

Drought and climate adaptation program

Improving profitability and resilience of livestock enterprises in western and northern Queensland



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What will be covered in the presentation?

1. The framework and tools

- used to assess **alternative management strategies and technologies** for their impact
- on **profitability, cash flow and risk**

2. Example results

- to demonstrate how the framework can be used



The project

- Better information to help livestock managers
 - prepare for,
 - respond to, or
 - recover from, **drought**
- **Improve drought resilience** of grazing properties



Prepare for drought - build resilience

To remain viable and build resilience, property managers

- need to regularly produce a profit and build capital, and
- determine how to incorporate new technology to improve profit

1. How can you assess the profitability and riskiness of alternative strategies?
2. What are the strategies most likely to improve profitability and resilience of a grazing business?



Which strategies or technologies are best?

- There are numerous alternative management strategies and new technologies which arrive at an increasing rate
- The challenge is to identify the ones that make the livestock production system more efficient (i.e. more profitable and resilient)
- Analysing one strategy in isolation **does not identify relative benefits**
 - all relevant strategies need to be identified, analysed and compared to the current system



Which strategies or technologies are best for my business?

When you want to test a strategy for your property

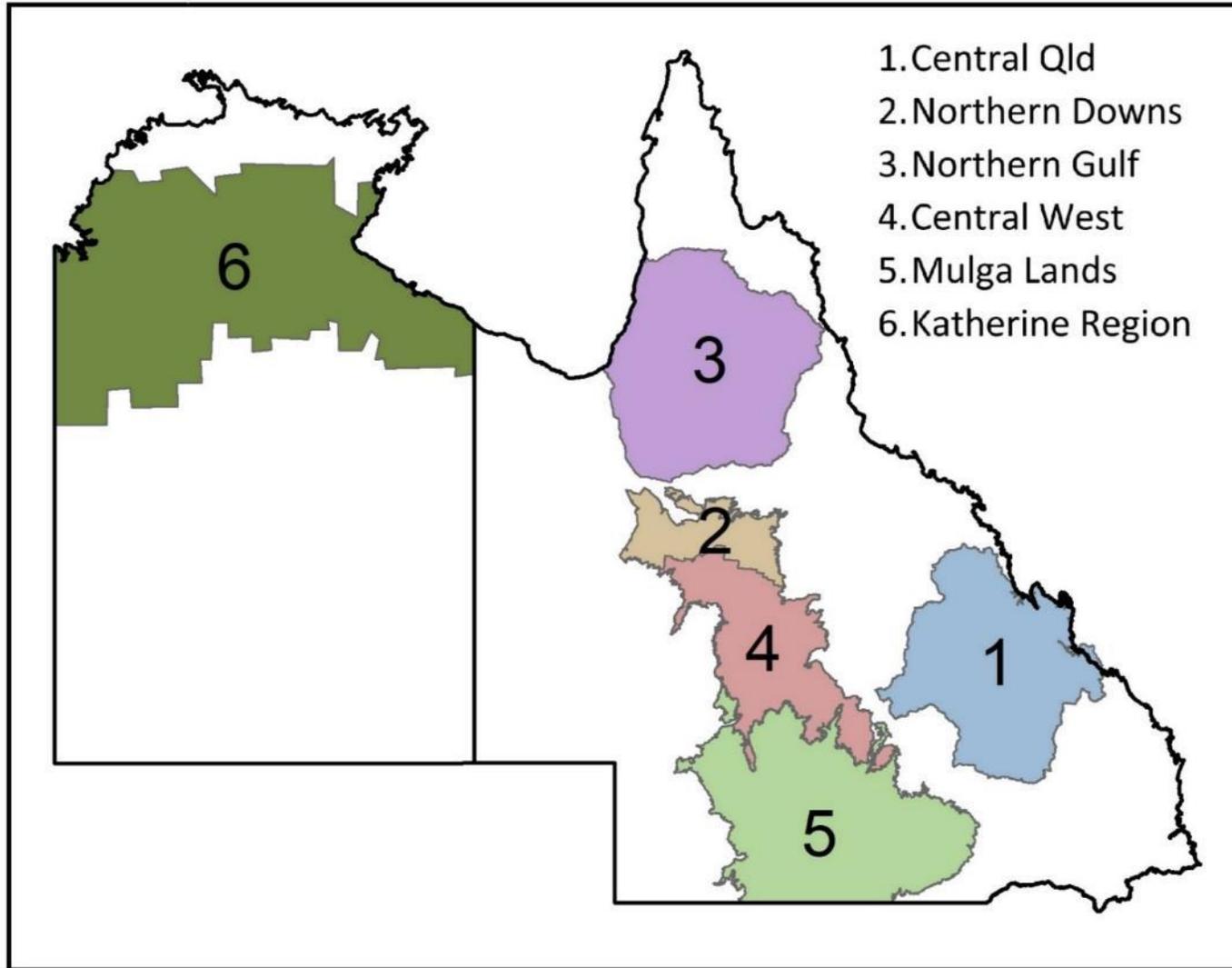
- what do you need to consider?
 - need an approach that looks forward (not backwards)
 - 'Farm management economics framework'

