

PROVISION OF SALT TO DAIRY COWS AS A POTENTIAL NITROGEN MITIGATION OPTION

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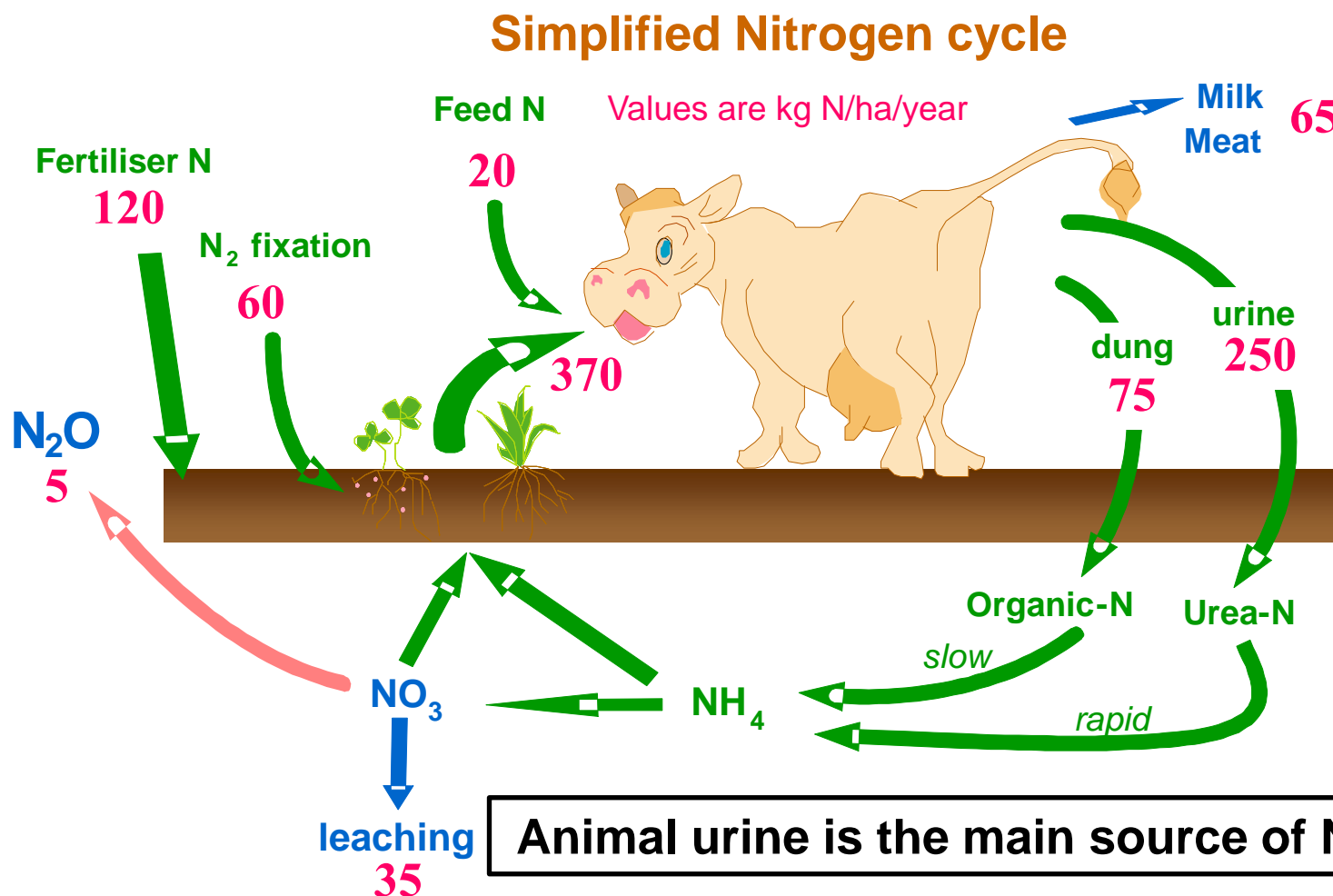
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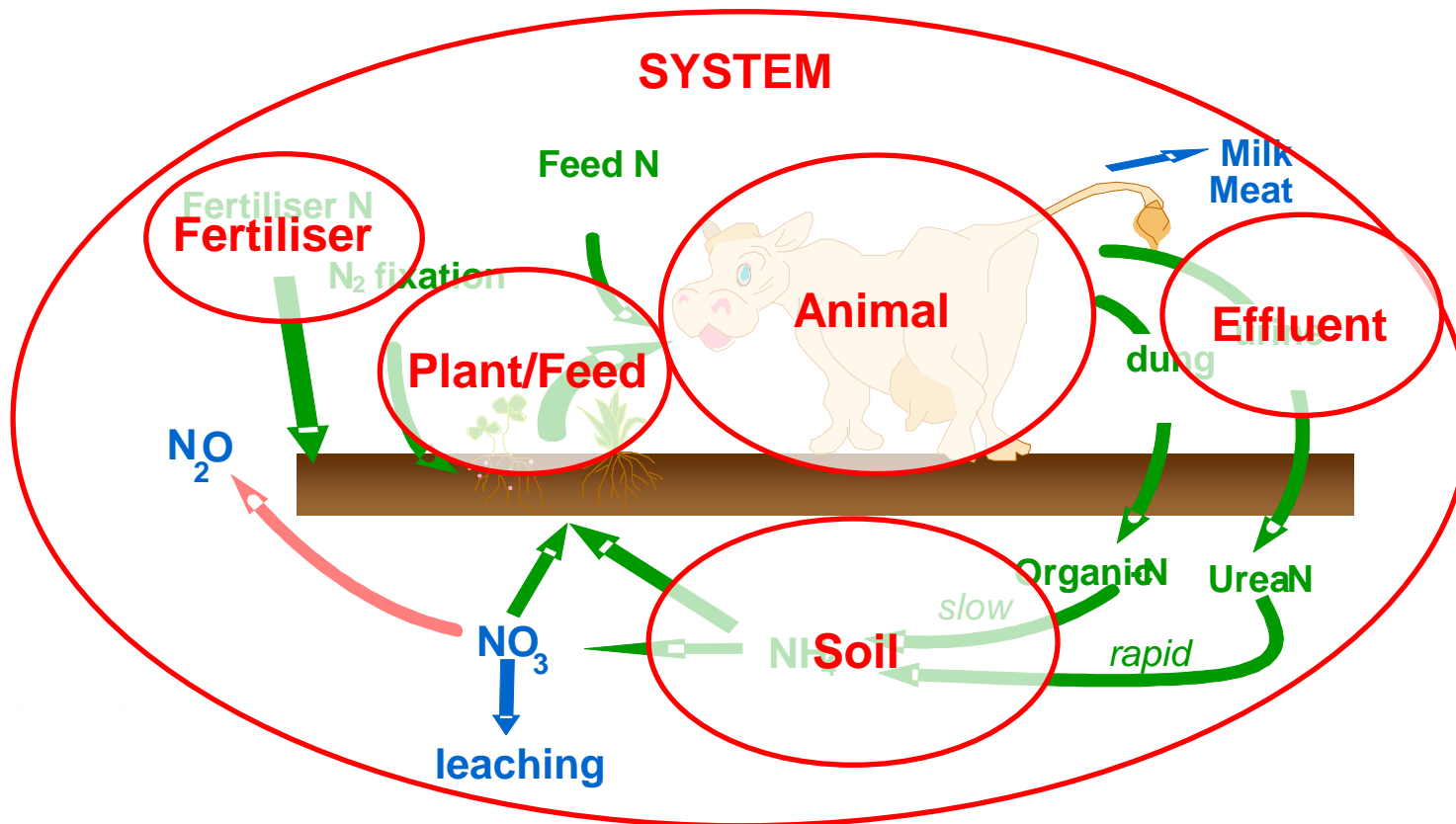
INTRODUCTION

