# final report

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# Northern Breeding Business: NB2
# Strategic Partnership Development

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# Abstract

The Northern Breeding Business strategic RDE&A partnership (NB2) will address three key issues that threaten the long-term viability and sustainability of the northern beef industry. These have been identified as; 1) the level of calf wastage in northern breeding herds, 2) the low level of profitability of many northern beef enterprises, and 3) the low level of adoption of proven management practices and technologies. Through its three RDE&A pillars of Herd, Feedbase and Environment, supported by integrated extension and adoption activities, NB2 will by 2027, deliver an estimated $20M in net benefits per annum to 250 northern beef enterprises. This is projected to be achieved through the increased production of 10M kg live weight of sale cattle (a five times return on investment) while operating at a level of production and profit that is sustainable in the long-term, by adopting proven management practices and new technologies, and using objective data to inform business decisions.

# Executive summary

The Northern Breeding Business: NB2 strategic RDE&A partnership proposal will address a number of key issues that impact on, threaten or limit the potential of the northern beef industry. It aims to promote and facilitate:

- Increased and diverse investment in RDE&A for the benefit of the northern beef industry
- Increased and integrated engagement in RDE&A by northern beef producers
- Sustainable increases in productivity and profitability from northern rangeland systems; including but not limited to reduction in calf mortality, increased breeder productivity and reproductive efficiencies
- Increased conversion of research and development output into industry/business outcomes

There are been three main drivers of the proposal:

1. A need to address the identified issue of calf wastage in northern breeding herds
2. The acknowledged relatively poor rate of uptake or adoption of R&D outcomes by the northern industry
3. Objective evidence that the majority of northern beef enterprises are not economically sustainable in the long term.

The specific objective of NB2 is to yield $20M in net benefits per annum to the northern beef industry through increased production of 10M kg live weight of sale cattle by 2027.

This objective will be delivered through up to 250 northern beef businesses, each with at least 800 AE of cattle (≈13 % of an estimated 1,900 businesses) engaging with NB2 and using objective data to inform business decisions. Within the proposed seven year, life of the program there is an intent to deliver a 5% increase in weaning rate; a 1% decrease in herd mortality rate; a 10 kg increase in sale weight of cattle at the same age; while operating at a level of production and profit that is sustainable in the long-term.

The core business of NB2 is built around three pillars supported by an integrated adoption and extension program, which will actively engage northern beef enterprises in the use of objective data to inform business decisions and provide a direct conduit from research and development outcomes to changes in business practice. The vehicle for achieving business practice change will be through the recruitment of up to 250 collaborating producers, in groups of ten, who have agreed participate in the on-farm research, development, education, training and(or) adoption activities. These producer groups will be supported by beef producer co-ordinators and by traditional agricultural department extension staff facilitators and (or) consultants. This activity is about identifying research needs and transforming R&D outcomes to business practice through trialling interventions, adapting management systems to particular production enterprises, training and mentoring producers, and assessing and demonstrating new technologies and management systems in the real-world of northern beef enterprises - leading to business practice change.

The Herd management pillar will focus on enhancing breeding herd performance through improved systems and interventions. The Feedbase pillar will focus on optimising feed production, supply and utilization for the breeding herd in order to achieve target performance levels in a cost effective manner. The Environment pillar will explore issues related to the managing the rangelands and the environment, and the long-term sustainability of the northern beef industry which aligns to the existing Beef Sustainability Framework.

Initiatives of the NB2 proposal include:

- Embedding producers in the conception, delivery, management and governance of NB2 will deliver ownership of RDE&A to beef businesses in northern Australia, leading to more effective uptake of field proven out-comes, and demonstrating a more effective pathway from research and development to business practice

- The widespread adoption of a more business focused approach by northern beef enterprises, based on the collection and analysis of objective data, will lead to long-term sustainable increases in productivity and profitability from the northern rangelands
- Relatively modest and readily achievable increases in productivity of a beef enterprise can have a significant positive impact on profitability. The proposed target increases in productivity for individual beef businesses that engage with NB2, while relatively modest at an individual enterprise scale, are potentially transformational at a whole of industry scale
- The identified issue of calf wastage in the northern beef industry, which was an initial driver of this initiative, will be addressed by NB2 through the development, promotion and implementation of breeding herd management systems that have been custom designed for beef enterprises in specific environments
- The Value Proposition of the NB2 proposal is attractive, with a minimum 5:1 benefit:cost ratio
- The scale and duration of NB2 offers significant education, training, career development, mentoring and employment opportunities for people entering or already engaged in the northern beef industry.

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# Abbreviations

| | | |
|---|---|---|
| ABARES | - | Australian Bureau of Agricultural and Resource Economics and Sciences |
| ABSF | - | Australian Beef Sustainability Framework |
| AE | - | Adult Equivalents |
| AWP | - | Animal Welfare Partnership |
| BISP | - | Beef Industry Strategic Plan |
| BRAC | - | Barkly Regional Advisory Committee |
| CN30 | - | Carbon Neutral by 2030 |
| CQU | - | Central Queensland University |
| CRCDNA | - | Co-operative Research Centre for the Development of Northern Australia |
| CSIRO | - | Commonwealth Scientific and Industrial Research Organisation |
| CSU | - | Charles Stuart University |
| DPIRD | - | Department of Primary Industries & Resources, Western Australia |
| EBIT | - | Earnings before interest and taxes |
| EBV | - | Estimated Breeding Value |
| EoIs | - | Expressions of interest |
| FTE | - | Full-time equivalent |
| Ha | - | Hectare |
| JCU | - | James Cook University |
| KPIAC | - | Katherine Pastoral Industry Advisory Committee |
| KPI | - | key performance indicator |
| LPP | - | Livestock Productivity Partnership |
| LTCC | - | Long-term carrying capacity |
| M | - | Million |
| MDC | - | MLA Donor Company |
| M&E | - | Monitoring and evaluation |
| MISP | - | Meat Industry Strategic Plan |
| MLA | - | Meat & Livestock Australia Ltd |
| NABRC | - | North Australia Beef Research Council |
| NB2 | - | Northern Breeding Business |
| NLGC | - | National Livestock Genetics Consortium |
| NRM | - | Natural Resource Management |
| NTDPIR | - | Northern Territory Department of Primary Industry & Resources |
| NQBRC | - | North Queensland Beef Research Committee |
| PGS | - | Profitable Grazing Systems |
| QAAFI | - | Queensland Alliance for Agriculture and Food Innovation |
| QDAF | - | Queensland Department of Agriculture and Fisheries |
| QUT | - | Queensland University of Technology |
| RBRC | - | Regional Beef Research Committee |
| R&D | - | Research and development |
| RDA | - | Research, development and adoption |
| RDE&A | - | Research, development, extension and adoption |
| RMAC | - | Red Meat Advisory Council |
| RMCiC | - | Red Meat Co-investment Committee |
| SEQBRC | - | South-east Queensland Beef Research Committee |
| SQBRC | - | South Queensland Beef Research Committee |
| UQ | - | University of Queensland |
| USyd | - | University of Sydney |
| UWA | - | University of Western Australia |
| WQBRC | - | Western Queensland Beef Research Committee |

# 1 Background

## 1.1 The North Australian Beef Industry

The beef industry in northern Australia accounts for about 61% of the total Australian beef cattle herd (ABARES 2019). Queensland, the Northern Territory and Western Australia (north of the Tropic of Capricorn) account for approximately 10.5M head (42%), 2.2M head (9%) and 0.8M head (3%), respectively, of the total Australian cattle population (MLA 2019a, E. White *pers comm.*).

### 1.1.1 Long-term sustainability

The 2009 Northern beef situation analysis (McCosker *et al*. 2010), concluded that the northern beef industry, at that time, was generally in an unprofitable and unsustainable state. Five years later, the Northern beef report: 2013 situation analysis (McLean *et al.* 2014), confirmed that the majority of northern beef enterprises were not considered to be economically sustainable in the long term.

According to the Australian Beef Report (Holmes and McLean 2017), "the underlying long-term profitability of the majority of beef businesses is alarmingly low and simple, cost-effective action is urgently needed". Given the severe widespread drought across much of northern Australia in more recent years, the situation is unlikely to have improved significantly. This is reinforced in the MLA prediction of a decline in national adult carcase weights across 2018 and 2019, underpinned by a lack of pasture and high percentage of female slaughter (MLA 2019b).

While these trends suggest a pessimistic future for the northern beef industry, McLean and Holmes (2015) identified a 10-fold difference in Long-Term Profit per adult equivalent (AE), between the average and the top 25% of beef production enterprises ($6.16 *vs* $61.96, respectively).

Across all regions, markets and herd sizes analysed, there was consistency in the factors distinguishing the top performers:

- Higher income/AE through better productivity (kg beef/AE) which is a function of:
  - Higher reproductive rate
  - Lower mortality rate
  - Higher sale weights
- Lower enterprise expenses per AE, which along with better productivity indicates more targeted expenditure on the herd, rather than simply less
- Lower overhead expenses per AE, due mostly to better labour efficiency
- Lower asset values per AE, meaning equivalent profits per AE equate to higher profitability.

These findings are consistent with those of the Northern Benchmarking Project 2012-2017 (McLean *et al*. 2018), which found that, although there was significant variation in the performance observed between pastoral operations , regions, and years, better performing businesses generally had higher productivity, more targeted herd expenditure, better labour efficiency and sufficient operating scale.

### 1.1.2 Profit drivers of the northern beef industry – productivity and profitability

Running the enterprise as a business was a key point of differentiation for the top 25% of producers, specifically focusing on those elements that they can control and key profit drivers (McLean and Holmes 2015).

The profit drivers of the northern beef industry are: reproduction; mortality; annual weight gain; and cost of production (a function of both productivity and costs, usually in that order of importance) (McLean and Holmes 2015), with reproductive rate being twice as important as mortality rate and turn-off weight (Holmes and McLean 2017).

