Ballance Agri-Nutrients

Our GHG and water quality challenge

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Topics

- GHG
- Priority issue of water quality
- Fertiliser approach

Externalities GHG

- Green house gases
  - NZ economy policy setting all sectors all gases
  - 48% of NZ emission from agriculture
  - Emission trading scheme linked internationally
  - Emission targets 2020 -5% 2030 -11% (all below 1990 levels)
  - Farm biological emissions exempt incur indirect costs from energy

  - Emission factors (EF_1)
    - 0.48% urea fertiliser (was 1%)
    - 1% farm dairy effluent and urine
    - 0.25% for dung
  - Point of obligation at sector rather than farm level

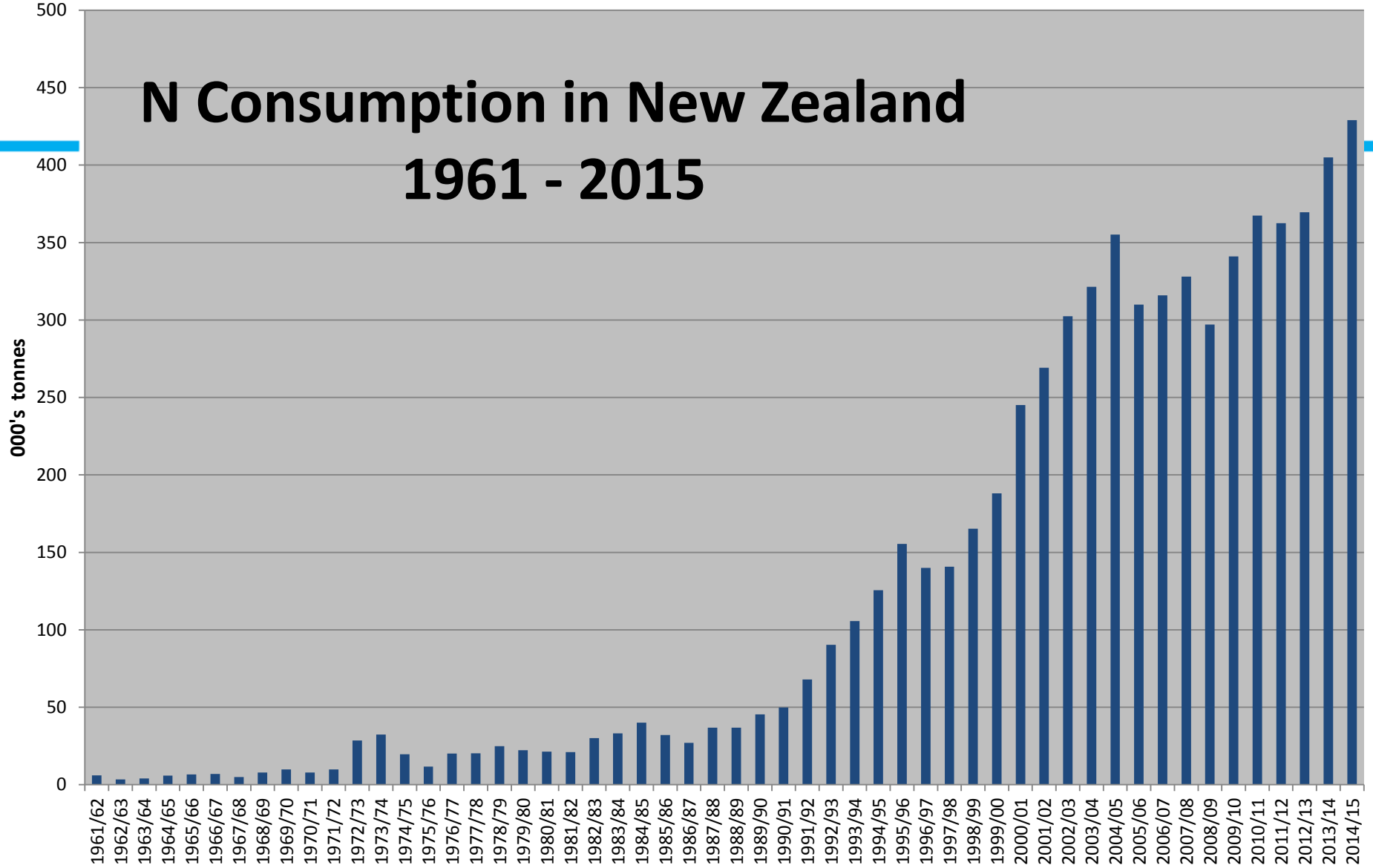
Externalities impacting fertiliser

- Ammonia
  - No limits but economic loss of N ($30m)

