Final report

Business case development
Improving the north-west cattle herd

Project code: **P.PSH.1530**

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Abstract

The northern pastoral industry must develop an integrated management system that is both financially and ecologically sustainable in the face of a changing climate. The aim of this project is to present a detailed business case for the development and testing, on station, of a best practice management system that builds on existing research and combines nutritional supplements (both organic and inorganic) with strategic management systems aimed at maximising production.
This is the Final Report for P.PSH.1530 - Developing a more resilient cattle industry in northern Australia

Agknowledge developed a detailed business proposition in collaboration with WA Agricultural Research Collaboration (WAARC), Meat and Livestock Australia (MLA), WA Department of Primary Industries and Regional Development (DPIRD), CSIRO, NT Department of Agriculture and Fisheries (DAF), University of Western Australia (UWA) and the Northern Hub that identifies priorities for research and adoption in the Northern WA beef production system. This proposition was developed for the Future Drought Fund funding round under the title Improving the NW Cattle Herd CDNMZ5JD and submitted in November 2024

1. Develop a detailed business proposition in collaboration with WAARC, MLA, WADPIRD, CSIRO, NT DAF, UWA and the Northern Hub that identifies priorities for research and adoption in the Northern WA beef production system.
2. Develop a needs and gaps analysis for the Northern WA beef production system identifying previous and future RD&A projects for this bioregion. Liaise with potential stakeholders of the North WA Beef production system and record stakeholder feedback. Stakeholder engagement will include but is not limited to,
    - Kimberley Pilbara Cattlemen's Association (KPCA)
    - Rangelands NRM
    - Kimberley Agricultural Investments (KAI)
    - Red Range Stock Supplements
    - New Agriculture
3. Compare and contrast the results of the needs and gaps analysis with the FY24 RD&A priorities endorsed by WALRC and NABRC and the MLA strategic plan.
4. Liaise with current northern Australia projects including the Cropping Enabled Cattle Production Project CRC Northern Australia, the Pilbara Innovation Project, and the Northern Beef Development Program and NT DAF.
5. Identify requirements for research and extension personnel to deliver the projects, and report on existing gaps in current capacity including, University/research organisation engagement, Pathways for Early Career Researchers (ECR's), On-station ECR career development and ECR industry engagement.
6. Provide an extension and communications plan for the listed RD&A priorities.
7. Developing a draft budget for the proposed business case
8. Deliver a final report detailing the business proposition for "Improving the North-west cattle herd." The final report should include Benefit cost analysis (BCA) and clear adoption pathways that detail the proposed practice change and impact on the Northern WA beef system.

Executive summary

Background

The project was developed following consultation between Department of Primary Industry and Regional Development (DPIRD), Western Australian Agricultural Research Collaboration (WAARC) and Agknowledge. Agknowledge had developed the concept of the project which was submitted for the 2023 funding round of the Future Drought Fund. While not successful the project addressed the key objective of

- Improving productivity in the northern pastoral industry
- Improving range condition.

The project also provided the opportunity for the development of early career staff to increase the scientific capacity in the northern region.

The project proposal was further developed in collaboration with Meat and Livestock Australia (MLA), CSIRO, University of Western Australia (UWA), the Northern Drought Hub, NT Department of Agriculture and Fisheries (NT DAF)

Objectives

Develop a detailed business proposition in collaboration with WAARC, MLA, WA DPIRD, CSIRO, NT DAF, UWA and the Northern Hub that identifies priorities for research and adoption in the Northern WA beef production system. This would be achieved by working in partnership with industry to develop and evaluate the elements of an "industry best management" system for the northern pastoral industry. The system would a range of existing technologies and evaluate a range of emerging technologies including the possible role of cotton seed in the northern industry given the recent investments into cotton processing facilities in Katherine and Kununurra.

Methodology

There were a number of sequential steps in finalising the project plan that included

- Consultation
- Development of a business case for investment that included a project budget and a benefit cost analysis
- Needs and Gaps analysis
- Priority alignment
- Development of an extension and communication plan

Consultation

The following organisations and groups were consulted in the development of this project

- Northern Drought Hub
- Northern Territory Department of Agriculture and Fisheries
- WA Agricultural Research Collaboration
- WA Department of Primary Industries and Regional development
- Kimberley Pilbara Cattlemen's Association

- Pilbara Innovation Partnership
- University of Western Australia
- South West Drought Hub/ Grower Group Alliance
- Charles Darwin University
- Meat and Livestock Australia
- Red Range Stock Supplements
- Kimberley Agricultural Investments

Nine pastoral industry representatives were consulted

Development of a business case including a project budget and benefit cost analysis

A project budget was developed and then evaluated against the predicted benefits that would accrue over a range of time periods.

Needs and Gaps analysis

A comprehensive needs and gaps analysis was carried out to:

- Identify research, development, and adoption opportunities to improve the productivity, profitability, and sustainability of the norther western beef industry and
- Identify any gaps that may be limiting these opportunities being achieved

Priority Alignment

The priorities and objectives of the proposed project were compared with the research and development priorities of the following organisations

- Meat and Livestock Australia (MLA)
- Northern Australian Beef Research Committee (NABRAC)
- Western Australian Livestock Research Committee (WALRC)
- Western Australian Department of Primary Industries and Regional Development (DPIRD)
- Northern Drought Hub (Northern Hub)
- Northern Territory Department of Agriculture and Fisheries (NTDAF)
- The Cooperative Research Centre for Developing Northern Australia (CRCNA)
- Kimberley Pilbara Cattlemen's Association (KPCA).

Results/key findings

Business case

The project area covered the Pilbara and Kimberley regions of WA and the Victoria River, Katherine, and Douglas Daly regions of the Northern Territory. The project targeted a 13% increase in productivity based on increasing weaning rate by 5%, reducing mortality by 1% and increasing turn off weight by 10 kg. Modelling indicated this would increase gross income by $38/Animal Equivalent (AE) which over 1.5 million head covered by the project this would equate to $57 million per annum.

The cost of the project over 5 years was estimated to be $13.2 million. The benefit cost ratio was calculated for years 5, 10, 15 and 20 years and was 0.34,2.07,4.78 and 8.38 respectively for those time intervals showing that over the longer term the project could deliver great benefits to the northern pastoral industry. Investment into the project would also provide extensive opportunity for the development of early career scientists within the region.

Needs and gaps analysis

A summary of the research, development and adoptions opportunities identified along with the major gaps were as follows;

Research

- Quantifying the optimal level of pasture utilisation that maximises productivity and sustainability for different land systems/pasture types in the region
- Integrating remote sensing technologies (satellite, high resolution drones and ground truthing) so they can be used to make grazing management decisions for different land systems/pasture types
- Evaluating the potential role of high quality supplements such as cotton seed, cotton seed meal and corn in improving productivity in the north western cattle industry in a cost effective way.
- Investigating possible responses to nitrogen supplementation during the wet season
- Undertaking more fundamental research into grazing behaviour, heat stress, methane emissions and the use of rumen probiotics.

Development

- Demonstrate and document the benefits of management systems such as early weaning and supplementing first calf heifers
- Work in partnership with pastoralists to develop a *best practice* management system based on the best possible information available.
- Record and analyse physical and financial performance data from participating pastoral businesses to provide a health check of their business

Adoption

- Continue to promote the adoption of proven technologies such as P and N supplementation in the wet and dry season respectively.
- Promote the analysis of pastoral businesses through the collection of physical and financial data and its use in making informed management decisions.
- Promote the use of objective information for making stocking decisions
- Develop and promote a participatory and resilient research ecosystem between researchers and the pastoral industry

Gaps

- A lack of experienced research and extension staff in the Western Australia section of the region is the major gap identified.
- There are limited research resources in the Pilbara and Kimberley for research.

Priority alignment

The review of priorities indicated that the priorities for this project were aligned with the priorities of all the major research and funding groups operating in the northern pastoral industry.

Communication and extension plan

A detailed communication and extension plan was developed with a focus on

1. Hindrances to Adoption in the North
2. R&D vs. Communicating Existing Messages
3. Benchmarking in Cattle Herd Management
4. Motivating Greater Engagement

Benefits to industry

This project brings a collaborative systems approach to improving productivity in the north west cattle herd.

The scientific collaboration brings together the state agencies of WA and NT (DPIRD and NTDAF) the Northern Hub, the Western Australia Agricultural Research Collaboration, CSIRO, and Universities (UWA and Charles Darwin). This is matched with industry partnerships with 10 pastoral properties, the KPCA and Red Range Stock Supplements.

The structure of the project provides the opportunity for

- Active extension and demonstration of existing research results
- Trialling different management systems with reduced risk and a high level of support
- Collection and analysis of physical and financial data
- Fundamental research in an industry setting into a range of topics
- Capacity building for early career researchers

The involvement of all the participants in an integrated systems based program provides the best opportunity for the industry to achieve physical and financial sustainability

Future research and recommendations

The work presented in this project makes a very strong case for investment into collaborative research and extension projects to improve the projectivity, profitability and sustainability of the northern pastoral industry.

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1. Background

The project was initiated following discussion between Dr Ben Biddulp, Department of Primary Industries and Regional Development (DPIRD) Chief Scientist and AgKnowledge. These discussions were held May 2024.

Agknowledge was involved in these discussions because of the integrated application it had developed for submission to the 2023 funding round of the Future Drought Fund (FDF) which while not successful, did address the two objectives of DPIRD being;

- To increase productivity in the northern pastoral industry
- Improving rangeland condition.

DPIRD also had a priority for the development of early career staff to increase their scientific capability in the northern region.

Following this there was a meeting on July 24th between AgKnowledge, DPIRD, MLA and the Western Australian Agricultural Research Collaboration (WAARC). The proposed project was of interest to WAARC for their Northern Agricultural Program led by Dr Dean Thomas and they developed the project scope.

