E-Beef
A Smart Farming Partnership

Drought and climate adaptation program

GrazingFutures and E-Beef Case Study

Amber Station: Phosphorus and property development

Background and property description

When implemented, phosphorus (P) supplementation greatly improves the herd performance (branding, death and growth rates) of northern breeding operations faced with seasonal variability, and is a fundamental feature of a resilient livestock business. However, innovative supplement delivery technologies and persistence are necessary to overcome wet season 'property access' challenges and achieve sufficient phosphorus intakes across the herd. The Drought and Climate Adaptation Program (DCAP) GrazingFutures project and associated E-Beef industry activities assist beef producers to identify phosphorus deficiencies, tailor supplement recipes and adopt practical feed delivery systems at the property and paddock level.

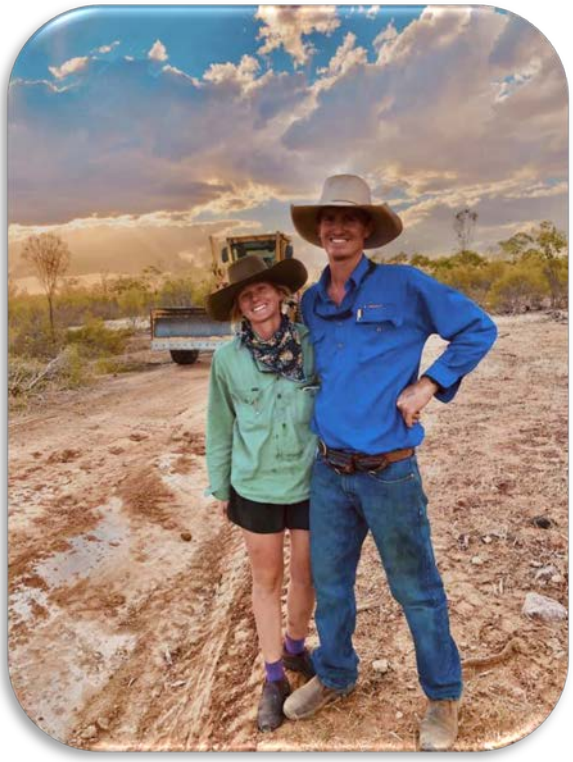

Figure 1. Georgia and Dan Slaney are part of the Mount Surprise E-Beef producer innovation hub

Amber station is a partly developed 103,000 ha breeding property located 55 kilometres north of Mount Surprise in north Queensland. It was recently purchased by Werrington Cattle Company with the new managers, Georgia and Dan Slaney (Figure 1) taking up residence during late 2019. Historically, Amber station operated as a low-cost breeding operation producing weaners for transfer to other family properties.

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At the time of purchase about half of the property was fenced into five large paddocks with the other half open but linked to laneways and holding squares around strategic dams and water points for the collection of cattle. Steep gullies and rocky outcrops are used as a natural boundary in places and the number of neighbouring cattle running on Amber suggested minimal stock control.

The condition of the breeding herd and calves purchased with the property indicated an effective phosphorus (P) supplementation feeding program had not been in place on Amber. Dan explained: "*Visually the poor condition of the calves was a clear example of just how long the cows had been severely deficient, and as a result they were falling in a heap in the yards when mustered".*

Werrington Cattle Co has a long history of successful wet season P and dry season supplementation of breeder herds (Figures 2 and 3) so it was no surprise that the first management decision on Amber station was to feed bulker bags of both wet and dry season supplement side by side. Two thousand cows purchased with the station consumed 22 tonnes of phosphorus supplement in just three weeks. Dan explained he had never seen such high intakes of phosphorus supplements.

Within weeks they noticed a dramatic turnaround in the cattle condition which coincided with a significant reduction in supplement intakes.

