Intensification of Home Grown Feed: where to next

DRF Symposium 2019
Bega, NSW

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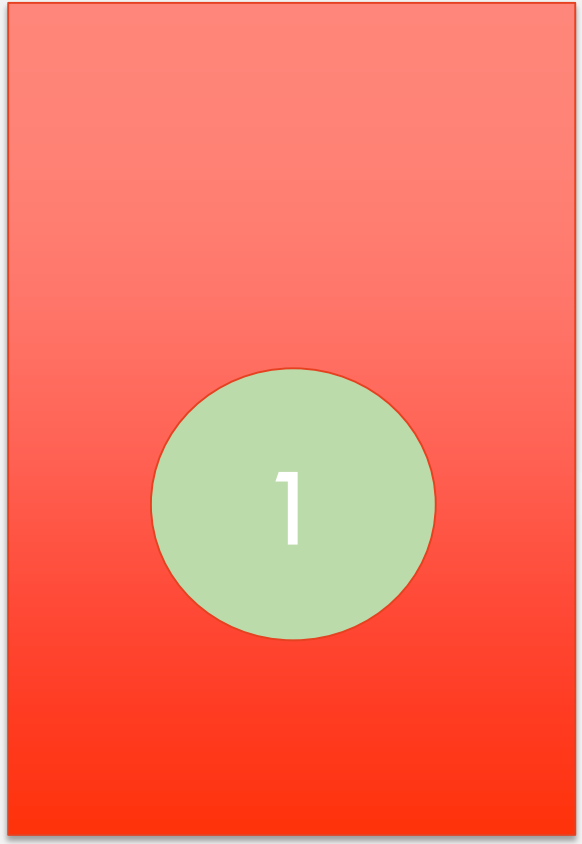
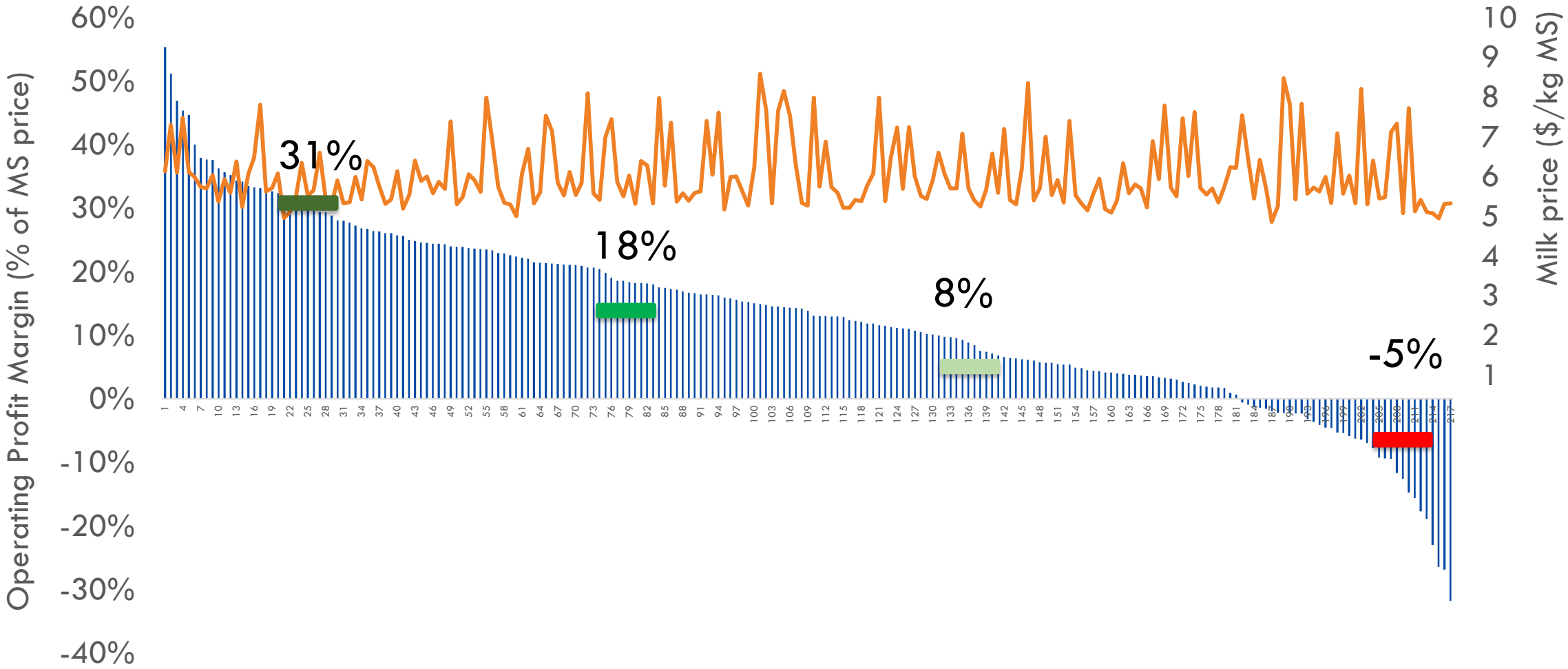
THE UNIVERSITY OF SYDNEY



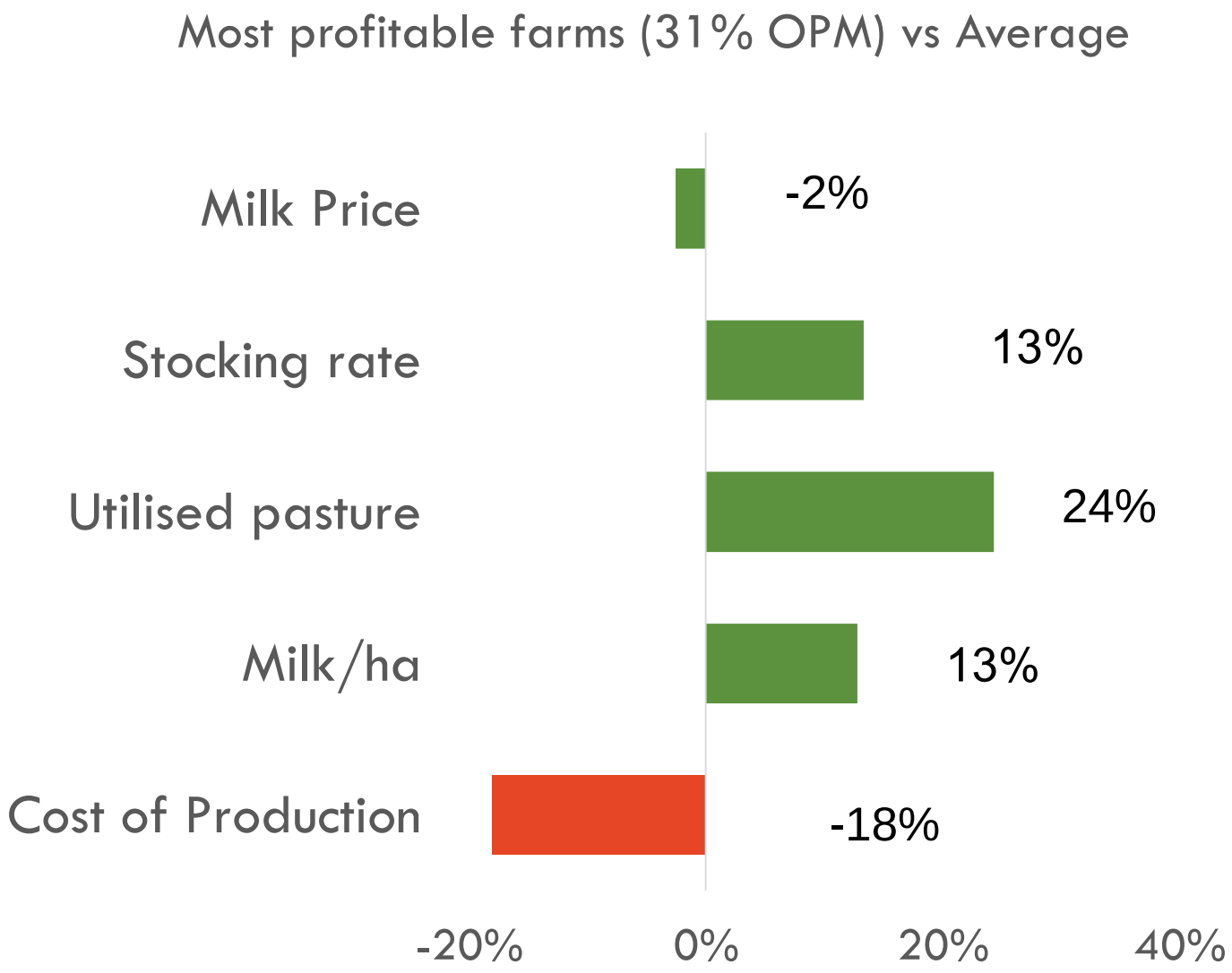
Profitability

Operating Profit Margin (or EBIT) as % of Milksolids price



Data source: DFMP (compiled by Juan Gargiulo)

What do top farmers do differently..?



Data source: DFMP

Which Production System?

