# Final report

## PDS: Winter Forage Tropical Grass Systems for Cattle


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# Abstract

The Northern Rivers region of New South Wales has a subtropical environment, with summer dominant rainfall and a dry spring period. The pasture species, both native and introduced are summer active. They have a reduced dry matter production and a decline in metabolizable energy, crude protein, and digestibility, in the late autumn and winter months.

The principal cattle operations are breeding herds producing veal calves for slaughter or sale to backgrounders or feed lotters on the tablelands and slopes regions of New South Wales and Queensland.

The low quantity and quality of the tropical pastures in winter restricts the number of breeding cows that can be carried in the Northern Rivers region properties. The breeding cows can suffer a negative energy balance for several months in the April to November period. This is the period of calving and rejoining to access the higher priced weaner sales from February to May.

This project is aimed at filling the feed gap by better managing the tropical grasses in summer/autumn and direct drilling ryegrass and oats into the managed sward to give high quality grazing in the winter months. The tropical grasses respond with increased production in spring due to accessing the residual nitrogen from the winter forage crop.

Giving the breeding herd access to winter forage from May to November impacted the productivity and profitability drivers of increased year-round stocking rate, decreased rejoining period, increased cow conception rate and increased the calf growth rate

# Executive summary


## Background

The Northern Rivers beef producers in NSW are impacted by a decrease in the year-round stocking rate, cow fertility and calf growth rate, due to the winter feed gap in the subtropical environment.

The producers who can benefit from the Winter forage/managed tropical grass project are those with beef breeding herds with existing tropical grass pastures. Also to benefit are those with land units, river and creek flats, that can be direct- drilled or mulch seeded with ryegrass and oats in Autumn.

The results of the demonstration will be used to encourage producers to use winter forage and better manage their tropical grass pasture. A benchmark of the expected increase in productivity drivers, stocking rate, breeding cow fertility and calf growth rate will be produced.

Producers will be able to assess the benefits of the project to investigate how winter forage and managed tropical grass can increase their on-farm productivity, profitability, and sustainability.

## Objectives

The objective of the project was to demonstrate the impact of winter forage and managed tropical grass on the productivity, profitability, and sustainability of the breeding herds on the Northern Rivers of NSW.

In addition, have the technology of managing the tropical grass pasture throughout the year and the establishment of winter forage into these existing pastures adopted by the wider beef producing community.

A further objective was to demonstrate that filling the winter feed gap will have a positive effect on the productivity drivers of stocking rate, cow fertility and calf growth rate.

## Methodology

Four core sites were established, one each on four properties with a proportion of the breeding herd. The productivity drivers of stocking rate, cow calving rate, calving date and calf growth rate were measured. These performance parameters were compared to other parts of the property and similar properties in the locality.

Pasture production per hectare was calculated throughout the whole year or the part of the year when winter forage was being grazed. This was calculated from the cows liveweight and the number of days the pasture was grazed and the area of the paddock.

Pasture input costs and animal input costs were recorded for the three years; 2019 to 2021.

Stocking rate data and animal performance data was recorded for each of the four sites.

The animal performance parameters were calving rate, calving pattern and calf weaning rate or sale weight. The observer sites measured the kg of red meat produced and the cost of production per hectare.

Soil samples were taken on some of the sites to allow the group members to relate soil nutrient levels with dry matter production.

Tropical grass feed quality was demonstrated by taking twelve pasture samples covering varieties and maturity levels.

## Results/key findings

All four core sites showed an increase in the monitored productivity drivers of stocking rate, cow fertility and calf growth rate. This resulted in an increase in red meat production per hectare.

The red meat produced on the core properties was 50% to 100% higher than the control programs on their properties and the local community performance.

The cost /benefit analysis was calculated on the four sites over the three years. One site recorded a benefit of $42/ha in the drought year of 2019 to $656/ha in 2021.

