



# Improving beef business performance with high quality forages in central Queensland

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Dr Maree Bowen

# How to maximise returns from high quality forages

Whole farm, economic case study analysis has shown

- for many areas of **northern Australia**
  - **perennial legumes** are a **profitable** investment
- in **central Queensland**
  - **perennial legumes**, especially **leucaena**, are the most profitable intervention of all strategies examined and also the most profitable of all forage options
  - **annual forage cropping** common



# How to maximise returns from high quality forages

Most producers only have a limited area of arable soil

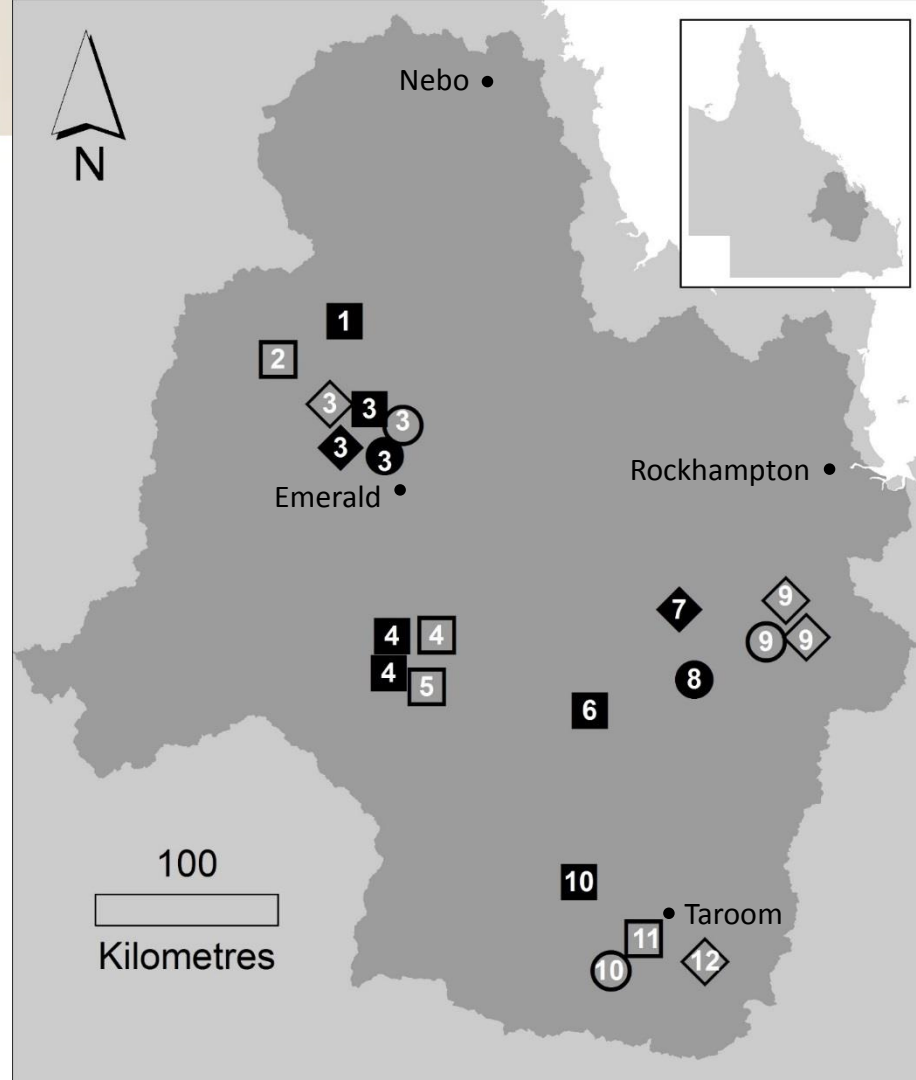
- forage type?
- allocation of high quality forage amongst **age groups of steers** in the herd?
  - **when** should steers start grazing high quality forage?
  - for **how long**?
  - which **target market**?



# Which forage type?

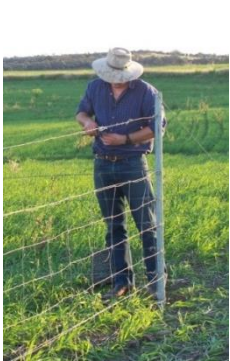
## Producer sites in central Qld

- Fitzroy NRM region
- monitored 24 forage sites on 12 properties over 2011-2014
- **annuals forage crops:**
  - oats
  - forage sorghum
  - lablab
- **perennials:**
  - butterfly pea-grass
  - leucaena-grass
  - perennial grass



# Data from producer sites in central Queensland

- monitored forage, animal and economic performance
- 31 individual data sets



# Data from producer sites in central Queensland

	Perennials			Annual forage crops		
	Perennial grass	Leucaena-grass	Butterfly pea-grass	Oats	Sorghum	Lablab
Biomass in grazed pdk (kg DM/ha)	3,702	L: 417 G: 3,809	BP: 528 G: 4,591			

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Total LWG (kg/ha/yr)	76	198	125			

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Gross margin (\$/ha/yr)	96	181	140			

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Gross margin (\$/ha/yr)	96	181	140	102	24	18

# Assessing profitability

- **Gross margins** are the **first step** in determining the effect of sown forages on farm profit
  - they show whether the forage activity makes a profit or loss, at the paddock level
  - however, a positive paddock gross margin does not necessarily mean that the strategy is going to be **the most profitable option for the whole farm business compared to other alternatives**



# Assessing profitability

- To determine the value of the sown forage system to the **whole farm** or business, a **more complete economic analysis** is required
  - identify **change** in **profit** and **risks** generated by alternative operating systems
  - include changes in un-paid labour, herd structure and capital





# Strategies tested for effect on whole farm profitability

## ➤ Improve steer growth rates

- Legume-grass pastures
- Forage crops such as oats
- Custom feedlotting
- HGPs

## ➤ Marketing options

- Organic beef
- EU steers
- Wagyu beef

## ➤ Improve breeder reproductive performance

- Better genetics for fertility
- Investing to reduce foetal/calf loss
- Pestivirus management
- P supplementation
- Supplementing first calf heifers to improve re-conception rates

These were discussed in the first webinar in this series, presented by Fred Chudleigh: “Part 1 – Improving the performance of beef production systems in northern Australia”

# Whole farm economic analysis – central Queensland

	Extra profit per year (NPV)	Peak deficit	Year of peak deficit	Payback period (years)
Leucaena (feed-on weight)	\$40,336	-\$145,722	4	7
Leucaena + purchased breeders	\$46,135	-\$190,539	4	7
Desmanthus (feed-on weight)	\$26,779	-\$103,212	4	8
Forage oats (feed-on weight)	-\$34,521	-\$1,544,320	never	never

- **Perennial legumes**, especially leucaena, were the **most profitable** forage option (and most profitable of all interventions)
- **Forage oats** always **reduced** enterprise **profitability**
- **Other annual forage crops** also **reduced profitability** in producer case studies

# Allocation of high quality forages within the steer herd?

Perennial legumes are profitable

- can we **fine-tune their management** to maximise profitability?

