# Collaborative Modelling Project
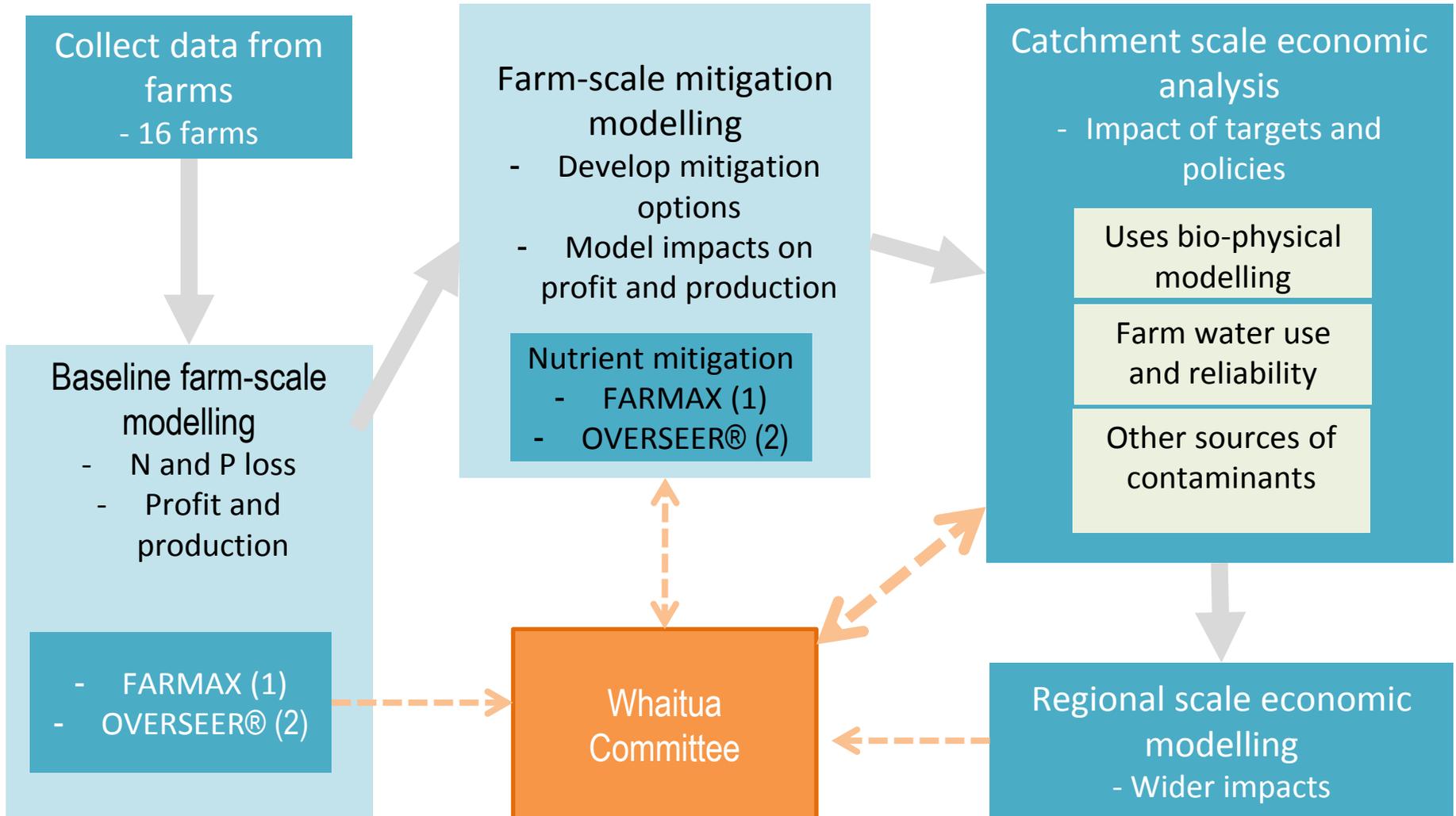# Farm-Scale Modelling



Terry Parminter
for
Ministry for Primary Industries
and
Ministry for the Environment

# Ruamāhanga Whaitua Collaborative Modelling Project Architecture

# Economic Modelling Process – Phase 1

**Collect data from farms**
- 16 farms

**Baseline farm-scale modelling**
- N and P loss
- Profit and production

  - FARMAX (1)
  - OVERSEER® (2)

**Farm-scale mitigation modelling**
- Develop mitigation options
- Model impacts on profit and production

  Nutrient mitigation
  - FARMAX (1)
  - OVERSEER® (2)

