**NB2 R&D projects**

**Project Code**: P.PSH.1310

**Project title**: **NB2: Delivery of 'Pathway to Practice' pillar of Northern Breeding Business (NB2) program.**

**Start date**: 6 July 2021 **End date**: 15-Dec-2023

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**Purpose & description**

The Northern Breeding Business (NB2) strategic RDE&A partnership will address key issues that threaten the long-term viability and sustainability of the northern beef industry. Through four RDE&A pillars of Herd, Feed base, Sustainability, and Pathway to Practice (the extension and adoption focus), the program is expected to deliver an estimated $20M in net benefits per annum to 250 northern beef enterprises by 2028.

Pathways to Practice (P2P) will support producers to adopt standardised methods for determining their business needs and for them to source the relevant R&D solutions leading to sustained practice change. This first two-years will actively engage northern beef producers to objectively determine their current situation to inform business decisions and provide a direct conduit from R&D outcomes to changes in business practice. The vehicle for achieving business practice change will be through the recruitment of collaborating producers in groups of five to 10 businesses, who have agreed to participate in the reporting, education, training and (or) adoption activities. Each producer group will be supported by a nominated peer (engaged as producer group coordinator), and an agricultural department extension staff and (or) consultant (group facilitator). Significant resources have been allocated for the producer group coordinator to develop their confidence and skills in group facilitation and business management. Establishing effective capacity development for not only beef producers, but equally coordinators, facilitators and consultants is critical for longer term success.

The focus of the Pathways to Practice project is adoption and practice change, led by producers for producers, thereby maximising the opportunity for peer-to-peer communication and a community of practice approach as the primary method to implement practice change on farm. Pathways to Practice is about producers identifying their needs and transforming R&D outcomes to business practice through undertaking situation analysis, adapting management systems to production enterprises, training and mentoring producers in good business principles, and assessing and demonstrating new technologies and management systems in the real-world of northern beef enterprises - leading to business practice change.

The initial period will develop standardised tools for collecting data relevant to herd, feed base and finances to generate a set of Key Performance Indicators (KPl's) for the producer to address fundamental questions:

1. Have I got a problem?

2. What area of the business is the problem/opportunity (herd, feed base, financial)?

Specifically, Pathways to Practice will initially support 30-40 north Australian beef businesses in 6 groups to:

• Interact with and learn from other producers in a group setting.

• Collect their own standardised business records (including financial, feed base, and livestock data), to establish baselines for achieving production, performance and financial outcomes that are sustainable in the long term. Continue to monitor these annually over the duration of the project. Discuss and identify appropriate management interventions/practice changes that are both economical and practical to implement. Undertake training to improve knowledge and skills required to implement management interventions/practice changes.

• Set direction for applied R&D as determined through needs within the program e.g. R&D based on producer- identified priorities which can be managed under the broader NB2 program.

Participation will require a commitment from producers to collect, and have analysed, standardised herd, feed base and financial data as described by the project templates. Six beef producer groups of 5-10 members will be initially formed across northern Australia - one in Western Australia (Kimberley/PiIbara region), one in the Northern Territory, two in Queensland (Burdekin and Fitzroy catchments), a corporate producer group based in the Barkly Region of Queensland/Northern Territory, and a group of properties managed by the Indigenous Land and Sea Corporation. Each group will be supported by traditional agricultural department extension staff and/or consultants. Additional support will be available from the NB2 Co-ordinators and theme leader network.

This Pathway to Practice project is deliberately addressing the general lack of adoption of known R&D outcomes for northern breeding businesses. Pathways to Practice will start with the producer identifying their specific needs and 'pulling in' the appropriate R&D. This is a different way of delivering extension services in northern Australia. By focussing on 'what do you (the beef producer) need?" rather than 'this is what you need' is a foundational concept that the project will test and will.

• Detail a standardised approach for beef producers to collect objective data to determine their current situation.

• Establish a pathway for data to be effectively utilised and analysed into a standardised report.

• Establish an integrated pathway for producers to access specialists depending on their needs.

