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THE DIRECT AND INDIRECT COSTS OF CONSENTING DAIRY FARMS UNDER HORIZONS ONE PLAN (PRIOR TO MARCH 2017 ENVIRONMENT COURT DECLARATION)

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Abstract

As at June 2016, 111 of the 141 Land Use consents in the Horizons region were granted via a restricted discretionary pathway, prior to an Environment Court declaration that the Horizon's process was invalid. Industry involvement and pragmatic consenting solutions had aimed to keep costs for dairy farmers down, while still achieving reductions in nutrient loss. This paper is based on the Master of AgriCommerce thesis of Chris Tidey, completed in late 2016. It investigates the direct and indirect costs incurred by dairy farmers throughout the process of obtaining land use consent. Twenty Manawatu farmers were involved in the study.

Direct costs to obtain consent were largely made up of the consultancy fees incurred in preparing the consent documentation, and council fees. The average direct cost was $5,080 (excl. GST). The spread was skewed towards the lower end due to the original DairyNZ system, used for the first 50 applicants. This system locked in a price for consultants (paid by DairyNZ) as both farmer and consultant became familiar with the new processes.

A variety of mitigation actions were agreed upon and implemented to achieve reductions in nutrient losses. The costs incurred in implementing these mitigations often remain unseen and are referred to as "Indirect cost". The average indirect net cost incurred was $20,364 (excl. GST). The majority of mitigation action costs are absorbed within the first three years of obtaining the consent.

This paper suggests that on-farm nutrient reductions can be achieved without significant impacts on financial viability. An average reduction in baseline nitrogen loss of 7.7% came at an average net cost of 15 cents/kg MS, with the cost spread over up to five production seasons.

Cost incurred varied significantly between farms. This was caused by factors including; the level of non-compliance with Table 14.2 of the Horizons One Plan, farm intensity, and the selected mitigation actions implemented.

The process and notion of obtaining a Land Use consent was daunting for many of the 20 farmers, with high levels of stress driven by uncertainty and the perceived impact on their properties and valuations.

Horizons has yet to finalise its new system for consenting subsequent to the 2017 Environment Court declaration. This paper provides a benchmark from the initial consenting system.