**Catchment scale economic analysis**
- Impact of targets and policies

  Uses bio-physical modelling

  Farm water use and reliability

  Other sources of contaminants

**Whaitua Committee**

**Regional scale economic modelling**
- Wider impacts

# Methods

Tryangulated critical methodology: Terry Parminter (KapAg), Martin Boyle (BakerAg), and John Stantiall (Stantiall & Associates)

1. Identify the groups of farm types in the catchment

2. Collect farm system data for Example Farms

3. Develop Representative Farms – nutrient budgets, financial accounts

4. Match representative farms to mapped landuses as Virtual Farms
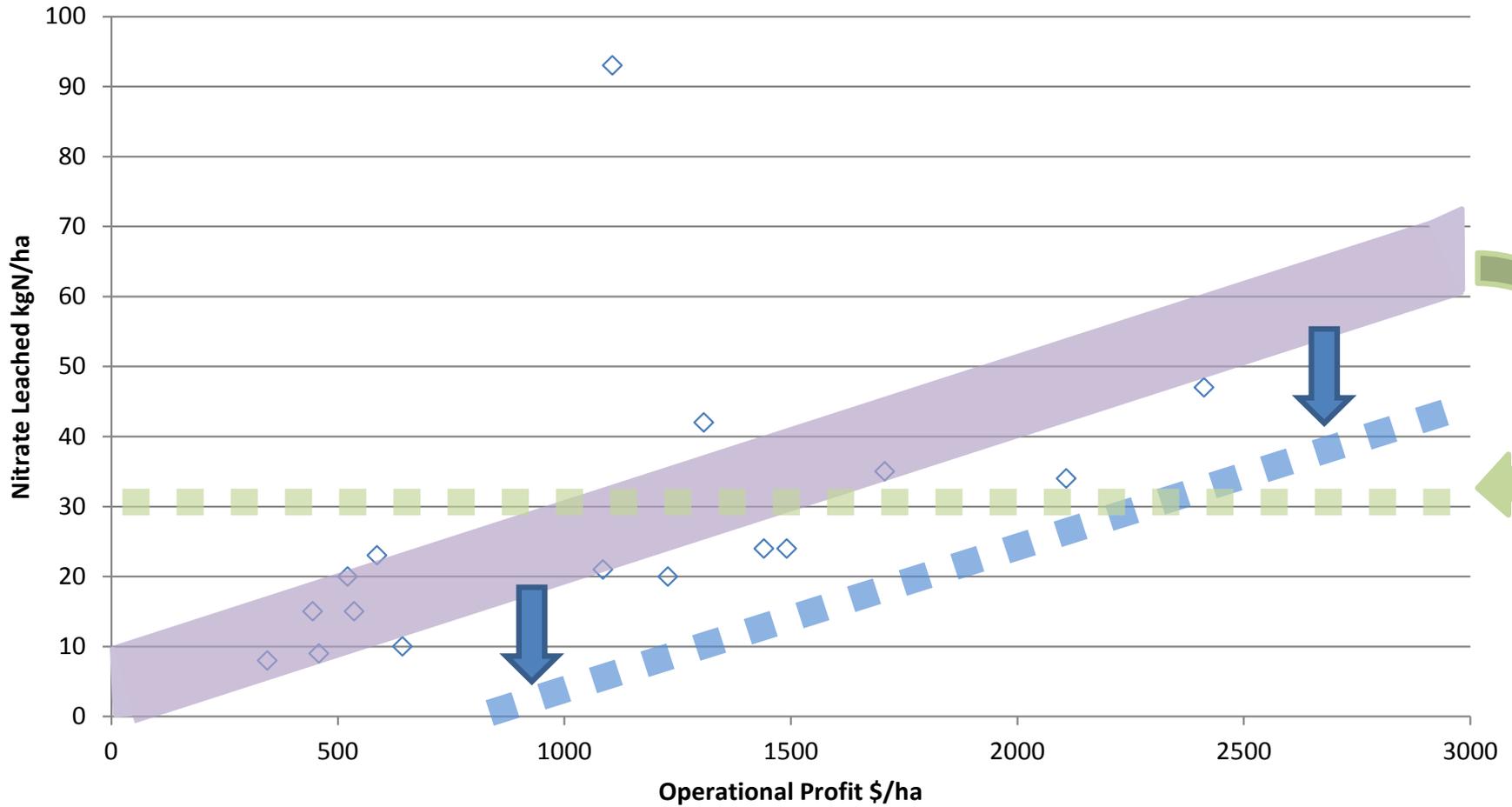
# Representative Farms

