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Alternative management strategies for Central Queensland beef business

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The profitability and resilience of Central Queensland (CQ) beef enterprises is affected by the management strategies that are used in response to property level production implications (Bowen and Chudleigh 2018). Therefore, when assessing the relative value of a current or potential new management strategy, it is critical to apply a sound economic framework at a property level basis. The aim of this study was to use an established farm-management economic framework to assess the benefits of implementing two alternative management strategies on a CQ case study herd: (1) correcting a phosphorus (P) deficiency through wet season supplementation; and (2) modifying the turn-off age of male cattle from bullocks to feedlot entry weight (Bowen and Chudleigh 2018).

The Breedcow and Dynama herd budgeting software (Holmes *et al.* 2017) was used to analyse two management strategies for a self-replacing breeding and finishing herd of 137 cows, located 30 km north of Rockhampton. The 1037-ha property is dominated by Blue and River red gum flats and Goldfield's red soil land types which are considered to be low in P status (State of Queensland 2019) and marginally P deficient for cattle as per definitions of Bowen *et al.* (2020). The existing base herd was supplemented during the wet season with a liquid supplement containing 1.5% P, considered to be inadequate to meet the herds P requirements. The marketing strategy was to grow steers on the more productive and P adequate alluvial land types and market to Teys Australia abattoir (Rockhampton, Qld) as finished slaughter steers >580 kg liveweight (LW). Assumptions used to model the alternative strategies were as follows. Strategy 1 replaced the current liquid supplement with a dry lick ration of 80% Kynophos® and 20% salt for 90 days in the wet season, and increased cow conception rate by 5% and cull cow LW by 10 kg. Strategy 2 marketed steers to CQLX Gracemere saleyards (Rockhampton, Qld), as feeder steers at 350–450 kg LW range. The price basis for each class of livestock was derived from CQLX Gracemere saleyards data and Teys Australia Abattoir (Rockhampton, Qld) average prices over a 6-month period between September 2020 to February 2021.

Strategies 1 and 2 resulted in an extra \$8333 profit/annum and \$17 606 profit/annum respectively, which were 6.85% and 14.5% higher than the existing base case study herd. Altering the P ration in Strategy 1, to adequately address the P deficiency, reduced the husbandry costs by \$7050/annum and the increase in conception rate decreased the breeder numbers from 137 to 128 head. Strategy 2 reduced the steer maximum age of turn-off from 48 to 36 months, which increased breeder numbers to 167 head and resulted in husbandry costs increasing by \$1498/annum.

Our study demonstrated that both Strategies 1 and 2 were more profitable than the base case study herd. The increase in profitability is consistent with the work reported by (Bowen and Chudleigh 2018; Bowen *et al.* 2020). However, in terms of business resilience, changing to a feeder steer marketing strategy increased drought risk due to the higher proportion of breeders in the herd (Bowen and Chudleigh 2021a, 2021b). In comparison, replacing the high-cost supplementation with a P adequate ration in Strategy 1 provided the benefit of decreased drought risk, but with a significantly smaller profit/annum. By using the established framework, the study has identified comparable benefits and disadvantages of implementing both strategies in isolation. It has however, been demonstrated by Bowen and Chudleigh (2021b) that modelling strategies in isolation may not identify the complementary or the additive benefits of implementing strategies simultaneously. It could then be expected that if Strategies 1 and 2 are implemented simultaneously, an increase in profit/annum and only a marginal increase in drought risk may be achieved through the complementary benefits of implementing both Strategies. It is recommended that the producer implement both Strategies 1 and 2 and change the steer age and weight of turn-off to a maximum (36 months, 450 kg) and replace the existing wet season supplementation program with a P adequate supplement.

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