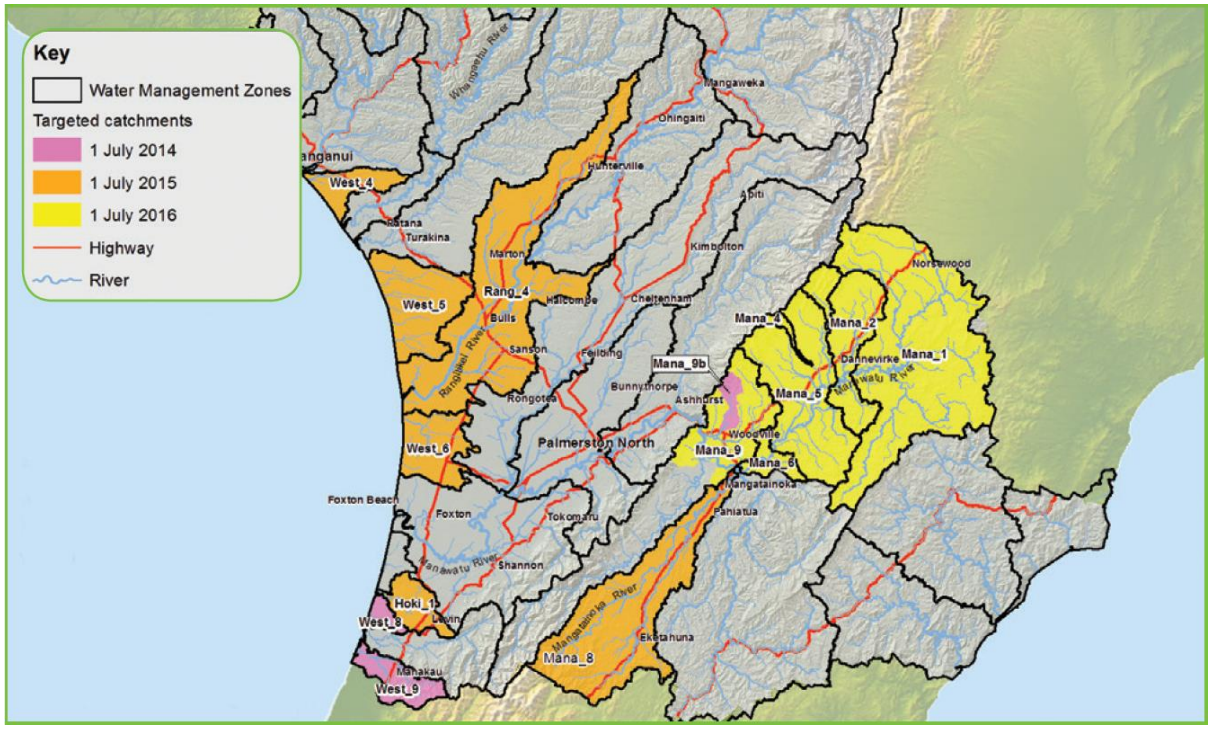
Introduction

In the last three decades significant intensification within the agricultural sector; and in particular the dairy sector has occurred. This intensification has provided rapid growth in many regional economies but has also increased pressure on regional water resources. In order to manage freshwater resources and water quality across the Manawatu-Wanganui region Horizons (Regional Council) laid out their policies for resource management in one unified document; known as the One Plan. The One Plan became operative on the 19th of December 2014. The One Plan defines how natural and physical resources will be managed and includes specific objectives, policies and rules targeting specific surface water catchments.

Chapter 14, of the One Plan, addresses intensive farming (dairy farming, commercial vegetable growing, cropping and intensive sheep & beef) and lays out objectives and policies for discharges to land and water (Manawatu-Wanganui Regional Council, 2014). Existing intensive farming land uses must be regulated in the all of the 14 targeted Water Management Sub-zones (priority catchments). These priority catchments are deemed to be most affected by nutrient enrichment and include almost 500 individual farmers; mostly dairy (Parminter, Duker, & Hughes, 2015).

Farms falling within priority surface water catchments are required to obtain land use consents. The first of the priority catchments were required to undergo the consent regime by the 1st of July 2014, with all other priority catchments coming into effect by the 1st of July 2016. Priority catchments are shown below, in **Figure 1**.

Figure 1: One Plan priority surface water catchments (DairyNZ Limited, 2014)



Existing intensive farming land uses falling within the 14 priority catchments must aim to operate at or below the nitrogen leaching maximum limits specified in Table 14.2 of the One Plan (Chapter 14; page 8) in order to be eligible for a controlled activity consent. .

Figure 2: Table 14.2 from the One Plan (Manawatu-Wanganui Regional Council, 2014).

Table 14.2 *Cumulative nitrogen leaching maximum* by Land Use Capability Class**

Period (from the year that the rule has legal effect[3])	*LUC** I	*LUC** II	*LUC** III	*LUC** IV	*LUC** V	*LUC** VI	*LUC** VII	*LUC** VIII
Year 1	30	27	24	18	16	15	8	2
Year 5	27	25	21	16	13	10	6	2
Year 10	26	22	19	14	13	10	6	2
Year 20	25	21	18	13	12	10	6	2

Table 14.2, shown in **Figure 2**, specifies the permissible nitrogen leaching maximum limits for specific land use classifications across the region. These figures range from nitrogen leaching limits of 2 kg N/ha up to 30 kg N/ha and have a downwards trajectory over a 20 year period.

In order for a farmer to obtain a controlled activity consent they must prepare a nutrient management plan, modelled in OVERSEER ®, to demonstrate that nitrogen leaching losses from their current farming activity will not exceed the nitrogen leaching maximums as specified in Table 14.2. If a farming activity cannot comply with the conditions required to obtain a controlled activity consent then farmers can seek to apply for a restricted discretionary consent. As at June 2016, 111 of the 141 Land Use consents in the Horizons region were granted via a restricted discretionary pathway, prior to an Environment Court declaration that the Horizon's process was invalid.

There is an increased level of national uncertainty surrounding the costs of obtaining and operating within the Land Use consent conditions. This paper summarises an investigation of the direct and indirect costs incurred, by 20 applicants, throughout the process of obtaining a Land Use consent, in the Manawatu.

Methodology

This project used a case study approach to collect actual costs incurred and mitigations implemented in order to obtain a Land Use consent through the restricted discretionary pathway. The cost data collected related to the direct expenditure to obtain consent and the indirect costs associated with implementing mitigation actions.