All the core producers and observers increased their skills and their confidence with the winter forage and managed tropical grass program. They understand the impacts of winter forage and managed tropical grass on the whole farm system and the production parameters.

The extension activity was hampered by the Covid 19 restrictions. The Norco staff training session was cancelled by the record floods in 2022.

Two public field days were unable to be conducted. However, the group was able to have two farm walks to inspect pasture establishment, pasture quality and animal performance.

Communication was hampered by not having public field days to focus the ABC radio interview and press releases. However, other general press releases were produced and appeared in The Land, local press, SALRC newsletter and the Northern Cooperative Meat Company newsletter.

A video highlighting the PDS and the four core properties was produced and was shown at the Casino MeatUp forum on 6/12/2022. This virtual farm tour video will be placed on the MLA site to promote the PDS program.

A case study on one of the four core properties has been produced and was available in February 2023 to accompany the Virtual Farm Tour video. It also appeared in MLA Friday feedback. Another case study has been completed and is with the MLA's communications team.

The project began with four core sites and seven supporting sites. However, one of the core sites was severely impacted by the Rappville bushfire and subsequently left the project core group. This site (site 4) was replaced by a supporting site, Site 7. The project finished with four core sites and five observer sites that were able to provide data for three years.

## Benefits to industry

The PDS project results have shown that the Northern Rivers beef producers can increase the calf turnoff weight from their breeding herds by 50 to 100% and increase the beef enterprise profitability, provided they have land units suited to winter forage production. This is primarily due to filling the winter feed gap and increasing the year-round stocking rate, increasing the breeding cow fertility, and increasing calf weaning weight.

The annual group of calves can be sold to backgrounders and finishers on the tableland, slopes, and western regions, where they are more heavily impacted by drought periods.

## Future research and recommendations

There are two potential areas of research that could be undertaken.

Firstly, the management of the aggressive tropical grasses leading up to the establishment of the winter forage is an area where timing, pasture biomass management and rainfall probability are paramount. This has a major impact on the winter forage establishment and dry matter production throughout the winter/ spring period.

Secondly, management techniques of the tropical grass species, especially in summer, have a dramatic impact of the feed quality, metabolizable energy, crude protein percentage and

digestibility. This flows through to animal performance and survival of the more desired pasture species.

# PDS key data summary table

**Project Aim:**
*To demonstrate the impact of sowing winter forage into managed tropical grass pasture to fill the winter feed gap and increase the productivity drivers of stocking rate, cow reproductive rate and calf growth rate.*

| | Comments | | Unit |
|---|---|---|---|
| **Production efficiency benefit (impact)**<br>Pasture productivity – kg DM/ha/day<br>Increased Stocking rate – breeding cow/ha<br>Reproductive efficiency – weaning %<br>Calf weaning weight. Kg HSCW/ha. | *9 to 26kg DM /ha/day*<br>*0.5 to 1 cow/ha*<br>*86% to 98%*<br>*64 to 277kg HSCW/ha* | 0 | |
| **Reduction in expenditure**<br>Reduction in labour i.e. DSE/FTE, LSU/FTE, AE/FTE;<br>Reduction in other expenditure | | 0 | |
| **Net $ benefit (impact)** | $37 to $1,344/ha | **$37.00-1,344.00** | **/ha** |
| **Number of core participants engaged in project** | | 4 | |
| **Number of observer participants engaged in project** | | 5 | |
| **Core group no. ha** | | 1,0520 | Ha |
| **Observer group no. ha** | | 5,2000 | Ha |
| **Core group no. sheep** | | 0 | |
| **Observer group no. sheep** | | 0 | |
| **Core group no. cattle** | | 1810 | Baseline stocking rate - 1.1 - 1.7hd/ha |
| **Observer group no. cattle** | | 5900 | Baseline stocking rate 1.1 hd/ha |
| **% change in knowledge, skill & confidence – core** | | 100% | |
| **% change in knowledge, skill & confidence – observer** | | 100% | |
| **% practice change adoption – core** | | 100% | |
| **% practice change adoption – observers** | | 80% | |
| **% of total ha managed that the benefit applies to** | | 40% | |

| **Key impact data** | |
|---|---|
| **Net $ benefit /ha (impacted ha)** | **$37 to $1,344/ha** |
| **Net $ benefit /ha (total ha managed)** | **$23 to $700/ha** |
| **Cost of production ($ / kg red meat)** | **$0.6/kg - $1.6/kg of red meat** |