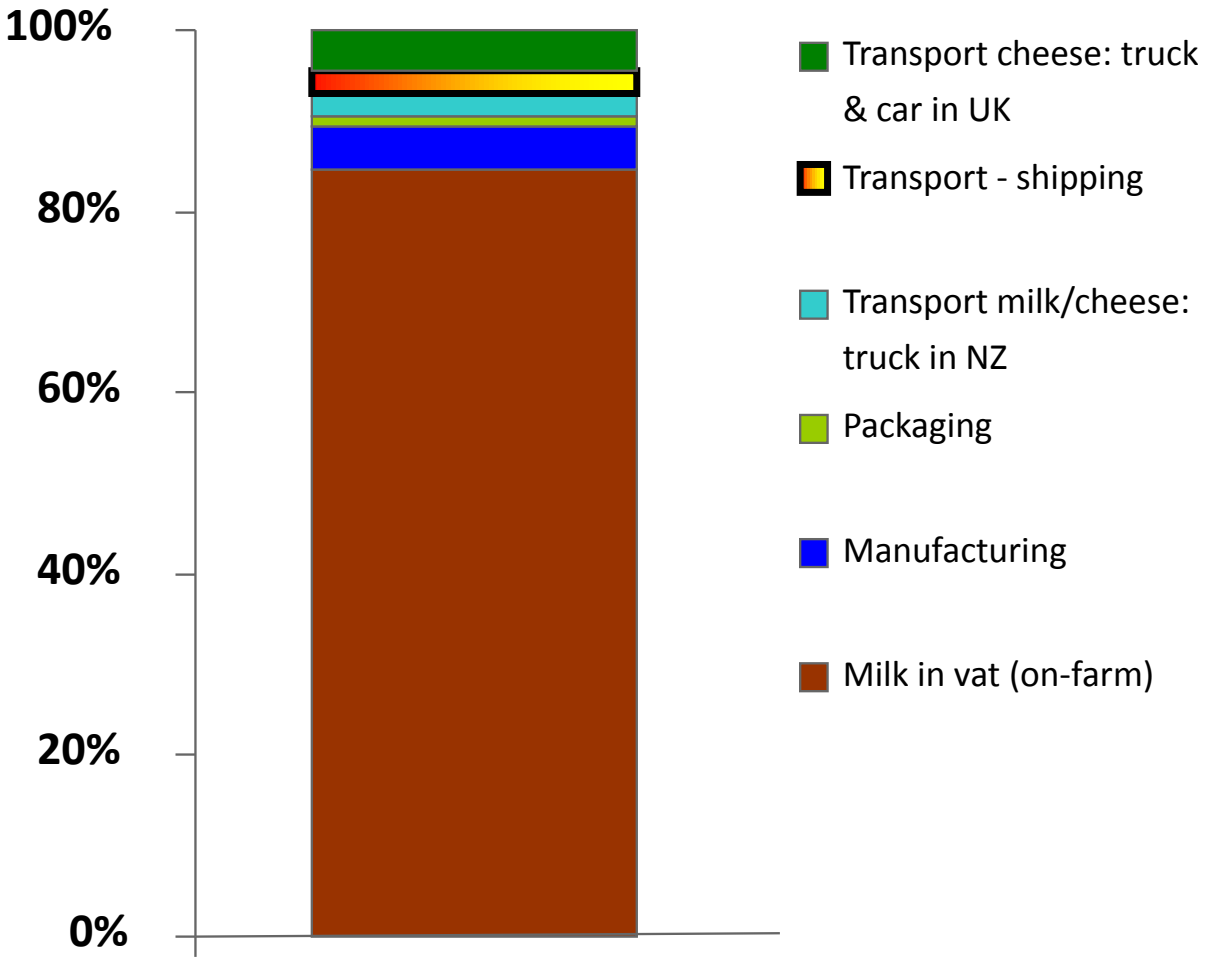
- Water quality limit is the primary driver of policy, industry and farmer responses
  - N, P, sediment, bacteria
  - Maori have strong views on water quality (co-governance)
  - Debate as to who owns water
  - Contact versus swimmable national standards

- Policy response philosophy (RMA)
  - if we regulate **we regulate on effects not inputs**