Primary data was collected in face to face interviews, following a semi-structured format. The questionnaire was separated into three sections; costs associated with obtaining the consent, consent conditions/agreed mitigation actions, and lastly the indirect costs and other attitudinal data.

Secondary data was obtained from the Regional Council following written approval from the sample participant. Nutrient management plans and the associated Land Use consent cover sheets were obtained. This provided farm systems information, including; farm area, land resources (soil & LUC), stock management, production data, supplementary feed, fertiliser usage and OVERSEER® modelling input and output data. It also included an in-depth analysis of selected mitigation actions and the respective changes in modelled nutrient losses.

The study involved a random sample of 20 dairy farms operating under a restricted discretionary consent in the Manawatu. The case farms were spread across 5 separate catchments; Coastal Rangitikei, Mangatainoka, Lake Horowhenua, Mangapapa and the Upper Gorge Target catchment. Data collected was limited to that associated with the direct and indirect costs incurred by the respondent, in obtaining their consent. The data, however, does

not extrapolate to changes in net farm operating profit and so conclusions around the total effects of costs incurred were speculative. The chosen approach provided real on-farm data and expenditure from the applicants sampled.

Results & Discussion

Summary data for the 20 Manawatu dairy farms surveyed is shown below, in Table 1.

Table 1: Dairy farm statistics gathered

	Average	Range		
		Minimum	**Maximum**	**Standard Deviation**
Number of farms	20	-	-	-
Date consents granted	-	Sep 2014	June 2016	-
Area consented (ha)	217	86	471	108
Effective milking platform (ha)	147	52	421	80
Peak cows milked	383	80	910	199
Effective stocking rate (kg LW/ha)	1223	708	1875	249
Baseline milk solids production (kg MS/cow)	366	290	447	46
Baseline milk solids production (kg MS/ha)	943	539	1517	185
Nitrogen fertiliser used (kg N/ha)	86	0	177	50
Supplements imported (kg DM/cow)	839	0	2095	672
Baseline Nitrogen loss (kg N/ha)	34	18	56	10.5
Nitrogen reduction (kg N/ha)	3	0	6	1.7
Percentage nitrogen reduction	7.7%	0%	15.6%	4.1

The average percentage nitrogen (N) reduction achieved from all consents granted as at the 29th June 2016 was 9.6% for the Tararua (Mangatainoka, Upper Manawatu, Upper Gorge & Mangapapa), and 1.1% for Rangitikei (Horizons Regional Council, 2016). This can be compared with the average overall reduction achieved from the sample population of 7.7%. The work undertaken by Nimmo-Bell & Company Ltd (2013) indicated that up to an 18% reduction in nitrogen losses was possible across the Manawatu without a significant impact on net farm operating profits. From the sample data the reductions achieved ranged from 0% up to 15.6%. The expectation being that; all reasonably practicable mitigations were investigated in conjunction with the external consultant. The lower percentage reductions were generally found on farms with a lower baseline nitrogen loss figure or on farms that were operating at a lower intensity. The level of non-compliance with the permissible nitrogen leaching figures found in Table 14.2 of the One Plan was also an important factor in determining the required on-farm reductions in nutrient losses.

Direct Costs Incurred

Direct costs relate to the expenditure incurred by the applicant in obtaining the Land Use consent. The process of obtaining a Land Use consent firstly requires the applicant to model their respective farm system in the most recent version of OVERSEER®. In order for the

