

## CO-DEVELOPMENT: A CASE STUDY OF ROTORUA FARMERS ON NUTRIENT MANAGEMENT

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### Abstract

Lake Rotorua catchment farmers are faced with the challenge of reducing nitrogen (N) and phosphorus (P) losses from their land, while remaining profitable. New RMA rules require 'nutrient management plans' (NMPs) with staged N loss reductions and Good Management Practice (GMP) adoption to manage P loss risk.

Through farmer and agency co-development, ten short videos were produced to promote proven, fit for purpose GMPs that can help reduce on-farm nutrient losses. The video series was one of several catchment projects funded by the Bay of Plenty Regional Council (BOPRC) and the Ministry for the Environment. Additional support was received from Ballance Agri-Nutrients (Ballance) with technical analysis provided by Perrin Ag Consultants, AgFirst and Ballance.

In eight of the videos, farmers talk about their experience with introducing a particular GMP and its impact on nutrient losses, profitability and their wider farm system. The videos are complemented by relevant web-based resources and a GMP cost-benefit analysis expressed as a \$ cost per hectare and/or per kilogram of N and/or P mitigated. The farmer videos are book-ended by an introductory video on nutrient cycling and a final video on pulling GMPs together in a NMP.

The project was guided by the principle of 'by farmers for farmers'. Positive farmer engagement was enabled by using local farmers who were known and respected by their farmer peers. Video topics were selected by farmers from the Lake Rotorua Primary Producers Collective (the Collective). The GMP series can be accessed via the Collective's website [www.rotoruafarmers.org.nz/gmp/](http://www.rotoruafarmers.org.nz/gmp/).

As at February 2017, total video views were 1,469, greatly surpassing the number of commercial farms in the catchment. The average GMP video view time is three minutes i.e. most are watched to completion. The long-term impact of the video series will be difficult to separate from the raft of parallel regulatory, incentive and extension mechanisms. However, farmer, Council and agency feedback on the videos has been very positive and supports the peer-to-peer learning and co-development approaches applied to this GMP video project.

### Introduction

Bay of Plenty Regional Council has set a sustainable annual nitrogen (N) load target for Lake Rotorua of 435 tonnes which must be met by 2032. New rules are being developed to limit N loss from land-based activities. These rules, known as PC10 or Plan Change 10 (BOPRC, 2018), will require landowners to demonstrate reductions in N losses through Nutrient Management Plans and regular [OVERSEER<sup>®</sup>](#) Nutrient Budgets assessments. Some farmers continue to

challenge these rules<sup>1</sup>, preferring a more voluntary approach to N loss reductions through on-farm good nutrient management practices or GMPs.

As part of the overall Lake Rotorua policy package, a Low Nitrogen Land Use Fund of \$3.3 million (BOPRC, 2018a) was set up to provide research and extension initiatives that support landowners to reduce nitrogen losses. Jointly funded by Regional Council and Ministry for the Environment (MfE), the three focus areas of this contestable fund are:

1. **How to promote additional uptake of proven existing low nitrogen land uses<sup>2</sup> or farm systems in the Lake Rotorua catchment.**
2. How existing low nitrogen land uses or farm systems can be applied to conditions in the Lake Rotorua catchment.
3. The potential of new low nitrogen land uses or farm systems to be adopted in the Lake Rotorua catchment.

Working in collaboration with Lake Rotorua catchment farmers and Ballance Agri-Nutrients, Landconnect secured funding to address the first focus area. We proposed to produce a video series on nutrient Good Management Practices (GMPs) by showcasing local farmers. Total project funding was \$58,000 plus in-kind support from Ballance and Collective members.

Rotorua farmers generally want to keep farming (with mitigations) rather than change to a completely new land use, as shown in the Rotorua Farmer Solutions Project survey ([Perrin Ag, 2012](#)). Within the PC10 rules context, the challenge was to convey the practical pros and cons of GMPs to farmers in a way that encourages adoption rather than scepticism. Further, there is a market gap in terms of informative GMP videos. Internet searches revealed many generic aspirational farmer environmental videos but very few ‘how-to’ videos on specific topics.

