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Ahead of the pack: what 30 years of commercial pastoral innovation can teach us

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Abstract

This paper documents three decades of innovation by a leading producer in the Barkly region of the Northern Territory. Many of the practices are being adopted by other producers, including infrastructure development, genetic and fertility selection, cross-breeding and sustainable stocking rate management.

Since 1981, management changes on the study property have resulted in a >50% increase in carrying capacity and herd size, a 46% improvement in weaning rate, an 82% reduction in breeder mortality rate and the maintenance of good land condition. Live weight turn-off per adult equivalent (AE) has increased from 75 kg to 128 kg. Gross margin per AE has improved by almost 300%.

This paper presents two additional scenarios that apply to many northern beef businesses. The first examined how the business would be performing if it had the current herd size but still had the same herd productivity as 30 years ago (i.e. similar to current average industry performance). The second scenario examined what the business would look like if it was generating today's annual weaner crop with the herd productivity of 30 years ago.

In Scenario 1, the property would have to carry more head to generate the same AE, and mate and retain more breeders, but would still produce less weaners than it does today. The economic implications of this "industry average" productivity are higher direct costs and significant lost livestock revenue. In Scenario 2, the property would have to carry almost twice as many head (far exceeding the sustainable carrying capacity) and would still generate less livestock revenue than it does today. The findings illustrate the dangers of simply increasing herd size without regard for sustainable carrying capacity and herd productivity.

Introduction

Productivity growth and returns on investment are generally static or declining across much of the northern Australian beef industry (McLean *et al*. 2014). Together with high debt levels and increasing input costs, the industry is striving to improve production efficiency and profitability.

Common strategies include increasing breeder productivity and live weight gain, reducing turn-off age, optimising feed utilisation and managing costs. Recommended practices include genetic and fertility selection, infrastructure development, stocking rate management, pasture improvement and/or finishing elsewhere (Bentley *et al*. 2008, Henderson *et al.* 2012, Petty *et al*. 2013, Quigley & Poppi 2013, McGowan *et al.* 2014).

This case study evaluates the performance of a business that has been at the forefront of innovation in the Northern Territory. Many of the practices implemented in the last 30 years are progressively being adopted by other producers. These include:

- Developing infrastructure to improve paddock utilisation, increase carrying capacity and sustainably increase herd size.

- Cross-breeding to achieve better animal production and marketability.
- Pregnancy-testing and culling non-performing breeders to increase herd fertility.
- Using safe stocking rates and wet season spelling to maintain good land condition.

Evaluating how these practices impact on productivity, economics and land condition provides valuable insights to other producers considering one or more of these practices (Bray *et al*. 2014).

Methods

An in-depth interview with the manager of the property was conducted by the author in December 2012. The property has excellent production and financial records and a documented history of management changes. This information was used to build a Breedcow model (Holmes 2013) representing the current situation on the property. This base model was then modified to create models representing two historical snapshots of the property (1981 and 2006).

Breedcow was also used to investigate two scenarios that represent the current situation for many northern beef businesses. The scenarios investigated how the business would be performing:

1. If it had today's herd size but still had the 1981 herd productivity.
2. If it was to generate today's weaner numbers but still had the 1981 herd productivity.

The 1981 Breedcow model was re-run to generate a new steady state with the 2013 AE figure (for Scenario 1) or the 2013 weaner numbers (for Scenario 2). All other assumptions for the 1981 model were left unchanged.

Results and Discussion

Historical performance

Shorthorn cattle were run for about a century before F1 Brahman bulls were introduced in 1982. In 1987-8 the company began developing its own composite by introducing Belmont Red and Charbray bulls. Today the company produces its own stabilised composite with improved disease resistance, heat tolerance and fertility. In the early nineties the company started routine pregnancy-testing and selection to increase herd fertility. At that time there were 64 fewer bores than today and large areas of under-utilised pastures. A large water point development plan commenced in 2005 and is now largely complete. Table 1 shows that marked improvements in performance have been achieved between 1981 and 2013, including:

- Increased carrying capacity and herd size (>50%).
- A 46% increase in weaning rates.
- An 82% decrease in mortality rates.
- A 12-month reduction in age of turn-off (thus meeting higher value 2-tooth Japox market specifications).

Table 1. Production metrics for three historical snapshots of the case study property. The figures are from Breedcow model output (based on data provided by the property manager).

	1981 Shorthorn Herd	2006 Composite Herd	2013 Composite Herd
Herd size (Adult Equivalents)	43,972	65,943	68,000
Number of breeders mated	33,370	47,916	49,203
Avg. calf birth live weight (kg)	35	32	32
Avg. weaning live weight (kg)	190	205	205
Change in fem. LW from weaning to maturity (kg)	224	290	290
Mature breeder live weight (kg)	400	480	480
Weaning rate (#calves/#breeders kept)	56%	81%	82%
Heifer retention (to achieve a steady state herd)	23%	12%	12%
Surplus heifer weaners (as a % of total breeders mated)	2%	24%	25%
Female turnoff (benchmark >47%)	33%	49%	49%
Total tonnes live weight turned off	3,293	8,327	8,689
Tonnes turned off per AE (t live weight)	0.07	0.13	0.13

Further scenarios

Infrastructure development and herd increase is an ongoing priority for many producers in northern Australia. The two additional scenarios illustrate the dangers of ignoring productivity improvements and sustainable carrying capacity when increasing herd size.

Scenario 1 - Today's herd size (AE) but 1981 herd productivity

Compared to today, the property would:

- Have to carry 21,817 more head to achieve the same AE.
- Retain almost twice as many replacement heifers.
- Have to mate >2,400 more breeders and retain >2,500 more breeders.
- Be weaning >10,000 less weaners.
- Would have >11,000 less breeders and >5,000 less steers to sell.
- Lose $7.3M in sales income.
- Have >$353,000 higher direct costs.
- Incur >$26,000 more in bull replacement costs.
- Have a >$7.8M (75%) lower herd gross margin (after interest).
- Have a $115 lower gross margin per AE (after interest).

Scenario 2 – Today's weaner numbers but 1981 herd productivity

Compared to today, the property would:

- Have to carry almost twice as many head and 38% more AE.

- Retain almost three times as many replacement heifers.
- Have to mate >22,000 more breeders and retain >20,000 more breeders.
- Would have >8,500 less breeders and >350 less steers to sell.
- Lose $4.8M in sales income.
- Have >$392,000 higher direct costs.
- Incur >$46,000 more in bull replacement costs.
- Have a >$6.8M (65%) lower herd gross margin (after interest).
- Have a $115 lower gross margin per AE (after interest).

Furthermore the herd size required to generate the desired number of weaners far exceeds the safe carrying capacity and is thus environmentally unsustainable. The inevitable decline in land condition would impact on animal productivity and potentially create a negative spiral in which there would be a temptation to run even more cattle to produce the required weaners.

Conclusion

Stalled productivity growth and declining returns on investment are impacting much of the northern Australian beef industry. Together with high debt levels and increasing input costs, the industry is continually seeking ways to improve production efficiency and profitability. This paper demonstrates how a suite of recommended practices has improved business performance for an innovative producer. The paper also highlights the grim prospects for businesses that seek to increase herd size without regard for sustainable carrying capacity and ongoing improvements in herd productivity.

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