A LICENSE TO FARM - FINDING VALUE BEYOND COMPLIANCE

Roshean R Woods

Agri Magic Ltd, 707 McLaughlins Rd, RD 1, Darfield 7571, Canterbury, New Zealand

Email: Roshean@agrimagic.co.nz

Abstract

In Canterbury, the Land and Water Regional Plan is operative and aims to deliver community aspirations for water quality. The rules which apply to farmers depend on which nutrient allocation zone(s) or catchment(s) their farm falls within. In most areas farmers are required to apply for a land use consent to continue with their farming activity. First, the Nitrogen Baseline must be determined using the most recent version of OVERSEER. This is the nitrogen (N) loss (kg N/ha/yr) averaged for 1 July 2009 to 30 June 2013. A nitrogen discharge allowance (NDA) is calculated from this Baseline which sets the nutrient constraint for the property. In some areas, reductions are also required.

At Agri Magic we support farmers through this process by putting their NDA into context by comparing it to the current farm system and future scenarios. It is important that farmers have sight over what these nutrient constraints mean for their farm business and daily operations. Future scenarios might include what the farmer is planning for the future, what they would like to do, or could include some mitigations they are considering.

Using OVERSEER in this way allows us to highlight the key drivers of N loss for a particular farm through the use of the OVERSEER block reports. When we share this information with the farmers and explain the impact of these drivers, this provides them with the information they need to do what they do best… to innovate. They can come up with practical options and solutions to manage the risk of this diffuse pollution. OVERSEER allows for a customised approach for each farm business. In this presentation an example case study farm will be used to illustrate how OVERSEER can provide context and help farmers to plan for the future.

Once farmers understand the key drivers of nutrient loss in the context of their property this allows them to innovate to address it. By using this approach farmers are able to choose their approach to manage the nutrient loss on their property, and this could ultimately have a better outcome for both the catchment and for their farm business.

Introduction

New Zealand farmers are great innovators, they are known for it. We also have 'effects-based' policy which means that once farmers understand the key drivers of nutrient loss in the context of their property they can innovate and choose their approach to address it. This could ultimately have a better outcome for both the catchment and for their farm business. During this presentation, a case study from one of our customers in Canterbury is used to demonstrate how farmers can get more value out of the land use consent process than just compliance.

In Canterbury, the Land and Water Regional Plan is operative, this means that there are rules around nutrient loss which farmers need to adhere to. The rules which apply to a particular farm depend where it is located within the Canterbury region.

Case Study

The case study farm is located in the Selwyn Te Waihora catchment, so the rules which apply to this farm are described under Plan Change One of the Canterbury Land and Water Regional Plan (Section 11). During the Baseline period (2009-2013) this case study farm was mainly a dairy milking platform but also had an area dedicated to wintering. They milked around 1000 cows, grew 22.5 ha of kale for winter feed, and wintered 560 cows on farm. The property has 5 soil types as described by Landcare Research's S Maps, and they have three irrigation systems: centre pivot, rotorainer, and K-line. The dairy shed effluent is spread onto a ~96 ha block beneath one of the centre pivots and some of the K-line area. When the Baseline farm system was modelled using OVERSEER® v6.2.3, the whole farm nitrogen (N) loss to the bottom of the root zone was 97 kg N/ha/yr. This sets the constraint for the property because under the Selwyn Te Waihora rules, properties are not allowed to increase their N loss above the Baseline. The farmer also needs a Farm Environment Plan in place, will need to apply for a Land Use Consent, and is required to make reductions in their N loss by 2022.

How big are these reductions for this property?

This is based on the Baseline land use which for this farm was 303.5 ha of dairy (30% reduction), 25.2 ha of dairy support (22% reduction), and 44.6 ha of other land use (0% reduction, includes non-productive land and scrub). The overall reduction required by the property is determined by weighted average to be 26%. This is the reduction required from the Baseline N loss, so the target N loss by 2022 is 72 kg N/ha/yr for the property.

So, how is the farmer tracking to meet this?
Are they currently above or below their Baseline N loss?

When the current farm system was modelled in OVERSEER® v6.2.3 the whole farm N loss was found to be 82 kg N/ha/yr. This provides context around the Baseline and target N losses. The farmer has made some reductions since the Baseline period, however, they still have some further reductions to make before 2022 to meet their target of 72 kg N/ha/yr. So what changes have they made since the Baseline period?

