# CAN WE PROVE MODELLED MITIGATION STRATEGIES WORK ON FARM?

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Demonstration farmlets in four regions of New Zealand (Waikato, Manawatu, Canterbury and Otago) were designed to investigate options to reduce nitrate leaching from dairy farms as part of the Pastoral 21 (P21) research program (funded by MBIE, DairyNZ, B+L New Zealand, Fonterra and the Dairy Companies Association of New Zealand). These farmlets ran from 2011 to 2015, the practicality, production, profit and nutrient losses to water of a system currently typical (Current) for the region was compared with an "increased efficiency" (Future) system.

The Future systems were designed to achieve increased profitability and decreased nutrient losses to water by implementing strategic changes to the current system that were previously evaluated in farm system modelling. Some changes had been shown in an earlier systems modelling study to have potential to deliver reduced emissions of greenhouse gases.

Here we evaluated the effects of these system changes on GHG emissions through comparing current and Future dairy systems in Waikato, Canterbury and Otago in an NZAGRC funded project. Annual average GHG emissions for each system were estimated for three (Canterbury and Otago) or four (Waikato) years, using calculations based on the New Zealand Agricultural Inventory methodology. This methodology uses estimates of dry matter intake, N inputs, and N leaching losses, in combination with $CH_4$ and $N_2O$ emission factors. The effects of system changes designed for N leaching mitigation on the GHG footprint of the P21 farmlets will be presented.

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**Editor's Note:** An extended manuscript has not been submitted for this presentation.