Assessing profitability and riskiness

- Applying an appropriate framework to decision making is critical
 - **Property-level analysis**
 - Identify **change in profit and risks** generated by alternative operating systems
 - Include **changes in unpaid labour, herd structure and capital**
 - Include the implementation phase **(this is critical!)**
 - Start by estimating the extra return on extra capital invested using **partial discounted cash flow budgets**
 - key components are opportunity cost, time value of money, marginal thinking
- A **clear understanding of the production system and likely response to change** is required to conduct appropriate economic and financial analyses
- We used the Breedcow and Dynama suite of programs



The regions



Queensland

1. Central Qld
2. Northern Downs
3. Northern Gulf
4. Central West (2 analyses)
5. Mulga Lands

Northern Territory

6. Katherine

Large number of strategies tested

- Improve overall herd biological performance or enterprise profitability
 - P supplementation
 - Herd segregation, controlled mating
 - Home-bred bulls
 - Managing prickly acacia
 - Converting from breeding to steer turnover
 - Purchasing a breeder property
 - Purchasing a beef fattening /growing property
 - Optimising performance across properties
 - Wool sheep vs meat goats vs meat sheep vs beef
- Improve breeder reproductive performance
 - Better genetics for fertility
 - Supplementing first-calf heifers
- Improve steer growth rates
 - Legume-grass pastures
 - Forage oats
 - Molasses production mix for steer tail
 - Concentrate feeding the steer tail
 - Silage
 - HGP
- Market alternatives
 - Increasing age of steer turnoff from weaners to optimal age
 - Organic beef
 - Wagyu beef

Assessing management strategies

Table 1 - Profitability and financial risk of implementing alternative strategies to improve profitability and drought resilience of beef enterprises in the Fitzroy region

Terms are defined in the Glossary of terms and abbreviations. All scenarios described in full in the report