N Consumption in New Zealand 1961 - 2015

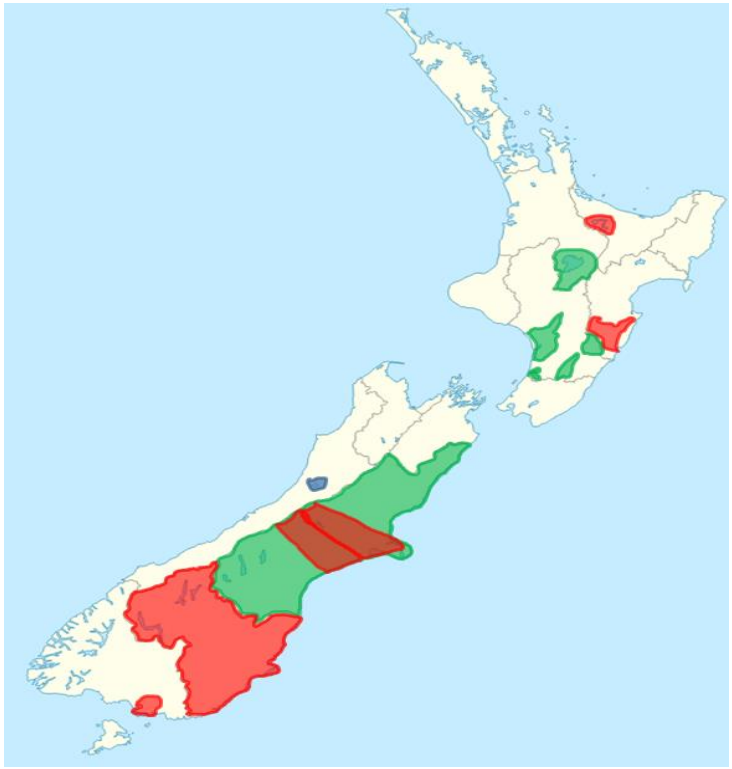


Life cycle of NZ cheese delivered to the UK



Regional councils plan to regulate N & P

2015



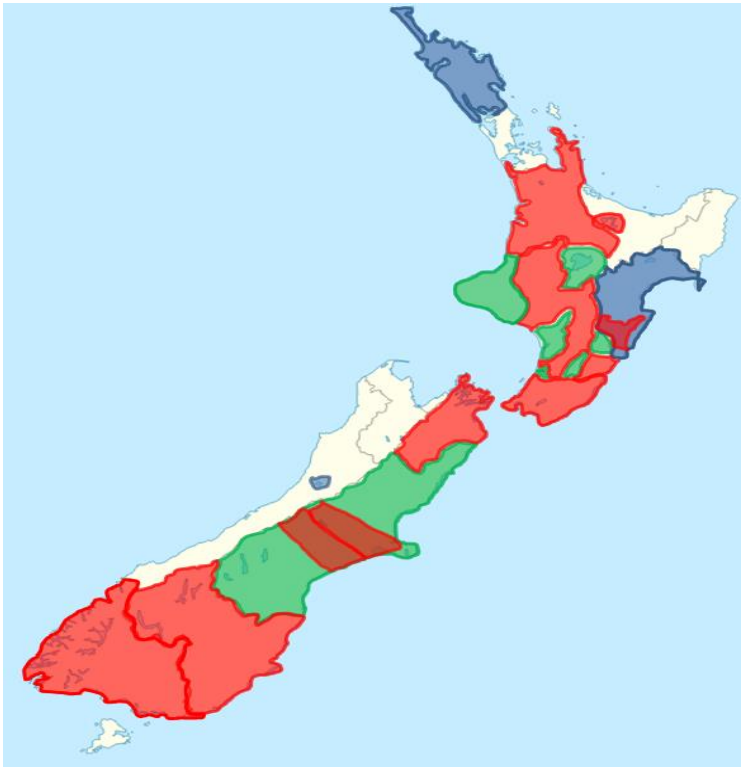
Regions with a nutrient management focus today

N

P

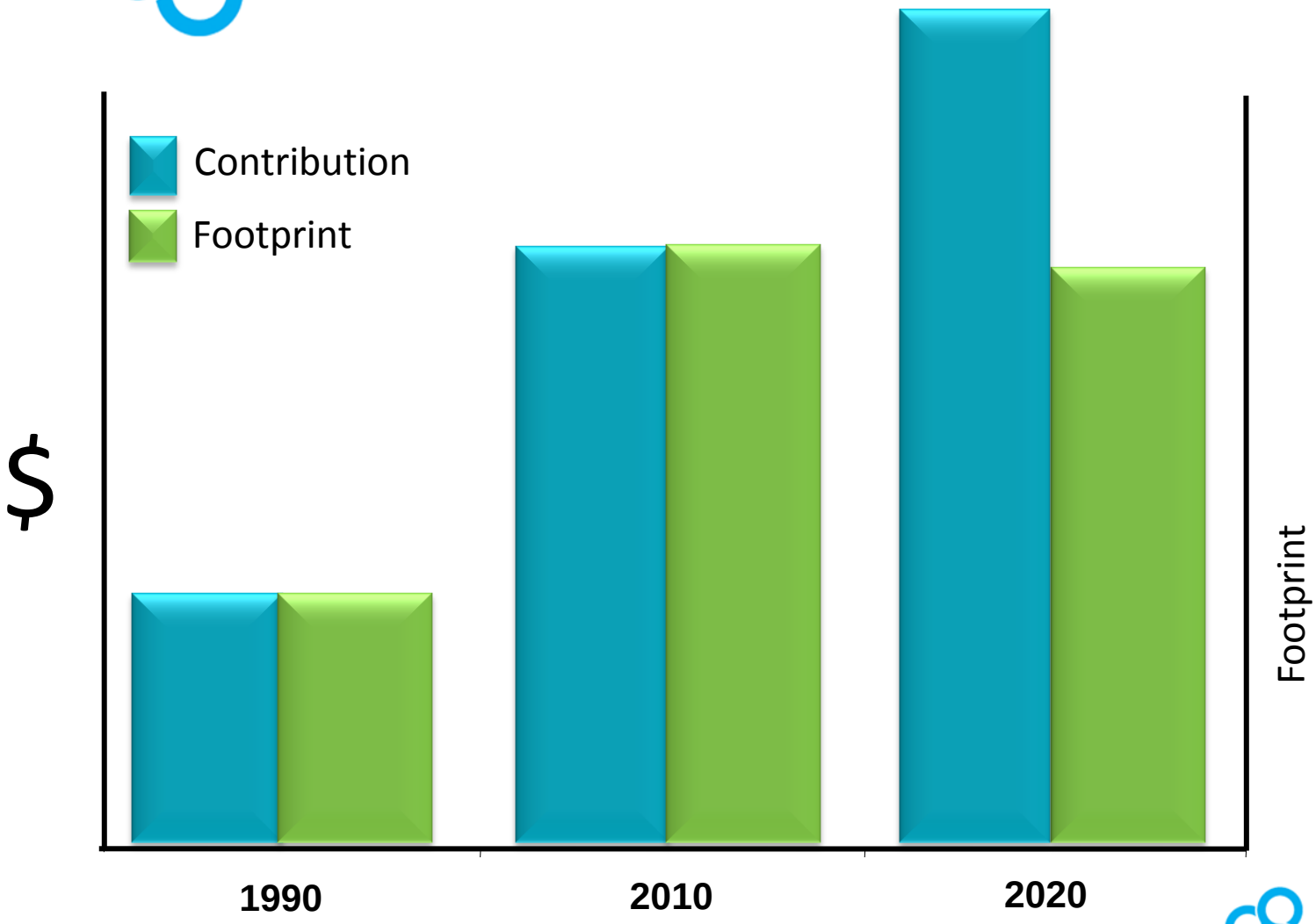
N&P

2025



Estimated future regions focused on nutrient management

Future Drivers



Tim Mackle, CEO DairyNZ, 2010

Fertiliser industry strategies

- Nitrification Inhibitors
  - DCD widely tested and proven efficacy (urine and urea)

