

# Healthy Rivers Block 2

## Diffuse Discharge – Nitrogen

### Dr Gavin Sheath

#### Context

- In Block 1, Miraka advocated that emphasis should be placed on Practice Change for reducing all four contaminants.
- Section 42A supports this position by recommending that FEPs and GFPs be key elements of PC1.
- Section 42A continues to recommend the determination of an NRP and the use of the 75<sup>th</sup> percentile rule for nitrogen.
- Miraka continues to oppose this recommendation as it is inequitable.
- This opposition is not a criticism of Overseer, but rather how it is to be used.

# Structure of My Evidence

- My evidence:
  - Outlines why the 75th percentile rule is inequitable
  - Strongly supports the use of FEPs and GFPs
  - Proposes the use of Nitrogen Surplus estimates
  - Considers two approaches to reducing nitrogen loss

# Nitrogen Source and Transport

- Overseer estimates of nitrogen **leached** take into account both source and transport processes.
- Land managers can influence the **source** of nitrogen loss through management changes, but they cannot influence **transport** processes associated with leaching.
- High NRP estimates generally reflect rainfall and soil type [transport] and not necessarily management factors [source].
- For example: 100 mm rainfall increase = 7-8 kg N/ha leached increase.
- In the Upper Waikato FMU rainfall can range from 1000 -1500 mm and generate a range of 35-40 kg N/ha leached.

# Equity

- Enterprises that exceed the 75<sup>th</sup> percentile because of rainfall/soil type will require significant management changes.
- Reduction of greater than 10% will impact on economic and social wellbeing [see Doole evidence].
- Enterprises below the 75<sup>th</sup> percentile may continue to operate poor management practices.
- Correcting these practices would contribute to reducing nitrogen contamination of water bodies.
- Miraka proposes the principle “that those enterprises which are most distant from GFP need to reduce the most contamination in absolute terms”.
- This principle focuses on reducing the source of nitrogen loss and places emphasis on FEPs and GFP.
- PC 1 should focus on reducing and tracking the **source** of nitrogen during Stage 1.

## Farm Environment Plans & Good Farming Practices

- Miraka strongly supports the development , implementation and auditing of FEPs that embody GFPs.
- It proposes that all enterprises and land managers should operate to an approved FEP.
- Evidence indicates that the implementation of available GFP [by all] and BFP [where necessary] will achieve the 10% reduction in nitrogen contamination being sought during Stage 1.
- The principles of the management practices that reduce nitrogen loss should be specified in PC1 as is the case for the other 3 contaminants.
- Miraka will participate in future PC1 activities pertaining to FEPs and GFPs.

