

How much data is needed for effective monitoring?

The challenge

There is a trade-off between:

- The cost of monitoring.
- The risk of missing a problematic trend.

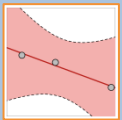
What's needed?

Based on the monitoring requirements, an adequate sampling design.

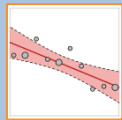
An understanding of the trade-off between the amount of sampling and how effective it will be.

The solution

Power analysis tells us how much data we need to collect.



With too little data we risk missing a trend



But collecting too much data might be expensive

Requirements

An understanding of what is being monitored and clearly defined questions.

Existing data to inform the analysis.

Analysis software and expertise.

Case study: Trends in nitrogen use on kiwifruit orchards

Nitrogen use and associated losses on kiwifruit orchards will be scrutinised, as councils implement fresh water management plans.

Given this, one question might be:

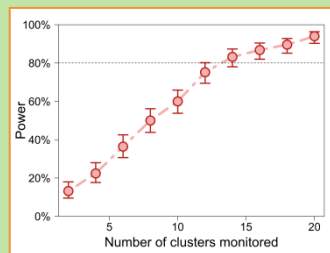
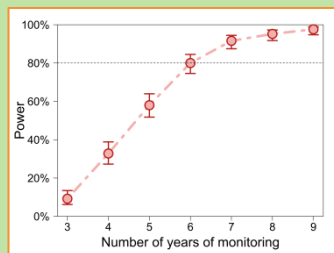
How much monitoring would be required to detect trends in fertiliser use?

To address this question, we used ARGOS data on fertiliser use:

- 30 ARGOS kiwifruit orchards in the Bay of Plenty.
- Orchards arranged in 10 clusters, each including one Green, one Green Organic, and one Gold.
- For the period 2007/8 to 2009/10.



Based on the ARGOS design, it would take 6 years before the risk of missing a 1 kg/ha/yr trend is less than 20%.



To detect a trend of 1 kg/ha/yr within 5 years, a minimum of four clusters would need to be added.