

# **Economic activity supported by RDRML in Canterbury**

Rangitata Diversion Race Management Ltd  
(RDRML)

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## ***Making sense of the numbers***

Rangitata Diversion Race Management Limited owns and manages the Rangitata Diversion Race scheme in the Canterbury region, which diverts water from the Rangitata River to support stockwater, and three irrigation schemes in the mid-Canterbury region. Two hydrogeneration stations are also installed on the RDR. The three irrigation schemes supported by RDRML are:

- MHV Water Limited
- Barrhill Chertsey Irrigation Limited
- Ashburton Lyndhurst Irrigation Limited.

In total, the three schemes account for close to 108,000 hectares of farmland. This includes close to 63,000 hectares of land used for dairy, just over 20,000 hectares of arable land, and just over 19,000 hectares of dairy support land. The two hydrogeneration stations, Montalto and Highbank, are operated by Manawa Energy under the Highbank Power Scheme.

*Business and Economic Research Limited (BERL) undertook an economic impact assessment of each of the three irrigation schemes and the Highbank Power Scheme to estimate the overall economic activity that RDRML supports in the Canterbury regional economy.*

### **Total expenditure of \$1.1 billion in the economy**

The combined direct expenditure created from the farmland, which is supported by the three irrigation schemes, plus the estimated expenditure from the Highbank Power Scheme, equals \$563 million. This expenditure creates additional flows of expenditure (indirect and induced), which are multiplied as they flow on to the wider economy, leading to an estimated total expenditure of \$1.1 billion.

### **Supporting a total of \$612 million of value-add (GDP) to the Canterbury regional economy**

This total expenditure contributed to creating a total of \$612 million in value add (gross domestic product (GDP)) of the regional economy. This expenditure and contribution to GDP supports total employment of 3,414 full-time equivalents across the region.

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# 1 Introduction

Rangitata Diversion Race Management Limited (RDRML) commissioned Business and Economic Research Limited (BERL) to provide an estimate of the economic activity that is supported by the Rangitata Diversion Race (RDR) scheme that RDRML owns and manages.

The RDR scheme diverts water from the Rangitata River to support stockwater and irrigation in the mid-Canterbury region, with two hydrogeneration stations installed on the scheme as well.

Specifically, RDRML consents and administers water from the RDR to the following three irrigation schemes:

- MHV Water Limited (MHV)
- Barrhill Chertsey Irrigation Limited (BCI)
- Ashburton Lyndhurst Irrigation Limited (ALIL).

The two hydrogeneration stations (Montalto and Highbank) operate under the Highbank Power Scheme managed by Manawa Energy.

More detail about the RDR, each of the three schemes, and the hydrogeneration scheme can be found in Section 2.

## 1.1 Our approach

BERL undertook multiple economic impact assessments (EIA) to determine the level of economic activity that is ultimately supported by the RDR scheme and RDRML in the Canterbury region. This included assessing the economic impact of the three irrigation schemes and the hydrogeneration scheme. Collectively, they form an estimate of the overall economic activity that is supported by RDRML.

We have measured the impact in terms of output (or expenditure), GDP, and employment (as measured by full-time equivalents, or FTEs).<sup>1</sup>

Appendix A contains a more detailed explanation of the methodology applied.

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<sup>1</sup> An FTE is an estimation of the number of employed people, assuming that full-time positions equal one employee (one FTE), and part-time positions equal 0.5 of an employee.

## 2 Rangitata Diversion Race scheme

The RDR scheme was constructed over 80 years ago and is a 67-kilometre-long canal in the mid-Canterbury region that diverts water from the Rangitata River into a race. A range of offtakes along the race divert water for stockwater, irrigation, and hydrogeneration purposes in the region.

### 2.1 Supporting three irrigation schemes

The RDR scheme supports three irrigation schemes (MHV, BCI, and ALIL) in the mid-Canterbury region, supplying water to close to 108,000 hectares of farmland.<sup>2</sup>

Table 1 presents the different land uses (by hectares) across the three schemes that are supported by water supplied from the RDR. Farmers supported by any one of the three irrigation schemes contribute to the regional economy by generating revenue and operational expenditure.