Feed: ~50% of cost in any system

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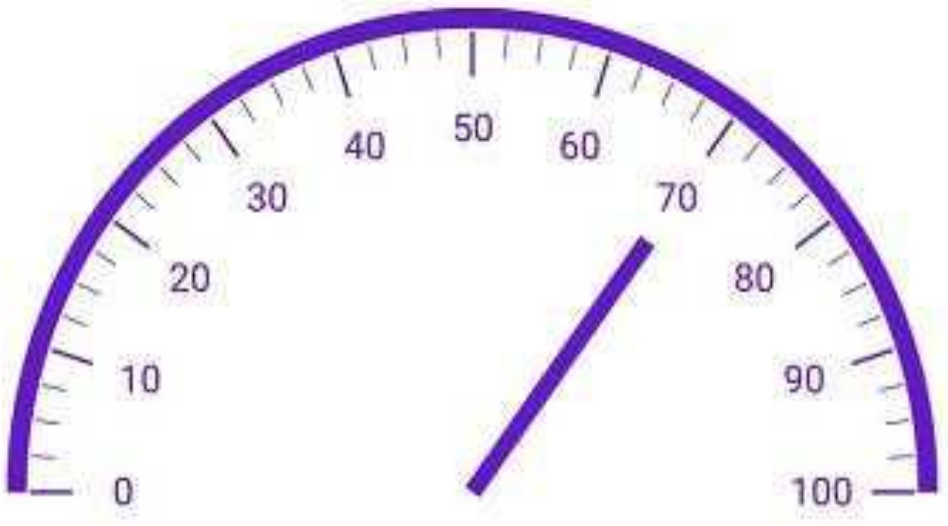
Learnings

Role of research: what is possible?



Profit-meter

Feedbase research (www.futuredairy.com)