2. Objectives

The objectives were to:

- Develop a detailed business proposition in collaboration with WAARC, MLA, WADPIRD, CSIRO, NT DAF, UWA and the Northern Hub that identifies priorities for research and adoption in the Northern WA beef production system.
- Develop a needs and gaps analysis for the Northern WA beef production system identifying previous and future RD&A projects for this bioregion. Liaise with potential stakeholders of the North WA Beef production system and record stakeholder feedback.
- Compare and contrast the results of the needs and gaps analysis with the FY24 RD&A priorities endorsed by WALRC and NABRC and the MLA strategic plan.
- Liaise with current northern Australia projects including the Cropping Enabled Cattle Production Project CRC Northern Australia, the Pilbara Innovation Project, and the Northern Beef Development Program and NT DAF.
- Identify requirements for research and extension personnel to deliver the projects, and report on existing gaps in current capacity including, University/research organisation engagement, Pathways for Early Career Researchers (ECR's), On-station ECR career development and ECR industry engagement.
- Provide an extension and communications plan for the listed RD&A priorities.
- Developing a draft budget for the proposed business case
- Deliver a final report detailing the business proposition for "Improving the North-west cattle herd." The final report should include Benefit cost analysis (BCA) and clear adoption pathways that detail the proposed practice change and impact on the Northern WA beef system.

All objectives have been achieved.

3. Methodology

3.1 Background

Detailed project plan

To communicate with all relevant stakeholders on the proposed project and consult with them as to determine:

- whether the project was aligned with their priorities
- whether they would be willing to be involved in the project
- if they were willing to involved in the project what contributions/commitments, they could make

Prior to meeting with each group were provided with an outline of the proposed project. The concept for the project was developed to address the three areas of priority for both research and development and adoption that were identified by Bell and Sangster (2023) as being

- Breeder herd management
- Feed base management
- Management of the environment

The concept is to develop and test potential elements of an industry best management system in collaboration with participating pastoral businesses. This is aligned with the recommendation of Chilcott et al (2020) in a major review of the northern industry for "a holistic approach to improving productivity, profitability and natural capital so that the whole is greater than the sum of the parts". The project has the twin objectives of increasing production and improving range condition.

The low nutritional value of the natural pastures particularly during the dry season is a major limiting factor on the productivity of the beef breeding herd. The management system will be developed to provide maximise production within the constraints of this poor nutrition and the key elements of the system will include;

- Setting appropriate stocking rates using the best available information
- Monitoring pasture condition using remote sensing and ground measurements
- Implementing animal management systems that best manage the nutritional requirements of different classes of livestock including early weaning and the supplementation of weaners, supplementation of first calf heifers.
- Basal treatments of mineral supplementation of Nitrogen (N) and Phosphorous (P) for all animals
- Evaluating the possible role of cotton seed and or cotton seed meal in providing a high-quality protein supplement for particular classes of livestock

This project is unique in two ways. Firstly it takes a systems approach to implementing a range of diverse research findings that collectively should increase production while preserving range condition. Secondly, the detail for activities on the stations will be co designed with each of the participating pastoral businesses to fit in with their requirements.

Consultations were carried out by Agknowledge during the period August to October 2024

The consultation was planned and undertaken by Peter Cooke and William Ryan from Agknowledge between August and November 2024 and included travelling to Darwin to meet with the Northern Drought Hub, Charles Darwin University and Northern Territory Department of Agriculture and Fisheries.

4. Results

4.1 Business Case

Develop a detailed business proposition in collaboration with WAARC, MLA, WADPIRD, CSIRO, NT DITT, UWA and the Northern Hub that identifies priorities for research and adoption in the Northern WA beef production system.

This proposition was developed for the Future Drought Fund funding round under the title Improving the NW Cattle Herd CDNMZ5JD and submitted in November 2024.

The area covered by the proposed project covers the Pilbara and Kimberley regions of Western Australia and the Katherine, Victoria River, and Douglas Daly region of the Northern Territory. Pastoral leases within this area cover 42.5 million ha and represent about 16% of all pastoral leases in WA, NT and Queensland and has a cattle herd of 1.5 million head.

The target of the Improving north west Cattle Herd project is to improve production by about 13% by increasing weaning rate by 5%, reducing mortality rate by 1% and increasing turn off weight by 10kg. Based on the work of McGowan et al (2014) there is significant opportunity to increase productivity and they observed greater differences in production between the average and the top 25% of producers. Petty and Ryan (unpublished) recorded a 10% increase in weaning rate in their work at Flora Valley with early weaning in the 1990's. The targets for this project are therefore considered realistic.

Modelling these targeted changes for a herd of 8,400 head indicates a change in production per Animal Equivalent (AE) from 95 kg/AE to 108 kg/AE. These estimates are very close to the data recorded by McGowan et al (2014) who recorded average herd productivity of 84 kg/AE for average breeding herds and 106 kg/AE for the top 25%. The modelling also indicated that for herd of 8,400 head the gross income would increase by 17.6%. This is equivalent to an increase gross income of $38/AE and if this is applied to the herd in the project area of 1.5 million would equate to a total potential increase of $57 million.

These potential increases were used to develop a benefit cost analysis for the project based on the following assumptions.

- Benefit cost calculated for 5, 10, 15 and 20 years
- Level of adoption to a maximum of 40% over the following time frame
    - 10% by year 5
    - 20% by year 10
    - 40% by year 15
- Full project cost of $3.056 million per annum for 5 years which includes both cash and in kind
- Funds requested from Future Drought Fund of $1.543 M pa

The benefit cost analysis was calculated for both the full project cost and for the funds requested from the Future Drought Fund.

The results relating to the full project cost are shown in Table 1 below

Table 1 Benefit cost analysis based on the full cost of the project including both cash and in kind

	Year 1	Year 5	Year 10	Year 15	Year 20
Present value of benefits	0	$4,478,464	$27,375,853	$63,259,853	$110,837,505
Present value of costs	$3,056,000	$13,230,881	$13,230,881	$13,230,881	$13,230,881
Net present value	($3,056,000)	($8,752,417)	$14,145,982	$50,028,972	$97,642,624
Benefit cost ratio		0.34	2.07	4.78	8.38

This analysis shows that after 10 years with a relatively low rate of adoption the benefit cost ratio is greater than 2 and that the ratio doubles by year 15 and increases four fold to 8.38 by year 20.

The results of the benefit cost analysis based on funds requested from the Future Drought Fund are shown in Table 2 below

Table 2 Benefit cost analysis based on the funds requested from the Future Drought Fund

	Year 1	Year 5	Year 10	Year 15	Year 20
Present value of benefits	0	$4,478,464	$27,375,853	$63,259,853	$110,837,505
Present value of costs	$1,543,000	$6,680,383	$6,680,383	$6,680,383	$6,680,383
Net present value	($1,543,000)	($2,201,919)	$20,696,480	$56,579,470	$104,193,122
Benefit cost ratio		0.67	4.10	9.47	16.60

The analysis considering only that portion of the project funds that were requested in the Future Drought Funding submission results in the benefit cost ratios over 10 to 20 years are nearly doubled and illustrates the increased returns on their investments that research funders are able to obtain when project such as this one are able to provide both cash and in kind contributions for the project partners.

These analyses show that over a period of 10 to 20 years the investment into this project will have a benefit cost ratio of between 2 and 8 and therefore will provide a strong return on the investment.

Other benefits

While the benefit cost analysis estimates the potential financial returns for the investment in the project there a range of other non-financial benefits that the project will deliver

Development of new research and extension capacity for the north west cattle industry

There is a dearth of industry RD and E capacity in the north of Western Australia and it is essential to rebuild this capacity to provide support for the industry in the future and to provide a foundation for evidences based decisions. A key aim of WAARC is “to develop the next generation of researchers based and focused in WA in a way that builds connections with the agricultural industry so they are better prepared to identify and address emerging issues” (Thomas et al 2025) and this project has

been designed to maximise the development opportunities for early career scientists both with experienced scientists and experienced industry people.

Involvement with indigenous producers

Having Roebuck Plains as an industry partner in the project provides the opportunity to work with key indigenous producers and again aligns with the priorities of WAARC (Thomas et al 2025). The indigenous estate in the Kimberley and the Pilbara covers about 8.25 million ha and the current productivity on these 39 properties is low. Engagement with Roebuck Plains will provide an interactive learning opportunity for other indigenous station managers and staff.

Reduction in methane emissions

Any improvement in productivity in the north west cattle herd will reduce the amount of methane produced for each kilogram of beef produced. The project will also provide a great opportunity for the evaluation of new technologies developed for reducing methane emissions in extensively grazing herds.

Participatory research partnerships

A key element of the project is the focus on industry involvement in both the design and the implementation of the project to ensure very close collaboration between the industry partners and the research, development, and extension staff. Involvement of the experienced staff from the Northern Territory across the whole region will provide a great resource for capacity building both in the early career scientists.

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Thomas D, Biddulph B, Blenkinsop K, Crisp J, Moynihan K, Pearce K, Sohel F, Stewart-McGinniss V (2025). WAARC, a state government funding initiative to catalyse agricultural research in northern Western Australia, XII International Rangeland Congress, Australia 2025

4.2 Needs and Gap analysis of the north western beef industry

Develop a needs and gaps analysis for the Northern WA beef production system identifying previous and future RD&A projects for this bioregion. Liaise with potential stakeholders of the North WA Beef production system and record stakeholder feedback.

The aim of this needs and gaps analysis is to;

- Identify research, development, and adoption opportunities to improve the productivity, profitability, and sustainability of the norther western beef industry and
- Identify any gaps that may be limiting these opportunities being achieved

A summary of the research, development and adoptions opportunities identified along with the major gaps were as follows;

Research

- Quantifying the optimal level of pasture utilisation that maximises productivity and sustainability for different land systems/pasture types in the region
- Integrating remote sensing technologies (satellite, high resolution drones and ground truthing) so they can be used to make grazing management decisions for different land systems/pasture types
- Evaluating the potential role of high quality supplements such as cotton seed, cotton seed meal and corn in improving productivity in the north western cattle industry in a cost effective way.
- Investigating possible responses to nitrogen (N) supplementation during the wet season
- Undertaking more fundamental research into grazing behaviour, heat stress, methane emissions and the use of rumen probiotics.