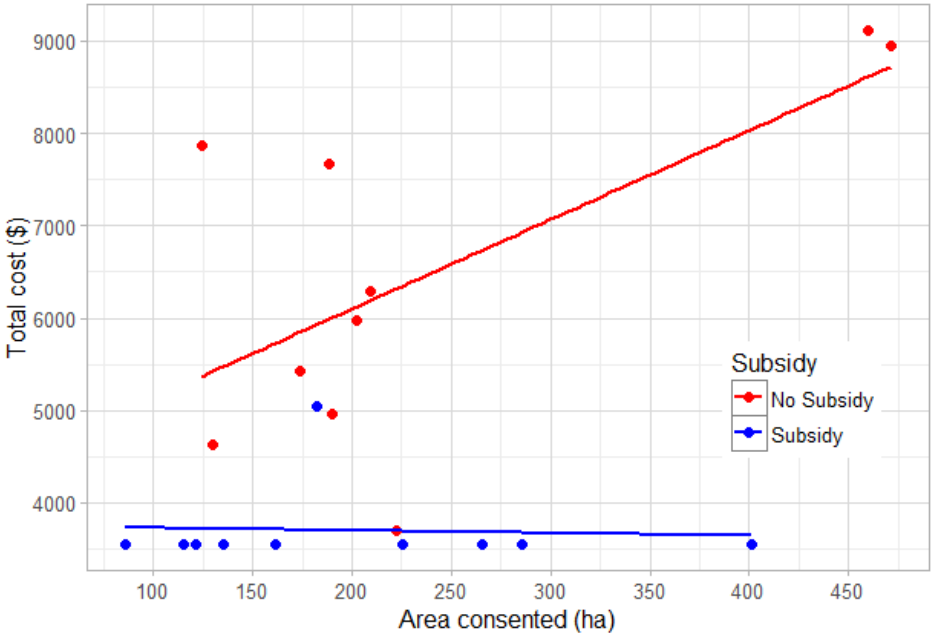
modelling to be accepted by the Regional Council a suitable qualified professional must undertake the modelling. This is the major direct cost of the consent applications. With many farms unable to meet the controlled activity requirements it was necessary for the applicant/farmer to work with the consultant to obtain a reduction in nutrient losses, from a historic baseline period. Often the baseline period used was the 2012-13 production season. In some instances, reductions were easily achieved or had already been made, making the consent application a comparatively simple process with lower preparation costs. In other instances, the applicant had to work extensively with a consultant and mitigation actions were harder to come by.

The second major cost in the process of obtaining the Land Use consent is the lodgement fees paid by the applicant to the Regional Council. Prior to the 31st of December 2015 the application fee was a fixed cost of $800. One applicant had consent lodged after this date and incurred a total variable application fee of $1,285. After the 31st of December 2015 all consents lodged incur a variable fee that is likely to be greater than the original $800.

Throughout the process any other additional costs incurred with obtaining the consent were also included in the total direct cost. These may have included; water monitoring, further environmental assessments and additional costs incurred with water take or discharge consents. Only two applicants sampled had any additional costs incurred.

The average direct cost incurred was $5,080. The range was from $3,550 to $9,113 (Standard deviation of $1,888.).

Figure 3: Direct cost spent to obtain Land Use Consent for 20 Manawatu dairy farms



In total 10 of the 20 farms surveyed as part of this project received an industry subsidy as they were part of the first 50 farms to obtain Land Use consent. **Figure 3**, above, shows the direct cost incurred compared to the farm area consented. From this figure it can be seen that the applicants who received the industry subsidy had a fixed and flat cost to obtain their consent (blue data points, **Figure 3**). It is evident that once this subsidy was removed all applicants incurred a greater direct cost to obtain their consents.

Indirect Costs Incurred

Throughout the restricted discretionary process of obtaining a Land Use consent reductions in nutrient losses from a baseline period (commonly 2012-13) were required. An external consultant was employed by many applicants to achieve reductions in nutrient loss whilst ensuring the farm business remains viable. The consultant often offsets any increases in nutrient losses associated with further intensification with additional mitigation actions. Throughout the process the farmer was often required to outlay a considerable amount of time; primarily with collection and sorting of historic data. An average time of 14 farmer hours was invested per respondent. Assuming a value of $34.50/hour[1] this equates to an average cost in farmer time involved of $483.

Mitigation actions ranged from one up to eight different actions implemented. Common mitigation actions included, but were not limited to:

- Effluent
    - Increased liquid effluent area
    - Improved infrastructure and systems
- Stock
    - Increased wintering-off
    - Earlier autumn culling
- Cropping
    - Removal or reductions of grazed fodder crops
    - Replacements of summer brassicas with multi-graze herbs
- Fertiliser
    - Removal of fertiliser from high-risk periods
    - Reductions in Nitrogen fertiliser usage
    - Variable fertiliser regimes for management blocks

Many of these mitigation actions incurred costs. Mitigation actions that involved capital expenditure, for example effluent infrastructure, often came at significant cost to the applicant. Other mitigation actions requiring a change in stock or feed management may have also incurred costs. However, many mitigation actions involving adjustments to the fertiliser regime often resulted in no net cost, unless fertiliser usage was supplemented with imported feed.

