estimation of expenditure flows into Christchurch from farm businesses and farm businesses**



## 2.3 Methodology of the rural business expenditure study

The sample of rural businesses in Selwyn and Waimakariri districts was drawn from lists of businesses held by the Selwyn District Council and Enterprise North Canterbury. For reasons of confidentiality these economic development agencies could not release the lists, but instead agreed to distribute the survey on behalf of the AERU. The survey was administered using Qualtrics™, a web-based survey instrument. An advantage of this approach was the access it provided to a comprehensive list of businesses, created by organisations with close ties to the business communities in each district. However, the limitations of the approach were, firstly, that no information on the sample distribution by business type or location, or the extent to which it reflected the total population of businesses was available. Secondly, it was not possible

to monitor how many businesses actually received the email with the link to the survey and, thus, to calculate the response rate accurately.

The rural business survey was sent out via email to 373 businesses in Selwyn District and 700 businesses in the Waimakariri District. A total of 64 fully and partially completed surveys was received, comprising 58 respondents from Selwyn District and six respondents from Waimakariri District. The estimated response rate of six per cent was based on the assumption that all 1,073 emails were received, although it is likely that some email addresses had changed, and it is known that there had been a number of business births and deaths in the Waimakariri District particularly since the Canterbury earthquakes (Miles Dalton, Enterprise North Canterbury, pers. comm.). Table 2-2 shows the responses by business type for the combined districts. The majority of businesses were from the retail sector (16 per cent), followed by the agricultural sector (14 per cent) and business services sector (13 per cent).

**Table 2-2: Responses by industry sector**

| <b>Industry category</b>         | <b>Responses</b> | <b>%</b>    |
|----------------------------------|------------------|-------------|
| Retail trade                     | 10               | 15.6%       |
| Wholesale trade                  | 2                | 3.1%        |
| Other manufacturing              | 2                | 3.1%        |
| Agriculture                      | 9                | 14.1%       |
| Electricity                      | 2                | 3.1%        |
| Waste and Water                  | 1                | 1.6%        |
| Accommodation                    | 5                | 7.8%        |
| Transport & Storage              | 2                | 3.1%        |
| Communication                    | 3                | 4.7%        |
| Business Services                | 8                | 12.5%       |
| Education                        | 5                | 7.8%        |
| Health                           | 2                | 3.1%        |
| Cultural and Recreation Services | 3                | 4.7%        |
| Personal Services                | 4                | 6.3%        |
| Other (please specify)           | 6                | 9.4%        |
| <b>Total</b>                     | <b>64</b>        | <b>100%</b> |

The questionnaire administered to rural businesses is included in Appendix 4. Businesses were asked to record the proportions of expenditure locally, in Christchurch, and elsewhere for each of a number of expenditure categories defined in the Australian and New Zealand Standard Industrial Classification (ANZSIC06) (Statistics New Zealand, 2006b).

The process of estimating the total effects of expenditure flows from rural businesses that stem from sales of goods and services to farms, involved several steps including:

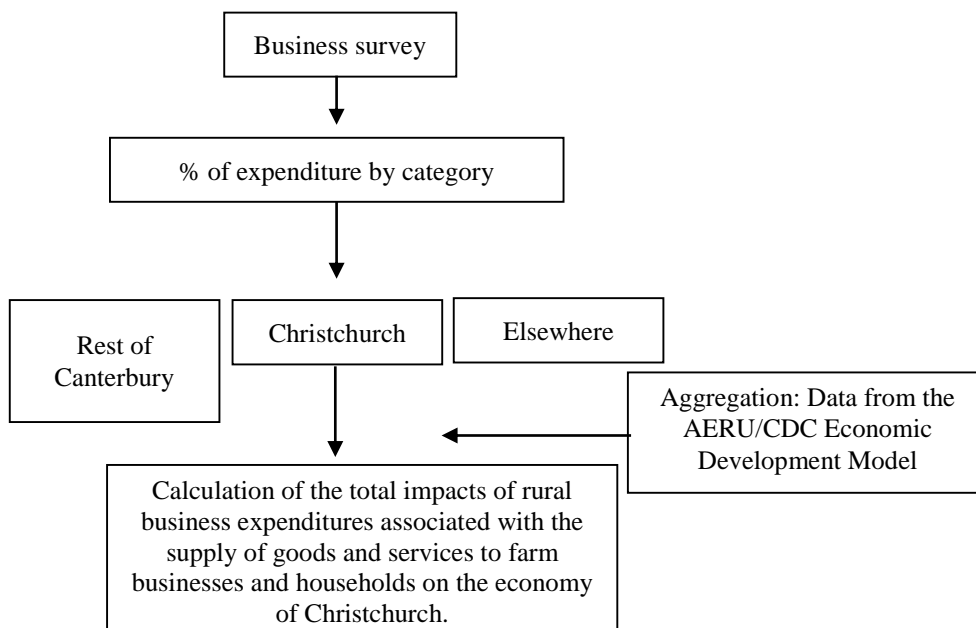
1. Data on the business expenditures for all businesses in the Waimakariri and Selwyn districts in each category were derived from data on Canterbury's total business inputs by sector, sourced from the AERU/CDC Economic Development Model. Business inputs for Selwyn and Waimakariri businesses were calculated as 17 per cent of Canterbury's business inputs,

since Selwyn and Waimakariri firms comprised 17 per cent of the total number of businesses in Canterbury in 2011 (Statistics New Zealand, 2011).

2. Since Selwyn and Waimakariri businesses do not provide goods and services to farms exclusively, in order to estimate the value of sales to farm customers the total expenditure of rural businesses in Christchurch was weighted by the estimated contribution of farm purchases to the total sales by those businesses. It was assumed that the proportional contribution would be approximately equal to the ratio of local expenditure by farms and farm households to the value of gross output in Selwyn and Waimakariri districts, (18 per cent). The expenditure flow from Selwyn and Waimakariri districts businesses as a result of farm purchases was estimated to be 18 per cent of the estimated flows from all Selwyn and Waimakariri districts businesses into Christchurch.
3. The estimated levels of business expenditure flows into Christchurch were compared with the total gross output of all businesses in Christchurch to determine the proportion of business spending in Christchurch that is attributable to the provision of goods and services to farms by businesses in Selwyn and Waimakariri districts. The data on gross output for Christchurch were obtained from the AERU/CDC Economic Development Model. In order to undertake this estimation survey expenditure categories were mapped to model categories (see Appendix 10).
4. Lastly, the total economic impacts (direct, indirect and induced) on the Christchurch economy of rural business expenditure flows that are a consequence of farm purchases were calculated. Multipliers provided by the AERU/CDC Economic Development Model were applied to the direct levels of business expenditure flows into Christchurch. The multiplier analysis was described in Chapter 2.1.

Figure 2-5 illustrates the analytical process for calculating the secondary farm expenditure flows from rural businesses into Christchurch

**Figure 2-5: Analysis of rural business expenditure flows from farm purchases into Christchurch**



## 2.4 Methodology of the annual variability study

There is considerable annual variability in the total value of farm production in Canterbury between seasons, which reflects the variability of climatic conditions and prices for agricultural products. The extent to which expenditure flows into Christchurch vary with the changing value of output was the subject of the second stage of the research.

The analysis of the annual variability of expenditure flows from Selwyn and Waimakariri districts into Christchurch was based on data from the annual Sheep and Beef Farm Survey undertaken by Beef and Lamb New Zealand (B&LNZ) and the DairyNZ Economic Survey, which is an annual survey of dairy farmers undertaken using dairy farm business data from DairyBase (a web-based package that records and reports standardised dairy farm business information). Revenue and expenditure data for Canterbury sheep/beef farms over 27 years from 1985/86 to 2011/12 were provided by B&LNZ (Rob Davison, B&LNZ; pers. comm.). DairyNZ (DNZ) provided only 12 years' data (1997-98 to 2011-12) (Matthew, Newman, DNZ; pers. comm.), since robust information on Canterbury dairy farms was not collected before that time. All values have been converted to \$2014 terms using the Consumer Price Index (Statistics New Zealand 2015).

It was originally intended to use MPI Farm Monitoring data as a basis for the analysis, since these data were used in order to map survey data on the proportions of farm expenditure spent in Christchurch to the values of expenditure by farm type in the first stage of the study. However, these data have been available in their current form only since 2000, and initial analysis indicated that the time-series dataset was too small for the estimation of robust relationships between revenue and expenditure measures.

The first stage of the analysis involved application of the coefficients derived in the earlier study to recorded expenditures on survey farms, in order to estimate the flows into Christchurch as a result of farm expenditure in the Selwyn and Waimakariri districts during the decade from 2001/02 to 2011/12. While these coefficients were derived from a survey of expenditure in a single year only, it is not considered likely that there will be marked changes in farm expenditure patterns in the medium term, even in exceptional circumstances. For example, the farm survey found that there had been little difference in expenditure patterns before and after the Canterbury earthquakes of 2009/2010. Consequently, application of the single-year coefficients to the time-series data is unlikely to result in significant under or over-estimation of expenditure flows.

Canterbury expenditure data from the high country, hill country and mixed finishing farms were weighted according to the estimated proportions of each farm type in Selwyn and Waimakariri districts to estimate the average expenditures by category on Selwyn and Waimakariri sheep/beef farms (B&LNZ, Rob Davison, pers. comm.). B&LNZ is the only source of time-series data available on arable farms, but the survey collects data on mixed livestock and cropping farms, rather than on intensive arable farms. In the absence of other data, these have formed the basis of the arable analysis.

The annual numbers of sheep/beef, cropping and dairy farms in the two districts were obtained from the BDS. The farm types included were:



Sheep/beef farms:

- ANZSIC06 A014100 Sheep Farming (Specialised);
- ANZSIC06 A014200 Beef Cattle Farming (Specialised);
- ANZSIC06 A014400 Sheep-Beef Cattle Farming.

Cropping farms:

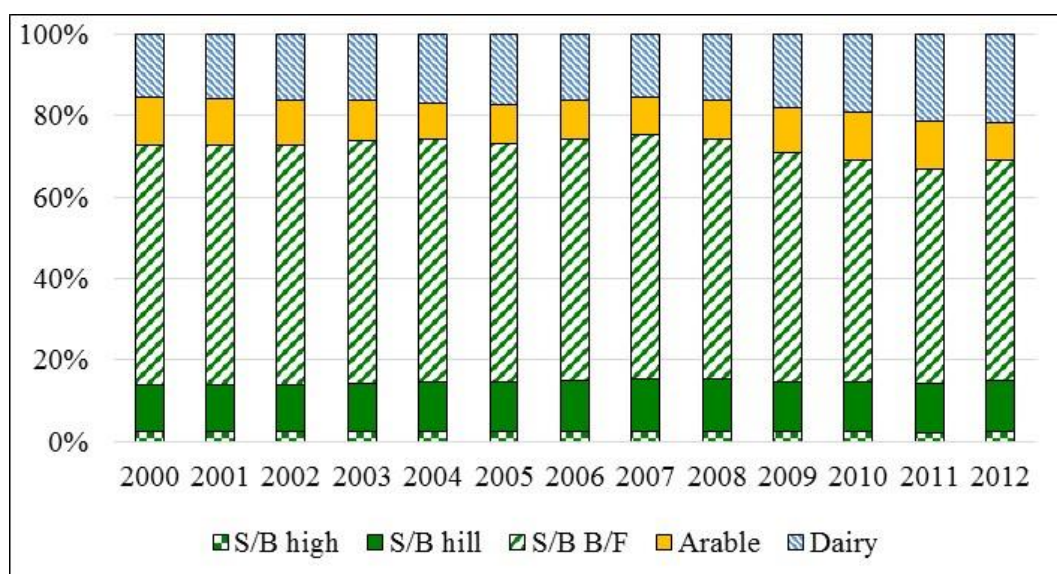
- ANZSIC06 A014500 Grain-Sheep or Grain-Beef Cattle Farming;
- A014900 Other Grain Growing.

Dairy farms:

- ANZSIC06 A016 Dairy Cattle Farming

Figure 2-6 shows the significant change that occurred in the distribution of farm types in the Selwyn and Waimakariri districts between 2000 and 2012. As a result of this change, expenditure flows from the districts into Christchurch have been influenced not only by changes in expenditure levels on-farm, but also by the proportional increase in the number of dairy farms, with associated changes in patterns and levels of expenditure.

**Figure 2-6: Distribution of farm types in Selwyn and Waimakariri districts 2001/02 to 2011/12**



The total annual values of expenditure flows from farms into Christchurch estimated in this analysis understate the actual total values of flows for three reasons. Firstly, the categories of expenditure for which coefficients were derived in the farm and farm household study excluded some expenditure categories, the largest of which was labour. This is explained in more detail in Appendix 6. Secondly, it has been possible to estimate flows only for the three farm types for which time-series expenditure data are available. These comprise approximately 60 per cent of the total farms recorded for the districts (2,051 out of 3,670 in 2011). Thirdly, only farm working expenditure flows are included in the analysis. While it is possible to calculate the proportion of total flows from sheep/beef, dairy and arable farms that was attributable to farm expenditures alone in 2010/2011 (77 per cent) using the farm household expenditure data from the earlier study, it is very probable that the relationship between farm expenses and

household expenses varies markedly with changes in farm revenue. For example, discretionary household expenditures are likely to be reduced in years of drought and low product prices.

In the second stage of the analysis, regression analysis was undertaken to estimate the relationships between farm revenues and expenditure flows into Christchurch, in order to explore the extent to which drought and land-use changes affect economic activity in the city. It was originally intended that, in addition to examining the impacts of changing land-use on economic flows to Christchurch from the rural sector, the impacts of reductions in water availability on the level of economic activity in Christchurch would be estimated. It was hoped to be able to establish the relationships between farm revenue, average dry matter production and expenditure flows, using regression analysis. Annual per-hectare drymatter production (with and without irrigation) in each year of the analysis period was modelled by Aqualinc for the Te Pirita-Mead rainfall zone, which covers the largest proportion of Selwyn District (John Bright, Aqualinc, pers. comm.). These values were regressed against total farm revenue and total working expenses (in both actual and real (\$2013/2014) values) for each farm type, including both one and two year lags, but no significant relationships could be established. It was concluded that the annual patterns of rainfall and a range of other explanatory variables would be required in order to model these relationships – an exercise beyond the scope of this project.

Consequently the scenarios to be evaluated in terms of their impacts on the economic activity of Christchurch were formulated round assumptions of differing levels of irrigation development and, therefore, land-use change. A number of estimates of the potentially irrigable land in Canterbury as a whole, and in the Selwyn and Waimakariri districts, have been proposed, although these areas are not known with certainty. Morgan (2002) assumed that the total area of irrigated land in Canterbury was 1.3 million hectares. Saunders and Saunders (2012), after examining GIS maps based on the New Zealand Land Resource Inventory, reduced this estimate to 1.1 million hectares. Overlaying the Morgan (2002) estimates of irrigable land by district with the Saunders and Saunders (2012) estimate of total irrigable area suggested that the potentially irrigable areas of Selwyn and Waimakariri districts are 184,298 and 85,328 hectares respectively. More recently Aqualinc has reviewed these estimates in the light of the topography of the Districts and provided the most recent estimates of actual and potential irrigation areas, which are shown in Table 2-3.

**Table 2-3: Irrigated and potentially irrigable areas (hectares) in Selwyn and Waimakariri districts**

|                                 | <b>Selwyn District</b> | <b>Waimakariri District</b> |
|---------------------------------|------------------------|-----------------------------|
| Irrigation 2012 (hectares)      | 92,000                 | 36,000                      |
| Potential irrigation (hectares) | 168,000                | 64,000                      |

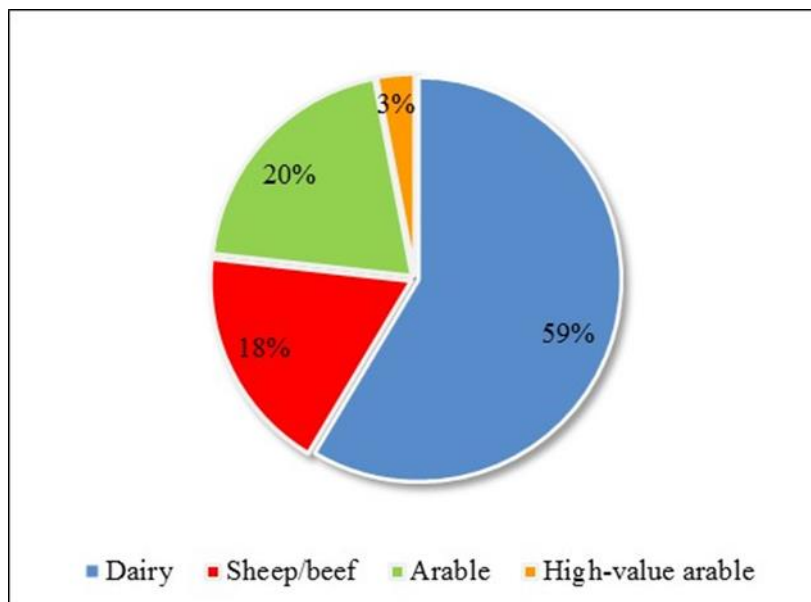
Source: J. Bright, Aqualinc, pers. comm.

Saunders and Saunders (2012) formulated the Canterbury irrigation scenarios they evaluated on the assumption that newly-irrigated land would be used primarily for dairying and dairy support, as assumed in the Canterbury Water Management Strategy (Canterbury Water, 2009), and experienced in the area irrigated from the Opuia Dam in South Canterbury (Harris et al., 2006). The proportions of additional irrigated land devoted to dairy farming, sheep/beef farming, arable farming, and high-value arable farming post-irrigation are shown in Figure 2-7. It was assumed that the previous land-use on newly irrigated land was dryland sheep and beef



production. In the absence of data on potential land-uses after irrigation development it was assumed, for the purposes of this analysis, that the proportions in Selwyn and Waimakariri districts will be the same as those used by Saunders and Saunders (2012) for Canterbury as a whole.

**Figure 2-7: Assumed distribution of enterprises on additional irrigated land**



Two scenarios for evaluation were formulated by Aqualinc (John Bright, Aqualinc pers. comm.) and overlaid with the assumed land-use patterns described above. They were:

- Scenario 1: Fifty per cent of the potentially irrigable land that had yet to be developed in the Selwyn and Waimakariri districts will be developed for irrigation over the next five years (an additional 48,000 hectares in addition to approximately 92,000 hectares already developed) and a similar proportion in Waimakariri District (14,000 hectares in addition to approximately 36,000 already developed).
- Scenario 2: Twenty five per cent of the potentially irrigable land that had yet to be developed in the Selwyn and Waimakariri districts will be developed for irrigation over the next five years.

The differences in expenditure flows into Christchurch under these two scenarios provide a very approximate estimate of the impacts of the rate of irrigation development on expenditure flows to Christchurch. As more information becomes available on the extent of irrigation development and the associated land-use changes, refinement of scenarios for evaluation will be possible. The estimates reflect only the relative expenditure flows from differing farm types under existing cost structures. It is recognised that the costs of nitrogen mitigation, for example, may also have a significant effect on the returns to irrigation development and the flows from rural areas to the city in future.

The differences in per-hectare revenues following irrigation development and land-use change in both scenarios were derived from Saunders and Saunders (2012), who modelled the changes in revenue over 20 years, incorporating price projections derived from the Lincoln Trade and Environment Model (LTEM). The per hectare revenues of each irrigated land-use in

comparison with dryland sheep revenues in 2014 and in 2031, in 2014 prices, are shown in Table 2-4.

**Table 2-4: Per hectare returns under irrigation (real \$2014)**

|                    | <b>2014</b> | <b>2031</b> |
|--------------------|-------------|-------------|
| Dairy              | \$8,595     | \$7,932     |
| Sheep/beef         | \$1,539     | \$1,441     |
| Arable             | \$8,056     | \$6,995     |
| High value arable  | \$3,050     | \$2,648     |
| Dryland sheep/beef | \$555       | \$520       |

Source: Saunders and Saunders (2012)

It was assumed that the development of the land for irrigation will occur at a rate of 20 per cent per year until the area defined in each scenario has been developed. This assumption was also used by Saunders and Saunders (2012).

For each scenario, the differences in revenue streams pre- and post-irrigation development were estimated and used to model the streams of farm expenditure flows into Christchurch from the Selwyn and Waimakariri districts.

## **2.5 Methodology of the food processing sector study**

The next stage of the research examined the contribution of the food manufacturing sector in Selwyn and Waimakariri districts to the economy of Christchurch, by means of a personal interview survey with representatives of food manufacturing businesses.

The BDS report the number of businesses in each Territorial Local Authority district, but it is likely that many smaller businesses are not captured in these measures. The statistics report that there were 36 Selwyn and Waimakariri food processing firms in 2013. They comprised 17 per cent of the number of food processing businesses in Canterbury (34 per cent of the Canterbury businesses outside Christchurch) and employed 13 per cent of the food processing employees in Canterbury (18.5 per cent of the food processing employees outside Christchurch). The distribution of food processing businesses by sector is shown in Table 2-5, and the employment levels in these in Table 2-6.

**Table 2-5: Number of food processing businesses in Selwyn and Waimakariri districts**

| <b>ANZSIC code</b>                               | <b>Canterbury</b> | <b>Christchurch</b> | <b>Waimakariri</b> | <b>Selwyn</b> |
|--|-------------------|---------------------|--------------------|---------------|
| C111 Meat and Meat Product Manufacturing         | 52                | 17                  | 5                  | 9             |
| C113 Dairy Product Manufacturing                 | 26                | 11                  | 3                  | 4             |
| C114 Fruit and Vegetable Processing              | 17                | 9                   | 1                  | *             |
| C116 Grain Mill and Cereal Product Manufacturing | 10                | 6                   | 1                  | 1             |
| C119 Other Food Product Manufacturing            | 110               | 67                  | 6                  | 6             |
| <b>Total</b>                                     | <b>215</b>        | <b>110</b>          | <b>16</b>          | <b>20</b>     |

**Table 2-6: Numbers of employees in Selwyn and Waimakariri food processing businesses**

| <b>ANZSIC code</b>                               | <b>Canterbury</b> | <b>Christchurch</b> | <b>Waimakariri</b> | <b>Selwyn</b> |
|--|-------------------|---------------------|--------------------|---------------|
| C111 Meat and Meat Product Manufacturing         | 4,860             | 980                 | 360                | 380           |
| C113 Dairy Product Manufacturing                 | 1,330             | 390                 | 15                 | 210           |
| C114 Fruit and Vegetable Processing              | 1,010             | 390                 | *                  | *             |
| C116 Grain Mill and Cereal Product Manufacturing | 60                | 40                  | 9                  | 3             |
| C119 Other Food Product Manufacturing            | 700               | 360                 | 6                  | 90            |
| <b>Total</b>                                     | <b>7,960</b>      | <b>2,160</b>        | <b>390</b>         | <b>683</b>    |

As there is no comprehensive list of food processing businesses in the Selwyn and Waimakariri districts, businesses were identified using several approaches to ensure that as many businesses as possible were included in the survey. Enterprise North Canterbury (the economic development agency that covers the Waimakariri District) and the Selwyn District Business Database provided some contact details. The remainder of the food processing businesses were found through other contacts and internet searching. In total, 25 businesses were identified, ranging from large dairy and meat processing businesses to small local butcheries. Table 2-7 shows the types of food processing businesses identified.

**Table 2-7: Food processing businesses identified in Selwyn and Waimakariri districts**

| <b>Business type</b>                             | <b>No in Selwyn and Waimakariri districts</b> |
|--|---|
| C111 Meat and Meat Product Manufacturing         | 8   |
| C113 Dairy Product Manufacturing                 | 6   |
| C114 Fruit and Vegetable Processing              | 1   |
| C116 Grain Mill and Cereal Product Manufacturing | 2   |
| C119 Other Food Product Manufacturing            | 8   |
| <b>Total</b>                                     | <b>25</b>                                     |

Of these, five were very small businesses employing only one or two people; two were no longer in business; two did not respond to attempts to contact them; and two (both larger businesses) declined to be interviewed. The remaining fourteen business owners/ managers were personally interviewed in early 2015.

The interviews were modelled on the questionnaire developed for the first business survey, but more information was sought on staff numbers, sources of raw material and the nature of expenditure. Interviewees were asked to indicate the proportions of their expenditure in other economic sectors that occurred locally, in Christchurch, and elsewhere.

The expenditure proportions reported by individual interviewees were weighted by that business's share of the total numbers of FTEs employed by businesses surveyed, in order to determine the average proportion of expenditure in each category that flowed into Christchurch from Selwyn and Waimakariri food manufacturing businesses.