The cost to produce a kilogram of beef (cost of production $/kg live weight) determines the profit of a beef business. The income of a business, is determined primarily by its productivity with price received being a secondary issue. Small productivity changes in the herd can transform the whole business performance (McLean and Holmes 2015).

There are only four practical means to influence productivity, assuming stocking rate is relatively constant (McLean *et al*. 2014):

1. Improving the reproductive rate,
2. Decreasing the mortality rate,
3. Increasing the turn-off weight through longer retention, better nutrition, or both
4. Improving the genetic potential for a heavier and/or higher yielding carcass either through selection or cross-breeding.

The relative impact on productivity of the first three are presented in Table 1.

**Table 1:** The relative impact on productivity of 1) increase in reproductive %, 2) decrease in mortality %, and 3) increase in sale weight.

| **Variable** | **Change (percentage points)** | **Kg beef/AE response** |
|---|---|---|
| Increase reproductive % | 1% | 1.50 |
| Decrease mortality% | 1% | 2.28 |
| Increase sale weight | 1kg | 0.18 |

(McLean *et al*. 2014)

## 1.2 Adoption

For the northern beef industry, poor adoption of production technologies or practice change "on-farm" has been a long-standing industry issue. Negative to marginal returns over the last several decades for many beef enterprises in northern Australia (McCosker *et al.* 2010, McLean *et al*. 2014) have highlighted the need for adoption of management practices that will improve economic viability and environmental sustainability of their beef businesses. However, low profitability has impeded the uptake of innovation.

There is a wealth of available research findings and know-how that have the potential to address many of these challenges, and these have been incorporated into a range of extension programs, projects, packages and activities to increase the rates of adoption. However, for many of the big issues facing the northern beef industry such as breeder herd performance, the rate of adoption of existing knowledge and solutions has been disappointingly low (Shepherd 2014).

More recently, the Northern Australian Beef Industry Situational Analysis (Chilcott *et al*. 2019) identified failure to adopt as the number one issue for the industry, and highlighted the fact that R&D is only as good as the adoption. While lamenting the lack of effective extension services, the analysis indicated that, at an individual property level, significant improvements in productivity and profitability could be achieved by applying existing R&D.

## 1.3 Why a strategic research partnership focused on the northern industry?

Innovation is central to increasing industry productivity, profitability and ensuring sustainability within the red meat industry. A complex web of R&D providers, extension providers and investors support. Meat and Livestock Australia (MLA) is an integral component of this web, alongside the Australian, State and Northern Territory governments, CSIRO, Universities, private companies and industry based consultants (McDonagh *et al*. 2016).

### 1.3.1 Strategic research partnerships and creative research coalitions

In 2013, a recommendation of the MLA Review of Systems and Processes for R&D Investment was, "MLA should focus a substantial proportion of its R&D portfolio on fewer, larger projects through strategic partnerships with appropriate organisations" (MLA, 2013). The Red Meat Co-Investment Committee (RMCiC) has also highlighted a continuing reduction of support across all Australian State and Federal governments in RDE&A for the livestock sector (McDonagh *et al*. 2016). This ranged from a broad withdrawal from government funded extension activities through to withdrawal from areas of R&D and consolidation of key resources around R&D strengths and/or major industry sectors. The RMCiC identified the need for an agreed approach to development of longer-term strategic partnerships primarily to arrest the decline in R&D capacity and capability to service the needs of the red meat industry. Co-incident to that, the MLA Board approved the direction of at least 30% of MLA's RDE&A budget towards strategic partnerships – that were defined as collaborative projects or programs of work with co-investments of more than $1 million per year for a period of 5 years or more.

The RMCiC furthered discussion of the process through which areas for development of strategic partnerships could be agreed to and through which they may be implemented on a case-by-case basis under the following principles:

i) MLA and RDE&A partners agreed to develop up to six strategic partnerships in addition to National Livestock Genetics Consortium (NLGC), over a two-year period (FY 2016–17-2017–18).
ii) The strategic partnerships were to be issues-based partnerships that had outcome targets and integrated RDE&A pathways to deliver industry benefit. Demonstrable industry benefit was a high priority for MLA's Board in establishing these partnerships.
iii) The strategic partnerships were to align with the key industry outcomes identified in MISP2020 and those defined within the BISP that were priorities for the Australian beef industry.

In 2016, the North Australia Beef Research Council Inc. (NABRC) endorsed the establishment of a number of creative research coalition (i.e. low overhead, cost effective consortia or strategic partnerships). This concluded the process that commenced in 2012–13 with the publication of the NABRC RDE&A Priorities Prospectus (NABRC 2012) and Implementation Plan, which were informed by two years of producer consultation on research priorities in 2015–16, and a workshop held in August 2016.

NABRC supported the establishment of creative coalitions in the following areas:

1. Improving the production efficiency of beef cattle in northern Australia, with a focus on the identified profit drivers of the northern beef industry – i.e. reproduction, growth, mortality, compliance with market specification, labour efficiency etc.
2. Developing strategies that increase production, quality and utilisation of the Feedbase**.**
3. Coordinating efforts in value chains aimed at improved compliance to market needs.
4. Enhancing the use of technology, including precision livestock management.

5. Developing a framework to build the capacity, efficiency and efficacy of activities that support adoption and skill development in the northern Australia beef cattle industry (i.e. Human capacity and capability).
6. Promoting a whole-of-production systems approach to beef cattle production in northern Australia.

### 1.3.2 Calf wastage in the northern breeding herds

Calf wastage has been defined as the total loss that occurs between confirmed pregnancy and weaning (McGowan *et al*. 2017). It includes losses due to abortion, premature birth and stillbirth (prenatal mortality), calf deaths in the first two weeks after birth (neonatal mortality), and losses of older calves including those associated with branding, dehorning, and castration. Death of pregnant heifers and cows is also a part of calf wastage.

A high level of calf wastage in the northern beef herds was highlighted by the Cash Cow Project in 2014 (McGowan *et al*. 2014), and in 2015 was calculated to conservatively cost north Australian beef business $54M annually (Lane *et al*. 2015). In a quarter of Cash Cow herds, losses between confirmed pregnancy and weaning were at least 15%, three times higher than what could be considered best practice. A 5% reduction in calf wastage in a 3,000AE herd has been estimated to annually increase herd live weight production by 18 tonnes and EBIT by at least $19,000.

The Cash Cow project monitored the performance of 142 breeding mobs over 3 to 4 years. The project demonstrated that the major factors contributing to calf wastage included type of country, failure of cows to lactate in the previous reproductive cycle, mustering pregnant heifers/first lactation cows around the time of calving, exposure to very hot/humid conditions around the time of calving, and grazing wet season pasture deficient in phosphorous. Cash Cow also found that calf wastage was likely to increase significantly, where property owners/managers considered wild dogs a problem, where the prevalence of recent infection with bovine pestivirus was high, and where there was strong evidence of vibriosis.

In 2016−17, an additional MLA funded project Development of candidate management interventions to reduce calf wastage in beef herds in northern Australia, found that there had been little or no systematic evaluation of the impact of management interventions on the incidence of calf wastage or business performance on northern beef breeding herds (McGowan *et al*. 2017). The project identified management interventions, which were most likely to reduce calf wastage:

- improving phosphorus supplementation,
- improving calf husbandry,
- reducing paddock size,
- enhancing mothering,
- improving nutritional management of pregnant yearlings to reduce dystocia, and
- controlling infectious diseases.

The issue of calf wastage has featured in NABRC's Top 10 RDE&A priorities for each of the five years of MLA's Producer Consultation Framework and in the Top 5 for the four years 2017−2020 (ranked 2017 - third, 2018 - first, 2019 -second and 2020 - third). To date, funding has been at the individual project level rather than at the level of a large R&D program that demonstrates positive benefits to both productivity and profitability of integrating management interventions into breeder systems for particular enterprises across a range of production environments.

Projects funded over the last five years under MLA's annual investment call have generally investigated individual interventions and management strategies. They include:

- Investigating the causes of calf loss in extensive pastoral systems – calf watch (B.GBP.0027)
- Reducing calf loss due to exposure (B.GBP.0031)
- The Sweet Spot improving breeder herd performance through optimal pasture utilisation (B.GBP.0029)
- Development and validation of novel tools to assess reproductive traits and improve beef cattle reproductive efficiency (B.GBP.0003)
- Remote calving alert for beef cattle – Technology Development (Phase 3) (B.NBP.1619)
- Paddock Power – increasing reproductive productivity through evidence-based paddock design" (B.GBP.0039)

### 1.3.3 Development of the Northern Breeding Business (NB2) concept

At its meeting in Perth in June 2018, NABRC resolved to promote the development of a strategic research partnership that would be focused on the northern beef industry and largely resident within the NABRC region, i.e. Queensland, the Northern Territory and Western Australia above the Tropic of Capricorn (the Kimberley and Pilbara). Improving the production efficiency of beef cattle in northern Australia, a previously identified potential creative research coalition (see 1.3.1), was the obvious focus of this initiative. A large longer-term collaborative and integrated RDE&A program was viewed as an effective vehicle to address the calf wastage issue in the northern industry.

NABRC and MLA subsequently conducted a workshop on the issue in Brisbane in August 2019, in association with the Northern Beef Research Update Conference. In order to gauge the level of interest from potential partners among the research community, MLA called for expressions of interest (EoIs) in developing a northern Australia strategic partnership to address calf loss. EoIs were called for to address the delivery of an integrated strategy using evidence-based R&D that will improve weaning rates and reduce calf loss to achieve a 4% reduction in lost breeder herd productivity on 500 properties.

In May 2019, the Red Meat Panel endorsed the development of a strategic research partnership which would focus on improving the production efficiency of beef cattle in northern Australia and effectively address the identified issue of calf wastage. In June 2019, NABRC was contracted by MLA (Project No. L.NAB.1903 - Strategic Partnership Development) to initiate development of a strategic partnership to address some of the biggest R&D priorities for Northern Australia, including breeder efficiency and calf loss.

