

Manuherikia Irrigation Scheme

Regional and District Economic Impacts

**Report prepared as an input to a study for the
Manuherikia Catchment Water Services Group**

Butcher Partners Ltd

November 2016

KEY RESULTS

If the proposed Manuherikia High Dam goes ahead then GDP in Otago region will increase by a one-off estimated \$168 million as a result of both on-farm and off-farm investment associated with the development and construction phases of the Scheme. Associated with that will be an extra \$107 million of household income and 1,620 job-years of work. These impacts will be spread over perhaps 10 years, but possibly 80 % will occur in the first five years covering dam and distribution costs and the initial wave of on-farm development.

Regional GDP will increase as farms convert to efficient irrigation. Once 100 % of them are converted Otago region's GDP on farms and in industries that directly or indirectly support farms will increase by an estimated \$58 million per year. Associated with this increase will be an additional \$21 million per year of household income and 410 Full Time Equivalent jobs.

There is expected to an increase in meat processing with the greater productivity of pastoral land more than off-setting the conversion of a presumed 40 % of the irrigated land to dairy and dairy support. This meat processing activity will add a further \$9 million per year to regional GDP, including \$6 million per year of earned household income, and will create an additional 113 jobs. Hence in total regional GDP will increase by \$66 million per year, including \$26 million per year of earned household income, and there will be an additional 520 jobs in the region.

The degree to which the above impacts are realised depends on the ways in which labour and capital would have been employed in the absence of the proposed irrigation scheme. To the extent that the scheme displaces other projects which would otherwise have occurred, impacts of the irrigation scheme will be reduced from the levels shown in this report. This is because to this degree, net employment and income will simply have been switched between industries.

This report does not address the profitability of investment in irrigation. However, it is assumed that the scheme will only proceed if it is commercially viable, which in turn implies that farmers think it is worth investing and expanding production.

This report also does not address the issue of whether the Scheme will have a net benefit from the widest societal perspective, which takes into account matters such as community vibrancy associated with a larger and more diverse economy, and environmental and other non-market values such as recreation which are affected by the state of the river and levels of water abstraction. What this report does do is provide decision makers with information to inform their weighing up of the wide range of societal costs and benefits associated with the proposed scheme.

Table 1. Summary of Economic Impacts of High Dam

	Central Otago District			Otago Region		
	Jobs	Value Added	Household Income	Jobs	Value Added	Household Income
Construction	900 job-yrs	\$95m	\$62m	1,620job-yrs	\$168m	\$107m
On-going Farm prod'n	FTEs	\$m/yr	\$m/yr	FTEs	\$m/yr	\$m/yr
On-farm	211	35	9	211	35	9
Off-farm Support	133	15	8	199	23	12
Processing & supp.	0	0	0	113	9	6
Total	269	50	17	523	66	26

Summary

A. Potential Scheme Effects

1. The assessment of on-going district and regional economic effects of increased farm production, arising from increased irrigation in the area serviced by the proposed Manuherikia water storage projects, are based on budgets for various farm types, provided by Compass Agriculture. There are 10 budgets with the first five covering existing farming systems and the latter five covering new irrigated farming systems. All new irrigated farm budgets include an annual water charge of \$300 / Ha to cover scheme operating costs. The budgets for three of the existing farming systems and three of the proposed farming systems are also available on the website of Manuherikia Catchment Water Strategy Group (MCWSG).
2. All on-going impacts are expressed on a per 000 Ha basis for each farm type. It is hence a simple matter to work out the economic impacts of converting a specified area of one existing farm type to a similar area of a future more intensively irrigated farm type. Total impacts of all land are also expressed for the three options. These are based on assumptions about current and likely future land use of the irrigable areas.
3. The one-off construction effects associated with the proposed scheme are a combination of off-farm costs of dams and distribution works (canals and pipes), and on-farm costs of converting dryland farms to irrigation, and of converting existing irrigated farms to more efficient forms of irrigation. These costs are taken from the MCWSG website. The economic impacts of construction presented in this report are approximations only, principally because until design is finalised and until construction and farm conversion contracts are signed, it is not possible to know whether the principal contractors will be from the district, from elsewhere in Otago, or come from further afield. Water distribution costs have not yet been estimated for anything except the High Dam option, and costs of environmental effects mitigation have not yet been addressed and are not included in this report.
4. Assumptions, shown later in this report, have been made as to where contractors undertaking the capital works will come from, although regardless of where the principal contractors are located, there are likely to be many local subcontractors, employees and suppliers. The centre pivot irrigators will be imported. However, assembly and installation of supporting services is a significant part of the total cost, and again it is reasonable to assume that a major part of this work will be undertaken by district and regional contractors who are already experienced in this work.
5. Economic impacts are estimated for three specific storage options including:
 - (i) Falls Dam – High (20m) dam: Will provide 70Mm³ of water and irrigate 25,000 Ha, including 9,000 Ha of existing irrigated land and 16,000 of newly irrigated land. Water supply reliability¹ is consistent with other recently developed irrigation schemes, but less than the 100 % reliability associated with an even higher dam. Cost is \$80m for the dam + \$101m for distribution works;

