Waimakariri land and water solutions programme: Economic assessment of the current state

Report prepared for Environment Canterbury

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1 Background

This technical assessment focusses on the Waimakariri Canterbury Water Management Strategy (CWMS) zone and the process managed by Environment Canterbury (ECan) to assist the Waimakariri Water Zone Committee with the Waimakariri land and water solution programme. The output from the Waimakariri land and water solution programme is recommendations for on the ground actions (e.g. riparian planting) and, if needed, instructions for the Waimakariri sub-regional chapter of the Canterbury Land and Water Regional Plan.

The CWMS Waimakariri zone is the Waimakariri district, which spans from the north bank of the Waimakariri River to just north of the Ashley River (see Figure 1). It is bounded by the Hurunui District to the north, and by Christchurch City and Selwyn District to the south. In this technical assessment the whole Waimakariri zone is considered.

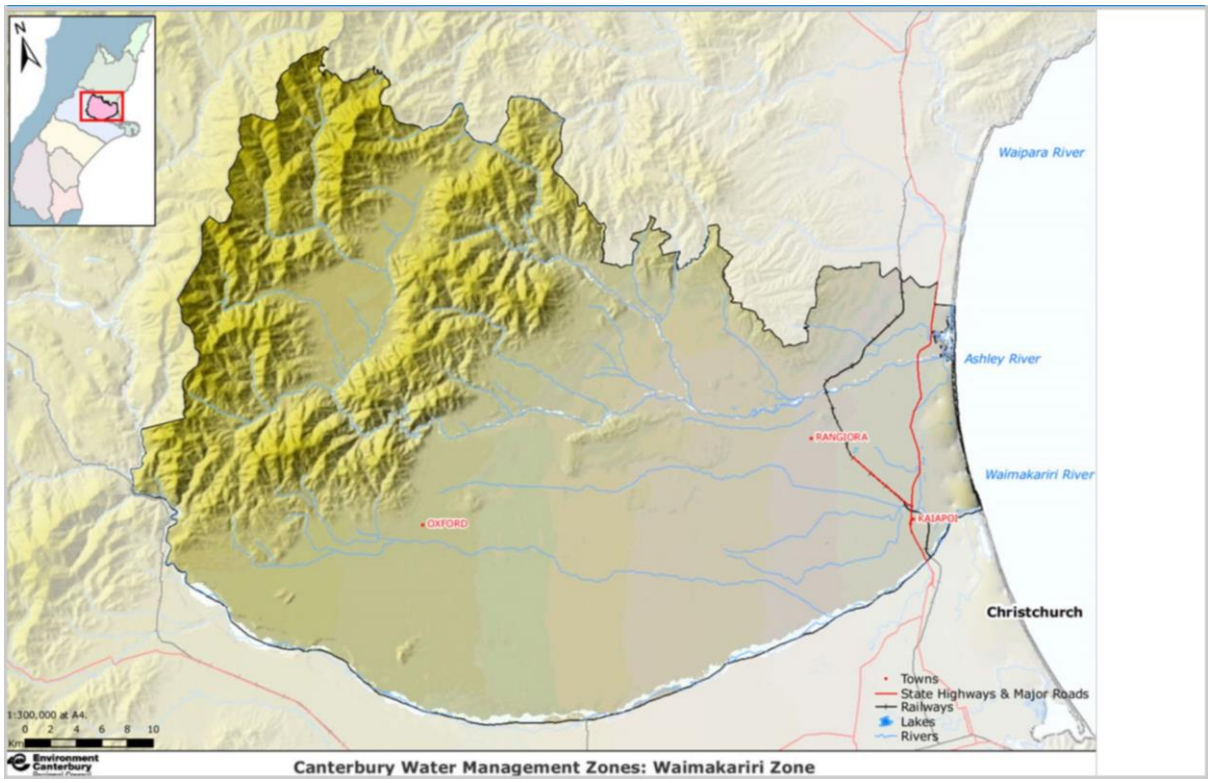


Figure 1: Waimakariri water management zone

The assessments utilise outputs from ECan's other technical assessments of land uses, nutrients, surface and ground water quality, and stream ecology. It should be noted that many bio-physical effects have economic consequences, for instance, ecological effects are important for the consequences they have for industries using water-and tourist activity. Similarly, economic effects are interconnected with social ones. For instance, employment growth affects population levels which in turn affect community vitality. Where relevant and possible, these chains of effects are noted in this assessment.

Part of the economic assessment developed here has utilised information generated for the social assessment as part of the same Waimakariri water zone management process (M.

Sparrow, pers.comm.) and from a farmer stakeholder group that has in operation since late 2015. The report briefly outlines an overview of the economy in the Waimakariri zone, focusing on the nature of business and employment. It then focuses on key water-using activities, with a focus on land-based activities that both use water and are expected to contribute to water quality issues. The report concludes with analysis of the contribution of the key water-using industries to the current economy, and how this will change in the Low Milk Payout[1] scenario (see Section 7.2), with a view to setting up comparisons with other scenarios of the catchment in the future.

2 Scenarios

This assessment considers two scenarios – the Current State (including average milk price) and the Low Milk Payout scenario. This report was originally intended to focus on a single current state of the economy, but during consultation with the farmer stakeholder group the difficulties in considering the "current" impacts of agriculture were highlighted. These difficulties primarily arise from changes to the dairy sector, which over the last three years has had a milk price that varied between $8.40/kgMS and $3.90/kgMS. In previous analyses, the Current State has been considered to be the average of the last five years of prices and expenses, but it is clear that the last five years may not be representative of a true "current" state. Therefore, two models were developed:

- A scenario based on the average of last five years of data (2010/11 – 2014/15) and which is termed Current State.
- A scenario based on sustained returns of $5/kgMS (including dividend and stock sales) termed the Low Milk Price scenario.

These scenarios will be compared through the zone committee and community deliberation processes with other scenarios of change in the catchment, to help understand the likely and range of potential economic outcomes.

3 Economy, business and employment in the Waimakariri zone

The economy of the Waimakariri District is spread across a range of sectors, with notable activity in construction, wholesale and retail trade, and service sectors.

Statistics NZ business demographic data shows that the Waimakariri District economy is structured quite differently from the national economy, with construction (15.9% vs 6.4% of employee count), retail trade (14.8% vs 10.1%), and agriculture (8.6% vs 5.7%) all larger parts of the employment in Waimakariri than in New Zealand as a whole (see Table 1). The dominance of these sectors suggests a different structure to the economy for the district when compared with both the Canterbury and national economy. In both Canterbury and New Zealand, *manufacturing* and *healthcare* and *social assistance* are the largest industries while *professional, scientific and technical services* are in the top five industries nationally but are not represented in the top five of the Waimakariri District. *Agriculture, forestry and fishing* is in the top five employers for Waimakariri but are not for the national or the regional economy.

Table 1: Five largest industries in the Waimakariri District by employee count (Statistics NZ, 2013)

[1] The Low Milk Payout scenario is one where the dairy farm revenue remains at a low level over a sustained period.

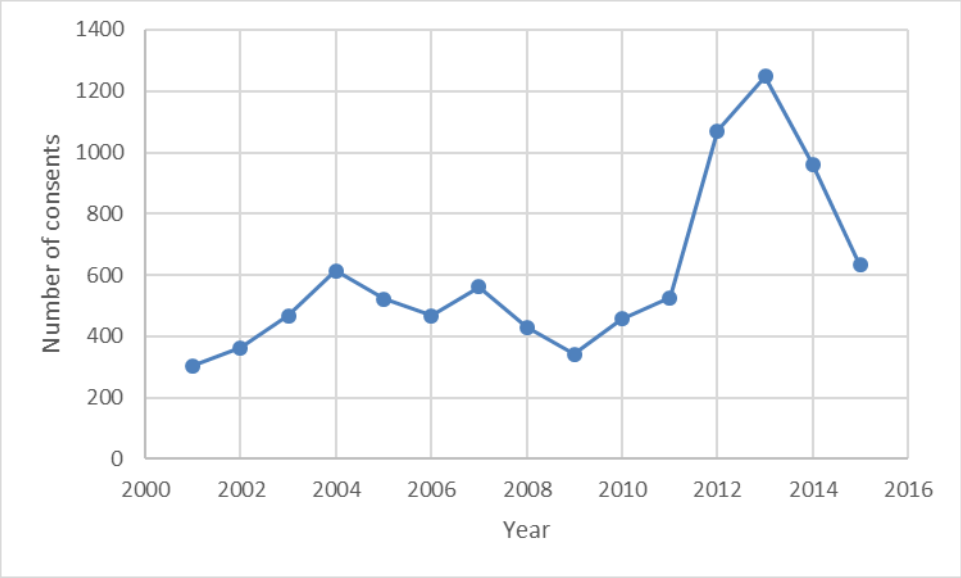
Industry (ANZSIC06)[1]	Waimakariri District		New Zealand	
	Employee count	Percent of total employee count	Employee count	Percent of total employee count
Construction	1,940	15.9	124,870	6.4
Retail trade	1,810	14.8	195,870	10.1
Manufacturing	1,540	12.6	211,710	10.9
Education and training	1,230	10.1	167,240	8.6
Agriculture, forestry and fishing	1,050	8.6	111,520	5.7

There was significant growth in the Waimakariri District economy between 2000 and 2015. Infometrics (2016) estimates GDP to have grown strongly in the Waimakariri District in the period since the Canterbury earthquake sequence in 2010-11, with GDP growth of 10% in 2012, and approximately 4.1% in 2014. However growth appears to have slowed recently, with their most recent estimate showing GDP contracting 0.4% in the year to June 2016 to $1.57 billion.

Over the period 2000 – 2015 the number of businesses increased from 4,200 to 6,300 (50% increase), and employment increased by 80% over that fifteen year period. This growth was led by increases in construction and services to people which together comprise 60% of the total employment increase. When combined with *retail and wholesale trade*, three quarters of the employment increase has been driven by these three sectors, which is largely associated with the population increase experienced in the district – from 29,000 in 1996 to 55,000 in 2015. With the predominance of the population (80%) in the south-east of the district (Rangiora, Kaiapoi and surrounds), it is likely that the majority of economic activity is also located in this area.

This growth in population is reflected in the building consent data (Figure 2), which shows the number of building consents issued doubled between 2001 and 2004, declined following the Global Financial Crisis (GFC) in 2008, and then quadrupled to a peak of over 1,200 consents in 2013 following the Canterbury earthquake sequence. From 2012 to 2014, Waimakariri District Council (WDC) processed either the most or second-most building consents of any district council in NZ.

Figure 2: Number of residential building consents, Waimakariri District (Statistics NZ)



4 Water-using industry

The key industries using groundwater (Figure 3) in the Waimakariri District are irrigation (~70%) and public water supply (~20%). There are a range of other uses, including aquaculture, augmentation of drains and streams, stockwater, construction, cooling, and industrial uses. There are also be a number of private domestic takes from groundwater for drinking and household use that are part of the permitted activities category.

Surface water use (Figure 4) is dominated by irrigation, intensive farming (non-irrigation uses) and stockwater, with stockwater forming 60% of the total take rate. Agriculture is collectively ~98% of the use for surface water, with only minor takes (2–3%) for other activities.

