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Economic analysis of sown stylo and/or grass pastures on red earth and red basalt soils in north Queensland

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The Meat & Livestock Australia funded project, ‘Progressing superior tropical grasses and legumes in seasonally-dry Queensland (B.NBP.0812)’ is developing strategies for selection and establishment of alternative grass and legume species adapted to diverse soil types and climate zones in north Queensland. The objective of the present study was to conduct an economic analysis of the preliminary results from project B.NBP.0812.

The economic performance of two types of sown pastures for beef production was assessed using a gross margin framework and considered (i) legume stylo (*Stylosanthes* spp.)-grass and (ii) stylo-only, established on (1) red earth (low fertility) and (2) red basalt (high fertility) soil types typical of the Mt Surprise and Charters Towers regions of north Queensland. These scenarios were compared with existing native pastures growing on both soil types. Sown pastures were fertilised with (i) sulphur (red basalt) and (ii) phosphorus and sulphur (red earth) at planting and reapplied every 5 years. Pasture establishment costs were representative of an owner/operator using their own machinery and were included as an annual cost in the gross margin after being amortised over 30 years. The analysis was based on a 100-ha representative paddock, which was used to graze steers from weaning at 6 months to sale at 18 months. North Queensland saleyard cattle prices averaged over the previous 5-years, were applied.

The analysis based on preliminary trial results indicated that investing in stylo-grass pastures was more profitable than stylo-only pastures on both red earth and red basalt soil types in north Queensland (Table 1). Both sown pasture options (stylo-grass and stylo-only) outperformed native, unimproved pastures grown on the same soil type. The high fertility red basalt soil was more profitable than the low fertility red earth soil across all pasture scenarios.

Table 1. Comparison of gross margin results for pastures grown on 100 ha of red earth or red basalt soil types in north Qld

| Factor | Soil type and pasture | | | | | |
|---|-----------------------|----------------------------|----------|--------------|-----------------------------|----------|
| | Native grass | Red earth Stylo + grass | Stylo | Native grass | Red basalt Stylo + grass | Stylo |
| Livestock sales | \$12 119 | \$45 896 | \$29 157 | \$22 047 | \$73 260 | \$60 051 |
| Total expenses ^A | \$10 432 | \$35 297 | \$23 660 | \$17 535 | \$47 763 | \$39 171 |
| Gross margin/annum on 100 ha | \$1687 | \$10 599 | \$5497 | \$4513 | \$25 497 | \$20 881 |
| Gross margin/annum on 100 ha (after interest ^B) | \$1253 | \$9309 | \$4677 | \$3780 | \$23 586 | \$19 314 |
| Gross margin/ha.annum (after interest ^B) | \$13 | \$93 | \$47 | \$38 | \$236 | \$193 |

^AIncludes amortised establishment costs.

^BInterest relates to the opportunity cost of capital. Calculated as the amount of interest that could have been received on the capital invested in the livestock and pasture establishment and subtracting this amount from the gross margin. This allows for an appraisal of the economic worthiness of the investment options by accounting for the earnings foregone by using the capital in this way.

The results of the present study are in accord with previous economic modelling indicating that sown legume-grass pastures can substantially improve the productivity and profitability of beef production in northern Australia (Bowen and Chudleigh 2018; Bowen and Chudleigh 2019, 2021; Bowen *et al.* 2019). However, it is important to recognise that the biological assumptions of pasture and cattle performance applied in the present analysis are yet to be validated at a commercial scale for the study region and soil types. Additional research data measured under grazing conditions will improve confidence in the results of future gross margin and whole-farm economic analysis of these sown pasture options for north Queensland.

References

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