



# Measure, Monitor, Manage and Mitigate – PNZ research projects to minimise potato nitrate emissions

Dr Iain Kirkwood

Potatoes New Zealand Technical Manager

# PNZ Strategic Goal

- **Zero Net Nutrient & GHG Industry Emissions by 2050**
  - **The industry has adopted environmental targets that align with domestic and international targets**
  - **Social and regulatory license to operate**
  - **The tactics will include a mix of reduction, mitigation and off setting.**

# Measure

- **Develop the tools (methodologies and models) to measure nitrate emissions**
- **PNZ – 79 Nitrate leaching below the potato root zone**
- **Plant and Food Research ran a series of replicated plot field trials in Lincoln to collect data in order to validate and or improve Overseer model or develop alternatives**
- **Regional monitoring sites – 2 sites in Canterbury Ashburton district**
- **Measuring representative commercial potato paddocks to test run the model under real life conditions and compare with actual nitrate levels**
- **On going monitoring of field sites.**



# PNZ - 79

- Nitrate leaching rates from all the treatments ranged from 0 to 10Kg/ha as measured in the suction cups
- Residual soil mineral N levels post harvest were also low for all the treatments except the 2x GMP rate of nitrate – (400Kg/ha applied)
- These results closely resemble the Overseer predictions from commercial potato crops
- Overseer modelling of the PFR site will be completed shortly.

# PNZ-79

PNZ-79 morphed into a much larger 4 year project called SVS (\$M\$5) funded through industry levies as well as MPI



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# Monitor

- **SVS project has 4 Workstreams**
  - **WS1 Replicated plot trails at PFR – a continuation of the potato plots at Lincoln plus a new series of trials in Hawkes Bay incorporating a wide range of vegetable crops**
  - **WS2 - 9 regional monitoring sites throughout the country cycling through a range of locally grown vegetable crops**
  - **WS3 – Model development – initially focusing on Overseer also investigating alternate models (Quarterly meeting with Overseer to share results).**

# Manage

- **WS4 – Communications extending project results with growers and the wider industry**
  - **Firstly provide the industry with the tools to measure and model – nitrate emissions**
  - **Secondly provide the industry a series of refined series of management practices (GMPs and BMPs) which will further reduce nitrate leaching from vegetable crops.**



# Mitigate

- **Future Project proposed**
  - **Investigate agronomic practices to further reduce the risk of nitrate leaching**
  - **Investigate leaching of other nutrients eg: Phosphate**
  - **Investigate carbon emissions (and sequestration) in the potato industry**
  - **Develop demonstration farms to show case mitigation strategies on a farm scale.**

# Potato Rotations

- In Canterbury approximately 60% of potatoes are grown on leased ground
- The average rotation (period between potato crops) is now 5-8 years with commercial crops
- With seed crops growers are ideally seek virgin ground – failing that a minimum of 10 years – a minimum of 5 years is required for certification
- Without this lengthy rotations growers get reduced yield and quality – primarily caused by a build up of soil borne pathogens.