¹ 96 % average, and 90 % in a one-in-ten-year drought.

- (ii) Falls Dam – Medium (12-15m) dam: Will provide 50Mm³ of irrigation water and will irrigate 20,000 Ha including 9,000 Ha of existing irrigated land and 11,000 Ha of newly irrigated land. Cost is \$65 million for the dam and an assumed² \$55 million for distribution.
- (iii) Falls Dam – Low (5m) dam: Will provide 19 Mm³ of water for irrigation and irrigate 12,500 Ha including 8,820 existing irrigated land and 3,680 newly irrigated land. Cost of \$28 for dam and an assumed³ \$25 million for distribution.
6. Regardless of which if the above options is undertaken, the existing Falls dam will require \$17.5 million of remedial and upgrading work to continue to operate. This is ignored in the economic impact analysis because it is required regardless of which, if any, dam option is pursued.
7. On-farm investment will depend on the land uses and whether the land is currently unirrigated or inefficiently irrigated. For this analysis it has been assumed that the average cost, excluding livestock and irrigation shares⁴ is \$7,000 / Ha for sheep farming, \$7,600 for dairy grazing and \$14,075 / Ha for dairy farms. These figures have all been obtained from Compass Agriculture and detail is shown on the MCWSG website.
8. At this stage it is assumed that for each option, the current and future land use proportions are as follows:

Table 2 Assumed Current and Future Land Use

	Farm Income* (\$/Ha)		% of land use
	Net*	Surplus**	
Poorly irrigated Mixed arable	1,596	345	5 %
Poorly irrigated Sheep breeding	981	287	37 %
Poorly irrigated Dairy Support	1,333	569	7 %
Poorly & partially irrigated Sheep breeding & lamb finishing	1,958	393	27%
Dryland Half-Bred Sheep	414	167	24%
Efficiently irrigated mixed Arable	3,472	917	5 %
Efficiently irrigated Sheep Breeding & Finishing	2,437	718	28%
Efficiently irrigated Dairy Support	3,027	1,149	15%
Efficiently irrigated Dairy	8,417	2,530	25%
Efficiently partially irrigated Sheep breeding & lamb finishing	3,534	873	27%

* Gross farm income less stock purchases

** Net income *less* expenses (including depreciation), but before drawings or interest.

² Costs for 20,000 irrigated Ha, based *pro rata* on \$101m for 25,000 irrigated Ha, suggest \$80 m distribution cost, but this has been reduced to \$55 million to reflect the statement that “*for lower dam height options the distribution costs are expected to be significantly lower as works will be focused on upgrading existing infrastructure rather than the cost of new infrastructure*”. Figures will need to be reviewed once more data is available.

³ Costs for 12,500 irrigated Ha, based *pro rata* of \$101m for 25,000 irrigated Ha, suggest a cost of \$50m. This has been halved to reflect the statement that “*for lower dam height options the distribution costs are expected to be significantly lower as works will be focused on upgrading existing infrastructure rather than the cost of new infrastructure*”. Figures will need to be reviewed once more data is available.