Development

- Demonstrate and document the benefits of management systems such as early weaning and supplementing first calf heifers
- Work in partnership with pastoralists to develop a *best practice* management system based on the best possible information available.
- Record and analyse physical and financial performance data from participating pastoral businesses to provide a health check of their business

Adoption

- Continue to promote the adoption of proven technologies such as Phosphorus (P) and N supplementation in the wet and dry season respectively.
- Promote the analysis of pastoral businesses through the collection of physical and financial data and its use in making informed management decisions.
- Promote the use of objective information for making stocking decisions
- Develop and promote a participatory and resilient research ecosystem between researchers and the pastoral industry

Gaps

- A lack of experienced research and extension staff in the Western Australia section of the region is the major gap identified.
- There are limited research resources in the Pilbara and Kimberley for research.

The project under the title Improving the NW Cattle Herd CDNMZ5JD submitted to the Federal Drought Fund in November 2024 was formulated to address the needs and gaps identified in this analysis.

Introduction

The analysis has utilised the scientific literature, existing reviews published on the northern cattle industry in combination with the authors experience in the industry, their own data, and their ongoing interaction with members of the industry and research communities.

Definition of the region

For the purposes of this analysis the area of the northwestern beef production system covers the Pilbara and Kimberley region of WA and the Katherine and Douglas Daly region of the Northern Territory. This covers an area of 420,000 square kilometres and has a cattle herd of about 1.5 million head. In other analysis of Australia's northern cattle industry the Kimberley and Katherine region have been included and designated as part of the "Northern Forest" bioregion.(McGowan, et al.2014, Holmes et al, 2017).

Characteristics of the north western pastoral region

The pasture base that underpins the north western beef production system is extremely diverse and includes a wide range of soil types, landforms, grass, and shrub species. While there is great diversity there are some consistencies particularly with the grass species which typically have moderate quality (digestible energy) when green and actively growing and poor quality when they senesce during the dry season. In terms of animal production this results in moderate growth rates during the wet season (0.5 -0.7 kg/day) and very limited growth during the dry season (maintenance of bodyweight).

Pastures in much of this region are deficient in phosphorus in the wet season which can limit intake and therefore growth in the wet season. The pastures can also be very low in nitrogen in the dry season which limits microbial digestion which in turn limits intake and growth or maintenance of body weight

When comparing productivity of cattle across a range of bioregions across northern Australia McGowan et al, (2014) found that productivity of cattle in the northern forest bioregion is the lowest with the results in Table 3 below

Table 3 Median values of reproductive performance of all cows by country type

Measure	Southern Forest	Central Forest	Northern Downs	Northern Forest
Pregnant with 4 months of calving (%)	74	77	68	17
Annual pregnancy (%)	87	88	82	66
Foetal/Calf Loss (%)	5	6	7	14
Pregnant cows missing (%)	8	6	7	12

In their analysis McGowan et al (2014) used the measure of percentage of cows pregnant within 4 months of calving (P4M) as their key indicator of reproductive performance as a high percentage must be achieved in high performing herds. The northern forest bioregion was outlier in their analysis with only 17% pregnant with 4 months of calving compared to the range of 68% to 77% for the other bioregions.

They found that the key parameters that impacted P4M levels were

- Body condition score at the pregnancy diagnosis muster
- Possible phosphorus deficiency

- Previous calving period
- Seasonal pasture condition
- Country type
- Environmental factors

Apart from environmental factors all the other parameters reflect current and past nutrition, and it is not unreasonable to conclude that nutrition is likely to be the major constraint to productivity in the north western cattle industry.

From an environmental point of view McGowan et al (2014) used the temperature heat index (THI) to measure the potential impact of environmental conditions on cattle performance with a threshold value of 79. While the THI exceeded 79 in all bioregions at times during the year the total time above 79 was greatest in the northern forest indicating that environmental factors may also be impacting on cattle performance in the region.

In an extensive review of the northern beef industry for the CRC for Northern Australia by Chilcott et al (2020) they argued while nutritional management of northern beef herds had changed little over the past 30 years significant improvements in productivity and profitability could be made by applying the results of existing research and development.

Increasing productivity and profitability

Chilcott et al 2020 noted that the top 25% of producers were characterised by having higher levels of productivity, targeted herd expenditure, more efficient labour use and great scale. Productivity is the key driver of herd income (Holmes 2017) and is driven by the number and weight of animals sold. This is in turn a function of

- Reproductive rate
- Mortality rate
- Growth rate

Increasing productivity requires increases in reproductive and growth rates and a decrease in mortality rate. McLean and Holmes (2015) estimated the potential benefit in changes of each of these parameters as follows

- 1% increase in reproductive rates leads an increase of 1.5 kg/AE
- 1% decrease in mortality rate leads to an increase of 2.28 kg/AE
- 1kg increase in sale weight leads to an increase of 0.18 kg/AE

Our own modelling which uses a steady state herd model that is adjusted for total grazing pressure predicts similar levels of improvements with these changes.

The key question is how much improvement in productivity is potentially possible and what management interventions are needed to achieve these improvements. In an endeavour to provide some estimates of this McGowan et al (2014) used the 75% and 25% percentiles in their observed data to estimate what could be achieved for reproductive rates and mortality rates. For measures such as pregnancy rates and P4M they used the 75% percentile and for mortality and calf loss they used the 25% percentile. The comparison of these values with their median values for the northern forest bioregion are shown in Table 4 below and provide an indication as to the potential scale of improvements.

These estimates indicate that there is significant opportunity to increase the productivity of the north western cattle herd.

While it was acknowledged that the top producers achieve higher levels of productivity there has been limited analysis as to what management systems and interventions they have used to achieve this.

Table 4 Comparison of median and "achievable" values for the northern forest bioregion

Measure	Median	Achievable performance
Pregnant with 4 months of calving (%)	17	25
Annual pregnancy (%)	66	73
Foetal/Calf Loss (%)	14	9.6
Pregnant cows missing (%)	12	5.8

If the hypothesis is "*that nutrition is the overriding factor influencing productivity in the north western cattle herd*" then the analysis needs to focus on how the nutrition can be improved. There are two components to be addressed

1. Utilising the natural pasture with maximum efficiency
2. Providing additional sources of nutrition to improve performance.

Utilising native pasture with maximum efficiency

The first element of this is the simple equation of how much grows and how much can be used sustainably.

How much grows

Given the scale and geographical area of the north western beef industry direct measurement of pasture production is not possible and difficult to estimate using predictive tools. Remote sensing provides the best possible option and techniques have been, and continue to be, developed to estimate pasture production.

The Pastoral Remote Sensing (PRS) information system has been developed for Western Australia by the Department of Primary Industries and Regional Development in conjunction with Landgate. This system provides real time estimates of ground cover and pasture production. The system uses the underlying land systems maps to differentiate the different pasture types. Information is available an individual station basis and contains comparative data for the last 20 years along with historical rainfall. Users are able look at the impact of annual rainfall on the total estimated pasture production. The system is available free of charge.

Cibo Labs is a commercial company based in Queensland that has also developed a similar service. Based on a subscription model it used remotely sensed data to provide an estimate of pasture on offer on a weekly basis.

While both systems provide a good first step to quantifying the amount of pasture that is produced, there is a need for further refinement and ground truthing to become an easy to use tool for producers to make management decisions. The gap is the lack of data on how they are used as and how effective they are as a management tool.

How much can we use?

It is generally considered that utilisation of unimproved native pastures should be in the range 10 - 25% with utilisation at the higher end of this range being on the more productive clay soils such as the black soil plains.

In the long term high utilisation levels are not sustainable and will lead to a decline in pasture condition and ground cover. A key indicator of declining condition is the removal of desirable species and often an increase in undesirable and often unpalatable species.

These levels of utilisation have typically been developed from the perspective of ensuring the natural pasture base is sustained. They have not been considered from a cattle nutrition perspective. Different parts of the plant provide different levels of nutrition (mainly due to differences in digestibility and protein (N)) with leaves and seeds being of higher quality than the more fibrous stems. While the quality declines with senesce these differentials remain. A very low level of utilisation could therefore enable cattle to selectively graze a diet of higher quality and potentially increase production. There is some evidence of this occurring in this region. Jayawardana (1992) observed in the Victoria River region that where breeders were run at lower stocking rates they had a higher branding rate and lower mortality rates. More recently the interaction between utilisation rate and individual animal performance has been intensively researched in the "Sweet Spot" project headed by Dr Robyn Cowley in the Northern Territory. While the detailed results are still being finalised the preliminary results found that rates of annual pregnancy and percentage pregnant within four months of calving declined and foetal and calf mortality increased as pasture utilisation increased (Cowley, 2023).

There is a strong need to further understand these interactions and to test it under commercial conditions with the objective of determining the financial impacts or opportunities this may provide.

The role of phosphorus and nitrogen in the utilisation natural pasture

A key element in the efficient use of natural pasture it to ensure that the pasture intake of animals is maximised within the constraints of limitations imposed by the seasonal changes in pasture quality. In the north western cattle region phosphorus and nitrogen, at different times of the year, can reduce the intake of native pastures which reduces productivity.

The soils in the region under consideration are phosphorus deficient and this can limit intake during the wet season when pasture quality is at its highest. This can easily be overcome by providing adequate phosphorus supplementation during the wet season. Work by Schatz et al (2023) showed significant improvement to weaning percentage in the Victoria River district in response to phosphorus supplementation. In a long term trial the performance of breeders as monitored over a number of years. The economic analysis indicated that for every $1 invested there was a return of $4.98 due to a greater number of heavier calves being produced.

Similar limitations in intake can occur during the dry season when low levels of nitrogen in the pasture limit microbial growth and their capacity to digest the ingested material. This in turn limits intake. The threshold ratio of Crude Protein(N x 6.25) to Dry Matter Digestibility (%) (CP:DMD) is considered to be 0.125 and McGowan et al (2014) showed that the ratio was below this level for the majority of the dry season in the northern forest bioregion. Again this limitation can be overcome by providing nitrogen supplements to cattle during the dry season with urea the most common source of nitrogen for such supplements.

Although these limitations have been recognised for many years growers have been slow to adopt phosphorus and nitrogen supplementation as a routine part of their management systems. This trend does however appear to be changing. The authors have an involvement with a commercial supplement company within the region which have given permission to provide some commercial in confidence data for the purposes of this analysis. The company started about 10 years ago from scratch and in now consistently supplying between 16,000 and 20,000 tonnes of phosphorus and nitrogen supplements predominately in the Kimberley region in WA and Katherine Victoria River region of the NT. The company's internal analysis suggests they are supplying about 20% of the estimated demand for phosphorus supplementation and about 10% for the estimated demand for nitrogen supplementation across these regions. This suggests that there has been greater adoption of phosphorus supplementation in the wet season compared to nitrogen supplementation in the dry season.