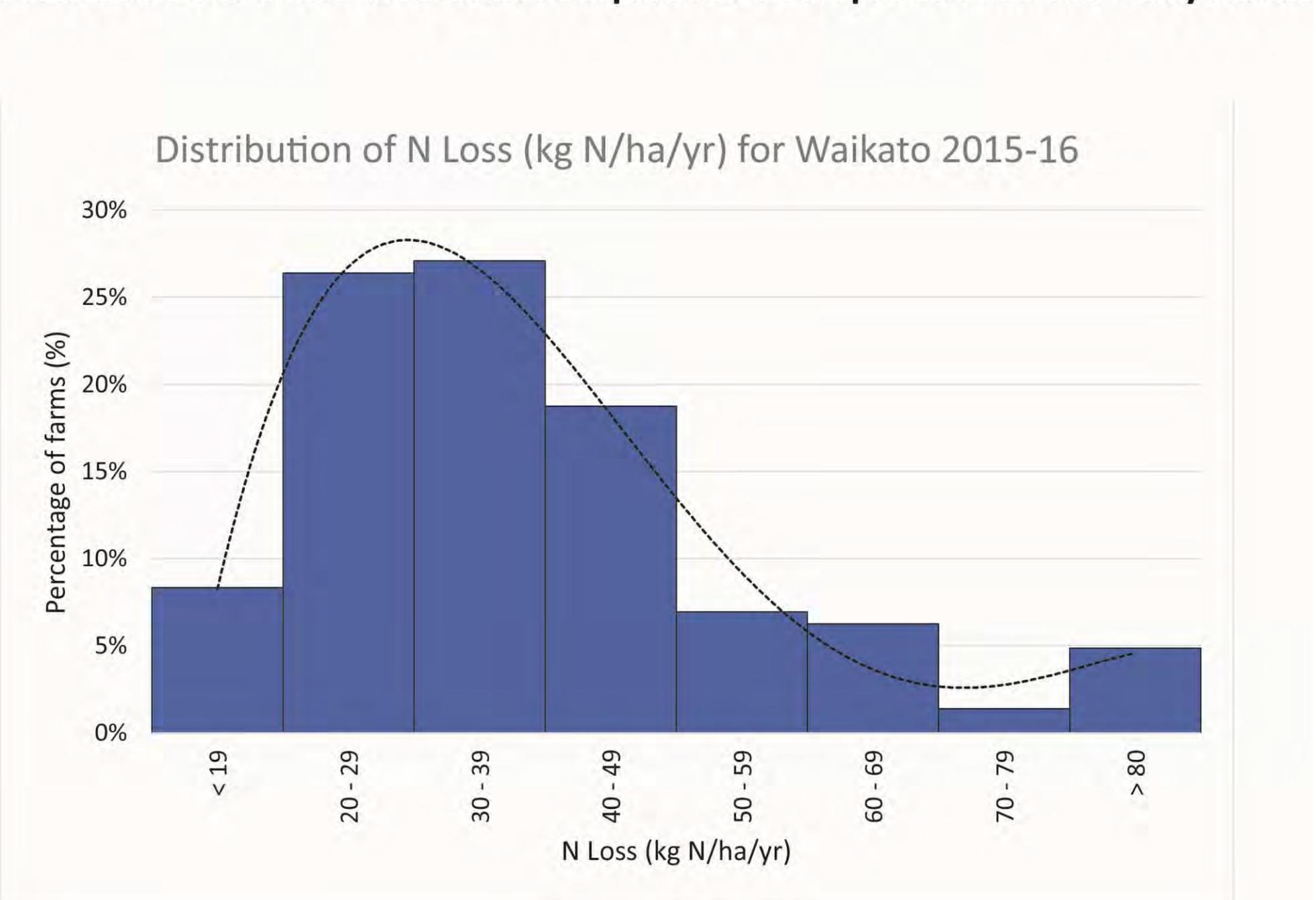
## Baseline & Tracking Change

- PC 1 should focus on reducing and tracking the **source** of nitrogen during Stage 1.
- Two approaches can be used to estimate the source of nitrogen loss and predict the impact of management changes.
- Farm Nitrogen Surplus can be estimated by simple input-output budgets. This reflects the “potential source of nitrogen loss” and is currently calculated by Overseer.
- Net Nitrogen Surplus can be estimated by standardising rainfall and soil type inputs into Overseer. This reflects the “net source of nitrogen loss” by taking into account mitigation actions.
- In my opinion, tracking changes in farm practice is also essential. This is a lead indicator of change and can be supported by model estimates.