Maize

25-28tDM/ha

Forage rape

~8-10tDM/ha

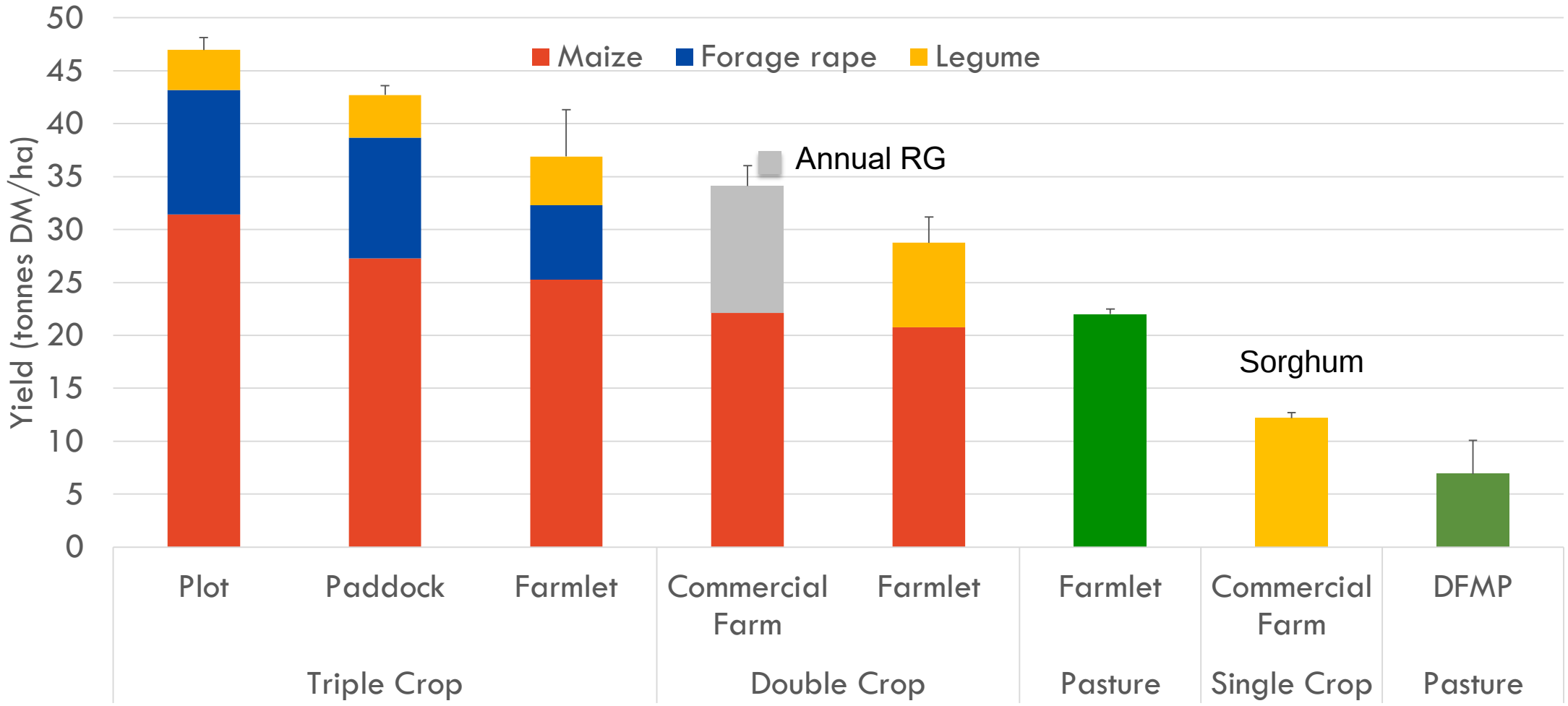
Legume

~5tDM/ha

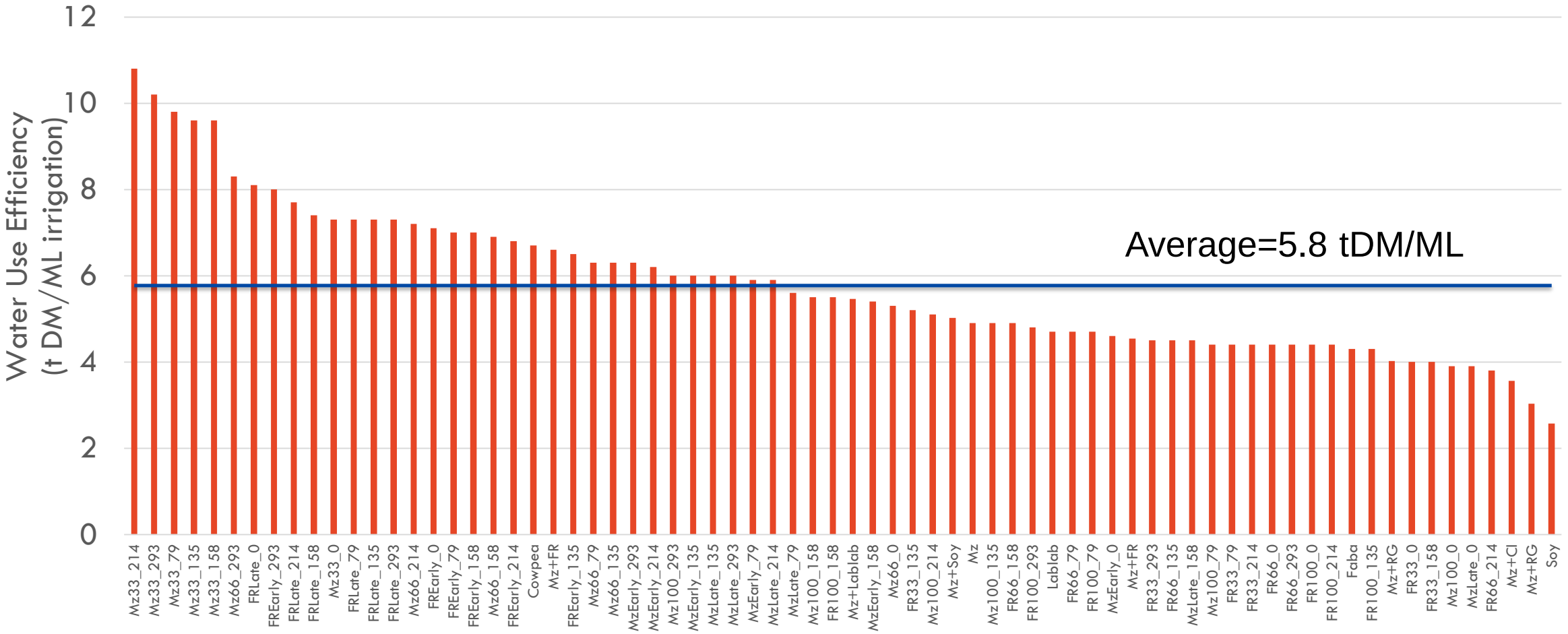
Pasture

18-22tDM/ha

The ‘efficiency toll’…



Apparent Irrigation Water Use Efficiency

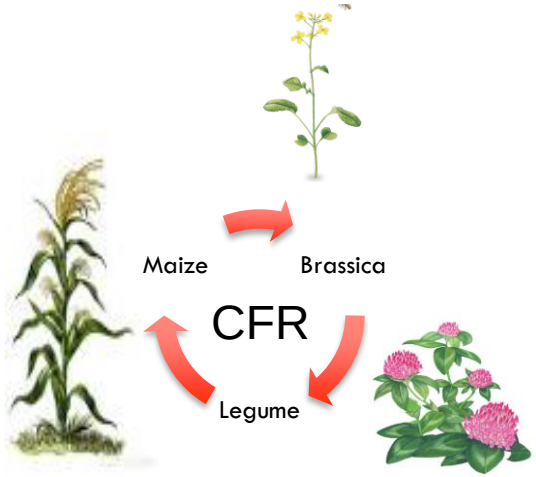


Complementary Forage System: 100 cows in 21.5 ha

Pasture
65% of area

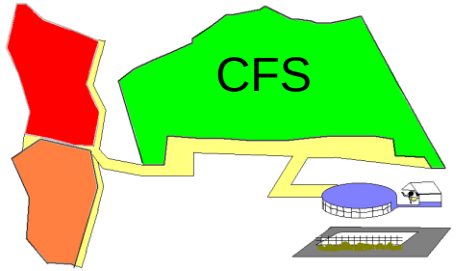
22 ton utilised DM/ha

Crops
35% of area



40 ton utilised DM/ha

7,700 L /cow with 1 ton/cow of grain

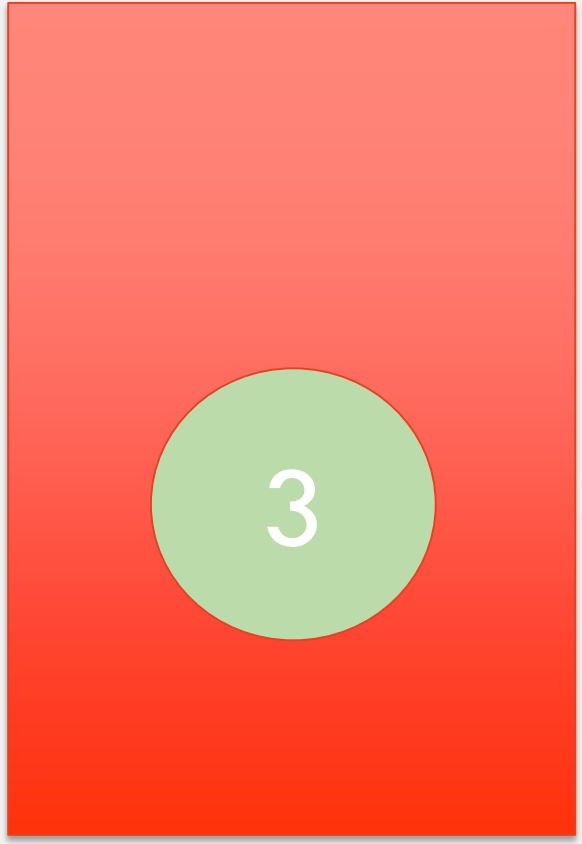


> 2,150 kg MS/ha from home-grown feed

Key learnings

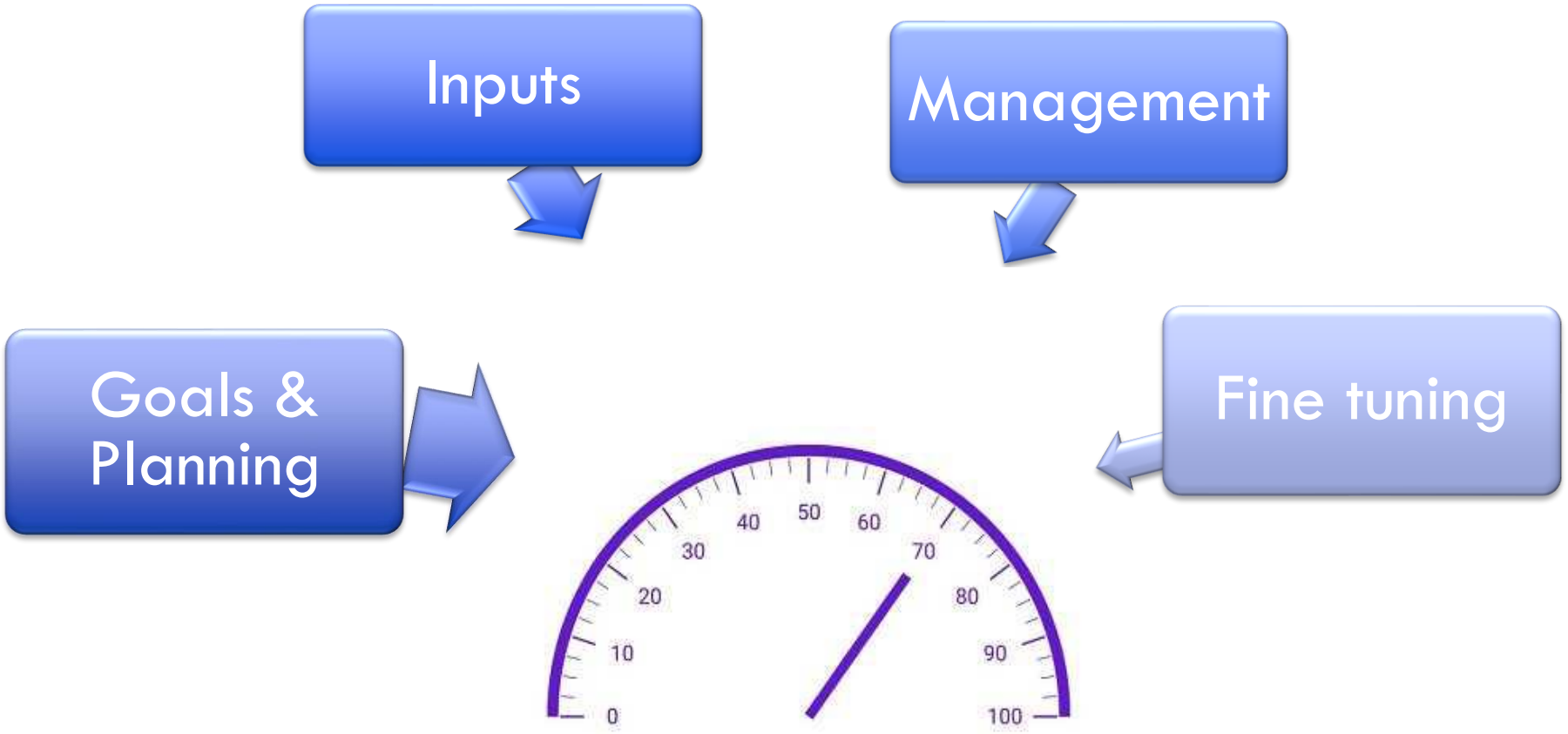
- Achievable, repeatable, sustainable
- Highly Flexible
- More Economic than other intensification strategies
- But more Complex!

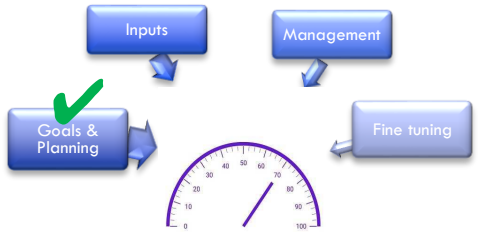

CCORMICK
MTX150



Losses

Where are the losses..?





Start from profit to end with profit…

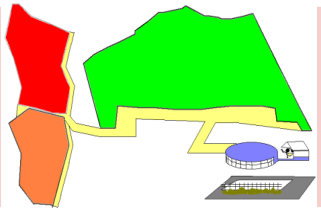
What EBIT and margin?

How much milk?

How many cows?

Which system?

What forages?