### **GMP Video Series Objective**

The project objective was to produce a series of ten short videos and supporting web-based information on nutrient good management practices that would:

- *Provide Rotorua farmers the key information they need to consider before adopting a new GMP, especially the amount of N and/or P mitigated and the cost.*

The primary target audience was pastoral farmers in the Lake Rotorua catchment, however the principles discussed in the videos are applicable to other regions of the New Zealand. The video series is not intended as a substitute for farm specific tailored advice from rural professionals.

### **Methodological Approach**

Peer-to-peer learning is a recognised extension method within the agricultural sector (Drury *et al.*, 2017). Farmers relate well to their peers and will often call on them for advice and support. New Zealand has a long history in using peer-to-peer learning through a range of mechanisms such as catchment care groups, farmer hosted field days and dairy discussion group, monitor and demonstration farms. A current application is through the Red Meat Profit Partnership [action networks](#). Video is a recognised medium for sharing farmer knowledge and experience and can be a successful education tool in influencing farmer behaviour and practice ([Karubanga et al. 2017](#)).

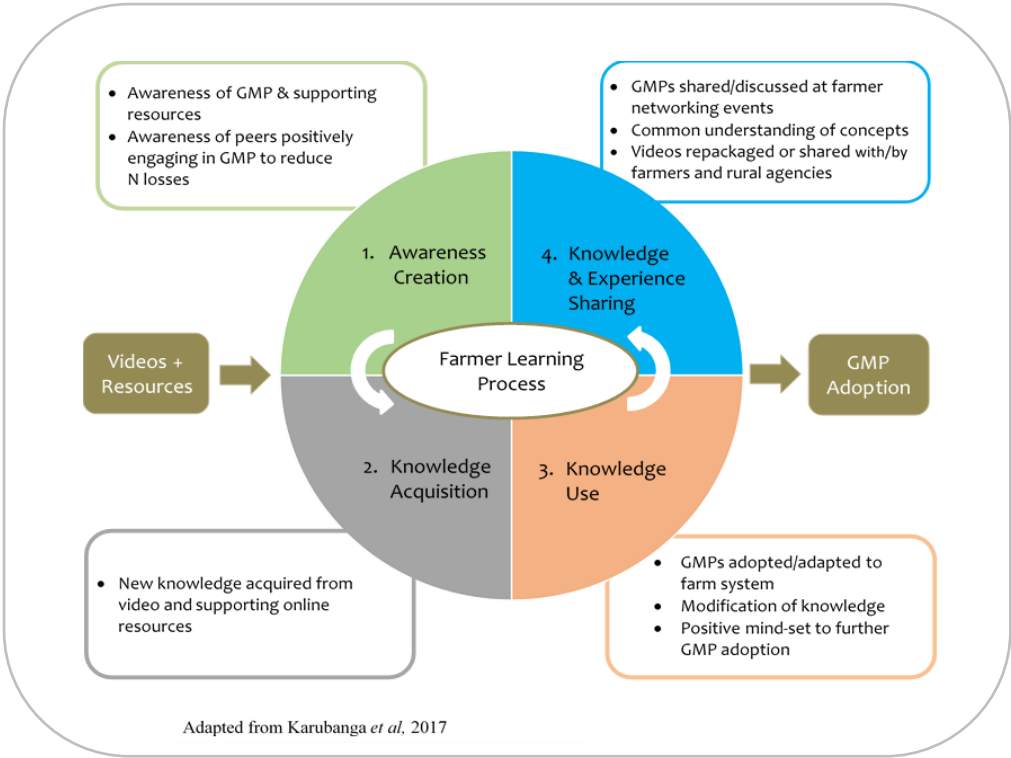
The goal of the GMP video project was to promote uptake of proven nutrient GMPs to Lake Rotorua farmers and beyond. Using a peer-to-peer approach through video was guided by a

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<sup>1</sup> Environment Court appeals on PC10 are scheduled for mid-2018.