Table 1 Land use by scheme under RDRML<sup>3</sup>

RDRML Land use	Hectares supplied by the RDR			Total
	MHV	BCI	ALIL	
Dairy	38,739	6,232	17,822	62,792
Dairy support	13,330	2,479	4,196	20,004
Arable	4,537	8,004	6,651	19,191
Beef	527	565	1,735	2,828
Mixed	1,035	419		1,453
Sheep	371		939	1,310
Horticulture			314	314
<b>Total</b>	<b>58,539</b>	<b>17,699</b>	<b>31,656</b>	<b>107,893</b>

The RDR supports the greatest number of hectares under the MHV irrigation scheme. Dairy is the most common land use in the MHV scheme, with close to 39,000 hectares used for dairy and a further 13,330 hectares used for dairy support.

The ALIL follows behind, with close to 32,000 hectares of farmland supported, and close to 18,000 hectares of this used for dairy purposes.

The RDR supports approximately 17,700 hectares of the BCI scheme, with much more diversified land use included, specifically with more arable farming occurring.

#### Wider mid-Canterbury irrigation scheme picture

While the MHV and ALIL irrigation schemes are entirely supplied by the RDR, the BCI scheme is only partially supplied with water from the RDR. This means that the full extent of the BCI scheme is not captured in Table 1, as a significant amount of land is supplied with non-RDR water.

Recognising this, Table 2 presents the full picture of land use under the BCI scheme alongside the Acton scheme, which BCI manages and operates.

<sup>2</sup> Appendix B provides a geographical mapping of the RDR scheme in mid-Canterbury.

<sup>3</sup> Land use data was supplied directly from each scheme.

Table 2 Land use of farmland under BCI and AFIC<sup>4</sup>

Land use	BCI	AFIC
Dairy	13,849	3,969
Dairy support	5,508	1,018
Arable	17,787	14,495
Beef	1,256	
Mixed	930	7
Sheep		420
Horticulture		
<b>Total</b>	<b>39,330</b>	<b>19,909</b>

The Acton scheme provides water to shareholders of Acton Farmers Irrigation Cooperative (AFIC) and utilises water under licence from BCI. In combination, Table 1 and Table 2 provide a complete picture of irrigation schemes across the mid-Canterbury region.

## 2.2 Highbank Power Scheme

The Highbank Power Scheme is operated by Manawa Energy and consists of the 25-megawatt (MW) Highbank and 1.8MW Montalto power stations that are both installed along the RDR scheme. During the summer (irrigation season), the Highbank power station only generates electricity with water that is not required for irrigation. During winter, the Highbank power station operates full time. The smaller Montalto power station generates electricity year-round, but at a much lower output than the Highbank power station. The generation from both stations is sold into the national electricity market.

Highbank power station is scheduled for major refurbishment and upgrade to improve generation efficiency starting late 2025. This is a significantly capital- and labour-intensive project. Throughout the project, the Canterbury region will benefit from the economic injection of capital to support the work, as well as the employment supported by the construction. While we acknowledge that this project will deliver economic benefits to the regional economy, it was not included in our scope. Our assessment estimates the economic impact generated up to this point, whereas the majority of benefits from this project will only be realised in the future, over its lifespan.

<sup>4</sup> Only farmland presented in Table 1 is included in this economic assessment as this research focuses exclusively on the economic activity resulting from the RDR.

### 3 Contribution to the Canterbury regional economy

The following section details the total economic activity that is supported by the RDR which RDRML manages. It first presents an overall picture, before highlighting the total economic activity supported under each irrigation scheme and the Highbank Power Scheme.

- MHV Water Limited (MHV) – **Section 3.2**
- Barrhill Chertsey Irrigation Limited (BCI) – **Section 3.3**
- Ashburton Lyndhurst Irrigation Limited (ALIL) – **Section 3.4**
- Highbank Power Scheme – **Section 3.5.**