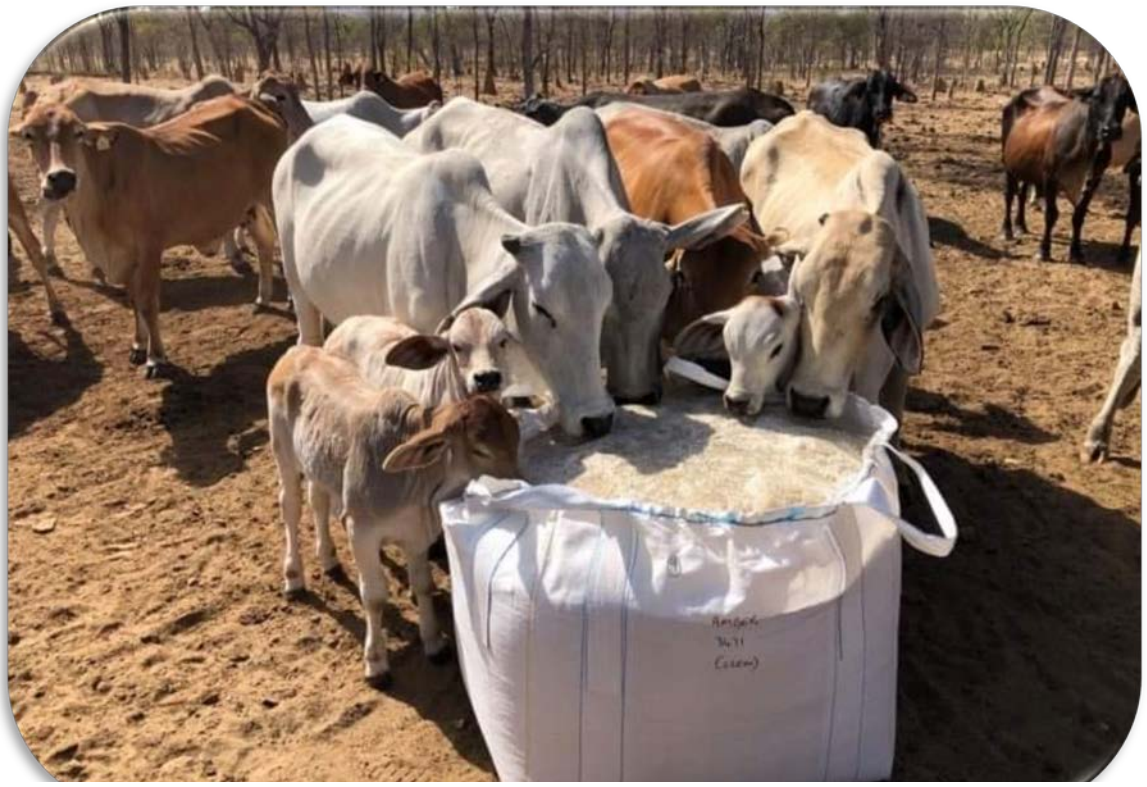

Figure 2. Amber cows and calves both consuming dry season supplement with phosphorus

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Amber station receives reliable annual wet season rainfall (~ 800mm) and is fortunate to have several creeks branching off the Lynd River, which runs through Amber all year round. Along with a variety of native pastures and numerous edible shrubs there is widespread *Seca* and other introduced stylos on Amber. Ranges and rocky outcrops intersect the property and key soil types include decomposed granites, sandy country, watercourse frontages and some basalt soils. In addition to the river and natural springs, Amber has a house bore and 28 dams.