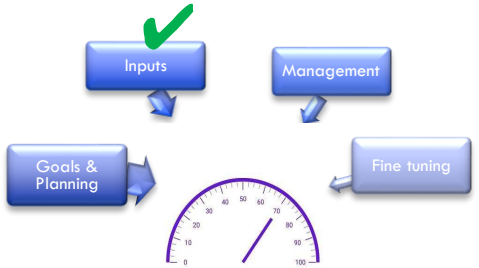


E.g. EBIT $250k $7/kgMS

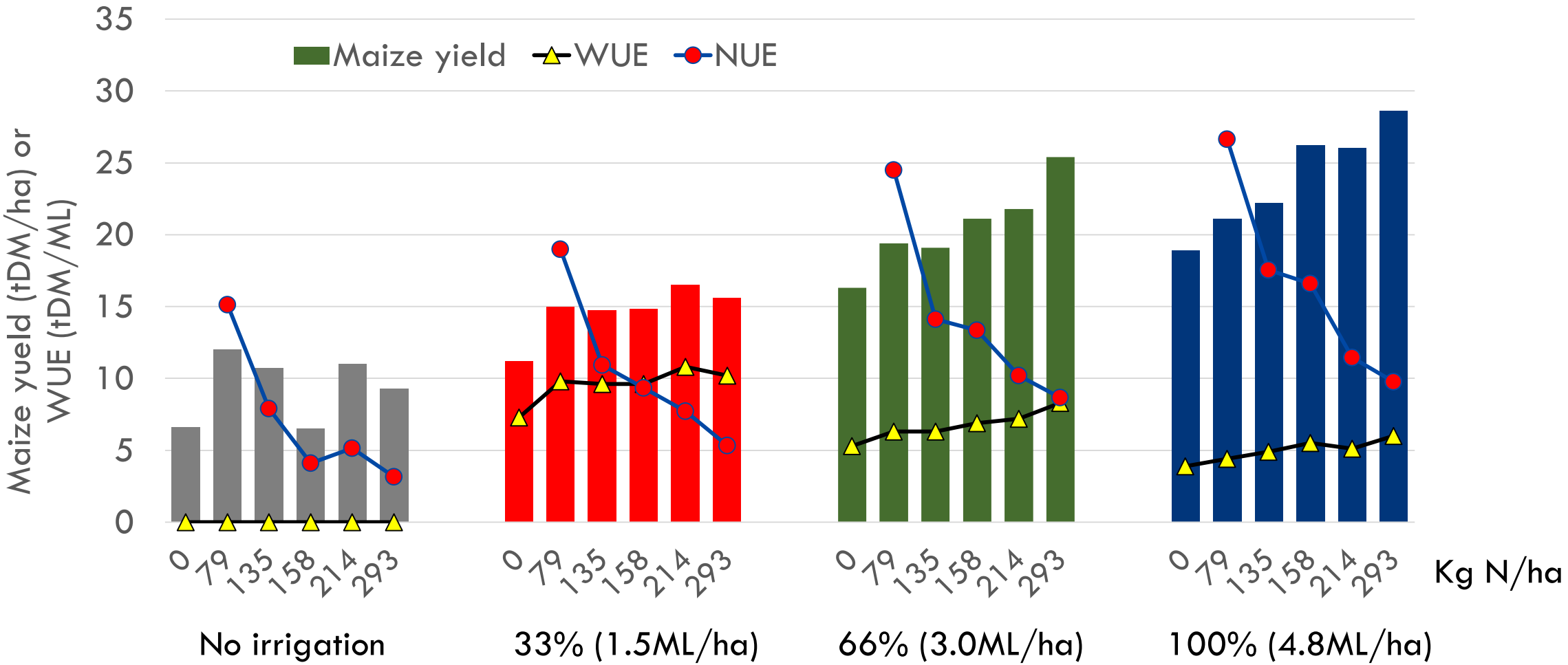
@11%(NSW)=4.5M L ~560 cows

@24%(TAS)=2.1M L ~262 cows

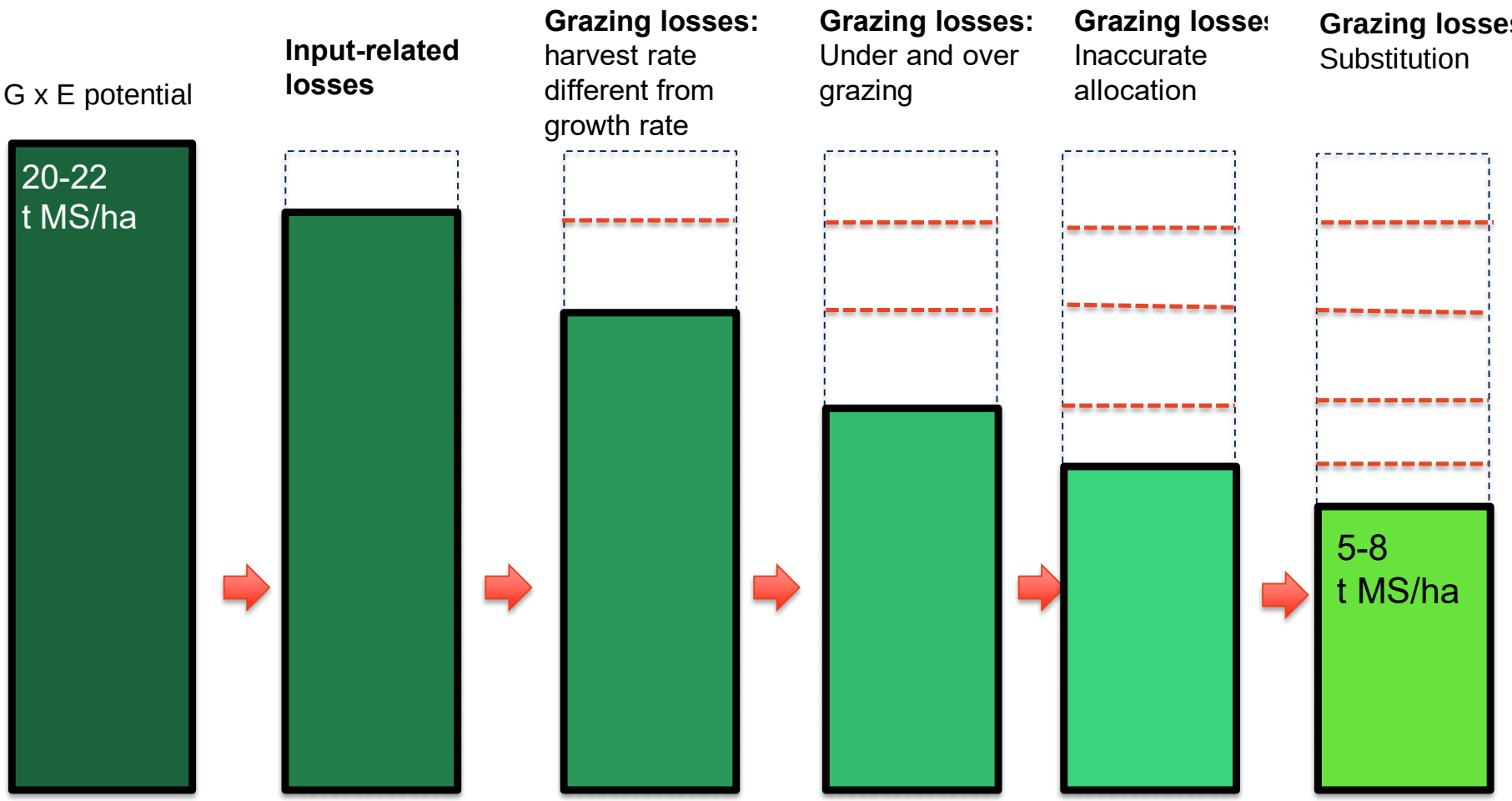
SR? Grain level? Forage base?



Yield, Water, and Nitrogen Use Efficiency in Maize

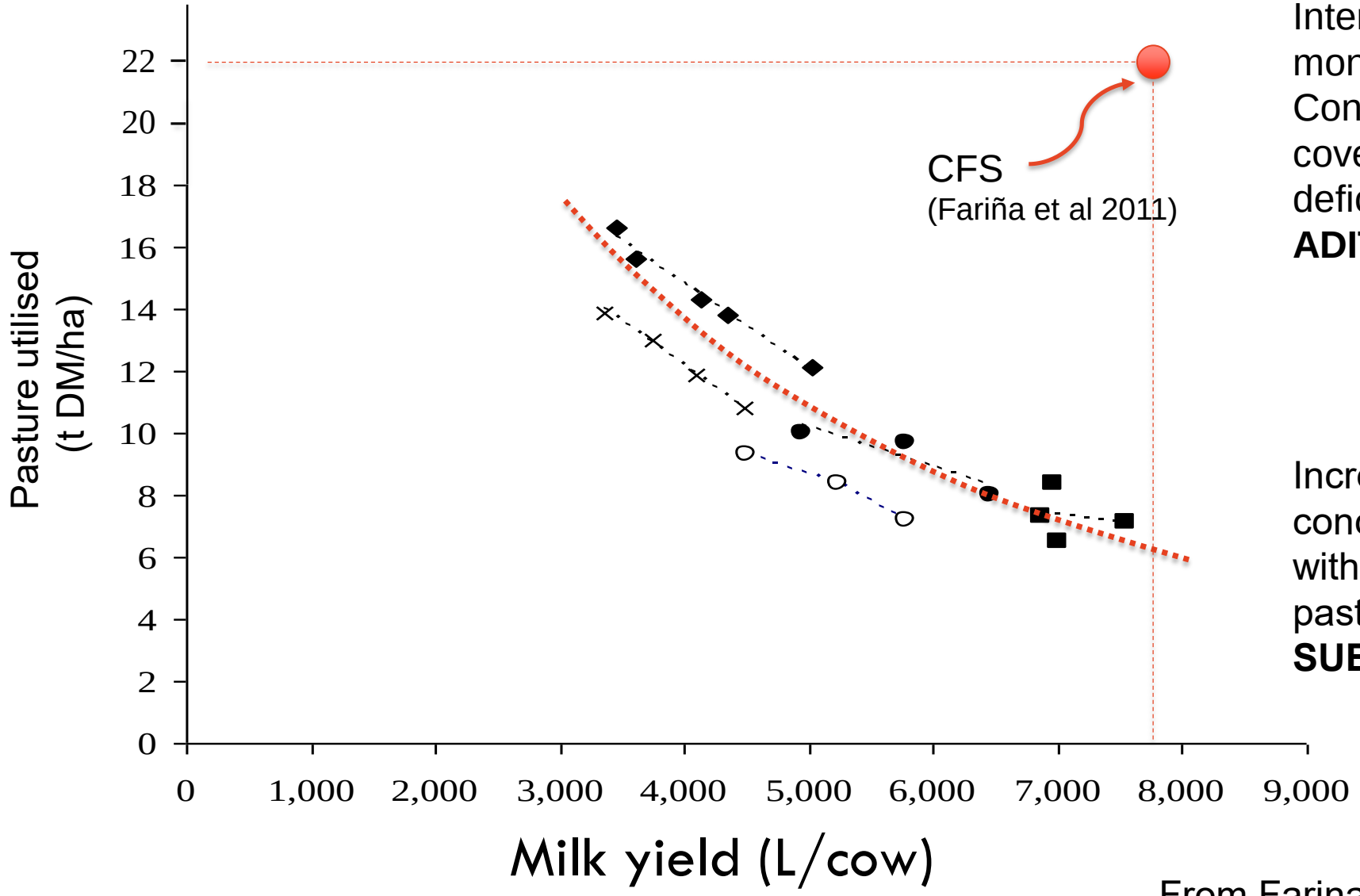


Management



Garcia et al 2014

The hidden losses…



Intensive pasture monitoring; Concentrate fed to cover true pasture deficits:
ADITIVE EFFECT