⁴ Livestock are excluded because they represent either imported animals or a diversion from export of existing livestock production. Irrigation shares are excluded because the economic impacts have been picked up in the off-farm construction impacts.

B Assessment Undertaken

9. This assessment is of the total economic impact from the perspective of Central Otago district and from Otago region. The results are based on district and region economic models which assume that there are no barriers to growth of economic activity and that there are spare resources of labour and capital available. In particular it is assumed that if more jobs become available there will be workers available to fill them. This could be people coming into the region, or people within the region who are currently unemployed.
10. We have not undertaken a regional general equilibrium analysis⁵, nor do the models used in this paper make any allowance for an increase in central government services (e.g. health, education and police) which may arise from any population increase associated with the increase in employment opportunities.
11. There is considerable uncertainty as to the exact mix of land uses on future irrigated land, the level of processing of production from the irrigated farms, and the proportion of processing which will take place in the region. The figures given here are realistic assessments of what is likely to occur, but actual outcomes could be higher or lower than this.
12. The analysis is of economic impacts only. It is not a cost : benefit analysis, and it ignores any environmental effects which arise from the land use changes arising from the proposed irrigation schemes. If the project proceeds, then this suggests that farmers believe there is a high probability of significant commercial benefit. Otherwise they would not take part in the scheme. It is anticipated that people in other sectors who experience an increase in economic activity will also perceive themselves to be receiving a benefit. A formal cost benefit analysis framework would typically not recognise this latter benefit because of the framework's restrictive assumptions regarding price equalling opportunity cost in these other sectors⁶. It is for this reason that we show in the following sections the increase in employment, regional GDP and regional household income. Decision makers can take these impacts into consideration when deciding whether the proposed irrigation schemes have larger benefits than costs when viewed from the widest societal perspective.

C2. Economic Impacts

13. The economic impacts arising from the Scheme have two components. The first is the impact of construction on and off-farm. This is a one-off impact, and for this reason impacts are expressed as \$million (rather than \$million per year) and job-years (as opposed to on-going jobs). The second component of economic impact is the on-going effect of increased farm production. This generates impacts including:
 - a. on-farm,
 - b. in all the industries that support farming production and farm household spending (e.g. agricultural contractors, stock and station agents, rural transport, shops and service providers); and

⁵ A general equilibrium analysis takes into account the degree to which additional economic activity in farming will be at the expense of reduced economic activity in other sectors because of a lack of surplus labour and capital within the region. It makes its own assumptions about regional mobility of labour and capital.

⁶ In simple terms, formal cost benefit analysis assumes that unless there is reason to assume otherwise, price equals opportunity cost, which is the benefit foregone in the next best possible use.

- c. In processing industries such as meat, dairy and vegetable processing, and in all the industries that support the processing industries and the household spending that flows from them.

14. Economic impacts are generally reported in terms of changes to output (sales), value added⁷ (sometimes referred to as regional income or regional GDP), household income (which is a component of value added) and employment. The impacts are split up into the direct effects, which in this case are the direct changes in output, employment and income on-farm, and the multiplier effects, sometimes referred to as the indirect and induced effects, or the industry-support effects.

One-Off Construction Impacts

15. The economic impacts of construction are shown in Summary Table 3. The investment of \$402 million on and off-farm (excluding livestock and dam shares) leads to economic impacts during construction including an increase in regional value added of \$168 million, including household income of \$107 million, and an additional 1,630 job-years of work. This economic impact will be focussed on the first few years of the project, when all the dam construction and a significant part of the on-farm conversion is expected to take place. The balance will be spread over the remaining period of the investment programme until land development is completed.

Table 3 District and Regional Economic Impacts of Three Options:
Construction-related only (One-off effects spread over perhaps 10 years)

Central Otago District Total Economic Impacts	Output (\$m)	Jobs Job-years*	Value Added (\$m)	Gross HHI (\$m)
High Dam	250	900	95	62
Medium Dam	190	690	73	47
Low Dam	110	410	42	28
Otago Region Total Economic Impacts	Output (\$m)	Jobs	Value Added (\$m)	Gross HHI (\$m)
High Dam	430	1,620	168	107
Medium Dam	320	1,210	125	80
Low Dam	180	680	69	44

* A job-year is a full-time job for one year; a part time job for two years; two full time jobs for 6 months etc

On-Going Impacts Arising from Increased Farm Production

16. The High Dam Option is expected to lead to an increase in farm-gate output of \$74 million per year. This increase will be accompanied by an increase in direct value added⁸ on farm of \$35 million per year, including \$9 million per year of earned⁹ household income. There will be an increase of 211 jobs on farm (see column 1 in Table 4).