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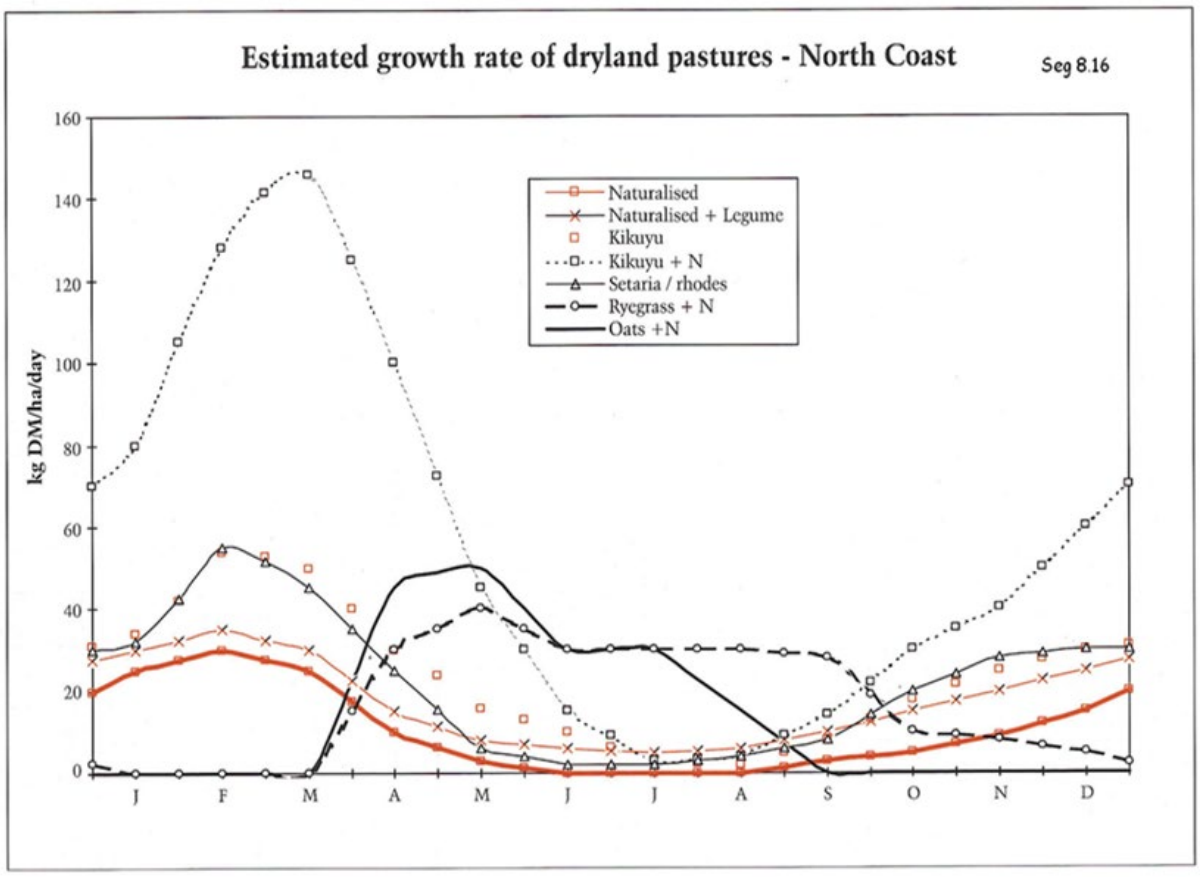
# 1 Background

The Northern Rivers beef producers are impacted by a decrease in the year-round stocking rate, cow fertility and calf growth rate all due to the low winter feed supply in the subtropical environments.