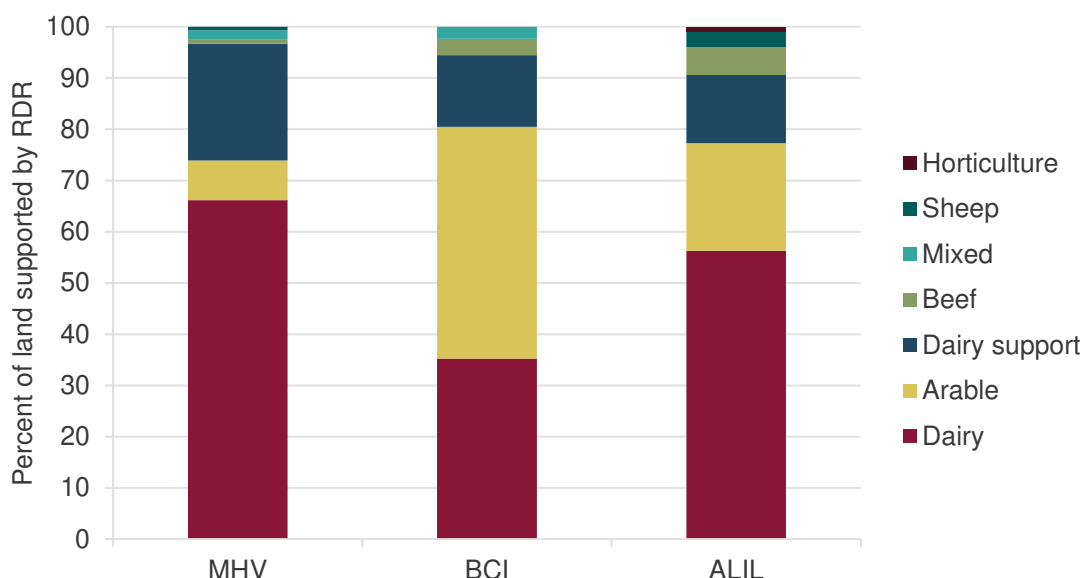
Collectively, the economic activity created by each of the four components forms the overall picture of the total economic activity that RDRML supports in the Canterbury regional economy (**Section 3.1**). We present this in terms of output (expenditure), GDP, and employment (as measured by FTEs) in the Canterbury region for the 2023/24 season.

#### 3.1 Total economic activity supported

##### Land use composition of each scheme

Across the three schemes (MHV, BCI, and ALIL) supported by the RDR, there are close to 108,000 hectares of farmland being used for a variety of different purposes, as illustrated in Figure 1. Dairy, arable, and dairy support are the three most common land uses across each scheme.

Figure 1 Farmland use in each scheme by type, 2023/24



##### Economic activity supported by RDRML

The direct expenditure from the farmland supported by the three irrigation schemes, plus the estimated expenditure from the Highbank Power Scheme, equals \$563 million. Direct expenditure

represents the outflow of expenses from farmers in order to resource and enable their operations, as well as the spending required to maintain operations of the two power stations. It includes spending on labour, feed, fertiliser, electricity, vehicle maintenance, machinery repair, general maintenance, fuel, shearing, administration, etc.

**Table 3 Total economic activity supported by RDRML, 2023/24**

	Direct	Indirect	Induced	Total
Expenditure (\$m)	563	349	181	1,093
GDP (\$m)	310	187	115	612
Employment (FTEs)	1,669	1,119	626	3,414

#### **The full economic activity of the four schemes under RDRML**

An initial spend of \$563 million creates additional flows of expenditure, which are multiplied as they flow on to the wider economy. For example, in the case of the three irrigation schemes, the cost of fertiliser for farmers operating in either of the schemes contributes to revenue in the fertiliser and pesticide manufacturing industry (**the direct effect**). Businesses operating within the fertiliser and pesticide manufacturing industry, in turn, use part of this revenue to purchase materials from their supplier (**the indirect effect**). Additionally, part of this revenue is turned into wages and salaries for employees in the fertiliser and manufacturing industry, as well as employees of their suppliers. These people, after tax is deducted, spend money on consumption (**the induced effect**).

Once we take into account the wider effects (indirect and induced) of direct expenditure of \$563 million, the total economic activity supported by RDRML includes a contribution towards Canterbury's GDP of \$612 million, supporting a total of 3,414 FTEs across the region.