- 4.1_(1b1) low rain dairy, T3
- 4.2_(1b2) low rain dairy, T2
- 4.3_(1a) mod. rain dairy, T4
- 4.4_(3) high rain dairy, T3
- 4.5_(2) irrigated dairy, T4
- 4.6_(4) organic dairy, T2
- 4.7_(5) S&B finishing, dry, T3
- 4.8_(6a) S&B breeding, wet, T2
- 4.9_(6b) S&B finishing, wet, T3
- 4.10_(7) S&Bull finishing, T3
- 4.11_(8a) S&B irrigated trading, T4
- 4.12_(8b) lb&bll trading 20% cropping, T4
- 4.13_(9) S&B breeding dry, T2
- 4.14_(10) beef finishing 65% cropping, T3
- 4.15_(11b) dairy support 15% cropping, T4
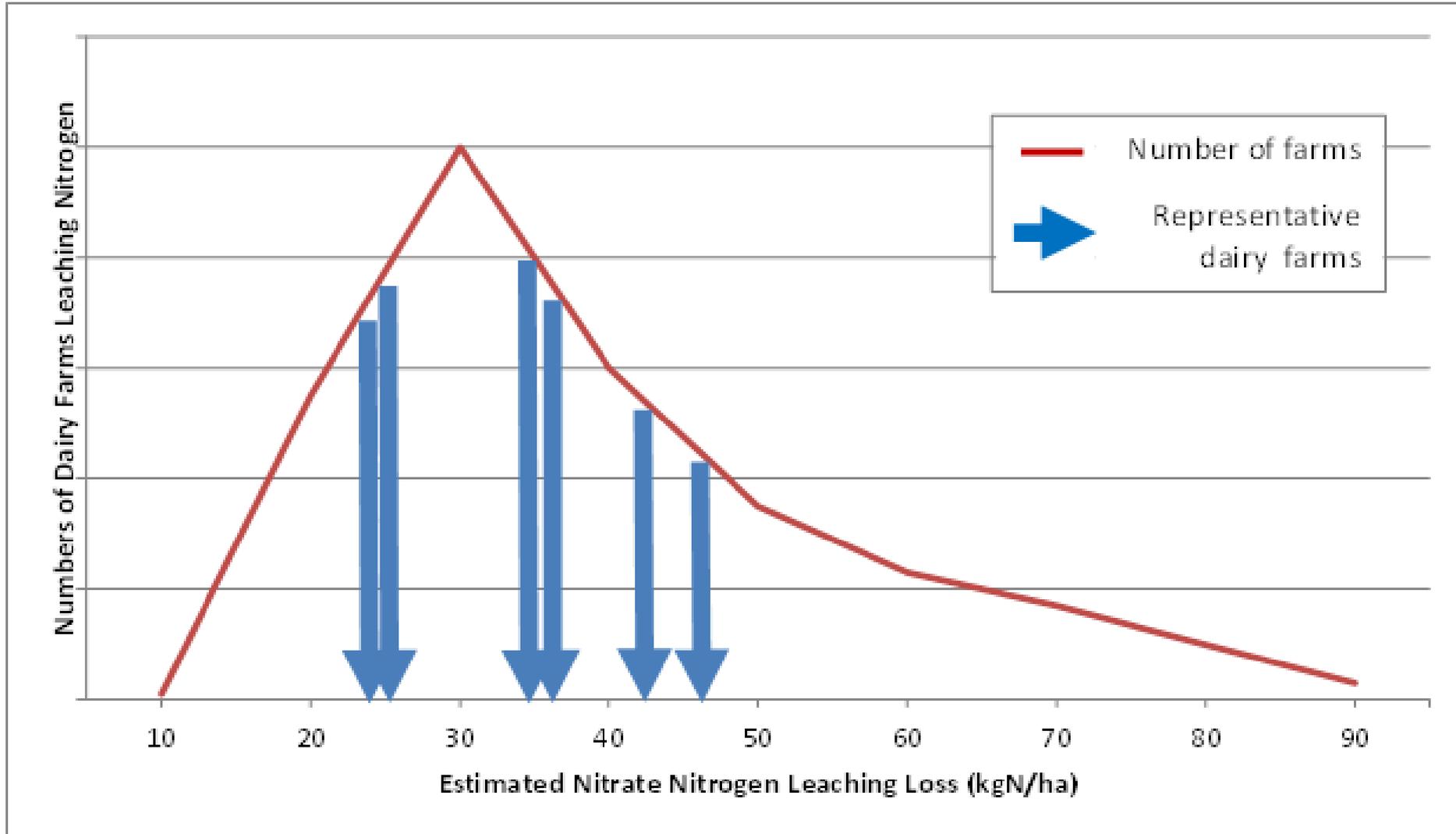- 4.16_(11a) dairy support 48% cropping, T4