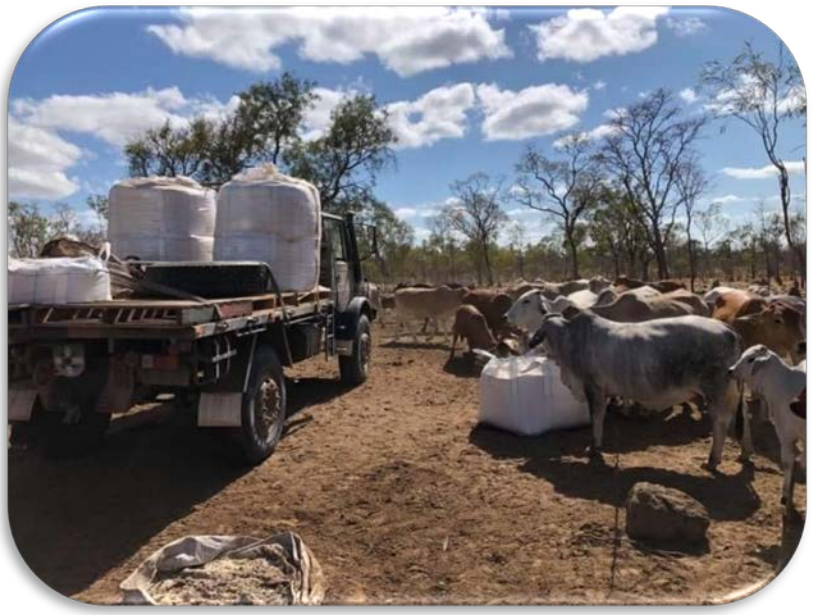

Figure 3. Amber lick truck replenishing supplement supplies at lick sites

Werrington management principles

Werrington Station is 19,500ha of mainly eucalypt woodland approximately 125km south-east of Georgetown. Werrington Station carries most of the breeders (of the total Werrington Cattle Co herd of 9,000 – 10,000 head) and is run in conjunction with Rainmore (28,000 ha of buffel grass on Brigalow country south of Alpha) and other agistment on forest and Downs country. Each paddock on Werrington is spelled for 4–5 months over the wet season every second year, with weaner paddocks spelled every year. There has been no burning on Werrington for over 30 years.

Some country on Werrington has been oversown with *Seca* and *Verano* stylo, and *Wynn Cassia*. Breeders are control-mated to drop calves over from September to November each year. All cattle are vaccinated for botulism. Breeders receive both dry season urea-based supplements (with phosphorus) and wet season phosphorus supplements (using bulker bags). After the first frosts, weaner heifers are fed M8U plus 1% P and 8% copra meal for six months of the dry season.

Both Werrington and Amber are currently using the same wet season P lick recipe. Target wet season P intakes on Werrington are 7 – 8g/head/day for breeders and heifers, and 4g/head/day for steers. When fed for 100 days over the wet season, P supplements cost $7 – 8 per breeder.

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Amber five-year property management plan

The current property management plan, developed by Georgia and Dan in conjunction with the Werrington Cattle Co team (Figure 4), focuses on implementing a P (wet and dry season) supplementation program and investing in yards, fences and waters to improve the carrying capacity and running efficiency of Amber. Only breeders with better reproductive performance will be retained and herd bulls will be selected on objective criteria that focus on improving herd fertility, temperament and survivability.

The majority of the Slaney's planning activities are heavily influenced by the successful management strategies applied by Georgia's family on Werrington station.

Figure 4. Dan and Georgia Slaney with Georgia's older brother Clayton Lethbridge make up part of the Werrington Cattle Co management team, and are the next generation of industry leaders.

However, even with access to a range of mentors and support mechanisms, the implementation of the Amber plan will rely on a very high level of teamwork, skill and timeliness. Georgia and Dan, as members of the Mount Surprise E-Beef producer innovation hub, regularly discuss herd, land and business management with fellow producers. The progress of the Amber plan in relation to infrastructure development, phosphorus supplementation delivery technologies, herd management, breeder performance and improving land condition will be articulated throughout the innovation hub in a peer to peer learning environment.

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Underpinning the success of the plan will be an effective wet season P supplementation program across the entire property, focussed on achieving P intakes of 10g /day for each cow-calf unit during the wet season, and targeted dry season supplementation (with P; Figure 5) of weaners and replacement heifers. Bulker bags are preferred due to the lack of lick sheds and wet season access issues on Amber, as well as the success of this wet season P delivery method on Werrington for nearly two decades.

Figure 5. A closer look at the Amber dry season loose licks with phosphorus

Using a variety of 250 and 400 kg bags allows a wider distribution of lick across each paddock when cattle are typically scattered due to surface water. Smaller 25 kg bags are transported by helicopter to replenish existing lick sites when wet season vehicle access is limited on Amber. The Amber wet season P supplement recipe (Table 1) includes a mix of Kynofos 21™ (21% P), GranAm™, lime, Rumigro™ and salt. The aim is for breeders to consume around 100 g/head/day of lick which, at 10% P (as fed), delivers the required 10g P/breeder/day. However it is not unusual to see daily lick intakes fluctuate during the wet season. GranAm™, a source of non-protein nitrogen, is used to help fill the protein gap as pasture quality declines later in the wet season. While used successfully in wet season P supplements on Werrington and Amber, GranAm™ is sour and can reduce supplement intakes in some situations. Many northern producers are reluctant to use GranAm™ in their wet season supplements as target wet season P intakes are often difficult to achieve. The inclusion of lime (5%) in exposed wet season P bulker bags helps form a surface crust and weatherproof the recipe.