## **3.2 Economic activity of MHV farmland**

MHV delivers water to over 58,000 hectares of farmland in Canterbury. Most of this farmland is used for dairy and dairy support (accounting for 89 percent), with smaller portions of land used for arable, mixed use, beef, and sheep (Figure 1). In the 2023/24 season, farmers under the MHV scheme had direct expenditures of \$322 million. This included, for example, spending on animal feed, grazing costs, fertiliser, and electricity. This level of expenditure directly generated GDP of \$179 million in the Canterbury region, while directly supporting 947 FTEs.

**Table 4 Economic impact of MHV farmland, 2023/24**

	Direct	Indirect	Induced	Total
Expenditure (\$m)	322	198	103	623
GDP (\$m)	179	106	66	351
Employment (FTEs)	947	642	357	1,946

As the direct expenditure from farmers under the MHV scheme flows through the wider economy, the total GDP generated for the Canterbury region reaches \$351 million, with 1,946 FTEs supported. That is, the RDR supports \$351 million in GDP created from farmland under the MHV scheme through the supply of water.

### 3.3 Economic activity of BCI farmland

The RDR supplies water for irrigation purposes to just under 17,700 hectares of farmland under the BCI scheme in Canterbury. Just under half of the farmland supported by the RDR is used for arable purposes (45 percent), with dairy and dairy support accounting for 35 percent and 14 percent of the 17,700 hectares, respectively.

In the 2023/24 season, farmland supported by the RDR that were operating under the BCI scheme had direct expenditure of \$74 million, resulting in a direct contribution to Canterbury regional GDP of \$39 million, while supporting 232 FTEs directly.<sup>5</sup>

Table 5 Economic impact of BCI farmland, 2023/24

	Direct	Indirect	Induced	Total
Expenditure (\$m)	74	46	24	143
GDP (\$m)	39	24	15	79
Employment (FTEs)	232	147	84	463

The flow-on effects of expenditure from BCI farmers supported by the RDR result in a total contribution to Canterbury GDP of \$79 million, supporting a total of 463 FTEs. Dairy and arable land accounted for most of BCI's economic contribution to the Canterbury region, accounting for \$49 million and \$23 million in GDP, respectively.

### 3.4 Economic activity of ALIL farmland

ALIL delivers water to farmers in the Canterbury region, covering close to 32,000 hectares. More than half of the farmland supported by ALIL is used for dairy purposes (56 percent), followed by arable (21 percent) and dairy support (13 percent). Some of the farmland is also used for beef, sheep, and horticulture.

Table 6 Economic impact of ALIL farmland, 2023/24

	Direct	Indirect	Induced	Total
Expenditure (\$m)	158	97	52	307
GDP (\$m)	88	52	32	172
Employment (FTEs)	479	316	178	973

In the 2023/24 season, farmers operating in the ALIL scheme generated direct expenditure of \$158 million, with 80 percent of this spend coming from the 17,822 hectares of land used for dairy. As this initial expenditure flows through the wider Canterbury economy, the total contribution of farmers in the ALIL scheme results in GDP of \$172 million, supporting 973 FTEs. This reflects economic activity which the RDR supports through the supply of water.

<sup>5</sup> The economic contribution of the BCI scheme would be larger if all farmland under the scheme was captured regardless of whether it was supplied with RDR or non-RDR water.

### 3.5 Economic activity of Highbank Power Scheme

The Highbank Power Scheme is operated by Manawa Energy and includes the Highbank and Montalto power stations, both installed on the RDR. Montalto station operates year-round, generating electricity 24/7 whenever there is water flowing in the RDR. The Highbank power station, however, only generates electricity during the irrigation season with water that is not required for irrigation purposes. In the winter (or non-irrigation season), Highbank station operates full time. Operating under the Highbank Power Scheme, both hydrogeneration stations create revenue from the electricity that is generated and sold into the national electricity market. In 2023, the combined revenue from electricity generated at Montalto and Highbank power stations equalled \$15 million.<sup>6</sup>

Due to data limitations, only revenue data was available for the Highbank Power Scheme. Therefore, to estimate expenditure based on the \$15 million in revenue, we have used a Canterbury input-output (IO) table to determine the direct expenditure categories and expenditure levels associated with the amount of revenue. This approach allows us to evaluate the Highbank Power Scheme using the same approach as the three irrigation schemes. Consequently, direct expenditure is estimated at \$10 million. A downside of this approach is that it assumes that the Highbank Power Scheme has a similar expenditure profile as the industry average for power generation businesses in the Canterbury region.