# 2 Project objectives

## 2.1 Project No. L.NAB.1903 – Strategic Partnership Development

### 2.1.1 Objectives of Project Strategic Partnership Development

The purpose of the Strategic Partnership Development (L.NAB.1903) project was for NABRC develop a plan to develop a strategic partnership to address some of the biggest R&D priorities for Northern Australia, including breeder efficiency and calf loss.

The specific objectives of the project were:

1. Hold initial conversations with six current applicants, as well as other relevant partners in Northern Australia to discuss their possible participation and role in the strategic partnership.
2. Conduct a stocktake of the progress of current R&D.

3. Assist in identifying the biggest gaps in R&D, and propose a potential scope for the strategic partnership in the form of key pillars and areas of work, as well as priorities to be covered.
4. Organise an initial workshop with partners to develop and agree on the scope of the strategic partnership.
5. Define the types of measures that would be required to be standardised, and the standards/process of data collection, storage and ownership.
6. Identify a leadership team, in collaboration with MLA, for the strategic partnership.
7. Develop a strategy on a page for the strategic partnership.

These objectives have been addressed numbers #1 to #7 in in parentheses, indicate the objective being addressed.

## 2.2 Northern Breeding Business: NB2

### 2.2.1 Vision

A business focused culture throughout the north Australian beef industry that delivers sustainable, adaptable, resilient and profitable businesses.

### 2.2.2 Objectives

NB2 aims to promote and facilitate:

- Increased and diverse investment in RDE&A for the benefit of the northern beef industry
- Increased and integrated engagement in RDE&A by northern beef producers
- Sustainable increases in productivity and profitability from northern rangeland systems
- Increased conversion of research and development output into industry/business outcomes

The specific objective of NB2 is:
By 2027, return $20M in net benefits per annum to the northern beef industry through increased production of 10M kg live weight of sale cattle.

This will be delivered through up to 250 northern beef businesses engaged with NB2, each with at least 800 AE of cattle (≈13% of an estimated 1,900 businesses), collecting and using objective data to inform business decisions and within the seven year initial life of the program achieving:

- 5% increase in weaning rate,
- 1% decrease in herd mortality rate,
- 10 kg increase in sale weight of cattle at the same age, while operating at a level of production and profit that is sustainable in the long-term.

# 3 Methodology

## 3.1 Interviews

Unstructured face-to-face meetings with each of the Chief Investigators named on the EoIs in calf loss research that were submitted to MLA for the 2019–20 R&D investment call were conducted. The Chief Investigators of relevant current and recent MLA funded research projects, and a number of other relevant strategic persons were interviewed. At each of these meetings, the proposed scope of the strategic partnership was discussed, as were options for a structure and funding model. In the case of the Chief Investigators there was discussion around how those EoIs might inform a focus on the issue of calf loss for the strategic partnership. Persons interviewed are detailed in Appendix 1 (#1).

## 3.2 Stocktake of the progress of current and recent R&D

A significant number of relevant scientific publications and other documentation of research in Australia and overseas, as well as current and proposed research project applications that focussed on the issue of calf wastage in the north Australian beef herd were reviewed. Literature reviews by Australian authors were reviewed as a base to develop an understanding of what knowledge has been gained in the past (Appendix 2) (#2).

There is little relevant new information available on calf wastage in the published international literature, and the bulk of current knowledge on extensively managed herds in northern Australia

resides with the Chief Investigators of the Cash Cow project (McGowan *et al*. 2014). This not surprising given that highlighting this issue was a significant outcome from the Cash Cow project.

In 2017 MLA funded the project "Development of candidate management interventions to reduce calf wastage in beef herds in northern Australia" (McGowan *et al*. 2017). This activity appears to provide the best summary on reducing calf wastage in north Australian beef herds and includes well-developed indicators of potential areas of intervention that are likely to have a positive impact. The proposed interventions are yet to be tested. Ideally, this could be done by implementing custom breeding herd management practices across a range of environments in northern Australia. (#3).

## 3.3 Workshop

In August 2019, a further workshop developed the concept of a strategic research partnership focussed on the northern beef industry and addressing calf wastage in the northern herd (Appendix 3). At that time, the strategic research partnership proposal was given the working title "Northern Breeding Herd Efficiency Coalition", to reflect its broader focus on the northern breeding herd.

Some 30 people attended the workshop, including seven of NABRC's eleven producer Regional Beef Research Committee (RBRC) Chairs, representatives of four universities, two departments of primary industries/agriculture, CSIRO and MLA. Also represented were ten chief investigators of current relevant MLA funded projects or Expressions of Interest in the calf wastage issue from the MLA 2019–20 Annual Investment Call. The workshop agreed to a small working group being formed to further progress the proposal, (#4).

## 3.4 The Working Group

A Working Group was assembled from attendees at the workshop who self-nominated to assist with developing a detailed proposal.

**NB2 Working Group**

- NABRC Chair – Lee Fitzpatrick (Co-ordinator)
- MLA Program Manager – Nigel Tomkins (MLA)
- Researcher 1 – Geoff Fordyce (QAAFI)
- Researcher 2 – Drew Ferguson (CSIRO)
- Researcher 3 – Dave Swain (CQU)
- Extension Officer – Dave Smith (QDAF)
- Producer 1 – Jay Mohr-Bell (KPIAC)
- Producer 2 – Ben McGlynn (BRAC)
- Producer 3 – Andrew Gray (SQBRC)
- Secretariat – Janine King (NABRC)
- Observer - Tim Huggins (MLA)

The Working Group met face-to-face on the 8th October and 25th November 2019, to further develop the NB2 strategic partnership proposal (Appendix 4). In consideration of outcomes from the Workshop and discussions held at these meetings, the Working Group formed the view that broader RDE&A agenda (other than calf wastage) was required to transform northern beef profitability – hence the NB2 themed proposal was developed.

# 4 Results

## 4.1 The structure of NB2

The proposed NB2 strategic RDE&A partnership proposes to embed north Australian beef businesses in the core of its management, execution and delivery of outcomes (Figure 1).

There are two key elements to the NB2 structure:

1. An adoption focus through its Pathway to Practice pillar that actively engages northern beef businesses in the collection and use of objective data to inform business decisions and provides a direct conduit from research and development outcomes to changes in business practice.
2. A Management Committee led by an independent Chair with extensive experience in the northern beef industry and two northern beef producer representatives.

The core business of NB2 will be built on four pillars:

- Pathway to Practice
- Herd
- Feedbase
- Environment

Each pillar will be led by a producer collaborator and an RDA professional (with a record of achievement and leadership in the area).

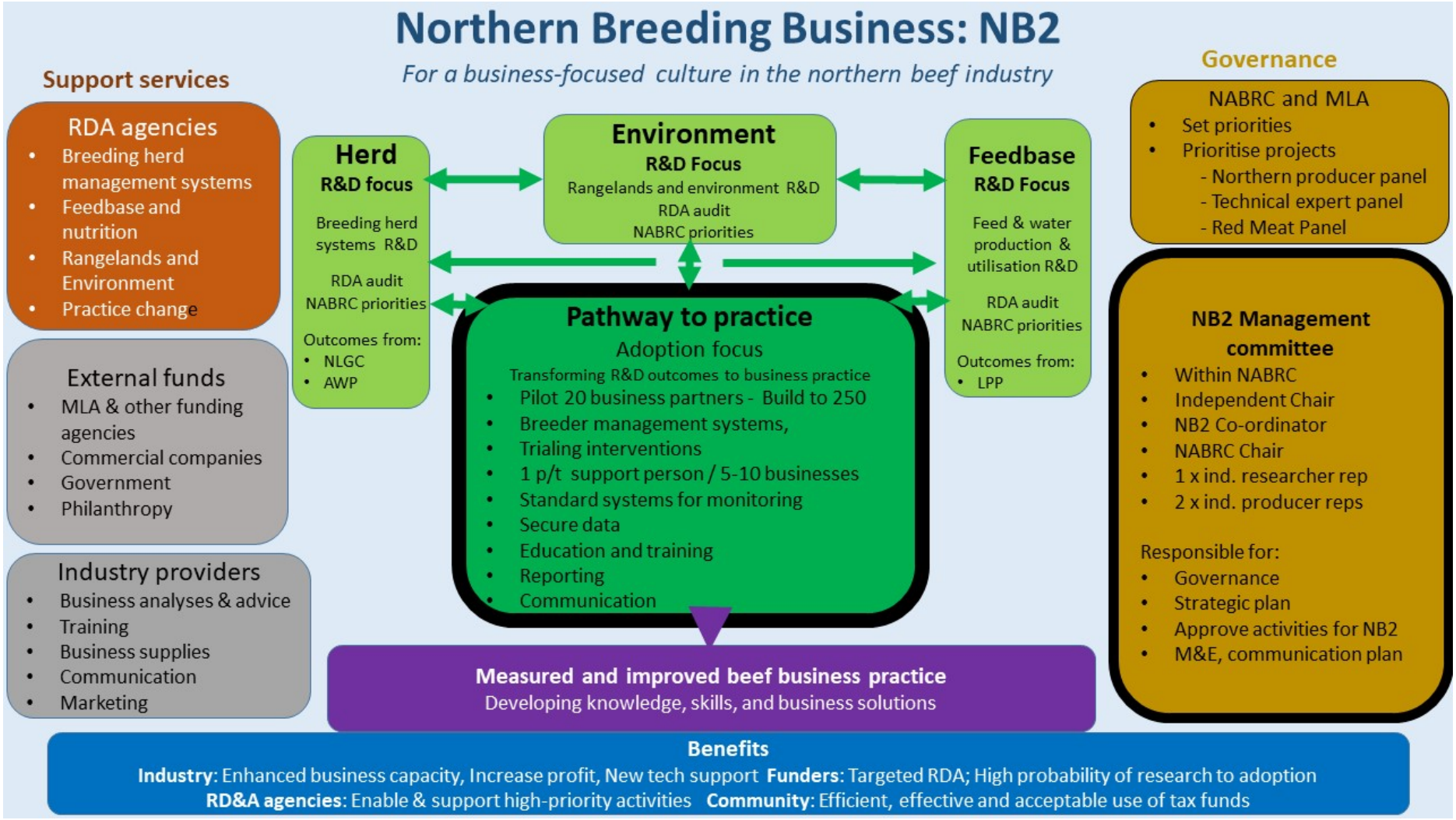
### 4.1.1 Pathway to Practice

Programs which incorporate a long-term, hands-on, experiential and supported learning approach with associated coaching have been shown to be highly effective in achieving practice change and adoption on farm. (Fitzgerald and Bewsell 2016, Sobotta *et al*. 2016, Cooreman *et al*. 2018). The focus of the Pathway to Practice pillar is adoption and practice change, led by producers for producers, thereby maximising the opportunity for peer-to-peer communication as the primary method of creating, acquiring, testing and implementing innovations. While it will have a much smaller R&D component than the Herd, Feedbase and Environment pillars, Pathway to Practice is about:

- identifying needs and transforming R&D outcomes to business practice through trialling interventions,
- adapting management systems to particular 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.