The AERU/CDC Economic Development Model was used to derive estimates of business expenditure in Christchurch, in the rest of Canterbury, and elsewhere, by Canterbury food processing businesses located outside the city. The input-output data used in the model were based on data for the 2003/04 year and are consequently somewhat dated. Output values have been converted to 2013/2014 values using the Consumer Price Index (Statistics New Zealand, 2015), but as this does not account for changes in industry structure over the period. The impacts on employment have been estimated on the basis of the base output values rather than the inflation-adjusted values.

The proportion of expenditure occurring in Christchurch was expected to be higher for Selwyn and Waimakariri business than for those located further from the city. Consequently, the approach taken to estimation of business expenditures in Christchurch was to estimate the total expenditure (irrespective of where it occurred) in each category by all Canterbury food manufacturing businesses outside Christchurch. Total expenditure by Selwyn and Waimakariri food manufacturing businesses by category was calculated using the ratio of Selwyn and Waimakariri employment in food manufacturing to employment in food manufacturing in Canterbury outside Christchurch (18.5 per cent). The reported proportions of expenditure in Christchurch were applied to the total expenditures by category of Selwyn and Waimakariri food manufacturing businesses.

## 2.6 The contribution of expenditure by employees

Wages comprise a high proportion of total expenditure on farms (see footnote P19), and it can be assumed that at least part of the wages of farm employees in Selwyn and Waimakariri districts is spent on goods and services from Christchurch. As it has been assumed that most farm employees reside in the same district as the farms on which they are employed, these expenditures create another stream of expenditure flows from rural districts to the city. Farms in the Selwyn and Waimakariri employed 2,980 employees in 2011 (Statistics New Zealand, 2011), and the distribution of employees by farm type is shown in Table 2-8.

**Table 2-8: Farm employees on Selwyn and Waimakiri farms**

| Farm type                   | No of employees |       |
|-----------------------------|-----------------|-------|
|                             | 2011            | 2014  |
| Dairy                       | 1,120           | 1,300 |
| Sheep/beef cattle and grain | 780             | 900   |
| Deer                        | 65              | 65    |
| Other                       | 1,015           | 1,065 |
| Total                       | 2,980           | 3,330 |

These data include both full time and part time employees, and no FTE total is available. Nor is it possible to determine the number of households associated with those employees.

Survey respondents were not asked to estimate the expenditure flows from employees into Christchurch, since they could not have reasonably been expected to know this. Rather, these flows have been estimated by calculating the ratio of expenditure in Christchurch by farm households to the median household income in Selwyn and Waimakariri districts, and applying this ratio to the total wages bill on each type of farm. This estimate is discussed in Chapter 3.5.

Although wages are also an important contributor to the total costs incurred by rural businesses (including food processing businesses), no data on the wages paid by businesses included in the survey on which to estimate total expenditure in Christchurch by rural businesses were available. The estimated expenditure flows from the rural sector into Christchurch have been under-estimated for this reason as well as those discussed elsewhere.

## 2.7 The contribution of the Christchurch agricultural sector

In addition to the expenditure flows from farms and rural businesses in rural districts, the economy of Christchurch includes both agricultural and food manufacturing sectors. While these sectors were not examined in detail during the research, the contribution of both farms and food processing businesses to the value of output and to value-added (Gross Domestic Product (GDP)), and their expenditure in other sectors of Christchurch, were estimated using secondary data sources. The value of the Christchurch farming contribution is reported in Chapter 3.6, and contribution of the Christchurch food manufacturing sector in Chapter 4.4.



## **Chapter 3**

### **Results of the Farm Expenditure Flows Analysis**

Flows of expenditure from farms in Selwyn and Waimakariri into Christchurch include the flows of both household and farm expenditure. Secondary data were available on the value of expenditures, but a survey was required to determine where farms purchase goods and services. The farmers who participated in the expenditure survey (315) were asked to estimate the proportions of their household and business expenditures that were made in the local area (defined as Canterbury outside Christchurch), Christchurch, and outside Canterbury. They were also asked to estimate both current and pre-earthquake expenditure patterns but as few differences in these were reported, only current patterns have been used in the analysis.

A number of expenditure categories were defined, but as these did not include all farm expenditures the estimated expenditure flows will be an underestimate of the total<sup>2</sup>. The major expenditure item excluded on all farm types was “wages”, since survey respondents could not be expected to know where employee wages are spent. The expenditure in Christchurch by employees on farms in the Selwyn and Waimakariri districts has been estimated very approximately using the ratio of farm expenditure to median household income and the cost of farm wages, and is discussed in Chapter 3.5. Most of the other expenditure omitted could be expected to flow to areas other than Christchurch. Total working expenditures and those included in the analysis are shown in detail in Appendix 6.

The contribution of farm households in the Selwyn and Waimakariri districts was also almost certainly underestimated in the analysis. The data used to estimate the total expenditure by farm households were derived from the Household Economic Survey (Statistics New Zealand, 2010), which does not separately identify farm households, and the average value across all households in Selwyn and Waimakariri was used in the analysis. However, data on farm drawings suggest that farm households have higher-than-average incomes and, therefore, higher-than-average expenditures. Farm drawings (MAF, 2011a-e), the funds removed from the farm business to meet personal expenses, were \$53,000 on average in 2010/11 (\$57,570 in 2014 terms). This was less than the median household expenditure in Selwyn and Waimakariri districts of \$63,134 reported in the 2013 Census (Statistics New Zealand, 2014c). However, farm accountants quote a ratio of farm drawings to urban salary of 1:2.5. Consequently, the salary equivalent of the drawings reported would be \$127,000, very much higher than the household income, suggesting that farm household expenditure is also likely to be markedly higher than the estimates included in the study.

#### **3.1 Direct expenditure in Christchurch by farm households and businesses**

On average, farm household expenditure accounted for 23.8 per cent of the total value of expenditure in Christchurch in the selected categories, while farm business expenditure comprised 76.8 per cent. The largest proportions of household expenditure that occurred in Christchurch were expenditures on clothing and footwear (an estimated 64 per cent) and household contents and services (63 per cent). Amongst farm expenditures the highest

---

<sup>2</sup> The farm expenditure categories included accounted for 48 per cent of working expenditures on dairy farms; 55 per cent of working expenditure on sheep/beef farms; 64 per cent of cropping farm working expenditure; and 65 per cent of working expenditures on deer farms in 2010/11. See Appendix 6 for details.

proportion of accountancy, legal and consultancy services (57 per cent) was purchased in Christchurch.

It was estimated that Selwyn and Waimakariri farm businesses and households spent \$72,992 per year on average in Christchurch, which represented 27.9 per cent of the expenditure in the expenditure categories included (see Table 3-1). In order to estimate the total expenditure from all farms in the Selwyn and Waimakariri districts, weighted average expenditures (accounting for the numbers of farms of each type) were calculated. Dairy, sheep/beef, mixed cropping and deer farms comprised 61 per cent of the total number of farm properties in the two districts. The remaining 39 per cent of farms included a diverse range of enterprises for which no financial data were available. Consequently, the conservative assumption that expenditure flows from other farm types would be similar in size to the lowest value estimated for the four farm types analysed (deer = \$51,694) was made. On this basis the total value of direct expenditure in Christchurch from farms (including household and farm business) was valued at \$267.62 million.

**Table 3-1: Direct expenditure in Christchurch by farm type<sup>1</sup>**

|   | <b>Dairy<br/>\$/yr</b> | <b>Sheep/<br/>Beef<br/>\$/year</b> | <b>Mixed<br/>crop<br/>\$/year</b> | <b>Deer<br/>\$/year</b> | <b>Other<br/>\$/year</b> | <b>Wt'd<br/>average<br/>\$/year</b> |
|---|------------------------|------------------------------------|-----------------------------------|-------------------------|--------------------------|-------------------------------------|
| Expenditure in Christchurch               | 144,788                | 65,019                             | 129,188                           | 51,694                  | 51,694                   | 72,922                              |
| % of total farm and household expenditure | 23.31%                 | 29.31%                             | 28.60%                            | 30.77%                  | 30.77%                   | 27.84%                              |
| Total direct flows (\$million)            | 63.85                  | 89.08                              | 31.01                             | 7.13                    | 76.56                    | 267.62                              |
| % of total direct flows                   | 23.86%                 | 33.28%                             | 11.59%                            | 2.67%                   | 28.61%                   | 100.0%                              |

<sup>1</sup> The expenditure estimates reported, which have been derived from Farm Monitoring and Household Economic data, have been converted into 2014 dollar values (adjusted by the Consumer Price Index – see Appendix 5) as described in Chapter 2.1.

There was variability in the total values of expenditure flows amongst farm types. The average dairy farm contributed more than twice as much to the Christchurch economy as the average sheep farm; 13 per cent more than the average mixed cropping farm; and 2.8 times as much as the average deer farm. Table 3-2 summarises the reported proportions of expenditure in Christchurch of all farms, and the estimated total values and flows into Christchurch by farm type.



**Table 3-2: Expenditure (\$2014) flows from farms<sup>1</sup> in Waimakariri and Selwyn into Christchurch for selected categories by farm type**

| Category                                      | Weighted flow coefficients <sup>1</sup> | Total exp. in ChCh by farm \$/year | Direct expenditure flows into ChCh from dairy farms in Selwyn and Waimak. \$m <sup>23</sup> | Direct expenditure flows into ChCh from sheep/beef farms in Selwyn and Waimak. \$m <sup>23</sup> | Direct expenditure flows into ChCh from mixed cropping farms in Selwyn and Waimak. \$m <sup>23</sup> | Direct expenditure flows into ChCh from deer farms in Selwyn and Waimak. \$m <sup>23</sup> | Direct expenditure flows into ChCh from other farms in Selwyn and Waimak. \$m <sup>23</sup> | Total direct expenditure flows into ChCh from farms in Selwyn and Waimak. \$m |
|---|---|------------------------------------|---|--|--|--|---|---|
| Food & beverages                              | 37.5%                                   | 4279                               | 1.83  | 5.90   | 1.01   | 0.59   | 6.37  | 15.70   |
| Household contents and services               | 62.1%                                   | 1742                               | 0.78  | 2.38   | 0.42   | 0.24   | 2.57  | 6.39  |
| Clothing and footwear                         | 62.8%                                   | 1256                               | 0.56  | 1.72   | 0.30   | 0.17   | 1.86  | 4.61  |
| Health (excluding insurance)                  | 29.4%                                   | 408                                | 0.18  | 0.56   | 0.10   | 0.06   | 0.60  | 1.50  |
| Recreation, culture and electronics (e.g. TV) | 49.6%                                   | 3143                               | 1.45  | 4.26   | 0.79   | 0.43   | 4.61  | 11.54   |
| Household Utilities                           | 26.9%                                   | 1157                               | 0.40  | 1.63   | 0.29   | 0.16   | 1.76  | 4.24  |
| Education                                     | 29.2%                                   | 401                                | 0.18  | 0.55   | 0.10   | 0.05   | 0.59  | 1.47  |
| Personal care (hairdresser, toiletries, etc.) | 36.2%                                   | 461                                | 0.19  | 0.64   | 0.10   | 0.06   | 0.69  | 1.69  |
| Home maintenance                              | 25.6%                                   | 295                                | 0.12  | 0.41   | 0.07   | 0.04   | 0.44  | 1.08  |
| Public transport/ travel                      | 30.2%                                   | 515                                | 0.24  | 0.70   | 0.13   | 0.07   | 0.75  | 1.89  |
| Fuel  | 32.4%                                   | 6238                               | 3.45  | 7.98   | 2.83   | 0.74   | 7.90  | 22.89   |

<sup>1</sup> Derived from AERU survey data (n=315)

<sup>2</sup> Household expenditure figures are obtained from Household Economic Survey data for Christchurch, Selwyn and Waimakariri (see Appendix 7). Farm expenditure figures are derived from Farm Monitoring reports (Appendix 8), converted to real 2014 dollar terms using the Consumer Price Index (see Appendix 5)

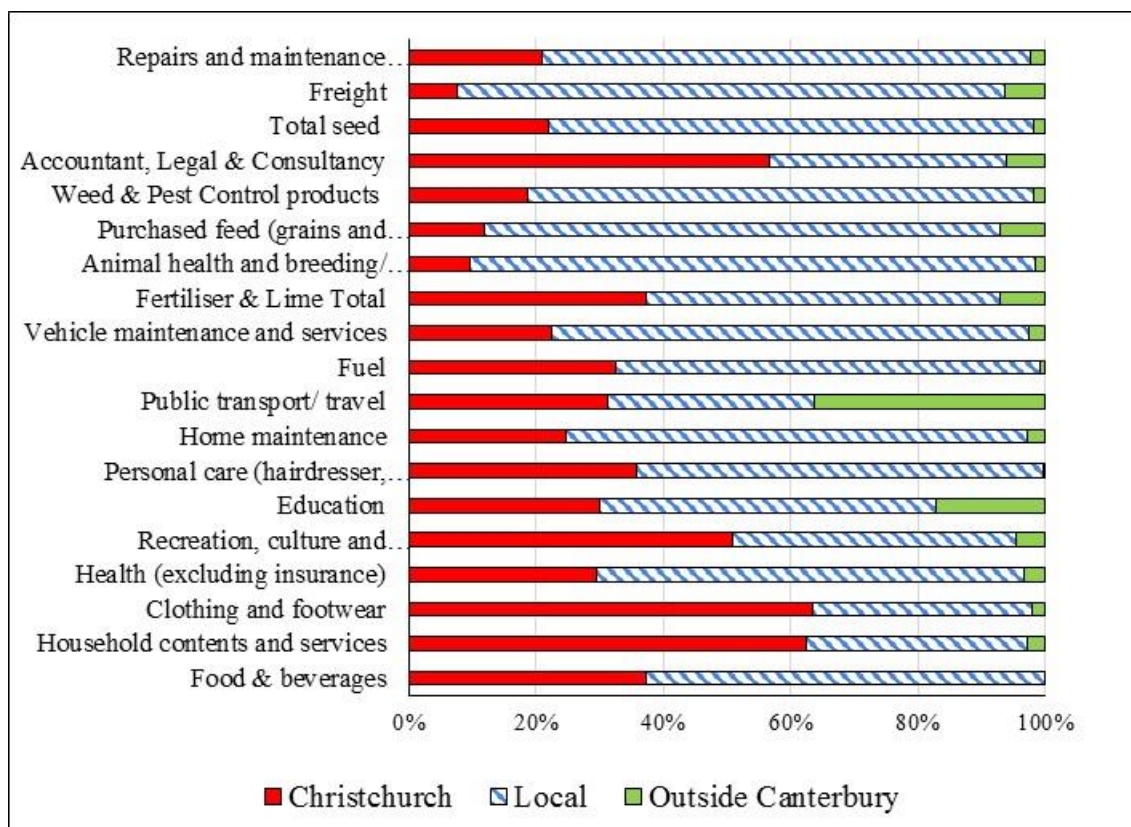
<sup>3</sup> Aggregated to total number of farms using data from the Business Demography Statistics.; n=3,670 (ANZSIC code A01) as at June 2013 (Statistics NZ, 2013; Appendix

Table 3-2 cont.

| Category  | Weighted flow coefficients <sup>1</sup> | Total exp. iIn ChCh by farm \$/year | Direct exp. flows –dairy Waimak. \$m <sup>23</sup> | Direct exp. Flows - sheep/beef. \$m <sup>23</sup> | Direct exp. flows - mixed cropping \$m <sup>23</sup> | Direct exp. flows - deer \$m <sup>23</sup> | Direct exp. flows - other \$m <sup>23</sup> | Total direct exp. flows - \$m <sup>23</sup> |
|---|---|-------------------------------------|--|---|--|--|---|---|
| Vehicle, plant and machinery                        | 33.1%                                   | 1581                                | 1.13   | 1.44  | 0.78   | 0.21                                       | 2.24  | 5.80  |
| Vehicle maintenance and services                    | 22.1%                                   | 3200                                | 2.70   | 3.92  | 1.54   | 0.31                                       | 3.28  | 11.74                                       |
| Fertiliser and lime                                 | 37.6%                                   | 22957                               | 24.37  | 28.25   | 11.36  | 1.73                                       | 18.55                                       | 84.25                                       |
| Animal health and breeding/ supplies & veterinary   | 9.3%                                    | 2534                                | 4.09   | 2.67  | 0.10   | 0.21                                       | 2.22  | 9.30  |
| Purchased feed (grains and concentrate, not fodder) | 11.7%                                   | 2587                                | 7.83   | 0.84  | 0.06   | 0.07                                       | 0.70  | 9.49  |
| Weed & Pest Control products                        | 19.5%                                   | 2693                                | 0.55   | 3.75  | 4.01   | 0.13                                       | 1.44  | 9.88  |
| Accountant, Legal & Consultancy                     | 53.9%                                   | 6902                                | 3.38   | 9.43  | 1.38   | 0.95                                       | 10.19                                       | 25.33                                       |
| Real Estate   | 26.9%                                   | 1933                                | 0.67   | 2.72  | 0.49   | 0.27                                       | 2.94  | 7.09  |
| Home Ownership                                      | 26.9%                                   | 840                                 | 0.29   | 1.18  | 0.21   | 0.12                                       | 1.28  | 3.08  |
| Total seed  | 22.0%                                   | 708                                 | 0.00   | 0.00  | 2.60   | 0.00                                       | 0.00  | 2.60  |
| Freight   | 7.6%                                    | 568                                 | 0.36   | 0.88  | 0.42   | 0.04                                       | 0.39  | 2.08  |
| Repairs and maintenance products and service        | 21.1%                                   | 6525                                | 9.10   | 7.27  | 1.92   | 0.48                                       | 5.17  | 23.95                                       |
| <b>Total</b>  | <b>27.9%</b>                            | <b>72,922</b>                       | <b>63.85</b>                                       | <b>89.08</b>                                      | <b>31.01</b>   | <b>7.13</b>                                | <b>76.56</b>                                | <b>267.62</b>                               |

There were only minor differences in the reported proportions of expenditure in Christchurch (farm or farm household) by individual category among the farm types, although dairy farm expenditure in Christchurch was the lowest in many of the categories. As a result, a lower percentage of dairy farm expenditure occurs in Christchurch in total (23.3 per cent), than of expenditure by other types of farms (average = 29.1 per cent). The weighted average proportions of farm business expenditures in Christchurch and elsewhere for major expenditure categories are shown in Figure 3-1.

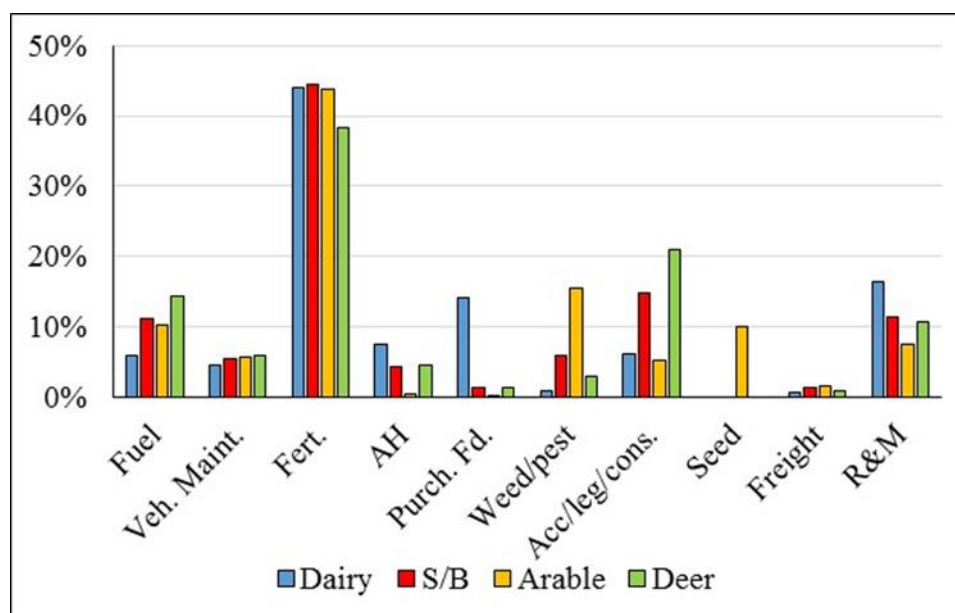
**Figure 3-1: Proportions of farm and farm household expenditure by location of goods/service provider**



Consequently, the differences in absolute values of flows of farm business expenditures into Christchurch amongst farm types, which are shown in Table 3-2 (and in more detail in Appendix 8), reflect the differing *values* of total expenditure on each farm type, rather than differences in the *proportions* of expenditure in different locations amongst the farm types. Figure 3-2 shows the proportions of total direct farm business expenditure flows into Christchurch from each farm type that are accounted for by individual categories of expenditure.

Expenditure on fertiliser and lime in Christchurch accounted for the highest proportion of flows into the city from all farm types (almost 45 per cent on dairy, sheep/beef and arable farms; 38 per cent on deer farms).

**Figure 3-2: Expenditure categories as a proportion of total farm business expenditures in Christchurch by farm type**



### 3.2 The total (direct, indirect and induced) effects of farm expenditure on the Christchurch economy

Multiplier analysis, as described in Chapter 2.1, was used to estimate the total impact (including the direct impact on businesses in Christchurch; the indirect impact on suppliers of those businesses; and the induced effect on the purchase of final goods and services) of the expenditure flows from Selwyn and Waimakariri farms on the value of gross output in Christchurch, as shown in Table 3-3.

In total, expenditure by farmers in the Selwyn and Waimakariri districts was estimated to contribute \$677.65 million in 2014 prices to the value of gross output of Christchurch. The annual gross output of Christchurch derived from the AERU/CDC Economic Development Model was \$22,694.24 million (\$29,282.99 million in \$2014 terms). The estimated total impact of spending by Selwyn and Waimakariri farm households represented 2.3 per cent of the gross output of Christchurch<sup>3</sup>.

<sup>3</sup> The estimate of the gross output of Christchurch is now some years out of date, and the adjustment to 2014 values accounts only for changes in prices, rather than changes in productivity and industry structure, this estimate should be treated with caution. The contribution was initially valued in 2011 terms.

**Table 3-3: Direct, indirect and induced effects<sup>1</sup> from farm expenditure in Christchurch**

| <b>Category</b>   | <b>Direct expenditure in ChCh of all farms in Selwyn and Waimak. \$m</b> | <b>Indirect effects of farm expenditure in ChCh \$m</b> | <b>Induced effects of farm expenditure in ChCh \$m</b> | <b>Direct+ indirect + induced effects in \$m</b> |
|---|--|---|--|--|
| Food & beverages  | 15.70  | 18.37   | 2.15   | 36.23  |
| Household contents and services (excluding electronics) | 6.39   | 7.03  | 3.38   | 16.81  |
| Clothing and footwear                                   | 4.61   | 5.06  | 2.44   | 12.11  |
| Health (excluding insurance)                            | 1.50   | 1.57  | 1.10   | 4.16   |
| Recreation, culture and electronics (e.g. TV)           | 11.54  | 14.03   | 2.19   | 27.76  |
| Household Utilities                                     | 4.24   | 4.75  | 1.11   | 10.11  |
| Education   | 1.47   | 1.46  | 1.30   | 4.23   |
| Personal care (hairdresser, toiletries, etc.)           | 1.69   | 2.29  | 0.78   | 4.76   |
| Home maintenance  | 1.08   | 1.85  | 0.33   | 3.26   |
| Public transport/ travel                                | 1.89   | 2.75  | 0.48   | 5.12   |
| Fuel  | 22.89  | 25.18   | 12.14  | 60.21  |
| Vehicle, plant and machinery                            | 5.80   | 8.60  | 2.96   | 17.37  |
| Vehicle maintenance and services                        | 11.74  | 14.28   | 1.30   | 27.33  |
| Fertiliser & Lime Total                                 | 84.25  | 113.11  | 14.46  | 211.82   |
| Animal health and breeding/ supplies & veterinary       | 9.30   | 9.70  | 6.81   | 25.79  |
| Purchased feed (grains and concentrate, not fodder)     | 9.49   | 9.56  | 6.89   | 25.94  |
| Weed & Pest Control products                            | 9.88   | 10.87   | 5.24   | 26.00  |
| Accountant, Legal & Consultancy                         | 25.33  | 31.63   | 8.13   | 65.09  |
| Real Estate   | 7.09   | 6.66  | 0.00   | 13.76  |
| Home Ownership  | 3.08   | 3.15  | 0.00   | 6.23   |
| Total seed  | 2.60   | 2.86  | 1.38   | 6.83   |
| Freight   | 2.08   | 3.03  | 0.52   | 5.63   |
| Repairs and maintenance products and service            | 23.95  | 25.63   | 11.53  | 61.11  |
| <b>Total</b>  | <b>267.62</b>  | <b>323.43</b>   | <b>86.63</b>   | <b>677.65</b>                                    |

<sup>1</sup> Multipliers from the AERU/CDC Economic Development Model used to estimate the indirect and induced impacts are presented in Appendix 9).

