

## CASE STUDY IN COLLECTIVE NUTRIENT MANAGEMENT

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### Collective Nutrient Management Programme Summary

Barrhill Chertsey Irrigation Limited (BCI) is a developing mid-Canterbury irrigation scheme, which first delivered water in the 2010-11 season. BCI is a joint venture, owned by its 180 shareholders and a local lines company.

In 2015, BCI started a programme to collectively manage the nutrient losses of their shareholders as a nitrogen loading cap came into effect for the scheme. The programme is one of the first of its kind in Canterbury and in New Zealand. Shareholders are contractually obliged to participate in our nutrient management programme and risk losing access to their water and, eventually, their shares, if they fail to make improvements over time.

While BCI has now grown to irrigate approximately 23,000 ha between the Rangitata and Rakaia Rivers (Figure 1), the area under their management is now 53,000 ha, as BCI manages the nutrients for the whole property, regardless of whether or not it is fully irrigated by the scheme. Therefore, the current irrigated area managed under the BCI nutrient management programme is about 44,000 ha, ~ 9% of the irrigated land in Canterbury.

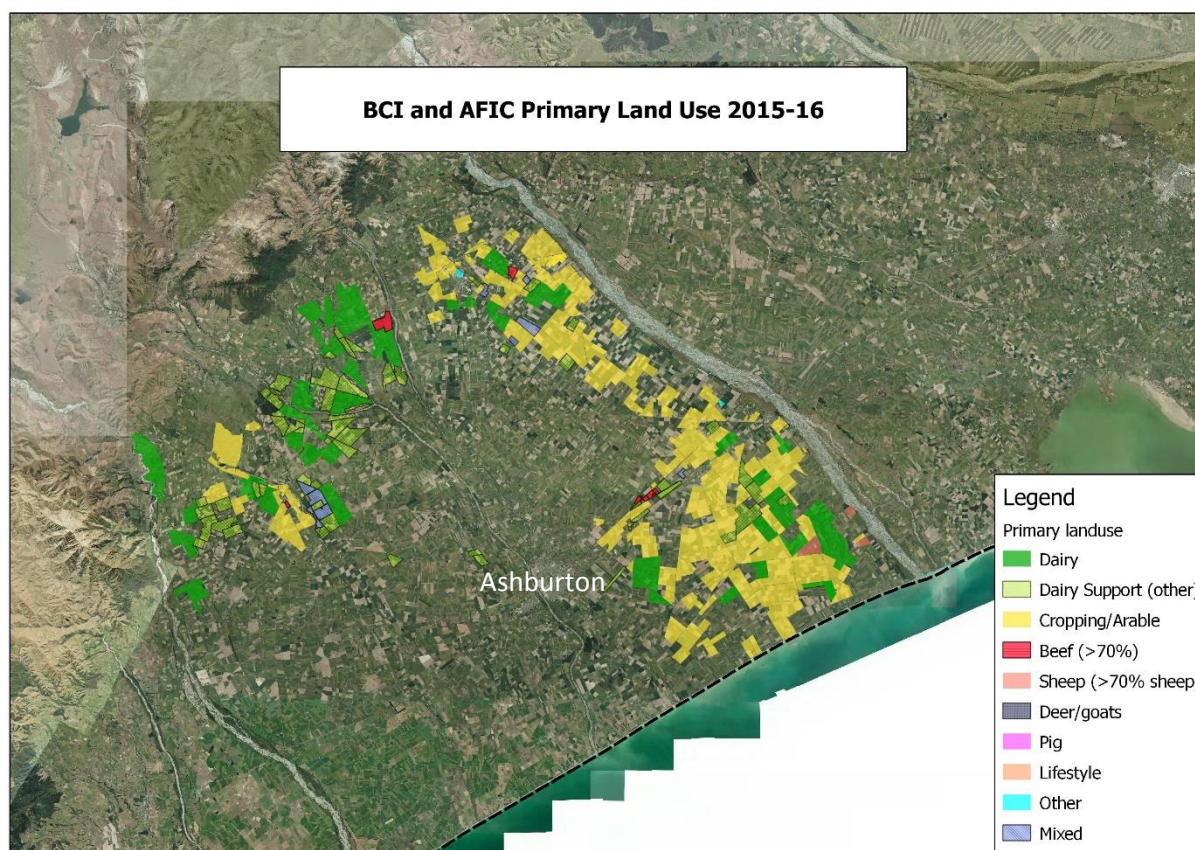


Figure 1: BCI Command Area and Land Use (2015-16 season)

Approximately 60% of the land under our nutrient management programme is used for arable crops, with most of the properties also incorporating stock into their rotations. The high proportion of arable land managed under nutrient loading limits is unique to BCI.

