

Facts on Water Quality and Agriculture

Over 40 costed mitigation strategies are available at the farm and small-catchment scale.

- Over 40 different strategies exist to mitigate losses of nitrogen (N), phosphorus (P), sediment and *E.coli* from land to water. These provide a range of strategies to help farmers mix and match to suit their farming systems and local conditions. These have also been priced to allow farmers to meet a reduction target cost-effectively.

Targeting Critical Source Areas minimizes cost and maximizes the effectiveness of mitigations.

- Isolating and targeting the key areas of a farm that account for the majority of contaminant losses, called critical source areas, minimizes the cost and maximizes the effectiveness of mitigation strategies. Targeting critical source areas for mitigation improves cost-effectiveness, on average, 6-7 times that of an untargeted approach.
- Research based on 14 either dairy or sheep and beef farms across New Zealand has shown that 30 to 50 percent of the contaminant load from farming (depending on the contaminant) can be mitigated by targeting critical source areas without impairing profitability beyond 10% of earnings before interest and tax (EBIT).

Mitigations have maintained average N and P water quality levels during a period where dairy production increased by 30 percent.

- The implementation of mitigations over seven years, measured at a catchment scale has maintained on average N and P water quality levels and reduced sediment levels while dairy production has increased by 30%.

If mitigations had not been developed used over the past 15 years, present-day contaminant concentrations in some areas would be much worse.

- Using the farm practices of 10-15 years ago without today's mitigations, would result in farm-scale losses of water quality contaminants such as *E. coli* from newly converted land that were up to 90% greater.

Forestry can improve water quality in catchments, but care needs to be taken at harvest.

- Nitrogen and P losses were measured in five of 13 long-term catchments and showed decreases in P loss associated with land-use change to forestry (up to 62%), but a short-term 4-fold increase in N and P losses associated with harvesting. Profit increased in some locations due to the afforestation of marginal land.

At the National scale there are recorded improvements in water quality for some contaminants.

- Of 145 monitored river sites in the pastoral class, trends in dissolved reactive phosphorus were improving at 46 percent and worsening at 21 percent of sites for the period 1994–2013. This has been attributed to the use of on-farm mitigations, uptake of advice to target mitigations in critical source areas mentioned in 77 documents (industry guidelines, farm environment plans, and regional policies), and the training of > 2000 farm consultants, fertiliser company representatives, and regional council staff since 2002 on mitigating P loss.
- From 1990 to 2010, sheep and beef farms have increased the volume of saleable product by 47%, while decreasing nitrate leaching and greenhouse gas emissions by 21% and 40%, respectively.
- However, due to time lags between implementing mitigations and those mitigations showing up in-stream, at least five years data (preferably 10 years) is required to show trends in water quality.