The improved tropical grass pastures perform extremely well in the subtropical environment producing 8 tons of dry matter per hectare (tdm/ha) for Setaria and Rhodes grass over the year without the application of nitrogen fertilizer. See Figure 1. Prograze Growth Curves.

**Figure 1 Prograze Growth Curves for the North Coast of NSW**




Source: NSW PROGRAZE Manual, Appendix 4, NSW Agriculture (for further information and assumptions on which these tables are based, see NSW PROGRAZE Manual or visit the Department's website, www.agric.nsw.gov.au).

For approximately forty years the dairy industry on the Northern Rivers addressed the severe forage shortage in the winter months by growing ryegrass and oats. This feed shortage was traditionally filled by expensive hay or grain supplements. The dairy industry dynamics changed with the main period of milk production moving from Spring- Summer to Autumn -Winter with a higher return per litre.

The beef producers who can benefit from the winter forage are those with beef breeding herds with existing tropical grass pastures. Others to benefit are those with land units, river, and creek flats, that can be direct- drilled or mulch seeded with ryegrass and oats in Autumn. However, all beef producers could benefit from better management of their tropical grass pastures.

The results of the Demonstration will be used to encourage producers to use winter forage and better manage their tropical grass pasture. A benchmark of the expected increase in productivity

drivers, stocking rate, breeding cow fertility, calf weaning weight will be produced. This will allow the investment to be critically assessed and implemented with greater confidence.

Producers will be able to assess the benefits of the project to investigate how winter forage and managed tropical grass will increase their on-farm productivity, profitability, and sustainability.

# 2 Objectives

The project's overall objective was to demonstrate the impact of winter forage and managed tropical grass on the productivity, profitability, and sustainability of the breeding herds on the Northern Rivers of NSW. Have the outcomes be extended and adopted by the project producer group and the wider Northern Rivers of NSW beef community.

There were six objectives of this project, as per the contract and are reported on under the following headings:

**Objective 1. As a result of 4 demonstration sites in the Casino region of NSW, 200 producers will be trialling the Winter Forage Tropical system for beef breeding enterprises on the Northern Rivers of NSW, resulting in:**

**Objective 1a. Increase in the kilogram Hot Standard Carcass Weight per hectare (kgHSCW/ha) of the calves produced from the trial groups.**

Objective 1a was successfully achieved. The carcass weight of the calves on the winter forage group at the demonstration sites ranged from 10 to 15kg higher than the non-forage group. However, the sale price of the lighter calves on the non-winter forage group was similar to the winter forage group due to a higher $/kg HSCW.

The dominant driver in the increase in the kg HSCW/ha from the winter forage group was the increase in stocking rate, ranging from 50% to 100%.

**Objective 1b. Reduced cost of production.**

Objective 1b was partially achieved. The cost of production per calf from the winter forage group was higher than the non-winter forage group. However, this cost was nullified by the increase in the calf income /ha in the winter forage group, primarily driven by increased stocking rate. For example, at Site 1, the winter forage group benefit per ha ranged from the drought year; 2019 of $42/ha to $656/ha in 2021.

**Objective 1c. Stocking rates will have increased by 15%.**

Objective 1c was successfully achieved. The stocking rate increased on average by more than 50% across the 4 main demonstration sites. The impact on stocking rate as the result of winter forage and managed tropical grass was dramatic, with increased stocking rates per hectare from 44% to 110%.

**Objective 1d. Breeding cow condition score increased by one.**

Objective 1d was not measured. In lieu of body condition score (BSC), liveweight gain was measured. The liveweight of the cows in the winter forage groups was higher than the non-winter forage group. For example, at Site 1, the winter forage group consistently had a liveweight of greater than 80kg and, therefore, a condition score greater than one unit.