<sup>2</sup> In this context, low nitrogen land use means land uses and practices with low N discharges per hectare.

conceptual model adapted from Karubanga *et al.* (2017). This model, summarised in Figure 1 below, is based on social learning context. It focuses on: raising awareness; acquiring knowledge; using knowledge through experimentation and adaption; and sharing knowledge and experiences of GMPs with peers.

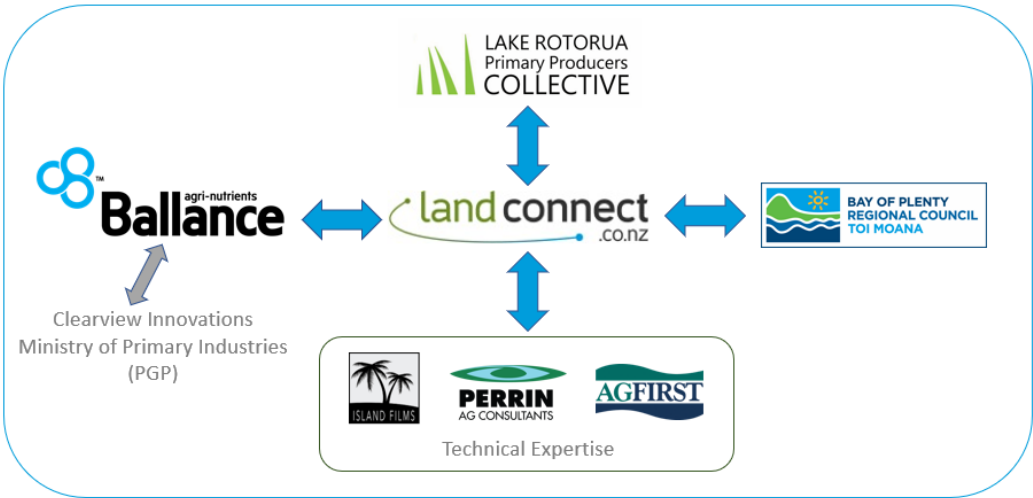


Adapted from Karubanga *et al.*, 2017

**Figure 1: Farmer Learning Process Through Videos**

**The Co-development Model**

The production of the video series involved an iterative co-development approach with Rotorua farmers, Ballance and BOPRC, complemented by technical expertise from Ballance, Perrin Ag, AgFirst and Island Films. Landconnect Ltd coordinated the video project and the collaborative process. This co-development approach is summarised in Figure 2 below.



**Figure 2: Project Co-development with Farmers and Agencies**

- **BOPRC** provided funding through the Low Nitrogen Land Use Fund. The funding contract included multiple milestone and sign-off points.
- **Rotorua farmers** provided voluntary, in-kind guidance to the conceptual development of the project, direction on video topics, recommendations for farmers to be showcased in each video and sign-off on the final video series and supporting web resources.
- **Ballance Agri-Nutrients Ltd** provided financial support linked to its [Clearview Innovations PGP programme](#) co-funded by the Ministry for Primary Industries. Ballance also provide technical expertise on mitigations and video development from its science extension team.
- Project technical support was provided by:
  - **Perrin Ag and AgFirst** consultants who used [OVERSEER](#), [FARMAX](#) and local knowledge to identify the N/P/\$ impacts for each GMP. They also advised on GMP efficacy, risks to consider, skills required, terrain factors and the interaction with other farm practices.
  - **Island Films** who undertook the videoing and editing of the video series.

### **By ‘Farmers for Farmers’ Principle in Action**

The fundamental principle guiding peer-to-peer learning is the commitment to using a ‘by farmers for farmers’ approach. For the GMP video project to be successful, it was essential to have farmer support and engagement throughout the project, covering project initiation, planning and delivery.