Increasing concentrate/cow without adjusting pasture management:
SUBSTITUTION

From Farina (2011)

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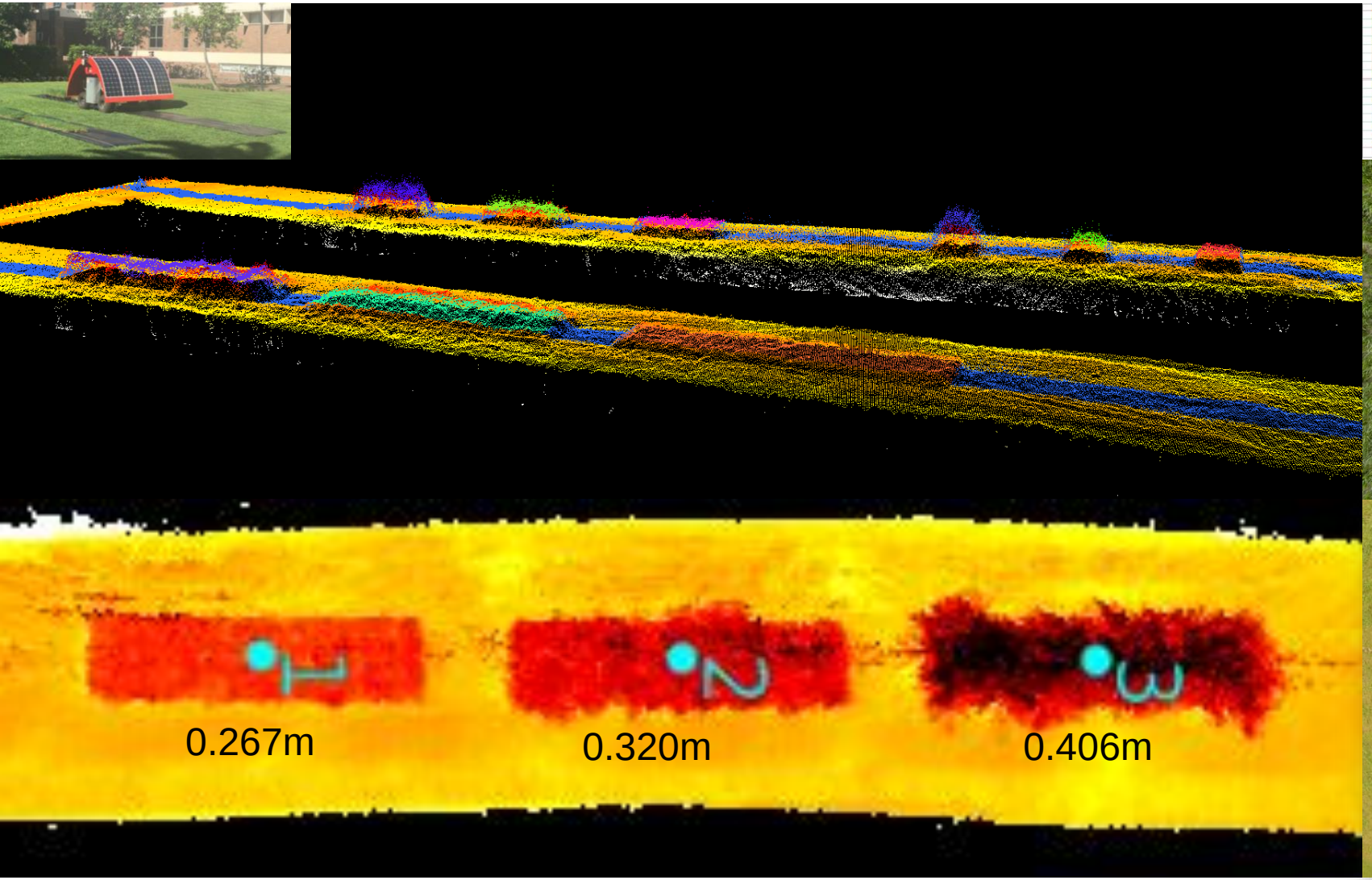
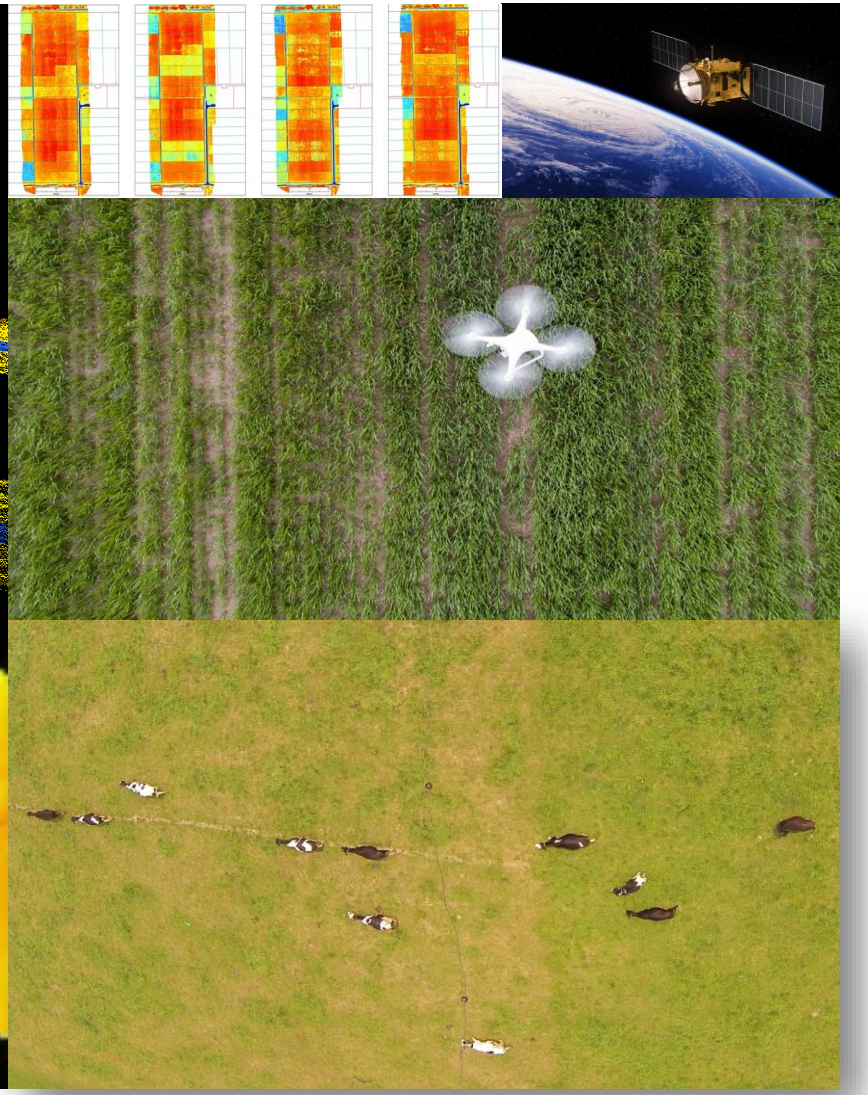
Where to next…

Reducing complexity in management



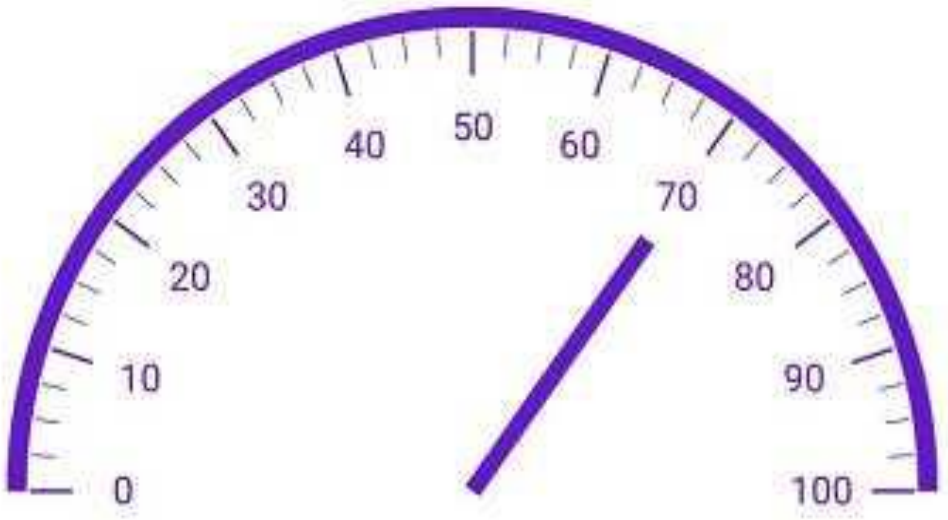


3-D cameras for pasture height (Li, Underwood, Clark, Islam & Garcia 2016)

Where to next

- Reducing complexity through automation
- Eco-friendly nutrient management
  - Compost-effluent
  - Legume-based HGF
  - Biofertilisers (PGPR)
- Designer crop:
  - Genetic engineering..?
  - Ratoon corn?