**Objective 1e. Pregnancy rates will be above 90%.**

Objective 1e was successfully achieved. All the winter forage groups had calving rates higher than 90%, in some cases as high as 98%, therefor the pregnancy rate was also more than 90%. At

all sites, the pregnancy rates and the resulting calving rates were higher than 90%. The four core winter forage sites had a calving rate 5% higher than the non- winter forage site.

**Objective 1f. Increased weaning weights of calves.**

Objective 1f was partially achieved. The weaning weights of the calves from the winter forage groups were higher than the non-forage groups. At sites 1 and 7 the winter forage calf weaning rates were 10 to 15kg HSCW higher than the control areas. However, the winter forage group calves were also sold one to two months earlier. This then contributed to the increase in the cow weight at next calving of 26 to 80kg liveweight.

Sites 2 and 3 had insufficient or confounded data to be able to compare the winter forage group with the non- winter forage breeding cows. The winter forage group at Site 2 were first calf heifers and the control group were cows. At Site 3, the winter group had a high proportion of first calf heifers, and the control group were mature cows.

Overall, objective 1 was partially achieved. COVID-19 impacted the delivery of a number of the extension activities planned for this project, which resulted in not achieving the targeted 200 producers engaged.

**Objective 2. Six other demonstration sites will provide yearly comparative data on**

a. Kg/Ha
b. Cost of production
c. Description of farming system used

Objective 2 was partially achieved. Five observer sites were supplied data across the three years of the project.

This data was used to compare the winter forage groups and the non-winter forage group. The advantage of producers generating this data made them more aware of the demonstration site's results.

The data collected was simplified to.

a. Kilogram of red meat /ha
b. Cost of production /ha
c. Description of production system

**Objective 3. Twenty producers will have increased their skills and confidence in managing the winter forge/ managed tropical grass system.**

Objective 3 was partially achieved. Feedback has shown that the 10 core producers and observers have increased their knowledge and confidence. The results of the core and observer producer post project surveys and comments are shown in Section 4.4. A positive guide is the increased seed sales over the period of the project.

**Objective 4. Two hundred producers will be trialling the winter forage/ managed tropical grass system for beef breeding enterprises on the Northern Rivers of NSW.**

Objective 4 was unable to be effectively measured. Covid 19 restrictions across 2020-2022 had implications on the level of direct observer engagement with the project.

The sales data of winter forage seed, within the region, over the four years of the project provide an indication of adoption.

The Casino Norco Rural store sold 80 tons of ryegrass in 2019, which was the drought year, sales increased to 120 tons of in 2021. During 2022 large quantities of ryegrass was flown onto flooded tropical grass pastures as the sodden soil conditions prohibited machinery usage. The 2022 ryegrass tonnage was 128t. The ryegrass seed sales to 30th April 2023 are already 123t, with two months remaining in the planting season. An estimate of 160 t is achievable.

**Objective 5. One thousand three hundred red meat producers in the region will be made aware of the system and its benefits through a coordinated stakeholder extension and communication program, including:**

a. **One field day per year.**
b. **Two farm walks per year.**
c. **Three seminars and a range of other communication products.**

Objective 5 was not achieved. COVID-19 restrictions and seasonal conditions impacted the project's ability to deliver a number of planned events within the extension and communication program. This had a negative impact on the level of direct observer engagement with the project.