The majority of consented discharges (excluding dairy effluent consents) (Figure 5) are for residential stormwater (46%) and industrial stormwater (26%) (see Figure 5). There are a small number of process solid discharges, which cover a range of activities, and there are a similarly small number of human effluent discharges. A small number of leachate consents are all held by the WDC.

The contaminated water discharge consents cover a range of activities, including an aquaculture operation supplying salmon smelt to most of the South Island aquaculture operations, two timber operations, and a number of food processing operations including a small dairy processing operation (Karikaas) and an organic food grower/retailer, a supermarket chain, concrete manufacturing, and various other sundry operations and activities (e.g. flood management, construction activities etc.). In total, approximately two thirds of the consented discharges by number are to land, with the remainder to water.

In addition to the discharge consents shown in Figure 5, there are a number of dairy effluent consents. Based on 105 dairy herds in the district, (*NZ Dairy Statistics 2014-15*) there is likely to be a similar number of dairy effluent consents, which would comprise ~30% of the total discharge consents. There will also be permitted activities such as septic tanks, and a range of non-point source discharges from agricultural activities which are not currently consented.

It appears that in terms of consented economic activities that affect water bodies, agriculture is by far dominant in terms of water takes. Dairy effluent and residential and industrial stormwater are significant sources of discharges by number, with approximately half of the stormwater discharges likely to be directly into a water body.

Figure 3: Primary use for groundwater abstraction

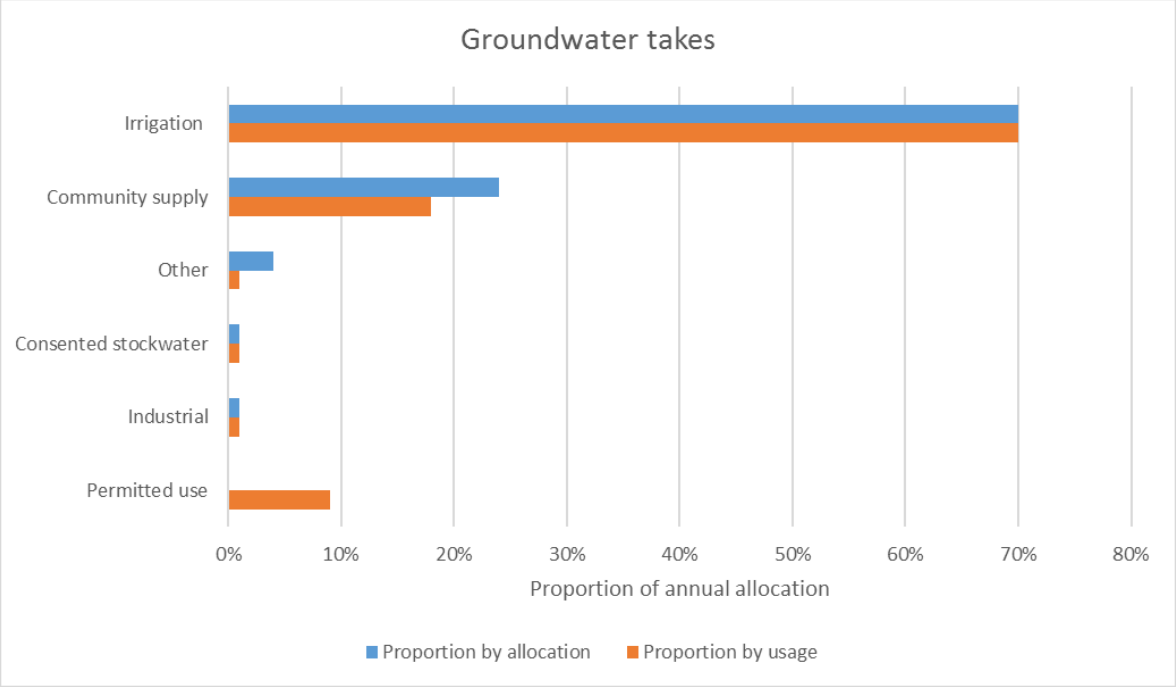


Figure 4: Primary use for surface water abstraction

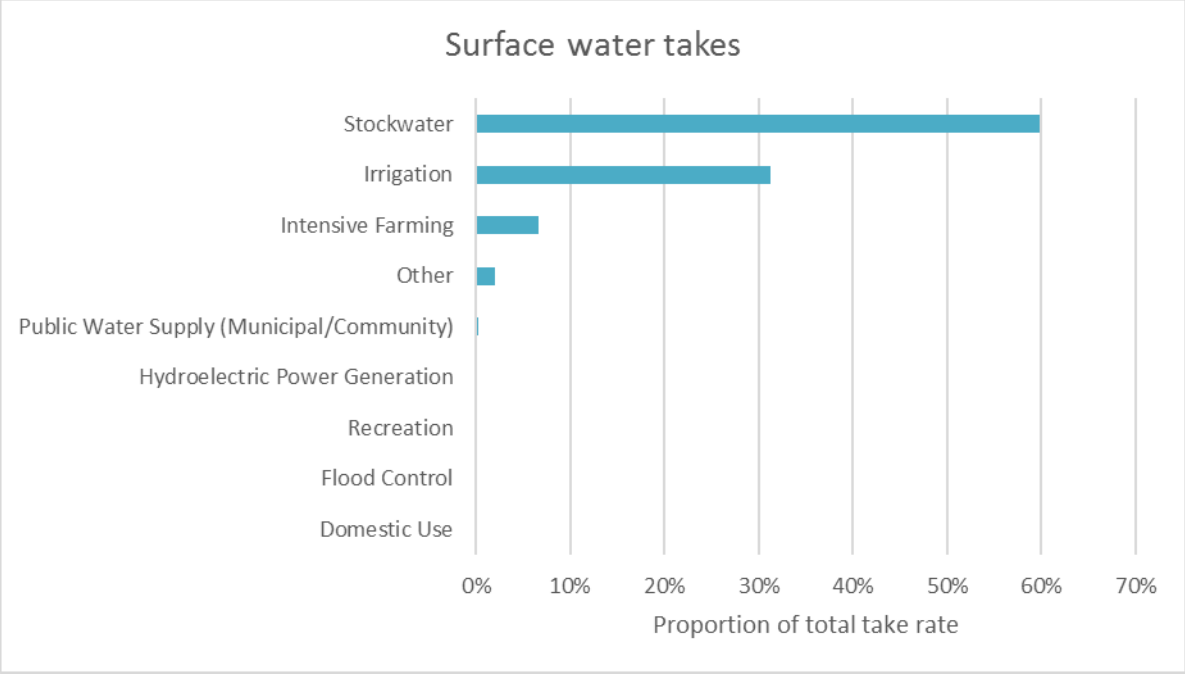
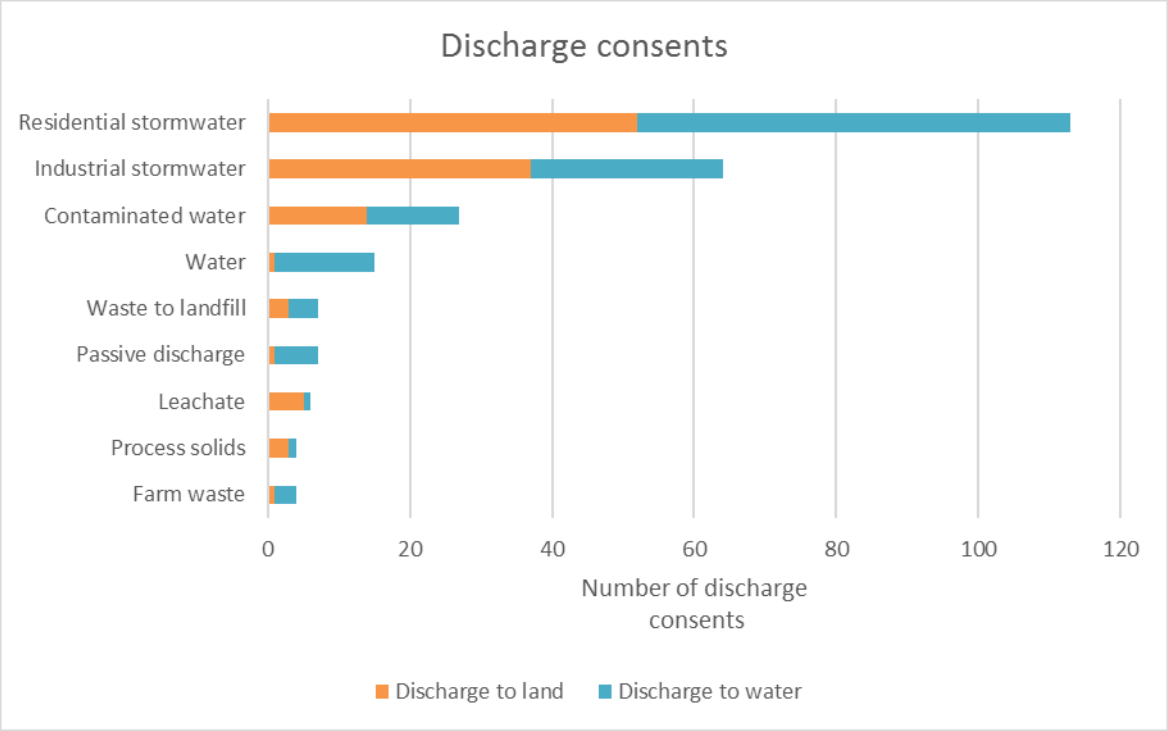


Figure 5: Discharge consents by activity type (excluding dairy effluent)



In a wider context, the environment provides a range of ecosystem services that support the economy, including waste assimilation, flood amelioration and various non-consumptive values such as recreation, tourism, and other amenity values.

Tourism is often a significant non-consumptive user of water through recreation and amenity use of water bodies. For example, the Waitaki catchment is a key tourist destination for recreation (fishing, boating, rowing etc.) and for sightseeing with the lakes and rivers having high amenity values (Taylor, Harris, McClintock, & Mackay, 2015). While there is some contradictory information[2] surrounding the tourism sector in the Waimakariri District, it seems a fair conclusion that it is not large, with only 20 accommodation units. No major iconic attractions are present in the catchment, and recreation on the local rivers is likely driven by residents and day visitors from Christchurch. Expenditure from these sources, or from visitors passing through the townships of Woodend and Waikuku on SH1, are likely to have a relatively small impact on the district economy. As a water-using sector of the economy, tourism should be regarded as not highly significant. This does not imply that water is not an important recreational resource for the local and visiting population, but merely that in terms of measured economic activity it is not likely to make a major contribution.

Gravel extraction from the waterways is an important part of the economy, supporting construction, road building and other infrastructure projects. ECan (McCracken, pers.comm.) supplied the recorded gravel extraction from waterways in the Waimakariri zone over the last five years, which is shown in Figure 6 below. There was a significant increase in 2013, which

[2] http://www.northcanterbury.co.nz/content/library/New_statistics_highlight_tourism_value_to_Canterbury.pdf which suggests that 1 in 6 resident's employment is supported by tourism. It is likely that these results are either mistaken or take a very broad view of tourism or a very broad view of the term "supported" since such a significant contribution is not identifiable from any of the data that is available elsewhere. It is likely that because of the very small size of the sector in the district the data is very poor – for example the commercial accommodation monitor data for the district suggests and average occupancy rate of 12%.(http://www.stats.govt.nz/browse_for_stats/industry_sectors/accommodation/info-releases.aspx) , which does not suggest commercial levels of activity.

is likely to have been associated with major building and infrastructure projects in the district, most likely post earthquake rebuild related. Using a price of $11/m3 this has an average value of ~$2 million/annum.