In summary…



Profit-meter

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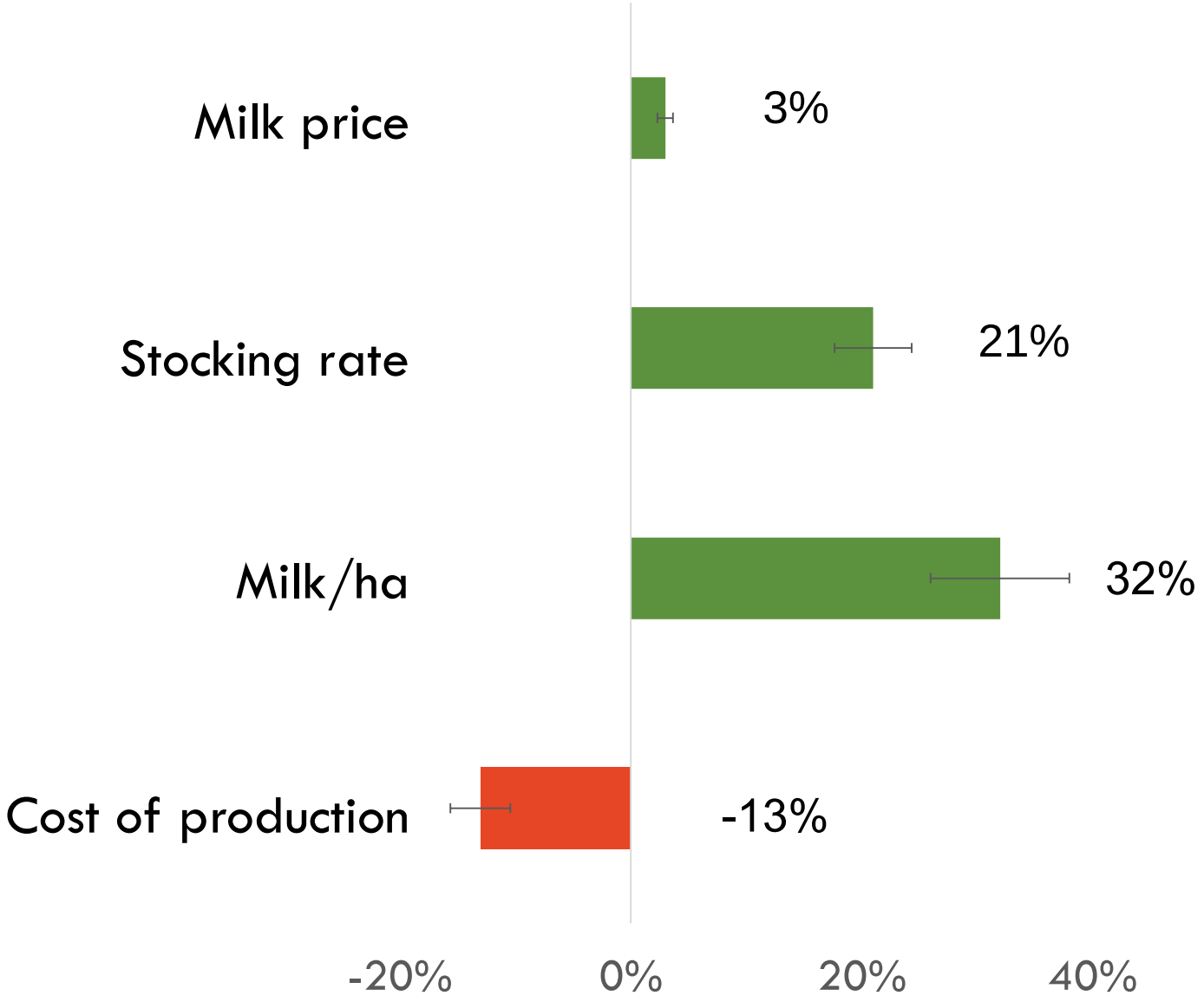
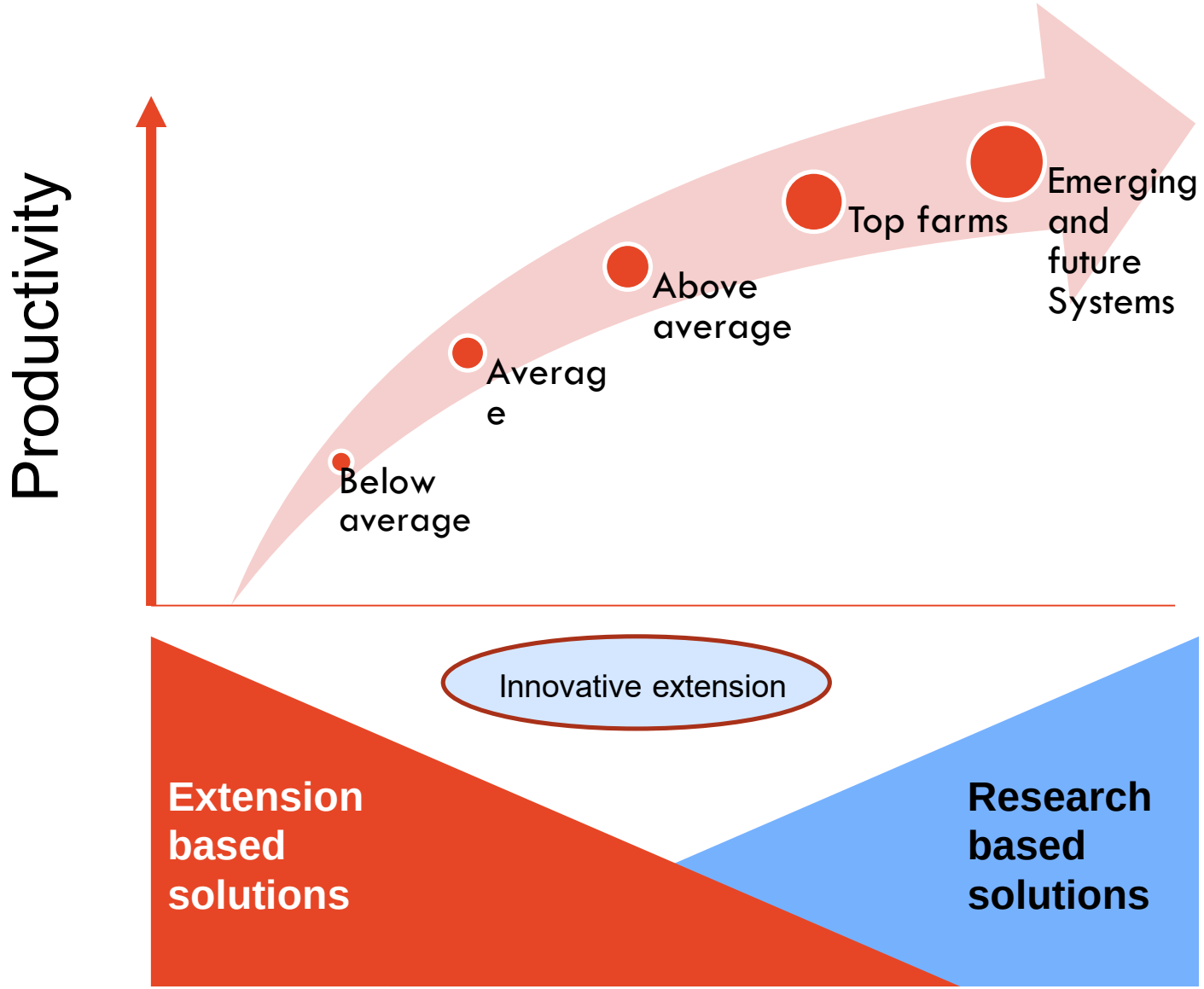
What do top farmers do differently..?