- Nitrogen (N) leaching loss from grazed pastures is of major concern for water quality



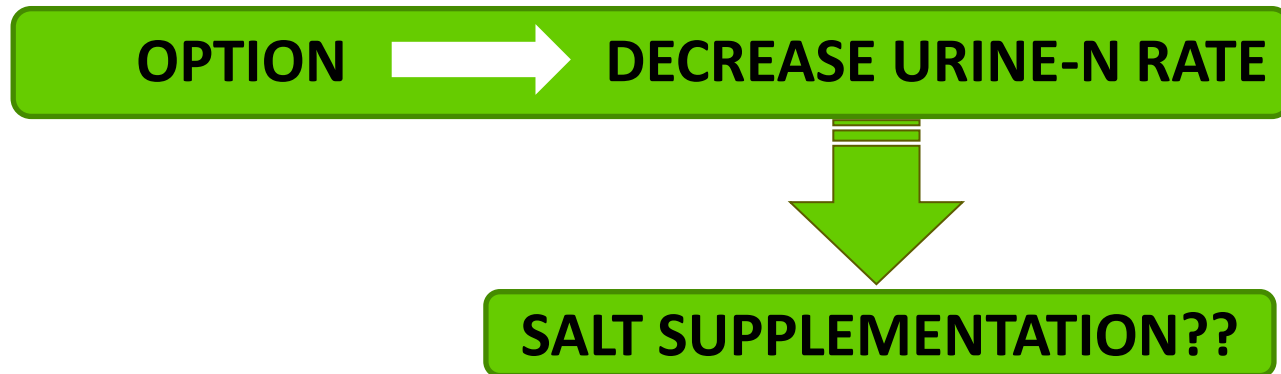
DEVELOP NITROGEN MITIGATION OPTIONS

- Range of management/mitigation options needed
 - Account for economics, risk, skill, labour, complexity, lifestyle....
- Research is targeting different aspects of N cycle



