

# Evaluation of wet season phosphorus supplementation to improve production and greenhouse gas emissions in northern Australia

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## Background

The northern beef herd is a significant component of agricultural greenhouse gas (GHG) emissions in Australia. Finding ways to improve production efficiency and reduce emissions will be a win-win for the beef industry and the atmosphere.

Wet season phosphorus supplementation in phosphorus (P) deficient country can lift productivity key performance indicators (KPIs) such as weaning rates, cow survival and growth rates, leading to more product produced per adult equivalent (AE = 450 kg dry cow). Feed intake per animal is stimulated by P supplementation so herd numbers need to be reduced to maintain the same grazing pressure.

This evaluation investigated the use of P supplementation in P deficient country to lift per head productivity and achieve a greenhouse gas emissions benefit through reduced stock numbers.

## The evaluation

A representative model breeding herd from the Croydon/west Mareeba shire region of north Queensland developed through the Beef CRC was used in the analysis. The evaluation compared no P supplement and wet season P supplement in P deficit country. Due to higher intake with supplement, herd size was reduced from 4000 to 3600 adult equivalents, maintaining the same grazing pressure.

Wet season P supplementation can improved reproductive rates and reduce death rates enabling cow numbers to be lowered by 25% while producing the same number of weaners. P supplementation improves growth rates and enables steers to be sold up to 12 months earlier.

The higher reproductive rates and lower death rates with P supplementation mean that as well as more steers being sold, there are more and heavier surplus females sold, with total liveweight sold increasing by 36%.

## Financial results

With wet season P supplementation, husbandry costs increase by \$43,500 per year as a result of additional money spent on P supplement, although less money is spent on other inputs per head such as dry



*Phosphorus deficient cow and calf in P deficient country during a dry spell.*

**‘Wet season phosphorus supplementation can significantly increase productivity key performance indicators’**



*Cows and calves receiving wet season phosphorus supplementation in P deficient country.*

season supplement. Herd gross margin improved from \$228,300 to \$369,600 with P supplementation. An important consideration in beef enterprises is the impact of management changes on the value of capital tied up in the herd. Accounting for the opportunity cost of having this capital tied up (at 10% interest rate), the gross margin for the herd increases from \$30,600 to \$184,600.

Consideration needs to be given to the fact that the change in herd structure and productivity improvements take 2–3 years to achieve, as the benefits of P supplementation take time to build up in terms of improved reproduction rates. In the intervening period the extra supplement costs and estimated capital expenditure of \$25,000 for feeding stations will initially reduce cash flow before positive returns are achieved.

## Emissions results

Only on-farm emissions associated with livestock were modelled. Other emissions such as savanna burning and legume pasture residues were assumed to remain constant.

Total herd greenhouse gas emissions were reduced by 7% (622 tCO<sub>2</sub>-e reduction) with supplementation while greenhouse gas emissions intensity improved from 40.9 to 19.5 kg CO<sub>2</sub>-e per kg liveweight sold.

## Summary

Wet season phosphorus supplementation in phosphorus deficient country can improve herd productivity, business profitability and greenhouse gas emissions.

Whether implementing a wet season phosphorus supplementation strategy is suitable for development of a 'carbon farming' project is still unclear (as at May 2012). Key issues include scheme acceptance of wet season P supplementation as an allowable practice, costs associated with project establishment, administration, verification and risk management and the final price of carbon. In this scenario the emissions savings at a net carbon price (carbon price of \$23 per tCO<sub>2</sub>-e minus expenses) of \$20 equates to \$12,400 per year.

However this analysis indicates that the improvement in business profitability with wet season phosphorus supplementation even without 'carbon farming' income means that this strategy is highly worthwhile.

Further information on phosphorus supplementation can be found at <http://www.futurebeef.com.au/topics/nutrition/phosphorus-nutrition-of-cattle-in-northern-australia/>

This fact sheet has been summarised from the report:

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*Cattle being fed wet season phosphorus supplement in northern Australia.*