| Strategy | Annualised NPV | Peak deficit (with interest) | Year of peak deficit | Payback period (years) | IRR (%) |
|----------------------------------------------------------------------|----------------|------------------------------|----------------------|------------------------|---------|
| Improving steer growth rates | | | | | |
| Leucaena (p. 45) | \$40,336 | -\$145,722 | 4 | 7 | 34% |
| Leucaena + purchased breeders | \$46,135 | -\$190,539 | 4 | 7 | 37% |
| Desmanthus (p. 52) | \$26,779 | -\$103,212 | 4 | 8 | 26% |
| Forage oats (p. 58) | -\$34,521 | -\$1,544,320 | never | never | n/c |
| Feeding steers (p. 63) | -\$48,841 | -\$2,166,733 | never | never | n/c |
| HGP - same price, heavier weight (p. 65) | \$10,794 | -\$5,063 | 1 | 2 | 140% |
| HGP - lower price, heavier weight | -\$806 | -\$33,182 | never | never | -14% |
| HGP - same price, younger age | -\$5,494 | -\$231,803 | never | never | n/c |
| Improving reproductive performance | | | | | |
| Better genetics for fertility (p. 68) | -\$3,265 | -\$126,309 | never | never | -12% |
| Benefit of reducing foetal/calf loss in young females by 50% (p. 71) | | | | | |
| \$5/head | \$474 | -\$1,829 | 5 | 6 | 31% |
| \$7.50 /head | -\$418 | -\$17,502 | never | never | n/c |
| \$10/head | -\$1,310 | -\$55,927 | never | never | n/c |
| \$20,000 capital | \$1,019 | -\$20,000 | 2 | 12 | 9.9% |
| \$30,000 capital | \$400 | -\$30,000 | 2 | n/c | 4.6% |
| \$40,000 capital | -\$220 | -\$40,451 | 4 | never | 1.4% |
| Pestivirus, high prevalence, vac all (p. 74) | \$1,025 | -\$21,219 | 7 | 15 | 9% |
| Pestivirus, high prevalence, vac heifers | \$3,683 | -\$3,276 | 6 | 6 | n/c |
| Pestivirus, naïve herd vaccination | -\$2,436 | n/c | n/c | n/c | n/c |
| Inorganic supplements for breeders (p. 80) | | | | | |
| Marginal P herd, P wet season | \$7,918 | -\$1,365 | 1 | 1 | 2,796% |
| Marginal P herd, N+P dry season | \$1,542 | -\$21,252 | 9 | 14 | 317% |
| Marginal P herd, N+P dry, P wet | \$375 | -\$33,892 | 9 | 1 | 244% |
| Deficient P herd, P wet season | \$17,967 | -\$4,251 | 1 | 1 | 1,163% |
| Deficient P herd, N+P dry season | \$9,025 | -\$10,692 | 1 | 1 | 348% |
| Deficient P herd, N+P dry, P wet | \$16,206 | -\$14,943 | 1 | 1 | 463% |
| Acute P herd, P wet season | \$48,216 | -\$7,136 | 1 | 1 | 1,280% |
| Acute P herd, N+P dry season | \$11,477 | -\$13,769 | 1 | 1 | 522% |
| Acute P herd, N+P dry, P wet | \$44,714 | -\$20,839 | 1 | 1 | 433% |
| Feeding first calf heifers (p. 94) | -\$9,684 | -\$416,285 | never | never | n/c |
| Marketing options | | | | | |
| Organic beef (p. 96) | \$2,436 | n/c | n/c | n/c | -0.28% |
| EU slaughter and feed on (p. 97) | \$5,494 | -\$10,500 | 2 | 2 | 105% |
| EU feed on only | \$5,338 | -\$10,500 | 2 | 2 | 199% |
| EU feed on only, lower premium | -\$3,845 | -\$183,713 | never | never | n/c |
| Wagyu beef, price premium maintained (p. 102) | \$32,943 | -\$269,104 | 4 | 12 | 14% |
| Wagyu beef, price premium reduces from year 20 | \$3,218 | -\$269,104 | 4 | n/c | n/c |
| Wagyu beef, price premium reduces from year 10 | -\$42,071 | -\$1,927,459 | never | never | n/c |

Which strategies could

✓ improve profitability

• make little difference

X send you broke over time?

(most were suggested as positive changes)

What have we learnt?

Specific examples

Northern Gulf example

Getting the age of steer turn-off right

| | Weaners (6 months) | 18 months | Base herd (29 and 41 months) | Medium steers (41 months) | Bullocks (53 months) |
|-------------------------------------------------------------------|-----------------------|-----------|------------------------------------|------------------------------|-------------------------|
| Herd gross margin less interest on livestock capital | | | \$181,800 | | |
| Difference to base herd | | | - | | |



Returns at the property level

- Increasing age of steer turnoff to 41 months (average 529 kg)
 - rather than two cohorts at 29 months (418 kg) and 41 months (414 kg)
 - Added \$32,500 profit/annum over 30 years to the business (24% IRR)
 - Peak deficit in cash flow of **-\$95,500** in Year 2
 - 8 years payback period



Northern Downs example

Managing Prickly Acacia



1. Property-level control of prickly acacia

- 13% IRR but > \$1.3 million investment over first 4 years of treatment
- (base property starting net profit of \$169,000/annum)
- It is too risky to fund all of the up front expenditure required; where do you start?

2. Best return on investment for spending \$10,000 on PA control in Year 1 (plus ongoing maintenance for 30 years)

- Returns over 30 years

| Density of PA | Area treated (ha) | Extra profit/annum | Internal rate of return (%) |
|------------------|-------------------|--------------------|-----------------------------|
| High density | 40 | \$1,900 | 6 |
| Moderate density | 100 | \$25,500 | 16 |
| Mosaic density | 200 | \$50,600 | 20 |
| Minimal density | 4,000 | \$130,100 | 18 |

Northern Gulf and Downs example

Transferring steers to the Downs



| Strategy | Operating profit | |
|---------------------------------------------------------------|------------------|--------------------|
| | Combined total | Difference to base |
| Separate entities - both Gulf and Downs, breeding and growing | \$128,900 | Base |

- All strategies for transferring steers from the Gulf to the Downs reduced profit
 - compared to operating the properties as separate entities
- There was substantial benefit in operating the Downs property as a steer turnover enterprise
 - compared to a breeding and growing enterprise

Key insights – the strategies

- In each region, strategies were identified that could substantially improve profit
 - compared to the base property net profit/annum
- Many strategies had an negligible effect on annual enterprise profit:
 - $< \pm \$5,000$ per annum
- Many strategies had a negative effect on profit:
 - despite a positive production response