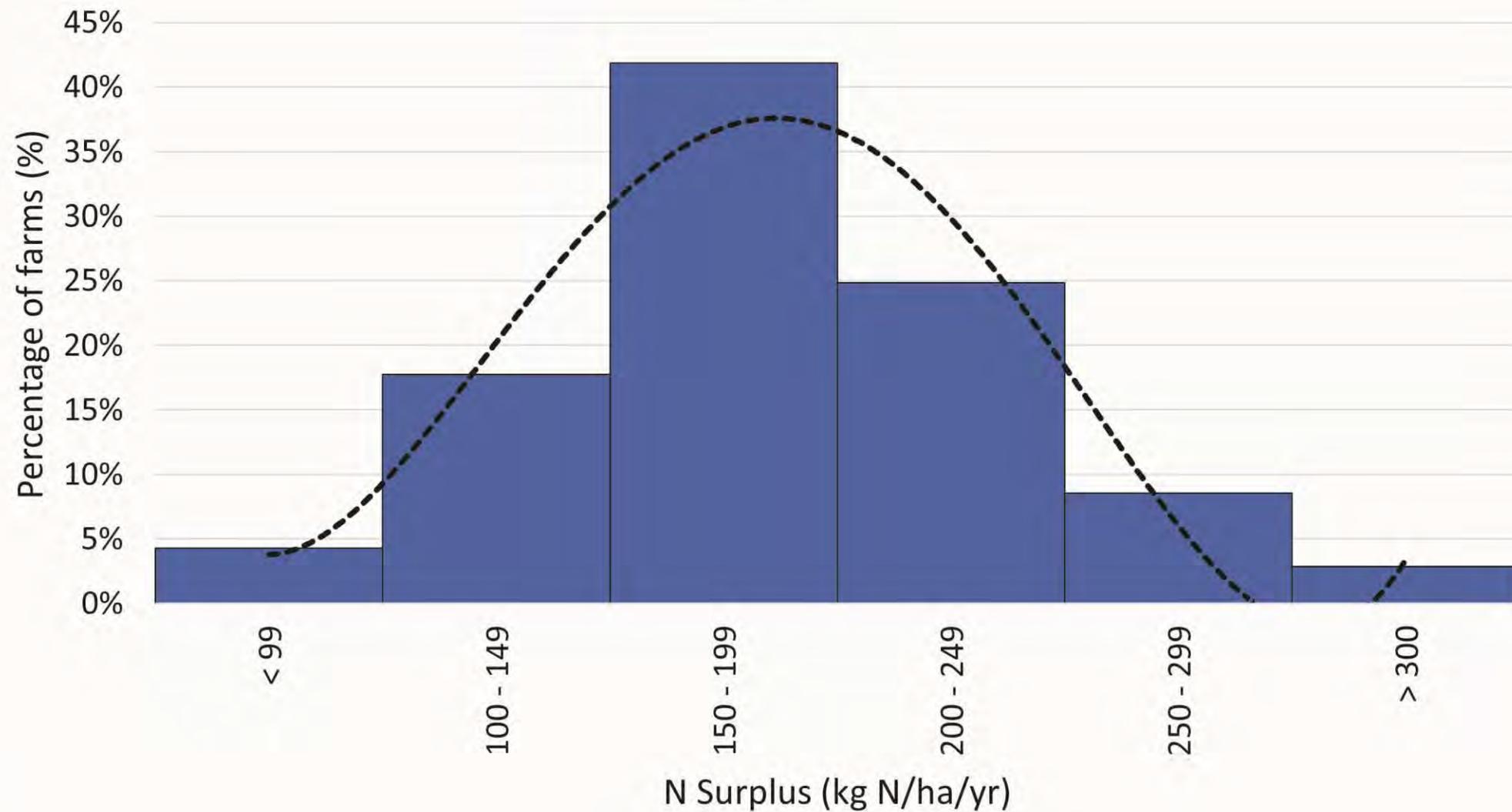
## Extent of Reduction

- Two options to determine the extent of reductions in nitrogen loss are provided for consideration in Stage 1.
- They are based on the premise that **practice change** and its impact on **source** of nitrogen loss is accepted.
- Require a similar proportional reduction in Nitrogen Surplus for all enterprises that exceed the average Nitrogen Surplus in an FMU/sub-catchment.
- Identify enterprises in an FMU/sub-catchment that are implementing GFP and use their Nitrogen Surplus as a reference target for those enterprises with higher estimates.
- Both approaches would take into account the magnitude of change required in individual FMUs/sub-catchments.