### **3.3 Employment associated with farm expenditure flows**

Employment in the city is also affected by the impact of expenditure flows from farms in the Selwyn and Waimakariri districts on output in Christchurch. The employment multipliers derived from the AERU/CDC Economic Development Model, as discussed in Chapter 2.1, were used to estimate the number of full-time equivalent positions (FTEs) associated with the direct, indirect and induced effects of expenditure flows from Selwyn and Waimakariri farms. The employment effects were calculated using actual expenditure values, rather than the values adjusted for inflation, since price changes are not directly linked to the structural change or expansion/contraction that lead to changes in employment. The levels of employment in total, and in individual economic sectors in Christchurch, are shown in Table 3-4. In total, it was estimated that 4,277 FTEs in Christchurch were associated with expenditure from farm businesses and their households in the Selwyn and Waimakariri districts. The highest number of employees associated with farm expenditure in Christchurch were employed in the fertiliser sector. This was followed by 650 FTEs in the fuel sector, and 614 FTEs in the repairs and maintenance sector.

Employment in the fertiliser sector and repairs and maintenance sectors was analysed in more detail with respect to the sectoral occupation profile, using Census 2006 data for occupation by industry (Statistics New Zealand, 2006a). Table 3-5 shows the FTEs by occupation in the fertiliser and lime sector and repairs and maintenance sector that could be attributed to expenditure flows from Selwyn and Waimakariri farms and their households into Christchurch. In the fertiliser and lime sector, the majority of employees (24 per cent) were employed as “plant and machine operators and assemblers”, followed by “trades workers” (18 per cent). In the repairs and maintenance sector, the majority of employees were “trades workers” (47 per cent).

**Table 3-4: Expenditure flows from Waimakariri and Selwyn businesses as FTEs<sup>1</sup> in Christchurch by industry sectors affected by farm expenditure**

|   | <b>Total impact of exp. flows into ChCh 2010/11 values</b> | <b>Employ't associated with exp. in ChCh (FTEs)</b> | <b>Total number of employees in ChCh<sup>2</sup></b> | <b>Percentage of employees in ChCh</b> |
|---|--|---|--|--|
| Food & beverages  | 34.48  | 423   | 18,897   | 2.2%                                   |
| Household contents and services (excluding electronics) | 16.00  | 182   | 10,187   | 1.8%                                   |
| Clothing and footwear                                   | 11.53  | 131   | 7,887  | 1.7%                                   |
| Health (excluding insurance)                            | 3.96   | 44  | 23,780   | 0.2%                                   |
| Recreation, culture and electronics (e.g. TV)           | 26.42  | 137   | 8,870  | 1.5%                                   |
| Household Utilities                                     | 9.62   | 34  | 2,860  | 1.2%                                   |
| Education   | 4.03   | 52  | 14,880   | 0.3%                                   |
| Personal care (hairdresser, toiletries, etc.)           | 4.53   | 47  | 6,240  | 0.8%                                   |
| Home maintenance  | 3.10   | 16  | 10,690   | 0.1%                                   |
| Public transport/ travel                                | 4.87   | 33  | 2,440  | 1.4%                                   |
| Fuel  | 57.31  | 650   | ...  | ...                                    |
| Vehicle, plant and machinery                            | 0.00   | 0   | 7,090  | 0.0%                                   |
| Vehicle maintenance and services                        | 26.01  | 86  | 2,300  | 3.7%                                   |
| Fertiliser & Lime Total                                 | 201.63   | 658   | ...  | ...                                    |
| Animal health and breeding/ supplies & veterinary       | 24.55  | 273   | ...  | ...                                    |
| Purchased feed (grains and concentrate, not fodder)     | 24.70  | 209   | ...  | ...                                    |
| Weed & Pest Control products                            | 24.75  | 57  | 2,350  | 2.4%                                   |
| Accountant, Legal & Consultancy                         | 61.96  | 507   | 26,530   | 1.9%                                   |
| Real Estate   | 13.10  | 32  | 2,960  | 1.1%                                   |
| Home Ownership  | 5.93   | ...   | ...  | ..                                     |
| Total seed  | 6.50   | 55  | ...  | ..                                     |
| Freight   | 5.36   | 36  | 4,240  | 0.9%                                   |
| Repairs and maintenance products and service            | 58.17  | 614   | 2,600  | 23.6%                                  |
| <b>Total</b>  | <b>645</b>   | <b>4,277</b>  | <b>156,804<sup>3</sup></b>                           |  |

<sup>1</sup> Employment multipliers were derived from the AERU/CDC Economic Development Model (see Appendix 11).

<sup>2</sup> Sourced from Business Demography Statistics, Stats NZ, 2012.

<sup>3</sup> Total employees in sectors affected by farm expenditure.

**Table 3-5: FTEs associated with total expenditure flows from Selwyn and Waimakariri farms by occupation<sup>1</sup> for selected sectors in Christchurch**

| <b>Occupation/ Sector</b>                        | <b>Fertiliser and Lime<sup>2</sup></b> | <b>Repairs &amp; Maintenance<sup>3</sup></b> |
|--|--|--|
| Legislators, Administrators and Managers         | 89                                     | 57   |
| Professionals                                    | 37                                     | 22   |
| Technicians and Associate Professionals          | 51                                     | 40   |
| Clerks   | 49                                     | 39   |
| Service and Sales Workers                        | 26                                     | 11   |
| Agriculture and Fishery Workers                  | 5                                      | 14   |
| Trades Workers                                   | 116                                    | 281  |
| Plant and Machine Operators and Assemblers       | 153                                    | 74   |
| Labourers and Related Elementary Service Workers | 73                                     | 42   |
| Not Elsewhere Included <sup>4</sup>              | 31                                     | 14   |
| <b>Total</b>                                     | <b>630</b>                             | <b>593</b>                                   |

<sup>1</sup> Sourced from Census 2006 data on occupation by industry for the Employed Census Usually Resident Population Count, Aged 15 Years and Over (Stats NZ, 2006a; Appendix 12).

<sup>2</sup> Percentage breakdown is derived from data on occupation by industry in Christchurch (Stats NZ, 2006a, Appendix 12) for ANZSIC code C (manufacturing sector).

<sup>3</sup> Percentage breakdown is derived from data on occupation by industry in Christchurch (Stats NZ, 2006a; Appendix 12) for ANZSIC code E (Construction).

<sup>4</sup> Not Elsewhere Included includes Response Unidentifiable, Response Outside Scope and Not Stated.

### **3.4 Local farm business and farm household expenditure**

Local farm business and farm household expenditure (i.e. all areas in Canterbury other than Christchurch) was valued at \$624.07 million in 2014 terms (65.1 per cent of farm and household expenditure in the categories analysed). The proportions of farm business expenditures in the local economy presented in Figure 3-1 show that, for most of the farm business expenditure categories, local expenditure accounted for 75 per cent or more. The exceptions were accountancy, legal and consultancy services, fertiliser and lime, and fuel. The largest local expenditures by value were fertiliser and lime, animal health and breeding supplies; and purchased feed. The magnitude of animal health supplies and feed purchases reflect the strong influence of the dairy sector in the rural economy.

The total impact, including direct, indirect and induced effects, from local farm (including their households) expenditure from the Selwyn and Waimakariri districts was valued at \$1.25 billion, approximately 18 per cent of the value of gross output in Selwyn and Waimakariri districts, sourced from the AERU/CDC Economic Impact Model (adjusted to 2014 values). A conservative multiplier of 2.0 was used to estimate the total impacts since the multipliers for the sectors involved were estimated to be within the range of 1.7 to 2.7. The sectors in which the largest proportions of expenditure occurred were the



retail and wholesale trade sectors for which the multipliers were estimated to be more than 2.3. The impacts of local spending by farm households and businesses are summarised in Table 3-6.

**Table 3-6: Local expenditure flows from Selwyn and Waimakariri district farms and their households**

|   |                  |
|---|------------------|
| Local expenditure % (by farm) <sup>1</sup>  | 65.1%            |
| Expenditure by farm in NZ\$ <sup>2</sup>  | \$262,700        |
| Local expenditure in NZ\$ by farm \$2014 million <sup>3</sup>                             | \$170,045        |
| Direct local expenditure from all farms \$2014 million <sup>4</sup>                       | \$626.37 million |
| Total value of local expenditure \$2014 million   | \$1,250 million  |
| Total gross output in Selwyn and Waimakariri in \$2014 million <sup>5</sup>               | \$6,391million   |
| Total impacts of local expenditure as a percentage of gross output Selwyn and Waimakariri | 18%              |

<sup>1</sup> Own calculations based on AERU farm survey data (n=315).

<sup>2</sup> Household expenditure figures are derived from Household Economic Survey data for Christchurch, Selwyn and Waimakariri (Stats NZ, 2010; Appendix 7). Farm expenditure figures are derived from Farm Monitoring reports (MAF, 2011 a-e; Appendix 8).

<sup>3</sup> Average age of expenditure by category was applied to expenditure data from secondary sources.

<sup>4</sup> Value of expenditure was multiplied by total number of farms in Selwyn and Waimakariri District derived from business demography tables; n=3,670 (ANZSIC code A01) as at June 2013 (Appendix 1).

<sup>5</sup> Sourced from AERU/CDC Economic Development Model.

### 3.5 Expenditure flows from farm employees

In 2011, almost 3,000 employees worked on farms in the Selwyn and Waimakariri districts (Statistics New Zealand, 2011), and their expenditures in Christchurch are also a component of the total flow from farms in the two districts into Christchurch. The method of estimating this contribution to expenditure flows was described in Chapter 2.6.

The weighted average annual wage bill on Selwyn and Waimakariri farms was estimated to be \$43,649 in 2010/11 (see Appendix 6 for details), or \$47,413 when adjusted to 2014 dollar values. As the median household income in Selwyn and Waimakariri District in 2013 (Statistics New Zealand, 2014c) was \$76,134 and the estimated value of expenditure by farm households in Christchurch, \$14,816, the ratio of expenditure to median household income was calculated to be 19 per cent. The total expenditure flow from Selwyn and Waimakariri farm employees into Christchurch, estimated as 19 per cent of the total wage bill on each type of farm, was \$29.6 million per annum. The total (direct, indirect and induced) effect of this expenditure on the gross output of Christchurch was estimated to be \$73.6 million per annum. The employment generated in association with these flows was estimated to be 464 FTEs.

### 3.6 The contribution of the Christchurch agricultural sector

Christchurch includes not only the metropolitan area but also a significant number of farm properties (726 in 2013), (Statistics New Zealand, 2014), many of which are located on Banks Peninsula. In total 8.1 per cent of the farms in Canterbury are located within the city boundaries. The largest proportion of these are “other farms” (which include

nurseries and flower farms; mushroom and vegetable farms; fruit and nut orchards; other crop enterprises and other livestock farms) and sheep/beef and arable farms as Table 3-7 shows.

**Table 3-7: Farms in Christchurch City 2013**

| <b>Farm type</b>   | <b>No of farms</b> | <b>% of farms</b> | <b>% of farms in Canterbury</b> |
|--------------------|--------------------|-------------------|---------------------------------|
| Dairy              | 33                 | 4.45%             | 2.13%                           |
| Sheep beef/ arable | 319                | 43.94%            | 6.95%                           |
| Deer               | 14                 | 1.93%             | 4.43%                           |
| Other              | 360                | 49.59%            | 14.36%                          |
| <b>Total</b>       | <b>726</b>         | <b>100.00%</b>    | <b>8.10%</b>                    |

These farms contribute directly to the gross output and value-added (GDP) of Christchurch, and purchase goods and services from other sectors of the Christchurch economy. Only farm business expenditures are included in this analysis. Data on the contribution of Christchurch farms was sourced from the AERU/CDC Economic Development Model and converted to 2014 prices using the CPI (Statistics New Zealand, 2015). In total the contribution to gross output was estimated to be \$323.38 million and the GDP contribution, \$140.37 million. The annual expenditure by farms in other sectors of the Christchurch economy was estimated to be \$51.0 million (0.2 per cent of the value of gross output in Christchurch). If a conservative output multiplier of 2.0 is used to estimate the total (direct, indirect and induced) impact on gross output of expenditure by Christchurch farms in the city (the multiplier for farms in Selwyn District was 2.53), the total impact is estimated to be \$102 million in 2014 prices.

## **Chapter 4**

### **Results of the Rural Business Expenditure Flows Analysis**

In order to examine the indirect link between farms in the Canterbury Plains and Christchurch through secondary flows from their purchases from rural businesses, a web-based survey of rural businesses in the Selwyn and Waimakariri districts was conducted. Like farmers, business owners/managers in Selwyn and Waimakariri districts were asked to indicate where their expenditure on business supplies occurred, locally, in Christchurch or elsewhere. Expenditure included purchases of all business goods and services. As discussed in Chapter 2.2, only a proportion of the expenditures in Christchurch by the business sector in Selwyn and Waimakariri districts is associated with the goods and services they supply to the agricultural sector. Since local farm and farm household expenditure in Selwyn and Waimakariri was 18 per cent of the gross output in Selwyn and Waimakariri (see Chapter 3.3), 18 per cent of business flows into Christchurch were assumed to be associated with the agricultural sector.

#### **4.1 Direct expenditures in Christchurch by businesses in Selwyn and Waimakariri districts**

Table 4-1 shows the direct expenditure in Christchurch industry sectors by businesses in the Selwyn and Waimakariri districts. On average, individual businesses obtained 55 per cent of business supplies from Christchurch, and the total value of direct expenditure in Christchurch from businesses in Selwyn and Waimakariri was valued at \$544 million in 2014 terms. The value of business expenditure for all businesses in the Waimakariri and Selwyn districts by category was estimated using data on Canterbury's total business inputs by sector derived from the AERU/CDC Economic Development Model. Expenditures in Christchurch were proportionately highest for electricity supply (73 per cent on average), followed by communication services (71 per cent on average) and business services (65 per cent on average). The greatest value of business expenditure in Christchurch, however, was spent on goods and services from the food manufacturing sector (\$89 million), the "other" manufacturing sector (\$81 million) and the business services sector (\$67 million).

**Table 4-1: Expenditure flows from Waimakariri and Selwyn businesses into Christchurch by industry sector**

| Category                           | Average % direct business expenditure in Christchurch <sup>1</sup> | Direct expenditure flows into ChCh in in \$2014m <sup>2</sup> | Aggregated total gross output for Christchurch in \$2014m <sup>3</sup> | Percentage of Selwyn and Waimakariri direct expenditure flows to ChCh gross output |
|------------------------------------|--|---|--|--|
| Retail trade                       | 48.9%  | 23.44   | 1,651.18   | 1.42%  |
| Wholesale trade                    | 59.8%  | 64.72   | 5165.35  | 1.25%  |
| Food manufacturing <sup>4</sup>    | 49.5%  | 89.43   | ...  | ...  |
| Other Manufacturing                | 57.3%  | 80.61   | 4,528.89   | 1.78%  |
| Electricity supply                 | 72.5%  | 17.76   | 504.01   | 3.53%  |
| Water and waste                    | 36.1%  | 0.26  | 24.19  | 1.06%  |
| Accommodation & restaurants        | 30.8%  | 7.29  | 638.17   | 1.14%  |
| Transport & Storage                | 56.3%  | 34.84   | 1,836.60   | 1.90%  |
| Communication                      | 71.3%  | 18.03   | 1,169.42   | 1.54%  |
| Business Services                  | 64.9%  | 66.84   | 3,958.68   | 1.69%  |
| Education                          | 50.0%  | 9.15  | 933.25   | 0.98%  |
| Doctors and other medical services | 48.8%  | 16.85   | 1636.73  | 1.03%  |
| Culture and recreation             | 40.5%  | 9.48  | 765.89   | 1.24%  |
| Personal care                      | 57.5%  | 6.77  | 429.81   | 1.58%  |
| Public Administration              | 50.0%  | 17.06   | 1,032.92   | 1.65%  |
| Other <sup>5</sup>                 | 50.0%  | 81.36   | 4,700.49   | 1.73%  |
| <b>Total</b>                       | <b>54.8%</b>   | <b>543.92</b>   | <b>29,282.98</b>   | <b>1.86%</b>   |

<sup>1</sup> Own calculations based on AERU business survey data (n=64).

<sup>2</sup> Local farm and farm household expenditure in Selwyn and Waimakariri is 19.8 per cent of the Gross Output in Selwyn and Waimakariri, therefore 19.8 per cent of business flows into Christchurch were assumed to be associated with the agricultural sector.

<sup>3</sup> Sourced from the AERU/CDC Economic Development Model

<sup>4</sup> This sector is composed of the following sectors: Mining and quarrying, Construction, Real estate, Forestry and logging, Fishing, Oil and gas exploration and extraction, Gas supply, Ownership of owner-occupied dwellings.

<sup>5</sup> The food manufacturing sector is covered in Chapter 4.4 in this report.

## 4.2 Direct, indirect and induced effects of business expenditures in Selwyn and Waimakariri districts on the Christchurch economy

Gross output multipliers for Christchurch, derived from the AERU/CDC Economic Development Model were used to estimate the indirect, induced and total effects of expenditures by businesses from the Selwyn and Waimakariri districts.

Table 4-2 shows the total impact, including direct, indirect and induced effects, from the expenditure flows from rural businesses in the Selwyn and Waimakariri districts into Christchurch. The total impact was valued at \$1,467 million in 2014 prices, which represents 5.01 per cent of the total value of gross output of Christchurch.

**Table 4-2: Direct, indirect and induced effects from business expenditure<sup>1</sup> in Christchurch by industry sector**

| Category                        | Direct business expenditure in ChCh in \$m | Indirect effects from business expenditure in ChCh in \$m | Induced effects from business expenditure in ChCh in \$m | Direct, Indirect & Induced effects business expenditure in ChCh in \$m | Total exp. flows from Selwyn & Waimak. Businesses as % of gross output of ChCh |
|---------------------------------|--|---|--|--|--|
| Retail trade                    | 23.44                                      | 25.90   | 12.37  | 61.70  | 3.74%  |
| Wholesale trade                 | 64.72                                      | 79.98   | 32.37  | 177.08   | 3.43%  |
| Food manufacturing <sup>2</sup> | 89.43                                      | ...   | ...  | ...  | ...  |
| Other manufacturing             | 80.61                                      | 119.59  | 40.75  | 240.94   | 5.32%  |
| Electricity supply              | 17.76                                      | 21.77   | 0.01   | 39.54  | 7.84%  |
| Water and waste                 | 0.26                                       | 0.24  | ...  | 0.50   | 2.07%  |
| Accomm. & restaurants           | 7.29                                       | 8.54  | 1.00   | 16.83  | 2.64%  |
| Transport & storage             | 34.84                                      | 50.67   | 8.72   | 94.23  | 5.13%  |
| Communication                   | 18.03                                      | 20.19   | 4.65   | 42.88  | 3.67%  |
| Business Services               | 66.84                                      | 83.44   | 21.44  | 171.72   | 4.34%  |
| Education                       | 9.15                                       | 9.08  | 8.07   | 26.31  | 2.82%  |
| Doctors and other med. services | 16.85                                      | 17.56   | 12.34  | 46.75  | 2.86%  |
| Culture and recreation          | 9.48                                       | 11.53   | 1.80   | 22.81  | 2.98%  |
| Personal care                   | 6.77                                       | 9.20  | 3.15   | 19.12  | 4.45%  |
| Public Administration           | 17.06                                      | 22.53   | 9.39   | 48.98  | 4.74%  |
| Other                           | 81.36                                      | 82.99   | 21.15  | 185.49   | 3.95%  |
| <b>Total</b>                    | <b>543.92</b>                              | <b>717.79</b>   | <b>205.01</b>  | <b>1,466.72</b>  | <b>5.01%</b>   |

<sup>1</sup> This includes rural business expenditure from farm purchases only.

<sup>2</sup> The food manufacturing sector is covered in Chapter 4.4 in this report.

### 4.3 Employment associated with business expenditure flows from farm purchases into Christchurch

Employment multipliers derived from the AERU/CDC Economic Development Model were used to calculate the employment associated with the expenditure flows from Selwyn and Waimakariri businesses into Christchurch, which is presented in Table 4-3. In total, 7,012 FTEs in Christchurch were attributed to the Selwyn and Waimakariri business expenditure associated with farm purchases. The largest number of FTEs associated with business expenditure in Christchurch was employed in the business services sector (1,321 FTEs). This was followed by 1,028 FTEs in the “other” manufacturing sector and 724 FTEs in the wholesale trade sector.

**Table 4-3: Expenditure flows from Waimakariri and Selwyn businesses<sup>1</sup> as FTEs in Christchurch by industry sector**

| Category                        | Direct, indirect and induced effects of business expenditure in ChCh from businesses in Selwyn and Waimakariri in \$2011 m | Expenditure flows into ChCh as Employment (FTE) <sup>2</sup> |
|---------------------------------|--|--|
| Retail trade                    | 57.96  | 658  |
| Wholesale trade                 | 166.35   | 724  |
| Food manufacturing <sup>3</sup> | ...  | ...  |
| Other manufacturing             | 226.34   | 1,028  |
| Electricity supply              | 37.14  | 23   |
| Water and waste                 | 0.47   | 1  |
| Accomm. & restaurants           | 15.81  | 204  |
| Transport & storage             | 88.52  | 598  |
| Communication                   | 40.28  | 141  |
| Business Services               | 161.31   | 1,321  |
| Education                       | 24.72  | 318  |
| Doctors and other med. services | 43.92  | 488  |
| Culture and recreation          | 21.43  | 111  |
| Personal care                   | 17.96  | 188  |
| Public Administration           | 46.01  | 248  |
| Other                           | 174.25   | 962  |
| <b>Total</b>                    | <b>1,122</b>   | <b>7,012</b>   |

<sup>1</sup> This includes only business expenditure associated with supplying goods and services to farms.

<sup>2</sup> Employment multipliers obtained from the AERU/CDC Economic Development Model were applied to the direct, indirect and induced effects of business expenditure in Christchurch.

<sup>3</sup> The food manufacturing sector is covered in Chapter 4.4 of this report.

Employment in the sectors in which the employment effects were greatest was analysed further to obtain the occupation profile of each sector. The proportions of total employment accounted for by rural business expenditure flows associated with farm

purchases were highest in these sectors. Occupation was calculated using Census 2006 data on occupation by industry (Statistics New Zealand, 2006a), which is presented in Table 4-4. Among the 1,321 employees in the business services sector attributable to rural business expenditure, the majority (503 FTEs) were classified as professional; followed by “technicians and associate professionals” (256 FTEs). Of the 1,028 FTEs in the other manufacturing sector, the majority (248 FTEs) were employed as “plant and machine operators and assemblers”, followed by “legislators, administrators and managers” (147 FTEs).

**Table 4-4: FTEs by occupation<sup>1</sup> for selected industry sectors in Christchurch (associated with direct, indirect and induced effects of rural business expenditure<sup>2</sup> from Waimakariri and Selwyn businesses)**

| <b>Occupation/sector</b>                         | <b>Business Services<sup>3</sup></b> | <b>Other Manufacturing<sup>4</sup></b> |
|--|--------------------------------------|--|
| Legislators, Administrators and Managers         | 199                                  | 147                                    |
| Professionals                                    | 503                                  | 60                                     |
| Technicians and Associate Professionals          | 256                                  | 83                                     |
| Clerks   | 228                                  | 80                                     |
| Service and Sales Workers                        | 29                                   | 42                                     |
| Agriculture and Fishery Workers                  | 4                                    | 9                                      |
| Trades Workers                                   | 22                                   | 191                                    |
| Plant and Machine Operators and Assemblers       | 14                                   | 248                                    |
| Labourers and Related Elementary Service Workers | 20                                   | 118                                    |
| Not Elsewhere Included <sup>5</sup>              | 46                                   | 50                                     |
| <b>Total</b>                                     | <b>1,321</b>                         | <b>1,028</b>                           |

<sup>1</sup> Sourced from Census 2006 data on occupation by industry for the Employed Census Usually Resident Population Count, Aged 15 Years and Over (Stats NZ, 2006a; Appendix 12). In order to map survey categories to ANZSIC codes, Stats NZ data on employee count by sector in Christchurch (YE June 2011) were used and applied.

<sup>2</sup> This includes rural business expenditure from farm purchases only.

<sup>3</sup> Per centage breakdown derived from data on occupation by industry (Stats NZ, 2006a; Appendix 12) for ANZSIC code M (Professional, Scientific and Technical Services).

<sup>4</sup> Per centage breakdown derived from data on occupation by industry (Stats NZ, 2006a; Appendix 12) for ANZSIC code C (Manufacturing).