Research question:

- What is the most profitable way to **incorporate high quality forages** into the whole-of-life **steer growth path** in central Qld?
  - comparison of **leucaena-grass pastures** and **forage oats** as examples



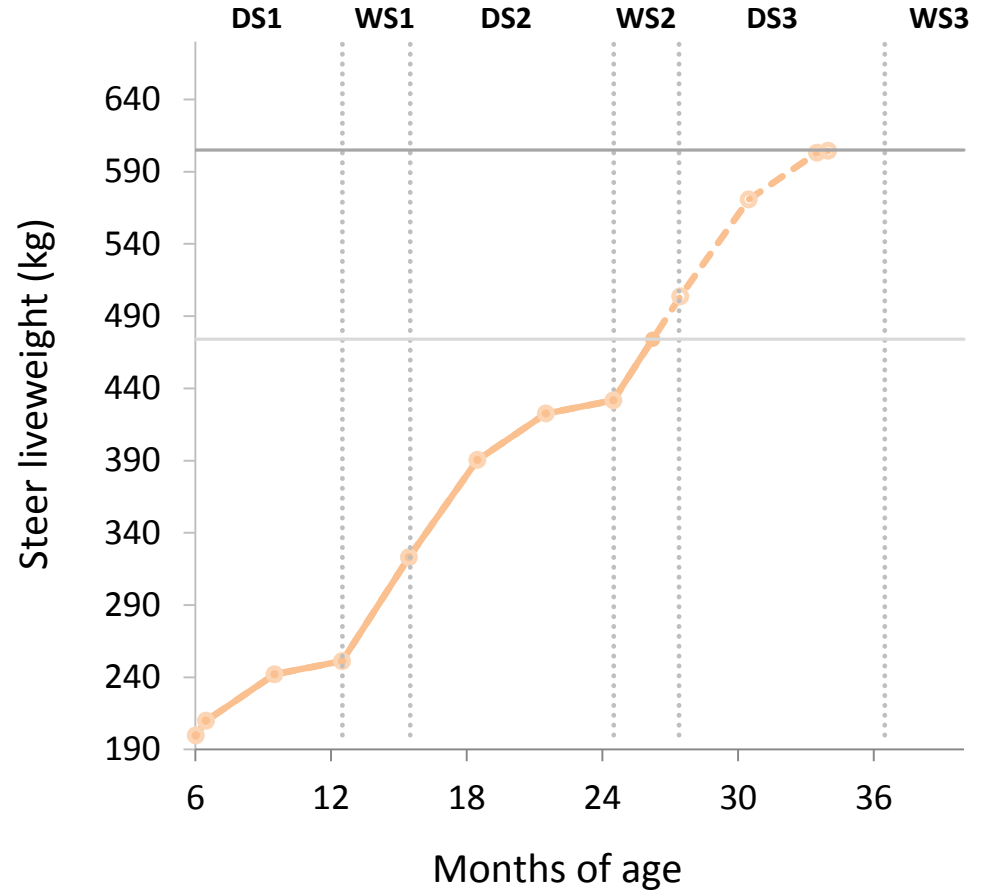
# Cattle growth paths modelling study – central Qld

- 22 scenarios
- growth paths of steers from weaning to marketing
- buffel grass +/- leucaena-grass pastures or forage oats
- feed-on (474 kg) vs. slaughter steers (605 kg)
- breeding and finishing enterprise vs. steer turnover enterprise
- comparison to a baseline scenario
  - turn-off of finished, slaughter steers (605 kg) from buffel grass pastures
- QuikIntake model was used to calculate intakes and stocking rates
- the effect of implementing each growth path modelled over 30 years
- compared **marginal returns, peak deficit, payback period**