The conduit to working with Rotorua farmers was through the Lake Rotorua Primary Producers Collective, known locally as ‘the Collective’. The Collective was formed in 2011 as an incorporated society to advance the interests of rural landowners facing regulated reductions in nutrient losses from their farms. The Collective comprises a diverse group of farmers responsible for about 10,000 hectares within the Lake Rotorua Catchment. The GMP video series project was aligned with the Collective’s strategic priority of identifying and promoting good nutrient practice ([Collective, 2015](#)).

Well respected farmers from the wider Rotorua area were chosen as the key GMP promoters or spokespeople of/for the GMP, describing how they introduced the method and how it is working on their own farms. Where possible, winners from the Bay of Plenty Ballance Farm Environment Awards (BFEA) were used as GMP spokespeople. Farmers who are opinion leaders provide the impetus for social learning and improving GMP uptake among peers. (McEntee, 2010; Payne *et al*, 2016).

The Collective also agreed that it was important to publish the video series and supporting information on a farmer-based website rather than a government or council site, so that the project was not directly integrated with PC10 rules communications. The video series was therefore published on the Collective’s own website at [www.rotoruafarmers.org.nz](http://www.rotoruafarmers.org.nz) ([developed and maintained by Landconnect Ltd](#))

### ***Co-Development of Video Topics***

The GMP video topic selection was guided by the Collective, with input from Ballance and BOPRC. The ten-video series consists of eight core GMP farmer focussed videos with an introductory video on farm N and P cycling and losses, and a final video on integrating multiple GMPs.

The video topics are:

1. Understanding Nutrient Cycles
2. Using Nitrogen Efficiently
3. Good Fertiliser Practices
4. Chicory as a Fodder crop
5. Effluent Management
6. Optimising Sheep and Beef Stocking Rate & Type
7. Reducing Phosphorus Runoff
8. Using a Feed pad to Stand Off Stock
9. Importing Maize Silage to Reduce Nitrogen Leaching
10. Nutrient Management Plans.

The draft list of topics was debated amongst the Collective leadership with several added, removed and modified. The final topic list was subsequently approved by Ballance and BOPRC before film production commenced.

Each GMP video topic is structured into three sections:

1. An introduction of the farmer and GMP topic
2. How the farmer introduced the GMP into the farm system i.e. practical how-to information
3. A concluding technical analysis summarising the benefits of the GMP i.e. a cost-benefit analysis expressed as a \$ cost per hectare and/or per kilogram of N and/or P mitigated.

All videos were embedded on a dedicated GMP webpage that included:

- A transcript of the video
- Links to relevant research and practical resources related to the topic so that farmers could find out more about each GMP
- The full GMP technical analysis supplied by Ballance, Perrin Ag or AgFirst consultants
- Links to other videos in the series
- A caveat to explain that the information provided is for general guidance only and is not intended as a substitute for farm specific advice.

### **Video Production Co-Development**

Each of the ten videos in the series was developed through interaction between farmers and project partners as follows:

1. Individual farmers implementing a specific GMP were invited to take part in the project by a member of the Collective leadership
2. Landconnect arranged an initial farm visit to talk with the farmer(s) about the project and learn more about the particular GMP being used on their farm
3. A draft script was then developed and emailed to the farmer for comment
4. The revised script was sent to Ballance and agricultural advisers for comment and technical input i.e. GMP cost-benefit analysis
5. Final script sent to farmer for sign-off
6. Videoring scheduled and carried out (generally a single visit)

7. Draft video sent to farmer for feedback
8. Final edits completed and sent to farmer for final sign-off.

Farmers generally preferred a pre-written script rather than trying to “wing it” in front of the camera. A script also ensured that the videos were focussed and kept short. However, a tightly scripted approach did not always work when it came to shooting the video. A flexible approach was needed to respect farmer preferences and style.

While female farmers were supportive of the project and involved in the development of the video topics, they were generally reluctant to be filmed. To address this gender imbalance, a respected female Collective sheep and beef farmer voiced the intro and outro for each video.