For the purpose of this project the cost associated with implemented mitigation actions is referred to as the "Indirect cost".

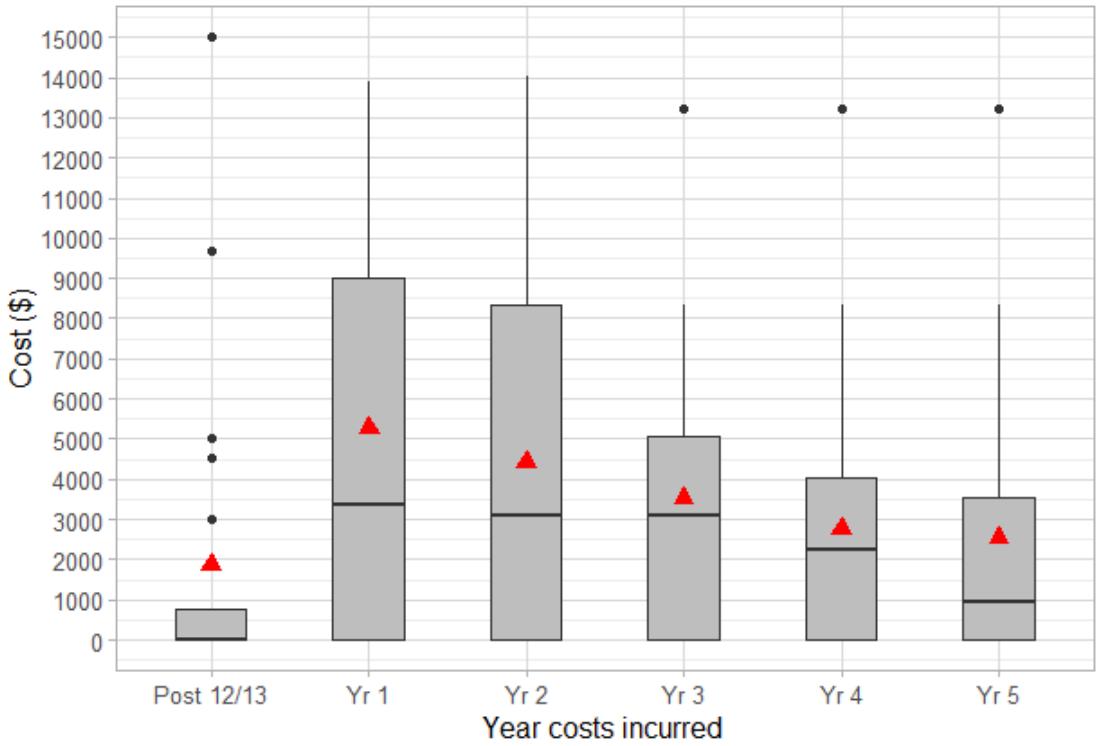
The average indirect net cost incurred was $20,364. This ranged from $0 to $66,124.

The net cost incurred from many mitigation actions was in some cases absorbed over multiple years. However, some mitigation actions; for example capital expenditure, were often absorbed in a single time period. **Figure 4**, below shows the spread of average net indirect costs across six time periods. The post 2012/13 period represents the net cost of mitigation actions that were often voluntarily implemented since the baseline period, but prior to obtaining the consent. The remaining time periods refer to the years since obtaining the Land Use consent. This highlights that the majority of net cost incurred with mitigation actions was absorbed within the first three years of obtaining the consent. The average cost of mitigation actions immediately prior to the

[1] Average Farm Managers Wage (Federated Farmers of New Zealand, 2014).

baseline period of 2012/13was $13,000. This cost and benefit of mitigation actions may not have been taken into consideration throughout the consenting process resulting in some inequity.