<sup>5</sup> Not Elsewhere Included includes Response Unidentifiable, Response Outside Scope and Not Stated.

## 4.4 Linkages to Christchurch's food manufacturing sector

Farms not only have an impact on Christchurch through their expenditure on *outputs* provided by the city, but are also a major source of *inputs* into the city's food manufacturing sector. The surveys did not capture flows from the agricultural sector of Waimakariri and Selwyn into Christchurch's food manufacturing sector, because they dealt exclusively with expenditure flows into the city. However, the food manufacturing businesses in the city are closely linked to agriculture on the Canterbury Plains. The AERU/CDC Economic Development Model reported the gross value of output and the value added (contribution to GDP), and expenditure of this sector, which are shown in Table 4-5. The gross output by Christchurch's food manufacturing sector was valued at \$1,926 million in 2014 prices (6.6 per cent of gross output in Christchurch) of which the highest proportion was generated by the "other food manufacturing sector", which accounted for \$907 million (47 per cent). "Dairy product manufacturing" accounted for \$575 million (30 per cent) while "meat and meat product manufacturing" was valued at \$444 million (23 per cent). The value-added (GDP contribution) of the sector was 361 million. Total expenditure by Christchurch food manufacturing firms in other sectors (excluding agriculture) in Christchurch was \$726 million in 2014 prices (2.5 per cent of the value of gross output). If a conservative multiplier of 2.0 is used to estimate the total (direct, indirect and induced) impact of expenditure by Christchurch food manufacturing businesses, (the estimated total output multiplier for Selwyn/Waimakariri district food manufacturing businesses was 2.7) the total contribution to the value of output in Christchurch by Christchurch food manufacturing businesses was estimated to be \$1,452 million in 2014 prices.

Although there are no data on the value of the contribution of food-producing farms in the Selwyn and Waimakariri districts to the Christchurch food manufacturing industry, it is known that 38 per cent of food-producing farms in Canterbury, and 27 per cent of the total employment on those farms, were located in the two districts in 2012 (Statistics New Zealand, 2014). In addition, Selwyn and Waimakariri farms comprise at least 25 per cent of the number of farms, and at least 20 per cent of employment, for each type of food production farm in Canterbury. Consequently, Selwyn and Waimakariri farms make a significant contribution to the Christchurch food manufacturing sector.

**Table 4-5: Christchurch gross output for food and beverage manufacturing (\$2014)**

| <b>Sector</b>                     | <b>Gross output in Christchurch \$m</b> | <b>Value added in Christchurch \$m</b> |
|-----------------------------------|---|--|
| Meat & meat product manufacturing | 444                                     | 80                                     |
| Dairy product manufacturing       | 575                                     | 63                                     |
| Other food manufacturing          | 907                                     | 218                                    |
| <b>Total food manufacturing</b>   | <b>1,926</b>                            | <b>361</b>                             |

Source: AERU/CDC Economic Development Model.



## **Chapter 5**

### **Results of the Analysis of Annual Variability in Expenditure Flows into Christchurch**

The quantity and value of farm outputs from the Canterbury rural districts are subject to the influences of both climatic and market conditions. Changes in land-use over time, and changes in rural infrastructure (e.g. irrigation development), also affect the nature and value of farm production. The analysis of annual variability was undertaken to determine the impacts of changes in the value of output, and changes in the availability of water, on the expenditure flows from Selwyn and Waimakariri farms into Christchurch from 2001/02 to 2011/12

#### **5.1 Direct farm expenditure flows**

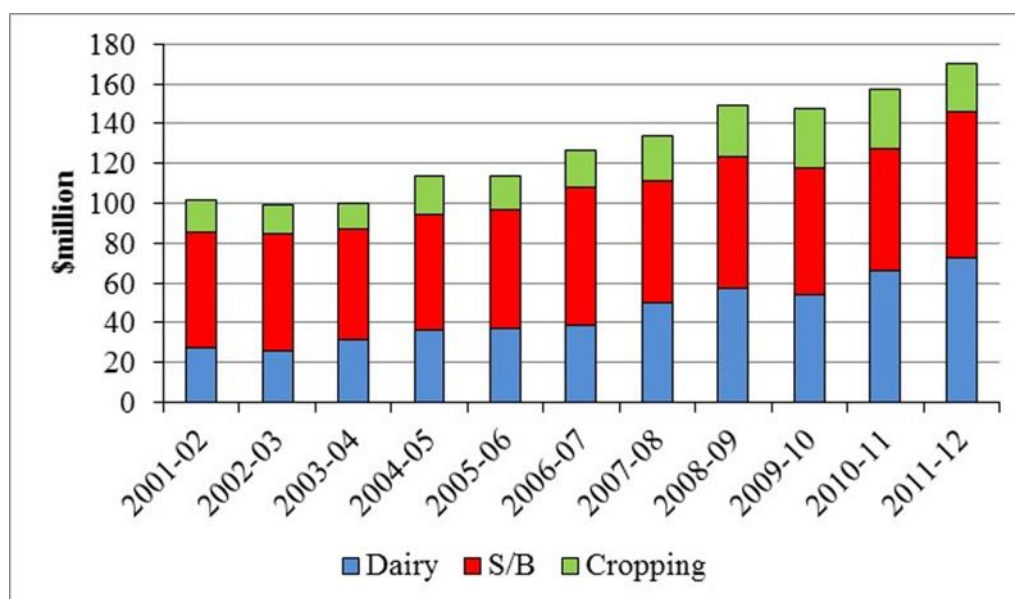
In order to determine the between-year variability in expenditure flows into Christchurch from farms in the Selwyn and Waimakariri districts, time-series data on farm expenditure for a reasonable time period were required. Farm monitoring data, which were used in the analysis of farm expenditure flows for 2011/12, have been available in their current form only since 2000, and initial analysis indicated that the time-series dataset was too small for the estimation of robust relationships between revenue and expenditure measures. Instead, data from Beef & Lamb NZ (B&LNZ) on sheep/beef and arable farms and from DairyNZ (DNZ) were used to analyse the variability of expenditure flows into Christchurch. As a result the inter-annual analysis differed from the analysis of expenditure flows in 2010/11 because:

- The analysis did not include deer farms or those producing primarily non-arable crops or other livestock and is, therefore, based on an estimated 2,051 farms compared with 3,670 in the earlier analysis (55.9 per cent);
- B&LNZ and DNZ data were used as a basis for the analysis. This differed to some extent from Farm Monitoring data, although the trends demonstrated by the datasets are similar.

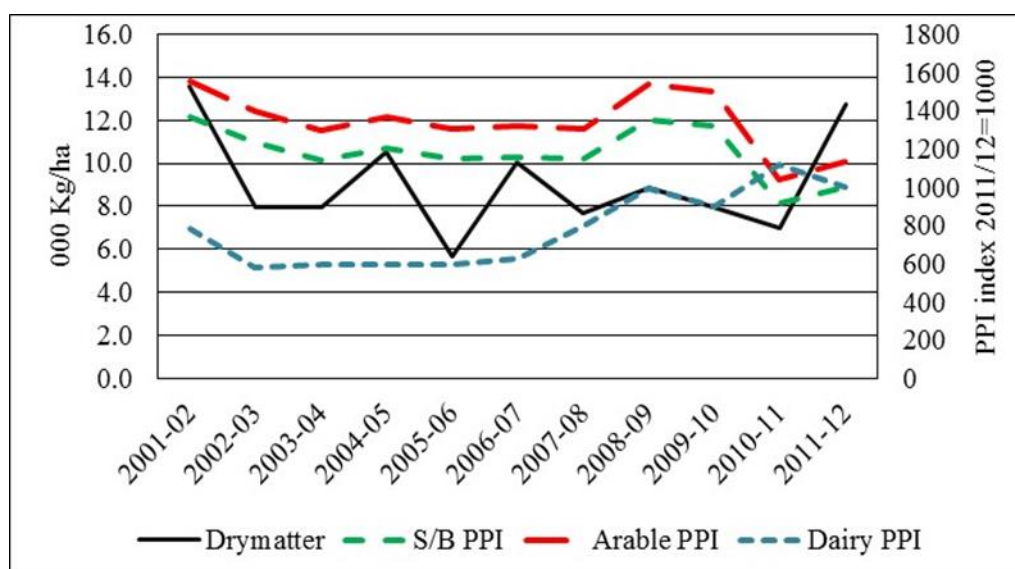
Figure 5-1 shows the annual direct expenditure flows from sheep/beef, dairy and arable farms adjusted to \$2014 values using the Consumer Price Index (CPI) (Statistics New Zealand, 2015). In real \$2014 terms the flow of farm expenditures from sheep/beef, arable and dairy farms in the Selwyn and Waimakariri Districts has increased from approximately \$101 million at the start of the decade to \$173 million in 2011/12.

The relatively steady increase in the value of expenditure flows shown in Figure 5-1 has occurred despite the fact that there was considerable variability in rainfall and, consequently, pasture production, as well as some variability in product prices, during the analysis period (see Figure 5-2).

**Figure 5-1: Real direct expenditure flows from Selwyn and Waimakariri farms into Christchurch 2001/12 to 2011/12**



**Figure 5-2: Drymatter production and producer price indices 2001/02-2011/12**



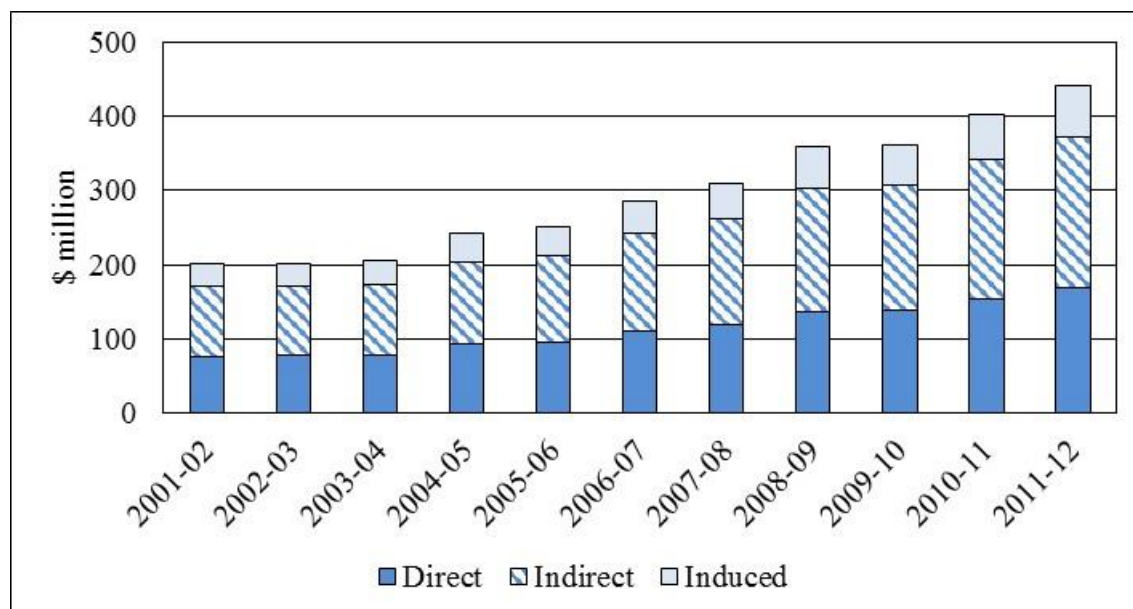
Sources: Dryland DM production for the Te Pirita Mead rainfall zone: Aqualinc.  
 Producer Prices (outputs) Indices: Statistics New Zealand (2014b)

The gross output multipliers (see Appendix 10) derived from the AERU/CDC Economic Development Model were used to estimate the flow-on effects of farm expenditure during the analysis period. Figure 5-3 shows the total impact (direct, indirect and induced) of farm expenditure flows on the output of Christchurch from 2001/2002 to 2011/2012.

The direct effect of farm expenditure on the businesses supplying products and services to Selwyn and Waimakariri farms in 2011/12 (\$2014) comprised 38 per cent of the total impact of these expenditures on the Christchurch economy (\$422.1 million). The

remainder comprised the indirect effect, or value of the impact on suppliers to those businesses, and the induced effect of the increased expenditure that occurs as a result of the increase in income of Christchurch businesses. The indirect effect was estimated to \$207.7 million; and the induced effect, to be \$70.5 million

**Figure 5-3: Total impacts of farm expenditure on Christchurch (\$2014 terms)**



### 5.1.1 Impacts of revenue changes on expenditure flows

The relationship between changes in farm revenues and changes in expenditure flows to Christchurch depends on the proportion of total input expenditure that flows to Christchurch, and the extent to which input purchases vary with changes in farm revenues. Regression analysis showed that the relationships between all expenditure categories and total revenue were significant ( $F < .001$ ) on sheep/beef and arable farms. On dairy farms most relationships were significant at the one per cent level, although “fuel”, “vehicle maintenance” and “freight” were not significantly related to total revenue and “weed and pest control” and “accountancy, legal and consultancy” were significant only at the five per cent level.

Table 5-1 shows the changes in the value of inputs purchased in Christchurch for each one dollar change in farm revenues by the input category and farm type. Fertiliser and lime purchases show the largest dollar response to changing revenues on all farm types. Not only do they account for the largest proportion of farm working expenses, but a high proportion of the total is purchased in Christchurch (40 per cent), second only to accountancy, legal and consultancy services (between 50 per cent and 60 per cent).

**Table 5-1: Change in expenditure flows to Christchurch associated with \$1 change in revenue by farm type**

| <b>Expenditure category</b> | <b>Sheep/<br/>beef<br/>\$</b> | <b>Arable<br/>\$</b> | <b>Dairy<br/>\$</b> |
|-----------------------------|-------------------------------|----------------------|---------------------|
| Animal health & breeding    | 0.004                         | 0.001                | 0.004               |
| Feed & grazing              | 0.011                         | 0.005                | 0.031               |
| Fertiliser & lime           | 0.045                         | 0.057                | 0.029               |
| Seeds                       | 0.005                         | 0.007                | 0.001               |
| Acct., legal, cons.         | 0.007                         | 0.005                | 0.006               |
| Repairs & maintenance       | 0.012                         | 0.010                | 0.008               |
| Weed & pest                 | 0.006                         | 0.017                | 0.001               |
| Fuel                        | 0.009                         | 0.013                | 0.002               |
| Vehicle maintenance         | 0.005                         | 0.006                | 0.002               |
| Freight                     | 0.001                         | 0.002                | 0.003               |
| <b>Total</b>                | <b>0.105</b>                  | <b>0.122</b>         | <b>0.086</b>        |

The relationships between revenue and expenditure on each of the farm types were used to estimate the changes in expenditure flows as a result of the land-use changes anticipated after irrigation development in the scenario analysis.

It was estimated that the direct expenditure flow responses to an increase of \$1 million in farm revenues on dairy farms in Selwyn and Waimakariri districts would be \$86,000. On sheep/beef farms the expenditure response would be \$105,000; and on arable farms, \$122,000.

## **5.2 The scenario analysis**

Two irrigation development scenarios were formulated by Aqualinc, and the changes in the flows of farm expenditures into Christchurch were calculated under each.

Under Scenario 1 an additional 52,000 hectares will be developed for irrigation in the Selwyn and Waimakariri districts during the five years to 2018. The estimate includes irrigation development under the Central Plains Water scheme and the proposed extension to the Waimakariri Irrigation Scheme, as well as new irrigation from groundwater sources (John Bright, Aqualinc, pers. comm.). This represents approximately 30,000 hectares of dairy development, 9,400 hectares of irrigated sheep/beef development, 10,400 hectares of arable development (including mixed livestock and arable farms) and 2,000 hectares of high value arable production. Under Scenario 2 the total areas of new irrigation development are 50 per cent of those assumed in Scenario 1.

Table 5-2 shows the changes in production values, direct expenditure flows and total expenditure flows from sheep/beef, dairy and arable farms in the Selwyn and Waimakariri districts to Christchurch in 2018 after completion of irrigation development.

Under the Saunders and Saunders (2012) price assumptions (adjusted to 2014 terms using the CPI) the value of production on sheep/beef, dairy and arable farms in the Selwyn and Waimakariri districts will have increased by \$287.9 million by 2018 under Scenario 1, and \$144.0 million under Scenario 2. The value of expenditure flows from these farms to Christchurch will have increased by \$25.9 million (direct) and \$66.2 million (total) under Scenario 1 and \$12.9 million (direct) and \$33.2 million (total) under Scenario 2.

**Table 5-2: Changes in production values and expenditure flows 2018 (\$ million)**

| Farm type    | Value of production (\$million) |              | Direct expenditure flows (\$million) |             | Total expenditure flows (\$ million) |             |
|--------------|---------------------------------|--------------|--------------------------------------|-------------|--------------------------------------|-------------|
|              | Scenario 1                      | Scenario 2   | Scenario 1                           | Scenario 2  | Scenario 1                           | Scenario 2  |
| Dairy        | 254.5                           | 127.2        | 21.6                                 | 10.8        | 55.0                                 | 27.5        |
| Sheep/Beef   | 14.2                            | 7.1          | 1.5                                  | 0.8         | 4.0                                  | 2.0         |
| HV arable    | 16.5                            | 8.2          | 2.0                                  | 1.0         | 5.2                                  | 2.6         |
| Arable       | 31.2                            | 15.6         | 3.8                                  | 1.9         | 9.9                                  | 5.0         |
| Dry S/B      | -28.4                           | -14.2        | -3.0                                 | -1.5        | -8.0                                 | -4.0        |
| <b>Total</b> | <b>287.9</b>                    | <b>144.0</b> | <b>25.9</b>                          | <b>12.9</b> | <b>66.2</b>                          | <b>33.1</b> |

### 5.3 Impacts of revenue changes on employment in Christchurch

Changes in the value of farm output as a result of irrigation development can be expected to lead not only to changes in the value of expenditure flows to Christchurch, but also to changes in the levels of employment in the sectors in Christchurch that provide goods and services to the agricultural sector.

Employment multipliers derived from the AERU/CDC Economic Development Model (Saunders et al., 2010) were used to estimate the numbers of jobs in Christchurch associated with the flows of expenditure from sheep/beef/dairy and arable farms in the Selwyn and Waimakariri districts. The employment multipliers for sectors of the Christchurch economy providing goods and services to farm businesses and households are included in Appendix 11. In this analysis, only the employment impacts of farm business expenditure have been estimated.

Table 5-3 shows the output and employment changes that occur in Christchurch in response to a million dollar change in the value of output on sheep/beef, arable and dairy farms in the Selwyn and Waimakariri districts.

**Table 5-3: Output and employment responses in Christchurch to a million dollar change in the value of output at the farmgate**

|  | <b>Sheep/beef</b> | <b>Arable</b> | <b>Dairy</b> |
|--|-------------------|---------------|--------------|
| Change in farm expenditure (\$M)               | 0.46              | 0.46          | 0.48         |
| Direct expenditure flows to Christchurch (\$M) | 0.11              | 0.12          | 0.09         |
| Total expenditure flows to Christchurch (\$M)  | 0.29              | 0.33          | 0.22         |
| Jobs per \$M change in total flow. (FTEs)      | 6.26              | 5.45          | 6.75         |
| Jobs per \$M change in farmgate output (FTEs)  | 1.81              | 1.78          | 1.49         |

The additional jobs created in Christchurch once irrigation development is complete under both scenarios are shown in Table 5-4. In the first stage of the analysis it was estimated that expenditure flows from Selwyn and Waimakariri farms generated 4,277 FTEs in Christchurch. Under Scenario 1, it was estimated that this would increase by more than ten per cent, while a five per cent increase was estimated under Scenario 2.

**Table 5-4: Increase in FTEs in Christchurch as a result of irrigation development in Selwyn Waimakariri districts**

|              | <b>Scenario 1</b> | <b>Scenario 2</b> |
|--------------|-------------------|-------------------|
| Dairy        | 371               | 185               |
| Sheep/Beef   | -25               | -14               |
| Arable       | 83                | 51                |
| <b>Total</b> | <b>429</b>        | <b>223</b>        |

## **Chapter 6**

### **Results of the Food Manufacturing Business Expenditure Analysis**

The Business Demographic Statistics (Statistics New Zealand, 2014) showed that in 2013 there were thirty six manufacturing businesses in Selwyn and Waimakariri districts. Two of these are large dairy processing plants in Selwyn District, and a large meat processing business in Waimakariri District is that district's largest employer. Food manufacturing businesses were not included in the survey of rural-servicing businesses because they are purchasers of farm inputs rather than suppliers of goods and services to farms. In order to examine the impacts of expenditures by food manufacturing businesses in the Selwyn and Waimakariri districts on the economy of Christchurch, interviews were held with representatives of fourteen businesses in early 2015. The average proportions of business expenditure locally, in Christchurch, and elsewhere for food manufacturing businesses in the two districts were estimated from the proportions reported by interviewees, using employment weights as described in Chapter 2.4.

#### **6.1 Food manufacturing businesses in Selwyn and Waimakariri districts**

The 14 businesses surveyed employed 1,073 FTEs, which was identical to the employment level reported in the 2013 Business Demography Statistics, despite the fact that not all businesses were included in the survey. This discrepancy is attributable, in part, to the fact that a large dairy product manufacturing plant was opened in 2012 and employment in that business had increased significantly since that time. Dairy manufacturing accounted for half the total employment amongst businesses surveyed, and meat manufacturing for 44 per cent. However, the proportion of employment in meat manufacturing businesses is expected to be higher than the survey results since the second largest meat manufacturing company was not included in the survey. Employees in smaller businesses almost all lived in Selwyn or Waimakariri districts but it is not known what proportion of employees in the three largest businesses commute to work from Christchurch.

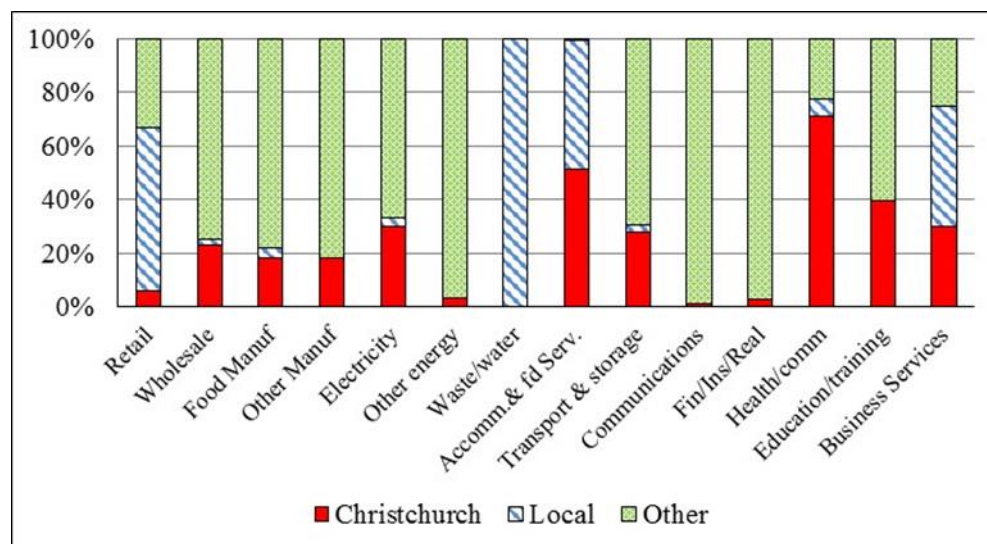
While the dairy products manufactured in the Selwyn and Waimakariri districts were largely destined for export markets, almost all of the production by other businesses surveyed was sold on the domestic market. For most companies, raw materials, which comprise the largest share of business expenses were sourced from Canterbury, mostly mid and central Canterbury, with only a very small proportion sourced from Christchurch.

The products of these businesses are diverse and included artisan cheese and meat products; nuts; fruit juices; wasabi; and specialist poultry products.

## 6.2 Expenditure patterns of Selwyn and Waimakariri food manufacturing businesses

Interviewees were asked to estimate the proportions of expenditures spent locally, in Christchurch, and elsewhere in New Zealand and/or overseas. Figure 6-1 shows the distribution of expenditures, and the data are included as Appendix 2.

**Figure 6-1: Expenditure categories by location of services**



A number of interviewees reported that their businesses spend little or nothing in some expenditure categories. No expenditure in the arts and recreation services sector was recorded, and little in the retail sector, the health and social sector, or the accommodation and food services sector. Christchurch provides these food manufacturing businesses with the largest share of the accommodation and food services and health and community services that they purchase, although most interviewees reported that expenditure in these two categories was low. Among their larger expenditures, the highest proportions of education and training and business services (professional/ scientific and accounting/legal services) are sourced in Christchurch. For all of the businesses surveyed, the costs of raw materials for manufacturing accounted for the largest share of total expenditure. Most raw materials were sourced from rural Canterbury and, although it was not possible to determine the relative proportions sourced in Selwyn and Waimakariri districts, very little was purchased in Christchurch.

