Future Proofing Vegetable Production

MILESTONE REPORT PREPARED BY DAN BLOOMER

405649-M01: Project Established

(Due 30 September 2018)

Project Team Establishment Meeting

Two project establishment meetings were held, one in Levin at Te Takere and one in Gisborne at Gisborne District Council. At both there was a strong presence of growers and regional council representatives. The Levin meeting also brought together science support providers from Landcare, Plant and Food and Groundtruth and other stakeholders including the Foundation for Arable Research, Ballance AgriNutrients and Potatoes New Zealand.

There is strong engagement and commitment from all parties to collaborate.

A presentation by Groundtruth at the Levin meeting showed the work being done in the Wairarapa to reduce surface water nitrates by installing wetlands. This helped raise interest and potential for use in Arawhata.

Follow-up "grower only" meetings were held in Levin and Gisborne to further work through project ambitions and activities and to enable growers to ask direct questions and give unconstrained opinion. Both meetings were very positive and confirmed engagement and a desire to genuinely review farm practices. The need to have good practices that can realistically be applied within the many operational constraints that growers face was reinforced. There many operations to complete and often very tight weather and crop development windows in which to act.

Arawhata workshop on common pool resource management

The concept of common pool resource management was introduced at the establishment meetings. Using Elinor Ostrom principles, it involves all stakeholders taking responsibility and determining how to collaboratively manage the resource fairly and sustainably. In the context of this project the common resource could be contributions to the catchment's nitrate load.

The second Levin meeting readdressed the topic and considered two potential management approaches.

1. Pooling nitrate leaching allocations and managing them to maintain the overall catchment losses to be within targets.
   This approach acknowledges that some places may more easily limit nitrate losses and their savings could be transferred to help another area where losses are higher. It would in effect be a "cap and trade" model. Fresh vegetable growers did not think there would be great scope for this as their operations are too similar. However, they did note that within any individual property there are still areas where no nitrates are applied and cut and carry cropping may provide a nett benefit.

2. Intercepting and removing nitrate from drainage water.
   Surface water can be passed through wetlands and anaerobic zones to both absorb nitrates and to convert nitrate to N2 gas. Subsurface drainage flows can be intercepted and treated through high carbon woodchip bioreactors to convert nitrate to N2 gas. In both cases the N2 is harmlessly released to atmosphere. Levin growers support trials of both approaches. Three wetland sites were offered, and planning is underway for their design and development. A woodchip bioreactor site was offered and subject to further research will be used as a trial.

Grower Good Practice Survey completed Levin and Gisborne

The Good Practice Survey is underway and should be completed by mid-October. In both regions, it was resolved to base the survey on information collected and required for farm environment plans. While the two councils have adopted different templates, there is considerable similarity and a common template is being developed for this project.

Growers note the management practices do not apply solely to nitrates. Both growers and councils have expressed interest in extending the project's breadth to not exclude phosphate and sediment management.

Group and farmers supported to build capacity and capability

To date the focus has been on establishing the project, ensuring common understanding of its aims and objectives and readying for work starting over the spring and summer period.

Nitrate test strips to assess available soil nitrate have been distributed to project farms in Levin and Gisborne and farmers have been trying them out. All the required resources for farmers to undertake testing themselves have been brought together as a "Test Kit" containing test strips, extract solution, test tubes and soil sieves. We will be running workshops as required to ensure appropriate sampling strategies, sample processing and nitrate calculations are understood and test results are valid.

Each farmer is being encouraged to undertake some form of trial comparing a "new" management practice with current practice. A number of sites have been identified. Woodhaven Gardens in Levin has made a 4 ha site available for any trials the group wishes to run and other growers wish to collaborate. In Gisborne, growers are also keen to participate, and we are working through which catchments and operations provide best opportunities to effectively reduce nitrate impacts.

A number of potential trials are being evaluated. Common to all is using the Nitrate QuickTest to assess available soil nitrate and modify fertiliser prescriptions. Others include assessing new fertiliser products that are designed to minimise losses, reducing base application rates, and testing biological products that are showing increased growth and reduced leaching in pastoral systems.

Potatoes NZ is engaged with a company offering automated soil moisture and nutrient sampling technology that includes nitrate measurement at three depths. We will support a trial some of these in the Arawhata Catchment when they are made available.

We will help growers design the trials, support trial establishment and monitoring and help with harvest and data analysis. Our aim is to increase the knowledge of successful farm trialling which will have legacy benefits when farmers have other questions they want to test or when reviewing information given to them by sales people.

Horizons Regional Council and Massey University have appointed a PhD candidate to undertake a study in the Arawhata Catchment in parallel with our project. The working title of the research is, “The capacity of grower management to reduce nitrogen losses to Lake Horowhenua”. The intent is for the PhD research to independently monitor the effectiveness of the different management strategies trialed.

Sites for nitrate mitigation trials identified

In both regions, farmers are keen to include testing of waterways that pass through farmed areas. We are identifying sub-catchments and drainage networks that can be monitored and developing protocols for data collection. In the Arawhata, we are planning to follow key drains from above the cropped areas, monitoring above and below each farm and at the regional monitoring site at Hokio Beach Road. Both Councils have indicated support for this initiative.

As noted, three potential wetland sites and one woodchip bioreactor site have been identified and these are being evaluated. Landcare Research will be involved in bioreactor design.

We are keeping in communication with Massey University’s researchers investigating a bioreactor in sand country in Bulls.

We are also involved with a Queensland group testing different bioreactor designs in a range of environments and aim to increase our collaboration as our own work progresses. They have a planned study group and tour of sites in November.