The collective nutrient management programme has a strong emphasis on continuous improvement (Figure 2). We require all shareholders to prepare, and regularly update, a Farm Environment Plan (FEP), which details what they currently do and what they need to do to achieve Good Management Practice (GMP), as described by the industry prepared booklet titled *Industry-agreed Good Management Practices Relating to Water Quality (September 2015)*.



Figure 2: BCI Cycle of Continuous Improvement

All FEPs are audited at a frequency determined by their previous audit grade. Higher grades are audited less frequently than lower graded properties. Properties who are graded lower “C” or “D” grades are followed up by the scheme and are required to implement an action plan, with potential repercussions to their water supply if improvements are not made.

Information from our FEP audits are collated, and progress with meeting GMP on farm is monitored. Where common areas of improvement are identified, specific workshops are developed to target areas where shareholders need the most support.

We are also required to report on scheme nutrient losses annually, using the sum of shareholder N losses calculated using year-end OVERSEER nutrient budgets.

### Programme Successes and Challenges

Greatest engagement with shareholders was achieved with workshops, one on ones, working with other industry initiatives and the FEP audits. Our educational focus has been on the benefit adoption of GMP will have on the farm business, with minimisation of environmental effects as a bonus side-effect.

We believe the targeted, localised workshops broke down social barriers, creating a “safe” environment and encouraged discussion between attendees. These peer discussions were essential to normalise GMPs with less responsive shareholders, and resulted in an increase in engagement and uptake of the GMPs being advocated.

For instance, we ran a series of 6 workshops related to irrigation maintenance and calibration in the Spring of 2016. We had a total of 90 shareholders and their staff attend, and received excellent feedback. During all of 2016, Irrigation New Zealand also ran their Irrigator Operator and Managers Training Days, which covers much of the same information. In all of Canterbury, they had a total of ~140 people attend, who were not known to be referred by an irrigation scheme (including BCI).

Our independent FEP auditors have indicated the BCI shareholders have a higher level of understanding and motivation to achieve GMP on BCI farms, compared to individuals who are not part of a collective.

We found using OVERSEER to calculate the scheme N losses has been costly and ineffectual in managing N losses due to the inconsistency of the preparation of the budgets, limitations of the model (particularly for the arable properties) and ensuring they are completed within the same version. Overall, our shareholders spend on average about \$1,500-\$2,000 per year to complete their budgets by a suitably qualified person, a total cost of about \$200,000-\$250,000 annually. Furthermore, this process is a significant strain on the nutrient budgeting industry, as our scheme alone takes 3 people full-time 6 months to complete all budgets.

There will simply not be enough people in the industry to expand on this method of nutrient budgeting reporting, as intimated by various regional plans being developed in response to the National Policy Statement for Freshwater.

Our experience with using OVERSEER to model nitrogen loss from many different farm systems and by different individuals and companies has found the Best Practice Data Input Standards (BPDIS) still requires significant subjective judgement by the individual preparing the budget, which introduces numerous opportunities for inconsistency. For instance, we found at least 25% of nutrient budgets prepared for the scheme required “work-arounds” – a term used to adjust input parameters from the real farm system to overcome modelling rules. There is currently no guidance available to practitioners on how to overcome modelling errors, and therefore we see considerable variation between companies and individuals on how they choose to complete the “work-arounds” in order to model the farm.

Many shareholders are sceptical of the information provided in the budgets and are not yet confident in using this information for making improvements in their farming practices. We also found an emphasis on achieving a numerical limit had the perverse outcome of “gaming” of the model and only encouraged the GMPs which had a specific impact on their number, while ignoring those which will benefit the environment, but are not modelled by OVERSEER.

## **Summary**

Uptake of GMPs by shareholders to date have largely been due to an emphasis on education of resource use efficiency, and enabling peer-peer learning opportunities as opposed to avoiding N loss based on OVERSEER nutrient budgets.