## 6.3 The direct value of business expenditure by Selwyn and Waimakariri food manufacturing businesses on the Christchurch economy

The total values of expenditures by food manufacturing businesses in Canterbury, but outside Christchurch were derived from the AERU/CDC Economic Development Model (Saunders et al, 2010). These were weighted by the proportion of Canterbury food manufacturing employees employed in Selwyn and Waimakariri districts (18.5 per cent), to estimate the total annual values of expenditures by food manufacturing firms in the two districts. The expenditure values were multiplied by the proportions of expenditure described in Chapter 6.2 in order to estimate the levels of annual expenditure by these



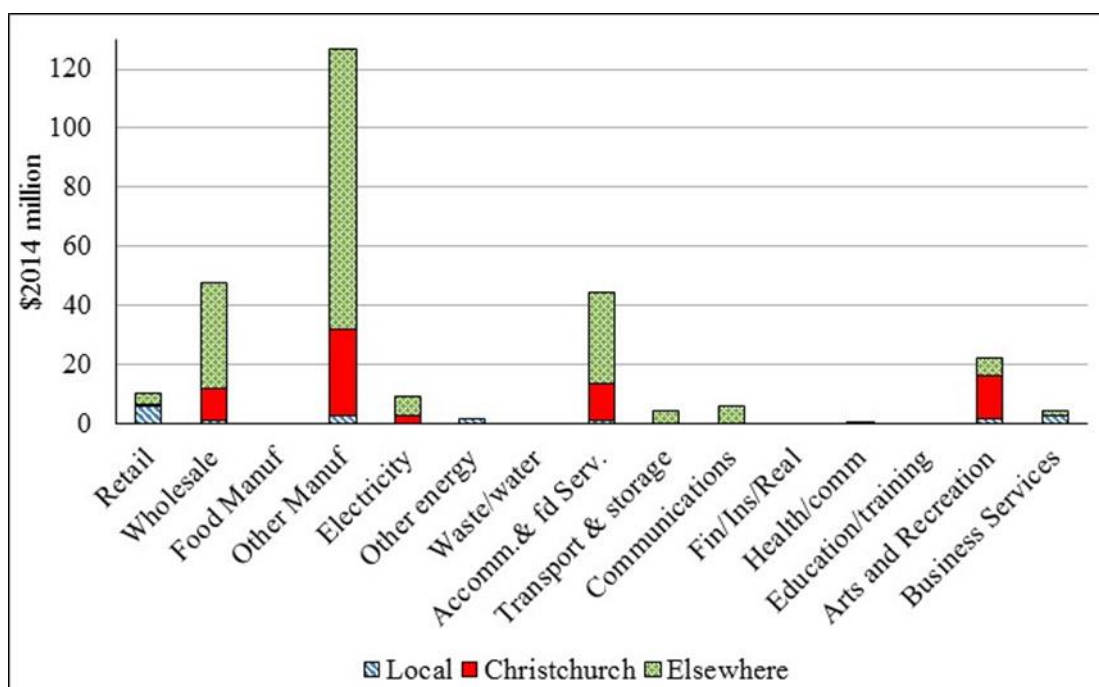
firms in Christchurch and elsewhere, which are summarised in Figure 6-1 and detailed in Table 6-1.

The AERU/CDC Economic Development Model does not include estimates for some areas of expenditure that were reported to be very small by respondents (e.g. purchases from other food manufacturers, accommodation and food services and health, and community services). Consequently, the total impact of Selwyn and Waimakariri food manufacturing business expenditure on Christchurch will be slightly understated for this reason, since a large proportion of the goods and services purchased from those sectors were purchased in Christchurch. Conversely the model reported that more than five million dollars was spent on arts and recreational services by food manufacturing companies in Selwyn and Waimakariri districts, although those interviewed reported that their businesses did not purchase these services at all.

Expenditure data from the AERU/CDC Economic Development Model show the extent to which raw material purchases dominate the business expenditures of food manufacturing businesses, accounting for more than two thirds of the total. Purchases from the rural districts of Canterbury accounted for more than 90 per cent of raw material purchases.

In total, Selwyn and Waimakariri District food processors spend an estimated \$72.6 million dollars in 2014 prices per year on goods and services from Christchurch businesses. This represents 26 per cent of total business expenditure excluding raw materials, but only nine per cent of total business expenditure. The largest values of business expenditure in Christchurch by Selwyn and Waimakariri food manufacturing business are for purchases from manufacturers (excluding food manufacturers) (\$29.6 million per year); suppliers of business services (\$15.1 million per year); and transport and storage operators (\$12.4 million per year) (see Figure 6-2). These categories account for 79 per cent of the businesses' total expenditure in Christchurch.

**Figure 6-2: Value of business expenditures (\$2014) (excluding raw materials) by source of goods and services**



**Table 6-1: Real (\$2014) annual expenditures by Selwyn and Waimakariri food manufacturing businesses (excluding raw materials)**

|                                 | Total<br>\$million | Local<br>\$million | ChCh<br>\$million | Elsewhere<br>\$million |
|---------------------------------|--------------------|--------------------|-------------------|------------------------|
| Agriculture <sup>1</sup>        | 576.53             | 522.80             | 0.78              | 52.95                  |
| Retail trade                    | 10.11              | 6.15               | 0.62              | 3.34                   |
| Wholesale trade                 | 47.92              | 0.99               | 11.16             | 35.77                  |
| Food Manufacturing              | 0.00               | 0.00               | 0.00              | 0.00                   |
| Other manufacturing             | 126.84             | 2.61               | 29.55             | 94.68                  |
| Electricity                     | 9.23               | 0.27               | 2.72              | 6.25                   |
| Waste/water                     | 1.47               | 1.47               | 0.00              | 0.00                   |
| Accommodation & food service    | 0.00               | 0.00               | 0.00              | 0.00                   |
| Transport & storage             | 44.57              | 1.19               | 12.35             | 31.03                  |
| Communications                  | 4.28               | 0.00               | 0.04              | 4.24                   |
| Finance, insurance, real estate | 5.91               | 0.00               | 0.16              | 5.75                   |
| Health and community services   | 0.00               | 0.00               | 0.00              | 0.00                   |
| Education and training          | 0.36               | 0.00               | 0.14              | 0.22                   |
| Arts and recreation             | -                  | 0.00               | 0.00              | 0.00                   |
| Business services               | 22.17              | 1.45               | 15.08             | 5.64                   |
| Other                           | 4.32               | 2.81               | -                 | 1.52                   |
| <b>Total</b>                    | <b>853.73</b>      | <b>539.74</b>      | <b>72.61</b>      | <b>241.38</b>          |

<sup>1</sup> The values of expenditures on raw materials in different areas are derived directly from the AERU/CDC Economic Development Model, rather than by using proportions estimated by interviewees. Local expenditure in this category only includes expenditure in the rest of Canterbury outside Christchurch.

## 6.4 Total effects of business expenditures by Selwyn and Waimakariri food manufacturing businesses on output and employment in Christchurch

The total direct and flow-on effects of the business expenditures of Selwyn and Waimakariri food manufacturing businesses on the economy of Christchurch were estimated using the multipliers derived from the AERU/CDC Economic Development Model presented in Appendix 10.

### 6.4.1 Total effects on the value of output

The total impacts of Selwyn and Waimakariri food manufacturing expenditures on the value of output in Christchurch are shown in Table 6-2 to be \$199.57 million in 2014 prices. The Christchurch sectors most affected by the expenditures of food manufacturing businesses in Selwyn and Waimakariri districts are “other” manufacturing and transport and storage, (2.0 per cent and 1.8 per cent of output respectively).

**Table 6-2: Direct, indirect and induced effects from food manufacturing business expenditure in Christchurch**

|                            | <b>Direct<br/>business<br/>exp. in<br/>ChCh<br/>\$million</b> | <b>Indirect<sup>1</sup><br/>effects of<br/>business<br/>exp. in<br/>ChCh<br/>\$million</b> | <b>Induced<sup>1</sup><br/>effects of<br/>business<br/>exp. in<br/>ChCh<br/>\$million</b> | <b>Total<br/>effects of<br/>business<br/>exp.in<br/>ChCh<br/>\$million</b> | <b>Aggregate<br/>Total gross<br/>output for<br/>ChCh<sup>2</sup><br/>million</b> | <b>Total<br/>effects<br/>on<br/>gross<br/>output<br/>in<br/>ChCh<br/>%</b> |
|----------------------------|---|--|---|--|--|--|
| Agriculture                | 0.78  | 0.78   | 0.34  | 1.90   | 198.58   | 1.0%   |
| Retail trade               | 0.62  | 0.69   | 0.33  | 1.64   | 1651.18  | 0.1%   |
| Wholesale trade            | 11.16   | 13.79  | 5.58  | 30.54  | 5165.35  | 0.6%   |
| Manufacturing <sup>3</sup> | 29.55   | 43.84  | 14.94   | 88.33  | 4528.89  | 2.0%   |
| Electricity/energy         | 2.72  | 3.33   | 0.00  | 6.05   | 504.01   | 1.2%   |
| Transport & storage        | 12.35   | 17.96  | 3.09  | 33.40  | 1836.60  | 1.8%   |
| Communications             | -   | 0.00   | 0.00  | 0.00   | 1169.42  | 0.0%   |
| Finance insurance          | -   | 0.00   | 0.00  | 0.00   | 805.21   | 0.0%   |
| Education/training         | -   | 0.00   | 0.00  | 0.00   | 933.25   | 0.0%   |
| Business Services          | 15.08   | 18.82  | 4.84  | 38.73  | 3958.68  | 1.0%   |
| Other                      |   |  |   |  | 8,531.80   |  |
| <b>Total</b>               | <b>72.26</b>  | <b>98.43</b>   | <b>28.78</b>  | <b>198.69</b>  | <b>29,282.98</b>   | <b>0.7%</b>  |

<sup>1</sup> Employment multipliers were sourced from the AERU/CDC Economic Development Model.

<sup>2</sup> The total value of output in Christchurch covers all sectors, not only those sectors in which Selwyn and Waimakariri food processing businesses reported expenditure.

<sup>3</sup> Excludes food manufacturing.

### 6.4.2 Total effects on employment in Christchurch

The effect of expenditure flows from Selwyn and Waimakariri food manufacturing businesses on employment in Christchurch was estimated using employment multipliers derived from the AERU/CDC Economic Development Model (see Appendix 11). As Table 6-3 shows, a total of 614 jobs were created in Christchurch as a result of expenditure by Selwyn and Waimakariri food manufacturing companies.

**Table 6-3: Impacts of food manufacturing expenditures on total employment in Christchurch**

|                          | <b>Total effects of<br/>business exp.in<br/>ChCh<br/>\$million</b> | <b>Employment<br/>(FTEs)</b> |
|--------------------------|--|------------------------------|
| Agriculture              | 1.72   | 11                           |
| Retail trade             | 1.48   | 14                           |
| Wholesale trade          | 27.63  | 102                          |
| Manufacturing (not food) | 79.90  | 307                          |
| Electricity/energy       | 5.47   | 3                            |
| Transport & storage      | 30.21  | 172                          |
| Communications           | 0.09   | 0.3                          |
| Finance insurance        | 0.33   | 0.8                          |
| Education/training       | 0.37   | 4.1                          |
| Business Services        | 35.04  | 243                          |
| <b>Total</b>             | <b>180.52</b>  | <b>614</b>                   |

## **Chapter 7**

### **Summary and Conclusions**

This research has shown that the rural sector in Canterbury makes a significant contribution to the economy of Christchurch, and that changes in rural sector infrastructure, particularly extensive irrigation development and associated land-use change, will have significant flow-on effects on the city's economy. The study, conducted in three stages, examined the impacts of expenditures by farm businesses and households, rural-servicing businesses and food manufacturing businesses in Selwyn and Waimakariri districts on the economy of Christchurch. The contributions of the Christchurch farming and food manufacturing sectors were also reported.

A postal survey of 315 farms in the Selwyn and Waimakariri districts provided data on farm expenditure patterns that were used in the analysis of farm household and business expenditure flows into Christchurch. The farms surveyed were representative of the farm types and geographic location of farms in the two districts. The analysis showed that farms in Selwyn and Waimakariri spent \$73,000 on average per year in Christchurch, which was 27.9 per cent of total farm household and business expenditure in the categories included in the analysis

There is considerable variability among farm types in the value of expenditure in Christchurch, which means that significant land-use change is likely to have a marked effect on expenditure flows into the city. Since 2000, the number of dairy farms in Selwyn and Waimakariri districts has increased by almost 30 per cent, largely at the expense of dryland sheep and beef farms, and increased irrigation development means that this trend is likely to continue, albeit slowed by the imposition of nitrogen limits. Dairy farmers spent more than twice as much in Christchurch as sheep and beef farmers, and as noted in Chapter 3, the extent to which the analysis under-estimated dairy farm expenditure was greater than other farm types.

It was estimated that the total impact (including the direct (\$267.62 million); indirect (\$323.43.58 million); and induced (\$86.63 million) effects) of the expenditure flows into Christchurch from farm households and businesses in the Selwyn and Waimakariri districts during 2010/11 was \$677.65 million dollars in 2014 prices. This accounted for 2.3 per cent of the value of gross output in Christchurch. In addition 4,277 full-time jobs in the city were directly associated with economic activity generated by farm expenditure flows from Selwyn and Waimakariri Districts.

Survey respondents reported that most (65.1 per cent) of farm household and business expenditure was spent locally (in Canterbury outside Christchurch) and the businesses providing goods and services to the farming community also generate expenditure flows into Christchurch. The farm expenditure analysis showed that total value of farm expenditures in Selwyn and Waimakariri districts (including direct, indirect and induced) accounted for approximately 18 per cent of the value of output in these districts. Consequently, it was assumed that 18 per cent of the expenditure by businesses in the district would be associated with the provision of goods and services to farms.

In addition to the expenditure flows into Christchurch from farm businesses and households, the estimated direct flow associated with the expenditure of wages by farm employees was \$29.6 million per annum. The total (direct, indirect and induced) effect

of this expenditure on the gross output of Christchurch was estimated to be \$73.6 million per annum.

The rural business analysis found that the total impact (including the direct (\$543.92 million); indirect (\$717.79 million); and induced (\$205.01 million)) effects of the expenditure flows into Christchurch from rural businesses in the Selwyn and Waimakariri districts during 2010/11 was \$1,466.72 million dollars in 2014 prices. The expenditure flows from wages paid by rural businesses have not been included in the total flows estimated.

In stage three of the research, a separate personal interview survey was carried out in 2015 to determine the expenditure patterns of the food manufacturing sector. The survey found that the expenditure flows into Christchurch from these businesses were small (direct expenditure (\$72.61 million); indirect expenditure (\$98.76 million); induced expenditure (\$28.99 million); total expenditure (\$199.57 million)), and comprised only nine per cent of total business expenditures. This was attributable to the fact that the purchase of raw materials dominates the business expenditures of food manufacturing companies, and nearly 90 per cent of these are sourced from rural Canterbury. Expenditure flows from wages paid by these businesses were not estimated.

In total, the business expenditure flows into Christchurch from farms and businesses in Selwyn and Waimakariri districts account for more than \$2.3 billion (8.25 per cent) of the value of output in Christchurch, and the associated employment is estimated to be almost 12,000 FTEs as Table 7-1 shows.

**Table 7-1: Total impacts of farm and rural business expenditures of the economy of Christchurch**

|                               | <b>Direct<br/>business<br/>expendi-<br/>ture in<br/>ChCh<br/>\$m</b> | <b>Indirect<br/>effects<br/>of<br/>business<br/>expendi-<br/>ture in<br/>ChCh<br/>\$m</b> | <b>Induced<br/>effects<br/>of<br/>business<br/>expendi-<br/>ture in<br/>ChCh<br/>\$m</b> | <b>Direct,<br/>indirect<br/>&amp;<br/>induced<br/>effects<br/>business<br/>expendi-<br/>ture in<br/>ChCh<br/>\$m</b> | <b>% of<br/>gross<br/>output<br/>of ChCh<br/>\$m</b> | <b>FTEs</b>   |
|-------------------------------|--|---|--|--|--|---------------|
| Businesses                    | 544  | 718   | 205  | 1,467  | 5.0%   | 7,012         |
| Farms                         | 268  | 323   | 87   | 678  | 2.3%   | 4,277         |
| Farm employees                | 30   | 35  | 9  | 74   | 0.25%  | 464           |
| Food processing<br>businesses | 73   | 99  | 29   | 200  | 0.7%   | 73            |
| <b>Total</b>                  | <b>915</b>   | <b>1,175</b>  | <b>330</b>   | <b>2,419</b>   | <b>8.25%</b>   | <b>11,826</b> |

The AERU/CDC Economic Development Model provided data on the contribution of the food manufacturing and agricultural sectors of Christchurch, which are summarised in Table 7-2. The two sectors jointly spend \$777 million (2014 prices) in Christchurch

which has a total impact of \$1,554 million on the gross output of Christchurch, and accounts for 5.4 per cent of the value of output in the city.

**Table 7-2: Contribution of the Christchurch agricultural and food manufacturing sectors to the Christchurch economy (2014 prices)**

| Sector                  | Value of gross output<br>\$m | Value-added (GDP)<br>\$m | Direct exp. in other ChCh sectors<br>\$m | Total impact of exp. on gross output in ChCh<br>\$m | % of gross output of ChCh<br>\$m |
|-------------------------|------------------------------|--------------------------|--|---|----------------------------------|
| Christchurch farms      | 323                          | 140                      | 51                                       | 102   | 0.4%                             |
| ChCh food manufacturing | 1,926                        | 361                      | 726                                      | 1,452   | 5.0%                             |
| <b>Total</b>            | <b>2,249</b>                 | <b>501</b>               | <b>777</b>                               | <b>1,554</b>  | <b>5.4%</b>                      |

While the study included only the two rural districts closest to Christchurch and Christchurch itself, both farms and businesses in the other districts of Canterbury purchase goods and services in Christchurch. In the districts to the north of the city, particularly Hurunui district, local towns are small (Amberley, Kaikoura), and provide limited access to the goods and services needed by farm households and businesses. In the south, Ashburton and Timaru offer wider choice and it is probable that a relatively high proportion of purchases are made in these. Consequently the results of this study are an underestimate of the total impact of rural sector expenditures on the economy of Christchurch.

The analysis of inter-annual variability in expenditure flows showed that despite the considerable variability in pasture production, as a consequence of differences in rainfall, and some price variability, the value of expenditure flows to Christchurch from Selwyn and Waimakariri farms into Christchurch has shown a relatively steady increase in both actual and real terms since 2000. The increase reflects primarily the increasing contribution of the dairy sector to the regional agricultural economy, which has been made possible by irrigation development. In real 2011/12 terms the direct contribution of expenditure flows from sheep/beef, dairy and arable farms has increased from approximately \$100 million to almost \$170 million between 2001/02 and 2011/12.

The relationships between revenues and expenditures estimated were used in conjunction with the flow coefficients estimated in the first part of the study, in order to estimate the impacts of irrigation development in the Selwyn and Waimakariri districts on expenditure flows into Christchurch from farms in these districts. The results indicated that development of the potentially irrigable land in Selwyn and Waimakariri districts could result in significant increases in the contribution of the agricultural sector to the economy of Christchurch. If 50 per cent of the potentially irrigable land were to be developed by 2018, it was estimated that the value of production would increase by approximately \$280 million dollars per annum at the farm gate. The direct value of farm business expenditure in Christchurch would increase by \$25 million per annum (almost 15 per cent); and the total value (direct, indirect and induced) by \$66 million per annum.

The impact of expenditure by the agricultural sector in Selwyn and Waimakariri districts in Christchurch was estimated to be 8.2 per cent of the total value of output in the city. Expenditures by food processing businesses and farms within the city boundaries, contribute a further 5.4 per cent. Therefore the total contribution to the Christchurch economy is estimated to be \$3.9 billion (13.6 per cent of the value of output).



## References

- AsureQuality (2012). Agribase™ Data. Ashburton: AsureQuality.
- Canterbury Water (2009). Canterbury Water Management Strategy: Strategic Framework November 2009. Accessed January, 2014, from: <http://www.canterburywater.org.nz/downloads/cwms-strategic-framework-november-2009.pdf>
- Greer, G., Rutherford, P., Saunders, C. (2014). *The wheel of water: Annual variability in the contribution of agriculture to the economy of Christchurch*. Report prepared for Aqualinc. AERU, Lincoln University May 2014. 19pp.
- Greer, G. and Saunders, C. (2015). The Wheel of Water: the contribution of food processing businesses in Selwyn and Waimakariri districts to the economy of Christchurch. Report prepared for Aqualinc. AERU, Lincoln University May 2015. 19pp.
- Guenther, M., Saunders, C., Rutherford, P. Tait, P. *The wheel of water: Agricultural Expenditure flows from Selwyn and Waimakariri districts into Christchurch*. Report prepared for Aqualinc. AERU, Lincoln University September 2013. 68pp. Greer, G., Rutherford, P., Saunders, C. (2014). *The wheel of water: Annual variability in the contribution of agriculture to the economy of Christchurch*. Report prepared for Aqualinc. AERU, Lincoln University May 2014. 19pp.
- Harris, S. Butcher, G. Smith, W. (2006). *The Opuha Dam: An ex-post study of its impacts on the provincial economy and community*. Aoraki Development Trust, August, 2006. 62pp. Accessed February 2014 from: [http://ecan.govt.nz/publications/Consent Notifications/lower-waitaki-submitter-evidence-timaru-district-council-annexure-1-opuha-study-230210.pdf](http://ecan.govt.nz/publications/Consent%20Notifications/lower-waitaki-submitter-evidence-timaru-district-council-annexure-1-opuha-study-230210.pdf)
- Ministry of Agriculture and Forestry (2011a). Farm Monitoring Report. Canterbury/ Marlborough breeding and finishing sheep and beef model 2010/11. Wellington. MAF
- Ministry of Agriculture and Forestry (2011b). Farm Monitoring Report. Canterbury/ Marlborough sheep and beef hill country model 2010/11. Wellington: MAF.
- Ministry of Agriculture and Forestry (2011c). *Farm Monitoring Report. Canterbury dairy model 2010/11*. Wellington: MAF.
- Ministry of Agriculture and Forestry (2011d). *Farm Monitoring Report. South Island deer model 2010/2011*. Wellington: MAF
- Ministry of Agriculture and Forestry (2011e). *Farm Monitoring Report. Canterbury arable cropping model 2010/11*. Wellington: MAF.