Engagement with social scientists, particularly behavioural scientists, in the start-up phase of NB2 will be important to the success of adoption and behaviour change activities in the Pathway to Practice pillar of the strategic RDE&A partnership. Such engagement would also facilitate the exploration of other adoption models.

**Figure 1: The structure of NB2.**
The two elements of NB2: the Pathway to Practice pillar and the producer involvement in its governance through the NB2 Management Committee, are enclosed in bold black boxes.



Pathway to Practice will support north Australian beef businesses to:

- Collect and analyse standard beef business records to establish baselines for achieving production, performance and financial outcomes that are sustainable in the long term
- Promote and support awareness, development and adoption of business practice innovations
- Set direction for, and engage in, on-property R&D as determined through needs within the program (R&D based on producer-identified priorities).

The vehicle for achieving business practice change will be through the establishment of RDE&A-ready collaborative producer reference groups (business partners). In the start-up phase of the program, this approach will be piloted with 20 business partners who have agreed to participate in the on-farm research, development, education, training and (or) adoption activities. This participation would require a commitment at a scale that could range from cohort/management group to whole-of-herd, and resources to service these activities. Regional diversity in this pilot will be important, for example, four groups of five beef business partners across northern Australia – one in the Kimberley, one in the NT and two in Qld.

Over the proposed seven-year life of the program, collaborating producers engaged with the program will be expanded to 250 beef businesses. They will be supported by one beef producer co-ordinator per five to ten businesses, employed part-time to assist collaborators with the activities required by the program. For the first three years following establishment, traditional agricultural department extension staff or consultants will support each reference group. In the initial years of the NB2 program, there will be a need to direct resources towards developing this capacity while additional support will be available from the NB2 Co-ordinator and the Pathway to Practice leader.

The Pathway to Practice pillar will offer a framework for industry to become more astute in business decisions by collecting and analysing standardised beef enterprise data to establish baselines for their own businesses and help to build regional targets for productivity and performance. In order to establish baseline levels of performance at the start of the program and demonstrate the impacts on productivity and profitability from management interventions or technology adoption, collaborating business owners will be required to implement and maintain a standard set of basic business monitoring practices. Specific training or assistance will be provided by the NB2 program, as required. Such activities could include Business EDGE, Breeding EDGE, Nutrition EDGE, Grazing Land Management programs (EDGE 2020), Profitable Grazing Systems (PGS), or the engagement of a business/financial advisor or consultant. In addition, the NB2 program may need to direct resources towards developing a web-based tool similar to Dairy Australia's Dairy Base to enable beef producers to measure and analyse their business performance over time (Dairy Australia 2020).

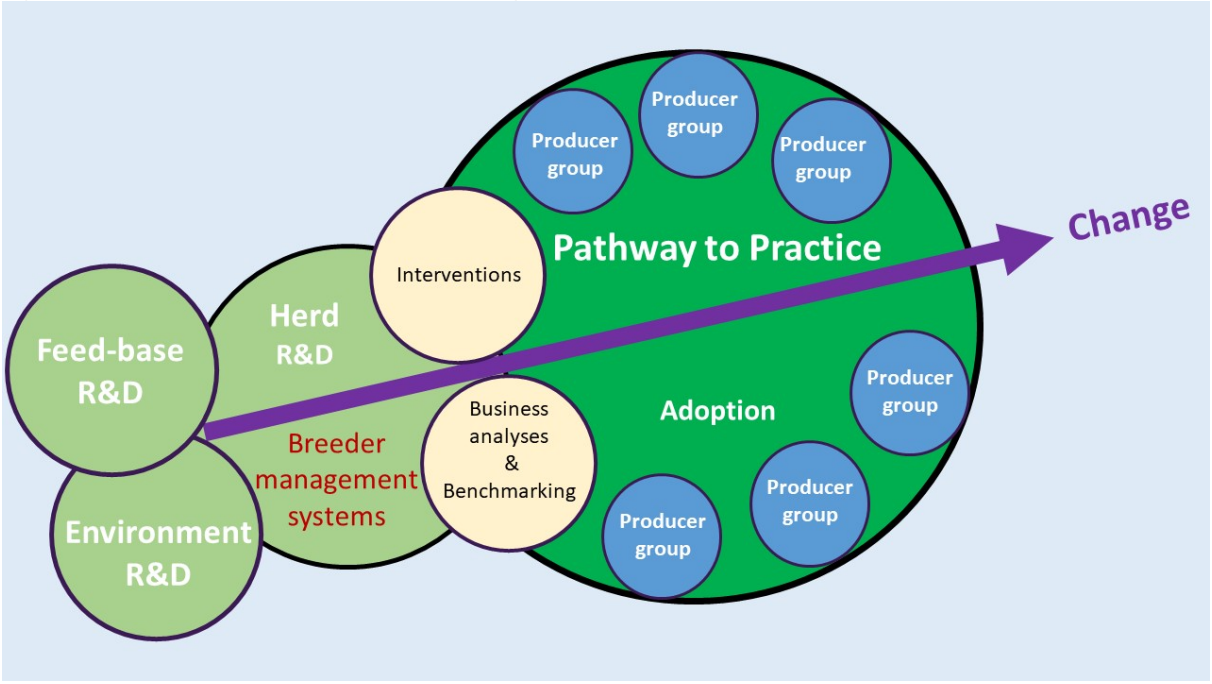
The first stage of this adoption pillar will involve a detailed business analysis to identify opportunities for interventions. Without this, no alternate interventions could be considered unless their benefit is proven or obvious. Pathway to Practice will require the R&D focussed pillars of NB2 (Herd, Feedbase and Environment) to deliver relevant alternate practice options for consideration. These will be derived from previous R&D outcomes, and from current and future research. The Northern Australia Beef Systems Analyser (NABSA), which is now incorporated into the Crop Livestock Enterprise Model (CLEM 2020), could be utilised to model the productivity, profitability and sustainability potential of any proposed management or technology interventions (Ash *et al*. 2015).

Pathway to Practice businesses will be well-positioned to access education, training and research opportunities, and will attract other providers such as government and Natural Resource Management (NRM) bodies who may provide additional funding for RDE&A activities. The advantage of creating Pathway to Practice is that much more accurate assessment of potential effects on a business will be

seen directly and more quickly. Collaborative businesses will be well positioned to host additional NB2 herd, Feedbase or environment research and, given the embedded standard business monitoring within these beef enterprises, it will expedite the establishment and impact monitoring of any new collaborative R&D.

The NB2 producer groups will align with and contribute to the MLA Profitable Grazing Systems (PGS) program (PGS 2020). In addition, some selected Pathway to Practice businesses throughout northern Australia may host MLA supported integrated PDS activities (PDS 2020), demonstrating the outcomes of NB2 facilitated R&D projects in real-life on-property environments.

**Figure 2: An illustration of the RDA flow through NB2.**




North Australian beef business engaged with NB2, having identified their needs through detailed business analyses, will "pull" appropriate research and development outcomes from the Herd, Feedbase and Environment.

### 4.1.2 Herd, Feedbase and Environment

Targeted R&D will be conducted in the Herd, Feedbase and Environment pillars. The Herd pillar will focus on enhancing breeding herd performance through improved management systems and interventions. The Feedbase pillar will also have a focus on optimising feed production, supply and utilisation for the breeding herd in order to achieve the desired performance, in a cost-effective manner. The Environment pillar will explore issues related to the managing the rangelands and the environment, and the long-term sustainability of the northern beef industry.

For each of these pillars, an audit of published literature will be conducted to identify proven technologies and management practices of potential benefit to the northern industry, that have not been widely or effectively adopted. Candidate technologies and management practices will be assessed for incorporation into integrated custom breeder management systems or for further R&D, as indicated.

While there are current R&D projects addressing some areas of work, more may be required to either fully address them or to facilitate successful adoption of outcomes. Addressing these identified R&D

priorities more effectively could provide an immediate program of work for the NB2 strategic partnership, for example:

For Pathway to Practice
1. Develop pathways to efficiency: performance recording, business analysis, identification of attainable levels of performance

For Herd
1. Whole farm systems for managing breeder productivity
2. Rapid dissemination of superior genetics

For Feedbase
1. Use of remote sensing to assist grazing management
2. Adoption of new pasture species

For Environment
1. Sustainable development to support increased productivity and profitability

In addition, R&D projects that address future NABRC R&D priorities relating to the breeding herd and approved for funding by MLA's Red Meat Panel could be managed through NB2, with their outcomes evaluated from a whole of business performance perspective through the Pathway to Practice pillar. Finally, through NB2, relevant outcomes from other strategic R&D partnership such as the NLGC, LPP and the AWP could be assessed via the collaborative partnerships established under the Pathway to Practice pillar. Given the embedded business principles and benchmarking, these partnerships should prove to be the ideal vehicle for facilitating adoption in northern beef systems.