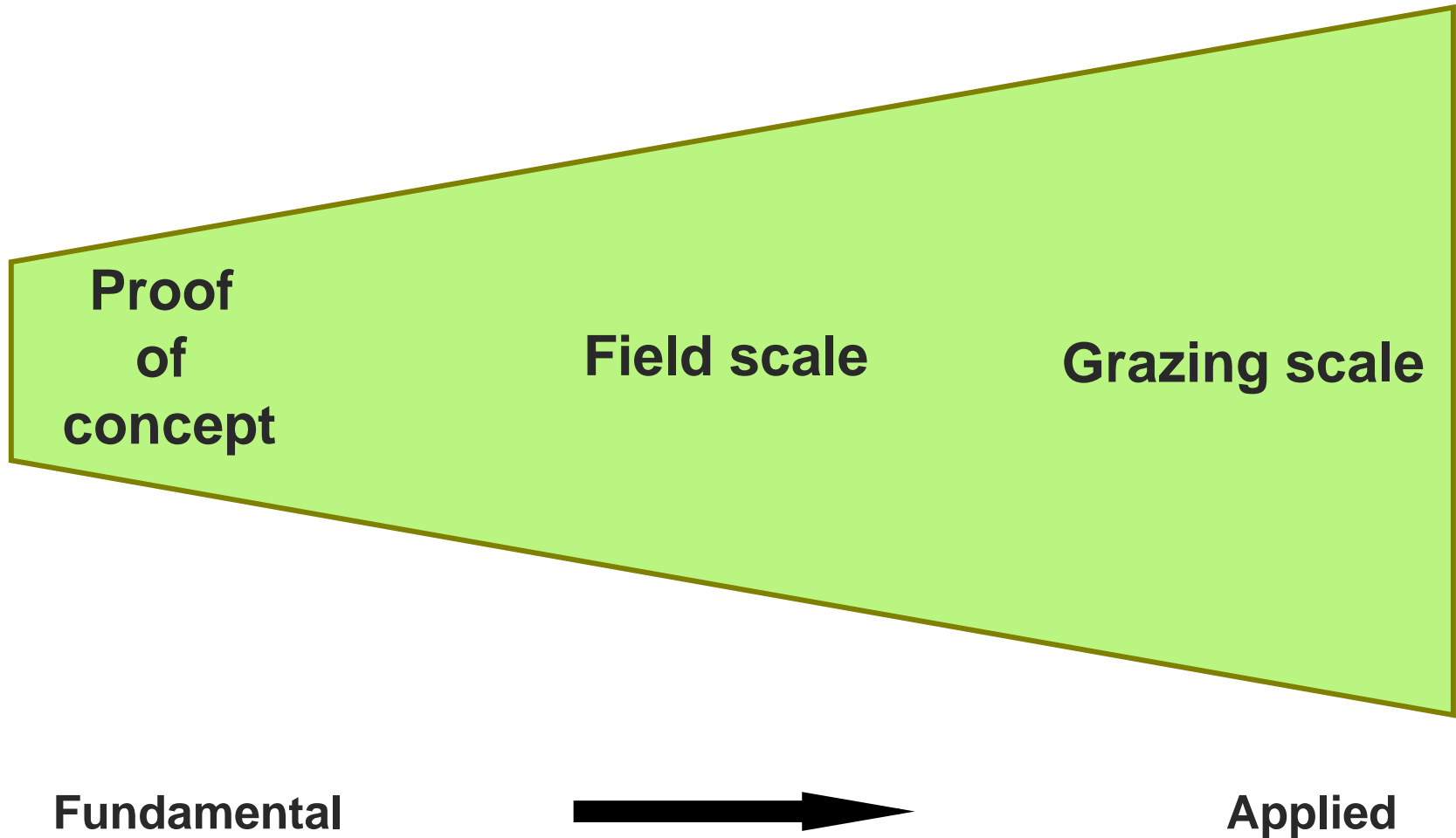
POTENTIAL MITIGATION OPTION: SALT

- Dairy cows excrete ~600 kg N/ha in 0.3 m² urine patch



- **Potential benefits.....**
 - Increase urination frequency with lower N rate