- Morgan, M, Bidwell, V., Bright, J, McIndoe, I, Robb, C. (2002). *Canterbury Strategic Water Study*. Report to the Ministry of Agriculture and Forestry, Environment Canterbury and the Ministry for the Environment. Lincoln Environmental Report No 4557/1, Lincoln University, August 2002. 270pp. Accessed February 2014 from:  
<http://ecan.govt.nz/publications/Plans/Canterburystrategicwaterstudy.pdf>
- Saunders, C., Rutherford, P., Guenther, M., Black, O. (2010). *Canterbury economic development model - methodology and data*. A report to the Canterbury Development Corporation. AERU, Lincoln University, 2010.
- Saunders, C., Saunders, J. (2012). *The economic value of potential irrigation in Canterbury*. A report to the Canterbury Development Corporation. AERU, Lincoln University, September, 2012. 34pp.
- Statistics New Zealand (2006a). *Census data. Occupation by industry by area unit in Christchurch*. Wellington: Statistics New Zealand.
- Statistics New Zealand (2006b). *Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006*. Wellington: Statistics New Zealand.
- Statistics New Zealand (2007). *Agricultural Census 2007. Farm size by type and district*. Wellington: Statistics NZ.
- Statistics New Zealand (2010). *Household economic survey*. Wellington, Statistics New Zealand.
- Statistics New Zealand (2014a). *NZ Stat; Business Demography Statistics*. Detailed industry by region for geographic units (ANZSIC06) 2000-2014. Accessed from: <http://nzdotstat.stats.govt.nz/wbos/Index.aspx>
- Statistics New Zealand (2014b). *Infoshare: Producer Producers Price Index - PPI Table: Outputs (ANZSIC06) - NZSIOC level 3*. Accessed from:  
<http://www.stats.govt.nz/infoshare/SelectVariables.aspx?pxID=b949270f-0c5b-4f9d-90fa-c63e3c6198eb>
- Statistics New Zealand (2014c). *2013 Census QuickStats about income – Tables*. Retrieved June 2015 from: <http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-income.aspx>
- Statistics New Zealand (2015). *Infoshare: Group: Consumer Price Index - CPI Table: CPI All Groups for New Zealand (Qrtly-Mar/Jun/Sep/Dec)*. Accessed from:  
<http://www.stats.govt.nz/infoshare/SelectVariables.aspx?pxID=1a14e67d-4ce4-4d1b-b0fc-15b300e4659a>

# Appendix 1

## Statistics NZ: Number of farms by type and area, Year ended June 2011

| AERU farm survey category | ANZSIC sub class                                 | Area                 | 2011         |
|---------------------------|--|----------------------|--------------|
| Dairy                     | A016 Dairy Cattle Farming                        | Waimakariri District | 149          |
|                           |  | Selwyn District      | 292          |
|                           |  | <b>Total</b>         | <b>441</b>   |
| Deer                      | A018 Deer Farming                                | Waimakariri District | 80           |
|                           |  | Selwyn District      | 58           |
|                           |  | <b>Total</b>         | <b>138</b>   |
| Sheep & Beef              | A014100 Sheep Farming (Specialised)              | Waimakariri District | 179          |
|                           |  | Selwyn District      | 294          |
|                           |  | <b>Total</b>         | <b>473</b>   |
|                           | A014200 Beef Cattle Farming (Specialised)        | Waimakariri District | 361          |
|                           |  | Selwyn District      | 268          |
|                           |  | <b>Total</b>         | <b>629</b>   |
|                           | A014400 Sheep-Beef Cattle Farming                | Waimakariri District | 133          |
|                           |  | Selwyn District      | 135          |
|                           |  | <b>Total</b>         | <b>268</b>   |
| Mixed cropping            | A014500 Grain-Sheep or Grain-Beef Cattle Farming | Waimakariri District | 27           |
|                           |  | Selwyn District      | 88           |
|                           |  | <b>Total</b>         | <b>115</b>   |
|                           | A014900 Other Grain Growing                      | Waimakariri District | 25           |
|                           |  | Selwyn District      | 100          |
|                           |  | <b>Total</b>         | <b>125</b>   |
| Other                     |  | Waimakariri District | 740          |
|                           |  | Selwyn District      | 866          |
|                           |  | <b>Total</b>         | <b>1,606</b> |
| Total number of farms     | A01 Agriculture                                  | Waimakariri District | 1,669        |
|                           |  | Selwyn District      | 2,001        |
|                           |  | <b>Total</b>         | <b>3,670</b> |

## Appendix 2

### Expenditure flow coefficients

#### Farm expenditure flow coefficients derived from the farm survey

|                                    | <b>S/B<br/>Flow<br/>coeff.</b> | <b>Dairy<br/>Flow<br/>coeff.</b> | <b>Arable<br/>Flow<br/>coeff.</b> |
|------------------------------------|--------------------------------|----------------------------------|-----------------------------------|
| Animal health & breeding           | 9%                             | 9%                               | 10%                               |
| Purchased feed                     | 12%                            | 12%                              | 11%                               |
| Fertiliser & lime                  | 36%                            | 39%                              | 39%                               |
| Seed                               | 22%                            | 22%                              | 22%                               |
| Accountancy, legal and consultancy | 53%                            | 59%                              | 60%                               |
| Repairs and maintenance            | 20%                            | 21%                              | 21%                               |
| Weed & pest control                | 20%                            | 18%                              | 19%                               |
| Fuel                               | 32%                            | 33%                              | 33%                               |
| Vehicle                            | 22%                            | 23%                              | 23%                               |
| Freight                            | 7%                             | 8%                               | 8%                                |

#### Rural business flow coefficients derived from the rural business survey

| <b>Category</b>                    | <b>Average percentage of<br/>direct business<br/>expenditure</b> |
|------------------------------------|--|
| Retail Trade                       | 48.9%  |
| Wholesale                          | 59.8%  |
| Food manufacturing                 | 49.5%  |
| Other Manufacturing                | 57.3%  |
| Electricity supply                 | 72.5%  |
| Water and waste                    | 36.1%  |
| Accommodation & restaurants        | 30.8%  |
| Transport & Storage                | 56.3%  |
| Communication                      | 71.3%  |
| Business Services                  | 64.9%  |
| Education                          | 50.0%  |
| Doctors and other medical services | 48.8%  |
| Culture and recreation             | 40.5%  |
| Personal care                      | 57.5%  |
| Public Administration              | 50.0%  |
| Other                              | 50.0%  |

**Food processing business flow coefficients derived from the food processing business survey**

|                                 | <b>Local</b> | <b>Christchurch</b> | <b>Other</b> |
|---------------------------------|--------------|---------------------|--------------|
| Retail trade                    | 61.2%        | 5.5%                | 33.2%        |
| Wholesale trade                 | 2.1%         | 23.3%               | 74.6%        |
| Food manufacture                | 3.7%         | 5.5%                | 78.0%        |
| Other manufacture               | 2.1%         | 23.3%               | 74.6%        |
| Electricity                     | 3.0%         | 30.0%               | 67.0%        |
| Other energy                    | 0.0%         | 3.3%                | 96.7%        |
| Waste/water                     | 100.0%       | 0.0%                | 0.0%         |
| Accommodation and food services | 47.9%        | 51.3%               | 0.8%         |
| Transport & storage             | 2.7%         | 27.8%               | 69.5%        |
| Communications                  | 0.0%         | 1.0%                | 99.0%        |
| Finance and insurance           | 0.0%         | 2.8%                | 97.2%        |
| Health and community services   | 6.2%         | 71.1%               | 22.7%        |
| Education and training          | 0.0%         | 39.6%               | 60.4%        |
| Arts and Recreation             | 0.0%         | 0.0%                | 0.0%         |
| Business Services               | 6.4%         | 68.1%               | 25.5%        |

## Appendix 3

### Farm questionnaire

#### Information sheet

Welcome to our survey to assess the benefits and flows of farm expenditure in Canterbury.

- **Farm expenditure is an important contribution to the Canterbury economy.**
- **Where this occurs is crucial information for businesses to grow, infrastructure development and the rebuild of Christchurch.**
- **Currently, we do not know where the benefits of farm expenditure occur.**
- **We are interested in understanding the flows of farm expenditure, and thus ask for the percentage of your expenditure by main area.**

We are surveying a sample of Canterbury farmers to find out where they purchase different goods and services. We realise that there may have been changes in spending patterns since the earthquakes, so the survey includes questions about pre – and post-earthquake expenditure.

While participation is entirely voluntary, we will be really grateful if you took the 10 minutes required to complete this questionnaire and return it in the stamped addressed envelope provided. Your answer will be completely confidential, and the results of the survey will be published only in aggregate. You do not need to answer all survey questions, and no personal information is collected. The questionnaire has been reviewed and approved by the Lincoln University Human Ethics Committee. The return of the completed survey will be taken as your consent of participation. However, you can withdraw from the survey at a later date. If you wish to withdraw, please let us know and we will discard your survey form. Also, if you have any questions about the research, please don't hesitate to call or e-mail me:

Caroline Saunders  
03 321-8287  
caroline.saunders@lincoln.ac.nz

Funding for this research has been received from the Ministry of Science and Innovation.

We use a number on the reply freepost envelope to keep track of those who have replied so as not to bother respondents with a follow up reminder. The list of addresses is kept confidential and separate from the responses in the questionnaire.

Thank you very much for assisting us with this work.

Yours sincerely



Professor Caroline Saunders

**Q1:** Could you please note the approximate percentages of expenditure on the following goods and services that you buy locally, in Christchurch or elsewhere.

'Locally' includes all areas in Canterbury other than Christchurch, and Christchurch is defined as Greater Christchurch including its suburbs.

Please sum up the total to 100%.

*(Note: we are interested in the place of purchase not manufacturing)*

| Category   | %<br>Locally | %<br>Christ-<br>church | %<br>Other<br>(Rest of<br>NZ,<br>Internet<br>etc.) |
|--|--------------|------------------------|--|
| <b>Household</b>   |              |                        |  |
| Food & beverages (at home and elsewhere)   |              |                        |  |
| Household contents and services (excluding electronics)                                |              |                        |  |
| Clothing and footwear  |              |                        |  |
| Health (excluding insurance)   |              |                        |  |
| Recreation, culture and electronics (e.g. TV)  |              |                        |  |
| Education  |              |                        |  |
| Personal care (hairdresser, toiletries, etc.)  |              |                        |  |
| Home maintenance   |              |                        |  |
| Public transport/ travel   |              |                        |  |
| <b>Some expenses are incurred in part by the farm and in part as private expenses.</b> |              |                        |  |
| Fuel   |              |                        |  |
| Vehicle maintenance and services   |              |                        |  |
| <b>Farm expenses</b>   |              |                        |  |
| Fertiliser & Lime Total  |              |                        |  |
| Animal health and breeding/ supplies & veterinary                                      |              |                        |  |
| Purchased feed (grains and concentrate, not fodder)                                    |              |                        |  |
| Weed & Pest Control products   |              |                        |  |
| Accountant, Legal & Consultancy  |              |                        |  |
| Total seed   |              |                        |  |
| Freight  |              |                        |  |
| Repairs and maintenance products and service (excluding labour)                        |              |                        |  |

**Q2:** For each category, please indicate if the location has changed due to the earthquakes and the per cent where you sourced the following goods and services from before the earthquakes occurred. 'Locally' includes all areas in Canterbury other than Christchurch, and Christchurch is defined as Greater Christchurch including its suburbs.

Please sum up the total to 100%.

*(Note: we are interested in the place of purchase not manufacturing)*

| Category   | Changed since earthquakes<br>Yes/ No | % Locally | % Christchurch | % Other (Rest of NZ, Internet etc.) |
|--|--------------------------------------|-----------|----------------|-------------------------------------|
| <b>Household</b>   |                                      |           |                |                                     |
| Food & beverages (at home and elsewhere)   |                                      |           |                |                                     |
| Household contents and services (excluding electronics)                                |                                      |           |                |                                     |
| Clothing and footwear  |                                      |           |                |                                     |
| Health (excluding insurance)   |                                      |           |                |                                     |
| Recreation, culture and electronics (e.g. TV)  |                                      |           |                |                                     |
| Education  |                                      |           |                |                                     |
| Personal care (hairdresser, toiletries, etc.)  |                                      |           |                |                                     |
| Home maintenance   |                                      |           |                |                                     |
| Public transport/ travel   |                                      |           |                |                                     |
| <b>Some expenses are incurred in part by the farm and in part as private expenses.</b> |                                      |           |                |                                     |
| Fuel   |                                      |           |                |                                     |
| Vehicle maintenance and services   |                                      |           |                |                                     |
| <b>Farm expenses</b>   |                                      |           |                |                                     |
| Fertiliser & Lime Total  |                                      |           |                |                                     |
| Animal health and breeding/ supplies & veterinary                                      |                                      |           |                |                                     |
| Purchased feed (grains and concentrate, not fodder)                                    |                                      |           |                |                                     |
| Weed & Pest Control products   |                                      |           |                |                                     |
| Accountant, Legal & Consultancy  |                                      |           |                |                                     |
| Total seed   |                                      |           |                |                                     |
| Freight  |                                      |           |                |                                     |
| Repairs and maintenance products and service (excluding labour)                        |                                      |           |                |                                     |



**Q3:** In the last year, how much have you approximately spent on cars and farm machinery/ vehicles/ plants?

\_\_\_\$ \_\_\_\_\_

**Q4:** What proportion of the amount on cars and farm machinery/ vehicles/ plants that you have purchased in the last year was spent locally, in Christchurch or elsewhere? 'Locally' includes all areas in Canterbury other than Christchurch, and Christchurch is defined as Greater Christchurch including its suburbs.

Please indicate the approximate percentage:

|                                   |       |
|-----------------------------------|-------|
| Locally                           | %     |
| Christchurch                      | %     |
| Other (Rest of NZ, Internet etc.) | %     |
| Total                             | 100 % |

**Q5:** What is your main farming activity?

- ☐ Dairy
- ☐ Sheep/ Beef Breeding and Finishing
- ☐ Sheep/ Beef Hill Country
- ☐ Deer
- ☐ Mixed cropping and livestock finishing
- ☐ Other, please specify

\_\_\_\_\_

Thanks for your participation!

## Appendix 4

### Business Questionnaire

#### ABOUT THE SURVEY

Welcome to our survey to assess the benefits and flows of business expenditure in Canterbury. Business expenditure is an important contribution to the Canterbury economy. Where this occurs is crucial information to aid business growth and infrastructure development. Currently, it is unknown where the benefits of your business expenditure occur.

We are interested in understanding the flows of this, and thus ask for the % of your business expenditure by main area. This survey is being conducted by the Agribusiness and Economics Research Unit at Lincoln University. Data will be held on a secure server on the University campus.

The survey does not collect identifying information, and your responses cannot be linked to you. Your answer will be completely confidential. The survey will take no more than 10 minutes and no personal information is collected. In order to produce sound information, we need replies from as many business owners as possible, so we are grateful for your response. You do not have to participate.

You have the right to:

- Decline to answer any question.
- Stop the survey at any time. If you do stop the survey before the end, the information you have provided will be destroyed.

Completion of the survey will be taken as your consent to participate in this research. If you complete the survey, you will not be able to withdraw your information at a later date. The last day for submitting a completed survey is Tuesday, 31 July 2012.

If at any time you wish to withdraw from the survey just click the >> button until you get to the end, or simply close your browser window. Incomplete surveys will be discarded.

If you have any questions about the research, please don't hesitate to call or e-mail me:

Caroline Saunders

0064 3 321-8287

saunderc@lincoln.ac.nz

To begin the survey, begin by clicking on the >> button below Thank you very much for assisting us with this work.

Yours sincerely

Professor Caroline Saunders

**Q1:** What is your main business activity? For a detailed description of the sector, please hover over the relevant sector.

- ☐ Agriculture
- ☐ Food Manufacturing

- ☐ Other Manufacturing
- ☐ Electricity Services
- ☐ Water & Waste Services
- ☐ Retail
- ☐ Wholesale Trade
- ☐ Accommodation & Restaurants
- ☐ Transport & Storage
- ☐ Communication Services
- ☐ Finance, Insurance and Real Estate
- ☐ Business Services
- ☐ Education
- ☐ Health & Community Services
- ☐ Cultural & Recreational Services
- ☐ Personal Services
- ☐ Other (please specify) \_\_\_\_\_

**Q2:** Where is your business located? Please type the postcode into the field below.

\_\_\_\_\_

**Q3:** The next group of questions shows business suppliers by industry sector and area. We ask you to indicate approximately what percentage of supplies your business obtains from each supplier and area. The total must sum up to 100. Below is an example display of the question.

Click the >> button to start the questions.

**Q4:** Could you please indicate approximately what percentage of supplies your business obtains from each industry supplier and area. 'Locally' includes all areas in Canterbury other than Christchurch, and Christchurch is defined as Greater Christchurch including its suburbs. Additional information can be viewed by hovering over the relevant business supplier and the area.

Please sum up the total to 100% and leave the field blank, if the category is not relevant to your business.

|  | %       | %            | %                                 |
|--|---------|--------------|-----------------------------------|
|  | Locally | Christchurch | Other (Rest of NZ, internet etc.) |

|                                    |  |  |  |
|------------------------------------|--|--|--|
| Retailers                          |  |  |  |
| Wholesalers                        |  |  |  |
| Food Manufacturers                 |  |  |  |
| Other Manufacturers                |  |  |  |
| Farmers                            |  |  |  |
| Electricity Providers              |  |  |  |
| Water & Waste Services             |  |  |  |
| Accommodation & Restaurants        |  |  |  |
| Transport & Storage Firms          |  |  |  |
| Communication Services             |  |  |  |
| Finance, Insurance and Real Estate |  |  |  |
| Business Services                  |  |  |  |
| Education Institutes               |  |  |  |
| Health & Community Services        |  |  |  |
| Cultural & Recreational Services   |  |  |  |
| Personal Services                  |  |  |  |
| Other (please specify)             |  |  |  |

**Q5:** For each category, please indicate if the location has changed due to the earthquakes and the percentage where you sourced your business supplies from before the earthquakes occurred. 'Locally' includes all areas in Canterbury other than Christchurch, and Christchurch is defined as Greater Christchurch including its suburbs. Additional information can be viewed by hovering over the relevant business supplier and the area. Please sum up the total to 100% and leave the field blank when the purchase location hasn't changed or the category is not relevant for your business.

|  | Location has changed since the earthquakes |    | %            | %                       | %                  |
|--|--|----|--------------|-------------------------|--------------------|
|  | YES  | NO | Christchurch | All areas in Canterbury | Other (Rest of NZ, |

|  |                       |                       |  |                             |                    |
|--|-----------------------|-----------------------|--|-----------------------------|--------------------|
|  |                       |                       |  | other than<br>Christchurch. | internet,<br>etc.) |
| Retailers                                | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Wholesalers                              | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Food<br>Manufacturers                    | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Other<br>Manufacturers                   | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Farmers                                  | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Electricity<br>Providers                 | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Water & Waste<br>Services                | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Accommodation<br>& Restaurants           | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Transport &<br>Storage Firms             | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Communication<br>Services                | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Finance,<br>Insurance and<br>Real Estate | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Business<br>Services                     | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Education<br>Institutes                  | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Health &<br>Community<br>Services        | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Cultural &<br>Recreational<br>Services   | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Personal<br>Services                     | <input type="radio"/> | <input type="radio"/> |  |                             |                    |
| Other (please<br>specify)                | <input type="radio"/> | <input type="radio"/> |  |                             |                    |

Please click the >> button to submit the survey.      Thanks for your participation!

**Appendix 5**  
**Consumer Price Index – All Groups**  
**(Base =June 2014)**

| <b>Year</b>    | <b>Index</b> | <b>Conversion factor</b> |
|----------------|--------------|--------------------------|
| <b>2000/01</b> | 1376         | 1.38                     |
| <b>2001/02</b> | 1343         | 1.34                     |
| <b>2002/03</b> | 1313         | 1.31                     |
| <b>2003/04</b> | 1290         | 1.29                     |
| <b>2004/05</b> | 1256         | 1.26                     |
| <b>2005/06</b> | 1214         | 1.21                     |
| <b>2006/07</b> | 1183         | 1.18                     |
| <b>2007/08</b> | 1147         | 1.15                     |
| <b>2008/09</b> | 1110         | 1.11                     |
| <b>2009/10</b> | 1090         | 1.09                     |
| <b>2010/11</b> | 1051         | 1.05                     |
| <b>2011/12</b> | 1028         | 1.03                     |
| <b>2012/13</b> | 1019         | 1.02                     |
| <b>2013/14</b> | 1004         | 1.00                     |

Source: Statistics New Zealand Business Infoshare

## Appendix 6

### Canterbury Farm Monitoring Data 2010/11<sup>1</sup>

**Note: Shaded expenditures were included in the expenditure flows analysis.**

| Farm working expenses                     | Dairy          | Excluded costs % | Sheep/beef    | Excluded costs % | Arable        | Excluded costs % | Deer         | Excluded costs % |
|---|----------------|------------------|---------------|------------------|---------------|------------------|--------------|------------------|
| Permanent wages                           | 172,679        |                  | 26,114        |                  | 45,000        |                  | 0            |                  |
| Casual wages                              | 36,800         |                  | 5,320         |                  | 6,000         |                  | 5,100        |                  |
| ACC                                       | 6,727          |                  | 1,183         |                  | 900           |                  | 179          |                  |
| <b>Total labour expenses</b>              | <b>216,206</b> | <b>18%</b>       | <b>32,616</b> | <b>11%</b>       | <b>51,900</b> | <b>9%</b>        | <b>5,279</b> | <b>3%</b>        |
| Contracting (incl. harvesting and drying) |                |                  |               |                  | 27,000        |                  |              |                  |
| Animal health                             | 62,278         |                  | 17,082        |                  | 4,200         |                  | 11,835       |                  |
| Breeding                                  | 31,139         |                  | 3,020         |                  | 0             |                  | 3,620        |                  |
| Dairy shed expenses                       | 14,154         |                  | 0             |                  | 0             |                  | 0            |                  |
| Electricity                               | 59,447         |                  | 7,131         |                  | 21,600        |                  | 4,994        |                  |
| Feed (hay and silage)                     | 141,540        | 28%              | 13,938        | 9%               | 9,000         | 6%               | 15,203       | 15%              |
| Feed (feed crops)                         | 0              |                  | 1,917         |                  | 0             |                  | 2,896        |                  |
| Feed (grazing)                            | 110,401        |                  | 3,166         |                  | 4,200         |                  | 755          |                  |
| Feed (other)                              | 144,371        |                  | 5,007         |                  | 2,100         |                  | 3,872        |                  |
| Fertiliser                                | 129,855        |                  | 47,646        |                  | 112,950       |                  | 31,540       |                  |
| Lime                                      | 4,200          |                  | 6,160         |                  | 2,400         |                  | 1,133        |                  |
| Cash crop expenses <sup>1</sup>           | 0              | 0%               | 7,204         | 3%               | 0             | 0%               | 0            | 0%               |
| Freight (not elsewhere deducted)          | 9,625          |                  | 8,324         |                  | 20,100        |                  | 3,431        |                  |
| Seed dressing                             | 0              | 0%               | 0             | 0%               | 29,100        | 5%               | 0            | 0%               |

<sup>1</sup> In 2010/11 prices

|                                      |                  |            |                |            |                |            |                |            |
|--------------------------------------|------------------|------------|----------------|------------|----------------|------------|----------------|------------|
| Seeds                                | 0                |            | 0              |            | 35,260         |            | 0              |            |
| Regrassing costs                     | 12,172           | 1%         | 14,214         | 5%         | 0              | 0%         | 4,690          | 3%         |
| Shearing expenses <sup>2</sup>       | 0                |            | 16,645         |            | 6,300          |            | 0              |            |
| Weed and pest control                | 6,511            |            | 12,878         |            | 85,050         |            | 4,564          |            |
| Fuel                                 | 20,948           |            | 15,314         |            | 32,400         |            | 13,755         |            |
| Vehicle costs (excluding fuel)       | 23,496           |            | 11,195         |            | 24,900         |            | 8,467          |            |
| Repairs and maintenance              | 93,416           |            | 23,955         |            | 35,700         |            | 15,769         |            |
| <b>Total other working expenses</b>  | <b>863,553</b>   | <b>29%</b> | <b>214,797</b> | <b>17%</b> | <b>452,260</b> | <b>11%</b> | <b>126,524</b> | <b>18%</b> |
| Communication costs (phone and mail) | 5,945            | 1%         | 3,319          | 1%         | 4,200          | 1%         | 1,685          | 1%         |
| Accountancy                          | 6,228            |            | 4,302          |            | 6,000          |            | 3,162          |            |
| Legal and consultancy                | 6,794            |            | 2,201          |            | 3,600          |            | 610            |            |
| Other administration                 | 11,323           |            | 3,101          |            | 4,800          |            | 2,161          |            |
| Water charges (irrigation)           | 13,022           |            | 2,920          |            | 8,400          |            | 0              |            |
| Rates                                | 15,003           | 4%         | 9,859          | 8%         | 11,400         | 6%         | 5,164          | 9%         |
| Insurance                            | 17,834           |            | 8,016          |            | 16,500         |            | 4,422          |            |
| ACC employer                         | 4,665            |            | 2,990          |            | 0              |            | 4,323          |            |
| Other expenditure                    | 13,022           |            | 2,345          |            | 7,960          |            | 2,424          |            |
| <b>Total overhead expenses</b>       | <b>93,836</b>    | <b>5%</b>  | <b>39,051</b>  | <b>9%</b>  | <b>62,860</b>  | <b>7%</b>  | <b>23,951</b>  | <b>10%</b> |
| <b>Total farm working expenses</b>   | <b>1,173,595</b> | <b>52%</b> | <b>286,464</b> | <b>37%</b> | <b>567,020</b> | <b>28%</b> | <b>155,754</b> | <b>32%</b> |
| Total incl. in analysis              | 538,861          |            | 157,084        |            | 364,660        |            | 101,758        |            |
| <b>Included as % total</b>           | <b>48%</b>       |            | <b>55%</b>     |            | <b>64%</b>     |            | <b>65%</b>     |            |