Any RDA project targeting northern Australia and requiring support from MLA or NABRC, or any other funder's project that wishes to use the industry infrastructure available through NB2 will be subject to endorsement by the NB2 management committee as well as that of the funding body, thus:

- A high level of industry ownership will be maintained
- A suitable framework is established for other entities to fund RDA, e.g. government agencies, corporations.

A Strategy on a Page for NB2 is presented in Figure 3.

### 4.1.3 Carbon and carbon accounting

The NB2 program will contribute to the beef industry's ambitious goal to be carbon neutral by 2030 (CN30). This will largely be achieved through productivity and efficiency gains in herds (Davison 2015), such as:

- increase in the weight-for-age of the herd;
- reduction in the average age of the herd;
- reduction in the proportion of unproductive animals in the herd; and(or)
- reduction in herd mortalities.

## 4.2 Funding and budget

It is proposed that funding will be made up of a combination of:

- Levy funds from the MLA Beef Production budget (R&D) – $1M per annum*
- Levy funds from the MLA Producer Adoption budget (Adoption) – $1M per annum
- Levy funds from the MLA Producer Adoption budget (Adoption) – $1M per annum*

- Cash investment from research providers & other industry stakeholders – $1M per annum*
- Matched funds through the MLA Donor Company (MDC) – notional $1M per annum*

$4M per annum for 7 years = $28M program of work*.
(* indicative only)

A detailed budget will need to be developed during the Start-up phase (first 18 months) of NB2 (Table 2, p29).

## 4.3 Benefit:cost analysis

The NB2 partnership intends to deliver a seven-year program to achieve a 5% increase in weaning rate, a 1% decrease in herd mortality rate, and a 10 kg increase in sale weight of cattle at the same age. The program aims to operate across 250 northern beef producers, each with at least 800 AE of cattle.

Data from Table 1 has been used to calculate the increase in beef produced per AE from the identified goals of NB2 (Table 2).

**Table 2:** Total kg of live weight/AE generated by a 5% increase in weaning rate; a 1% decrease in herd mortality rate; and a 10 kg increase in sale weight of cattle at the same age.

| Variable | Kg live weight/AE response per unit change | Proposed change | Kg live weight /AE response to proposed change |
|---|---|---|---|
| ↑ reproductive % | 1.50 | 5% | 7.50 |
| ↓ mortality % | 2.28 | 1% | 2.28 |
| ↑ sale weight (kg) | 0.18 | 10 kg | 1.80 |
| **Total** | | | **11.58kg live weight / AE** |

Table 3 summarises the potential increase in income generated in north Australian beef herds with >800 AE of cattle (≈2,917) if they successfully achieve the NB2 objectives of a 5% increase in weaning rate, a 1% decrease in herd mortality rate, and a 10 kg increase in sale weight of cattle at the same age.

**Table 3**: Increased income generated per by an estimated 2,917 herds with >800 AE, from a 5% increase in weaning rate; a 1% decrease in herd mortality rate; and a 10 kg increase in sale weight of cattle at the same age.

| Herd size (AE) | Avg. AE | Income per kg | New kg live weight/AE | Total income improvement per herd | No. of herds | Total ↑ kg of live weight produced/year | Total ↑ income/year |
|---|---|---|---|---|---|---|---|
| 200-800 | 540 | $2.06 | 109 | $8,915 | 2,851 | - | - |
| 800-1,600 | 1,372 | $2.00 | 108 | $21,990 | 1,314 | 14,447,751 | $28,895,503 |
| 1,600-5,400 | 3,295 | $1.99 | 107 | $52,548 | 1,309 | 34,565,739 | $68,785,821 |
| >5,400 | 14,584 | $2.06 | 79 | $240,766 | 294 | 34,361,710 | $70,785, 123 |

I. McLean *pers comm.*

The largest impact of the proposed NB2 program will be on larger herds of Queensland, the Northern Territory and the north of Western Australia. The benefit:cost ratio for the proposed NB2 program has been calculated based on at least 50 herds of 800 to 1,600 AE, and 200 herds of >1,600 AE engaging with NB2, to reflect the smaller average herd size found in southern Queensland.

- For 50 of 1,372 herds (4%) of 800 to 1,600 AE, Total increase in income per year = $1,155,820
- For 200 of 1603 herds (13%) of 1,600 to >5,400 AE, Total increase in income = $18,144,223
- Total increase in income for 250 herds = $19,300,043

A notional $4M per annum expenditure over 7 years ($28M) returns $19.3M per annum over the subsequent 7 years ($135M) to give a Benefit : Cost = $135M : $28M = 5:1.

## 4.4 Governance

### 4.4.1 NB2 Management Committee

A Management Committee, established as a sub-committee of NABRC Inc., will be responsible for:

- Oversight of activities
- Risk analyses
- Monitoring, Evaluation, Review, Improvement (MERI) framework
- Oversight of Communication and Adoption Plans

The proposed makeup of the Management Committee is as follows:

**NB2 Management Committee**
Independent Chair
NB2 Co-ordinator
NABRC Chair
MLA representative/s
1 x Independent researcher representative
2 x Independent producer representatives (#6)

Key Selection Criteria for the Management Committee appointments are proposed in Appendix 5.

### 4.4.2 The MLA Northern Producer Panel

The MLA Northern Producer Panel, which is made up of the Chairs of NABRC's Regional Beef Research Committees, will be utilised by **NB2** to evaluate preliminary RDE&A proposals for industry relevance and potential impact, in a similar manner to the MLA Annual R&D Investment Call.

### 4.4.3 MLA Expert Panel

It is recommended that the MLA Expert Panel will be utilised by NB2 to evaluate the technical merit of full RDE&A proposals, in a similar manner to the MLA Annual R&D Investment Call.

### 4.4.4 The MLA Red Meat Panel

The MLA Red Meat Panel will be utilised by NB2, in a similar manner to the MLA Annual R&D Investment Call, to provide a final recommendation to MLA on the funding of RDE&A proposals.

### 4.4.5 NB2 RDA Co-ordination Group

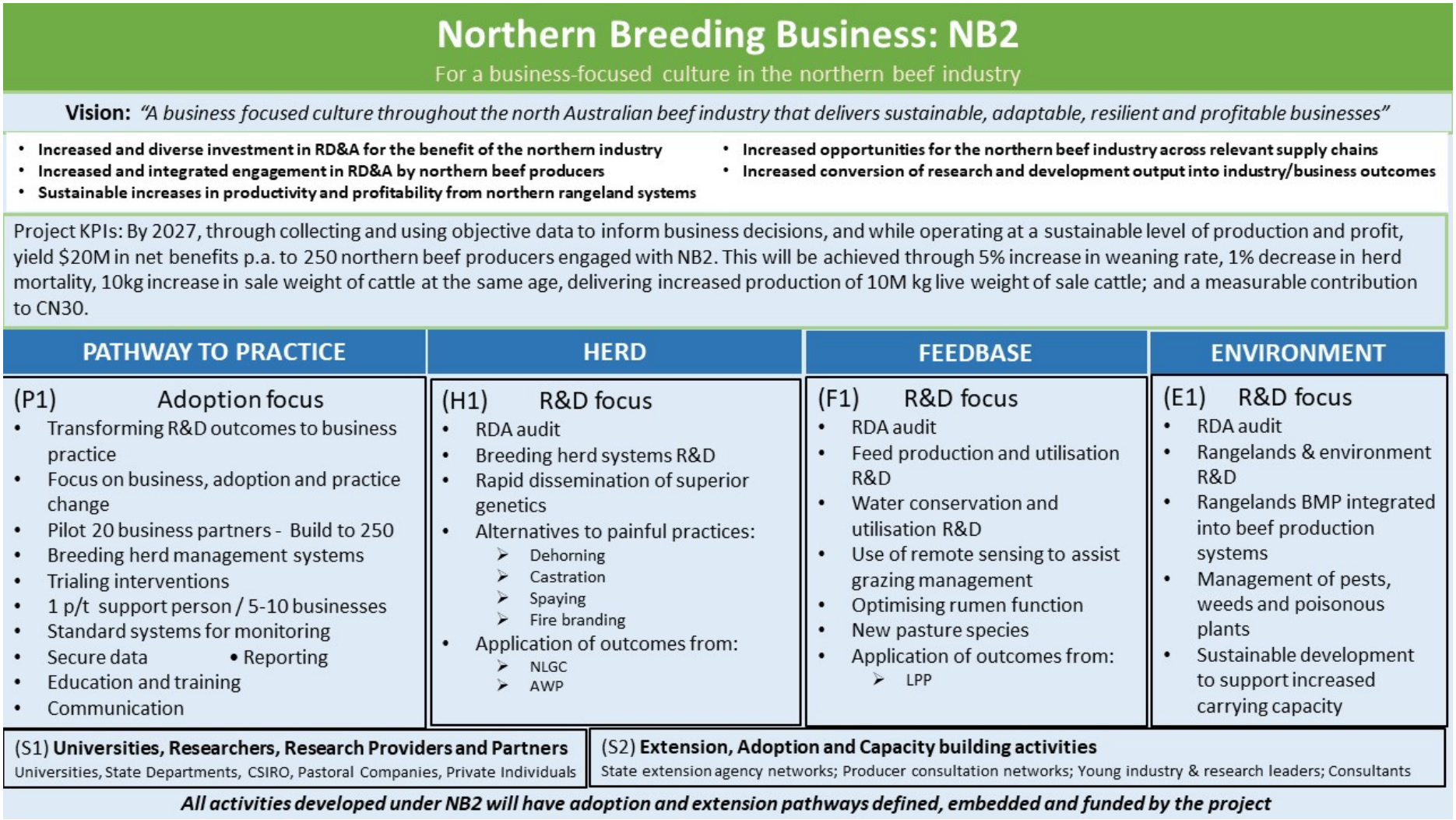
An RDA Co-ordination Group, funded from NB2 project funds will be engaged to oversee the integration and co-ordination of the activities of the stakeholder partners; research, development, education, extension and adoption providers; and collaborators. The proposed makeup of the RDA Co-ordination Group is as follows:

**NB2 RDA Co-ordination Group**

- NB2 Co-ordinator (Chair)
- MLA Program Manager – Adoption

- 4 x collaborating Pathway to Practice beef business partners from the NB2 program
- The 4 x component RDA activity leaders from the NB2 program:
    - Pathway to Practice,
    - Herd,
    - Feedbase,
    - Environment.