⁷ In accounting terms this is equivalent to EBITDA.

⁸ Value added is the return to labour and capital. It is the equivalent concept to Gross Domestic Product. In accounting terms it can be seen as EBITDA + wages & salaries, or as gross output less purchases of inputs (other than capital and labour).

⁹ Wages and salaries, plus self-employed income. Excludes any dividends from increased profits

17. Multiplier effects arise as a result of the expansion of economic activity in supporting industries. The combination of direct impacts on farm and multiplier¹⁰ effects in the farm-support industries gives a total increase in regional value added of \$50 million per year in the district, of which earned household income will be \$17 million per year. The additional 133 jobs created off-farm give a total increase of 344 jobs in the district (see highlighted figures in column 1 of Table 4).
18. Multiplier effects in the region are significantly greater than in the district because of the much greater diversity of businesses which support farm production and farm worker household spending. Total employment in the region, excluding any related to increased processing of meat and milk, is expected to increase by 410 jobs, while total regional GDP is expected to increase by \$58 million per year, and total earned household income is expected to increase by \$21 million per year (see highlighted figures in second column of Table 4).

Table 4 District and Regional Economic Impacts of Falls High Dam Option: Farm and Farm-Support, and Processing at Full Development

	Central Otago District Impacts	Otago Region Economic Impacts			
	Farming	Farming	Meat Process	Dairy Process	Total
Direct Output (\$m/yr)	74	74	21	-	95
Total Output (\$m/yr)	102	119	30	-	150
Direct Employment (FTEs)	211	211	65	-	276
Total Employment (FTEs)	344	410	113	-	523
Direct Value Added (\$m/yr)	35	35	4	-	39
Total Value Added (\$m/yr)	50	58	9	-	66
Direct Gross HHI (\$m/yr)	9	9	3	-	12
Total Gross HHI (\$m/yr)	17	21	6	-	26

On-going Impacts Arising from Increased Processing

19. It has been assumed that 70 % of the additional meat produced (including store stock) eventually is processed within the region, and this increases regional GDP by \$9 million / year including \$6 million / year of earned income, and generates an extra 113 jobs. Hence total regional economic impacts associated with the High Dam proposal is 523 jobs and an increase of \$66 million per year in regional GDP, including \$26 million per year of earned household income (final column of Table 4).
20. It has been assumed that additional milk production will not lead to increased processing of milk in the region. This is a significant assumption, and if in fact all the additional milk was processed in the region then it could add perhaps 160 jobs to the regional employment total shown above.
21. Lower dams storing less water and irrigating less additional land will have a correspondingly smaller impact as is shown in Table 5 below.

¹⁰ Sometimes called indirect and induced effects.

Table 5 District and Regional Economic Impacts of Three Options
Farm and Farm-Support, and Processing at Full Development

	Central Otago District Impacts			Otago Region Impacts		
	Low Dam	Medium Dam	High Dam	Low Dam	Medium Dam	High Dam
Direct Output (\$) (farms and processing)	37	59	74	47	76	95
Total Output (\$)	51	82	102	75	120	150
Direct Employment (FTE) (farms and processing)	105	169	211	133	213	266
Total Employment (FTEs)	172	275	344	262	418	523
Direct Value Added (\$) (farms and processing)	17	28	35	19	31	39
Total Value Added (\$)	25	40	50	33	53	66
Direct Gross HHI (\$)	5	7	9	6	10	12
Total Gross HHI (\$) (farms and processing)	8	14	17	13	21	26

