

Managing large N₂O emissions from supplemental feed production.

Nitrous oxide (N₂O) is a potent and long-lived greenhouse gas and represents 20% of New Zealand's agricultural emissions. Very Large N₂O emissions have been observed for supplemental feed crops in pasture-based farming, and with 290,000 ha supplemental feed planted annually, strategies to reduce N₂O from supplemental feed production are needed.

This PhD project will determine N₂O emissions during establishment of different supplemental feeds using soil chambers. Concurrently, they will determine carbon balances and N₂O emissions using eddy covariance techniques for comparison. Subsequently, potential mitigation strategies will be tested in plot studies.

The PhD candidate will develop expertise in chamber measurements of N₂O emissions and analysis and conducting field work aimed at testing mitigation strategies. They will receive training in analysis of large datasets. They will also be exposed to eddy covariance techniques broadly with a focus on carbon balance and N₂O fluxes. The candidate will be embedded in a group that has strong track record in how to improve animal production systems, develop GHG mitigation technology and conduct research.

Preferred candidate skills experience: Ideally, experience or strong understanding of measurement of greenhouse gases, such as nitrous oxide, and the ability and motivation to learn chamber and eddy covariance techniques:

- Completed Masters/Honors research thesis in environmental or agricultural sciences.
- Experience or detailed knowledge of greenhouse gas emissions and mitigation strategies.
- Experience in field and laboratory work.
- A background in Matlab, R Studio or similar scripting computer language.
- Exposure to micro-meteorological approaches considered an advantage.
- License for driving in New Zealand is a requirement.

Host institute(s) and location(s): University of Waikato, Hamilton.

Project leader(s)/research supervisor:

Professor Louis Schipper (University of Waikato) – Louis has supervised 17 PhD students and co-supervisor of a further 22 PhD students. Louis has supported postdocs and students to publish more than 100 papers in peer-reviewed literature and many of these former postdocs and students now work in Crown Research Organisations (including Manaaki Whenua, AgResearch, NIWA, GNS), Universities, or have scientist roles in the private and policy sectors.

The project will also be co-supervised by Dr Aaron Wall (University of Waikato), Dr Jiafa Luo (AgResearch Ltd), Associate Professor Dave Campbell (University of Waikato).