**Figure 3: Northern Breeding Business: NB2 – Strategy on a page**



## 4.5 Stakeholders

In addition to MLA and NABRC, potential stakeholder partners in the NB2 strategic partnership include, but are not limited to:

- NABRC members
  - State and territory departments
    Queensland Department of Agriculture and Fisheries (QDAF)
    Northern Territory Department of Primary Industry & Resources (NTDPIR)
    Department of Primary Industries & Resources, Western Australia (DPIRD)
  - Government research agencies – CSIRO
  - Universities
    University of Queensland (UQ)
    Central Queensland University (CQU)
    James Cook University (JCU)
    University of Western Australia (UWA)
    Queensland University of Technology (QUT)
    University of Sydney (USyd)
    University of Melbourne
- Other non-NABRC member universities
- Pastoral companies
- Agricultural technology companies
- Agribusiness and AgPharm companies
- NRM agencies
- Consultants
- Private individuals
- Other stakeholders in the northern beef industry,

## 4.6 Data

### 4.6.1 Standards and process of data collection, storage and ownership

The integrity of data and its analyses, are critical for decision making to be useful. All participants in NB2, researchers, co-ordinators, collaborating producers and business advisors will be required to collect and store prescribed data and information in a standard format and manner, to be defined during the start-up phase of the strategic partnership. All data collection, storage, analysis and use will be compliant with the national Farm Data Code (2020).

Data, while remaining confidential and in the ownership of the relevant researcher or collaborating producer, will be stored centrally in a secure database. The physical location and management of the database will be determined during the start-up phase of NB2, however, there may be an opportunity for NB2 to engage with the Integrity System Company's MLA Data Platform (I. Sobotta *pers comm*.). Annual outputs will provide each partner business with up-to-date analysis of the productivity and profitability of their herd and business, including analyses of the efficacy of systems used or being evaluated, by comparing with like businesses. This information will form a basis for discussion groups to share experiences and findings. Where appropriate, and with approval of the owners, data that has been de-identified at the enterprise level, could be made available to NB2 collaborators.

### 4.6.2 Data to be collected from collaborating beef enterprises

Holmes & McLean (2017) define a good beef business as one that at least:

- Generates a return that meets or exceeds its cost of capital
- Funds all current operating expenses and operational capital expenditure through internally generated working capital
- Remunerates its owners adequately, at least to the standard of the average wage earner
- Maintains a 'safe' level of equity (suggested 85% equity or greater)
- Survives and prospers in the long-term without the erosion of environmental capital (environmental sustainability)

The proposed data to be collected by northern beef production enterprises that choose to engage with the NB2 strategic partnership are listed in Appendix 6.

## 4.7 KPIs and outcomes for collaborating beef enterprises

The primary KPIs for enterprises engaged with NB2 are:

Production: Annual live weight production (kg) / AE
Profitability: EBIT/Value of assets ($)
Sustainability: Appropriate metrics need to be identified or developed.

Secondary KPIs include:

- For each primary animal class, where relevant:
    - annual growth (kg)
    - survival (%)
    - pregnancy rate, where applicable (%)
    - calf wastage, where applicable (%)
    - market value ($/kg)
    - body condition distribution (mean score)
- fixed costs ($/AE)
- variable costs ($/AE)
- land condition summary
- pasture production and quality summaries.

Table 5 lists the questions that northern beef enterprises that have engaged with NB2 should be able to effectively answer by the end of 2027, along with the resources required to enable them to do so.

**Table 4:** Questions that northern beef enterprises that have engaged with NB2 should be able to effectively answer by the end of 2027, along with the resources required to enable them to do so.

| Question | Resources required to answer the question |
|---|---|
| • Can you articulate what your core business is, and why your enterprise is the most suitable for your location, scale and long-term aspirations? | Business objectives<br>Analysis demonstrating superiority of primary business strategy |
| • Do you know what the key profit drivers, within management control, are for your enterprise? | Sensitivity analyses to show relative impact of variation in all secondary KPIs on production and profit |
| • What strategies do you have in place address those drivers? | All management options listed with their contribution to each secondary KPI |
| • How are you measuring enterprise performance? | Measures made listed against each secondary KPI |

| | |
|---|---|
| • Have you ever benchmarked the production and financial performance of your business against your peers? | All KPIs listed over years against data from comparable businesses |
| • Do you know your long-term carrying capacity, can you demonstrate that your stocking has been in line with this environmental limit and that land condition is maintaining or improving? | LTCC calculated<br>Annual herd inventory compared to LTCC and short-term carrying capacity (seasonal) annually<br>Land condition summary each year |
| • Do you have a working understanding of the seminal and timeless research that has been done of relevance to your region/ production system/ enterprise? | List of known industry and scientific research recommendations with comments on application and potential value to the business |
| • Do you have a process to keep up to date with current research? | List of known industry and scientific research recommendations |
| • Do you invest in professional advice across the key aspects of your business and invest in your own continuing professional development? | Annual summary of the cost of business advice and of investigation of industry and scientific research recommendations |

(after Holmes and McLean 2019)

## 4.8 Timetable

An indicative timetable for the establishment and implementation, delivery and review of the proposed NB2 research, development and adoption strategic partnership is set out below.

**March 2020** – Final report on NB2 proposal submitted to MLA.
If endorsed:

| | |
|---|---|
| January 2021 – June 2022 | Start-up phase |
| June 2022 | Stop/go |
| July 2022 – December 2023 | Implementation phase |
| September 2023 – December 2023 | Internal review |
| September 2025 – December 2025 | External review |
| September 2027 – December 2027 | Closure or extension |

A timeline and work plan for the first 18 months of NB2 is presented in Table 4.

**Table 5: Timeline and work plan for the first 18months of NB2 Activities**

**January 2021**

**January 2021 – Start-up**

- Appoint NB2 Co-ordinator
- Recruit RDA partners
- Contract (12 month) Pathway to Practice, Herd, Environment and Feedbase leaders
- Develop detailed budget for Years 1-3
- Produce NB2 Investment Prospectus
- Develop NB2 RDA Strategic Plan, M,E& R and Communications plan
- Recruit producer co-ordinators and facilitators
- Collect baseline data from collaborating herds
- Develop and implement custom breeder management systems for collaborating herds
- Contract relevant R&D agencies
- Appoint independent Management Committee Chair
- Establish Management Committee
- Establish RDA Leadership group
- Establish governance plan
- Undertake audit of past R&D
- Define base data to be collected and standard systems for monitoring
- Recruit 20 beef businesses Pathway to Practice pilot partners in 4 groups [1 in WA, 1 in NT, 2 in Qld]
- Provide training as required for beef business partners, co-ordinators, and facilitators
- Identify existing MLA Adoption programs (eg PGS, EDGE etc) which align with NB2 and the gaps.

**June 2022 – Stop/go**

- Analyse baseline data for pilot herds
- Continue data collection
- Recruit additional beef businesses, co-ordinators and facilitators
- Implement custom breeder management systems on beef businesses
- Hold annual NB2 participant meeting

**January 2022**
**January 2023 –** Internal review
**January 2024**
**January 2025 –** External review
**January 2026**
**September 2027 – December 2027:** Closure or extension

**December 2027**

# 5 Discussion

The Northern Breeding Business: NB2 strategic RDE&A partnership proposal, will address a number of identified RDE&A issues that, while continuing to be of importance to the northern beef industry, have not been effectively addressed to date.

There have been three main drivers of the proposal:

1. A failure to address the identified issue of a high level of calf wastage in the northern breeding herds through the MLA Annual Investment Call.
2. The acknowledged relatively poor rate of uptake or adoption of outcomes from R&D by the northern industry, over many years.
3. Objective evidence that the majority of northern beef enterprises are not economically sustainable in the long term.

Through the Workshop (see 3.3) and meetings of the Working Group (see 3.4), development of the NB2 proposal has brought together a group of producers and researchers, with substantial records and experience in the northern beef industry, to focus on a way forward in addressing these issues. The primary outcome is a partnership approach in which producers take a leadership role in RDE&A for the benefit of their industry, in collaboration with researchers, extension personnel and private consultants/advisors. This will break down the barriers between effective Research, Development and Adoption by embedding north Australian beef businesses in the core of management and delivery of RDE&A outcomes (see 4.1.1).

The potential impact of NB2 lies in its Pathway to Practice pillar, which nurtures peer-to-peer communication as the primary method of creating, acquiring, testing and implementing innovation. In addition, Pathway to Practice is built around business outcomes by providing a framework for beef enterprises to establish base-line levels of performance, through detailed analysis of their business, that will not only aid in the identification of issues and opportunities, but also facilitate objective assessment of the effects on the sustainable productivity and profitability of any interventions or innovations.

### 5.1.1 A high level of calf wastage in the northern breeding herds

The NB2 strategic partnership will address the issue of calf wastage in northern breeding herds that was highlighted by the Cash Cow project (McGowan *et al*. 2014) by encouraging the implementation of custom designed breeder herd management systems in collaborator herds. A number of management interventions have previously been identified to be the most likely to practically and economically reduce calf wastage (McGowan *et a*l. 2017), and should be given due consideration in the design of any breeding herd management system. However, for some herds, more specific interventions may be indicated on a case-by-case basis, e.g. the provision of shade during calving for herds on open downs country.