# Cattle growth paths on leucaena-grass pastures

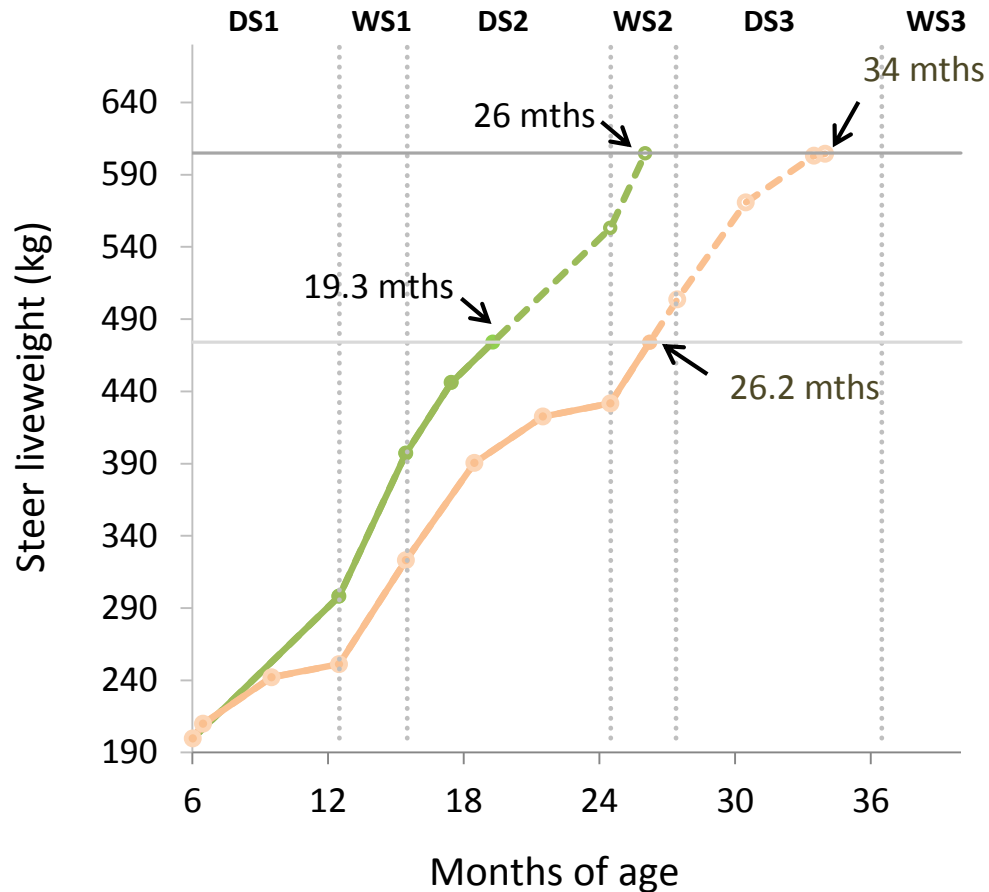
- buffel grass from weaning



# Cattle growth paths on leucaena-grass pastures

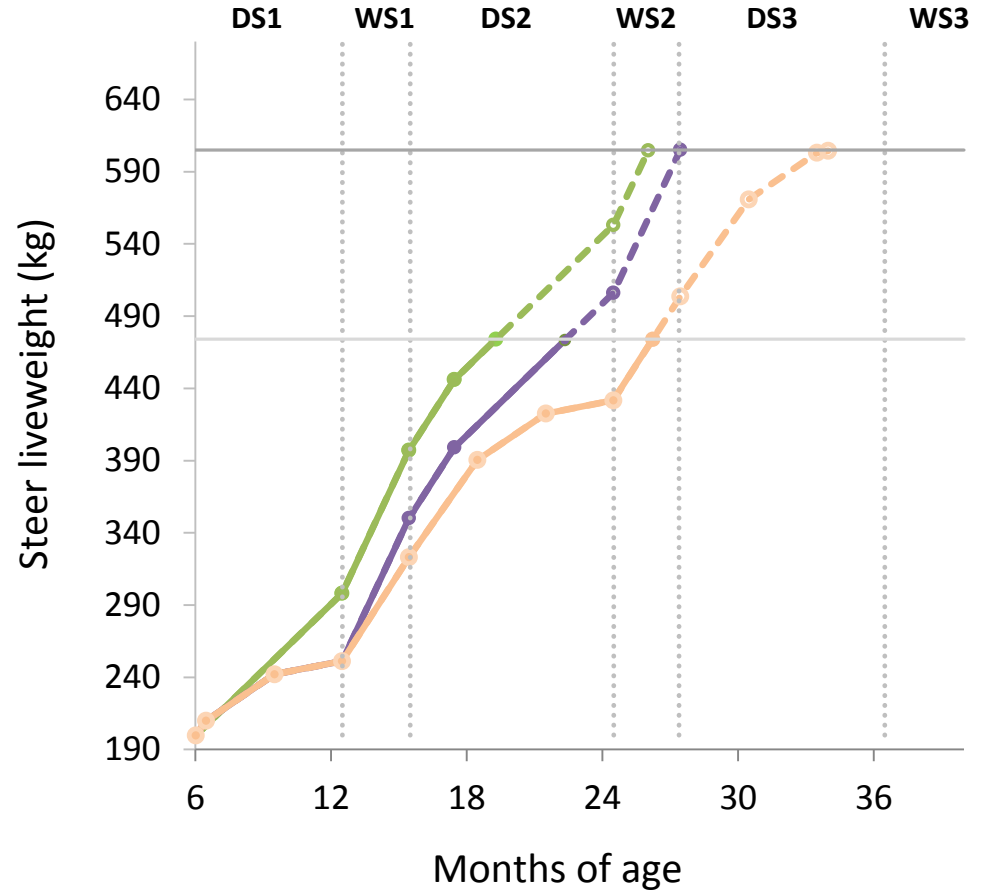
- buffel grass from weaning
- leucaena-grass from weaning

- shifting the growth path to the left
- earlier age of turn-off



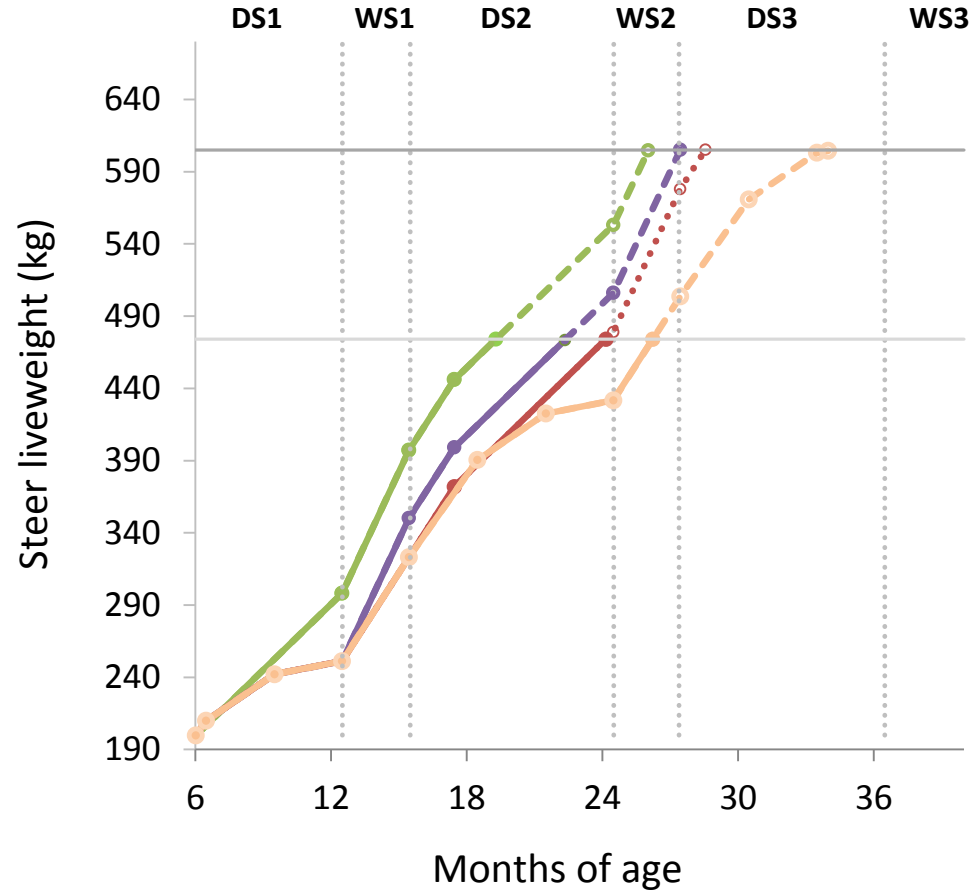
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- buffel grass from weaning
- leucaena-grass from weaning
- leucaena-grass from WS1



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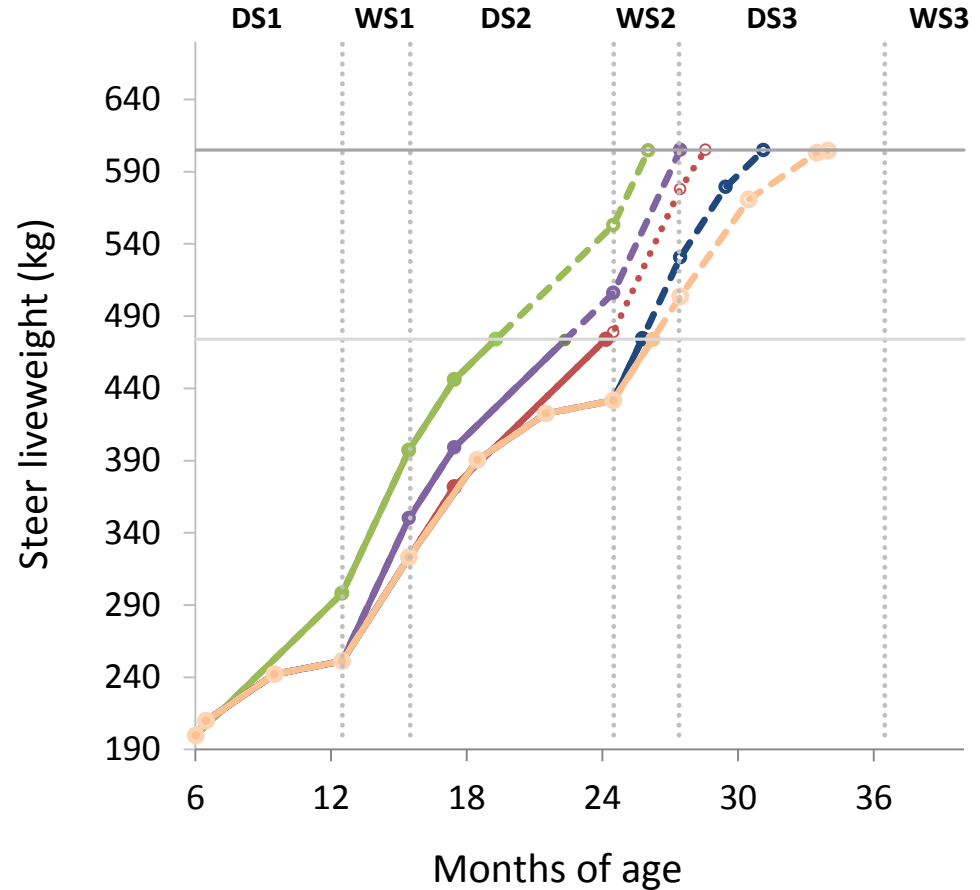
- buffel grass from weaning
- leucaena-grass from weaning
- leucaena-grass from WS1
- leucaena-grass from DS2