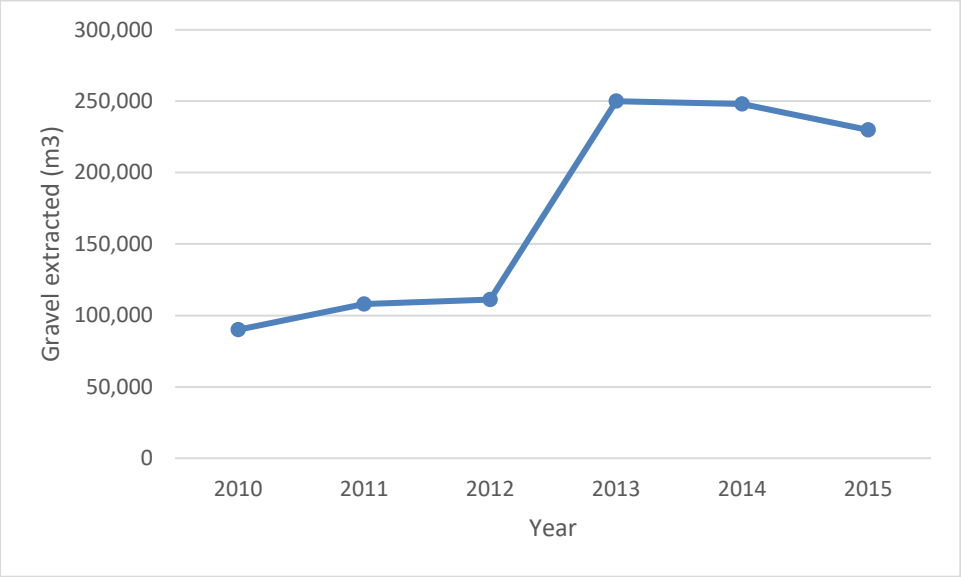


Figure 6: Gravel extraction from the Waimakariri zone 2010 - 2015 (Source: ECan)

Other market economy ecosystem services that can be identified will be included as the scenarios develop, and the recreation and amenity values will be considered through a range of mechanisms within the technical and socio-political processes that make up the development of the solutions for the catchment.

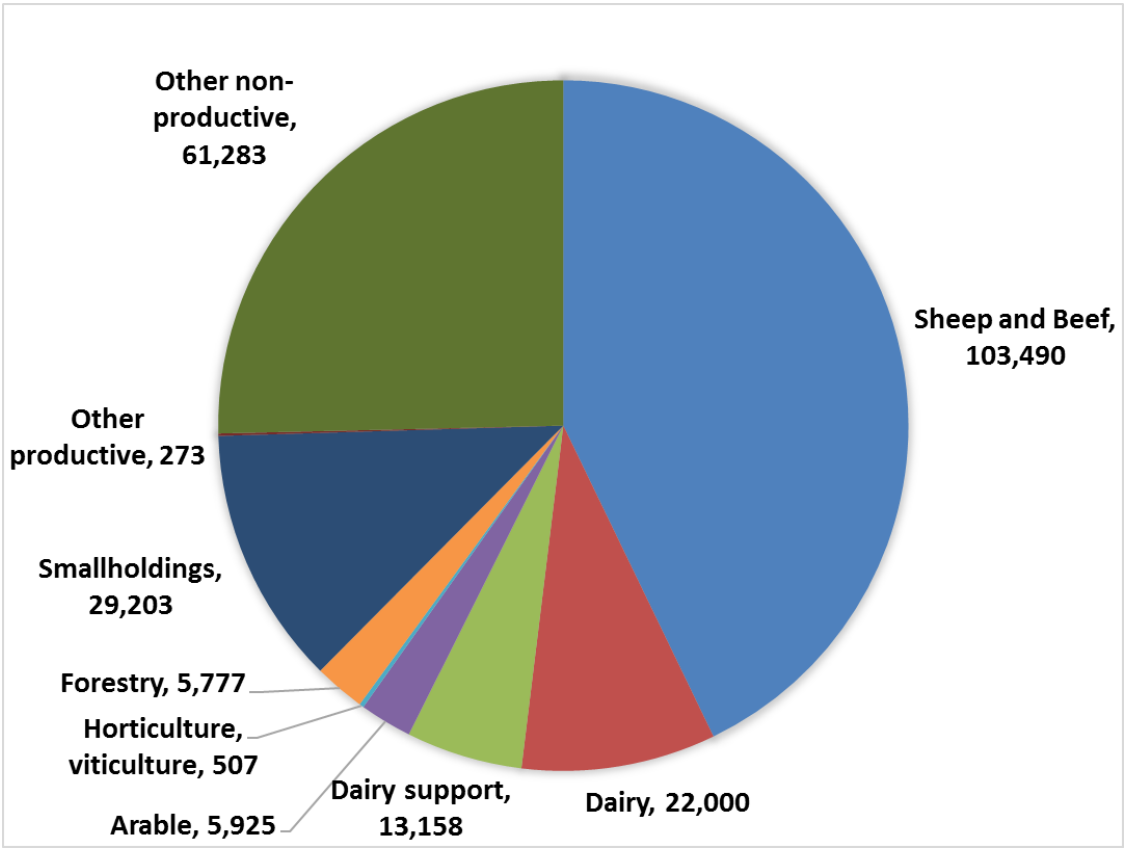
5 Land use

The activities which use land are generally the largest users of water in Canterbury, through stockwater and irrigation takes. Because of the nature of agricultural systems, they also tend to lose nutrients to the environment, which end up in water bodies. The nature and patterns of land use are therefore of considerable importance in determining the outcomes for water.

It is estimated by ECan that there is 240,000 hectares of land in the Waimakariri zone with the three dominant land uses accounting for 70% of total land use. Current land use (June 2015) is shown in Figure 7 and is dominated by sheep and beef, which comprises approximately 40% of the total land use in the catchment. Non-productive land, including native forest, scrub, water, and urban areas, is 25% of the total land, and dairy plus dairy support accounts for a further 14%. Smallholdings account for 12% of the catchment area, and this has grown in recent years. Forestry, arable and horticulture are minor land uses with less than 5% of the area collectively.

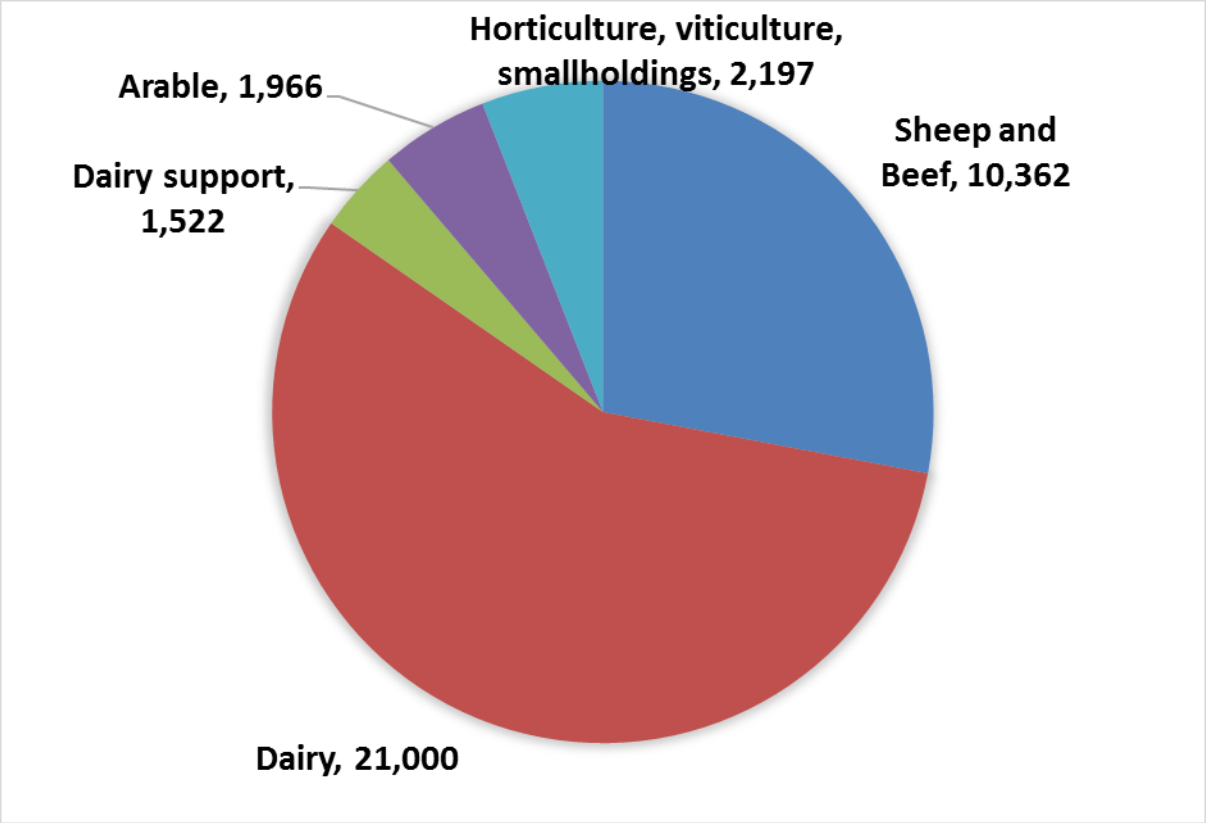
Irrigation (Figure 8) has experienced major development in the catchment over the last two decades since the implementation of the Waimakariri Irrigation Limited (WIL) in the late 1990s. The majority of irrigated area is currently in dairy with 60% of the total area, followed by sheep and beef with 30% of the total area. Dairy support, arable, lifestyle and horticulture are smaller irrigation users. Irrigation also occurs on approximately 1700 ha of lifestyle land, but this is often not fully utilised.

Figure 7: Estimated land use in catchment (Source: ECan)[3]



[3] Figures are total area not effective area.

Figure 8: Estimated irrigated land use in catchment (Source: ECan)



5.1 Pastoral agriculture

Over the last decade, at a broad scale there has been a significant increase in dairying and smallholdings, and a decrease in sheep and beef area. These have been driven by the high dairy milk price making dairy relatively more attractive, and the long term trend to lifestyle properties in the district. The trends in individual sectors are discussed below.

5.1.1 Sheep and Beef

Beef and Lamb NZ (B+LNZ) estimates that over 35% of sheep and beef farms are under 750 stock units (SU)[4] in 2013/14, and there has been a 36% decrease in farm numbers since 1990/91. Beef and Lamb NZ data for the northern part of Canterbury shows that for the period 2000/01 to 2013/14 there has been a decrease in area per farm for the both hill country and intensive finishing breeding categories. Intensive properties have seen a decrease in stocking rate both per farm and per ha, while hill country properties have seen an increase in both. Fertiliser usage per ha over that period has also decreased from by 8% on intensive properties, and increased by 2% on hill country properties.

