

Agricultural economic impact modelling summary for reducing nitrate losses in the Waimakariri zone (July 2018)

This memorandum summarises the knowledge we currently hold about the on-farm impact of a 5%, 10% and 20% reduction in N losses beyond GMP/Baseline.

The implications for profitability of dairy were based on case studies of a range of mitigations developed by the Waimakariri farmer reference panel and DairyNZ. The dairy analysis uses a fitted curve for its estimate of the relationship between reducing nitrogen loss rates and the associated reduction in profit, but it should be noted that the case studies used to develop this curve produced a range of possible costs for different operations that should be taken into account.

No specific mitigations were found for mitigating beyond GMP for sheep and beef, arable and dairy support land uses. Curves for these land uses were generated by reducing revenue and variable costs in order to achieve the reduction in N losses required, essentially signalling a reduction in area utilised or the intensity of operation.

The economic impact indicators used are operation profit (OP) changes and changes in land value. These are used because they are useful in describing the short to medium term viability of farming operations – OP describes the ability to service debt and meet other fixed charges, and the land value changes are useful to understand the implications for solvency and meeting bank covenants on debt/asset ratios.

The implications for dairy OP of N reduction targets are shown in Table 1. A 10% reduction in N loss beyond GMP shows relatively minor impacts (from a moderate benefit to 5% reduction in OP), but at 20% the modelled OP reduction is 12% and for some farmers the reduction in operating profit will be up to 22%.

For non-dairy operations only a modelled estimate is available. The costs for these landholders increases linearly with an increase in N reduction required. The range across these land uses is from 6% to 11% reduction in OP for 5% reduction in N, and a 26% to 44% reduction in OP for a 20% reduction in N.

Table 1: Range of operating profit change for reduction in N losses from dairy operations

Reduction in N	Operating profit reduction							
	Dairy			Sheep and beef irrigated	Sheep and beef dryland	Arable	Dairy support irrigated	Dairy support dryland
	Low	Modelled	High	Modelled	Modelled	Modelled	Modelled	Modelled
5%	-10%	0%	5%	11%	9%	10%	6%	7%
10%	-10%	2%	7%	22%	18%	20%	13%	15%
20%	~5%	12%	22%	44%	36%	41%	26%	29%

The implications for land value in the catchment at two different targets incorporating a 5% reduction for non-dairy, and 10 – 20% reduction for dairy and dairy support are shown in Table 2.

Table 2: Reduction in land value resulting from combinations of N loss targets (modelled results for each land use, NT and Interzone combined)

Combination of targets	Reduction in land value – NT and Interzone total (\$ million)	% change
5% non dairy, 10% dairy	\$240	5%
5% non dairy, 20% dairy and dairy support	\$550	13%

These results are based on case studies and modelling, and there is no guarantee that the actual impacts will lie within the range suggested here. Furthermore there are a number of very complex issues around the definition of GMP/Baseline, and the way in which these are resolved will affect the range of mitigations and costs faced by different landholders. There are also management skill and capacity changes that will need to occur in order for some of the mitigations to be implemented without a greater impact occurring, and these will take management time and resource away from other aspects of the farm business. A somewhat precautionary approach is therefore warranted in relation to the results provided here.