There are number of other commercial supplement suppliers operating in the region so to total supplement use will be greater than the figures provided above.

It has been the authors experience that investment in P and N supplementation is still considered by some pastoralists as a discretionary expenditure rather than an essential expenditure that underpins the performance of the system. Any future promotion on supplementation must overcome this misconception.

Based on the above analysis it is likely that a combination of appropriate stocking rates and adequate wet and dry season supplementation is the most appropriate basis for the most efficient use of natural pasture.

There is still a number of research, development and extension needs and gaps in relation to this including

- Accurate estimation of how much pasture is grown in any one year
- Determining the appropriate level of utilisation that optimises both animal production and natural pasture sustainability from both a physical and financial perspective.
- Determining the current level of utilisation.
- Developing easy to use tools for pastoralists to management decisions on pasture growth and utilisation
- Ongoing communication and extension on phosphorus and nitrogen supplementation.
- Investigations of role of nitrogen supplementation in the wet season

Providing additional sources of nutrition to improve performance

There are two main options available to pastoralists to provide additional nutrition to their livestock. They can be high energy supplements brought in such as grains, cotton seed, cotton seed meal, hay or they can be high quality pastures grown on the station under irrigation. Both options come at a significant cost and the challenge is ensure that they are used efficiently and that the value is captured.

The first step is to identify those parts of the production system that are most impacted by the seasonal changes in quality of the natural pasture system and where high energy supplementation could be most effective.

Two classes of livestock strongly impacted by pasture quality in the dry season are lactating cows and maiden pregnant heifers.

Lactating cows are not able to meet their energy demand from pasture during the dry season and catabolise their own tissues to produce milk for their calves. This leads to a reduction in body condition and a longer period of lactational anoestrus. It is this, in our view, that is major reason for the low reproductive rate in this region and is illustrated by McGowan et al (2014) who observed the percentage of cows pregnant with 4 months of calving in the Northern Forest was 17% compared to the three other regions in northern Australia which ranged from 68% to 78%.

The energy demand of a lactating cow is about 90 MJ of ME/day and during the dry season the pasture is likely to provide between 40 and 50 MJ of ME /day. This deficit could be met by between 4 and 5 kg of a high energy supplement (10MJ/kg) for the duration of the lactation.

The alternative is to early wean the calf which immediately reduces the energy demand of the cow down to about 45 MJ of ME /day which is likely to be adequately met by the natural pasture. The early weaned calf, under this system, does require a high energy supplement but at about half the rate of the cow and is therefore a much more efficient way to utilise the high energy supplement. Petty and Ryan (unpublished) trialled early weaning at Flora Valley in the Kimberley from 1990 to 1994 and increased branding percentage from 68% to 84%. Calves down to 60 kg were weaned in the first round of mustering. Following this result early weaning was implemented across the whole

station) of approximately 10,000 breeders and this resulted in the average branding percentage increasing from 68% to 78%. The early weaned calves were fed a high quality supplement until they reached 150 kg and showed no negative impacts of early weaning on their subsequent growth and fertility. Another key change observed under this management system was an increase in the synchronisation of the calf drop with an increase in the percentage of calves born in the early wet season. This resulted in the proportion of the calf drop being weaned early decreasing. The result being the number of early weaned calves requiring feeding being reduced along with the volume and cost of the high energy supplement.

First calving heifers are another class of livestock with energy demands that will not be met by dry season pastures. Providing high quality energy and protein supplements to them during the dry season before their first calving when their energy demand is increased due continuing her own growth, growing a foetus, and preparing for her first lactation enables them to be heavier and in better body condition at calving. Reconception rates in lactating first calving heifers can be as low as 19% (Sullivan et al 1997) and McGowan at al, (2014) reported a P4M for first calf heifers in the northern forest bioregion of only 11% compared to the range of 37% to 45% for other regions in northern Australia. The response to supplementation was demonstrated by Schatz (2014) who found that reconception rates increased an average of 42 percentage units when heifers were provided with a high energy high protein supplement in the preceding dry season during their first pregnancy.

There is a need for further demonstrate these management systems so that pastoralists can be confident in incorporating them into their management systems.

Potential sources of high energy and protein supplements

The big change in the north western cattle region in relation to high quality supplements has been the resurgence of the cotton industry around Katherine and the Ord River Irrigation Area (ORIA) and the completion of the processing facility north of Katherine and the current construction of the processing facility in Kununurra. Both facilities will require a minimum of 100,000 bales annually for processing. This is highly feasible in the ORIA where yields of 10 to 11 bales per hectare are being achieved and the area grown to cotton is expected to rapidly rise to around 10,000 ha. Industry sources in Kununurra have advised the area planted this season (2025) in the ORIA is close to 10,000 ha. Dry land cotton production in the Northern Territory is lower yielding at about 4 to 6 bales/ha so to achieve the 100,000 bales will require an area of about 20,000 to 25,000 ha.

If both plants are operating at this level about 52,000 tonnes of cotton seed will be produced within the north western cattle region. Cotton seed is high quality animal feed with an energy content of about 13 MJ/kg and a protein content of 23%.

As cotton seed is traded on the world market there will be an underlying price which in this case is likely to be the world price less the cost of packaging and transporting it to Darwin as the nearest export port. This means that pastoralists in the region should be able to obtain cotton seed at a competitive price with the only freight component being that required to get it to the station.

While cotton seed and cotton seed meal are widely used as cattle feed pastoralist and research and extension staff in the region have very little experience with it. Whole cotton seed is difficult to store and handle and can spontaneously combust under certain conditions. Processing to produce cotton seed meal and in some cases cotton seed oil occurs in other cotton producing regions of the world and options for local processing into different forms of cotton seed meal are currently being developed. Cotton seed meal is a more stable product, has a reduced gossypol and oil content but is higher in protein and is easier to store and handle than whole cotton seed

Maize is the other high quality supplement available locally. It has a similar energy content to cotton seed of 13.6 MJ but a lower protein content of around 9%. Again maize is used throughout the

world as a high energy supplement and it the major component of the feedlot industry in the United States. Maize is currently grown in the ORIA and is exported to Korea for food production so again the price for pastoralists will be based on the export price.

This a rapidly developing situation and will provide a great opportunity for researchers to work with processors and growers to evaluate

- Feeding options for whole cotton seed
- Processing options for cotton seed
- Ration formulations for different classes of livestock
- Evaluate performance in the field and responses both from both production and financial perspectives.
- Quantifying the benefits to pastoralists of early weaning
- Further evaluating strategic supplementation to first calving heifers

Irrigated pastures

High quality pastures grown under irrigation provide another option to supplement cattle with improved nutrition. To date station development has been undertaken using pivot irrigation systems. In some situations the bores for these pivots are artesian where the pressure is sufficient that no pumping is required.

These systems are high cost high production systems. The most common pasture is Rhodes grass with some Panic grass also grown. With adequate fertiliser and water they can produce 30 to 35 tonnes of dry matter per hectare per year. Data from Pardoo station (Bell, 2020 and Bell 2023) show an operating cost of about $5,000 per ha per year with the major cost being fertiliser at $2,400 per year. Animal growth rates when grazing these pastures are in the range 0.48kg to 0.70kg per day. The estimated cost of gain is in the range $3.08 to $3.95 /kg of liveweight.

Efficient pasture utilisation is essential if these systems are to be used cost effectively. In discussion with Kevin Bell he indicated that a key requirement is the need for grazing management to be precise with grazing on any particular area limited to a maximum of three days. This if further complicated by the variation in pasture growth rates throughout the year from a peak of about 130 kg/ha/day in November and December to about 60 kg/ha/day in June and July. When pasture growth rates are high the option of making hay is often used as a way of utilising the grass grown. This provides the flexibility of utilising it at other locations.

Irrigated pastures, compared to the provision of supplements using cotton seed and maize, have a distinct disadvantage due to the high up front capital costs, high operating costs and the requirement for highly skilled management and this is likely to limit large scale development of this option.

Economic impacts

While there are many management options available for producers only those that provide an ongoing economic return will be imbedded into the ongoing management system.

Part of the challenge in a complex grazing system is to quantify the economic result from a particular management intervention and this is likely to be a major reason why the update of proven technologies has been slower than expected in the pastoral industry in north western Australia. Often new technologies require significant investment up front with the benefits not coming for one or two years. Producers need to be very confident of the outcome to make such decisions.

While some studies have developed a comprehensive framework for analysing the physical and financial performance of pastoral businesses (McLean et al, 2017) such analyses are not widely used as part of annual business performance monitoring. This is in contrast with large scale agricultural industries (e.g. grains industry) in southern Australia where detailed analysis of performance is

undertaken on an annual basis and producers can see how they are performing year on year as well as how they are performing against their peers both within and across regions.

There is a need for the gathering and analysis of the physical and economic performance of the industry so producers can clearly understand the profit drivers of the industry are and how they respond to changes in the management system. These data will in turn identify the opportunities for efficiency and economic gains.

Research, development and extension personnel

Experienced research, development and extension staff who are based locally and have strong industry credibility are a key component in facilitating changes in industries. Currently there are limited research and extension staff in the Kimberley and Pilbara regions of Western Australia and there has been a significant loss of experienced people over the last 20 years. Recently there has been some limited investment in young inexperienced staff in these regions but there is a lack of experienced staff and mentors for them to work with. In such an environment it is difficult for early career people to develop the knowledge and credibility within the industry without significant support. It is very difficult to help the industry embrace significant change under this scenario.

As such there is a very strong case for the employment of local early careers staff in the regions and to provide a comprehensive training and experiential program to enable them to have accelerated development

The situation in the Northern Territory is much better with a number of long term experienced staff in both animal production and rangeland management based in Darwin and Katherine. These staff are incredibly valuable resource to the cattle industry in north western Australia particularly in mentoring early careers scientists.

Any research programs for the region must be cognisant of these personnel limitations and include opportunities for the development of early career staff.

Proposed research and development project.