- Urease inhibitors
  - ATU Agrotain treated urea active NBPT
  - Over 48% of Ballance urea sales are SustaiN (ATU)
  - 45% reduction in ammonia emissions (250ppm NBPT)

- Dairy farm effluent not dosed with acid, Agrotain or DCD

- N fertiliser strategies to target animal intake i.e. impact of urine N load
  - Luxury uptake of N
  - Right rate, timing, form, placement

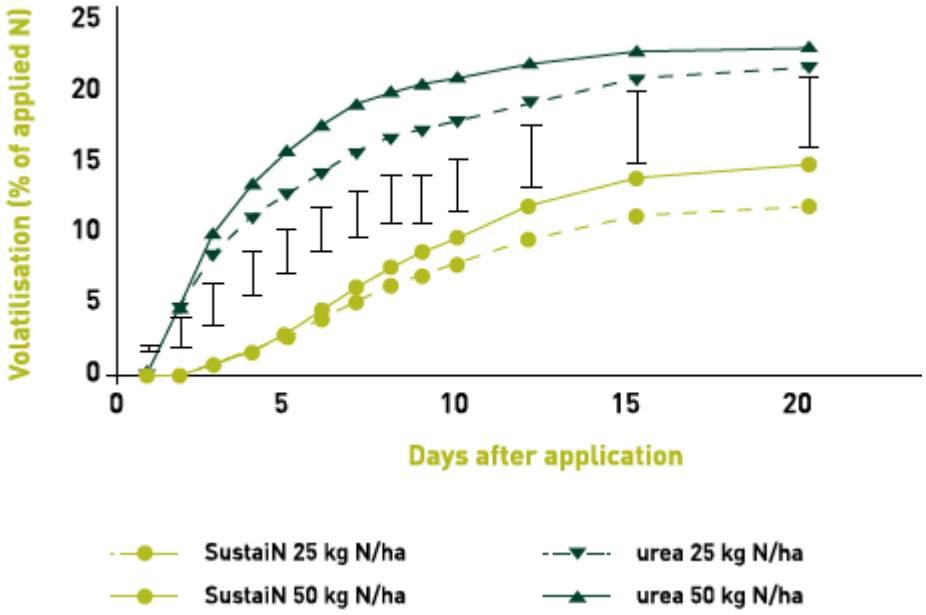
Fertiliser industry strategies continued

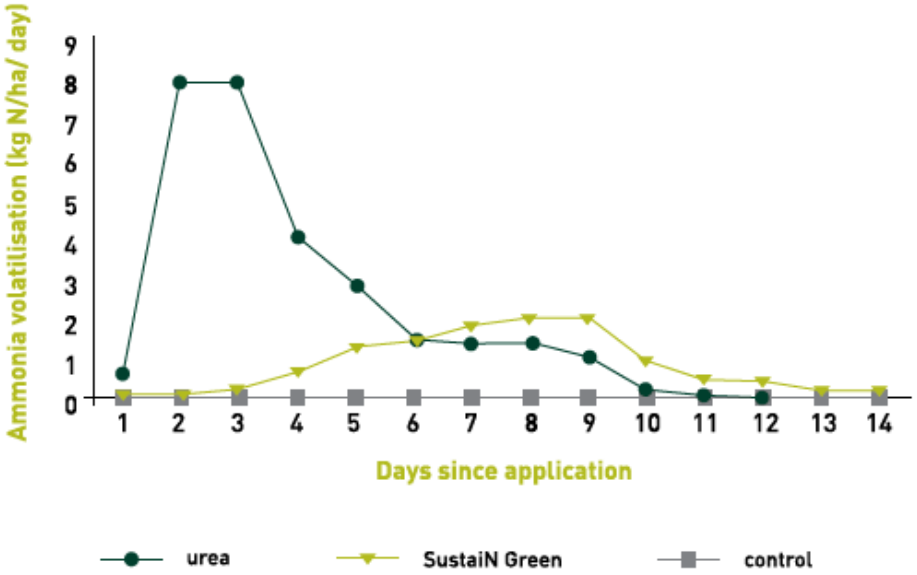
- Example of rapid adoption SustaiN (Agrotain Treated Urea)
  - Science based product
  - Simple messaging re ammonia loss (10mls within 8 hours)
  - Ease of use and ease of mind (addressed issue of when is right time)
  - Positive cost benefit

- Challenges with a right place right rate strategy
  - Objective assessment tool lacking
  - Fertiliser spreader calibration poor for varying rates
  - Lost N is an insignificant fertiliser cost
  - Decision support tools and automation
    - E.g. Spreadsmart aircraft, N Guru

SustaiN (Agrotain Treated urea)

- Independent trials funded by Ballance average 45% reduction in ammonia loss, relative to urea (Saggar et al., 2013)