The first video and web-based supporting resources were signed-off by the Collective, Ballance and BOPRC to ensure that the quality, format and look and feel of the video was professional and engaging to farmers. At this point Landconnect continued with the production of the remaining nine videos in consultation with farmers, the Collective and the farm consultants.

### **GMP Video Series Promotion**

The GMP video series and supporting information resources were published on 7 July 2017. The videos are hosted on YouTube and embedded on the Collective’s website [www.rotoruafarmers.org.nz/gmp](http://www.rotoruafarmers.org.nz/gmp) as a dedicated webpage. Promotional activity included:

- Local media releases
- Postcard drops to Rotorua rural sector agencies/ businesses and rural delivery addresses
- Publicity via the Collective’s website and e-newsletters
- Promotion via rural school newsletters
- BOPRC media release and social media posts
- Promotion at DairyNZ discussion days
- Social media promotion by local vets, agricultural suppliers and farm consultants
- Farm Source Rotorua played the videos in its customer coffee area.

### **GMP Video Series Evaluation**

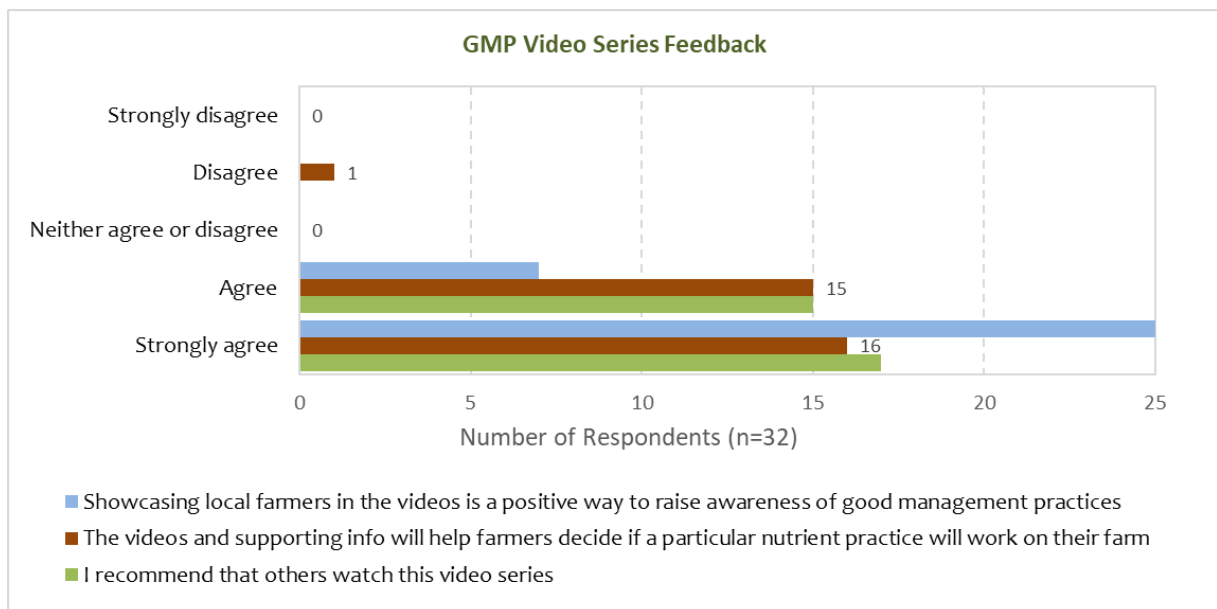
There is no comprehensive baseline picture of Rotorua farmer awareness and/or adoption of different nutrient GMPs. However, there are qualitative descriptions within two reports, namely Perrin Ag’s Farmer Solutions Project ([Perrin Ag, 2012](#)) and a local Sustainable Farming Fund project final report ([AgResearch, 2015](#)).

The long-term impact of the video series will be difficult to separate from the raft of parallel regulatory, incentive, and other extension mechanisms. Uptake of GMPs may be also be delayed as farmers await the outcome of PC10 appeals to the Environment Court. Other factors influencing the timing of GMP adoption include high upfront capital costs for implementing some GMPs, lack of incentives ([Monaghan et al., 2007](#)) or short term seasonal factors such as drought and flooding. Nonetheless, early feedback on the GMPs series from farmers and agricultural agencies has been positive and supports the co-development approach and peer-to-peer-model applied to this GMP video project.