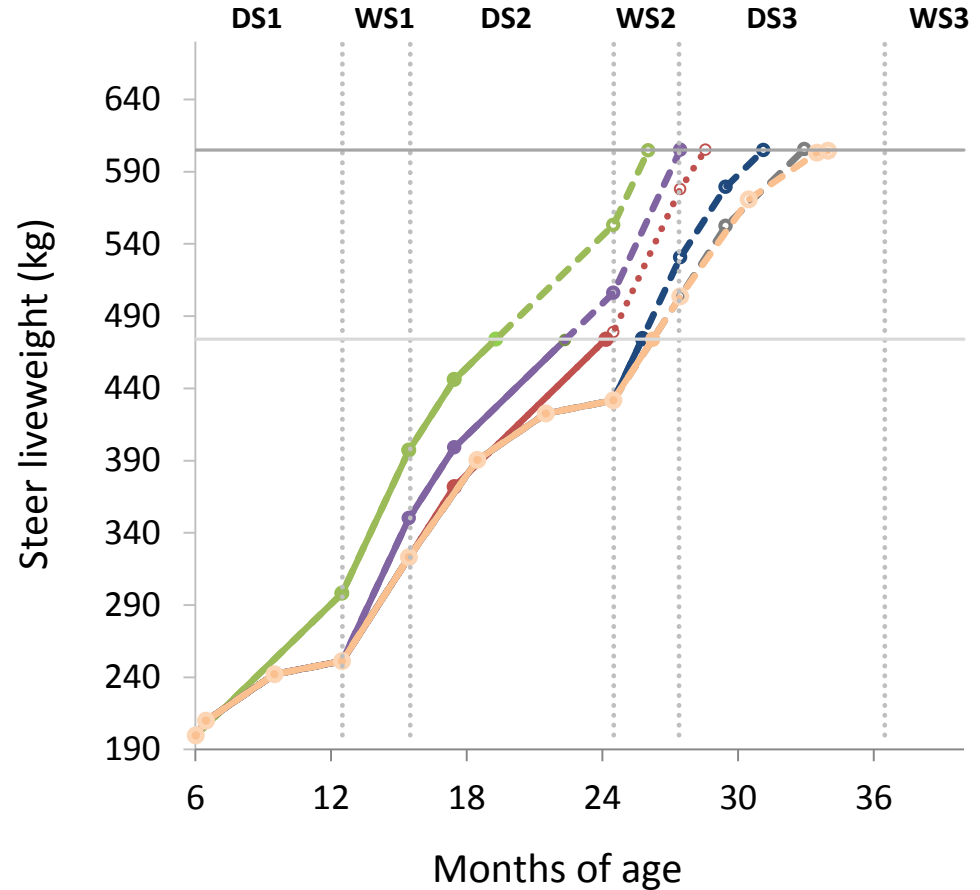
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- leucaena-grass from weaning
- leucaena-grass from WS1
- leucaena-grass from DS2
- leucaena-grass from WS2



# Cattle growth paths on leucaena-grass pastures

- buffel grass from weaning
- leucaena-grass from weaning
- leucaena-grass from WS1
- leucaena-grass from DS2
- leucaena-grass from WS2
- leucaena-grass from DS3



# Key findings – leucaena growth paths

- For both enterprise types
  - grazing steers on leucaena-grass pastures from weaning until they achieved feedlot entry weight (474 kg) was substantially more profitable than any other growth path
- improved profitability by
  - 121% for steer turnover enterprise (\$106,508 extra profit per year)
  - 37% for the breeding and finishing enterprise (\$31,383 extra profit/yr)
    - purchase of additional breeders required to optimise utilisation of leucaena-grass pastures immediately

# Key findings – leucaena growth paths

- However, incorporating leucaena at any steer age
  - increased profitability of the steer turnover enterprise
    - \$7,368 - \$106,508 extra profit/year
  - increased profitability of the breeding and finishing enterprise
    - \$1,754 - \$31,383 extra profit/year
    - exception was producing feed-on steers by providing leucaena grass to older steers (from DS2 and WS2)
      - \$4,816 and \$23,886 less profit/year, respectively



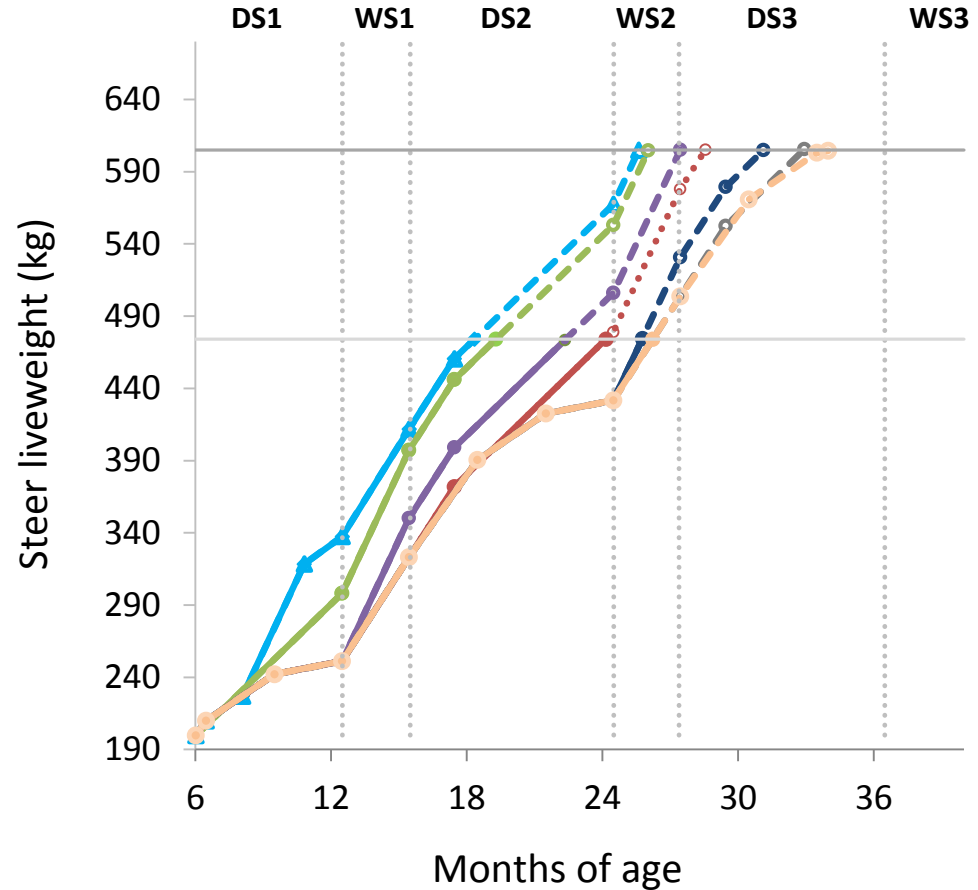
# Key findings – leucaena growth paths

- potentially negative consequences of too quickly implementing leucaena investments
  - peak deficit levels and financial risk increased
  - long payback periods (8 and 14 years for most profitable growth paths, for 2 enterprise types)
  - important to use correct agronomy to effectively establish leucaena (and all perennial legumes)