[4] A stock unit is a standardized unit of stocking rate for a property. B+LNZ standard stock unit conversion ratios are described in http://portal.beeflambnz.com/tools/benchmarking-tool/definitions.

Table 2: Key statistics for Beef and Lamb Class 6 Finishing Breeding farms[5] (Source: Beef and Lamb NZ data for Hurunui, Waimakariri and Selwyn)

	2000/01	2013/14	% change
Farm Class 6: Intensive finishing breeding			
Stocking rate** (SU/farm)	4,035	3,311	-18%
Effective area** (ha/farm)	496	423	-15%
Stocking rate** (SU/ha)	8.1	7.8	-4%
Fertiliser usage*** (kg/ha)	181	166	-8%
Farm Class 2: Hill country			
Stocking rate (SU/farm)	5,434	6,201	14%
Effective area (ha/farm)	1,154	1,114	-3%
Stocking rate (SU/ha)	4.7	5.6	18%
Fertiliser usage (kg/effective ha)	67	69	2%

5.1.2 Dairy

North Canterbury has on average the highest dairy herd production in the country, reflecting a combination of larger herd sizes, high stocking rate and high production per cow. Production in Waimakariri district for 2014/15 was 1,431kgMS/ha with an average of 420kgMS/cow. These are among the highest per ha and per cow production figures in the country, and represent an increase from 1,051kgMS/ha and 380kgMS/cow in 2004/05. Over the same period there has been an increase in herd numbers from 71 herds in 2004/05 to 105 herds in 2014/15, in cow numbers from 30,000 cows milked to 65,000 (LIC, 2005; DairyNZ & LIC, 2015), and in total dairy cattle numbers including young stock from 51,000 in 2004/05 to 83,000 in 2014/15 (Statistics NZ).

5.1.3 Dairy Support

Dedicated dairy support[6] propertues are estimated to cover ~13,000ha in the catchment. The farmer group has indicated that most of the dedicated dairy support will be directly associated with a dairy platform, either through ownership or lease, and therefore can be difficult to differentiate. However there is also a considerable amount of dairy grazing that takes place on sheep and beef and arable properties, which is on a direct contract basis. It appears that from information supplied by the farmer group that over the last five years there have been significant numbers of dairy cattle entering the district for grazing from outside the district, and these imports will affect the ratio of dairy to dairy support that might normally be expected to occur in a catchment. It is expected that under the Low Milk Payout scenario these imports of dairy cattle for grazing may reduce.

5.2 Arable and horticulture

Arable and horticulture land uses are relatively small (Table 3). Arable crops cover approximately 4,700ha, of which the majority is grain, primarily barley and wheat. A proportion of this will be grown within sheep and beef operations, as part of pasture renewal. The largest

[5] Class 6 is considered by Beef and Lamb NZ to represent 95% of sheep and beef farms in the Hurunui district.
[6] Grazing of non-milking stock, both young and wintering, and growing of feed to support dairy platform.

areas in horticulture are in tree crops, including walnuts and hazelnuts, and olives are probably the largest single horticultural crop with ~90ha planted. There are areas (66ha) of vegetables, both indoor (1.1ha) and outdoor (65ha), and a significant area in flowers (24ha). Some of the vegetable operations will occur within other land uses, as potato production (48ha), which is the largest vegetable crop, often occurs on leased land. It should be noted that the areas of horticulture are less than is identified in the ECan land use statistics, with the discrepancy likely to be associated with the difference between planted areas and property areas.

Table 3: Arable and Horticultural areas in Waimakariri District (Statistics NZ Agricultural Census 2012)

Crop	2012 Agricultural Census Area (ha)
Arable	
Grain	3655
Pulses (field peas)	141
Seeds	904
Orchard	
Grapes	32
Pipfruit	43
Olives	94
Tree crops (nuts etc.)	134
Other fruit	8
Vegetables	
Indoor	1.1
Outdoor	65
Floriculture[7] (2006)	24

5.3 Smallholdings

Smallholdings are a significant feature of the Waimakariri district, with much of the area in the south-east of the district given over to small block holdings. ECan estimates ~29,000ha are in smallholdings, with approximately 1000 small holdings (<20ha) recorded in the 2012 Agricultural Census.

The best detailed information available on small blocks was a survey undertaken by the Waimakariri District Council in 2006 (Waimakariri District Council, 2006). Although this survey is now a decade old and there has been considerable expansion in the intervening period, it provides a valuable snapshot of the economic activity occurring in smallholdings. In that survey 37% of respondents reported undertaking an activity on their smallholdings. These included horticulture (10%), consultancy (5%), engineering (4%), equestrian (3%), internet based (2%), arts and crafts (3%), boarding cattery/dog kennel (1%), sales and marketing (2%), and tourism (1%).

Allowing for one unique business per property (which is likely an overestimate because not all properties will be running a business), similar proportions with more current Agricultural Census data would give approximately 370 non-horticultural businesses operating on smallholdings. When compared with the total number of businesses in the Waimakariri (6,300

[7] Estimated from Waimakariri District Council survey of small block holders using the mid-point of area reporting categories and the frequency of response per area category. (Waimakariri District Council, 2006)

business units in 2015), this represents ~6% of businesses, which suggests that smallholdings are not a major location for non-horticultural business activity.

Land use by small holdings is highly varied. Sheep and cattle[8] were on 39% and 35% of properties in the 2006 survey, and horses on 31%. In total, 75% could be reasonably defined as sheep and beef operations. Poultry, goats and alpaca were also present, although were all on less than 10% of properties. Small blocks (<5ha) are a significant proportion of farms numerically (32%[9]), but when compared with the area in sheep and beef operations (106,000ha), lifestyle block holdings in sheep and beef represent a small part (~10%) of the total productive capacity. Furthermore, only 1700ha of the smallholdings are irrigated, implying that the majority of smallholdings are best described as dryland sheep and beef operations.

Horticultural operations on the other hand are likely to be predominantly located on small block holdings. Assuming that the size of properties on which horticulture takes place is not skewed, properties undertaking horticultural operations would cover 1,300ha of land, although it is likely that only a proportion of each small block holding is devoted to horticulture. This compares with approximately 400ha recorded as planted in horticultural crops in the 2012 Agricultural Census, which implies that the majority of horticulture is likely to take place on smallholdings. As noted earlier some of the horticulture is also likely to take place on leased blocks on sheep and beef and arable properties, and will move around the district.

Of all households on small blocks, 86% had at least one person in paid employment, although it is not recorded whether this includes businesses on the property. It does however seem reasonable to conclude that the small block operations are the only source of income for a small proportion of properties, likely associated with those that have significant horticultural or other businesses on the property. In many other cases the lifestyle properties, even where there are some revenue generating activities, should be regarded as a consumption unit rather than a productive unit because of the lack of scale and specialisation.

6 Economic Linkages with Christchurch City

The Waimakariri District is unusual in being located immediately adjacent to a major city (Christchurch), and although the Waimakariri River forms a physical boundary, it is very permeable to commuting and commerce between the two areas. The Waimakariri district has a high proportion of people who work in the city and live in the district, and its rate of employment "self-sufficiency" is low at ~50% (Table 4). There is a small increasing trend, probably as a result of the growing population in the district increasing the viability of larger retail options and services that were previously only available in Christchurch. However, this trend is minor, and overall it is clear that a significant proportion of the working population is employed outside the district. The WDC (Waimakariri District Council, 2015) estimates that approximately three quarters of those who work outside the district do so in Christchurch, with the remainder working in other non-specified locations.

[8] Likely to predominantly non-dairy cattle.
[9] Statistics NZ Agricultural Census 2012

Table 4: Employment in Waimakariri District (Source: Sparrow (2016), Statistics NZ)

Year	Usually resident work force	Workplace work force	Employment self-sufficiency
2001	19,293	9,147	47.4%
2006	22,716	10,977	48.3%
2013	26,883	14,307	53.2%

The linkage between the city and the Waimakariri District extends beyond employment. Local shopping centres are used for the majority (80%+) of groceries, chemist supplies, books and stationery, garden supplies and fuel. However, over half of clothing and shoes, and hardware/appliances were purchased in Christchurch. With future growth in Rangiora, and an expected increase in retail floor space of 12,000–20,000m^2 by 2030, it is likely that the proportion of supplies purchased in Christchurch will decrease (Waimakariri District Council, 2015).

Agribusiness and Economics Research Unit at Lincoln University (AERU) investigated the contribution of the agricultural sector in Selwyn and Waimakariri districts to Christchurch City (Guenther, Greer, Saunders, & Rutherford, 2015). AERU estimated:

- The average farm in the Waimakariri and Selwyn districts spends $73,000/year in business and household expenditure in Christchurch, which was 28% of total expenditure with sheep and beef spending more than dairy in Christchurch. Most of this was farm business expenditure (about ¾) with the remainder associated with the farm household. A further 19% of employees' income, or $9,000 per annum, was spent in Christchurch.
- Rural businesses in these two districts obtained 55% of business supplies from Christchurch, with 73% of electricity supply, 71% of communication services, and 65% of business services. However, the highest value purchases were from food manufacturers and other manufacturers, and business services sector.
- Food processors purchase 9% of total purchases from Christchurch, but 26% of non-raw material inputs (raw materials are more than 2/3 of total expenditure). These are primarily purchases from manufacturers, business services, and transport and storage operators.

7 Economic indicators

The indicators in this section are developed for the purposes of comparison between scenarios, and therefore focus on those sectors which are likely to be most affected by water management decisions. These sectors are overwhelmingly agriculturally based, and these sectors are therefore the focus of this initial estimation of economic indicators for the district and region.

The analysis develops estimates of direct indicators for agricultural activities, based on the business-level budgets and areas of each land use. The business-level budgets are based on five years of historic data, and because these reflect a period of very strong returns for dairy, an alternate Low Milk Price scenario is also tested (see Section 7.2). The business-level budgets are used to estimate the flow-on economic impact from the agricultural sector, and following direction from the Waimakariri Science Stakeholder Advisory Group these flow-on impacts are estimated at the regional level. The regional level is more appropriate because

the strong linkages between the Waimakariri district and other parts of the region, particularly Christchurch City, mean that restricting the analysis to the Waimakariri district only would be artificial and misrepresent the true flow-on impact from these activities.

At this stage the impacts from smallholdings are estimated based on the returns from dryland sheep and beef. The impacts of horticulture are estimated separately, which will be the most significant returns from this land use. However, it should be noted that the small scale of these lifestyle operations and the high level of off-block employment[10] means that the figures estimated here almost certainly overestimate the contribution from this land use. Given the scale of smallholdings as a land use in the Waimakariri district, this overestimate may be more significant than in other parts of the region.

There are a range of other water uses that are not represented in these estimates, but apart from public water supplies these are both individually and collectively a small number of both surface and groundwater abstraction and discharges. The public water supplies will be investigated and assessed further for any economic implications associated with water management decisions in the next phase of the project.