Table 7 Economic impact of Highbank Power Scheme to Canterbury region, 2023

	Direct	Indirect	Induced	Total
Expenditure (\$m)	10	7	2	19
GDP (\$m)	4	4	1	10
Employment (FTEs)	10	13	8	31

The combined expenditure that is generated under the Highbank Power Scheme is used to support the continued operations of both power stations. This includes, for example, distributing part of the revenue to wages, machinery, and maintenance. As the initial level of spend (\$10 million) flows through the wider economy, more economic activity is supported. The total economic activity from the Highbank Power Scheme includes a contribution to Canterbury regional GDP of \$10 million while supporting approximately 31 FTEs.

<sup>6</sup> For the purposes of this assessment, we have used revenue generated as a proxy for expenditure. Please see Appendix A for more detail.

## Appendix A Methodology

The objective of an EIA is to estimate the increase in the level of economic activity in a region caused by an activity, project, or investment; or in this case, the RDR scheme which RDRML owns and operates. The overall economic activity supported can be estimated by taking into account three economic effects: direct, indirect, and induced. These effects can be measured regionally or nationally using IO multipliers.

For our economic assessment of RDRML, our analysis presents the direct, indirect, and induced impacts by the following components:

- Revenue and expenditure from farmers supplied water from the RDR within the MHV scheme
- Revenue and expenditure from farmers supplied water from the RDR within the BCI scheme
- Revenue and expenditure from farmers supplied water from the RDR within the ALIL scheme
- Revenue generated and estimated expenditure from electricity generation under the Highbank Power Scheme.

Each component required its own EIA and, collectively, these components form an estimate of the total economic activity supported by the RDR and RDRML.

### Measuring the wider economic activity supported by RDRML – multiplier analysis

Multiplier analysis allows us to determine the direct, indirect, and induced effects in terms of output, GDP, and FTEs. This multiplier analysis uses multipliers derived from inter-industry IO tables for the Canterbury region. IO tables have been derived from the national IO tables and other data by Butcher Partners, Canterbury – a recognised source for regional IO tables and multipliers.

### Measures

#### Gross output multipliers

Gross output is the value of production, built up through the national accounts as a measure, in most industries, of gross sales or turnover. This is expressed in \$million at constant prices. Gross output is made up of the sum of:

- Compensation of employees (i.e., salaries and wages)
- Income from self-employment
- Profits
- Indirect taxes less subsidies
- Intermediate purchases of goods (other than stock in trade)
- Intermediate purchases of services.

#### Value added (GDP) multipliers

Value added multipliers measure the increase in output generated along the production chain which, in aggregate, totals GDP. Value added is made up of the sum of:

- Compensation of employees (i.e., salaries and wages)
- Income from self-employment
- Profits
- Indirect taxes less subsidies
- Employment impact multipliers.

Employment impact multipliers determine the number of FTE roles that are created for every \$1 million spent in an industry for one year. They provide a measure of total labour demand associated with gross output.

An FTE is the percentage of time an employee works represented as a decimal. A full-time position is 1.00; a part-time position is 0.50.

### **Direct, indirect, and induced effects**

The underlying logic of multiplier analysis is relatively straightforward. An initial expenditure (direct effect) in an industry creates flows of expenditures that are magnified, or “multiplied”, as they flow on to the wider economy. This flow occurs in two ways:

- The industry purchases materials and services from supplier firms, who in turn make further purchases from their suppliers. This generates an indirect (upstream) effect.
- People employed in the direct development of, for example, raw materials, and in firms supplying services, earn income (mostly from wages and salaries, but also from profits) which, after tax is deducted, is then spent on consumption. There is also an allowance for some savings. These are the induced (downstream) effects.

Hence, for any amount spent in an area (direct effect), the actual output generated from that spend is greater once the flow-on activity generated (indirect and induced effects) is taken into account.

### **Limitations of multiplier analysis**

#### **Partial equilibrium analysis**

Multiplier analysis is only a *partial equilibrium* analysis, assessing the direct and indirect effects of the development being considered without analysing the effects of the resources used on the wider national and regional economy.