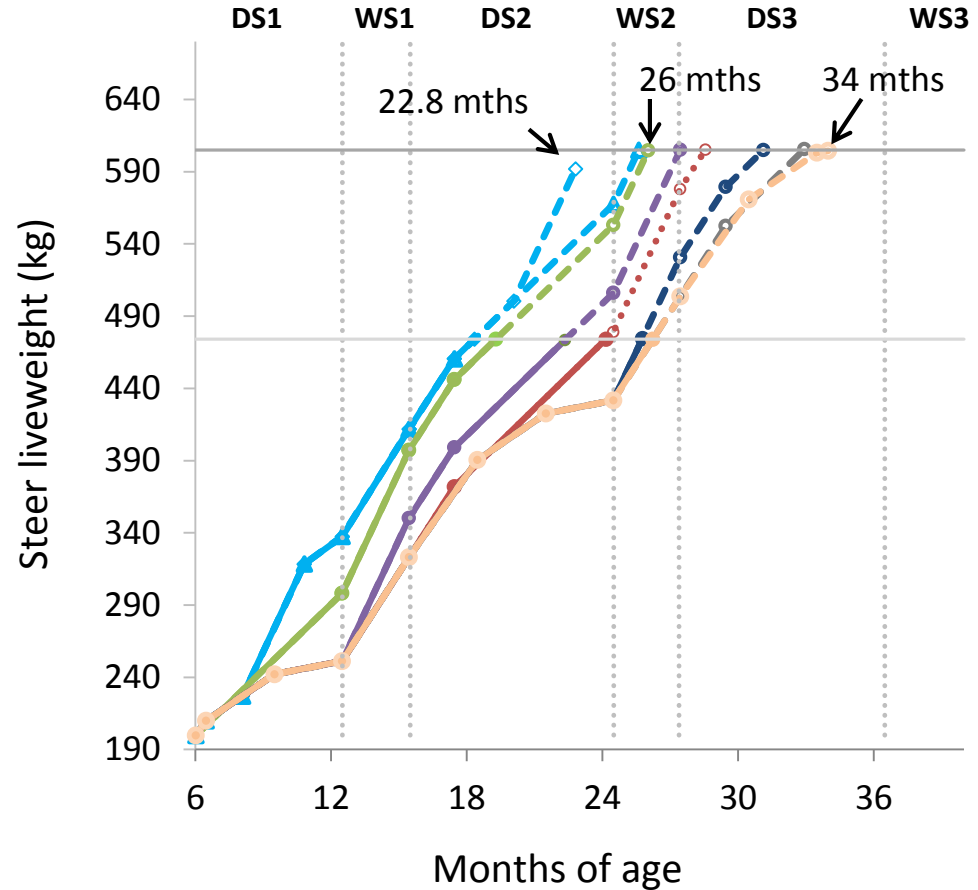
# Combining leucaena-grass pastures with oats

- buffel grass from weaning
- leucaena-grass from weaning
- leucaena-grass from WS1
- leucaena-grass from DS2
- leucaena-grass from WS2
- leucaena-grass from DS3
- oats in DS1 then leucaena-grass



# Combining leucaena-grass pastures with oats

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- leucaena-grass from WS1
- leucaena-grass from DS2
- leucaena-grass from WS2
- leucaena-grass from DS3
- oats in DS1 then leucaena-grass
- oats, leucaena-grass, oats



# Key findings – leucaena growth paths with oats

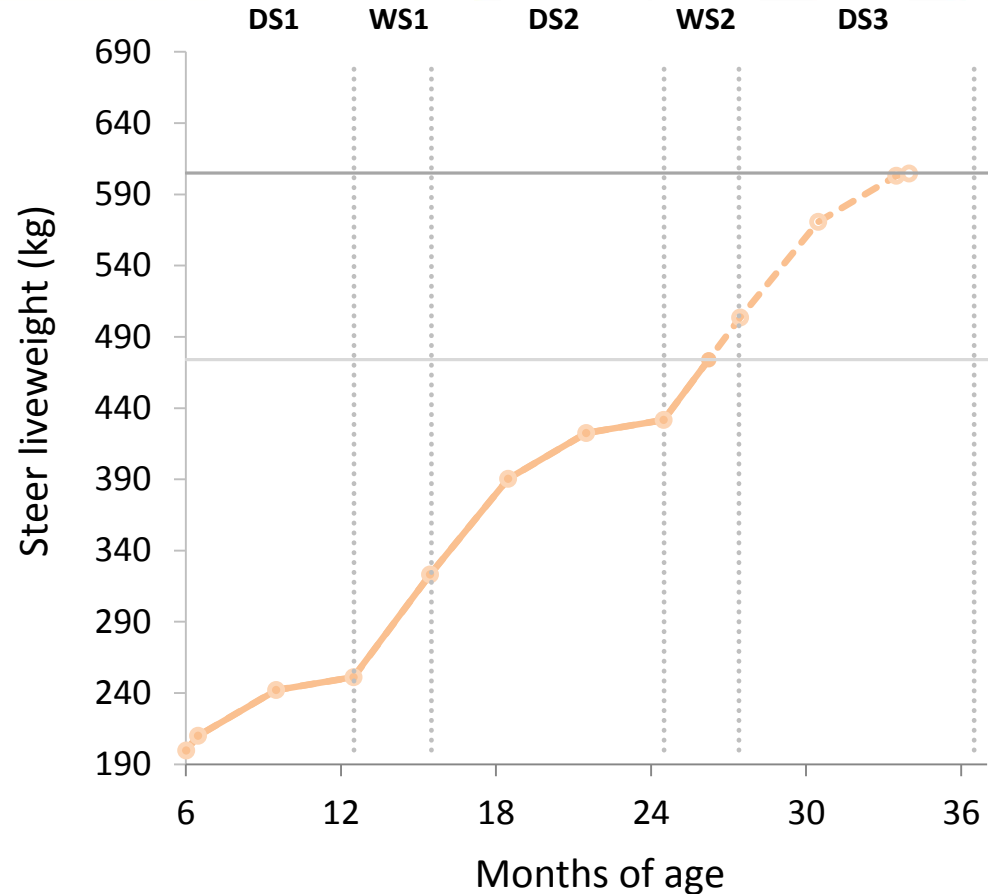
- incorporating **oats** into a **leucaena** growth path
  - always **reduced profitability** compared to comparable growth paths that only incorporated leucaena-grass
    - despite
      - decreasing age of finishing, and
      - filling the winter ‘feed gap’ with a higher quality forage