The collection of baseline objective performance data and ongoing annual business analyses of the breeding herd performance will highlight beneficial outcomes from a breeding herd management system approach and facilitate adoption among peer groups.

### 5.1.2 A poor rate of uptake or adoption of outcomes from R&D

The poor rate of adoption has been a long-standing issue for the northern beef industry – most recently highlighted by the Northern Australian Beef Industry Situation Analysis (Chilcott *et al*. 2019). The NB2 strategic partnership offers an active pathway from research outcomes to business practice and promoting ownership of breeding herd RDE&A by beef businesses in northern Australia.

The Pathway to Practice is about actively engaging northern beef businesses in the collection and use of objective data to inform business decisions and provide a direct conduit from research and development outcomes to changes in business practice. It will do this by establishing RDE&A-ready collaborative producer reference groups initially in a pilot of four groups, each with five producers, who have agreed to participate in business analysis, on-farm R&D, education, training and(or) adoption activities. Each group will be supported by a producer co-ordinator and have access to a State agricultural department extension officer or private consultant facilitator. Over the proposed 7-year life of NB2 up to 250 beef businesses across northern Australia, in groups of approximately 10, will be engaged with the program. The incorporation of beef producers into the leadership and delivery of the NB2 program and its RDE&A activities will promote, facilitate and achieve more rapid and effective adoption of proven innovations and technologies than has been the case in the past.

### 5.1.3 Improving the long-term profitability of the majority of beef businesses

A number of reports and reviews have indicated that many northern beef businesses are currently not making sufficient profit to be economically sustainable, and the top 25% of beef businesses are producing all industry profits at the production level (see 1.1). In general the industry lacks profitability and financial well-being at the producer level (Holmes and McLean 2017).

In addressing its vision of "A business focused culture throughout the north Australian beef industry that delivers sustainable, adaptable, resilient and profitable businesses", NB2 aims to demonstrate a whole-of-business approach to managing a beef breeding enterprise. This will be achieved through collection, analysis and interpretation of objective data on breeder herd performance which will allow producers to make better informed decisions on issues that impact on productivity and profitability. While there may be an identified 10-fold difference in the long-term profit per AE between the average and the top 25% of beef production enterprises, the factors that separate the top performers are consistent (Holmes and McLean 2017). The top performers have higher income per animal unit as a result of improved herd productivity, achieved through better performance in the three productivity drivers of northern beef breeding herds: higher reproductive rates; lower mortality rates; and higher sale weights.

The relatively low hanging fruit of increased productivity are the focus of the NB2 objective to deliver $20M in net benefits per annum for up to 250 northern beef producers by 2027, through collecting and using objective data to inform business decisions. At an individual herd level, 5% increase in weaning rate, 1% decrease in mortality rate and 10kg increase in sale weight at the same age may appear to be relatively modest objectives, however, their impact on the productivity of the herd and contribution to increased profitability is significant (see 4.3).

### 5.1.4 A need to increase and diversify the sources of RDE&A funding

The majority of current funding for RDE&A for the northern beef industry comes from grass-fed beef transaction levies administered by MLA, and the co-investment of R&D providers. In recent years, increasingly RDE&A investment funds are coming from private, corporate and institutional sources with a proportion of those that qualify, attracting matching federal government funds through the MLA Donor Company (MDC).

There is an urgent need for increased funding for RDE&A for the benefit of the northern beef industry. Recent long-term drought across much of eastern Australia and the impact of recent flood and bush fire events limit any increase in the available levy funds in the short to medium terms meaning the industry needs to look to other sources to fund its RDE&A activities.

As the NB2 proposal focuses on issues that have been pressing on the northern beef industry for a number of years, NB2 will create an attractive environment for increased private, corporate,

institutional and governmental, as well as potential philanthropic investment. While NB2 will initially require a proportion (up to 25%) to establish itself, it is likely that over the life of the program the balance will swing away from levy funding towards alternative sources matched with MDC funds.

### 5.1.5 The value proposition

The proposed NB2 strategic RDE&A partnership will require a substantial investment over a number of years to achieve its objectives. It does offer a significant value proposition for the northern beef industry (see 4.3).

While NB2's stated objectives of increased productivity may appear to be quite modest at an individual beef enterprise scale, when extrapolated to a whole-of-industry scale, they are potentially transformational for the northern beef industry and likely to make a significant contribution to the Red Meat 2030 priorities (RMAC 2019).

For a notional $4M per annum investment, after 7 years NB2 will return at least $19M per annum over the subsequent years.

The benefit : cost for NB2 = $19M : $4M = 5 : 1

### 5.1.6 Additional benefits of NB2

Among the less obvious benefits of a program of the scale and geographic spread of NB2 are the educational, training and mentoring opportunities that it can provide and accommodate for early career beef cattle producers, managers, students, graduate students, extension officers, animal scientists, agronomists, veterinarians, animal scientists, researchers and consultants. An issue that has been highlighted for the industry, is a looming shortage of trained personnel in many of these roles as incumbent staff approach retirement (McDonagh 2016). NB2 could make a significant contribution to addressing this issue.

### 5.1.7 Northern Australia Beef Situation Analysis

The NB2 proposal effectively addresses a number of recommendations of the Northern Australian Beef Industry Situational Analysis (Chilcott *et al*. 2020).

**Theme 1 Findings:** There is a need to improve the translation of proven R&D to farm practice for the majority of the northern Australian beef industry.

Recommendations:

1. At an individual property level, significant improvements in productivity and profitability could be achieved by applying existing R&D,
2. A key challenge is translating research into practice as rates of industry adoption are low. Increased investment in innovative ways of transforming practice change and integrating this into business operations throughout the supply chain is recommended.

**Theme 2 Findings:** There is an ongoing need for R&D for profitability and productivity gains for the top businesses.

**Theme 3 Findings:** There is a need to support the northern Australian beef industry to transform from its current state to a higher productivity state and ensure future viability.

### 5.1.8 Red Meat 2030

The NB2 proposal will make a significant contribution to Red Meat 2030, particularly for the indicators highlighted below (RMAC 2019).

**Our People**

Objective for 2030: People see being part of the Australian red meat and livestock industry as attractive now and into the future.

Indicators:

1. Substantial increase in adoption rates by doubling the percentage of project funding for extension.
2. Workforce turnover rates have decreased resulting in a more stable workforce.
3. Application response rates have increased helping us find the people we need to meet workforce demands.
4. Training and upskilling rates have increased ensuring we have the skills we need and
5. The diversity of our industry has increased making it a more inclusive place to work.

**Our Livestock**

Objective for 2030: We set the standard for world-class animal health, welfare, biosecurity and production science.

Indicators:

1. We are recognised as the world-leaders in animal health, welfare and production practices.
2. Understanding and use of Estimated Breeding Values (EBVs) have increased, enhancing our productivity and Return on Investment (ROI).
3. Customers, consumers and community approval and trust in our animal health and welfare practices has increased.
4. Industry responsiveness to biosecurity risks to our livestock has increased due to effective industry mitigation and management strategies.

**Our Environment**

Objective for 2030: We demonstrate leadership in sustainability, delivering on community expectations in the areas of land, water, biodiversity, climate variability and biosecurity.

Indicators:

1. Our industry's net carbon emissions have been reduced resulting in carbon neutrality by 2030,
2. Customers, consumers and community approval and trust in our environmental management and stewardship has increased,
3. We are recognised globally as world leaders in agricultural environmental management and stewardship practices,
4. Sustainability frameworks are a driving force for practice change.

# 6 Conclusions

## 6.1 Northern Breeding Business: NB2

The NB2 strategic RDE&A partnership proposal is a way forward to address many of the key issues that impact on, threaten or limit the potential of the northern beef industry. Its derivation is a prime

example of the power of group thinking, and a demonstration of what can be achieved when a group focus on a shared common goal – to facilitate significant change for the long-term benefit of the north Australian beef industry.

Some of the potentially high-impact highlights of the NB2 proposal include:

- Embedding producers in the conception, delivery, management and governance of NB2 will deliver ownership of RDE&A to beef businesses in northern Australia, leading to more effective uptake of 'field' proven out-comes, and demonstrating a more effective pathway from research and development to business practice.
- The widespread adoption of a more business focused approach by northern beef enterprises, based on the collection and analysis of objective data, will lead to long-term sustainable increases in productivity and profitability from the northern rangelands that are the powerhouse of the beef industry.
- Relatively modest and readily achievable increases in productivity can have a significant positive impact on the profitability of a beef enterprise. The proposed target increases in productivity for beef businesses that engage with NB2, while relatively modest at an individual enterprise scale, are potentially transformational for the whole of industry.
- The identified issue of calf wastage in the northern beef industry, which was an initial driver of this initiative, will be addressed by NB2 through the development, promotion and implementation of breeding herd managements systems that have been custom designed for beef enterprises in their specific environments.
- The value proposition of the NB2 proposal is attractive, with a minimum 5:1 benefit: cost ratio.
- A notional five times return for the northern industry on investment will likely make NB2 an attractive proposition for industry stakeholders, increasing the likelihood of private, corporate, institutional and government investment in the program, and thus diversifying the sources of RDE&A funding.
- Through the potential to attract alternative investment in RDE&A activities, the NB2 program offers a vehicle to effectively address producer driven R&D priorities that have been identified by the MLA Consultation Framework.
- A program on the scale and duration of NB2 offers significant education, training, career development, mentoring and employment opportunities for people entering or already engaged in the northern beef industry.

# 7 Recommendations

1. That the scope of the Northern Beef Business: NB2 strategic R&D partnership as outlined in this Final Report be approved, in principle
2. That the Start-up phase of NB2 (first 18 months) with appropriate budget be endorsed
3. That a Chair of the Management Committee be appointed
4. That a Co-ordinator of the NB2 strategic partnership be appointed
5. That the Management Committee of the NB2 strategic partnership be convened
6. That the Start-up phase of the NB2 strategic partnership be implemented as soon as possible in 2020.