**Relationship Between Profitability and Nitrate Leaching**
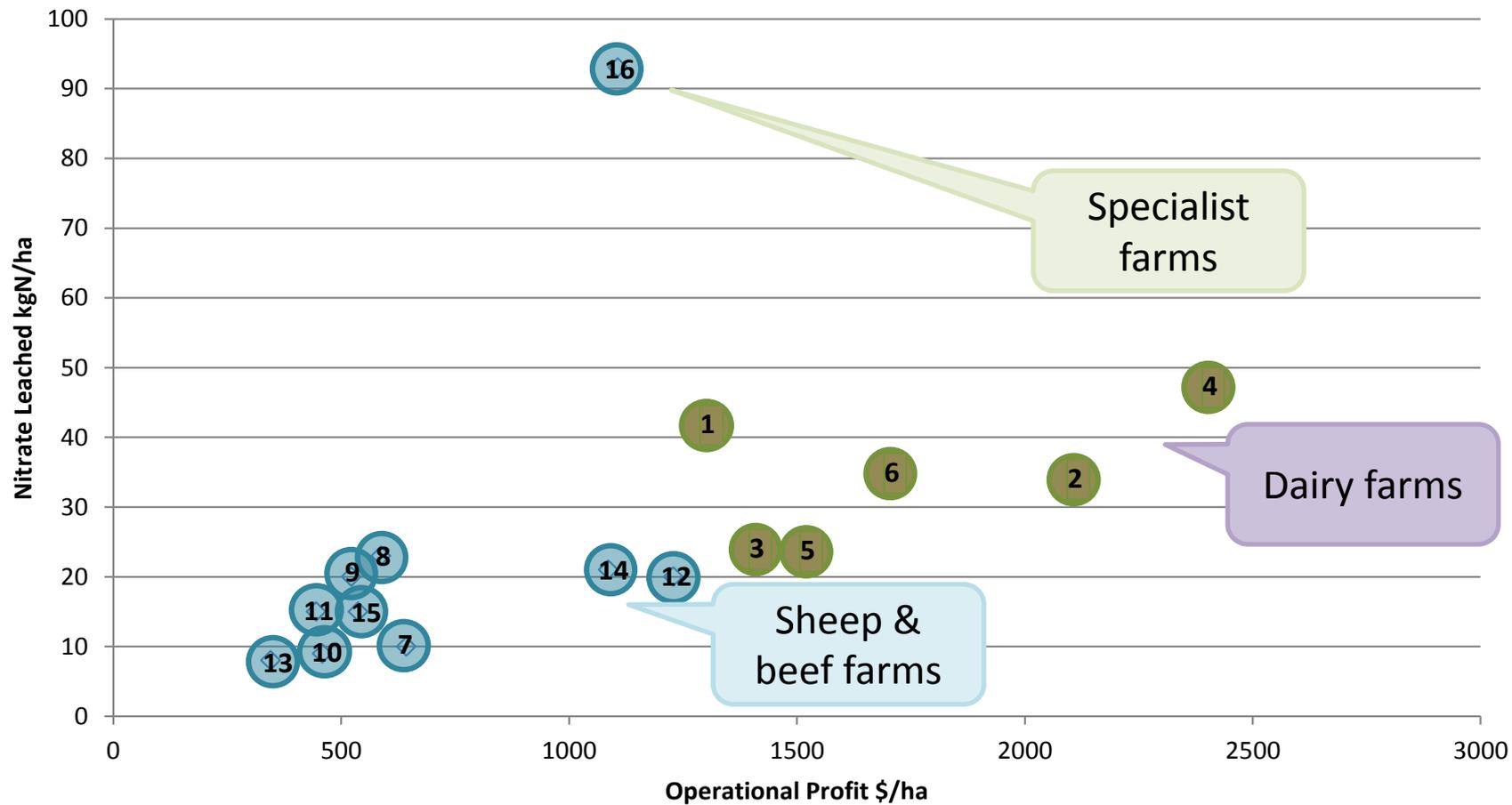
**Direction of Change Within Nutrient Limits**

Nitrate Leached kgN/ha

Operational Profit $/ha

# Dairy farm nitrate leaching with Representative Farm results super-imposed on a diagrammatic distribution of Wairarapa results

# What Happens Next

- The mitigation bundles are introduced and their catchment scale effects modelled

- The economic consequences are modelled at a catchment scale

- Whaitua committee use this information to inform their decision making