- They now have more cows at 1200 peak,
- They now winter off farm, on another property,
- They no longer grow any crops on farm,
- They are making more efficient use of their N fertiliser, using a lower rate of 250 kg N/ha/yr, compared with the 350 kg N/ha/yr that they were using during the Baseline period,
- They also now differentiate between their effluent and non-effluent area, applying less N fertiliser to the effluent block.

So…

Baseline N Loss (kg N/ha)	Current N Loss (kg N/ha)	26% Reduction Applied (N loss required)
97	82	72

Closing the gap

So how do we get there?

This is where OVERSEER® is used to help determine the key drivers of N loss on this property. OVERSEER®'s Nitrogen Block Reports are a good starting point to identify these.

Block Name	Baseline		Current	
	N loss / ha	Added N	N loss / ha	Added N
Eyre_4a.1 Pvt Eff	134	446	124	297
Mayf_2a.1 Pvt Eff	81	446	61	297
Rang_21a.1 Pvt Eff	128	446	101	297
Rang_21a.1 Pvt NE	111	346	92	252
Rang_21a.1 K-line NE	109	345	102	251

In the table above, some of the block N losses and added N (fertiliser and effluent) have been pulled out of the Nitrogen Block Reports from the Baseline and the current nutrient budgets for the case study property. The "N loss/ha" column of the current nutrient budget shows that the Eyre soil (Eyre_4a.1) on the property is more sensitive to N loss than the Mayfield soil (Mayf_4a.1) on the property. The other things which are shown are the difference in N loss between the effluent (Eff) and non-effluent (NE) blocks, and the greater N loss from the K-line irrigation system, compared with pivot. The reductions in N fertiliser applied in these two farm systems are also illustrated in the "Added N" column.

The other thing we do is run some "what if" scenarios for the farmer. These are usually things we have discussed with them during the process. When modelling these future scenarios it is important to take into account any future plans which the farmer may have for their farm business. Really it is about trying to decouple intensification and N loss. It is important that our customers can continue farming with profitable farm businesses while also meeting their requirements around nutrient loss, and in the case of the customer in the case study, having to meet reductions.

At the end of this process we put together a one-page document for the farm managers which summarises:
- Their constraint in context with their current farm system (or near future farm system)
- Identifies the <u>key drivers</u> of N loss for <u>their</u> farm
- Includes any management changes on farm which they need to be aware of in case it pushes them over their constraint

It is really important that this is kept up to date so that the farmers have constant sight over how their constraint is to fit with their farm business. It is important that farmers have their finger on the pulse when it comes to this stuff so they can continue operating. It is also important to stress that this is a **customised approach** - there is <u>no</u> "one size fits all". Each farm business is different in terms of physical resources, budget, farmer capability and farmer goals, so it is important to tailor the approach to fit.

So where is the value?
- By using OVERSEER® to provide context around the Baseline N loss the farmer knows where they are at and where they need to get to.
- They have an understanding of the <u>key drivers</u> of N loss for <u>their</u> property. This allows them to make decisions around where to put their dollar down or where to invest in terms of making changes on farm to reduce nutrient losses.
    - What is going to have the biggest impact?
    - What change will have the best value for money?
    - What will best fit with their farm business?
- They are aware of the things which could push them over their constraint - this is important for on-farm daily decisions.
- We often work at quite a strategic level with our customers, planning how their businesses will remain sustainable into the future. Through modelling of future scenarios we can help them to find a way through. This is very much a collaborative approach. OVERSEER® is an excellent tool when used in this way.

So, what did they decide to do?
Through going through this process, irrigation management was identified as being the biggest driver of N loss for this property in the case study. Armed with this information, the farmer decided to invest in soil moisture monitoring technology to better manage their irrigation scheduling, and they also invested in a new pivot to replace their rotorainer system. With these changes they will be able to meet their required reductions by 2022.

Other benefits of this process are that they have been able to increase their pasture production, and more efficient use of resources such as fertiliser and water has allowed them to be a more profitable business. They have been able find a way to meet their target 2022 N loss while maintaining their current cow numbers, and producing more milk than during the Baseline period.

Summary
- Once farmers understand the <u>key drivers</u> of nutrient loss in the context of <u>their</u> property this allows them to innovate to address it.
- Farmers are able to choose their approach to manage nutrient loss on their property.
- This could ultimately have a better outcome for both the catchment and for their farm business.

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