Lake Rotorua SFF Project

Change in Rotorua dairy farm N loss in since 2001/04

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Background

- Since 2012, a total of 15 of the Rotorua catchment's dairy farmers have been involved in case study analysis in a number of industry and council funded research, with some limited cross-over in participation between the projects.

(i) The Farmer Solutions Project, 2012 [9 farms];

(ii) Lake Rotorua SFF Project, 2011- present [7 farms];

(iii) NDA Impact analysis, 2014 [2 farms]

Background

- There is lack of clear, transparent and consistent information about the extent of any change in the levels of diffuse N loss from the assessed Lake Rotorua catchment dairy farm area since 2001-2004 to now.
- In response to this, the SFF steering group suggested that an aggregate analysis of N loss changes from participants in research projects to date be completed as part of the extension of the SFF for a further 6 months.
- This was to be done using previously available/utilized data

Methodology

- Benchmarking files for the 2001/04 season converted to v6.1.3 were used to derive average historic v6.1.3 N losses for the dairying areas of the farm properties in question.
- “Current” Overseer models used in the various studies were converted to v6.1.3 using identical protocols to derive “current” N losses that could be compared .
- Losses were then corrected for catchment boundaries.
- Only case study farms where both access to historic loss data and where current farm systems could be successfully converted to v6.1.3 were considered.
- In the end, data from 13 of the 15 farms were able be used. All of the farms were dairying in 2001-04 and are still dairying now.

2001/04 aggregate baseline

- The 13 farms represented 2,734ha of effective dairying area within the Rule 11 surface water catchment line as at 2001-2004.
- These farms milked 7,286 cows for total milk production of 2.09 million kg MS (an average of 287kg MS/cow)
- Total annual N losses from this effective dairying area in the Rotorua catchment were 203.9t N.

Current aggregate losses

- By the period 2012-2013, these farms now milked essentially the same number of cows (7,278), but for total milk production of 2.66 million kg MS (an average of 365kg MS/cow – a productivity increase of 27%). The area being farmed by these 13 operations also reduced by 121ha.
- Total annual N losses from these 13 farms is calculated to have reduced to 179.5t since 2001-04 – **a reduction of 24.3t in annual N load to the catchment from dairying**.
- On average, N losses per hectare of effective dairying area had reduced by almost 6kg N/ha.

Interpretation

- So this sub-set of 13 farms in the last 10 years have managed to reduce total N losses by 12% and per hectare N losses by almost 8%, while lifting production by 27% and leaving net stocking rate essentially unchanged.
- **How?**
- From our limited analysis of the data set, we make the following observations:

Interpretation

- The analysed area in dairying in the catchment has reduced by 121ha, or 4%, over this time frame. This appears to be a result of disaggregation of some farming units, rather than deliberate land use change within the business. Note our analysis doesn't take into account the current N losses from this land as we had no access to this data.
- If we estimated the current N losses from this area at an average of half those from dairying, the net reduction in N losses from the original 2,734ha is closer to 20tN.

Interpretation

- The area in forage crop has reduced by from 6% of the total area farmed to 4% of the area farmed (56ha less).
- Forage crops, particularly winter brassicas, will leach as much as 4x that of “average” dairying losses in v6.1.3. This might account for as much as 65% of the on-farm reductions.
- Interestingly on-farm cropping of maize silage has a lower N loss profile than in v5.4.11

Interpretation

- N fertilizer applied has reduced from 142kg N/ha to an average of 117kg N/ha.
- The increase in per cow production implies an increase in average feed eaten of approximately 700kg DM/cow/year, which has happened in conjunction with a decline in the growth of N boosted pasture and area in forage cropping (largely brassica).

Interpretation

- This suggests farmers have experienced a net increase in feed supply through the use of feeds of lower N content than urea-assisted pasture and with less direct N losses (reducing cropping).
- Any improvement in individual cow feed/N conversion efficiency unable to be represented in Overseer.
- Impact of changes in use of winter grazing and actual quantities and types of supplements fed have not yet been analyzed.

Conclusions

- The sample of 13 dairy farms in the Rotorua catchment able to be accessed by the ongoing SFF project have reduced total N losses in the order of between 10-12% since 2001-2004, based of “current” systems over the 2012-2013 years.
- This has occurred through some reduction in dairying area, with the majority delivered through changes in on-farm practices.