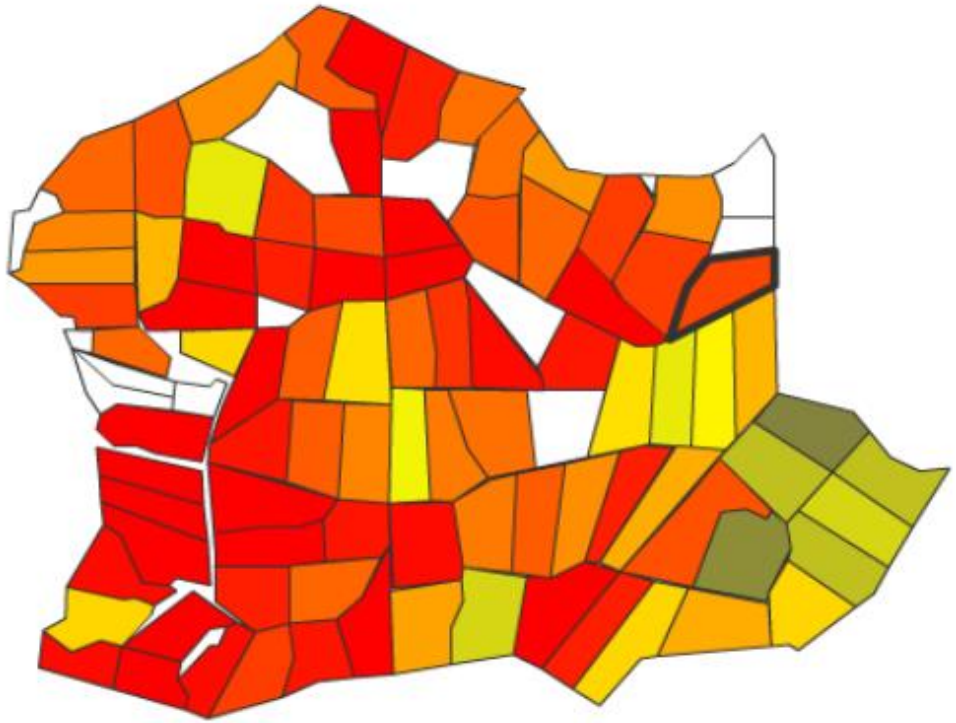




The future and past – exploiting variability

Detailed soil survey

	Range	Average
Olsen P	13 - 74	42
PR	9 - 70	29
Soil N	0.45 - 1.14	0.7
QTK	5 - 22	11
pH	5.2 - 6.7	6
TS	669 - 1900	1006
QTCa	6 - 20	13
QTMg	22 - 68	42