Key insights for northern Australia

- **Addressing a P deficiency** and introducing **perennial legumes** (e.g. stylos, leucaena)
 - ✓ consistently profitable strategies across northern Australia
- **Production feeding** (molasses, silage, grain) or **annual forage crops** (oats, forage sorghum)
 - X consistently reduce profitability across northern Australia
- Strategies to **improve the reproductive performance of breeders** (e.g. genetic improvement of weaning rate, supplementing first-calf heifers)
 - small positive to large negative effects on enterprise profitability
 - critical importance of implementing low cost strategies to improve profitability
 - e.g. optimising herd structure (steer sale age, cow cull age)



Key insights – the strategies

- **Improving returns** requires intensification
 - which increases income volatility, risk and increases demands on manager skills
 - e.g, leucaena, stylos, steer turnover operation, home-bred bulls
- Inflexible production systems are more risky and less resilient
 - targeting alternative markets (Organic beef or Wagyu), or
 - strategies that affect market access (HGP)



Spreadsheets with examples and recorded presentations, available from our project web page

➤ demonstrate the use of spreadsheet tools that can be used to compare options

➤ Drought response

➤ 7 presentations

- Do I sell, agist or feed?
- If I sell, what do I sell first?
- Does my response now determine my recovery strategy when it rains?

➤ Drought recovery

➤ 2 presentations

- Identify the most efficient way of rebuilding the herd structure for the optimum profit and resilience
 - Purchase of cows (and calves) to rebuild the herd faster?
 - Take cattle on agistment?
 - Purchase groups of steers, heifers or cows and calves as turnover stock?
 - Re-purchasing the components of the herd that were sold to rebuild numbers to the long-term herd structure?
 - Or, a combination of all of the above?



Project products to-date

<https://futurebeef.com.au/projects/improving-profitability-and-resilience-of-beef-and-sheep-businesses-in-queensland-preparing-for-responding-to-and-recovering-from-drought/>

The screenshot shows the FutureBeef website interface. At the top left is the FutureBeef logo. A navigation menu includes Home, About, Knowledge centre, News, and Events. The main content area displays the breadcrumb path: FutureBeef > Projects > Improving profitability and resilience of beef and sheep businesses in Queensland – Preparing for, responding to, and recovering from drought. Below this, there are three sections: 'In this section' with the title 'Improving profitability and resilience of beef and sheep businesses in Queensland – Preparing for, responding to, and recovering from drought' dated 14 February 2019; 'Knowledge centre articles'; 'Document library'; and 'Tools and services' with a link to 'The project'.

- 3 regional reports completed
- 3 regional reports underway
- 13 recorded presentations on YouTube
- 13 spreadsheet tools with examples
- 3 scientific publications (+ 2 in press)

The image displays three overlapping report covers from the Department of Agriculture and Fisheries. The top-left cover is titled 'Fitzroy beef production systems' and 'Preparing for, responding to, and recovering from drought', authored by M. K. Bowen and F. Chudleigh, dated December 2018. The top-right cover is titled 'Central West Mitchell Grasslands livestock production systems' and 'Preparing for, responding to, and recovering from drought', authored by M. K. Bowen, F. Chudleigh, G. Whish, and D. Phelps, dated September 2019. The bottom cover is titled 'Northern Gulf beef production systems' and 'Preparing for, responding to, and recovering from drought', authored by M. K. Bowen, F. Chudleigh, J. W. Rolfe, and B. H. English, dated June 2019. Each cover features a collage of images related to the production system and includes a brief description of the report's purpose and funding source.

Katherine, NT results also available from DAF website:

https://www.daf.qld.gov.au/_data/assets/pdf_file/0008/1439720/Improving-the-performance-of-beef-production-systems-in-northern-Australia.pdf



Improving the performance of beef production systems in northern Australia



This document provides analyses of management strategies for beef production systems across three regions of northern Australia using the Breedcow and Dynama suite of programs. The document is an extension of the Breedcow and Dynama user manual and all files and spreadsheets compiled to undertake the analyses are available from the DAF website.

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This report has been part funded through the Queensland Government Drought and Climate Adaptation Program via the project 'Delivering integrated production and economic knowledge and skills to improve drought management outcomes for grazing enterprises'.

- Outputs using the whole farm economics framework
 - have enabled producers/managers, researchers and extension staff to be
 - well informed
 - make sound judgements about the likely results of technological change



Drought and climate adaptation program

Thank you