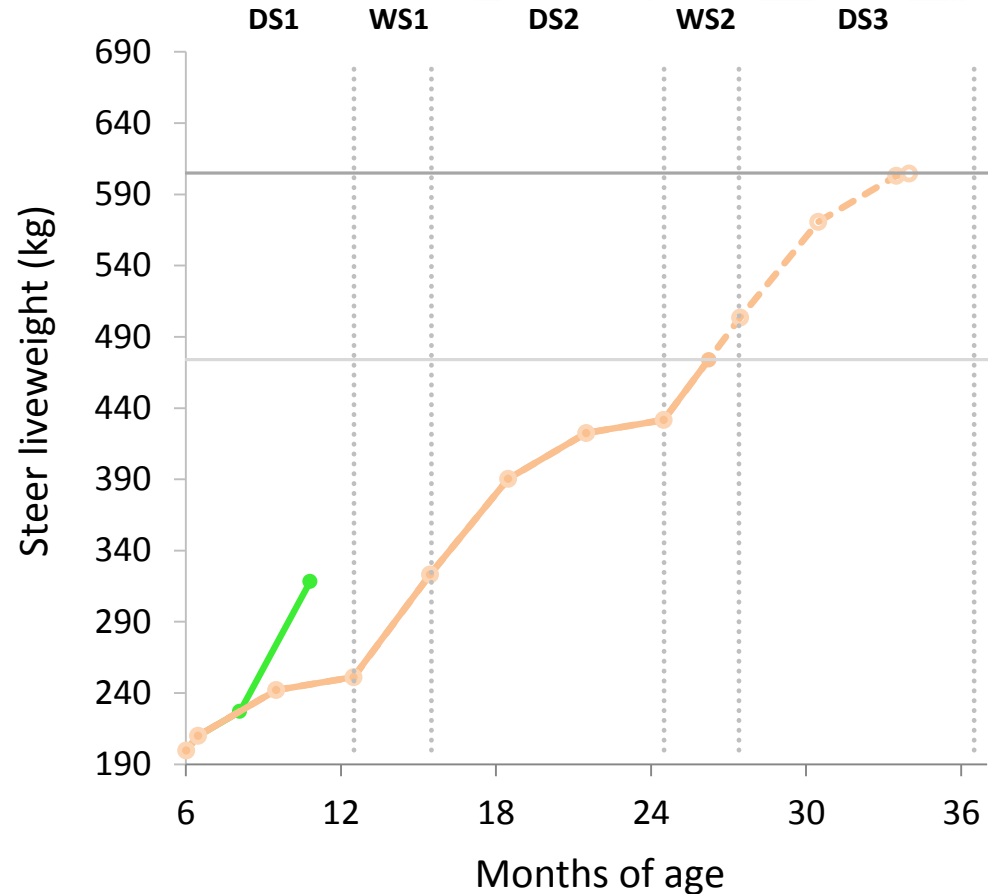
# Cattle growth paths on buffel pastures with forage oats

- buffel grass from weaning



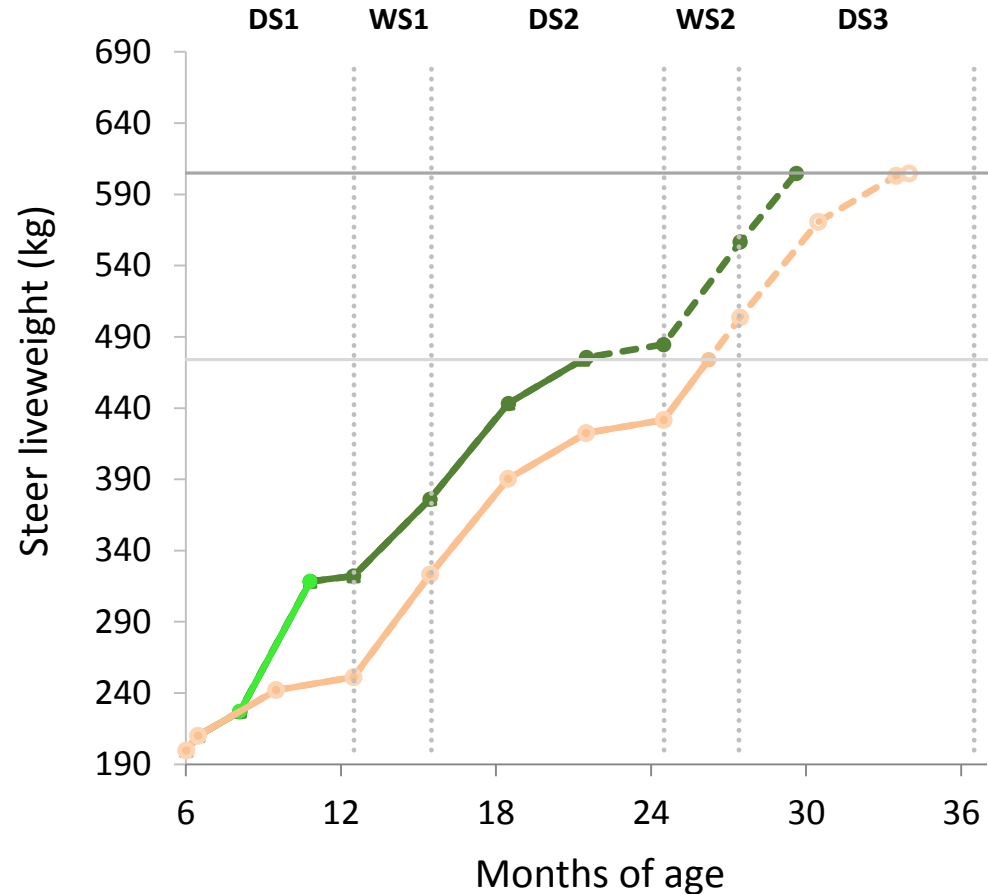
# Cattle growth paths on buffel pastures with forage oats

- buffel grass from weaning
- oats in DS1



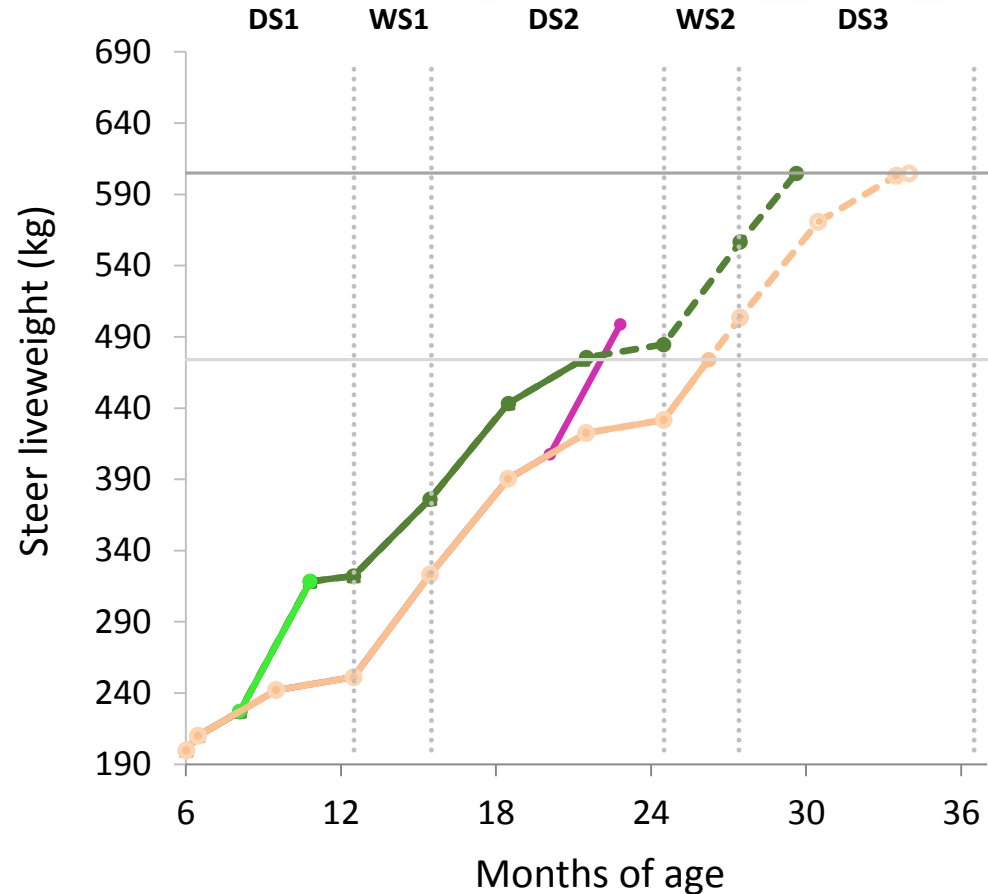
# Cattle growth paths on buffel pastures with forage oats