7.1 Economic indicators associated with water-using industries

The direct business-level indicators for the agricultural sector are shown in Figure 9. They show that dairy is the largest sector in terms of revenue, expenditure and operating surplus, despite being a significantly smaller land use than sheep and beef. In other words, dairying is significantly more intensive than sheep and beef. Most of dairy land is irrigated and these outcomes reflect partly the significantly higher intensity associated with irrigation. Sheep and beef is the next most significant water-using industry in the catchment, and contributes $120m in revenue and nearly $50m in operating surplus.

Contribution to GDP (Figure 8) is a measure of the value added by an activity in the economy, that is calculated by the value of outputs less the value of inputs excluding labour. In this catchment dairy is the most significant water using industry in terms of its contribution to GDP, and household income. The large contribution to GDP reflects both the greater intensity, but also a sustained period of high prices. However, sheep and beef is also important in both cases and is a major part of the zone economy.

Sheep and beef is a significant source of on-farm employment (including the owner operator) (Figure 11). Dairy operations, which have increased in scale and labour productivity, are a slightly larger source of employment at the farm/catchment level and at the regional level. Horticulture is a significant source of employment despite its small size at both the farm and regional scale, indicating the labour-intensive nature of the industry in both on- and off-farm activities. The estimates for employment in the Other category include lifestyle, and because the models are based on sheep and beef operations, the estimates are likely to be misleading with very little paid wage or salary employment in the lifestyle sector, with greater use of voluntary labour and contractors.

[10] Suggesting that the returns from the lifestyle operation are potentially not the major focus of the lifestyle block owner.

Figure 9: Estimated business revenue, expenses and operating surplus

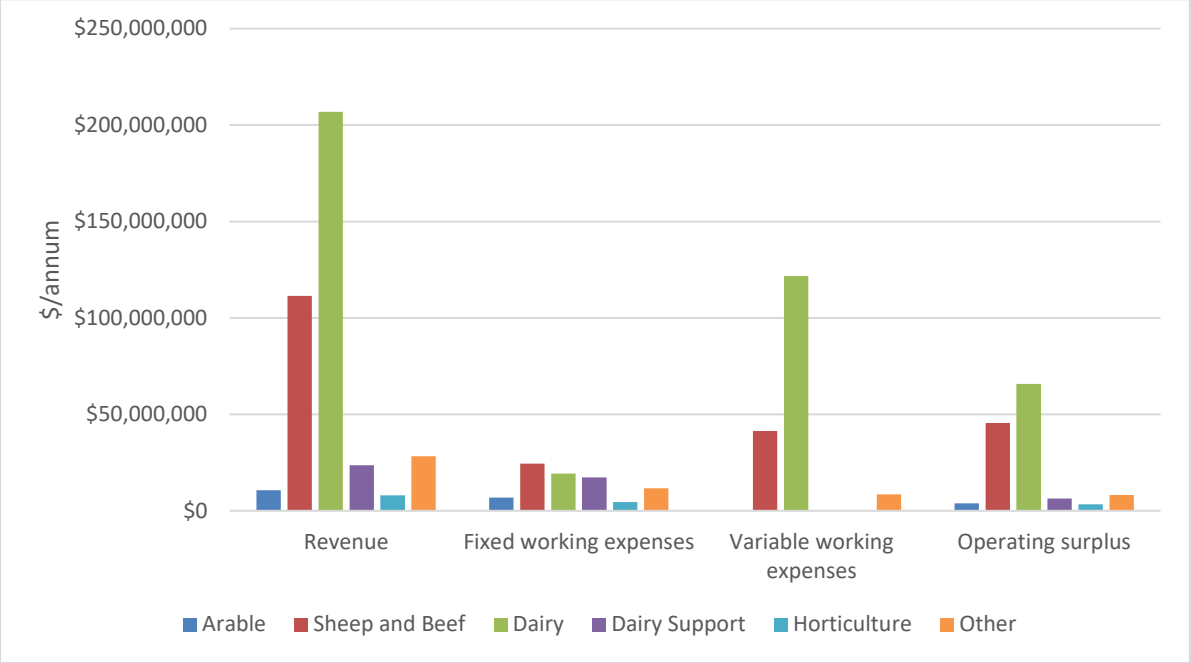


Figure 10: Estimated GDP and Household Income (HHI) contribution of key water-using industries

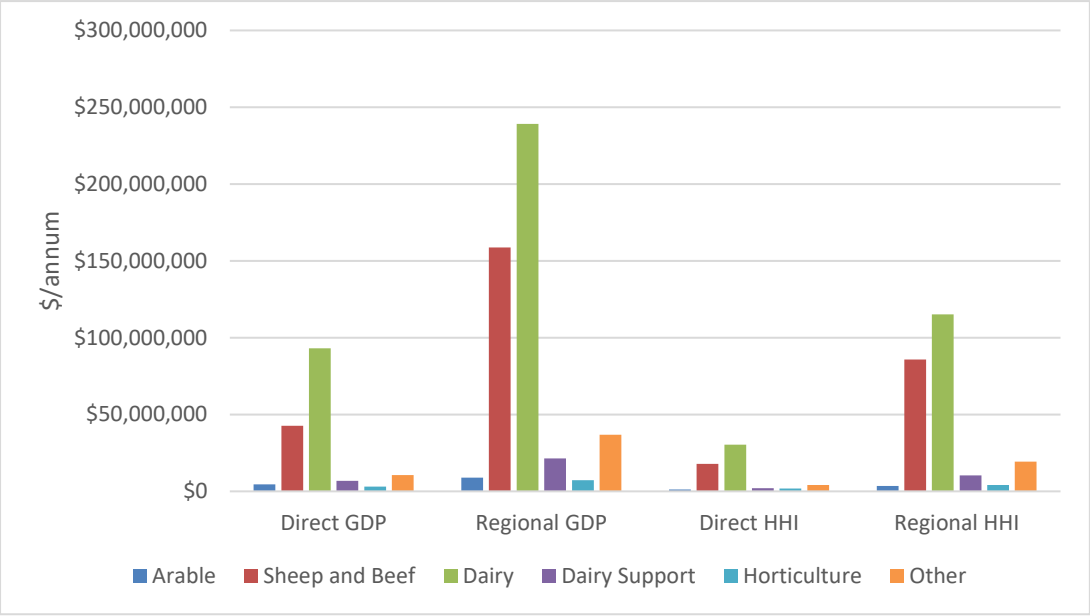
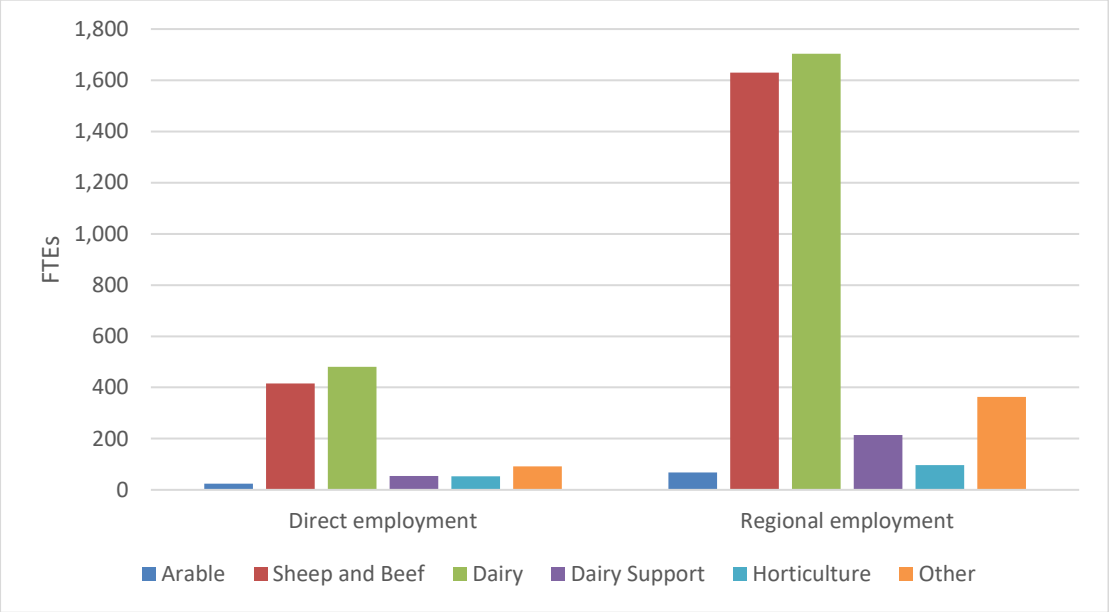


Figure 11: Estimated direct and regional employment associated with key water using industries (Full Time Equivalents (FTE))



7.2 Impact of Low Milk Price scenario

The Low Milk Price scenario has been generated to show the potential impacts of sustained low milk price (relative to the average of the last five years) on the contribution of the primary sector to the local and regional economy. Because the impacts on individual dairy businesses are significant, these are not changes that would be achieved in the short term, but will represent medium-term stability. The transition will require a significant increase in skills and management expertise because the performance required is only being achieved currently by the top ~10% of farm businesses. This will require a range of non-regulatory support from various sources to achieve, and is likely to involve exit from the industry, either voluntary or forced, for a significant proportion of current owners (see below).

Figure 12 shows the differences for business-level activities, with significant impacts on revenue, expenses and operating surplus. Most of these impacts are borne by the dairy sector, although there are significant impacts for dairy support activities. The impacts on dairy support will be mainly experienced by dedicated dairy support blocks, many of which are either owned or leased by dairy farmers. Dairy grazing is a feature of activity on many sheep and beef farms and also cropping farms. The B+LNZ Economic Service's Sheep and Beef Farm Survey statistics indicate that is a relatively minor source of income on average, although it may be more significant for some individuals with a higher reliance on dairy grazing. These sheep and beef industries are not expected to be heavily impacted, and there are alternate sources of income that will be able to be accessed that will ameliorate the impacts overall. It should be noted that the assumption that those properties which exit the dairy industry will move to sheep and beef, arable and lifestyle land uses, will increase activity in those sectors in aggregate.

The impact of a sustained low milk price on dairy operations is likely to be severe, and it is expected that there will be a small decrease in area (estimated ~10%) as older and less profitable farms exit the industry and go into smallholdings or dry stock and cropping farming.

The modelling undertaken here assumes that the exit from the industry occurs primarily on the heavy soil class, which is more suited to other activities and which tends to have the older dairy operations with less modern infrastructure.

The nature of the impacts will be exacerbated by debt held by farmers, and the potential for a significant proportion of existing farms to require recapitalisation either through sale or introduction of equity.

The Reserve Bank (Reserve Bank NZ, 2015) undertook stress testing of the potential impact of the low milk price through to 2018/19. Under a base scenario with the milk price recovering to $5.50/kgMS in 2016/17 and subsequently to $6.50 in 2018/19, non-performing loans (where cashflow is negative and equity is less than 10%) increase to 7.8% of debt. In a scenario where the milk price is $4 in 2015/16 and increases at 50c/kgMS annually through to 2018/19, 25% of farms and 44% of debt is in non-performing loans. We can expect that under a Low Milk Price scenario there will be significant upheaval in the dairy sector, and there are likely to be forced sales and disruption to farming businesses and families. It is likely that less skilled operators, and those with high debt levels, would not survive a long period of low milk price.