The research proposal outlined below was developed by the authors to address the needs and gaps outlined in this analysis and including the need to provide mentoring and training for early career staff.

The overarching concept is to work in partnership with pastoralists, other industry service providers to develop and test the elements of a best practice management system while providing the opportunity for early career staff to contribute while getting experience and mentoring.

Chilcott et al (2020) when considering future R&D at the property scale recommended a systems approach and concluded “the area of whole enterprise technology management appears to be neglected at the expense of component areas of research” and this project has been developed in line with this philosophy.

The framework for the program is a number of sites across the region each with 300 to 400 cattle in a dedicated paddock that would be used to test elements of a best practice management system while also providing the opportunity to overlay more fundamental research. Technologies that have been well proven would be implemented to the best level recommended (e.g. P and N supplementation). The site would then be used to test new technologies with a lower risk to the pastoral business while also providing additional resources to measure the impact of any changes.

More fundamental research into remote sensing, grazing behaviour, heat stress, methane emissions and rumen probiotics could be undertaken at some or all the sites.

This concept was developed for the Future Drought Fund funding round under the title Improving the NW Cattle Herd CDNMZ5JD and submitted in November 2024.

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4.3 Comparison with existing research and development priorities

Compare and contrast the results of the needs and gaps analysis with the FY24 RD&A priorities endorsed by WALRC and NABRC and the MLA strategic plan.

Liaise with current northern Australia projects including the Cropping Enabled Cattle Production Project CRC Northern Australia, the Pilbara Innovation Project, and the Northern Beef Development Program and NT DPI.

The needs and gaps analysis (4.2) identified a number of research, development, and adoption opportunities to improve the productivity and profitability of the north western beef industry. These were used to formulate the project under the title Improving the NW Cattle Herd CDNMZ5JD submitted to the Federal Drought Fund in November 2024.

To compare these findings of the needs and gaps analysis against existing research, development and adoption priorities published by a range of groups the priorities for the Improving the NW Cattle Herd project have been are detailed in Table 5 below.

Table 5. Priorities and strategies for Improving the north west Cattle Herd project

Priority	Strategies
Environmental Sustainability	Using natural pasture base to maintain or improve the condition of the rangelands
Resilient production system	Managing the cattle herd to maximise the beef produced in relation to the pasture grazed including: • Matching grazing pressure to pasture condition and growth • Utilising mineral supplementation to optimise pasture intake and animal growth when grazing deficient pastures • Strategic use of high energy feedstuffs (cotton seed and corn) for groups of animals such as early weaners, first calf heifers and selected sale stock
Resilient economic performance	Analysis of the economic performance of the system through: • Collection of animal performance data • Collection of all cost data • Analysis and bench marking of herd performance • Comparison with rest of the station herd and wider industry
Evaluation of technology	Detailed evaluation of potential technologies available to industry to achieve the above activities
Foundational research	Provide project resources for collaborative fundamental research into a range of areas including but not limited to • Grazing behaviour and impact on pasture utilisation • Heat stress in a warming climate • Methane emissions and methods to reduce them • Increasing rumen efficiency with probiotics

For the purposes of comparison the priorities of the following groups have been extracted from respective organisations (as listed) strategic plans.

- Meat and Livestock Australia (MLA)
- Northern Australian Beef Research Committee (NABRAC)
- Western Australian Livestock Research Committee (WALRC)
- Western Australian Department of Primary Industries and Regional Development (DPIRD)
- Northern Drought Hub (Northern Hub)
- Northern Territory Department of Agriculture and Fisheries (NTDAF)
- The Cooperative Research Centre for Developing Northern Australia (CRCNA)
- Kimberley Pilbara Cattlemen's Association (KPCA)

A summary of the alignment of the priorities of the Improving the north west Cattle Herd Project and those of the above organisations is presented in Table 6 below. Detailed comparisons are provided in the section following Table 6

Table 6. Alignment of priorities and strategies for Improving the north west Cattle Herd project with those of relevant research and producer organisations

Priority	Strategy	Alignment with other industry group research priorities
Environmental Sustainability	Using natural pasture base to maintain or improve the condition of the rangelands	MLA Programs • Environmental sustainability • Productivity (on-farm) NABRC • Improving land condition WALRC • Grassfed Beef Productivity – grazing management productivity gains particularly in a drying climate DPIRD • Management and stewardship of WA's land and aquatic resources • Dynamic regions and primary industries • Protect and enhance the condition of our natural resources Northern Drought Hub • Access to knowledge • Improve management • Enhance forage production and utilisation NT DAF • Protect natural resources and environment • Adapt and innovate in response to climate change threats CRCNA • Agriculture - Sector and supply chain development KPCA • Support and promote a resilient, profitable, and sustainable beef industry

Priority	Strategy	Alignment with other industry group research priorities
Resilient production system	Managing the cattle herd to maximise the beef produced in relation to the pasture grazed including: • Matching grazing pressure to pasture condition and growth • Utilising mineral supplementation to optimise pasture intake • Strategic use of high energy feedstuffs (cotton seed and corn) for groups of animals such as early weaners, first calf heifers and selected sale stock	MLA Programs • Animal wellbeing • Productivity (on-farm) NABRC • Understanding grazing behaviour • Promote adoption of existing forage budgeting, carrying capacity and land condition monitoring tools • Identification and collection of data to assist with decision making • Reducing loses from preg testing to weaning WALRC • Grassfed Beef Productivity – grazing management productivity gains particularly in a drying climate DPIRD • Collaborate across industry, community and regions to ensure research impact and extension and adoption of new technology and development of collective knowledge • Deliver, co invest and collaborate in research and development that drive innovation, protection of natural resources and international competitiveness • Capable and empowered communities • Build trust in WA's primary production • Differentiate, value add, and diversify primary industries Northern Drought Hub • Access to knowledge • Improve management • Enhance forage production and utilisation NT DAF • Protect natural resources and environment CRCNA • Agriculture - Sector and supply chain development KPCA • Support and promote a resilient, profitable, and sustainable beef industry
Resilient economic performance	Analysis of the economic performance of the system through: • Collection of animal performance data	MLA Programs • Objective measurement • Productivity (on-farm) NABRC • Identification and collection of data to assist with decision making

Priority	Strategy	Alignment with other industry group research priorities
	• Collection of all cost data • Analysis and bench marking of herd performance • Comparison with rest of the station herd and wider industry	DPIRD • Dynamic regions and primary industries • Maintain and build competitiveness Northern Drought Hub • Access to knowledge • Improve management NT DAF • Adapt and innovate CRCNA • Agriculture - Sector and supply chain development KPCA • Support and promote a resilient, profitable, and sustainable beef industry
Evaluation of technology	Detailed evaluation of potential technologies available to industry to achieve the above activities	MLA Programs • Productivity (on-farm) NABRC • Promotion adoption of existing forage budgeting, carrying capacity and land condition monitoring tools WALRC • Grassfed Beef Productivity – grazing management productivity gains particularly in a drying climate DPIRD • Invest in digital connectivity, technology, and new and emerging initiatives to improve and diversify industry and regional competitiveness. • Maintain and build competitiveness • Build trust in WA's primary production Northern Drought Hub • Access to knowledge • Improve management • Enhance forage production and utilisation NT DAF • Adapt and innovate CRCNA • Agriculture - Innovation KPCA • To maximise the value of the north-western beef industry through accessing innovation, building capacity, and achieving industry influence

Detailed comparison of priorities

Details of the strategic and operation priorities of the organisations are outlined below. In the case of the large organisations the priorities are quite broad and in these cases the detail of the relevant section has been presented to enable a more appropriate comparison.

Commentary is provided on the alignment of the priorities of the Improving north west Cattle Herd project with the priorities of these different organisations.

Meat and Livestock Australia (MLA)

Meat and Livestock Australia's purpose is to foster the long-term prosperity of the Australian red meat and livestock industry by collaborating with stakeholders to invest in research, development and marketing initiatives that contribute to producer profitability, sustainability, and global competitiveness.

MLA has a number of different documents including Red Meat 2030 which sets out the industry vision and priorities; a Strategic Plan with a 5-year view, and an Annual Investment Plan that help establish its research priorities along with the Australian Government priorities which are outlined below.

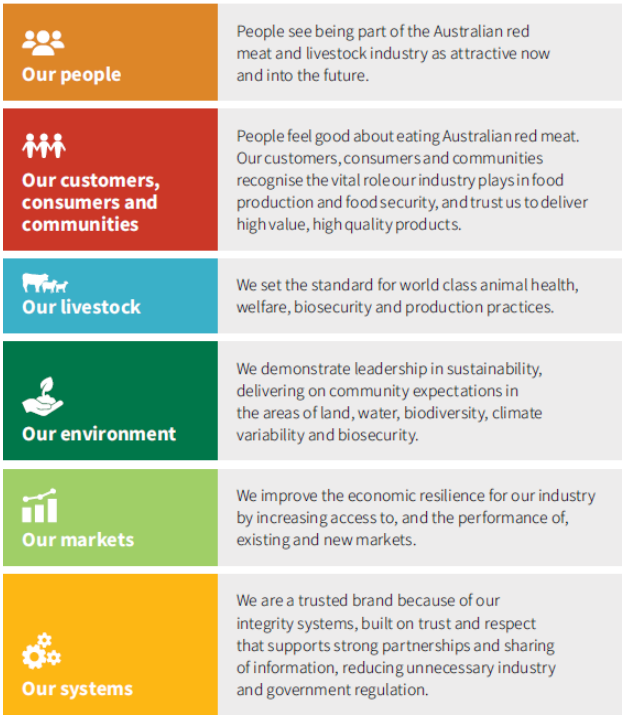
Australian Government priorities

Through its Science and Research Priorities and the Rural Research, Development and Extension (RD&E) Priorities, the Australian Government sets high-level priority objectives covering community, industry and environmental concerns. MLA has considered these priorities in the development of this Strategic Plan.