 - Improve plant N recovery and decrease urine-N leaching
 - Easy to source, low cost, variety of delivery methods

DEVELOP AND TEST NEW MITIGATION



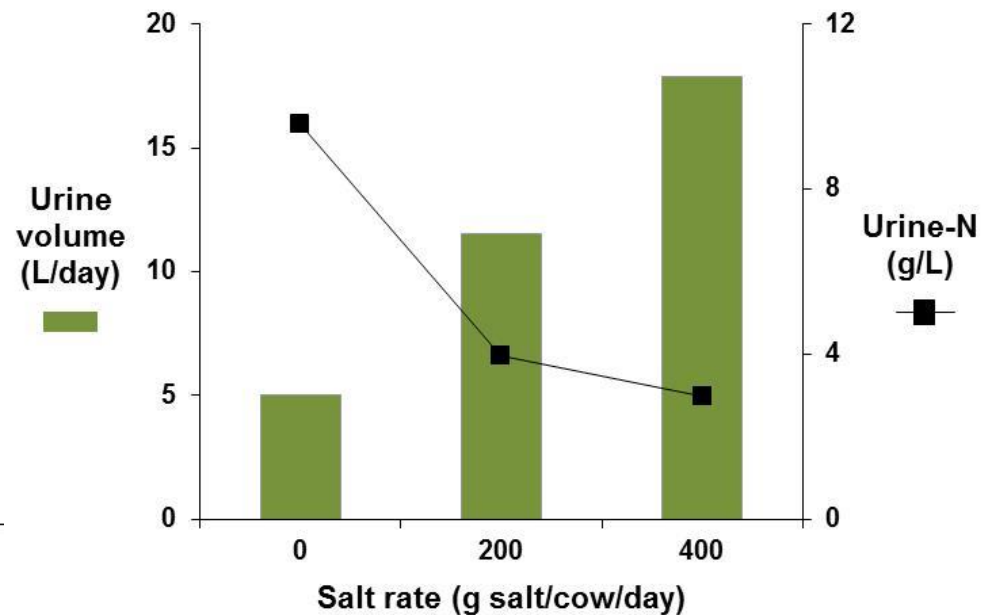
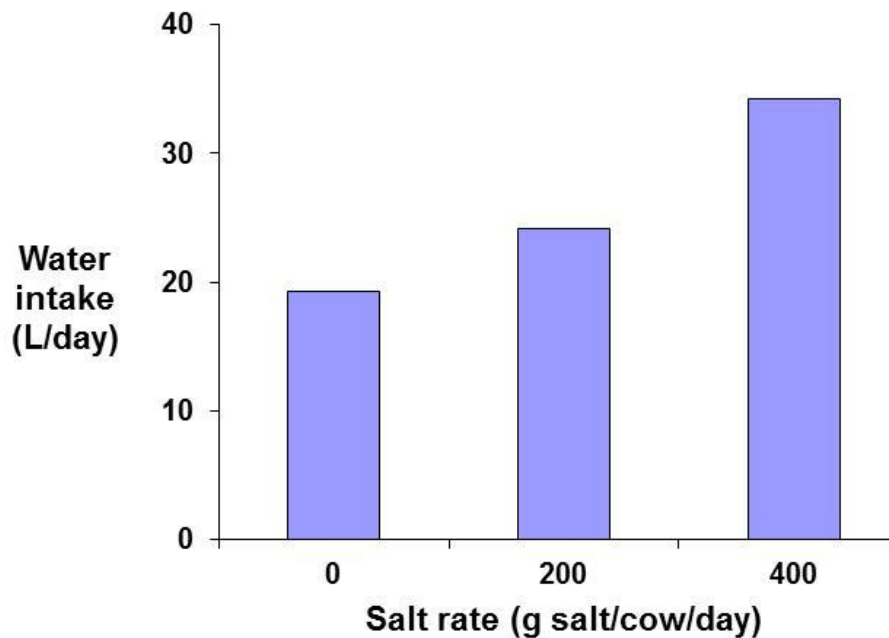
PROOF OF CONCEPT