- buffel grass from weaning
- oats in DS1
- oats DS1, buffel (FO or F)



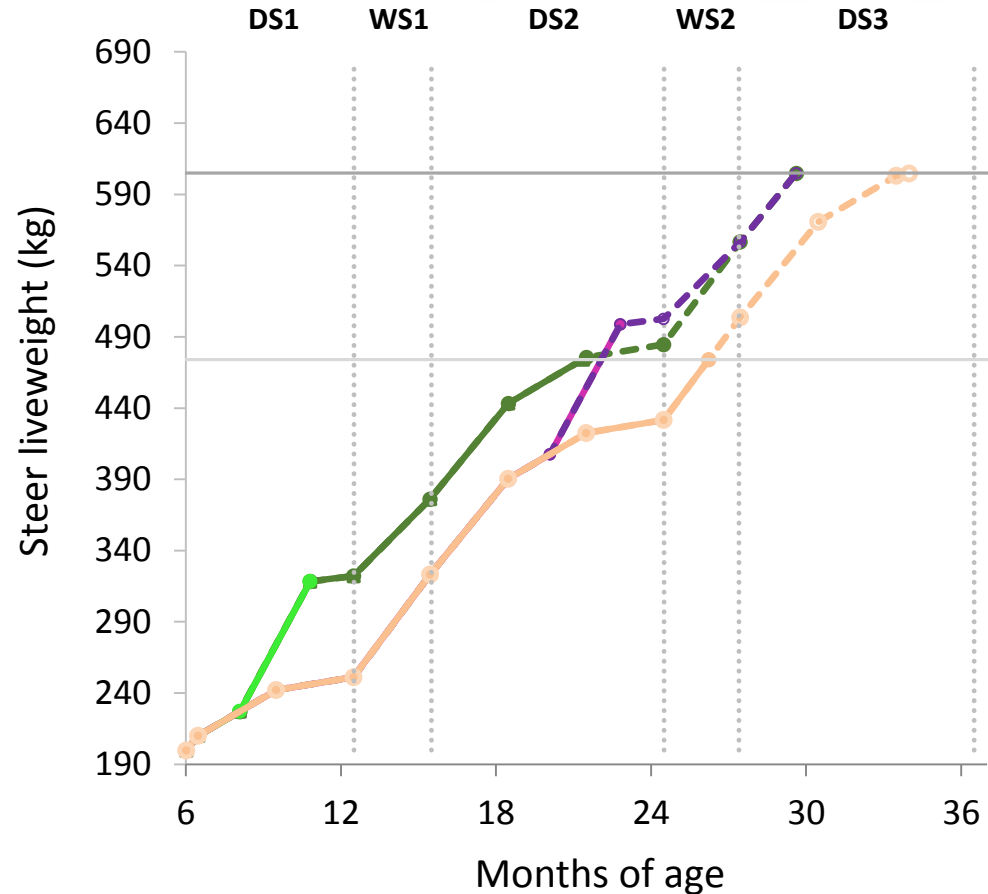
# Cattle growth paths on buffel pastures with forage oats

- buffel grass from weaning
- oats in DS1
- oats DS1, buffel (FO or F)
- oats DS2



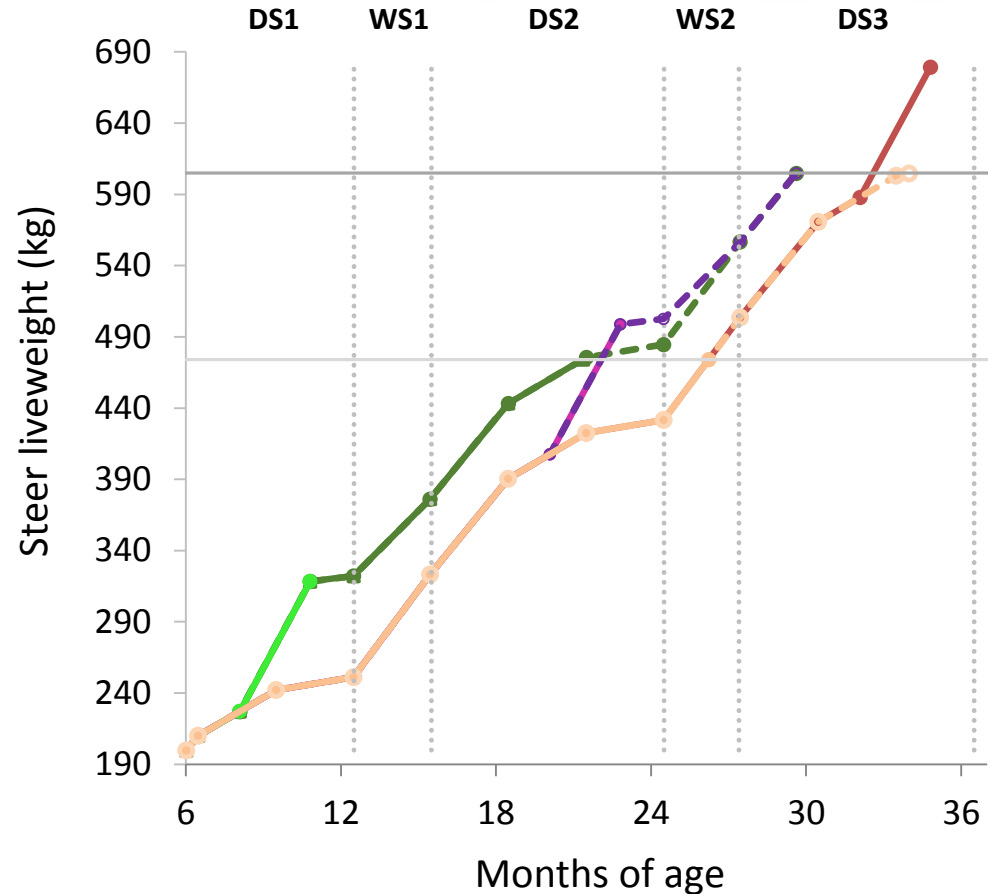
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- oats DS1, buffel (FO or F)
- oats DS2
- oats DS2, buffel