Science & Research Priorities	Rural RD&E Priorities
Food	**Advanced technology;** to enhance innovation of products, processes and practices across the food and fibre supply chains through technologies such as robotics, digitisation, big data, genetics and precision agriculture.
Soil and Water	**Biosecurity;** to improve understanding and evidence of pest and disease pathways to help direct biosecurity resources to their best uses, minimising biosecurity threats and improving market access for primary producers.
Transport	**Soil, water and managing natural resources;** to manage soil health, improve water use efficiency and certainty of supply, sustainably develop new production areas and improve resilience to climate events and impacts.
Cybersecurity	**Adoption of R&D;** focusing on flexible delivery of extension services that meet primary producers' needs and recognising the growing role of private service delivery.
Energy	
Resources	
Advanced Manufacturing	
Environmental Change	
Health	

Red Meat 2030 is the industry vision and sets out six priorities to guide activites for whole of industry benefit and to monitor progress against, which are include ‘people’; ‘customers’; ‘livestock’; ‘environment’; ‘markets’; and ‘systems’.

Figure 1: The six industry priorities outlined in *Red Meat 2030*



Red Meat 2030 provides the foundation to the MLA Strategic Plan 2025 which identifies areas for exploration within each of the industry priorities. Refer to Appendix 1 for a snapshot of the MLA 2025 Strategic Plan.

The six strategic focus areas of the MLA 2025 Strategic Plan are:

1. Decisions informed through data and insights
2. Targeted investment to address the industry’s big, complex challenges
3. Enabling new sources of revenue
4. Developing new, high value products that allow us to maximise the whole carcase
5. Beyond today’s farm gate
6. Strengthening our core

These strategic focus areas are aligned with MLA programs which include animal wellbeing; domestic market; international markets; eating quality; environmental sustainability; feedlot; integrity systems; objective measurement; producer adoption; product and packaging innovation; value chain information and efficiency; productivity (off farm); productivity (on-farm); capability building; communication; and corporate services.

The Annual Investment Plan, which is prepared each financial year guides the practical delivery of MLA’s long-term investment priorities and outcomes which are set in MLA’s strategic plan. It provides the one-year program level view.

The Red Meat 2030 objectives in ‘Our Livestock’ and ‘Our Environment’ are as follows;

'Our Livestock' focuses on the care of the animals throughout the whole supply chain including animal health, welfare, biosecurity and production practices. It is about ensuring whole-of-industry animal health and welfare standards and systems; adopting animal health, welfare, biosecurity and production best practices; and optimising animal production for the environment and market.

'Our Environment' is about demonstrating leadership in sustainability, delivering on community expectations in the areas of land, water, biodiversity, climate variability and biosecurity. It focuses on advancing sustainability frameworks and supporting their adoption; moving to a carbon neutral industry by 2030; environmental stewardship and building on a proactive approach to climate variability.

The priorities of the Improving the north west Cattle Herd project are very closely aligned particularly in relation to the developing industry best practice systems, optimsing animal production for the environment and demonstrating leadership in sustainability. The breadth of the project is such that is does not cover all of the priorities of MLA but is certainly in close alignment in the areas that it does cover.

Northern Australia Beef Research Committee (NABRC)

NABRC members help set the research and development priorities on behalf of beef producers across Northern Australia. It is made up of 11 regional committees and collates the individual committee priorities to identify priorities for the northern Australia cattle industry. Key research priorities for 2024-26 which have been identified by producers which include:

- Identification and collection of health and nutrition data on farm to assist with real time decision making (crush-side)
- Reducing losses from pregnancy test to weaning
- Non-surgical female contraception (both permanent and reversable)
- Minimum 6 months efficacy control methods to control buffalo fly to reduce skin lesions and production losses identification of natural resistant animals
- Improving land condition for productive and resilient pastures
- Understanding grazing behaviour to measure the impact of utilisation rate
- Promote adoption of existing forage budgeting, carrying capacity and land condition monitoring tools
- Identifying new tropically adapted legumes, developing methods for propagation and augmentation and measuring cost benefit
- Methane mitigation in extensive grazing systems with production benefits
- Generate and calculate accurate, standardised, carbon baselines with credibility
- Equipping produced with knowledge about carbon and methane measurement and accounting which will allow them to develop a plan to ensure viability of their business in a carbon accountable emissions reduction environment

The priorities outlined here that align with those of the Improving north west cattle herd project include health and nutrition data to assist with decision making; improving land condition, understanding grazing behaviour and tools to assist with forage budgeting, carrying capacity and land condition and methane mitigation in extensive grazing systems with production benefits.

There are there regional committees that cover the north western cattle industry, Kimberly, Pilbara in WA and Katherine in the Northern Territory. The top NABRC regional RD&A issues that were identified in 2021-22 for the each of those regions include:

- Kimberley
    - Alternatives to traditional castration/ sterilisation/dehorning/ hot branding practices
    - Driving productivity through genomics
    - Using technology to optimise feed base utilisation
    - Carbon footprint/ energy audit measurement methodologies and tools
    - Optimising supplementation including effectiveness of supplementing different animal classes (e.g. weaners vs breeders)
    - Fall armyworm surveillance/ management/ research/ quantify impact
- Pilbara
    - Alternatives to traditional castration/ sterilisation/dehorning/ hot branding practices
    - Pain relief
    - Herd data collection and use, satellite imagery for monitoring, drones etc
    - Closing the loop with MLA work on new market opportunities (e.g. Europe) in order to capitalise on them
    - Carbon footprint/ energy audit measurement methodologies and tools
    - Fall armyworm surveillance/ management/ research/ quantify impact
- Katherine
    - Calf loss from pregnancy to weaning
    - Options for improved pasture species for incorporation into production systems to improve feed protein at critical management stages
    - Development of non-invasive pregnancy test and foetal age
    - Develop whole systems for managing breeder productivity
    - Development of reduced cost and safe methods to address mineral deficiencies during the dry-season (including novel strategies)

The priorities of these regional committees that align with those of the Improving north west Cattle Herd project include; Using technology to optimise feed base utilisation and optimising supplementation including effectiveness of supplementing different classes of livestock for the Kimberley region, Herd data collection and use, Satellite imagery for monitoring, drones etc for the Pilbara region and Development of whole systems for managing breeder productivity and Development of reduced cost and safe methods to address mineral deficiencies in the dry season for Katherine region.

West Australian Livestock Research Committee (WALRC)

WALRC exists as one of three regional research councils as part of Meat and Livestock Australia's Regional Advisory Council framework, and they also work alongside the Northern Australia Beef Research Committee (NABRC) and the Southern Australia Livestock Research Council (SALRC). Representatives from each of the three councils make up the Red Meat Panel which provides advice on investment priorities to the MLA Board.

WALRC covers that part of WA not covered by NABRC (southern rangelands and agricultural area) and covers both sheep and cattle. The only priority related to the Improving north west cattle herd project is *'grassfed beef productivity - grazing management: productivity gains particularly in a drying climate'* which is outlined below.

Priority 2

Outcome Sought	Grazing Management: productivity gains particularly in a drying climate.
Context	Mediterranean areas are at the forefront of climate change threats and tools are required to assist producers understand the quantity and quality of feed available and to enable feed budgeting, supplementation decisions and herd planning.

R & D Gap	Adoption Gap
• Can we validate CIBO Labs predictions of biomass in Western Australia including to provide information on plant quality? • Can we investigate what tools are currently available, how do they interface and what is missing? What information does the industry need to know to optimise pasture and forage utilisation and make timely decisions?	• Advances in systems/tools that intensify grazing management to improve pasture utilisation. Is there something that is being done elsewhere that could be trialled by WA producers? • Ground truthing of CIBO Labs predictions to improve accuracy for WA, including getting more producers involved. • A better understanding of the role of pit silage compared to plastic-wrapped is needed. Challenges with logistics balanced against storage timeframes. We ask, is it better to use sown forages or mixed swards, monocultures or diverse mixtures? *Note: there are strong linkages here with Feedbase Priorities*

The priorities of the Improving north west Cattle Herd project align very closely with this priority of WALRC

DPIRD

In DPIRD's strategic intent 2022-2026, their strategic focus draws on their protect, grow and innovate approach to deliver the following priorities under each of the three strategic outcomes. (https://www.wa.gov.au/system/files/2021-11/DPIRD%20Strategic%20Intent%202022-26.pdf)

1. *Management and stewardship of WA's land and aquatic assets*
    a. Management systems and programs to sustain and enhance our aquatic, pastoral and agricultural resources.
    b. Provide services and programs that allow the community to access, use and develop our land and aquatic resource on a sustainable basis.
    c. A robust biosecurity system to support our industries and protect our land and aquatic assets, environment and lifestyle.
    d. Research and policy leadership in the primary industries and regions to enable transition to a sustainable carbon future as part of our adaptation to climate change.
2. *Capable and empowered communities*
    a. Collaborate across industry, community, and regions to ensure research impact and extension, adoption of new technology, and the development of collective knowledge.
    b. Work across government and with industry to deliver initiatives that meet the workforce needs of regions, including primary industries.
    c. Deliver models of support and targeted programs that empower Aboriginal people to develop and sustain long-term outcomes that strengthen communities.

    d. Build the capacity of community, industry, and Aboriginal people to work with us to deliver our priorities.

3. *Dynamic regions and primary industries*
    a. Policies and programs that encourage sustainable economic development, diversification, and job creation with a focus on unlocking land and water resources, building business capacity, and developing and facilitating trade and investment.
    b. Invest in digital connectivity, technology, and new and emerging initiatives to improve and diversify industry and regional competitiveness.
    c. Deliver, co-invest, and collaborate in research and development that drives innovation, protection of natural resources and international competitiveness.
    d. Develop specialist facilities that enable critical biosecurity, research, and development to be undertaken.
    e. Deliver systems and support to industry in animal welfare, biosecurity, and ethical and sustainable production to meet community expectations and enhance the reputation of our primary industries.

The priorities of the Improving the north west Cattle Herd project are aligned with a number the priorities outlined in DPIRD's Strategic Intent including the following;

- Management systems and programs to sustain and enhance our aquatic, pastoral, and agricultural resources
- Provide services and programs that allow the community to access, use and develop our land and aquatic resource on a sustainable basis
- Collaborate across industry, community, and regions to ensure research impact and extension, adoption of new technology, and the development of collective knowledge
- Invest in digital connectivity, technology, and new and emerging initiatives to improve and diversify industry and regional competitiveness
- Deliver, co-invest, and collaborate in research and development that drives innovation, protection of natural resources and international competitiveness
- Deliver systems and support to industry in animal welfare, biosecurity, and ethical and sustainable production to meet community expectations and enhance the reputation of our primary industries.