- Dairy cow metabolism stall study

Treatments:

1. Control (nil-salt)
2. Low salt (200g/cow/day)
3. High salt (400g/cow/day)

Drenched daily (6-day measurement period)



FIELD EVALUATION: LAKE TAUPO CATCHMENT

Treatments:

1. Control (nil-salt)
2. Salt – 150g/cow/day (autumn-winter period)

~20 beef heifers per group grazed 5 replicated paddocks (each 0.4ha)
(4 year study; 2007-2010)



Measurements included:

- Daily water intake
- Heifer live-weight gain
- Urination frequency
- Urine patch N leaching loss

FIELD EVALUATION: LAKE TAUPO CATCHMENT

- Effect of salt on heifer water intake

Year	Daily water intake (relative to control)
2007	+48%
2008	+35%
2009	+41%
2010	+14%

} Daily drenching

→ Salt with silage



- Salt had no adverse effect on heifer live-weight gain

FIELD EVALUATION: URINATION FREQUENCY

- Urine sensors were used to measure urination frequency

Treatments:

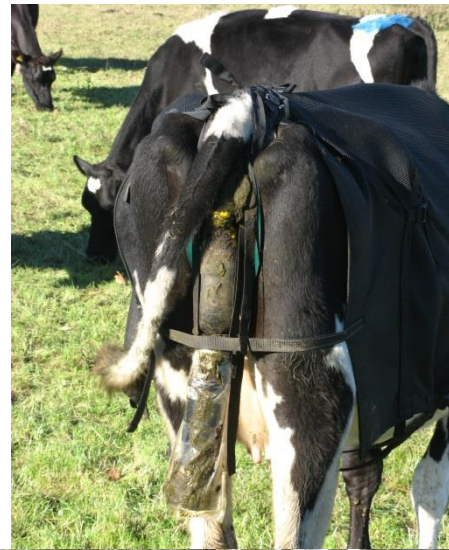
1. Control (nil-salt)
2. Salt – drenched 150g/cow/day

Six heifers per group (7 day measurement period)

Increase with salt (relative to control)