22. The impacts reported here should be seen as likely upper limits to the net impacts on the community¹¹. The estimates are based on an implicit assumption that there will be labour available to take up these jobs, and that the people taking them up will be either unemployed or out of the labour force in the absence of the irrigation, or will be migrants into the region from elsewhere. To the extent that the jobs are filled by people leaving existing jobs in the region and those existing jobs are not filled, the impacts will be lower than is estimated here.
23. If significant additional labour does come into the district and the population increases as a result, then there is likely to be an additional impact arising from increased provision of central government services, such as education, health and police, which are not covered by the above estimates.
24. Eventually an increase in population and economic demand will lead to a tipping point whereby businesses of a type which currently don't exist in the district will deem it worth doing so. The analysis in this report ignores that possibility, and to that extent the results reported here are conservative. The expanded off-farm employment modelled in this report assumes simply a scaling up of the kinds of business operation which already exist in the district or region, rather than an increase in the range of businesses operating.

¹¹ For the assumed land uses. Different land use mixes will give different results.

Assumptions Underlying Calculations

Capital Expenditure:

Off-Farm: Dams, Races, pipework etc

It is assumed that the capital expenditure off-farm will be in the “Heavy and Civil Engineering Construction” industry. Design, consenting etc is likely to be done outside the district and possibly outside the region. Construction is likely to be spread among district, rest-of-Otago, and outside contractors. The impacts assume that 20 % of expenditure is in district, 50 % is in the region (including the district), and the balance is from outside the region.

On-farm expenditure:

Item	Deemed Industry	% in District	% in Region (incl district)
Cleanup	Agricultural servicing & contracting	100	100
Irrigation	50 % imported plant; Balance non-building construction*	45	45
Cow Shed	Non-residential Construction	30	60
Electricity	Civil construction	60	80
Housing	Residential building construction	70	90
Other Buildings	Non-residential building construction	70	90
Fencing & Lanes	Agricultural servicing & contracting	80	95
Stockwater	Non-building construction	80	95
Fertiliser	Manufacture in Otago, transport, storage & spreading.	20	100
Regrassing	Agricultural servicing & contracting	80	95
Machinery	80 % imported machinery, Balance to wholesalers & retailers	6	12

* Everything to do with installation of the imported plant and associated earthworks, electricity supply, piping etc.

ECONOMIC IMPACTS PER 000 Ha by Land Use

Pre-Scheme Mixed Arable	District Impact per 000 Ha	Regional Impacts per 000 Ha			
		Farming	Farming	Meat Process	Dairy Process
Direct Output (\$m)	\$ 1.6	\$ 1.6	\$ 0.7	\$ -	\$ 2.3
Total Output (\$m)	\$ 2.3	\$ 3.3	\$ 1.0	\$ -	\$ 4.3
Direct Employment (FTE)	3.3	3.3	2.1	-	5.4
Total Employment (FTEs)	7.3	10.8	3.6	-	14.4
Direct Value Added (\$m)	\$ 0.4	\$ 0.4	\$ 0.1	\$ -	\$ 0.6
Total Value Added (\$m)	\$ 0.8	\$ 1.2	\$ 0.3	\$ -	\$ 1.5
Direct Gross HHI (\$m)	\$ 0.2	\$ 0.2	\$ 0.1	\$ -	\$ 0.3
Total Gross HHI (\$m)	\$ 0.4	\$ 0.6	\$ 0.2	\$ -	\$ 0.7

Pre-Scheme Sheep Breeding	District Impact per 000 Ha	Regional Impacts per 000 Ha			
		Farming	Farming	Meat Process	Dairy Process
Direct Output	\$ 1.0	\$ 1.0	\$ 1.1	\$ -	\$ 2.1
Total Output (\$)	\$ 1.5	\$ 1.8	\$ 1.7	\$ -	\$ 3.4
Direct Employment (FTE)	3.4	3.4	3.6	-	7.0
Total Employment (FTEs)	6.1	7.5	6.2	-	13.6
Direct Value Added (\$)	\$ 0.4	\$ 0.4	\$ 0.2	\$ -	\$ 0.6
Total Value Added (\$)	\$ 0.6	\$ 0.8	\$ 0.5	\$ -	\$ 1.3
Direct Gross HHI (\$)	\$ 0.2	\$ 0.2	\$ 0.2	\$ -	\$ 0.3
Total Gross HHI (\$)	\$ 0.3	\$ 0.4	\$ 0.3	\$ -	\$ 0.7