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# 9 Appendices

**Appendix 1: Details of face-to-face meetings**

Details of the face-to-face meetings held with each of the Chief Investigators named on the Expressions of Interest (EoIs) in calf loss research submitted to MLA for the 2019−20 R&D project call, the Chief Investigators of relevant current and recent MLA funded research projects, and other strategic persons, are as follows:

**Expressions of Interest (EoIs)**

- Prof David Swain, *CQU*, Rockhampton – Friday 7 June 2019
- Dr Lester Pahl, *QDAF*, Toowoomba – Monday 10 June 2019
- Prof Michael McGowan, *UQ*, Pinjarra Hills – Monday 10 June 2019
- Mr Glenn Ballin, *Heiferland*, Tudor Springs, Gayndah – Wednesday 12 June 2019
- Dr Luis Prada e Sliva, *QAAFI*, St Lucia – Monday 24 June 2019
- Dr Cyril Stephen, *CSU*, Wagga Wagga – Wednesday 26 June 2019

**Current and recent MLA projects**

- Dr Mark Trotter, *CQU*, Rockhampton – Friday 7 June 2019
- Mr Tim Schatz, *NTDPIR*, Darwin – Thursday 13 June 2019
- Dr Kieren McCosker, *NTDPIR*, Darwin – Thursday 13 June 2019
- Mr Geoff Fordyce, *QAAFI*, Charters Towers – Tuesday 16 July 2019

**Others**

- Dr Ian Johnsson, Chair of the Management Committee of the Livestock Productivity Partnership, Canberra – Tuesday 22 May 2019
- Mr Jed Matz, *CRCDNA*, Townsville – Tuesday 16 July 2019

**Appendix 2: Literature, other than that in the bibliography, reviewed in the process of developing this proposal**

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**Appendix 3: The agenda and a list of attendees at a workshop was held in Brisbane on Thursday 22nd August 2019, to further develop the concept of a strategic research partnership focussed on the northern beef industry and addressing calf wastage in the northern herd**

**Agenda**

08:00 Welcome and introductions – Lee Fitzpatrick
08:30 Strategic Research Partnership (Northern Breeder Efficiency Coalition - NBEC)

- Introduction (Why are we here?) – Lee Fitzpatrick
- The calf loss issue – Michael McGowan
- Candidate management interventions to reduce calf wastage – Geoff Fordyce

10:00 MORNING TEA
10:30 • Defining "breeder efficiency" – *Facilitated session*
11:00 • Objectives of a NBEC - *Facilitated session*
11:30 • Structure of a NBEC - *Facilitated session*
12:00 LUNCH
13:00 • A funding model - *Facilitated session*
13:30 • Appointment of a steering group - *Facilitated session*
14:00 • General strategies to address calf loss and other issues – an opportunity for all attendees to be heard - *Facilitated session*
15:00 AFTERNOON TEA
15:30 • Anything else that needs to be considered? - *Facilitated session*
16:00 What happens now? – Lee Fitzpatrick
16:15 Close – Lee Fitzpatrick

**Attendees**

| Attendee | Affiliation | Attendee | Affiliation |
|---|---|---|---|
| **Allen**, Ben: *USQ* | *USQ*, Toowoomba | **Lyons,** Michael | *NQBRC*, Charters Towers |
| **Ballin**, Glen and Mandy | *Heiferland*, Gayndah | **McCosker**, Kieren | *NTDPIR*, Katherine |
| **Charmley**, Ed | *CSIRO*, Townsville | **McGlynn**, Ben: *BRAC* | *BRAC*, Camooweal |
| **Dominik**, Sonja | *CSIRO*, Armidale | **McGowan**, Michael | *UQ*, Brisbane |
| **Ferguson**, Drewe | *CSIRO*, Armidale | **Menzies**, Don | *CQU*, Rockhampton |
| **Fitzpatrick**, Lee | *NABRC*, Townsville | **Niethe**, Geoff | MLA, Brisbane |
| **Fordyce**, Geoffry | *QAAFI*, Charters Towers | **Mohr-Bell**, Jay | KPIAC, Katherine |
| **Gray**, Andrew | *SQBRC*, Texas | **Pahl**, Lester | *QDAF, Toowoomba* |
| **Connors**, Hilary | *MLA*, Sydney | **Schatz**, Tim | *NTDPIR*, Darwin |
| **House,** Nina | *WQBRC*, Aramac | **Schooley**, Kylie | *SEQBRC*, |
| **Hudson**, Swin | *CQBRC*, Moura | **Sobotta**, Irene | *MLA*, Sydney |
| **Huggins**, Tim | *MLA*, Brisbane | **Stephen**, Cyril | *CSU* Wagga Wagga |
| **King**, Janine: *NABRC* | *NABRC*, Brisbane | **Swain**, Dave | *CQU*, Rockhampton |
| **Lehey**, Naomi | *MLA*, Brisbane | **Tomkins**, Nigel | *MLA*, Brisbane |
| **Lehnert**, Sigrid | *CSIRO*, Brisbane | **Walsh**, Dionne | *NTDPIR*, Brisbane |

**Appendix 4: Northern Breeding Business: NB2 - Working Group Meeting agendas**

Customs House, 399 Queen Street, Brisbane City, QLD 4000
Tuesday 8th October

| **Tuesday 8th October 2019** | |
|---|---|
| 09:30 | Welcome, introductions and outline of the day – Lee Fitzpatrick |
| 09:45 | What are the key R&D priorities for the Strategic Partnership? |
| 10:15 | Objectives of the Strategic Partnership |
| **10:45** | **MORNING TEA** |
| 11:00 | A structure for the Strategic Partnership |
| **12:00** | **LUNCH** |
| 13:00 | Governance of the Strategic Partnership – Management Committee etc |
| 13:30 | How will we establish a base line of performance and measure improvement/success? |
| **14:30** | **AFTERNOON TEA** |
| 14:45 | Revisiting the proposed name of the Strategic Partnership |
| 15:45 | What next (?) and Close – Lee Fitzpatrick |

## Northern Breeding Business: NB2 - Working Group Meeting

Belise Apartments, 510 St Pauls Terrace, Bowen Hills.

Monday 25 November 2019

| **Monday 25 November 2019** | |
|---|---|
| 08:30 | • Intro and summary of where we are |
| 09:00 | • NB2 on a page |
| 10:00 | MORNING TEA |
| 10:30 | • RDA program - Breeding herd management systems |
| 12:00 | LUNCH |
| 13:00 | • RDA program – HERD, NUTRITION / FEEDBASE and ENVIRONMENT |
| 14:00 | • What does “adoption” look like in NB2? |
| 14:30 | • How will we judge success of the NB2 strategic partnership? |
| 14:45 | • Where to from here? Close |
| 15:00 | AFTERNOON TEA |

**Appendix 5: Key Selection Criteria for appointments to the NB2 Management Committee**

***Independent Chair*** – to be appointed following consultation between MLA and NABRC
Key appointment criteria:

- Demonstrated high level leadership ability, preferably with board experience
- Substantial experience with a range of north Australian beef systems
- Experience in delivery of RDE&A for extensive north Australian beef operations
- Not concurrently employed by an RDE&A provider to north Australian beef businesses

**NB2 *Co-ordinator*** – to be appointed following consultation between MLA and NABRC
Key appointment criteria:

- Demonstrated high level leadership and administrative ability
- Demonstrated high level communication skills
- A track record of developing and working with industry groups
- Experience with north Australian beef production systems
- Not concurrently employed by an RDE&A provider to north Australian beef businesses

***NABRC Chair*** – NABRC appointee
***MLA representative/s*** – MLA nominee

***RDA representative*** – appointed following consultation between MLA, NABRC and stakeholders
Key appointment criteria:

- On-going, hands-on, experience conducting research with north Australian beef businesses, demonstrated by associated peer-reviewed publications
- Supported by agricultural departments, universities, and CSIRO in northern Australia
- Demonstrated success in assisting the adaptation of research outcomes to business practice in north Australian rangeland beef herds

***Producer representatives*** – to be appointed following consultation between MLA & NABRC
Key appointment criteria:

- Current owner and or manager of a north Australia rangeland beef business
- RBRC experience, preferable at Chair level
- Supported by the Northern Producer Panel

**Appendix 6: Data to be collected by northern beef businesses that are engaged with Pathway to Practice.**

1) Area (Ha)
2) Operating scale (AE)
3) Herd inventory

| | | | |
|---|---|---|---|
| Females | Weaners: Rising 1 year of age | Males | Weaners: Rising 1 year of age |
| | Heifers: Rising 2 years of age | | Males: Rising 2 years of age |
| | Heifers: Rising 3 years of age | | Males: Rising 3 years of age |
| | Cows: 3+ years | | Males: 3+ years |
| | Spays | | Purchased breeding bulls |

4) Total assets under management ($)
5) Productivity - annual live weight production (kg) /AE
6) Profitability – Earnings before Interest and Tax (EBIT) / AE
7) Reproductive rate (%)
8) Mortality rate (%)
9) Average sale weight (kg)
10) Total live weight of cattle turned off (kg)
11) Operating expenses - enterprise expenses + overhead expenses ($/AE)
12) Capital expenditure ($)
13) Finance costs ($)
14) Owner costs ($)
15) Taxation costs ($)
16) Provisioning ($)
17) Price received ($/kg live weight)
18) Cost of production ($/kg live weight)
19) Operating margin ($/kg live weight)
20) Kg of beef turned off /AE)
21) Labour efficiency (AE / FTE)
22) Labour costs ($/AE)
23) Gross value per head sold (all sales)
24) Sale weight per head sold (all sales)

(#5)

In addition to the required data listed above, for each engaged enterprise, the following need to be clearly defined:

- Business objectives
- Business analyses
- Management option list
- Relevant research recommendations list