Daily water intake **+21%**

Urination frequency **+17%**



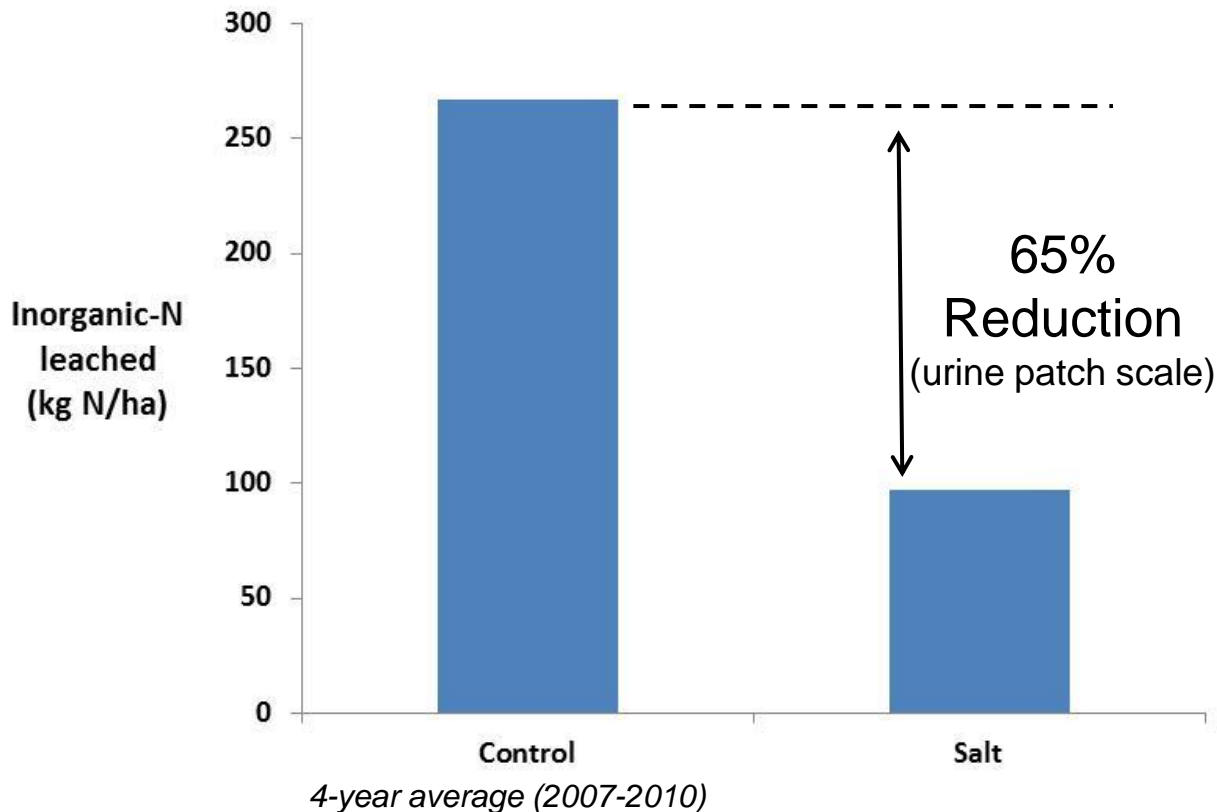
FIELD EVALUATION: LEACHING OF URINE-N

- Lysimeters examined the effect of urine-N rate

Treatments:

Control – urine applied at **600** kg N/ha

Salt – urine applied at **300** kg N/ha



Allied modelling indicates up to 20% decrease in per-hectare N leaching

CURRENT GRAZING STUDY (2015)

Pastoral 21 Research Program

Main Objective – Investigate the effect of salt supplementation to dairy cows on N leaching losses from grazed pastures

Treatments (during late-autumn & winter grazings)

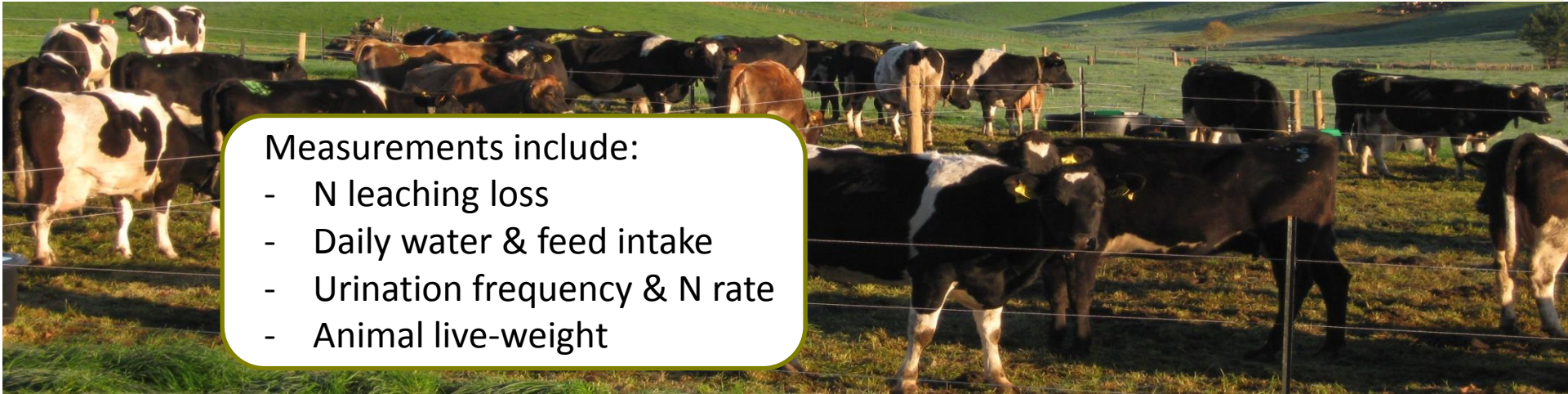
1. **Control** - standard grazing
2. **Salt** – salt delivered with supplementary feed

Four herds (each up to 15 non-lactating dairy cows) and 18 replicated paddocks per treatment



Measurements include:

- N leaching loss
- Daily water & feed intake
- Urination frequency & N rate
- Animal live-weight



SUMMARY

Potential of salt for N mitigation in grazed pastures:

- Increased water intake
- Increased urination frequency
- Lower N rate in urine patches
- Improved plant recovery and less urine-N leaching

Current research is looking at practical application for dairying and assessing benefits for N leaching under grazing

ACKNOWLEDGEMENTS



**Ministry of Business,
Innovation & Employment**