Data source:

- Argentina (CREA)
- Australia (RedSky)
- Chile (TodoAgro)
- Chile (Colun)
- New Zealand (RedSky)
- Uruguay (FUCREA)

Intensification: different for each farm/system



CFS > Grain > Leasing more land

HUNTER VALLEY

FARM 5

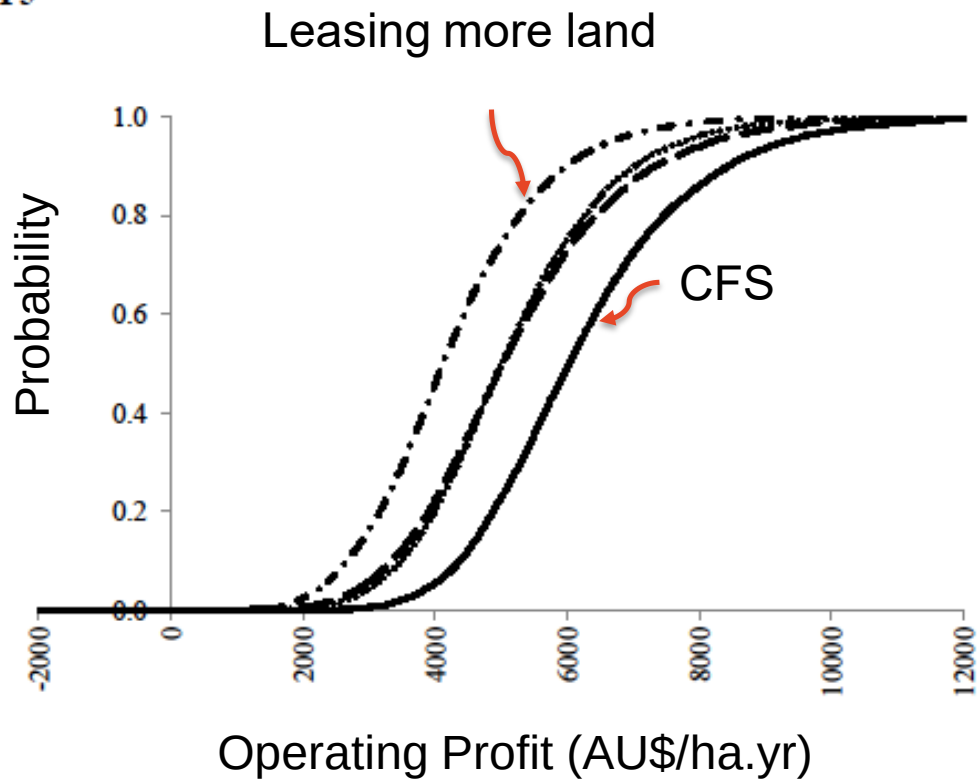


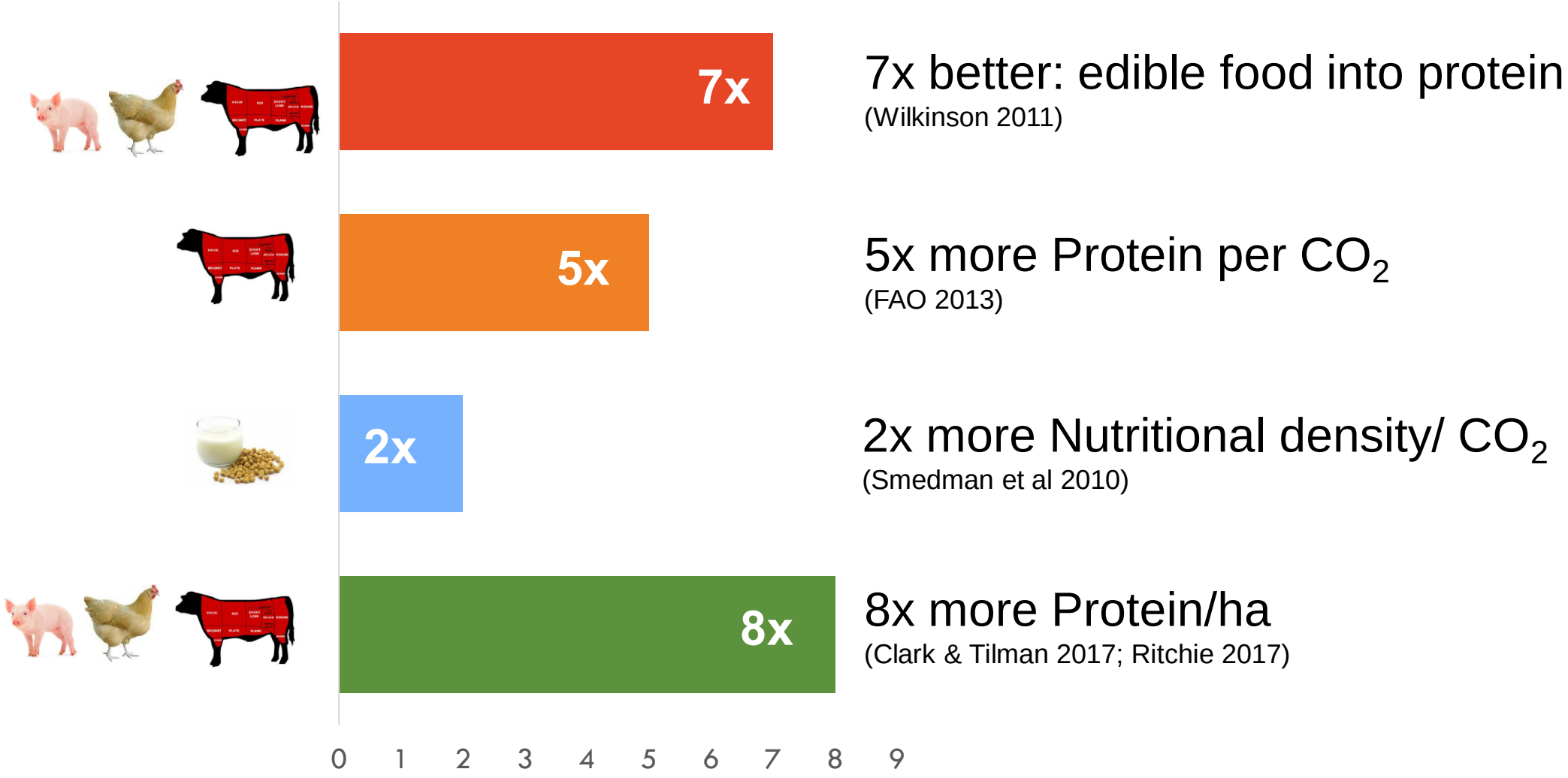
Figure 5-9: Cumulative probability of operating surplus (AU$/ha.year) for Base (round circles·····), CFS (solid line —), Feed (long dash – – –) and Leasing Land (dash/dot) for FARM 5 when all variables are simulated to vary stochastically.

Campbell (2018)

Modelled impact on farm

Campbell M. (2018)

What we don't see about milk…



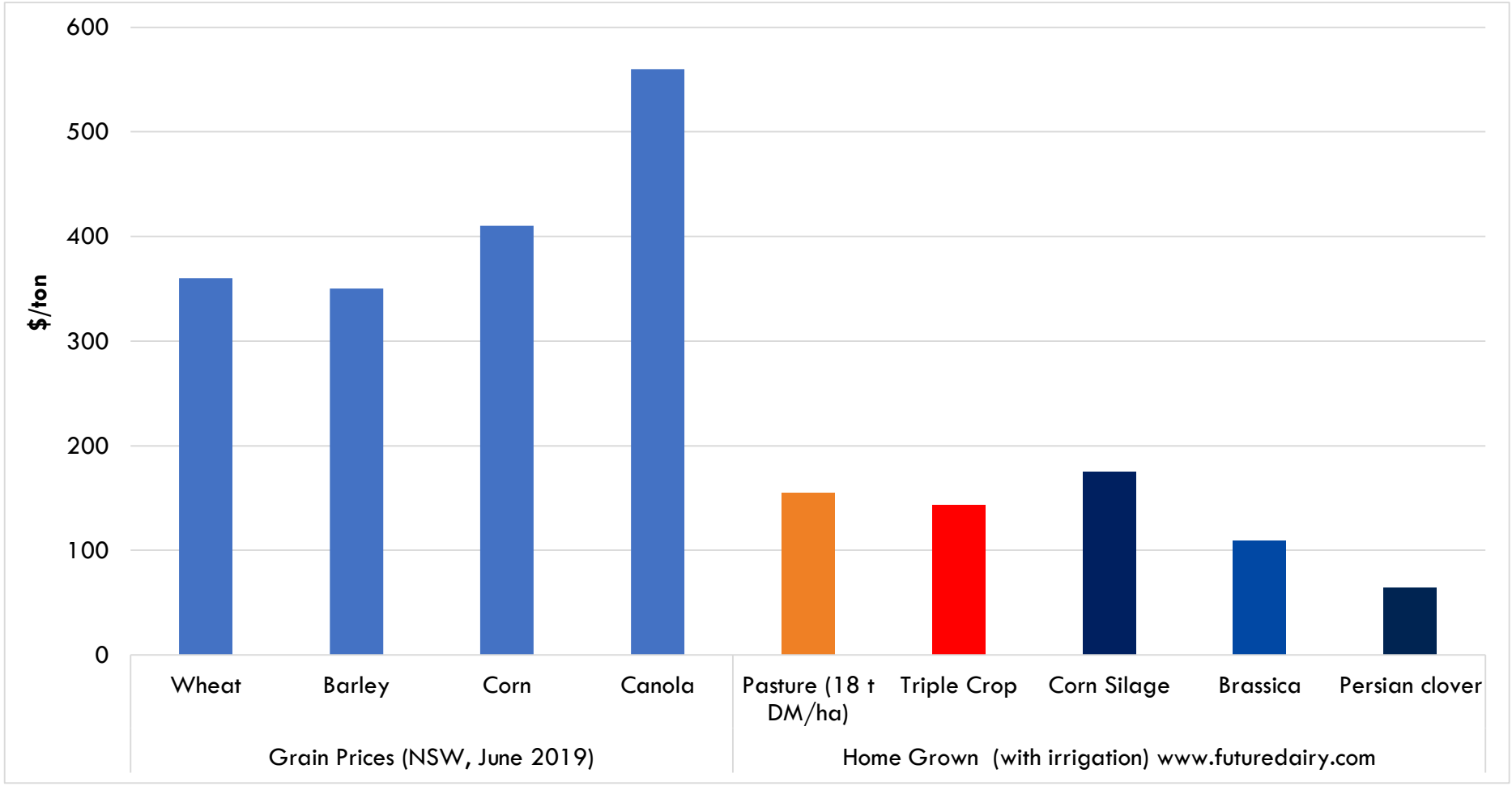
7x better: edible food into protein
(Wilkinson 2011)