Pre-Scheme Dairy Support	District Impact per 000 Ha	Regional Impacts per 000 Ha			
		Farming	Farming	Meat Process	Dairy Process
Direct Output	\$ 1.3	\$ 1.3	\$ -	\$ -	\$ 1.3
Total Output (\$)	\$ 1.8	\$ 2.2	\$ -	\$ -	\$ 2.2
Direct Employment (FTE)	5.8	5.8	-	-	\$ 5.8
Total Employment (FTEs)	8.4	9.8	-	-	\$ 9.8
Direct Value Added (\$)	\$ 0.8	\$ 0.8	\$ -	\$ -	\$ 0.8
Total Value Added (\$)	\$ 1.0	\$ 1.2	\$ -	\$ -	\$ 1.2
Direct Gross HHI (\$)	\$ 0.3	\$ 0.3	\$ -	\$ -	\$ 0.3
Total Gross HHI (\$)	\$ 0.4	\$ 0.5	\$ -	\$ -	\$ 0.5

Inefficient partial irrigation Breed & Finish	District Impact per 000 Ha	Regional Impacts per 000 Ha			
		Farming	Meat Process	Dairy Process	Total
Direct Output	\$ 2.0	\$ 2.0	\$ 2.3	\$ -	\$ 4.2
Total Output (\$)	\$ 2.9	\$ 3.6	\$ 3.3	\$ -	\$ 7.0
Direct Employment (FTE)	6.4	6.4	7.2	-	13.6
Total Employment (FTEs)	11.9	14.8	12.4	-	27.2
Direct Value Added (\$)	\$ 0.7	\$ 0.7	\$ 0.4	\$ -	\$ 1.1
Total Value Added (\$)	\$ 1.2	\$ 1.5	\$ 1.0	\$ -	\$ 2.5
Direct Gross HHI (\$)	\$ 0.4	\$ 0.4	\$ 0.3	\$ -	\$ 0.8
Total Gross HHI (\$)	\$ 0.7	\$ 0.9	\$ 0.6	\$ -	\$ 1.5

Pre-Scheme Half-Bred Sheep Dryland	District Impact per 000 Ha	Regional Impacts per 000 Ha			
		Farming	Meat Process	Dairy Process	Total
Direct Output	\$ 0.4	\$ 0.4	\$ 0.3	\$ -	\$ 0.7
Total Output (\$)	\$ 0.6	\$ 0.8	\$ 0.4	\$ -	\$ 1.2
Direct Employment (FTE)	1.6	1.6	1.0	-	\$ 2.6
Total Employment (FTEs)	3.0	3.7	1.7	-	\$ 5.3
Direct Value Added (\$)	\$ 0.2	\$ 0.2	\$ 0.1	\$ -	\$ 0.3
Total Value Added (\$)	\$ 0.3	\$ 0.4	\$ 0.1	\$ -	\$ 0.5
Direct Gross HHI (\$)	\$ 0.1	\$ 0.1	\$ 0.0	\$ -	\$ 0.2
Total Gross HHI (\$)	\$ 0.2	\$ 0.2	\$ 0.1	\$ -	\$ 0.3