Source: MAF, 2011a-e



## Appendix 7

### Statistics NZ: Household Expenditure Data

*Average Weekly Expenditure per Household (\$), Year ended June 2010 – Statistics NZ (2010)*

|   | Weekly  | Annually  |
|---|---|---|
| Expenditure Group and Subgroup                    | Waimakariri District/Christchurch City/Selwyn District Combined | Waimakariri District/Christchurch City/Selwyn District Combined |
| <b>Expenditure Group</b>                          |   |   |
| 01 Food   | 174.1   | 9053.2  |
| 02 Alcoholic beverages, tobacco and illicit drugs | 34.6  | 1799.2  |
| 03 Clothing and footwear                          | 36.6  | 1903.2  |
| 04 Housing and household utilities                | 234.4   | 12188.8   |
| 05 Household contents and services                | 51.4  | 2672.8  |
| 06 Health   | 25.4  | 1320.8  |
| 07 Transport                                      | 134.7   | 7004.4  |
| 08 Communication                                  | 34.1  | 1773.2  |
| 09 Recreation and culture                         | 116.1   | 6037.2  |
| 10 Education                                      | 25.1  | 1305.2  |
| 11 Miscellaneous goods and services               | 92.3  | 4799.6  |
| 13 Other expenditure                              | 96.0  | 4992  |
| <b>Expenditure Subgroup</b>                       |   |   |
| 01.1 Fruit and vegetables                         | 22.5  | 1170  |
| 01.2 Meat, poultry and fish                       | 27.0  | 1404  |
| 01.3 Grocery food                                 | 70.3  | 3655.6  |
| 01.4 Non-alcoholic beverages                      | 11.1  | 577.2   |
| 01.5 Restaurant meals and ready-to-eat food       | 43.2  | 2246.4  |
| 02.1 Alcoholic beverages                          | 26.2  | 1362.4  |
| 02.2 Cigarettes and tobacco                       | 8.3   | 431.6   |
| 03.1 Clothing                                     | 29.4  | 1528.8  |
| 03.2 Footwear                                     | 7.1   | 369.2   |
| 04.1 Actual rentals for housing                   | 88.4  | 4596.8  |
| 04.2 Home ownership                               | 57.2  | 2974.4  |
| 04.3 Property maintenance                         | 21.1  | 1097.2  |
| 04.4 Property rates and related services          | 22.2  | 1154.4  |
| 04.5 Household energy                             | 44.7  | 2324.4  |
| 05.1 Furniture, furnishings and floor coverings   | 16.3  | 847.6   |

|  |                |              |
|--|----------------|--------------|
| 05.2 Household textiles                          | 4.3            | 223.6        |
| 05.3 Household appliances                        | 9.3            | 483.6        |
| 05.4 Glassware, tableware and household utensils | 4.9            | 254.8        |
| 05.6 Other household supplies and services       | 9.2            | 478.4        |
| 06.1 Medical products, appliances and equipment  | 7.6            | 395.2        |
| 06.2 Out-patient services                        | 17.2           | 894.4        |
| 07.1 Purchase of vehicles                        | 40.2           | 2090.4       |
| 07.2 Private transport supplies and services     | 63.3           | 3291.6       |
| 07.3 Passenger transport services                | 31.2           | 1622.4       |
| 08.3 Telecommunication services                  | 31.5           | 1638         |
| 09.1 Audio-visual and computing equipment        | 17.6           | 915.2        |
| 09.3 Other recreational equipment and supplies   | 24.2           | 1258.4       |
| 09.4 Recreational and cultural services          | 37.5           | 1950         |
| 09.5 Newspapers, books and stationery            | 12.8           | 665.6        |
| 09.6 Accommodation services                      | 7.9            | 410.8        |
| 09.8 Miscellaneous domestic holiday costs        | 4.1            | 213.2        |
| 11.1 Personal care                               | 23.3           | 1211.6       |
| 11.3 Personal effects nec                        | 9.6            | 499.2        |
| 11.4 Insurance                                   | 41.8           | 2173.6       |
| 11.5 Credit services                             | 4.9            | 254.8        |
| 11.6 Other miscellaneous services                | 12.6           | 655.2        |
| 13.1 Interest payments                           | 57.8           | 3005.6       |
| 13.2 Contributions to savings                    | 19.5           | 1014         |
| 13.5 Expenditure incurred whilst overseas        | 8.3            | 431.6        |
| <b>Total net expenditure</b>                     | <b>1,027.0</b> | <b>53404</b> |

Source: Statistics New Zealand Household Economic Survey 2010

## Appendix 8

### Farm expenditure flows

Expenditure flows into Christchurch from Selwyn and Waimakariri dairy<sup>1</sup> farms

| Category                                      | Direct expenditure in ChCh as average percentage (by farm) <sup>(2)</sup> | Direct expenditure by farm in NZ\$ <sup>(3)</sup> | Direct expenditure in ChCh in NZ\$ by farm | Direct expenditure flows into ChCh from dairy farms in Selwyn and Waimakariri in \$m <sup>(4)</sup> | Direct, indirect and induced effects of dairy farm expenditure in ChCh in \$m <sup>(5)</sup> |
|---|---|---|--|---|--|
| Food & beverages                              | 37%   | 11,398  | 4,156                                      | 1.83  | 4.25   |
| Household contents and services               | 63%   | 2,808   | 1,768                                      | 0.78  | 2.05   |
| Clothing and footwear                         | 64%   | 1,999   | 1,271                                      | 0.56  | 1.48   |
| Health (excluding insurance)                  | 30%   | 1,387   | 419  | 0.18  | 0.50   |
| Recreation, culture and electronics (e.g. TV) | 52%   | 6,341   | 3,290                                      | 1.45  | 3.49   |
| Household Utilities                           | 29%   | 4,304   | 903  | 0.40  | 0.94   |
| Education                                     | 31%   | 1,371   | 413  | 0.18  | 0.54   |
| Personal care (hairdresser, toiletries, etc.) | 35%   | 1,273   | 439  | 0.19  | 0.56   |
| Home maintenance                              | 24%   | 1,152   | 270  | 0.12  | 0.37   |
| Public transport/ travel                      | 32%   | 1,704   | 545  | 0.24  | 0.65   |
| Fuel  | 33%   | 23,632  | 7,815                                      | 3.45  | 9.07   |
| Vehicle, plant and machinery                  | 33%   | 8,213   | 2,567                                      | 1.13  | 3.39   |
| Vehicle maintenance and services <sup>7</sup> | 23%   | 26,517  | 6,117                                      | 2.70  | 6.27   |

|  |              |                |                |              |               |
|--|--------------|----------------|----------------|--------------|---------------|
| Fertiliser & Lime Total                                | 38%          | 140,832        | 55,262         | 24.37        | 61.27         |
| Animal health and breeding/<br>supplies & veterinary   | 10%          | 98,140         | 9,284          | 4.09         | 11.35         |
| Purchased feed (grains and<br>concentrate, not fodder) | 12%          | 151,670        | 17,746         | 7.83         | 21.39         |
| Weed & Pest Control products                           | 18%          | 6,840          | 1,250          | 0.55         | 1.46          |
| Accountant, Legal & Consultancy                        | 59%          | 13,022         | 7,663          | 3.38         | 8.68          |
| Real Estate  | 29%          | 7,193          | 1,509          | 0.67         | 1.30          |
| Home Ownership   | 29%          | 3,124          | 655            | 0.29         | 0.58          |
| Total seed   | 22%          |                |                | 0.00         | 0.00          |
| Freight  | 8%           | 10,112         | 807            | 0.36         | 0.96          |
| Repairs and maintenance products<br>and service        | 21%          | 98,139         | 20,638         | 9.10         | 23.24         |
| <b>Total</b>   | <b>23.3%</b> | <b>621,168</b> | <b>144,788</b> | <b>63.85</b> | <b>163.78</b> |

<sup>1</sup> Includes farm business and farm household.

<sup>2</sup> Own calculations based on AERU farm survey data (n=315).

<sup>3</sup> Household expenditure figures are obtained from *Household Economic Survey* data for Christchurch, Selwyn and Waimakariri (Stats NZ, 2010 Appendix 7). Farm expenditure figures are derived from *Farm Monitoring reports* (MAF, 2011 a-e).

<sup>4</sup> No of dairy farms in Selwyn and Waimakariri derived from Business Demographic Statistics; n = 441 (ANZSIC code A018) as at June 2011 (Statistics NZ, 2011; Appendix 1).

<sup>5</sup> Gross output multipliers obtained from the AERU/CDC Economic Development Model.

<sup>6</sup> Sourced from the AERU/CDC Economic Development Model.

Symbol: ... - Data not available

## Dairy farm employment impacts

| Category  | Direct, indirect and induced effects of expenditure in ChCh from dairy farms in Selwyn and Waimakariri in \$m | Expenditure flows into ChCh as Employment (FTE) <sup>(2)</sup> | Number of employees in ChCh <sup>(3)</sup> | Percentage of employees in ChCh |
|---|---|--|--|---------------------------------|
| Food & beverages  | 4.25  | 49   | 18,897                                     | 0.26%                           |
| Household contents and services (excluding electronics) | 2.05  | 22   | 10,187                                     | 0.22%                           |
| Clothing and footwear                                   | 1.48  | 16   | 7,887                                      | 0.20%                           |
| Health (excluding insurance)                            | 0.50  | 5  | 23,780                                     | 0.02%                           |
| Recreation, culture and electronics (e.g. TV)           | 3.49  | 17   | 8,870                                      | 0.19%                           |
| Household Utilities                                     | 0.94  | 3  | 2,860                                      | 0.10%                           |
| Education   | 0.54  | 6  | 14,880                                     | 0.04%                           |
| Personal care (hairdresser, toiletries, etc.)           | 0.56  | 5  | 6,240                                      | 0.08%                           |
| Home maintenance  | 0.37  | 2  | 10,690                                     | 0.02%                           |
| Public transport/ travel                                | 0.65  | 4  | 2,440                                      | 0.16%                           |
| Fuel  | 9.07  | 98   | ...  |                                 |
| Vehicle, plant and machinery                            | 3.39  | 15   | 7,090                                      | 0.21%                           |
| Vehicle maintenance and services                        | 6.27  | 20   | 2,300                                      | 0.87%                           |
| Fertiliser & Lime Total                                 | 61.27   | 190  | ...  |                                 |
| Animal health and breeding/ supplies & veterinary       | 11.35   | 120  | ...  |                                 |
| Purchased feed (grains and concentrate, not fodder)     | 21.39   | 173  | ...  |                                 |
| Weed & Pest Control products                            | 1.46  | 3  | 2,350                                      | 0.13%                           |
| Accountant, Legal & Consultancy                         | 8.68  | 68   | 26,530                                     | 0.25%                           |
| Real Estate   | 1.30  | 3  | 2,960                                      |                                 |
| Home Ownership  | 0.58  | 0  | 0  |                                 |
| Total seed  | ...   | ...  | ...  |                                 |
| Freight   | 0.96  | 6  | 4,240                                      | 0.14%                           |
| Repairs and maintenance products and service            | 23.24   | 233  | 2,600                                      | 8.97%                           |
| <b>Total</b>  | <b>163.78</b>   | <b>1058</b>  | <b>154,801</b>                             |                                 |

<sup>1</sup> This includes farm business and farm household.

<sup>2</sup> Employment multipliers obtained from the AERU/CDC Economic Development Model were applied to the level of expenditure in Christchurch.

<sup>3</sup> Sourced from Census 2006 data on occupation by industry (Stats NZ, 2006a; Appendix 12). In order to map survey categories to ANZSIC codes, data on employee count by sector in Christchurch (YE June 2011) were used and applied (Stats NZ, 2011). The total includes only employees in the sectors in which farm expenditure was recorded.

### Expenditure flows into Christchurch from Selwyn and Waimakariri sheep/beef<sup>1</sup> farms

| Category  | Direct expenditure in ChCh as average percentage (by farm) <sup>(2)</sup> | Direct expenditure by farm in NZ\$ <sup>(3)</sup> | Direct expenditure in ChCh in NZ\$ by farm | Direct expenditure flows into ChCh from dairy farms in Selwyn and Waimakariri in \$m <sup>(4)</sup> | Direct, indirect and induced effects of dairy farm expenditure in ChCh in \$m <sup>(5)</sup> |
|---|---|---|--|---|--|
| Food & beverages                                  | 38%   | 11,398  | 4,303                                      | 5.90  | 13.61  |
| Household contents and services                   | 62%   | 2,808   | 1,738                                      | 2.38  | 6.25   |
| Clothing and footwear                             | 63%   | 1,999   | 1,253                                      | 1.72  | 4.50   |
| Health (excluding insurance)                      | 29%   | 1,387   | 405  | 0.56  | 1.54   |
| Recreation, culture and electronics (e.g. TV)     | 49%   | 6,341   | 3,111                                      | 4.26  | 10.26  |
| Household Utilities                               | 28%   | 4,304   | 1,189                                      | 1.63  | 3.88   |
| Education   | 29%   | 1,371   | 398  | 0.55  | 1.56   |
| Personal care (hairdresser, toiletries, etc.)     | 37%   | 1,273   | 466  | 0.64  | 1.80   |
| Home maintenance                                  | 26%   | 1,152   | 300  | 0.41  | 1.25   |
| Public transport/ travel                          | 30%   | 1,704   | 508  | 0.70  | 1.89   |
| Fuel  | 32%   | 18,067  | 5,823                                      | 7.98  | 20.99  |
| Vehicle, plant and machinery                      | 34%   | 3,111   | 1,054                                      | 1.44  | 4.54   |
| Vehicle maintenance and services <sup>7</sup>     | 22%   | 13,240  | 2,861                                      | 3.92  | 9.11   |
| Fertiliser & Lime Total                           | 36%   | 56,526  | 20,621                                     | 28.25   | 71.04  |
| Animal health and breeding/ supplies & veterinary | 9%  | 21,118  | 1,951                                      | 2.67  | 7.41   |

|   |              |                |               |              |               |
|---|--------------|----------------|---------------|--------------|---------------|
| Purchased feed (grains and concentrate, not fodder) | 12%          | 5,260          | 613           | 0.84         | 2.30          |
| Weed & Pest Control products                        | 20%          | 13,529         | 2,739         | 3.75         | 9.85          |
| Accountant, Legal & Consultancy                     | 53%          | 13,022         | 6,881         | 9.43         | 24.20         |
| Real Estate   | 28%          | 7,193          | 1,987         | 2.72         | 5.29          |
| Home Ownership                                      | 28%          | 3,124          | 863           | 1.18         | 2.38          |
| Total seed  | 22%          |                |               | 0.00         | 0.00          |
| Freight   | 7%           | 8,745          | 644           | 0.88         | 2.40          |
| Repairs and maintenance products and service        | 21%          | 25,166         | 5,305         | 7.27         | 18.54         |
| <b>Total</b>  | <b>29.3%</b> | <b>221,837</b> | <b>65,019</b> | <b>89.08</b> | <b>224.58</b> |

<sup>1</sup> Includes farm business and farm household.

<sup>2</sup> Own calculations based on AERU farm survey data (n=315).

<sup>3</sup> Household expenditure figures are obtained from *Household Economic Survey* data for Christchurch, Selwyn and Waimakariri (Stats NZ, 2010 Appendix 7). Farm expenditure figures are derived from *Farm Monitoring reports* (MAF, 2011 a-e).

<sup>4</sup> No of sheep/beef farms in Selwyn and Waimakariri derived from Business Demographic Statistics; n = 1370 (ANZSIC code A018) as at June 2011 (Statistics NZ, 2011; Appendix 2011).

<sup>5</sup> Gross output multipliers obtained from the AERU/CDC Economic Development Model.

<sup>6</sup> Sourced from the AERU/CDC Economic Development Model.

## Sheep/beef farm employment impacts

| Category  | <sup>1</sup> Direct, indirect and induced effects of expenditure in ChCh from sheep/beef farms in Selwyn and Waimakariri in \$m | Expenditure flows into ChCh as Employment (FTE) <sup>(2)</sup> | Number of employees in ChCh <sup>(3)</sup> | Percentage of employees in ChCh |
|---|---|--|--|---------------------------------|
| Food & beverages  | 13.61   | 159  | 18,897                                     | 0.84%                           |
| Household contents and services (excluding electronics) | 6.25  | 68   | 10,187                                     | 0.67%                           |
| Clothing and footwear                                   | 4.50  | 49   | 7,887                                      | 0.62%                           |
| Health (excluding insurance)                            | 1.54  | 16   | 23,780                                     | 0.07%                           |
| Recreation, culture and electronics (e.g. TV)           | 10.26   | 51   | 8,870                                      | 0.57%                           |
| Household Utilities                                     | 3.88  | 13   | 2,860                                      | 0.45%                           |
| Education   | 1.56  | 19   | 14,880                                     | 0.13%                           |
| Personal care (hairdresser, toiletries, etc.)           | 1.80  | 18   | 6,240                                      | 0.29%                           |
| Home maintenance  | 1.25  | 6  | 10,690                                     | 0.06%                           |
| Public transport/ travel                                | 1.89  | 12   | 2,440                                      | 0.49%                           |
| Fuel  | 20.99   | 98   | ...  |                                 |
| Vehicle, plant and machinery                            | 4.54  | 15   | 7,090                                      | 0.21%                           |
| Vehicle maintenance and services                        | 9.11  | 20   | 2,300                                      | 0.87%                           |
| Fertiliser & Lime Total                                 | 71.04   | 221  | ...  |                                 |
| Animal health and breeding/ supplies & veterinary       | 7.41  | 79   | ...  |                                 |
| Purchased feed (grains and concentrate, not fodder)     | 2.30  | 19   | ...  |                                 |
| Weed & Pest Control products                            | 9.85  | 21   | 2,350                                      | 0.91%                           |
| Accountant, Legal & Consultancy                         | 24.20   | 189  | 26,530                                     | 0.71%                           |
| Real Estate   | 5.29  | 3  | 2,960                                      |                                 |
| Home Ownership  | 2.38  | 0  | 0  |                                 |
| Total seed  | ...   | ...  | ...  |                                 |
| Freight   | 2.40  | 6  | 4,240                                      | 0.14%                           |
| Repairs and maintenance products and service            | 18.54   | 186  | 2,600                                      | 7.16%                           |
| <b>Total</b>  | <b>224.58</b>   | <b>1268</b>  | <b>154801</b>                              |                                 |

<sup>1</sup>This includes farm business and farm household.

<sup>2</sup> Employment multipliers obtained from the AERU/CDC Economic Development Model were applied to the level of expenditure in Christchurch.

<sup>3</sup> Sourced from Census 2006 data on occupation by industry (Stats NZ, 2006a; Appendix 5). In order to map survey categories to ANZSIC codes, data on Employee count by sector in Christchurch (YE June 2011) were used and applied (Stats NZ, 2011). The total includes only employees in the sectors in which farm expenditure was recorded.



### Expenditure flows into Christchurch from Selwyn and Waimakariri mixed cropping<sup>1</sup> farms

| Category  | Direct expenditure in ChCh as average percentage (by farm) <sup>(2)</sup> | Direct expenditure by farm in NZ\$ <sup>(3)</sup> | Direct expenditure in ChCh in NZ\$ by farm | Direct expenditure flows into ChCh from dairy farms in Selwyn and Waimakariri in \$m <sup>(4)</sup> | Direct, indirect and induced effects of dairy farm expenditure in ChCh in \$m <sup>(5)</sup> |
|---|---|---|--|---|--|
| Food & beverages                                  | 37%   | 11,398  | 4,197                                      | 1.01  | 2.32   |
| Household contents and services                   | 62%   | 2,808   | 1,748                                      | 0.42  | 1.11   |
| Clothing and footwear                             | 63%   | 1,999   | 1,265                                      | 0.30  | 0.80   |
| Health (excluding insurance)                      | 30%   | 1,387   | 417  | 0.10  | 0.28   |
| Recreation, culture and electronics (e.g. TV)     | 52%   | 6,341   | 3,275                                      | 0.79  | 1.89   |
| Household Utilities                               | 28%   | 4,304   | 1,219                                      | 0.29  | 0.69   |
| Education   | 30%   | 1,371   | 412  | 0.10  | 0.28   |
| Personal care (hairdresser, toiletries, etc.)     | 34%   | 1,273   | 436  | 0.10  | 0.29   |
| Home maintenance                                  | 24%   | 1,152   | 271  | 0.07  | 0.20   |
| Public transport/ travel                          | 32%   | 1,704   | 547  | 0.13  | 0.35   |
| Fuel  | 33%   | 35,974  | 11,778                                     | 2.83  | 7.43   |
| Vehicle, plant and machinery                      | 34%   | 9,486   | 3,243                                      | 0.78  | 2.33   |
| Vehicle maintenance and service <sup>7</sup>      | 23%   | 27,680  | 6,423                                      | 1.54  | 3.59   |
| Fertiliser & Lime Total                           | 39%   | 121,182   | 47,323                                     | 11.36   | 28.56  |
| Animal health and breeding/ supplies & veterinary | 10%   | 4,412   | 436  | 0.10  | 0.29   |

|   |              |                |                |              |              |
|---|--------------|----------------|----------------|--------------|--------------|
| Purchased feed (grains and concentrate, not fodder) | 11%          | 2,206          | 247            | 0.06         | 0.16         |
| Weed & Pest Control products                        | 19%          | 89,350         | 16,698         | 4.01         | 10.54        |
| Accountant, Legal & Consultancy                     | 60%          | 9,600          | 5,761          | 1.38         | 3.55         |
| Real Estate   | 28%          | 7,193          | 2,039          | 0.49         | 0.95         |
| Home Ownership                                      | 28%          | 3,124          | 885            | 0.21         | 0.43         |
| Total seed  | 22%          | 49,200         | 10,824         | 2.60         | 0.00         |
| Freight   | 8%           | 21,116         | 1,729          | 0.42         | 1.12         |
| Repairs and maintenance products and service        | 21%          | 37,505         | 8,015          | 1.92         | 4.91         |
| <b>Total</b>  | <b>28.6%</b> | <b>451,764</b> | <b>129,188</b> | <b>31.01</b> | <b>72.06</b> |

<sup>1</sup> Includes farm business and farm household.

<sup>2</sup> Own calculations based on AERU farm survey data (n=315).

<sup>3</sup> Household expenditure figures are obtained from *Household Economic Survey* data for Christchurch, Selwyn and Waimakariri (Stats NZ, 2010). Farm expenditure figures are derived from *Farm Monitoring reports* (MAF, 2011 a-e).

<sup>4</sup> No of arable farms in Selwyn and Waimakariri derived from Business Demographic Statistics; n = 240 (ANZSIC code A018) as at June 2011 (Statistics NZ, 2011; Appendix 1).

<sup>5</sup> Gross output multipliers obtained from the AERU/CDC Economic Development Model.

<sup>6</sup> Sourced from the AERU/CDC Economic Development Model...

## Mixed cropping farm employment impacts

|   | <sup>1</sup> Direct, indirect and induced effects of expenditure in ChCh from mixed cropping farms in Selwyn and Waimakariri in \$m | Expenditure flows into ChCh as Employment (FTE) <sup>(2)</sup> | Number of employees in ChCh <sup>(3)</sup> | Percentage of employees in ChCh |
|---|---|--|--|---------------------------------|
| Food & beverages  | 2.32  | 27   | 18,897                                     | 0.14%                           |
| Household contents and services (excluding electronics) | 1.11  | 12   | 10,187                                     | 0.12%                           |
| Clothing and footwear                                   | 0.80  | 8  | 7,887                                      | 0.11%                           |
| Health (excluding insurance)                            | 0.28  | 3  | 23,780                                     | 0.01%                           |
| Recreation, culture and electronics (e.g. TV)           | 1.89  | 9  | 8,870                                      | 0.10%                           |
| Household Utilities                                     | 0.69  | 2  | 2,860                                      | 0.08%                           |
| Education   | 0.28  | 3  | 14,880                                     | 0.02%                           |
| Personal care (hairdresser, toiletries, etc.)           | 0.29  | 3  | 6,240                                      | 0.05%                           |
| Home maintenance  | 0.20  | 1  | 10,690                                     | 0.01%                           |
| Public transport/ travel                                | 0.35  | 2  | 2,440                                      | 0.09%                           |
| Fuel  | 7.43  | 98   | ...  |                                 |
| Vehicle, plant and machinery                            | 2.33  | 15   | 7,090                                      | 0.21%                           |
| Vehicle maintenance and services                        | 3.59  | 20   | 2,300                                      | 0.87%                           |
| Fertiliser & Lime Total                                 | 28.56   | 89   | ...  | ...                             |
| Animal health and breeding/ supplies & veterinary       | 0.29  | 3  | ...  | ...                             |
| Purchased feed (grains and concentrate, not fodder)     | 0.16  | 1  | ...  | ...                             |
| Weed & Pest Control products                            | 10.54   | 23   | 2,350                                      | 0.98%                           |
| Accountant, Legal & Consultancy                         | 3.55  | 28   | 26,530                                     | 0.10%                           |
| Real Estate   | 0.95  | 3  | 2,960                                      |                                 |
| Home Ownership  | 0.43  | 0  | 0  |                                 |
| Total seed  | ...   | ...  | ...  | ...                             |
| Freight   | 1.12  | 6  | 4,240                                      | 0.14%                           |
| Repairs and maintenance products and service            | 4.91  | 49   | 2,600                                      | 1.90%                           |
| <b>Total</b>  | <b>72.06</b>  | <b>407</b>   | <b>154,801</b>                             |                                 |

<sup>1</sup>This includes farm business and farm household.