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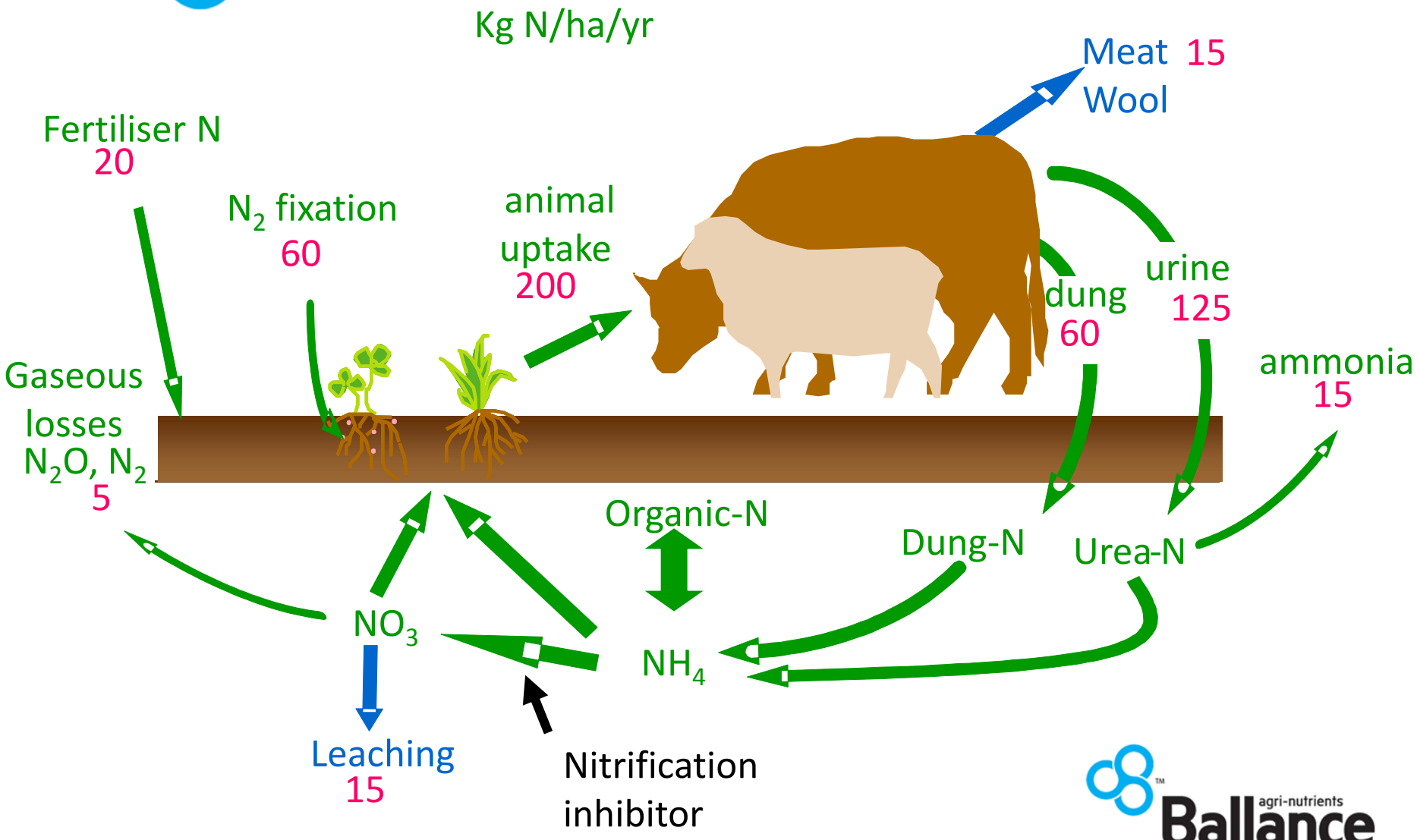
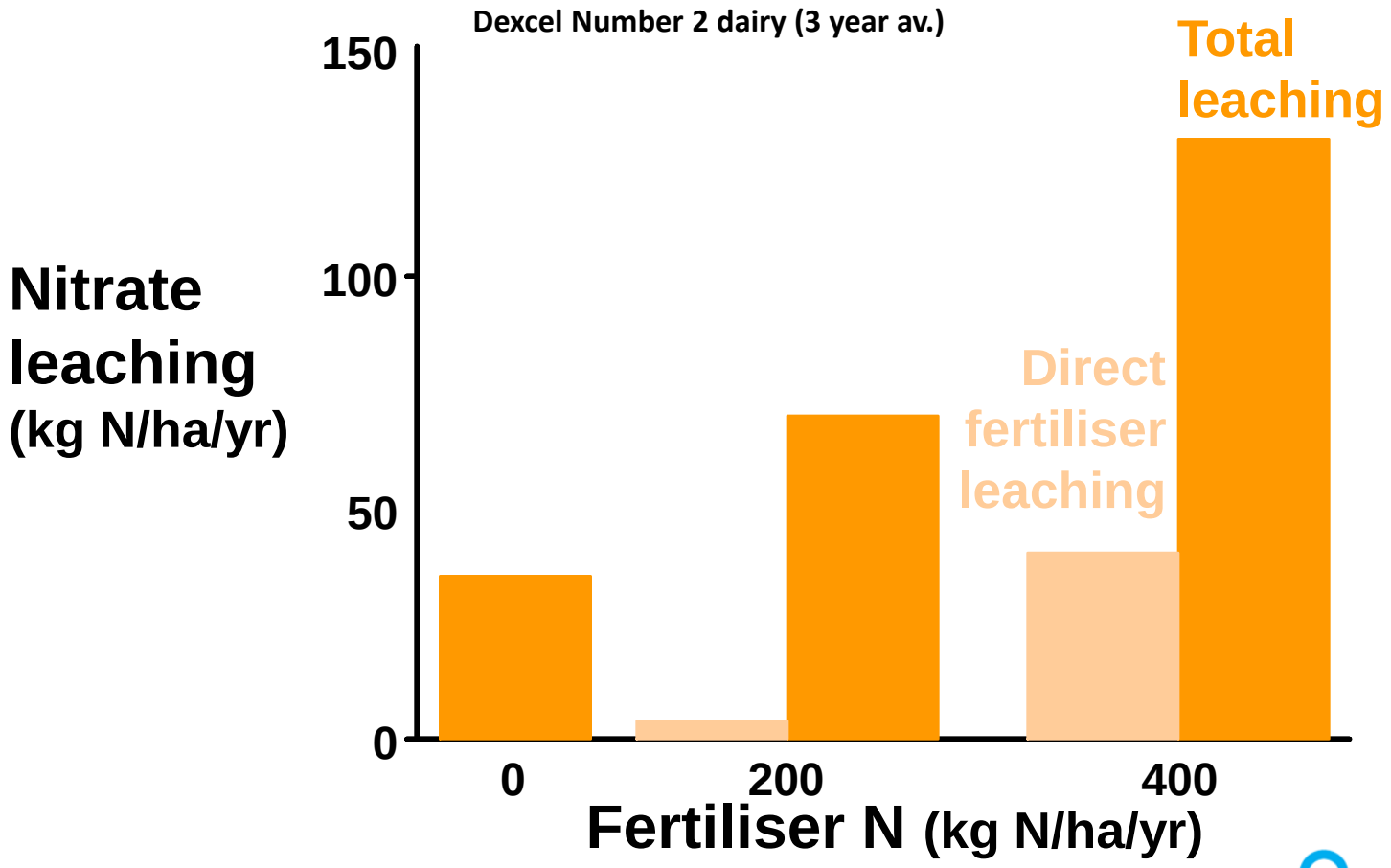
Simplified N Cycle