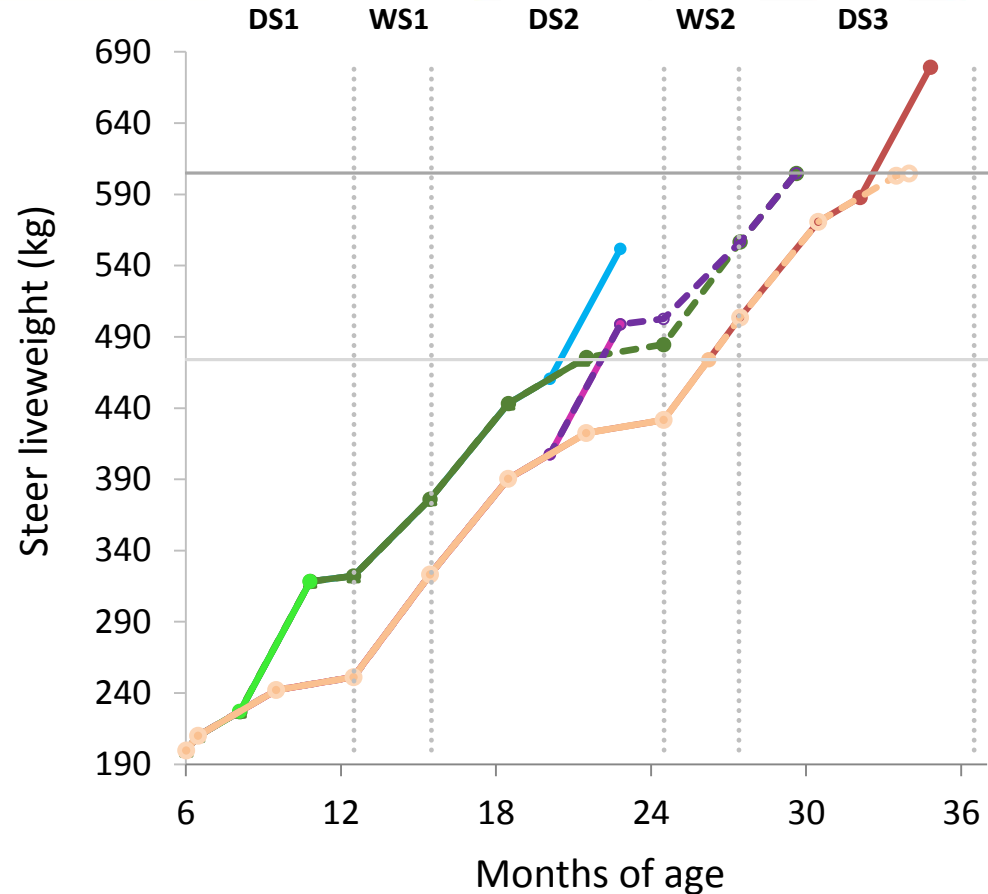
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- oats DS2
- oats DS2, buffel
- oats DS3



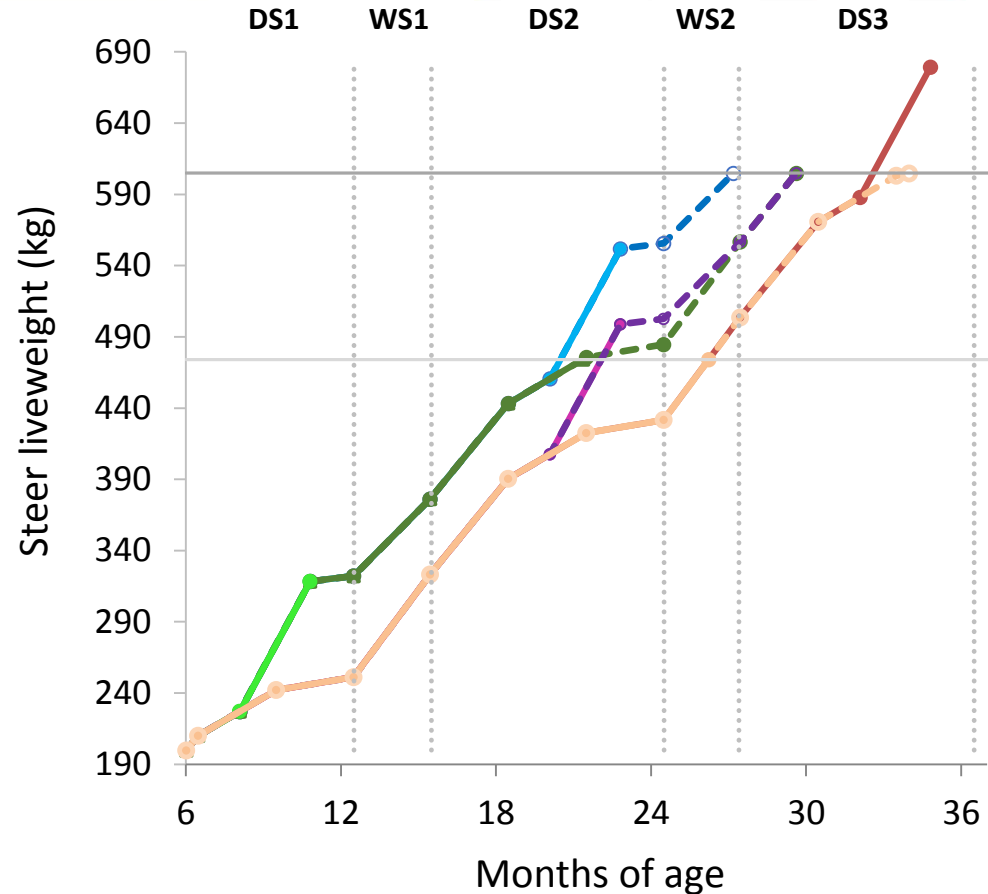
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- oats DS3
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# Cattle growth paths on buffel pastures with forage oats

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- oats DS2
- oats DS2, buffel
- oats DS3
- oats DS1, buffel, oats DS2
- oats DS1, buffel, oats DS2, buffel





# Key findings – buffel growth paths with forage oats

- Incorporating oats in to a steer growth path with buffel
  - always decreased enterprise profitability
    - steer turnover enterprise
      - \$471 - \$49,194 less profit per year
    - breeding and finishing enterprise
      - \$17,308 - \$74,711 less profit per year
  - substantially increased peak deficit levels and financial risk



# Key findings – buffel growth paths with forage oats

- this study didn't account for the 30% of years in which conditions are unsuitable for planting forage oats in central Qld
- results don't indicate that businesses that grow oats are unprofitable
  - just that growing oats is **less profitable** than utilising buffel grass or legume-grass pastures



## Other findings from growth path modelling study

- shifting to a **younger age of turn-off** (feed-on vs slaughter steers) was generally more profitable when steer nutrition was significantly improved from weaning
- no relationship between
  - change in profit, and
  - the number of extra weaners produced or the amount of extra beef produced per ha
- just because a strategy produces more beef, it is not necessarily more profitable

# Feeding forages in the Fitzroy

A guide to profitable beef production in the Fitzroy River catchment



## Productivity and profitability of a range of alternative steer growth paths resulting from manipulating the pasture feed base in central Queensland – a modelling approach

M.K. Bowen and F. Chudleigh

September 2017



## Fitzroy beef production systems

### Preparing for, responding to, and recovering from drought

M. K. Bowen and F. Chudleigh

April 2018



This report has been produced as part of the project 'Delivering integrated production and economic knowledge and skills to improve drought management outcomes for grazing enterprises'. The project was funded through the Queensland Government Drought and Climate Adaptation Program which aims to help Queensland primary producers better manage drought and climate impacts.

# CQ Beef extension team can assist with analyses

- Results should be considered as examples – analyses specific to your business should be conducted
- For more information, or to arrange a visit, from DAF economists and beef extension officers in central Queensland, contact
  - Matt Brown in the Rockhampton DAF office
    - [matt.brown@daf.qld.gov.au](mailto:matt.brown@daf.qld.gov.au)
- Questions?