Figure 4: Spread of the average cost spent on mitigation actions across a 5 year period



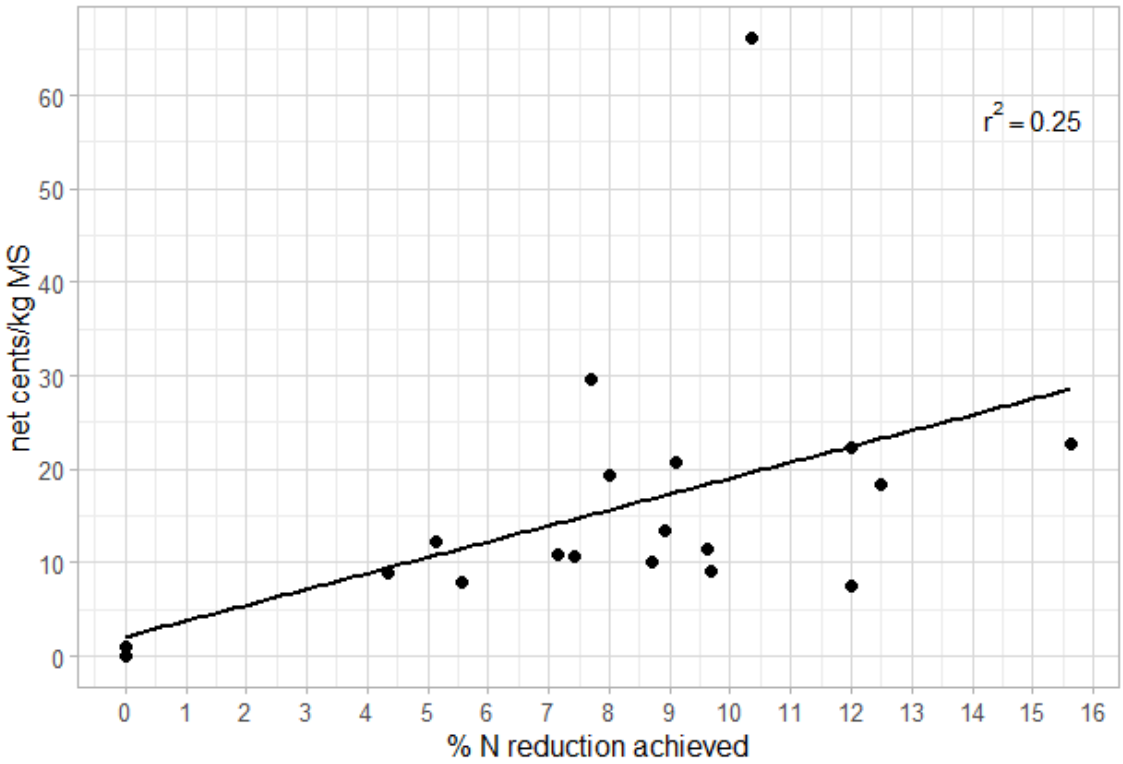
Factors that appeared to affect the level of reductions achieved included:

- The level of non-compliance with Table 14.2 of the Horizons One Plan
- Farm intensity
- Number of mitigation actions implemented
- Type of mitigation actions implemented

The average net indirect cost spent on mitigation actions was 15 cents/kg MS. The total indirect net cost was only assessed based on a single season's milk solid production. However, many respondents had spread the total net cost incurred over multiple seasons. The range of net indirect costs incurred was from 0 cents/kg MS to 66 cents/kg MS, with a standard deviation of 14 cents/kg MS.

From **Figure 5**, below we can see that farms with a higher net expenditure per kilogram of milk solids generally achieved greater reductions in nitrogen loss. This is expected as it makes sense that each unit increase in reduction achieved comes at a slightly greater cost. It is for this same reason that the original work completed by Nimmo-Bell & Company Ltd (2013) suggested that up to an 18% reduction in baseline nitrogen loss could be incurred without significant impact on net farm operating profits.

Figure 5: Ratio of net cents per kilogram of milk solids spent on mitigation actions compared to the percentage reduction achieved



The data shown above suggests that significant reductions can be achieved without significant impacts on on-farm financial viability. With an average reduction in baseline nitrogen loss of 7.7% coming at an average net cost of 15 cents/kg MS. This data confirms the work done by Nimmo-Bell & Company Ltd (2013). It is likely that after a certain point however, costs would increase rapidly as the level of reduction achieved increased.

As seen in **Figure 5**, one respondent had a relatively high level of cost incurred, with a net expenditure of 66 cents/kg MS incurred for a 10.4% reduction in nitrogen loss. The full impact of this expenditure will vary as the milk pay-out varies, but at a net spend of 66 cents/kg MS the impact may potentially be significant if expenditure coincided with a low pay-out season.

The net indirect cost incurred was dependant on mitigation actions implemented. The choice of mitigation actions is important to the cost incurred and so the net cost incurred is not necessarily related to farm intensity. It is important that applicants work with a suitably qualified consultant and select mitigation actions that will suit their respective systems.