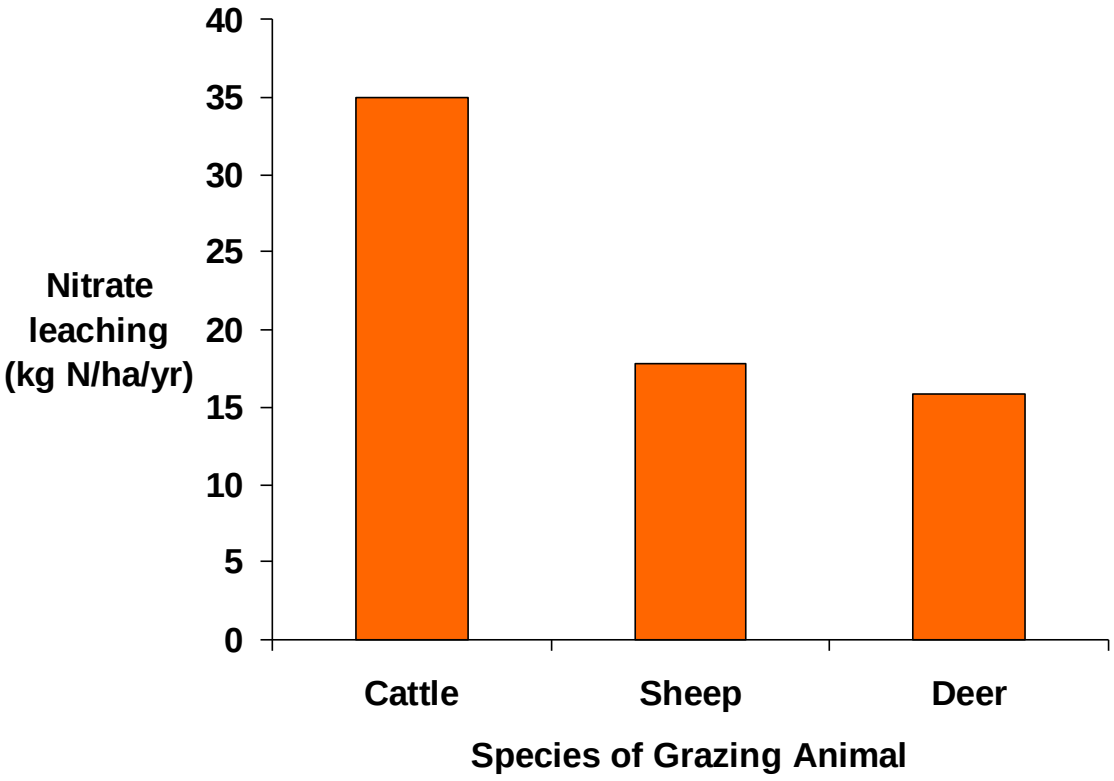


Nitrate leaching from fertiliser N



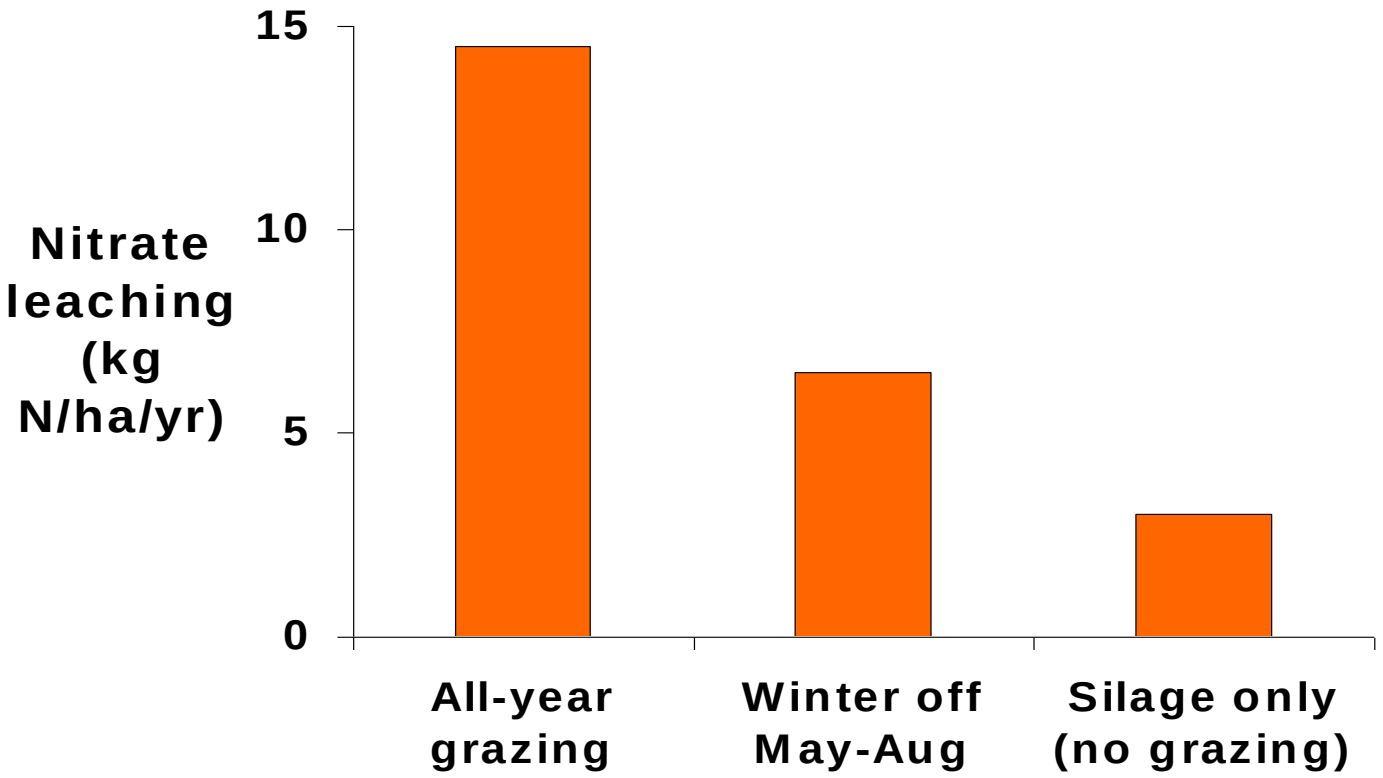
Some factors influencing N leaching

- Animal species



Some factors influencing N leaching

- Winter Management

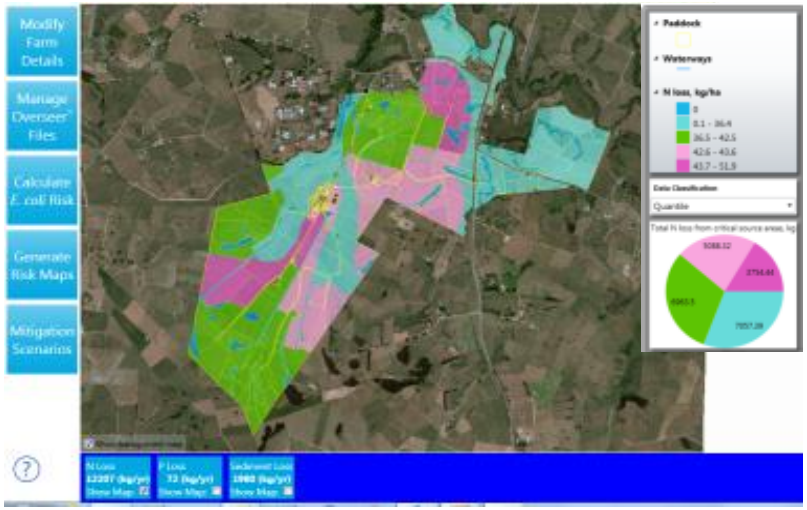


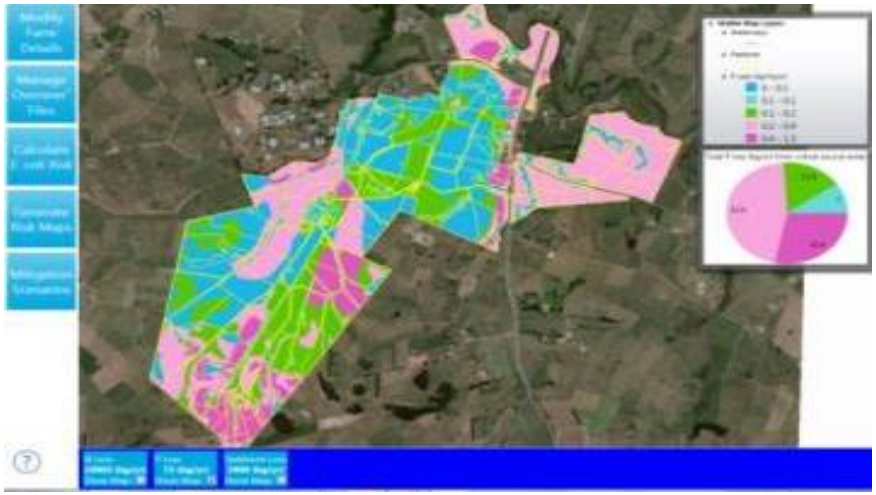
Bundling the knowledge in OVERSEER®

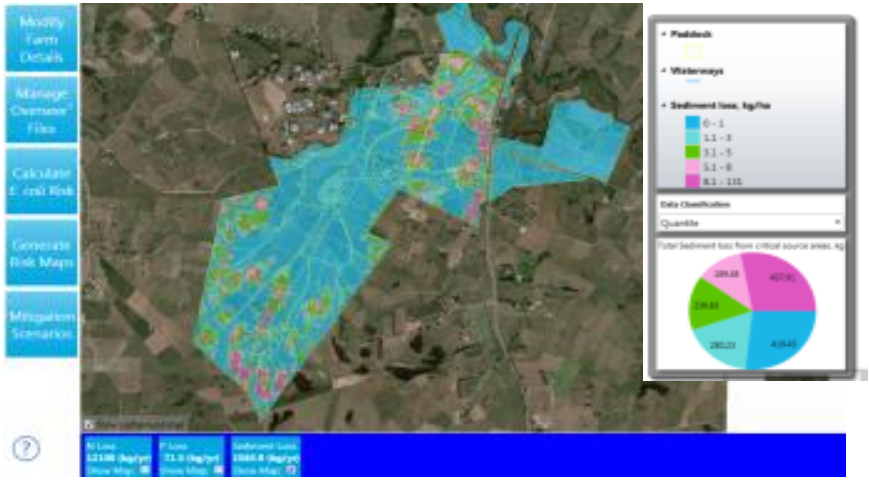
- Nutrient budgeting tool