In particular, it assumes that the supply of capital, productive inputs, and labour can expand to meet the additional demand called forth by the initial injection and the flow-on multiplier effects, without leading to resource constraints in other industries. These constraints would lead to price rises and resulting changes in the overall patterns of production between industries.

To assess inter-industry impacts in full would require economic modelling within a *general equilibrium* framework. Applying such models becomes more relevant where the particular development is considered significant within the overall economy.

### **Additionality**

Related to partial equilibrium, using multipliers for EIAs assumes that the event is something that would not have been undertaken anyway, and that it will not displace existing activity. That is, the event is additional to existing activity. If it does either of the above, then the economic impact is less than that determined by the multiplier, and it would be necessary to subtract both the activity that would have occurred anyway and the displacement effect.

### **Impact**

Again, related to partial equilibrium, *multiplier analysis* assumes that an event will not have an impact on relative prices. However, in a dynamic environment, it can be assumed that a large event would have an impact on demand and supply, and therefore prices. Hence, the larger the event and the more concentrated it is in a single industry or region, the more likely it is that the multiplier would give an inaccurate analysis of impacts. For example, if multiplier analysis was used to determine the effect of residential building construction nationally it would likely be inaccurate as residential building construction accounts for over six percent of GDP.

### **Aggregation**

Industries outlined in IO tables are aggregates of smaller sub-industries. Each sub-industry has unique inputs and outputs. The higher the level of aggregation the less accurate these inputs and outputs become. Thus, if determining the multiplier effect of a very specific event using highly aggregated data, there will be a lower level of accuracy. Similarly, if an event encompasses a range of industries and multipliers from a single industry are applied the accuracy levels will diminish.

### **Regions and boundaries**

The smaller or less defined a region and its boundaries, the less accurate the multiplier analysis will be. Similarly, the easier it is to move across boundaries, the less accurate the analysis will be. For example, at the national level, the multipliers will be very accurate as it is easy to determine the inputs and outputs crossing through the New Zealand borders.

It would also be more accurate to determine a North Island/South Island split. As smaller regions without obvious geographic boundaries are selected, a higher level of assumptions needs to be made and the multipliers become less accurate. For example, an individual could work in the Auckland region but live in the Waikato region and spend a large proportion of their recreation money in the Bay of Plenty region.

For any regional analysis the level of accuracy will have to be accepted. As a rule of thumb, the larger and more defined the region, the more accurate the analysis will be.

### **Methodology and data sources**

Determining the overall picture of the economic activity supported by RDRML required undertaking four separate EIAs, which collectively formed the overall picture. The approach and data sources used for the three irrigation schemes were the same, while a different approach was required for the Highbank Power Scheme.

While the three irrigation schemes provide a snapshot of the economic activity created during the 2023/24 season, the EIA of the Highbank Power Scheme estimates economic activity created in 2023 (January to December).

### Three irrigation schemes

The starting point in our analysis was determining the land use by hectares across each of the three schemes. To do this, we used data supplied directly to BERL from each of the three schemes. BERL aggregated the data provided into the following land use types: dairy, dairy support, arable, beef, mixed, sheep, and horticulture. The next two components of our analysis required us to determine:

- Per hectare revenue generated by each land use type
- Per hectare operating expenses (by type) by each land use type.

These proxies were then multiplied by the total hectares per use. This allowed us to determine the total revenue generated by each land use and their working expenses by type, which allows the data to be introduced into our multiplier model. Following this, we input each expense (or the output per multiplier industry) into the multiplier model, calculating the indirect, induced, and total GDP and employment impacts.

The following parts detail the methodology used for each land use included in the analysis. Given there is no individual records of farmers' revenue and working expenses, we have used credible industry proxies. Our sources have been stated.

#### Dairy

BERL used industry proxies from DairyNZ's Economic Tracker, sourced as at 25 June 2024.<sup>7</sup> BERL used forecasted 2023/24 season values:

- Per hectare gross revenue was \$12,439
- Per hectare operating expenses were \$7,613.