• Create a pathway for producers to co create with R&D specialists to determine what critical R&D is needed for northern systems.

The intention is for this project to provide a strong and sustainable foundation for a larger scale roll-out of the approach for an additional 5 years - providing opportunity for at least a further 200 producers to become involved in NB2 in this way.

**Project Code**: P.PSH.1314

**Project title: NB2: Assessing practical interventions to reduce calf wastage and herd mortality in northern systems**

**Start date**: 13 August 2021 **End date**: 15-Dec-2026

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**Purpose & description**

The Northern Breeding Business (NB2) strategic RDE&A partnership will address three key issues that threaten the long-term viability and sustainability of the northern beef industry including the low level of adoption of proven management practices and technologies. Through the four RDE&A pillars of Herd, Feed base, Environment, and Pathway to Practice in NB2 there is an expectation that outcomes will deliver an estimated $20M in net benefits per annum to 250 northern beef enterprises by 2028.

Poor nutrition and environmental stress during calving have been identified as major causes of calving difficulty and calf mortality. Reducing the mortality rate of cows and calves is an essential step in achieving long-term sustainability for northern breeding businesses. This proposal will assess the impact of nutritional interventions and management of environmental stressors around calving on cow and calf mortality, and to validate the use of a practical tool for early detection of more efficient animals. Targeted nutritional interventions will be implemented on 10 beef properties where heifers and cows will be monitored using GPS tags to determine likely cause of death, and environmental conditions monitored with rumen boluses and weather stations. By studying the interaction between nutrition and environmental extremes on calf wastage and herd mortality, and by identifying the cause for losses on individual properties, this project will develop practical and targeted management strategies. The participatory on-property research program, with support from cattle producers, feed and AgTech companies, government, and natural resource management organisations, will facilitate the rapid adoption of proven technologies. The expected impact from this project is a 5% reduction in calf wastage and a 1% reduction in herd mortality, representing an additional 25 t of sales per 3,000 AE herd.

The main project objective is to test cost-effective gestational nutritional management strategies to increase calf survival, reduce herd mortality, and improve calf growth through:

• Determine the incidence of mortality in calving 2-year-olds heifers in northern Australia

• Determine the impact of nutrition and environmental stress on reproductive efficiency and herd mortality in northern Australia

• Determine if more resilient breeders can be identified in advance with the use of tail hair analysis indicating the loss of nitrogen in the urine, and

• Model the impact of management intervention on whole-of-business productivity, profitability and sustainability.

**Project Number**: B.GBP.0058

**Project Title: ‘uSuckled’: Detection of maternal behaviours associated with suckling in beef cattle.**

**Start date**: 29 July 2021 **Completion date**: 14-Sep-2023

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**Purpose & description**

This project aims to explore the concept that suckling can be detected using remote monitoring devices (such as accelerometers, sound monitors and GPS trackers) attached to free-grazing cows. In doing so, documenting a non-invasive remotely-detectable dam-based method to approximate when a calf has been born, indicate whether the calf was born alive, if it suckled normally or not and if the occurrence of suckling prematurely stops indicating a self-weaning or mortality event.

On a research facility located in the Northern Territory, sensors generating constant GPS, sound recording and time series accelerometer data will be fitted to the neck and ear of 30 pregnant brahman heifers approximately one month before expected calving and to the resulting calf when practical after birth. The sensor-borne data from the cow-calf pair will be annotated to corresponding observational data generated from an intensive behavioural sampling protocol using both video and direct observation.

Machine-learning modelling procedures will be employed to identify accelerometer signatures with high discriminatory ability for indicating a cow being suckled using recorded behavioural data and validated by accelerometer data from calves.

This project aims to conduct a small, low-cost focused novel research activity to test a proposed methodology to identify a signature that indicates suckling using sensors attached first-lactation cows. The objectives of the proposed study are to:

• Detect material behaviours associated with suckling in beef cattle using remote monitoring devices (such as accelerometers, sound monitors and GPS trackers) attached to free-grazing first-lactation cows.

• Describe the association between frequency and duration of suckling and pre-weaning average daily gain of calves.