Primary Industries Plan ('the Plan') are to sets out clear priorities for investment and to establish a platform for strengthened collaboration between government and primary industries. (https://www.wa.gov.au/system/files/2020-12/Primary-Industries-Plan-2020-24.pdf)

While the strategic themes outlined are still at a very high level the following themes are relevant to the Improving the north west cattle herd project;

- Sustainable management of Land and soil resources
- Applied research to maintain and increase productivity
- Growth through Ag-Tech and digital connectivity
- Building business resilience
- Diversification of agribusiness opportunities – developing northern irrigation in Ord and Fitzroy Valley

The priorities of the Improving the north west cattle herd project are well aligned with these themes.

Northern Hub

The Northern Hub is one of eight national Drought Resilience Adoption and Innovation Hubs created as an initiative of the Future Drought Fund. The consortium of regional partners is committed to building the resilience and sustainable prosperity of rural industries and communities across the region.

The Hub will transform the drought resilience of farmers, traditional owners and communities in the Northern Territory and Northern Western Australian Tropical Top End and rangelands. This will be achieved by focusing on pastoral, broadacre, horticulture and forestry systems and water management.

The priority funding areas for the Northern Hub are:

- *Access to knowledge*
  - Improve the discoverability of available information for producers
  - Improve producer access to expertise
  - Indigenous knowledge of landscape and water
- *Improve management*
  - Assist producers to plan for climatic variation and change
  - Assist producers to identify risks and develop strategies for risk mitigation
  - Identify / monitor threats to indigenous production
- *Enhance forage production and utilisation*
  - Improve capacity of producers to predict and respond to changing forage availability.
  - Improve capacity of producers to maximise long-term forage biomass and nutrition availability
  - Develop / identify tools for regional benchmarking of rangeland condition
- Improve use of water sources
  - Improve the adoption of efficient irrigation practices
  - Improve the application of rainwater harvesting
- Increase human capacity
  - Provide opportunities for producer upskilling and peer-to-peer learning
  - Provide professional development opportunities for extension staff
  - Identify and address regional gaps in expertise and services.

There are a number of the priorities of the Northern Hub that align with those of the Improving north west cattle herd project as follows;

- Improve producer access to expertise.
- Improve producer capacity to evaluate information from commercial sources
- Successful management practices
- Develop / identify tools for regional benchmarking of rangeland condition

There are two other priorities of the Northern Hub which relate to human capacity building as follows

- Provide opportunities for producer upskilling and peer-to-peer learning
- Provide professional development opportunities for extension staff

Human capacity building while not covered under the research priorities of the Improving the north west cattle herd project are a major objective within the project this focus of the project will be covered in detail later in this report.

Northern Territory Department of Agriculture and Fisheries

The Department of Agriculture and Fisheries in the Northern Territory "Agribusiness 2030' strategy has a shared vision, and it is "a partnership to grow the size of the Agribusiness sector to $2 Billion by 2030 fostering vibrant, healthy and prosperous communities throughout the Northern Territory".

To achieve their vision and purpose they have identified four strategic priority areas to guide their objectives and actions. The strategic priority areas are as below.

The first target in this plan is to lift the productivity of the NT cattle herd. The Agribusiness 2030 plan acknowledges that while beef cattle production in the NT is well established and sophisticated due to a range of land and infrastructure improvements, improved genetics and productivity increases, there is significant scope to increase turnoff through further productivity gains. Those gains can be achieved by further application of phosphorous supplementation, sustainable grazing practices, herd selection, further genetic improvements, and strategic property infrastructure developments.

The availability of cost-effective protein and energy sources as a direct input or by-product of other value add exercises such as cotton seed will provide opportunity for further productivity gains across the sector. Further utilisation of big data as a decision-making tool will also assist.

The major priorities in the Northern Territory are in very close alignment with the priorities of the Improving the north west cattle herd.

Cooperative Research Centre for Developing Northern Australia (CRCNA)

The Cooperative Research Centre for Developing Northern Australia (CRCNA) investment priority is in industry led research that de-risks development in Northern Australia for a more resilient and sustainable economic future.

Their mission is to invest in industry-based research that de-risks development in Northern Australia to realise a resilient and sustainable economic future. CRCNA's six research pillars are underpinned by seven research programs:

1. *Sector and supply chain development*
   Research Program 1 – sector and supply chain development
2. Innovation
   Research Program 2 – New and developing industries in Northern Australia
   Research Program 3 – Industry specific production and supply chain innovations
3. Capacity building
   Research Program 4 – Building industry and community capacity with First Nations enterprises
4. Northern Health Service delivery
   Research Program 5 – Build northern health service delivery and models of care
5. Education and training
   Research Program 6 – Build education, training, and research capacity in and for Northern Australia
6. Developing strategic policy solutions
   Research Program 7 – Informing policy development

The CRCNA research programs are focused across three industry areas where the north has the most potential for growth in new and emerging sectors being Agriculture, Food and Aquaculture, Traditional Owner-led Business Development and Northern Health Service Delivery.

The priorities for the Agriculture, Food and Aquaculture are

- Research which seeks to de-risk investment in new, emerging, and established industries by identifying barriers and providing solutions.
- Support the development and growth of established industries by identifying value-add opportunities, new markets, improving supply chains, enhancing productivity, developing workforce skills, capacity, and capabilities, and improving decision-making processes and policy frameworks to enable solutions to be implemented.
- Advance new industries through developing and testing new production and agronomy systems, crop varieties, animal species, and animal breeding techniques, and building research and workforce capabilities to support and maintain this work.

While these priorities are very broad there are aligned with the more detailed priorities of the Improving northwest cattle herd project. The CRCNA has a significant investment into its Cotton Grains Cattle program both in Western Australia and in the Northern Territory. The authors consulted closely with the leaders of these projects when developing the Improving north west cattle herd project.

Kimberley Pilbara Cattlemen's Association (KPCA)

The KPCA is a not-for-profit organisation whose vision is to *support and promote a resilient, profitable, and sustainable beef industry*, with its mission being to *maximise the value of the northern beef industry through accessing innovation, building capacity, and achieving industry influence.*

Under the strategic direction of the Executive Committee, KPCA members (and the broader northern WA pastoral industry) are benefiting from proactive and collaborative issue identification and problem solving.

The KPCA strategic plan 2022-2027 outlines the following objectives:

- To represent 80% of northern WA cattle production and industry
- Build community confidence and enhance the reputation of the northern beef industry
- Productivity of our North-Western cattle industry is improving sustainably
- To be financially independent and have sound good governance

The key objective of the KPCA for productivity in the north western cattle industry is improving sustainably is totally aligned with the priorities of the Improving the north west cattle herd project.

Conclusion

The priorities used to develop the project Improving the north west Cattle Herd are aligned with parts of the priorities of all the other organisations considered in this review. While a small project like this will never cover all of the priorities of other groups, particularly state agencies, there was no evidence of the project priorities conflicting with any of the wide ranging priorities across all of the organisations.

References

- MLA Annual Investment Plan 2024-25
- MLA Strategic Plan 2025
- Red Meat 2030
- www.walrc.com.au
- www.nabrc.com.au
- DPIRD Primary Industries Plan 2020 – 2024 www.wa.gov.au/system/files/2020-12/Primary-Industries-Plan-2020-24.pdf
- DPIRD Strategic Intent 2022-2026. www.wa.gov.au/system/files/2021-11/DPIRD%20Strategic%20Intent%202022-26.pdf
- NT DAF Agribusiness 2030 strategy
- www.crcna.com.au
- www.northernhub.au
- Kimberly Pilbara Cattlemen's Association – Perth, WA (kpca.net.au)

4.4 Requirements for research and extension personnel

Identify requirements for research and extension personnel to deliver the projects, and report on existing gaps in current capacity including, University/research organisation engagement, Pathways for Early Career Researchers (ECR's), On-station ECR career development and ECR industry engagement.

The core operational staff for the delivery of the Improving the north west Cattle Herd will be four full time scientific staff. It is expected that this will be made up of a senior experienced scientist who will be responsible for technical and scientific oversight of the project. The other positions proposed are a mid-career scientist and two early career scientists. The early career scientists are likely to be recent graduates with limited experience.

These staff will be supported by staff from those consortium members who have agreed to contribute staff resources to the project and includes expertise in animal production, remote sensing, and economic analysis.

Contractors will be employed for the production of publications and extension material as required throughout the project and extension activities will be carried out in conjunction with consortium members with the KPCA taking a leading role.

The major gap in current capacity is in Western Australia where there has been a significant loss in experienced field staff in both animal production and rangeland science over the past 20 years. Rebuilding this capacity is a key priority for WAARC (Thomas et al 2025).

By contrast there is strong experience base within the NT Department of Agriculture and Fisheries in both animal production and rangeland science.

The success of the project will be dependent on recruiting the required staff and in the case of early career researchers providing a structured training program.

There are three elements required to build the capacity of early career researchers;

- Develop a sound technical understanding of the north western cattle industry and the environment in which it operates
- Develop strong industry and scientific networks
- Practical experience in doing field studies in this extensive environment and gathering their own data.

A key consideration in the development of this project was to provide the opportunity build the scientific capacity in the north west cattle industry.

1. The components of this capacity building with the project design include;
    a. Ensuring the consortium includes members who bring expertise and experience covering all the key areas of the project being
    b. Pasture production and remote sensing
    c. Animal production and nutrition
    d. Production economics and analysis
    e. Systems and supply chain analysis
    f. Extension and industry engagement
2. Co designing the detail of the project with the industry and consortium members over the first six months of the project which will expose the early careers scientists to all the technical experts as well as all the industry partners. This will give them an understanding of

both the opportunities but also the challenges of delivering the project under extensive grazing conditions on commercial properties.

3. Developing a structured training program for each early career scientist based on their individual needs. The program will cover scientific, extension and industry components. The Improving the north west Cattle Herd project will be overseen by and management committee with experience and expertise in managing large scale research, development and extension programs and this committee will have responsibility for developing and managing the training programs for the early careers scientists.
4. The provision of a mentor for each early careers scientist to help them with the development of their career.