Statistics NZ (Statistics New Zealand, 2014) estimated that the total equity-to-asset ratio for the dairy industry was 30% in Canterbury, but DairyNZ estimate is the average value is $12-$13 m for a 240 hectare farm (210 effective) with liabilities/debt around 50%[11]. The DairyNZ data indicates that Canterbury farms carry higher total absolute debt based on size, but on a per kg MS basis they are similar to national debt levels. Therefore the impact in Canterbury is likely to reflect the changes that occur nationally under this scenario.

The wider impacts of a low milk price scenario are shown in Figure 13 to Figure 15. They show a significant reduction in contribution to GDP, employment and household income from the agricultural sector. The effects of the on-farm impacts are exacerbated in the wider economy through the lower expenditure on dairy farms, the lower profitability, impacts from reduced dairy support, and lower activity amongst suppliers and processors.

[11] Source: Matthew Newman, DairyNZ, pers.comm. Also for later information regarding debt loadings for Canterbury relative to the national figures.

Figure 12: Comparison of Low Milk Price and Current State scenarios for estimates of business-level indicators (All Sectors total)

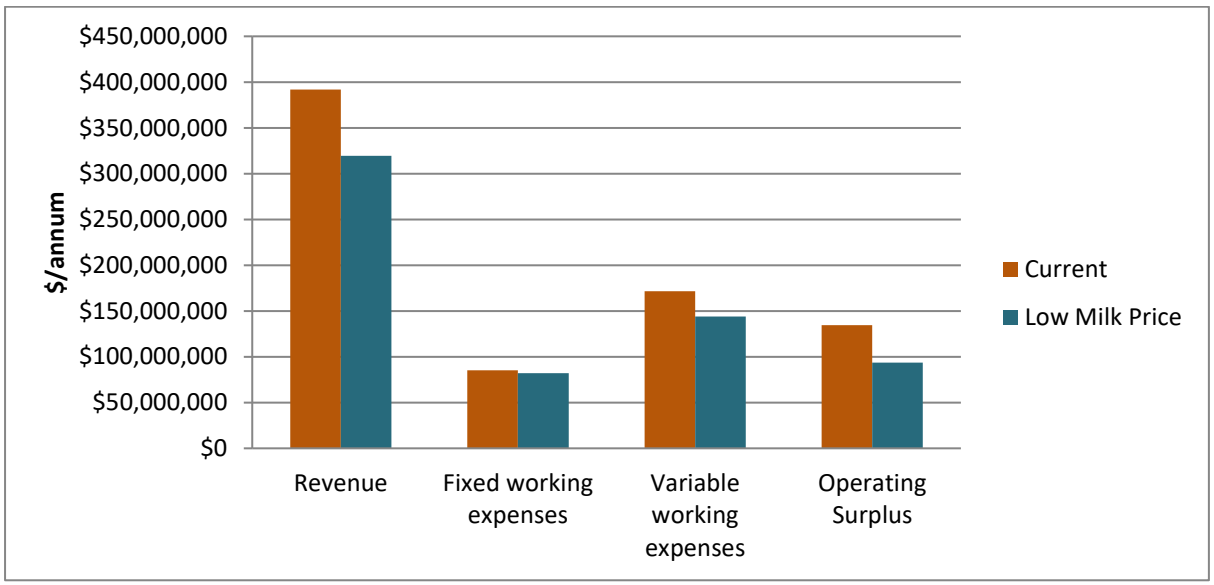


Figure 13: Impact of Low Milk Price scenario on direct and regional GDP

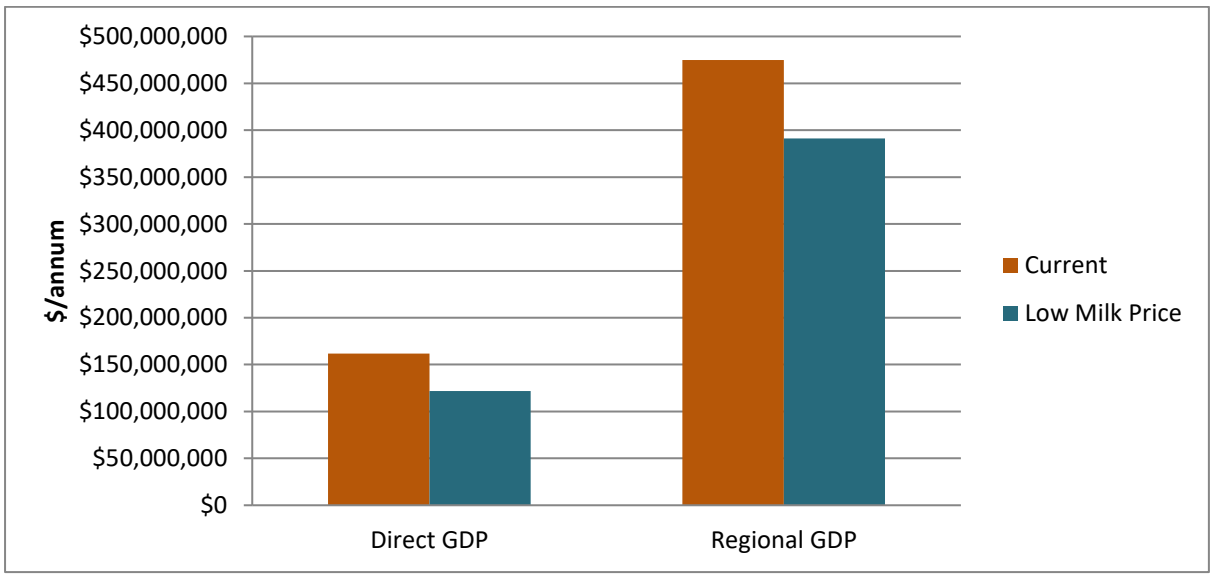


Figure 14: Impact of Low Milk Price scenario on direct and regional employment

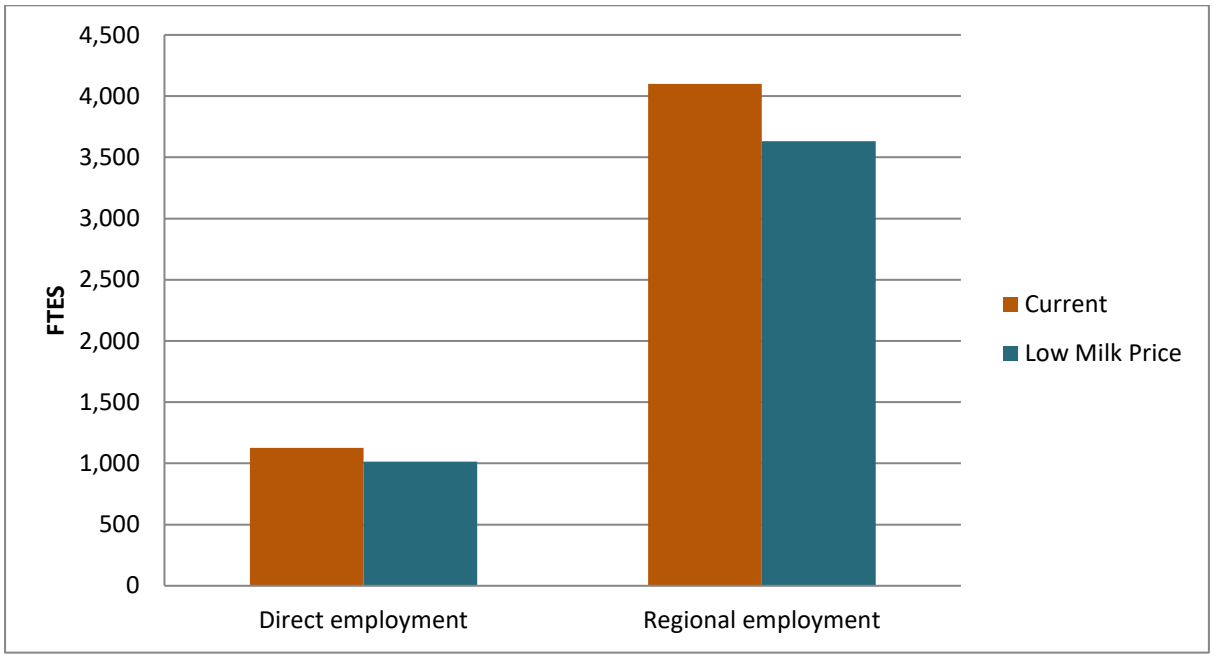
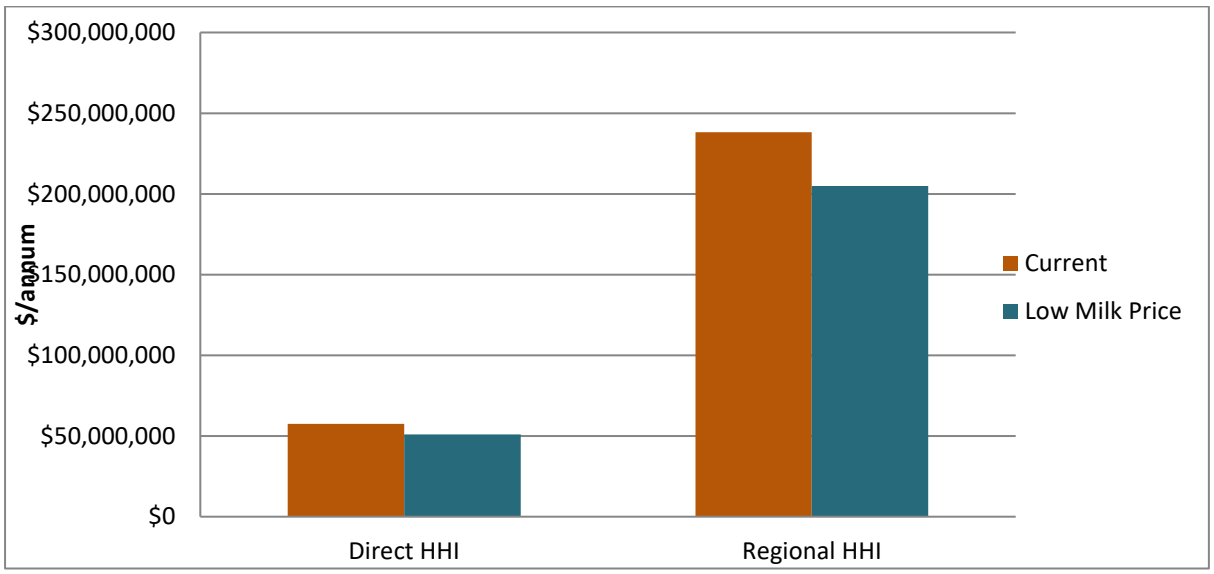


Figure 15: Impact of Low Milk Price scenario on household income



8 Discussion

The information and results discussed here should be used carefully. It is collated from a variety of sources, not all of which are consistent with each other. Furthermore, they represent a high level view, and the details of specific businesses and industries cannot be fully represented at this level. The modelling undertaken uses representative operations, and these are unlikely to be the actual average of each land use or business for a variety of reasons. The regional modelling is also high level and based on the latest (2013) inter-industry information available, however there are a number of assumptions that have to be made when modelling at this level. The method used to estimate the flow-on impacts has an inherent bias

that leads to consistent overestimation of the impacts. These caveats should be noted and allowed for in the decision making, and the information should be considered indicative of trends rather than definitive.