<sup>2</sup> Employment multipliers obtained from the AERU/CDC Economic Development Model were applied to the level of expenditure in Christchurch.

<sup>3</sup> Sourced from Census 2006 data on occupation by industry (Stats NZ, 2006a; Appendix 12). In order to map survey categories to ANZSIC codes, data on Employee count by sector in Christchurch (YE June 2011) were used and applied (Stats NZ, 2011). The total includes only employees in the sectors in which farm expenditure was recorded.

### Expenditure flows into Christchurch from Selwyn and Waimakariri deer<sup>1</sup> farms

| Category  | Direct expenditure in ChCh as average percentage (by farm) <sup>(2)</sup> | Direct expenditure by farm in NZ\$ <sup>(3)</sup> | Direct expenditure in ChCh in NZ\$ by farm | Direct expenditure flows into ChCh from dairy farms in Selwyn and Waimakariri in \$m <sup>(4)</sup> | Direct, indirect and induced effects of dairy farm expenditure in ChCh in \$m <sup>(5)</sup> |
|---|---|---|--|---|--|
| Food & beverages                                  | 37%   | 11,398  | 4,303                                      | 0.59  | 1.37   |
| Household contents and services                   | 63%   | 2,808   | 1,738                                      | 0.24  | 0.63   |
| Clothing and footwear                             | 64%   | 1,999   | 1,253                                      | 0.17  | 0.45   |
| Health (excluding insurance)                      | 30%   | 1,387   | 405  | 0.06  | 0.16   |
| Recreation, culture and electronics (e.g. TV)     | 52%   | 6,341   | 3,111                                      | 0.43  | 1.03   |
| Household Utilities                               | 29%   | 4,304   | 1,189                                      | 0.16  | 0.39   |
| Education   | 31%   | 1,371   | 398  | 0.05  | 0.16   |
| Personal care (hairdresser, toiletries, etc.)     | 35%   | 1,273   | 466  | 0.06  | 0.18   |
| Home maintenance                                  | 24%   | 1,152   | 300  | 0.04  | 0.13   |
| Public transport/ travel                          | 32%   | 1,704   | 508  | 0.07  | 0.19   |
| Fuel  | 33%   | 16,560  | 5,337                                      | 0.74  | 1.94   |
| Vehicle, plant and machinery                      | 33%   | 4544.9275   | 1512.0974                                  | 0.21  | 0.63   |
| Vehicle maintenance and services <sup>7</sup>     | 23%   | 10,244  | 2,214                                      | 0.31  | 0.71   |
| Fertiliser & Lime Total                           | 38%   | 34,325  | 12,522                                     | 1.73  | 4.35   |
| Animal health and breeding/ supplies & veterinary | 10%   | 16,236  | 1,500                                      | 0.21  | 0.57   |

|   |              |                |               |             |              |
|---|--------------|----------------|---------------|-------------|--------------|
| Purchased feed (grains and concentrate, not fodder) | 12%          | 4,068          | 474           | 0.07        | 0.18         |
| Weed & Pest Control products                        | 18%          | 4,795          | 971           | 0.13        | 0.35         |
| Accountant, Legal & Consultancy                     | 59%          | 13,022         | 6,881         | 0.95        | 2.44         |
| Real Estate   | 29%          | 7,193          | 1,987         | 0.27        | 0.53         |
| Home Ownership                                      | 29%          | 3,124          | 863           | 0.12        | 0.24         |
| Total seed  | 22%          |                |               | 0.00        | 0.00         |
| Freight   | 8%           | 3,604          | 265           | 0.04        | 0.10         |
| Repairs and maintenance products and service        | 21%          | 16,566         | 3,492         | 0.48        | 1.23         |
| <b>Total</b>  | <b>30.8%</b> | <b>168,017</b> | <b>51,694</b> | <b>7.13</b> | <b>17.95</b> |

<sup>1</sup> Includes farm business and farm household.

<sup>2</sup> Own calculations based on AERU farm survey data (n=315).

<sup>3</sup> Household expenditure figures are obtained from *Household Economic Survey* data for Christchurch, Selwyn and Waimakariri (Stats NZ, 2010). Farm expenditure figures are derived from *Farm Monitoring reports* (MAF, 2011 a-e).

<sup>4</sup> No of deer farms in Selwyn and Waimakariri derived from Business Demographic Statistics; n = 138 (ANZSIC code A018) as at June 2011 (Statistics NZ, 2011; Appendix 1).

<sup>5</sup> Gross output multipliers obtained from the AERU/CDC Economic Development Model.

<sup>6</sup> Sourced from the AERU/CDC Economic Development Model.

## Deer farm employment impacts

| Category   | Direct <sup>1</sup> ,<br>indirect and<br>induced<br>effects of<br>expenditure<br>in ChCh<br>from deer<br>arms in<br>Selwyn and<br>Waimakariri<br>\$m | Expenditure<br>flows into<br>ChCh as<br>Employment<br>(FTE) <sup>(2)</sup> | Number of<br>employees in<br>ChCh <sup>(3)</sup> | Percentage of<br>employees in<br>ChCh |
|--|--|--|--|---------------------------------------|
| Food & beverages   | 1.37   | 16   | 18,897   | 0.08%                                 |
| Household contents and services<br>(excluding electronics) | 0.63   | 7  | 10,187   | 0.07%                                 |
| Clothing and footwear                                      | 0.45   | 5  | 7,887  | 0.06%                                 |
| Health (excluding insurance)                               | 0.16   | 2  | 23,780   | 0.01%                                 |
| Recreation, culture and electronics (e.g.<br>TV)           | 1.03   | 5  | 8,870  | 0.06%                                 |
| Household Utilities  | 0.39   | 1  | 2,860  | 0.05%                                 |
| Education  | 0.16   | 2  | 14,880   | 0.01%                                 |
| Personal care (hairdresser, toiletries, etc.)              | 0.18   | 2  | 6,240  | 0.03%                                 |
| Home maintenance   | 0.13   | 1  | 10,690   | 0.01%                                 |
| Public transport/ travel                                   | 0.19   | 1  | 2,440  | 0.05%                                 |
| Fuel   | 1.94   | 98   | ...  |                                       |
| Vehicle, plant and machinery                               | 0.63   | 15   | 7,090  | 0.21%                                 |
| Vehicle maintenance and services                           | 0.71   | 20   | 2,300  | 0.87%                                 |
| Fertiliser & Lime Total                                    | 4.35   | 14   | ...  | ...                                   |
| Animal health and breeding/ supplies &<br>veterinary       | 0.57   | 6  | ...  | ...                                   |
| Purchased feed (grains and concentrate,<br>not fodder)     | 0.18   | 1  | ...  | ...                                   |
| Weed & Pest Control products                               | 0.35   | 1  | 2,350  | 0.03%                                 |
| Accountant, Legal & Consultancy                            | 2.44   | 19   | 26,530   | 0.07%                                 |
| Real Estate  | 0.53   | 3  | 2,960  |                                       |
| Home Ownership   | 0.24   | 0  | 0  |                                       |
| Total seed   | ...  | ...  | ...  |                                       |
| Freight  | 0.10   | 6  | 4,240  | 0.14%                                 |
| Repairs and maintenance products and<br>service            | 1.23   | 12   | 2,600  | 0.47%                                 |
| <b>Total</b>   | <b>17.95</b>   | <b>237</b>   | <b>154,801</b>                                   |                                       |

<sup>1</sup>This includes farm business and farm household.

<sup>2</sup> Employment multipliers obtained from the AERU/CDC Economic Development Model were applied to the level of expenditure in Christchurch.

<sup>3</sup> Sourced from Census 2006 data on occupation by industry (Stats NZ, 2006a; Appendix 12). In order to map survey categories to ANZSIC codes, data on Employee count by sector in Christchurch (YE June 2011) were used and applied (Stats NZ, 2011). The total includes only employees in the sectors in which farm expenditure was recorded.

## Appendix 9

### Sector Mapping & Multipliers for Farm Survey

| <b>Farm Sector</b>   | <b>ME Sector</b> | <b>ME Sector Description</b>                     | <b>Indirect multiplier</b> | <b>Induced multiplier</b> |
|--|------------------|--|----------------------------|---------------------------|
| Food & beverages   | 32               | Accommodation, restaurants and bars              | 1.17                       | 0.14                      |
| <b>Household contents and services (excluding electronics)</b> | 31               | Retail trade                                     | 1.10                       | 0.53                      |
| Clothing and footwear  | 31               | Retail trade                                     | 1.10                       | 0.53                      |
| Health (excluding insurance)                                   | 46               | Health and community services                    | 1.04                       | 0.73                      |
| Recreation, culture and electronics (e.g. TV)                  | 47               | Cultural and recreational services               | 1.22                       | 0.19                      |
| <b>Household utilities</b>                                     | 36               | Communication Services                           | 1.12                       | 0.26                      |
| Education  | 45               | Education  | 0.99                       | 0.88                      |
| Personal care (hairdresser, toiletries, etc.)                  | 48               | Personal and other community services            | 1.36                       | 0.47                      |
| <b>Home maintenance</b>  | 29               | Construction                                     | 1.71                       | 0.31                      |
| <b>Public transport/ travel</b>                                | 33               | Road transport                                   | 1.45                       | 0.25                      |
| <b>Fuel</b>  | 31               | Retail trade                                     | 1.10                       | 0.53                      |
| <b>Vehicle , plant and machinery</b>                           | 24               | Machinery and equipment manufacturing            | 1.48                       | 0.51                      |
| <b>Vehicle maintenance and services</b>                        | 35               | Air transport, services to transport and storage | 1.22                       | 0.11                      |
| <b>Fertiliser &amp; Lime Total</b>                             | 20               | Non-metallic mineral product manufacturing       | 1.34                       | 0.17                      |
| <b>Animal health and breeding/ supplies &amp; veterinary</b>   | 46               | Health and community services                    | 1.04                       | 0.73                      |
| <b>Purchased feed (grains and concentrate, not fodder)</b>     | 2                | Livestock and cropping farming                   | 1.01                       | 0.73                      |
| <b>Weed &amp; Pest Control products</b>                        | 31               | Retail trade                                     | 1.10                       | 0.53                      |
| <b>Accountant, Legal &amp; Consultancy</b>                     | 42               | Business services                                | 1.25                       | 0.32                      |
| <b>Real Estate</b>   | 40               | Real Estate                                      | 0.94                       | 0.00                      |
| <b>Home ownership</b>  | 41               | Home Ownership                                   | 1.02                       | 0.00                      |
| <b>Total seed</b>  | 31               | Retail trade                                     | 1.10                       | 0.53                      |
| <b>Freight</b>   | 33               | Road transport                                   | 1.45                       | 0.25                      |
| <b>Repairs and maintenance products and service</b>            | 5                | Services to agriculture, hunting and trapping    | 1.07                       | 0.48                      |

## Appendix 10

### Sector Mapping & Multipliers for Business Survey

| .  | ME Sector | ME Sectors   | Indirect multiplier | Induced multiplier |
|--|-----------|--|---------------------|--------------------|
| Retailers of food, beverages, cars and fuel.   | 31        | Retail trade   | 1.10                | 0.53               |
| Wholesale trade  | 30        | Wholesale trade  | 1.24                | 0.50               |
| Manufacturers of food, beverages and tobacco.  | 13        | Beverage, malt and tobacco manufacturing                                     | 1.73                | 0.31               |
| Manufacturers of machinery, furniture and raw materials.                                       | 24        | Machinery and equipment manufacturing  | 1.48                | 0.51               |
| Providers of electricity generation, transmission and distribution.                            | 26        | Electricity generation and supply  | 1.23                | 0.00               |
| Suppliers of water, sewerage and drainage; waste collection, treatment and disposal.           | 28        | Water supply   | 0.97                | 0.00               |
| Accommodation, cafes, restaurants, takeaway foods, pubs etc.                                   | 32        | Accommodation, restaurants and bars  | 1.17                | 0.14               |
| Water, rail and air transport firms, storage firms and related services.                       | 33        | Road transport   | 1.45                | 0.25               |
| Telecommunication and internet providers, libraries and other information services.            | 36        | Communication services   | 1.12                | 0.26               |
| Business Services (merged Professional Svc and Legal, Accounting)                              | 42        | Business services  | 1.25                | 0.32               |
| Schools and tertiary education institutes; adult and community education institutes.           | 45        | Education  | 0.99                | 0.88               |
| Doctors and other medical services; excl.  | 46        | Health and community services  | 1.04                | 0.73               |
| Entertainment, sports clubs, etc.  | 47        | Cultural and recreational services   | 1.22                | 0.19               |
| Personal care, religious/spiritual institutions, civic, interest or related service providers. | 48        | Personal and other community services  | 1.36                | 0.47               |
| Public Administration  | 43        | Central government administration, defence, public order and safety services | 1.32                | 0.55               |
|  | 44        | Local government administration services and civil defence                   | 1.22                | 0.49               |



## Appendix 11

### Employment multipliers Christchurch

#### Employment multipliers for Christchurch farm expenditure categories

| <b>Category</b>                    | <b>Total employment multiplier<br/>(FTES/\$million total expenditure)</b> |
|------------------------------------|---|
| Animal health & breeding           | 11.17   |
| Purchased feed                     | 8.52  |
| Fertiliser & lime                  | 3.27  |
| Seed                               | 8.49  |
| Accountancy, legal and consultancy | 8.20  |
| Repairs and maintenance            | 10.55   |
| Weed & pest control                | 2.28  |
| Fuel                               | 11.37   |
| Vehicle                            | 3.32  |
| Freight                            | 7.02  |

#### Sectoral employment multipliers for Christchurch used in the analysis

| <b>Sector</b>                   | <b>Total employment multiplier<br/>(FTES/\$million total expenditure)</b> |
|---------------------------------|---|
| Agriculture                     | 7.75  |
| Retail trade                    | 11.35   |
| Wholesale trade                 | 4.35  |
| Food manufacture                | 1.45  |
| Other manufacture               | 4.54  |
| Electricity/energy              | 0.618   |
| Waste/water                     | 2.13  |
| Accommodation and food services | 12.9  |
| Transport & storage             | 6.75  |
| Communications                  | 3.5   |
| Finance and insurance           | 2.9   |
| Health and community services   | 11.11   |
| Education and training          | 12.86   |
| Arts and Recreation             | 5.17  |

**Appendix 12**  
**Occupation by industry, in Christchurch 2006**  
Occupation by industry sector for the employed <sup>(1)</sup> Census Usually Resident Population Count, Aged 15 Years and Over  
(Statistics New Zealand Census 2006)

| <b>Industry</b>                            | <b>Legislators,<br/>Administrators and<br/>Managers</b> | <b>Professionals</b> | <b>Technicians<br/>and<br/>Associate<br/>Professionals</b> | <b>Clerks</b> | <b>Service<br/>and Sales<br/>Workers</b> | <b>Agriculture<br/>and<br/>Fishery<br/>Workers</b> | <b>Trades<br/>Workers</b> | <b>Plant and<br/>Machine<br/>Operators<br/>and<br/>Assemblers</b> | <b>Labourers<br/>and<br/>Related<br/>Elementary<br/>Service<br/>Workers</b> | <b>Not<br/>Elsewhere<br/>Included<br/>(2)</b> | <b>Total</b> |
|--|---|----------------------|--|---------------|--|--|---------------------------|---|---|---|--------------|
| Agriculture, Forestry and Fishing          | 7.9%  | 3.5%                 | 4.1%   | 4.8%          | 4.5%                                     | 53.0%  | 2.4%                      | 6.3%  | 6.8%  | 5.5%  | 100.0%       |
| Mining                                     | 9.5%  | 4.8%                 | 4.8%   | 9.5%          | 4.8%                                     | 0.0%   | 4.8%                      | 23.8%   | 23.8%   | 0.0%  | 100.0%       |
| Manufacturing                              | 14.2%   | 5.9%                 | 8.1%   | 7.8%          | 4.1%                                     | 0.8%   | 18.5%                     | 24.2%   | 11.5%   | 4.9%  | 100.0%       |
| Electricity, Gas, Water and Waste Services | 20.3%   | 12.1%                | 15.5%  | 9.7%          | 1.9%                                     | 0.5%   | 3.4%                      | 21.7%   | 11.6%   | 4.8%  | 100.0%       |
| Construction                               | 9.5%  | 3.6%                 | 6.6%   | 6.3%          | 1.9%                                     | 2.2%   | 47.4%                     | 12.5%   | 7.0%  | 2.3%  | 100.0%       |
| Wholesale Trade                            | 26.8%   | 6.4%                 | 16.3%  | 15.6%         | 10.1%                                    | 0.7%   | 6.0%                      | 7.3%  | 8.7%  | 2.3%  | 100.0%       |
| Retail Trade                               | 20.6%   | 3.7%                 | 7.0%   | 13.3%         | 39.2%                                    | 0.9%   | 5.6%                      | 3.6%  | 4.1%  | 1.4%  | 100.0%       |
| Accommodation and Food Services            | 22.2%   | 3.4%                 | 4.2%   | 5.2%          | 51.4%                                    | 0.5%   | 1.1%                      | 1.8%  | 8.5%  | 2.2%  | 100.0%       |
| Transport, Postal and Warehousing          | 10.5%   | 4.9%                 | 13.0%  | 18.2%         | 6.5%                                     | 0.4%   | 1.9%                      | 27.1%   | 14.5%   | 2.5%  | 100.0%       |
| Information Media and Telecommunications   | 15.5%   | 12.6%                | 34.8%  | 16.9%         | 6.6%                                     | 0.1%   | 3.0%                      | 1.3%  | 4.7%  | 2.3%  | 100.0%       |
| Financial and Insurance Services           | 20.1%   | 14.7%                | 22.6%  | 30.8%         | 3.0%                                     | 0.3%   | 1.5%                      | 2.7%  | 2.5%  | 1.5%  | 100.0%       |
| Rental, Hiring and Real Estate Services    | 23.9%   | 7.0%                 | 24.5%  | 11.1%         | 12.8%                                    | 2.2%   | 4.6%                      | 3.9%  | 6.7%  | 2.5%  | 100.0%       |

|   |       |       |       |       |       |      |       |      |       |       |        |
|---|-------|-------|-------|-------|-------|------|-------|------|-------|-------|--------|
| Professional, Scientific and Technical Services | 15.0% | 38.1% | 19.4% | 17.3% | 2.2%  | 0.3% | 1.7%  | 1.0% | 1.5%  | 3.5%  | 100.0% |
| Administrative and Support Services             | 12.6% | 9.0%  | 13.7% | 11.7% | 9.7%  | 7.0% | 3.4%  | 3.7% | 25.6% | 3.0%  | 100.0% |
| Public Administration and Safety                | 8.4%  | 15.9% | 22.4% | 16.1% | 28.0% | 0.4% | 1.9%  | 0.5% | 1.4%  | 4.5%  | 100.0% |
| Education and Training                          | 8.5%  | 57.8% | 14.6% | 7.8%  | 3.0%  | 0.7% | 0.6%  | 0.5% | 3.2%  | 3.1%  | 100.0% |
| Health Care and Social Assistance               | 5.7%  | 36.0% | 17.8% | 9.8%  | 24.9% | 0.4% | 0.4%  | 0.9% | 2.6%  | 1.2%  | 100.0% |
| Arts and Recreation Services                    | 16.3% | 5.5%  | 34.5% | 17.0% | 12.0% | 6.6% | 1.6%  | 0.7% | 3.0%  | 1.9%  | 100.0% |
| Other Services                                  | 13.3% | 11.0% | 11.1% | 9.4%  | 20.0% | 1.1% | 19.9% | 5.6% | 4.5%  | 2.9%  | 100.0% |
| Not Elsewhere Included (2)                      | 3.6%  | 3.2%  | 5.3%  | 2.5%  | 6.3%  | 2.4% | 4.7%  | 3.6% | 4.5%  | 63.0% | 100.0% |
| Total   | 14.2% | 15.4% | 13.3% | 11.4% | 15.4% | 2.0% | 8.6%  | 7.5% | 6.8%  | 5.4%  | 100.0% |

(1) Employed includes Full-time & Part-time Employed and is related to work in the 7 days prior to Sunday 5 March 2006.

(2) Not Elsewhere Included includes Response Unidentifiable, Response Outside Scope and Not Stated



## RESEARCH REPORT

---

- 308 The Key Elements of Success and Failure in the NZ Sheep Meat Industry from 1980 - 2007**  
McDermott, A., Saunders, C., Zellman, E., Hope, T. and Fisher, A. 2008
- 309 Public Opinion on Freshwater Issues and Management in Canterbury**  
Cook, Andrew 2008
- 310 Biodiversity Management: Lake Rotoiti Choice Modelling Study**  
Kerr, Geoffrey N. and Sharp, Basil N.H. 2008
- 311 The Key Elements of Success and Failure in the NZ Kiwifruit Industry**  
Kilgour, M., Saunders, C., Scrimgeour, F. and Zellman, E. 2008
- 312 The Key Elements of Success and Failure in the NZ Venison Industry**  
Shadbolt, N.M., McDermott, A., Williams, C., Payne, T., Walters, D. and Xu, Y. 2008
- 313 The Key Elements of Success and Failure in the NZ Dairy Industry**  
Conforte, D., Garnevska, E., Kilgour, M., Locke, S. and Scrimgeour, F. 2008
- 314 A Review of Research on Economic Impacts of Climate Change**  
Kaye-Blake, W., Greenhalgh, S., Turner, J., Holbek, E., Sinclair, R., Matunga, T. and Saunders, C. 2009
- 315 Managerial Factors in Primary Production: Data from a sample of New Zealand Farmers with an Emphasis on Experience as a Factor in Success**  
Nuthall, Peter 2009
- 316 Modelling Climate Change Impacts on Agriculture and Forestry with the extended LTEM (Lincoln Trade and Environment Model)**  
Saunders, C., Kaye-Blake, W. and Turner, J. 2009
- 317 Economic Strategy Issues for the New Zealand Region in the Global Economy**  
Saunders, Caroline, Dalziel, Paul and Kaye-Blake, William 2009
- 318 Multi-agent Simulation Models in Agriculture: A Review of their Construction and Uses**  
Kaye-Blake, W., Li, F. Y., Martin, A. M., McDermott, A., Rains, S., Sinclair, S. and Kira, A. 2010
- 319 Sustainability Trends in Key Overseas Markets: Market Drivers and Implications to Increase Value for New Zealand Exports**  
Saunders, C., Guenther, M. and Driver, T. 2010
- 320 The Socio-technical Networks of Technology Users' Innovation in New Zealand: A Fuzzy-set Qualitative Comparative Analysis**  
Lambert, S. and Fairweather, J.R. 2010
- 321 Comparison of Innovation Policies in selected European, Asian, and Pacific Rim Countries: How to best to optimise Innovation Governance in New Zealand**  
Fairweather, J., Wintjes, R., Williams, J., Rinne, T. and Nauwelaers, C. 2011
- 322 The Economic and Social Value of Sport and Recreation to New Zealand**  
Dalziel, D. 2011
- 323 An International Comparison of Models of Innovation and their Implications of New Zealand**  
Rinne, T. A. and Fairweather J. 2011
- 324 Enhancing Value for New Zealand Farmers by Improving the Value Chain**  
Saunders, C., McDonald, H. and Driver, T. 2011
- 325 An International Comparison of Models and Cultural and National Identity and their Implications for New Zealand Innovation**  
Rinne, T. and Fairweather, J. 2011
- 326 Publication cancelled.**
- 327 The Cost of Psu-V to the New Zealand Kiwifruit Industry and the Wider Community**  
Greer, G. and Saunders, C. 2012
- 328 50 Years of the AERU: An Examination and Summary of Past Research**  
Driver, T. and Saunders, C. 2012
- 329 Perceptions of Sustainability of Dairy Support Land Farmers**  
Bennett, M.R., Pangborn, M.C. and Bywater, A.C. 2012
- 330 Modelling Alternative Dryland Sheep Systems**  
Gicheha, M.G., Edwards, G.R., Bell, S.T. and Burtt, E.S. 2012
- 331 Report on a Succession and Governance Survey of a Random Stratified Sample of NZ Farmers**  
Nuthall, P.L. and Old, K.M. 2014
- 332 Maximising Export Returns (MER): Consumer behaviour and trends for credence attributes in key markets and a review of how these may be communicated**  
Miller, S., Driver, T., Velasquez, N., and Saunders, C. 2014
- 333 Consumer Attitudes to New Zealand Food Product Attributes and Technology Use in Key International Markets**  
Saunders C, Guenther M, Driver T, Tait P, Dalziel, P & Rutherford P, 2014
- 334 Maximising Export Returns (MER): Communicating New Zealand's Credence Attributes to International Consumers**  
Lees, N, Saunders C 2015