#### Dairy support

To determine the gross revenue and operating expenses per hectare of a dairy support farm, BERL assumed that a Class 8 S.I. Mixed Finishing farm for Marlborough-Canterbury would equal a dairy support farm.<sup>8</sup> This decision was made in light of a lack of credible, available industry data for a dairy support farm in Canterbury. BERL used forecasted 2023/24 season values:

- Per hectare gross revenue was \$3,682
- Per hectare operating expenses were \$2,385.

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<sup>7</sup> Retrieved from <https://connect.dairynz.co.nz/content/89ba1084-42c5-4786-882b-cc91b8016d05/>

<sup>8</sup> Retrieved from <https://beeflambnz.com/industry-data/farm-data-and-industry-production/sheep-beef-farm-survey>

### **Arable**

To determine the per hectare gross revenue of an arable farm in Canterbury, BERL first assumed that domestic prices for Canterbury feed wheat and barley were similar to 2021 levels, at \$400 per tonne.

To determine the per hectare operating expenses by type of an arable farm in Canterbury, BERL used working expenses totals derived from Ministry for Primary Industries (MPI) for 2013 and adjusted the expenses to 2024 using Stats NZ's business price indexes for farm expenses.

This process resulted in the following industry proxies for an arable farm in 2024:

- Per hectare gross revenue was \$3,620
- Per hectare operating expenses were \$2,782.

### **Beef and sheep**

We used the same industry proxies for a beef and a sheep farm.

BERL used industry proxies derived from Beef and Lamb New Zealand using a Class 6 S.I. Finishing Breeding farm for Marlborough-Canterbury as a representation of a beef farm.<sup>9</sup> BERL used forecasted 2023/24 season values:

- Per hectare gross revenue was \$1,269
- Per hectare operating expenses were \$804.

### **Mixed**

BERL used data derived from Beef and Lamb New Zealand using a Class 8 S.I. Mixed Finishing farm for Marlborough-Canterbury as an industry proxy for a mixed-use farm. Forecasted 2023/24 values were used:

- Per hectare gross revenue was \$3,682
- Per hectare operating expenses were \$2,385.

### **Horticulture**

Horticulture land included in this EIA was used for blackcurrants, which is a relatively niche market in New Zealand. In recognition of this, we used data obtained from a variety of sources to derive an estimate for per hectare gross revenue and operating expenses of a blackcurrant farm in New Zealand:

- Per hectare gross revenue was \$6,760
- Per hectare operating expenses were \$3,900.

The Horticulture Export Authority was the primary source for determining gross revenue of a blackcurrant farm. Using the latest available data from 2007/08, BERL determined gross revenue

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<sup>9</sup> Retrieved from <https://beeflambnz.com/industry-data/farm-data-and-industry-production/sheep-beef-farm-survey>

per hectare by taking the price per tonne multiplied by the yield per hectare. This was then adjusted to 2023 dollars by multiplying it by the change in the export price of blackcurrants between 2008 and 2023.

To obtain estimates for the expenditure profile of a blackcurrant farm, BERL adopted expense proportions for a pip fruit orchard model produced by MPI. This provided an estimate of the percentage of operating expenses by type.

### **Highbank Power Scheme**

Our EIA of the Highbank Power Scheme is different from the EIAs completed for the three irrigation schemes. Revenue is used as the main input, rather than expenditure, as is the case for the irrigation schemes. This is because only revenue data was available for the Highbank Power Scheme. In order to undertake an EIA of the Highbank Power Scheme, we used a Canterbury regional IO table to determine the direct expenditure categories and expenditure levels associated with the estimated amount of revenue. One downside of this approach is that it assumes that the Highbank Power Scheme holds the same expenditure profile as the industry average for power generation businesses in the Canterbury region.

Manawa Energy directly provided BERL with aggregated data on the electricity generation and revenue of both Highbank and Montalto power stations. Data was provided for 2019 to 2023. We have used data available for the 2023 year in our analysis. We assessed the fluctuations in electricity generation and revenue from year to year in both stations to determine whether it was appropriate to use a five-yearly average. We determined that 2023 was a “usual” year, due to it being considerably close to the five-year average.

It is important to note that while the assessment of the three irrigation schemes cover the period from 2023 to 2024, our assessment of the Highbank Power Scheme covers just the 2023 year.