While it has been traditional in projects such as this for the scientific staff to be employed by the research organisation other options are now available and in this project this could include employment by a grower group or directly by the stations participating in the project. These alternative employment options may be more attractive to some new graduates.

This option does provide more limited technical oversight but with a structured training program and clear definition of their role and responsibilities it is likely to be an effective alternative pathway for the development of industry expertise.

References

Thomas D, Biddulph B, Blenkinsop K, Crisp J, Moynihan K, Pearce K, Sohel F, Stewart-McGinniss V (2025). WAARC, a state government funding initiative to catalyse agricultural research in northern Western Australia, XII International Rangeland Congress, Australia 2025

4.5 Extension and Communications Plan

Provide an extension and communications plan for the listed RD&A priorities.

An Extension and Communications plan has been developed for the Future Drought Fund funding round under the title Improving the NW Cattle Herd CDNMZ5JD and submitted in November 2024 (see on the next page).

The plan outlines the overall strategic objectives, strategies, and tactics to deliver the specific NW Cattle Herd project. There are some key steps to undertake should the project proceed either as a Federally funded activity through the Drought Fund or a future collaboration of R&D partners as envisaged in the initial scope. The revision of the current Communication and Extension Plan would be completed by the future project team and include:

- Evaluate Existing Efforts: Assess the effectiveness of current communication strategies. Are they reaching the intended audience? Are they clear and actionable?
- Tailored Messaging: Develop region-specific messages that address the unique challenges of the north-west cattle industry, such as climate variability and resource constraints.
- Diverse Channels: Use a mix of digital platforms, face-to-face workshops, and printed materials to ensure accessibility for all stakeholders.

Underpinning the development of a future extension and communications plan requires an understanding of the barriers to adoption, current activities and messaging, some benchmarking investments and investment in generating greater engagement. The issues are identified as follows:

5. Hindrances to Adoption in the North
    - Barriers Identified:
        - Lack of trust in new technologies or practices.
        - High costs of implementation.
        - Limited access to reliable information or extension services.
    - Solutions:
        - Build trust through peer-to-peer learning and demonstration projects.
        - Provide financial incentives or subsidies to offset initial costs.
        - Strengthen local extension networks to ensure consistent support.
6. R&D vs. Communicating Existing Messages
    - Balance Needed: While ongoing R&D is crucial for innovation, the immediate focus should be on effectively communicating existing research findings. Many producers may not be aware of or fully understand the benefits of current recommendations.
    - Action Steps:
        - Simplify and incorporate complex research findings into actionable steps.
        - Engage local influencers or respected community members to advocate for change.
7. Benchmarking in Cattle Herd Management
    - Current Efforts: Benchmarking tools are being used to track key performance indicators like reproductive rates, calf mortality, and feed efficiency. These tools help identify areas for improvement and measure progress.
    - Enhancing Engagement:
        - Highlight success stories from producers who have benefited from benchmarking.

    - Offer training sessions to demystify the process and demonstrate its value.

8. Motivating Greater Engagement
    - Incentives: Provide tangible benefits, such as access to premium markets or financial rewards for achieving specific benchmarks.
    - Community Building: Foster a sense of community among producers through regular meetings, online forums, and collaborative projects.
    - Education and Support: Offer ongoing education and support to ensure producers feel confident in implementing new practices.

The project has been designed around these key issues and principles.

See Appendix 8.1 for the one page plan

5. Conclusion

This project brings a collaborative systems approach to improving productivity in the north west cattle herd.

The scientific collaboration brings together the state agencies of WA and NT (DPIRD and NTDAF) the Northern Hub, the Western Australia Agricultural Research Collaboration, CSIRO, and Universities (UWA and Charles Darwin). This is matched with industry partnerships with 10 pastoral properties, the KPCA and Red Range Stock Supplements.

The structure of the project provides the opportunity for

- Active extension and demonstration of existing research results
- Trialling different management systems with reduced risk and a high level of support
- Collection and analysis of physical and financial data
- Fundamental research in an industry setting into a range of topics
- Capacity building for early career researchers

The involvement of all the participants in an integrated systems based program provides the best opportunity for the industry to achieve physical and financial sustainability

5.1 Key findings

The project identified a number of key findings as follows:

There is the opportunity to improve the productivity of the northern pastoral industry through applying existing technologies as well as evaluating new technologies in collaboration with research organisations in the region.

There is the opportunity to develop some strong partnerships between research organisations and pastoral businesses to share the knowledge and the risk in evaluating new technologies for the industry. This includes the availability of cotton seed from the new processing facilities in Katherine and Kununurra.

There is a lack of experienced research staff in the Western Australia part of the northern pastoral industry and the implementation of the project outlined in this report would provide a great opportunity and framework for the long term development of early career staff to increase the scientific capability located within the region.

5.2 Benefits to industry

The development of a research partnership between research organisations and the pastoral industry will provide the opportunity for the demonstration and monitoring of the impact of adopting proven technologies and the capture of data that provides evidence of the effectiveness of the new technologies.

Industry would also be intimately involved in the evaluation of new technologies with research and broader industry supporter which will reduce both the costs and risks of doing it independently. It would also benefit the more intensive evaluation and data collection facilitated by the research partners.

6. Future research and recommendations

The work presented in this project makes a very strong case for investment into collaborative research and extension projects to improve the productivity, profitability and sustainability of the northern pastoral industry.

7. References

Please see Section 8

8. Appendices

8.1 North West Pastoral Resilience Project – Communications and Extension Plan 2025-30

8.2 Developing a draft budget for the proposed business case

NORTH WEST PASTORAL RESILIENCE PROJECT - COMMUNICATIONS & EXTENSION PLAN 2025-2030

PROJECT TITLE	PROJECT OBJECTIVE
Developing a more resilient cattle industry in northern Australia	***For the pastoral industry of Northern WA and West NT to develop resilient management systems that are ecologically and financially sustainable in a future with increased climate variability.***

STAKEHOLDERS

PASTORALISTS - PROJECT PARTICIPANTS	PASTORALISTS - NORTHERN CATTLE PRODUCERS	PROJECT COLLABORATORS	PROJECT MANAGEMENT TEAM / STAFF / CONTRACTORS	INDUSTRY GROUPS - KPCA, PGA, NTCA	PROJECT FUNDERS / CO-INVESTORS	COMMUNITY

IMPACT

Pastoralists supported to adopt practice change	System change is proven and improves profitability	Producers & researchers align to achieve change	Well managed project develops human capital	Improved pastoral profitability & sustainability	Investing for impact, delivering value	Improved perceptions and social licence

ENGAGEMENT STRATEGIES

Manage engagement with project collaborators/participants/funders	Implement the extension and adoption strategy	Implement the communications strategy	Manage project governance and reporting/compliance functions

TACTICS

1. Develop the **Internal Communications Strategy** and revise the Action Plan annually to support engagement. 2. Establish internal project team communications disciplines and mediums: schedule team meetings, IP management and storage protocols. 3. Produce monthly stakeholders e-news project updates. 4. Set up technologies to engage/support participants (virtual meetings, streaming events) to manage time/distance issues. 5. Set up a virtual discussion group (WhatsApp) to encourage peer to peer learning for participating pastoralists. 6. Create web-based benchmarking dashboard/s (Microsoft Power BI interactive data visualisation software) to manage data, photos, user input, reports/analysis to support pastoralist's management decisions.	1. Develop the project **Extension and Adoption Strategy** and revise the Action Plan annually with key milestones and resource allocations. 2. Engage extension staff allocated in-kind from project partners to co-design and deliver E&A activities. 3. Facilitate regular on-line pastoralist's discussion group forums, with guest spots from project partners. 4. Conduct demonstration days/events on-property to encourage peer to peer learning – 1 day/site/annum across 10 sites, align with other regional event dates 5. KPCA event hosting/co-branding: Annual Conferences: presentations/project updates with both pastoralists and technical staff, KPCA Annual Livestock Cup: demonstrations, discussion groups. 6. NTCA Annual Conferences: presentations/project updates with both pastoralists and technical staff. 7. Project partner events – co-hosted with project staff. 8. Develop an industry-facing dashboard to enable live project monitoring and engagement beyond the core project participants.	1. Develop the project **Communications Strategy** and revise annually to support wider industry and community engagement. 2. Develop an annual Communications Action Plan, mapping stakeholders, mediums, calendar of events/coverage, contacts database of stakeholders. 3. Employ experienced communications contractors: an agricultural specialist writer/editor, graphic designer for publishing communication materials. 4. Align with project partners' communications resources and ensure access to their mediums. 5. Build and manage a media contacts database and plan opportunities, key messages, deadlines. 6. Prioritise ABC radio (rural & regional) coverage to maximise peer learning and target key audiences. 7. Create project materials: fact sheets, financial analysis, pastoralist case studies, photo library, testimonials, video stories, social media content. 8. Prepare materials for events: backing posters, signage, handouts and fact sheets, marketing tools.	1. Develop an annual plan, key milestone dates and delegations to meet reporting and compliance functions against the $1.092m communication & extension budget. 2. Integrate with the Northern Hub compliance and reporting calendar. 3. Establish reporting systems to meet all Consortia member's requirements. 4. Align research and science activities from Consortia members to magnify the total productivity improvements. 5. Build a project risk management checklist and review regularly. 6. Develop data protection and privacy protocols for all platforms used. 7. Manage Monitoring and Evaluation to support project reporting and enable iterative project development.

KEY MESSAGES

Pastoralists are partnering with the livestock feed and cropping (cotton and corn) sectors and researchers to demonstrate productivity improvements in the NW cattle herd.	*Improving productivity in North West cattle herds may achieve a more resilient pastoral enterprise model that reduces grazing pressure on the natural resource and delivers more sustainable returns on capital invested.*	*Producer demonstration sites are established across the NW to ground truth feeding strategies supported by R&D and provide peer to peer learning opportunities for pastoralists to accelerate adoption.*	*This project demonstrates alignment, co-investment and collaboration across private and public sectors can deliver proactive ESG outcomes for the pastoral cattle industry.*	*Pastoralists are investing in improving the social licence of their North West cattle industry through improved livestock and environmental outcomes.*