Other Effects

With the majority of Existing Intensive Land Use consents unable to meet controlled activity requirements the level of uncertainty for applicants was increased. This uncertainty has the potential to increase farmer stress levels as costs increase and consent terms vary. Qualitative data on other effects of the consent process was collected and is summarised below:

Obtaining a Land Use Consent

All respondents placed some level of importance on obtaining a Land Use consent, with 16 out of 20 respondents placing a moderate to very important weighting on doing so. Prior to

obtaining the consent 15 out of 20 respondents indicated a moderate to high level of stress. This stress was driven through uncertainty of what the process and regulations might entail. Once engaged in the process the level of stress declined with 10 out of 20 respondents expressing a moderate to high level of stress, 6 out of 20 respondents feeling a slight level of stress and the remaining four respondents with no observed stress.

Post obtaining the consent 12 out of 20 respondents said all stress had been resolved or removed. One of these respondents was quoted as saying; "Now we have consent; safe dairying into the future." Other applicants responded stating that the process "…wasn't as bad as first anticipated". The remaining 8 respondents still felt some stress and indicated this was due to on-going consent requirement and commitments.

Environmental Legislation

The impact environmental legislation has had on the applicants farming business was positive for 9 out of 20 respondents. The other 6 out of 20 respondents suggested the effect had been negative and the remaining five respondents stated no impact. The positive effects of environmental legislation came from respondents who had gained an increased knowledge of their farming operation and improved efficiencies with nutrient usage. The negative effects came from respondents who felt they had incurred an unnecessary expense through implementation of mitigation actions.

Farm Value

The perceived impact of a Land Use consent on farm value was split evenly; 8 out of 20 respondents perceiving a positive impact, another eight respondents negative and the remaining four respondents perceiving no effect.

Conclusion

Overall the data suggests that on-farm nutrient reductions can be achieved without significant impacts on financial viability. With an average reduction in baseline nitrogen loss of 7.7% coming at an average net cost of 15 cents/kg MS, often spread across one to five production seasons. However, it is likely that beyond a certain level of nitrogen reduction, costs incurred may rapidly increase

The total direct and indirect net cost incurred varied significantly between farms. The variation was likely caused by a number of factors, including; the level of non-compliance with Table 14.2 of the Horizons One Plan, farm intensity, and the mitigation actions implemented.

The process and notion of obtaining a Land Use consent can be daunting for many farmers; causing high levels of stress. The stress was driven by uncertainty and the perceived impact on their properties. It is therefore important that applicants work with a suitable qualified consultant and select mitigation strategies that will suit their respective farm systems. A high net cost incurred does not necessarily relate to large nutrient reductions and so a range of mitigation actions should be investigated before any commitments are made and consent applications lodged.

Recommendations & Limitations

This project investigated the direct and indirect costs incurred by 20 applicants throughout the process of obtaining a Land Use consent. This therefore limited statistical analysis. The study was exploratory and sought to instead gather real on-farm cost data from applicants who had obtained consent, providing likely explanations and comments on observed trends. This study could be repeated with a larger data set to allow more robust statistical analysis of any observed trends. A census could also be used instead of a survey to increase the respondent return rate.

Although this project obtained real cost data from applicants implementing mitigation actions the overall effect on net farm operating profit (EBIT) was beyond the scope. This therefore did not identify any practices implemented by the applicant to offset any costs incurred throughout the process of obtaining a Land Use consent. Individual farm analysis would be required to determine the net effect on farm operating profit and therefore the true impact of obtaining the Land Use consent.

One of the largest identified risks is the potential for expenditure on mitigation costs to considerably increase, should individual farms be required to comply with permissible nitrogen loss figures, stated in Table 14.2, of the One Plan. With farmers unable to meet the necessary controlled activity requirements the level of non-compliance with Table 14.2 of the Horizons One Plan becomes a crucial matter of discretion. This therefore makes it difficult to draw similarities and trends between individual farms, with each farm assessed on a case-by-case basis.

The nature of consenting is constantly changing as national pressures shift. So, the data presented in this report is considered a snap shot in time and may be hard to extrapolate into the future, with the consent pathway and requirements likely to continue evolving. However, it will provide for an interesting contrast with costs when Horizons recommences the consenting process in the priority catchments.

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