  - Tracks nutrient flows around the farm (N, P, K, S, Ca, Mg, Na)
  - Within the farm system and in and out of the farm system
  - What if scenarios
  - Nutrient loss allocation
    - Estimates off-farm losses:
      - N and P leaching/run-off
      - Greenhouse gas emissions

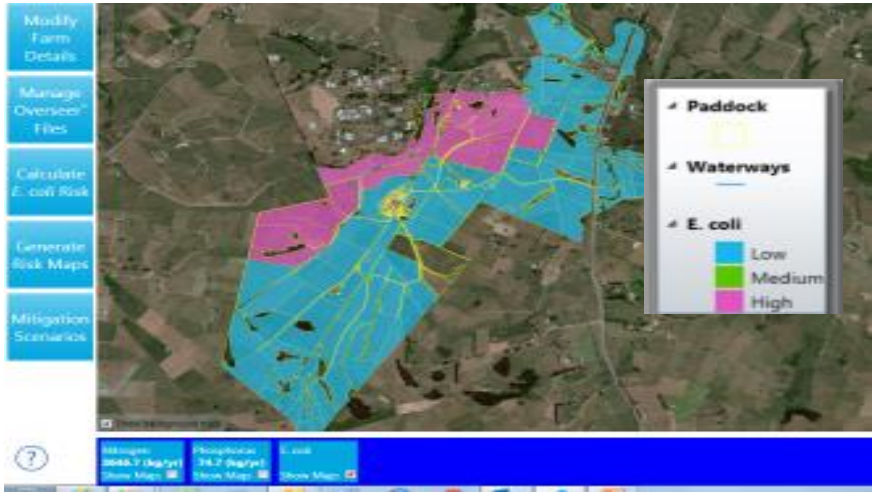
MitAgator – a tool to generate Risk Maps

Identification of CSA's and differential mitigation treatments









Questions?