### ***GMP Video Series Feedback***

The final milestone in the contract with BOPRC was to measure the effectiveness of the video series by conducting a farmer and partner agency survey (at least 20 participants) with a target of at least 70% rating the videos as satisfactory or highly satisfactory. A short farmer and partner agency online survey was circulated via the Lake Rotorua Primary Producer Collective database (N=302) in August 2017. The survey took about one minute to complete. Of the 32 respondents, 29 were farmers or landowners. While the response rate was disappointing, the results show a positive response to the video series (Figure 3).

- All respondents agreed that ‘showcasing local farmers was a positive way to raise awareness of GMPs’. Most (25) strongly agreed with this statement
- Almost all (31) agreed that ‘the videos and supporting information will help farmers decide if a particular GMP will work on their farm’. One disagreed with this statement (no reason given)
- All agreed that they would recommend this video series to others.



**Figure 3: Survey Feedback on GMP Videos**

The open-ended responses offered in this survey were also positive. A sample of these positive statements from farmers and others are highlighted below:

- The videos are great! Nice work. We have them playing in the Farm Source store here
- I've received direct positive commentary on these from other Regional Councils who think they're a great idea and are looking to emulate them in their own region. (BOPRC Communications Manager)
- Great to see some familiar faces
- Yes, good to show local people, their situations, and their solutions
- It is always difficult to engage in these discussions, the format you have chosen is excellent. The application of GMP must be socialised as an everyday action
- Let's have more discussion on the success and failures so we all learn more
- Great stuff people (Beef + Lamb NZ).



### ***Lake Rotorua Primary Producers Collective Feedback***

Further feedback was gathered from farmers at the Collective's Executive meeting in August 2017, summarised as follows:

- Videos are engaging
- Supporting information on the video page is very useful and will help farmers apply new practices
- Raises awareness in the community about nutrient management and what farmers can, and are, doing to reduce nutrient losses
- Would like to see other topics added in the future e.g. riparian management
- Raises the profile of the Collective.

### ***GMP Video Series Viewership***

As at February 2017, YouTube video analytics indicate 1,469 views. This greatly surpasses the number of commercial farms in the catchment (~100). The average GMP video view time is three minutes i.e. most are watched to completion.

<b>Video Topic</b>	<b>Views</b>	<b>Watch Time</b>
Understanding Nutrient Cycles	261	633
Chicory as Fodder Crop	206	640
Using a Feed pad to Stand Off Stock	184	506
Using Nitrogen Efficiently	147	521
Nutrient Management Plans	137	377
Good Fertiliser Practices	126	411
Reducing Phosphorus Runoff	122	424
Effluent Management	108	375
Optimising Sheep and Beef Stocking Rate & Type	103	373
Importing Maize to Reduce Nitrogen Leaching	75	252
<b>Total Views</b>	<b>1,469</b>	<b>4,512</b>

\*YouTube Analytics Summary as at 13/02/18

### **Conclusions**

The GMP video series was well received by its key target audience of farmers in the Lake Rotorua catchment. This positive reception reflected the extensive co-development approach and the 'by farmers for farmers' principle applied throughout the project. The focus on local respected farmers standing proudly on their own land and speaking to their own experiences was an effective application of peer-to-peer learning. This farmer-centric theme was underpinned by expert technical input and analysis by specialists from Ballance, Perrin Ag and AgFirst.

It is not possible to specifically attribute current or future farmer GMP adoption to an extension project like the GMP video series, especially when there are many parallel related initiatives in the target catchment. Some caution is also warranted around the substantial effort and cost involved for what is a relatively small key target audience. However, the encouraging evaluation assessment suggest that farmers can help drive change amongst their peers when an engaging medium like video is used with integrity and robust technical support.



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