Post Scheme Dairy	District Impact per 000 Ha	Regional Impacts per 000 Ha			
	Farming	Farming	Meat Process	Dairy Process	Total
Direct Output	\$ 8.4	\$ 8.4	\$ 0.6	\$ -	\$ 9.0
Total Output (\$)	\$ 11.4	\$ 13.5	\$ 0.9	\$ -	\$ 14.3
Direct Employment (FTE)	24.4	24.4	1.8	-	26.2
Total Employment (FTEs)	40.9	49.0	3.2	-	52.2
Direct Value Added (\$)	\$ 3.9	\$ 3.9	\$ 0.1	\$ -	\$ 4.0
Total Value Added (\$)	\$ 5.5	\$ 6.4	\$ 0.2	\$ -	\$ 6.6
Direct Gross HHI (\$)	\$ 1.1	\$ 1.1	\$ 0.1	\$ -	\$ 1.2
Total Gross HHI (\$)	\$ 2.0	\$ 2.5	\$ 0.2	\$ -	\$ 2.6
Post Scheme Mixed Arable	District Impact per 000 Ha	Regional Impacts per 000 Ha			
	Farming Only	Farming	Meat Process	Dairy Process	Total
Direct Output	\$ 3.5	\$ 3.5	\$ 0.8	\$ -	\$ 4.3
Total Output (\$)	\$ 4.9	\$ 6.7	\$ 1.2	\$ -	\$ 7.9
Direct Employment (FTE)	5.8	5.8	2.6	-	8.4
Total Employment (FTEs)	12.8	19.0	4.5	-	23.5
Direct Value Added (\$)	1.1	1.1	0.2	\$ -	\$ 1.2
Total Value Added (\$)	1.9	2.6	0.3	\$ -	\$ 2.9
Direct Gross HHI (\$)	0.3	0.3	0.1	\$ -	\$ 0.4
Total Gross HHI (\$)	0.7	1.0	0.2	\$ -	\$ 1.2
Post-Scheme Sheep Finishing	District Impact per 000 Ha	Regional Impacts per 000 Ha			
	Farming	Farming	Meat Process	Dairy Process	Total
Direct Output	\$ 2.4	\$ 2.4	\$ 2.8	\$ -	\$ 5.2
Total Output (\$)	\$ 3.6	\$ 4.3	\$ 4.1	\$ -	\$ 8.4
Direct Employment (FTE)	6.4	6.4	8.8	-	15.3
Total Employment (FTEs)	11.7	14.4	15.3	-	29.6
Direct Value Added (\$)	\$ 1.0	\$ 1.0	\$ 0.5	\$ -	\$ 1.5
Total Value Added (\$)	\$ 1.6	\$ 1.9	\$ 1.2	\$ -	\$ 3.1
Direct Gross HHI (\$)	\$ 0.3	\$ 0.3	\$ 0.4	\$ -	\$ 0.7
Total Gross HHI (\$)	\$ 0.6	\$ 0.8	\$ 0.7	\$ -	\$ 1.5

Post-Scheme Dairy Support	District Impact per 000 Ha	Regional Impacts per 000 Ha			
	Farming	Farming	Meat Process	Dairy Process	Total
Direct Output	\$ 3.0	\$ 3.0	\$ -	\$ -	\$ 3.0
Total Output (\$)	6.5	6.5	-	-	6.5
Direct Employment (FTE)	11.9	14.7	-	-	14.7
Total Employment (FTEs)	\$ 1.4	\$ 1.4	\$ -	\$ -	\$ 1.4
Direct Value Added (\$)	\$ 2.1	\$ 2.4	\$ -	\$ -	\$ 2.4
Total Value Added (\$)	\$ 0.3	\$ 0.3	\$ -	\$ -	\$ 0.3
Direct Gross HHI (\$)	\$ 0.6	\$ 0.8	\$ -	\$ -	\$ 0.8
Total Gross HHI (\$)	6.5	6.5	-	-	6.5
Post-Scheme Efficient partial Irrigation	District Impact per 000 Ha	Regional Impacts per 000 Ha			
	Farming	Farming	Meat Process	Dairy Process	Total
Direct Output	\$ 3.5	\$ 3.5	\$ 4.2	\$ -	\$ 7.7
Total Output (\$)	\$ 5.2	\$ 6.4	\$ 6.2	\$ -	\$ 12.6
Direct Employment (FTE)	13.7	13.7	13.3	-	\$ 27.0
Total Employment (FTEs)	22.4	27.0	23.0	-	\$ 49.9
Direct Value Added (\$)	\$ 1.5	\$ 1.5	\$ 0.8	\$ -	\$ 2.3
Total Value Added (\$)	\$ 2.4	\$ 2.9	\$ 1.8	\$ -	\$ 4.7
Direct Gross HHI (\$)	\$ 0.8	\$ 0.8	\$ 0.6	\$ -	\$ 1.4
Total Gross HHI (\$)	\$ 1.2	\$ 1.5	\$ 1.1	\$ -	\$ 2.6