5x more Protein per CO_2
(FAO 2013)

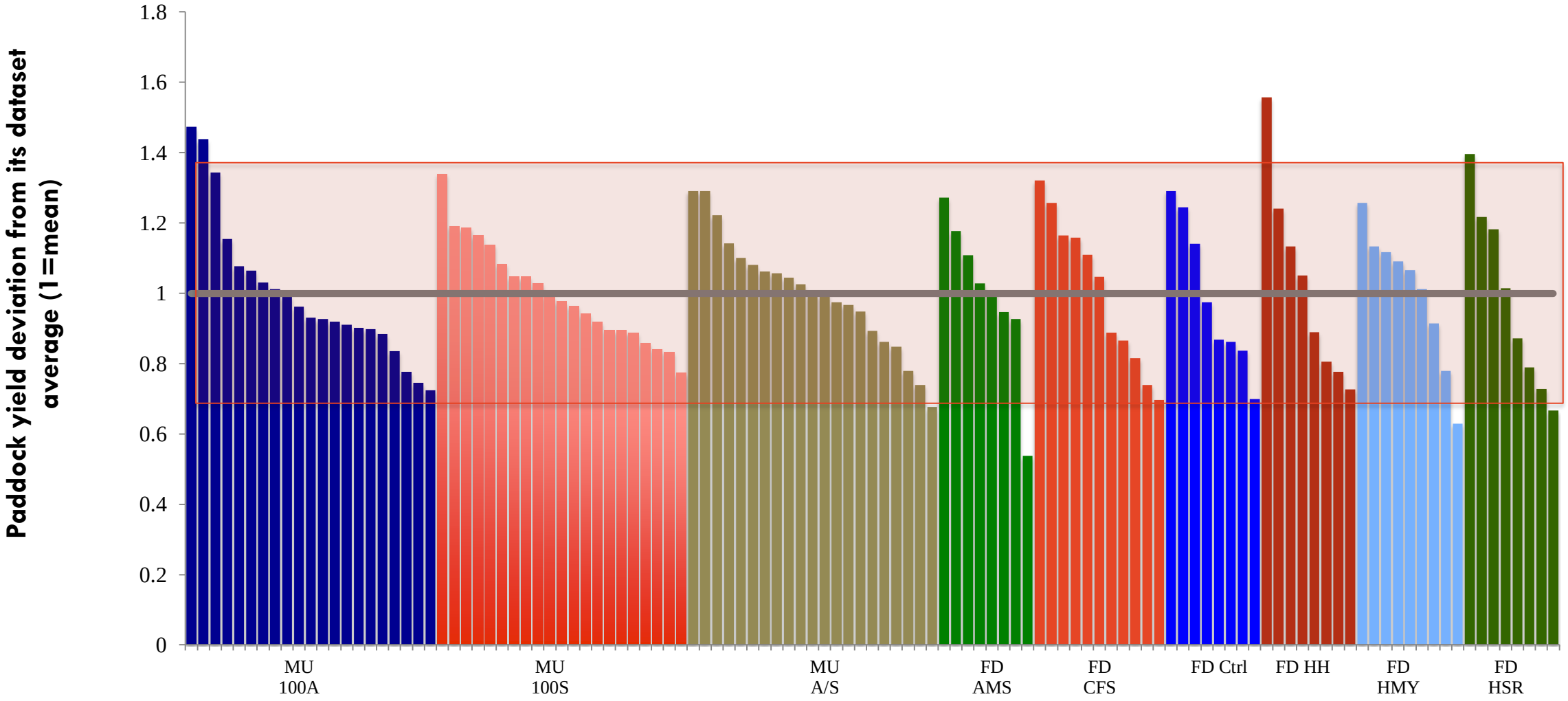
2x more Nutritional density/ CO_2
(Smedman et al 2010)

8x more Protein/ha
(Clark & Tilman 2017; Ritchie 2017)

A good reason for intensifying from HGF…



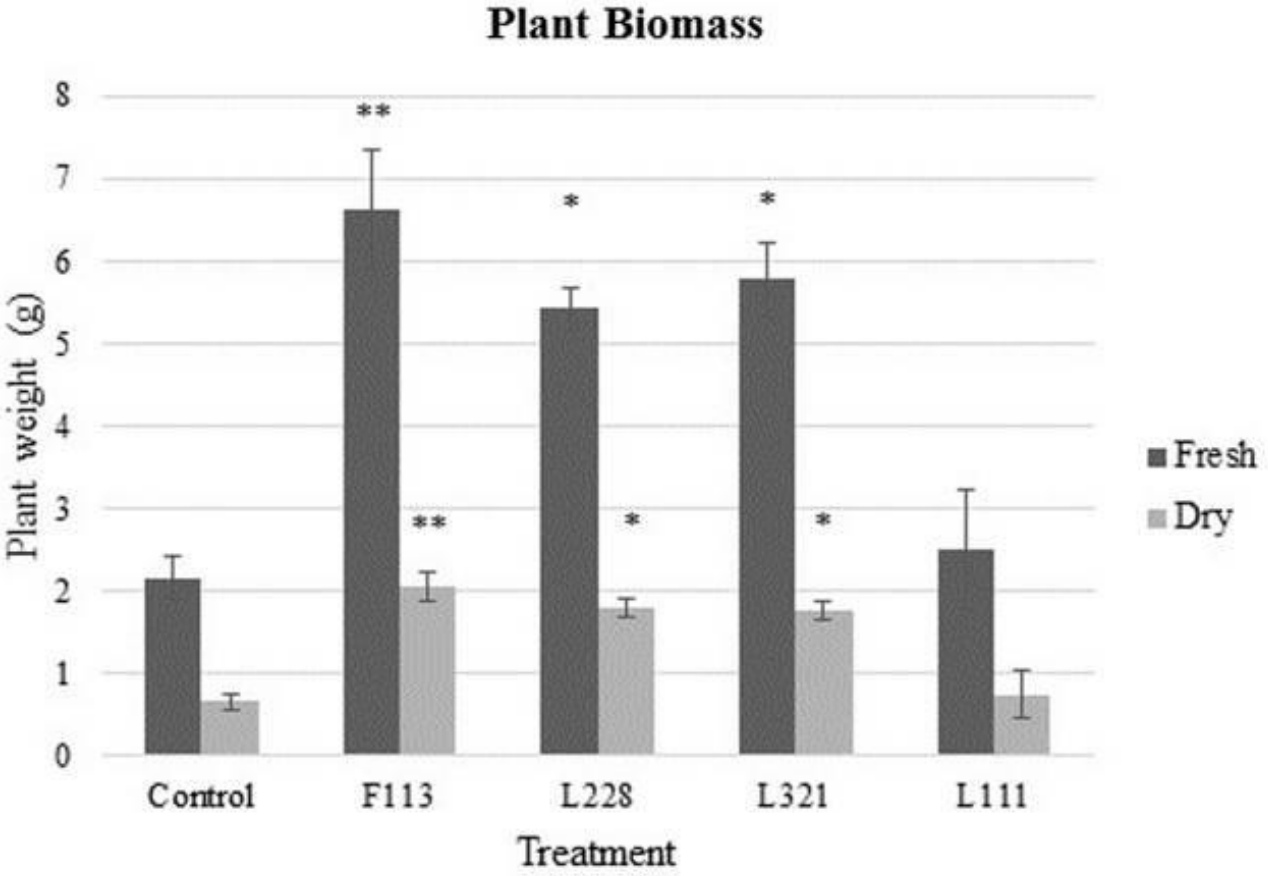
Individual paddock variability in whole farm system studies



Scientific and farmer-oriented outputs

www.futuredairy.com.au

>20% increase in plant biomass with PGPR



Lally et al 2017, Front Plant Sci; 8: 2193