Despite these caveats, an understanding of the economics of the zone is able to be derived. Although there is a reasonably significant manufacturing base in the district, the economic activity in the catchment is primarily focused on construction and services. The relative size of these sectors and the low employment self-sufficiency implies that the district economy is dominated by the activities associated with domiciling people and their families who are supported through work in Christchurch City. Agricultural activity in this context is approximately the fifth most important employment source, but is much more important as a locally focused employment opportunity not dependent on activity in the city. Agriculture in particular is likely to be much more important in parts of the district away from the south-east where the commuting population is focused, and the flow-on impacts from agriculture are likely to be more pronounced in the smaller towns and areas in the district outside of the south-east.

The activities associated with the commuting population are not typically water-related, although the domestic water supply and stormwater discharges are some of the more significant water-use activities after agriculture. Therefore, while they are not directly implicated in water management, issues that affect the district's ability to house these people, provide them with drinking water and dispose of their waste and stormwater, will have more significant implications for the local economy. These impacts may be investigated further in the next stages of the project as the implications of different scenarios are identified.

There are other water-based activities present in the catchment, such as the aquaculture operation in Kaiapoi that is directly dependent on Silverstream and groundwater. However, these are not major parts of the local economy, and the implications for these operations will be developed further in subsequent stages if implications of different scenarios warrant further investigation.

Agriculture is the primary use of water in the catchment, through stockwater and irrigation and dominates both surface and groundwater takes. It is likely to be a major source of both consented and unconsented discharges (outside of residential and industrial stormwater). Agricultural processing operations are not a major feature of the district economy, with no large processing plants present, however there are several small operations and these should be noted.

Of the agricultural sectors, dairy is the largest contributor to the local economy, although employment is very close to dairy for sheep and beef farming. A smaller area is utilised by dairy compared to sheep and beef, and their relative contribution to economic indictors reflects the widespread use of irrigation by dairying and the intensive nature of the activity. Sheep and beef is the largest land-use overall – when measured by area – and when combined with the lifestyle sector, which is predominantly sheep, beef and other minor land uses, is a major part of the economy. The implications of the sector for employment are important, because although it has lower returns, the labour use per unit of output is higher.

In regional terms, these trends generally hold, with the higher input nature of dairying meaning that it is a major contributor to regional GDP and household income. The Low Milk Price scenario illustrates the potentially significant impact on the contribution to GDP from the agricultural sector that would occur with continued low milk prices. These impacts are increased by the processing of both meat and dairy which is present in the region but not the

district, and this causes the flow-on implications of changes in these sectors to assume greater importance.

The implications of these relationships will be developed further through the different scenarios of limits for the zone and be used to contribute to community deliberations.

Acknowledgements

We wish to thank the members of the farmers stakeholder group who have contributed their time and information to the development of the farming related information in the analysis. Thanks also to Beef + Lamb New Zealand Ltd. and to DairyNZ who have provided valuable data, information and analysis.

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A1 Appendices

A1.1 Estimation of on-farm indicators

A set of revenue, expense and cash farm surplus estimates were derived from a number of sources.

DairyNZ provided a set of data for dairy farms within DairyBase for the Hurunui, Waimakariri and Selwyn districts, which is the smallest sub regional set of information that could reliably be supplied. The data from DairyNZ showed higher production per ha than the district average, so was recalibrated using NZ Dairy Statistics production data (LIC, 2005) for the Waimakariri District. The data was broken down into per cow and per ha farm financials and then re-estimated into dairy operations on a heavy and light soil based on stocking rates and production estimates from the farmer stakeholder group. The estimates of revenue, fixed and variable expenses are shown in Table 5 below.

Development of a budget for dairy operations was particularly problematic because of the major change to milk price between the historical data and current situation. Because of this the decision was made in conjunction with the farmer group to present two budgets for dairy operations. The first is termed “Current State”, and is based on the five years of historic data, which is the same basis that the other farm budgets were estimated. The second is termed the “Low Milk Price” scenario, and is predicated on a sustained revenue of $5/kgMS, which is a milk price of $4.50 and an additional $0.50 from other sources (cattle sales, etc.).

The Low Milk Price budget was generated in discussion with the farmer stakeholder group and discussion with knowledgeable industry figures. It aims for an operating expenditure of $4.00/kgMS, to give a surplus of $1.00/kgMS for capital and other items (interest, depreciation, wages of management, etc.). This is a small margin considering the average depreciation is $0.50/kgMS and interest payments of around $1.20/kgMS and implies significant restructuring of farm finances. The adjustments to expenditure items largely focused on grazing and feed costs, with some decrease in other costs to allow for the impact of reduced demand from dairy operations with greater pressure on budgets. It should be noted that the Low Milk Price budget is a potential approach to achieving the operating expenditure target, and a variety of operations will choose different pathways from that identified here. The intention of the scenario is to show a potential pathway, and it should not be regarded as definitive. Furthermore, there is a need for substantial changes in farm management and skill levels that will take a significant length of time for all farmers to achieve.

A budget for dairy support operations was estimated based on expenditure by dairy operations on feed and grazing, with the breakdown of revenue and expenditure developed by ECan[12]. For the Low Milk Price scenario the per ha revenue was adjusted to reflect the lower returns from dairy grazing, which was assumed in the expenditure figures of the Low Milk Price dairy scenario. The area in dairy support was also adjusted to reflect the assumption about a greater proportion of animals wintered, and replacements grazed, on-farm.

B+LNZ provided data from its Sheep and Beef Farm Survey for the last five years’ financials for farms in Waimakariri, Selwyn and Hurunui districts. Data was unavailable for only the Waimakariri district because the sample size was too small and would have breached the organisation’s confidentiality commitments to Survey farmers if provided in isolation. The data was provided for Farm Class 2 (South Island Hill Country) and Farm Class 6 (South Island

[12] Leo Fietje, pers.comm. 2016

Finishing Breeding) operations. B+LNZ estimates from Agricultural Census data that around 95% of sheep and beef properties in Waimakariri District are Farm Class 6.

The irrigated operation was estimated based on a division into fixed and variable expenses, with stocking rate used as a measure of intensity. Members of the farmer group indicated a stocking rate of 16SU/ha was appropriate for irrigated land in the district. The dryland operation was similarly adjusted so that the total stock numbers on sheep and beef farms matched the B+LNZ data multiplied by the estimated sheep and beef land use in the catchment. No alterations were made to the sheep and beef budgets for the Low Milk Price scenario because dairy grazing was a very small part of the revenue for the operation. It should be noted that sheep and beef operations are also exposed to price volatility, but it is likely that given their more recent history of exposure, and lower capital and input intensity of operations, they are better placed to respond to changes in product prices.

Arable operations were derived from B+LNZ's Farm Class 8 (South Island Mixed Finishing), which, although not specific to the district was considered sufficiently representative of the arable operations in the area. Dryland and irrigated arable operations were estimated by assuming that the B+LNZ Farm Class 8 data reflected an irrigated operation, and this was multiplied by the proportional difference between dryland and irrigated sheep and beef to produce a revenue and expenditure for a dryland arable operation.

Horticulture operations are a relatively small part of the district, but are spread across a large range of crop types. A viticulture model (Baker and Associates, 2014) is used to represent horticulture, which will be high for vegetable cropping but low for some of the smaller crops such as indoor vegetables and floriculture.

The EBIT or operating profit was estimated as shown in Equation 1.

- For dairy, the revenue and variable expense data was adjusted linearly for differences in stocking rate. This results in profitability increasing with increasing stocking rate. For dairy this can be problematic since there are situations where operators with low stocking rates have similar or better profitability than those with high stocking rate, and management skill is probably a better predictor of profitability than stocking rate. Therefore, the relationships outlined here may not hold in all situations and across all time periods.

- For arable, horticulture and forestry properties a fixed budget was used (Equation 2). The figures used are shown in Table 5 below, and the aggregate for each land use in the catchment was estimated by the area of each land use times the EBIT for that land use.

- For sheep and beef and deer the revenue, fixed and variable expenses were calculated per stock unit.

Equation 1: EBIT calculation for dairy and sheep and beef land use

$$EBIT_{(lu)} := \left(R_{lu} \times SU_{(lu)}\right) - FWE_{(lu)} - \left(VWE_{(lu)} \times SU_{(lu)}\right)$$

Where:

$EBIT_{(lu)} =$ Earnings before Interest, tax, depreciation and other capital charges ($/ha/annum)

$R_{(lu)} =$ Revenue per cow (dairy) or per stock unit (sheep, beef and deer) ($/ha/annum)

$SU_{(lu)} =$ Number of cows or stock units (sheep, beef and deer) per ha (30 June)

$FWE_{(lu)} =$ Fixed Working Expenses per ha. This includes all items that do not typically

vary at the margins with changes in intensity ($/ha/annum)

$VWE_{(lu)}$ = Variable working expenses per ha. These expenses are expected to change as stocking rate changes ($/ha/annum)

Equation 2: EBIT calculation for arable, horticulture and forestry

$$EBIT_{(lu)} = R_{lu} - FWE_{(lu)}$$

Where:

$EBIT_{(lu)}$ = Earnings before Interest, tax, depreciation and other capital charges per ha ($/ha/annum)

$R_{(lu)}$ = Revenue per ha for arable, horticulture and forestry ($/ha/annum) or per tonne

$FWE_{(lu)}$ = All Working Expenses per ha($/ha/annum).

Equation 3: EBIT calculation for catchment

$$EBIT_{(C,lu)} = \sum_{lu} EBIT_{(lu)} \times area_{(lu)}$$

Where

$EBIT_{(C,lu)} = EBIT\ for\ each\ land\ use\ in\ the\ catchment$ ($/annum)

$Area_{(lu)} = Area\ of\ each\ land\ use\ in\ the\ catchment\ (ha)$

Estimates of regional outcomes from changes in agricultural land use were derived from a regional model developed by Butcher Partners Ltd but updated for this project. This input/output (IO) model was developed using standard methodologies for developing IO tables (e.g. see Jensen 1990[13]), and the sectors included in the model customised to include detailed sectors covering arable, dairy, dairy support, sheep and beef and horticulture. Regional IO modelling involves a description of the input (expenditure) and output (revenue) structures of sectors in the economy of the area being described. These are collated into a table that describes the interrelationships between all the sectors – because the inputs from one sector is an output from another sector in the economy. The table is used to estimate the degree to which a change in output from one sector will result in further changes in other sectors of the economy. The magnitude of these relationships is estimated as a ratio between the direct output and total output, household income, and employment changes (including various flow on impacts) - effectively a set of "multipliers" for each sector and each indicator, which describes the relationship between output of a sector and the flow on impacts for the rest of the economy. Regional IO modelling tends to overestimate the total impact of land use change because it does not include feedback effects[14], but is the most appropriate model type suitable for use at this scale.