The aim is for the Amber dry season urea-based supplements to include approximately 10 - 15% Kynofos 21™ which will supply around 3g and 5g P/head/day to heifers and breeders respectively during the dry season. Georgia and Dan observe cattle are less likely to gorge wet season P supplements when fed dry season licks with P in the months preceding the wet season. They notice this results in steadier, but adequate, supplement intakes over the growing season. Georgia and

Dan also believe the nitrogen component (urea equivalent) of GranAm™ may be exacerbating the hard crusting of their wet season bulker bag licks. They will trial a new recipe this coming season by removing GranAm™, and adjusting the Kynofos 21™ and lime. The Werrington Cattle Co team are very proactive in trailing new ideas to work out what best suits each enterprise and paddock situation.

Table 1. The Amber wet season lick recipe is 10% phosphorus as fed and includes lime to waterproof the exposed bulker bags.

Ingredient	Inclusion rate
Gran Am™	12%
Kynofos 21™	48%
Lime	5%
Rumigro™	0.5%
Salt	34.5%

The Amber breeder management strategy requires regular pregnancy testing of all breeders. This combined with a successful P supplementation program, better cattle control and selection for fertility will allow the mating period to be progressively shortened. These strategies aim to achieve a female mortality rate of 2% in the long term, as well as produce a more consistent line of heavier weaner steers available for transfer to other properties within the family business.

The plan includes investments in additional fencing and property infrastructure which will allow pasture spelling, a reduction in grazing pressure on parts of the property and an expansion of the herd over the next decade. Rebuilding the existing yards and cattle handling infrastructure will improve the safety of staff and ease of livestock handling. Upgrading and adding to existing station roads will improve access throughout the property for a greater part of the year.

The economic analysis completed as part of this case study indicates the expected return to the total funds invested in the property purchase, livestock, plant and equipment and property development over the first decade could average 4 - 5% per annum when long term cattle prices and costs are used. This estimate did not include any allowance for a potential change in the value of the land component of the investment.

Table 2 is a comparison between a typical northern Gulf property with minimal management and little to no P feeding, and Amber at the end of Georgia and Dan's five-year development plan including full P supplementation of the Amber herd.

The benefits of feeding phosphorus include: (i) an increase in weaning rates from 47% to 66% (ii) a reduction in breeder deaths from 8% to 2%, and (iii) improved female and steer cattle weights and a subsequent increase in the value of these cattle. The overall contribution of P supplementation to the predicted increase in gross margin/AE on Amber is significant.

Table 2. A modelled comparison of the herd performance, turnoff age, turnoff value and gross margins with, and without, wet season phosphorus supplementation between a typical Northern Gulf property and after the implementation of the Amber five-year property development plan.

	Amber without P	Amber with P and development
Total adult equivalents	**5200**	**8742**
Total cattle carried	6196	8259
Total breeders mated and kept	4158	4860
Total calves weaned	2012	3945
Weaners/Total cows mated	**47%**	**66%**
Overall Breeders deaths	**8%**	**2%**
Female sales/Total sales	34%	48%
Total cows and heifers sold	**519**	**1810**
Total steers sold	1006	1972
Average female price	**$696**	**$774**
Average steer price	**$366**	**$428**
Direct costs excluding bulls	$104,307	$475,747
Bull replacement	$78.359	$96,842
GM per adult equivalent	**$105**	**$191**

Georgia and Dan are the next generation of rural leaders with a passion and drive that will set an example of what is possible for beef operations in the northern dry tropics. The Slaney's progress on Amber with property development, increasing carrying capacity and wet season phosphorus supplementation will be one to follow.

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