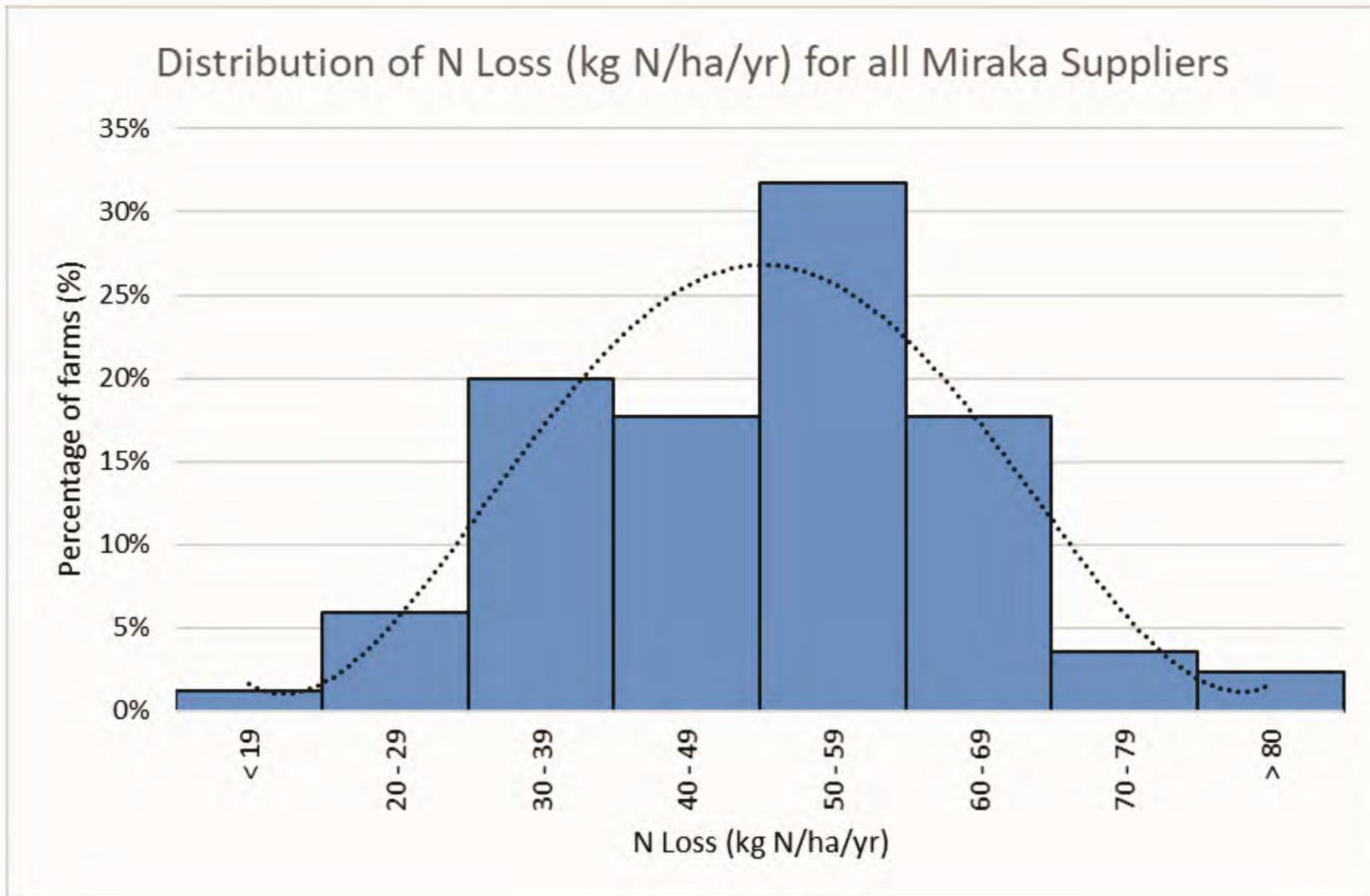
# Distribution of N Leached and N Surplus for a sample of Waikato Dairy Farms



# Distribution of N Surplus (kg N/ha/yr) for Waikato 2015-16



## Distribution of N Leached and N Surplus for all Miraka Suppliers



## Distribution of N surplus (kg N/ha/yr) for all Miraka Suppliers