[13] Jensen, R.C. 1990 Construction and Use of Regional Input-Output Models: Progress and Prospects. International Regional Science Review, Vol. 13, No 1&2, pp 9-25, 1990

[14] For example where a change increases demand for labour in an area, which results in higher wages, which in turn impacts on demand for labour across a range of sectors.

Table 5: Financial data used by land use for Waimakariri catchment for land uses where per ha revenue and expenses can be varied

Land Use Types	Stocking rate (cows/ha for dairy, SU/ha for sheep and beef)	Revenue ($/SU or per cow/annum)	Fixed Working Expenses ($/ha/ annum)	Variable Working Expenses ($/SU or per cow/ annum)	Source
Dairy Irrigated light	3.5 cows/ha	$2,758	$879	$1,621	DairyNZ, LIC 5 year average
Dairy irrigated heavy	3.2 cows/ha	$2,758	$879	$1,628	DairyNZ, LIC 5 year average
Sheep and Beef dry	6.5 SU/ha	$145	$237	$54	B+LNZ Finishing Breeding data 5-year average adjusted for higher stocking rate
Sheep and Beef irrigated	16 SU/ha	$145	$237	$54	B+LNZ Finishing Breeding data 5 year average adjusted for higher stocking rate

Table 6: Financial data used by land use for Waimakariri catchment for land uses where per ha revenue and expenses are fixed

Land Use Types	Stocking rate (cows/ha for dairy, SU/ha for sheep and beef)	Revenue ($/SU or per cow/annum)	Fixed Working Expenses ($/ha/ annum)	Source
Arable Irrigated		2,961	1,882	B+LNZ Mixed Finishing 5-year average
Arable Dry		1,234	784	B+LNZ Mixed Finishing *5/12
Dairy support irrigated		2,595	1,767	Leo Fietje
Dairy support dry		1,691	1,258	Leo Fietje
Exotic Forest		928	727	
Other (Pig, horse, etc.)		2,595	1,767	Irrigated dairy support
Lifestyle	5	145	237	As for dryland sheep and beef using a hill country stocking rate
Horticulture		15,716	8,934	Wairarapa Water Use Project viticulture budget

A2 Tables of results

A2.1.1 Current State Scenario

Table 7: Land use (ha) for Current State Scenario

Land Use	Irrigated	Dryland	Total
Sheep and Beef	10,362	93,128	**103,490**
Dairy	21,000	1,000	**22,000**
Dairy support	1,522	11,637	**13,158**
Arable	1,966	3,958	**5,925**
Horticulture, viticulture	507	0	**507**
Forestry		5,777	**5,777**
Lifestyle	1,690	27,513	**29,203**
Other productive		273	**273**
Other non-productive		61,283	**61,283**
Total	**37,046**	**204,570**	**241,616**

Table 8: On-farm indicators for Current State Scenario ($m/annum)

Land Use	Revenue ($m)	Farm Working expenses ($m)	Variable Expenses ($m)	EBIT ($m)
Sheep and Beef	$110	$20	$40	$50
Dairy	$210	$20	$120	$70
Dairy support	$20	$20	$0	$10
Arable	$10	$10	$0	$0
Horticulture, viticulture	$10	$0	$0	$0
Forestry	$10	$0	$0	$0
Lifestyle	$20	$10	$10	$10
Other productive	$0	$0	$0	$0
Other non-productive	$0	$0	$0	$0
Total	**$390**	**$80**	**$170**	**$130**

Table 9: Regional indicators for Current State Scenario ($m/annum, FTE)

Land Use	Direct GDP ($m)	Regional GDP ($m)	Direct HHI ($m)	Regional HHI ($m)	Direct employment (FTE)	Regional employment (FTE)
Sheep and Beef	$40	$160	$20	$90	420	1630
Dairy	$90	$240	$30	$120	480	1700
Dairy support	$10	$20	$0	$10	50	210
Arable	$0	$10	$0	$0	20	70
Horticulture, viticulture	$0	$10	$0	$0	50	100
Forestry	$0	$0	$0	$0	10	30
Lifestyle	$10	$30	$0	$20	90	330
Other productive	$0	$0	$0	$0	0	0
Other non-productive	$0	$0	$0	$0	0	0
Total	**$160**	**$470**	**$60**	**$240**	**1120**	**4080**

A2.1.2 Low Milk Price scenario

Table 10: Land use (ha) for Low Milk Price Scenario

Land Use	Irrigated	Dryland	Total
Sheep and Beef	12,148	94,864	**107,012**
Dairy	19,133	667	**19,800**
Dairy support	1,217	9,309	**10,527**
Arable	2,305	4,032	**6,337**
Horticulture, viticulture	594	0	**594**
Forestry		5,777	**5,777**
Lifestyle	1,648	28,026	**29,674**
Other productive		278	**278**
Other non-productive		61,283	**61,283**
Total	**37,046**	**204,237**	**241,283**

Table 11: On-farm indicators for Low Milk Price Scenario ($m/annum)

Land Use	Revenue ($m)	Farm Working expenses ($m)	Variable Expenses ($m)	EBIT ($m)
Sheep and Beef	$120	$30	$40	$50
Dairy	$140	$20	$90	$30
Dairy support	$20	$10	$0	$0
Arable	$10	$10	$0	$0
Horticulture, viticulture	$10	$10	$0	$0
Forestry	$10	$0	$0	$0
Lifestyle	$20	$10	$10	$10
Other productive	$0	$0	$0	$0
Other non-productive	$0	$0	$0	$0
Total	**$320**	**$80**	**$140**	**$90**

Table 12: Regional indicators for Low Milk Price Scenario ($m/annum, FTE)

Land Use	Direct GDP ($m)	Regional GDP ($m)	Direct HHI ($m)	Regional HHI ($m)	Direct employment (FTE)	Regional employment (FTE)
Sheep and Beef	$40	$170	$20	$90	430	1700
Dairy	$50	$150	$20	$80	360	1220
Dairy support	$0	$20	$0	$10	40	150
Arable	$0	$10	$0	$0	30	70
Horticulture, viticulture	$0	$10	$0	$0	60	110
Forestry	$0	$0	$0	$0	10	30
Lifestyle	$10	$30	$0	$20	90	340
Other productive	$0	$0	$0	$0	0	0
Other non-productive	$0	$0	$0	$0	0	0
Total	**$120**	**$390**	**$50**	**$210**	**1010**	**3620**

A3 Business level budgets for water using industries

Table 13: Dairy farm budget Current State and Low Milk Price (Source DairyNZ, various. $/ha/annum)

	Dairy Light Soil 5 year average	Dairy Heavy Soil 5 year average	Dairy Light Low Milk Price	Dairy Heavy Low Milk Price
Proportion of dairy land	**70%**	**30%**	**70%**	**30%**
Total area (ha)	**14,648**	**6,278**	**14,648**	**6,278**
STOCKING RATE				
Cows Milked (15 Dec)	**3.5**	**3.2**	**3.1**	**2.8**
PRODUCTION				
Milk Solids (kg)	**1,370**	**1,233**	**1,400**	**1,260**
REVENUE				
Gross Revenue	**9,701**	**8,731**	**$7,000**	**$6,300**
EXPENSES				
Labour	$1,252	$1,127	$1,109	$997
Animal Health	$317	$285	$253	$227
Breeding	$181	$163	$152	$137
Dairy Shed Expenses	$60	$54	$53	$48
Electricity (Shed)	$151	$136	$152	$137
Electricity (Irrigation)	$288	$288	$288	$288
Feed Purchased	$1,315	$1,184	$874	$787
Off-site Grazing (cows)	$324	$292	$172	$154
Off-site Grazing (heifers)	$777	$699	$619	$557
Fertiliser and Lime	$754	$678	$693	$693
Freight	$60	$54	$53	$48
Regrassing	$25	$14	$115	$115
Weed and Pest Control	$45	$45	$43	$43
Vehicle Costs	$196	$177	$197	$197
Repairs and Maintenance	$515	$515	$515	$515
Overheads	$318	$318	$318	$318
TOTAL FARM WORKING EXPENSES	**$6,582**	**$6,032**	**$5,608**	**$5,260**
EBIT	**$3,120**	**$2,700**	**$1,392**	**$1,040**

Table 14: Sheep, beef and deer farm budget (Source: Beef and Lamb NZ, 5 year average, $/ha/annum)

	Irrigated sheep, beef and deer	Dryland sheep, beef and deer
STOCKING RATE (su)	16	6.5
REVENUE		
Wool	$204	$83
Sheep	$1,142	$463
Cattle	$251	$102
Dairy Grazing (Heifers + Cows)	$179	$73
Deer + Velvet	$18	$7
Crop, Grain + Seeds	$340	$138
Other Revenue	$179	$73
TOTAL REVENUE	**$2,313**	$938
EXPENSES		
Wages and Rations	$119	$48
Cultivation and Sowing (Contract)	$34	$14
Cash Crop Sundry	$31	$12
Seeds	$46	$19
Animal Health	$70	$28
Feed and Grazing	$129	$52
Fertiliser	$208	$84
Lime (t)	$12	$5
Shearing Expenses	$62	$25
Weed and Pest Control	$71	$34
Vehicles, Fuel and Electricity	$150	$61
Repairs and Maintenance	$111	$53
Other	$346	$55
ACC and Other Farm Insurance	$56	$27
Standing Charges excl. Interest and depreciation	$138	$67
TOTAL FARM WORKING EXPENSES	**$1,584**	**$586**
CASH OPERATING SURPLUS	$729	$352

Table 15: Dairy Support farm budget (Source: ECan, $/ha/annum)

	Irrigated	Dryland
EFFECTIVE AREA (ha)	1,160	17,307
DRY MATTER PRODUCTION (t DM)	11	6.9
REVENUE		
MA Cows Wintered	915	$596
Heifers	1,118	$728
Silage Sold	562	$366
TOTAL REVENUE	**2,595**	**$1,691**
EXPENSES		
Labour	56	$37
Electricity (Irrigation)	250	$0
Making Silage	385	$251
Fertiliser	300	$195
Regrassing	234	$234
Growing Kale	321	$321
Vehicles incl. fuel	60	$60
Repairs and Maintenance	80	$80
Overheads	80	$80
TOTAL FARM WORKING EXPENSES	**1,767**	**$1,258**
EBIT	**829**	**$432.36**

Table 16: Mixed Arable Finishing Budget (Source: B+LNZ, $/ha/annum)

Mixed Arable	Per Hectare
REVENUE	
Wool	$61
Sheep	$402
Cattle	$136
Dairy Grazing (Heifers + Cows)	$100
Deer + Velvet	$18
Crop, Grain + Seeds	$2,072
Other Revenue	$173
TOTAL REVENUE	**$2,961**
EXPENSES	
Wages and Rations	$167
Cultivation and Sowing (Contract)	$37
Cash Crop Sundry	$155
Seeds	$81
Animal Health	$21
Feed and Grazing	$85
Fertiliser	$345
Lime	$14
Shearing Expenses	$26
Weed and Pest Control	$233
Vehicles, Fuel and Electricity	$208
Repairs and Maintenance	$133
Other	$232
ACC and Other Farm Insurance	$54
Standing Charges excl. Interest and depreciation	$92
TOTAL FARM WORKING EXPENSES	**$1,882**
EBIT	**$1,080**