**Objective 6. Training provided to at least 10 industry advisors**

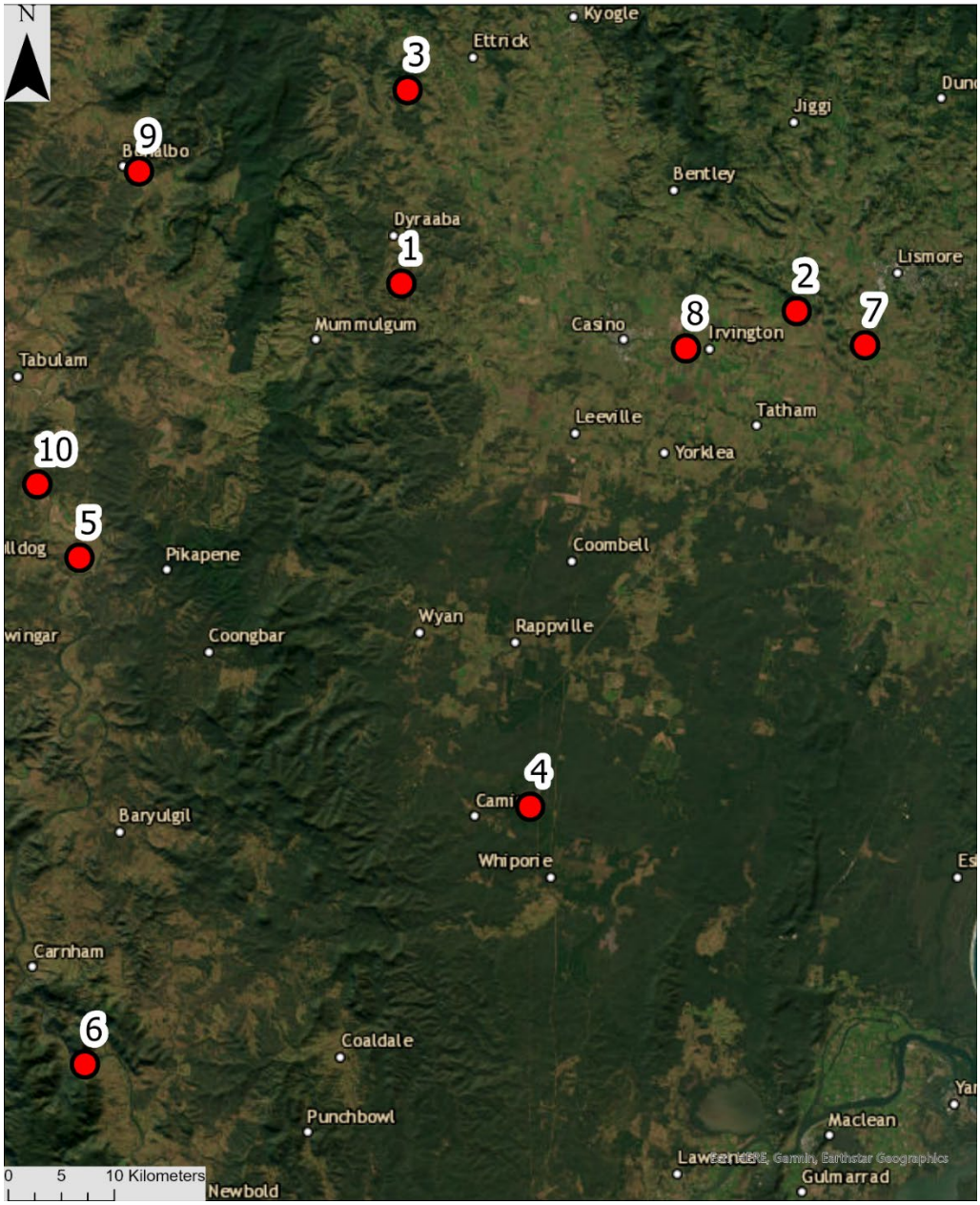
Objective 6 was partially achieved. A training day for 8 Norco advisory staff in Casino was conducted in early March 2020. Another training day planned for Coffs Harbor in February 2022 was cancelled due to the record-breaking rainfall and flooding.

# 3 Demonstration Site Design

## 3.1 Methodology

Four core sites and six observer sites were established in the area from Lismore to Tabulam in Northern NSW (Figure 2). Site 4 was destroyed by bushfires and was replaced by observer, Site 7.

**Figure 2 Location of Core and Observer sites**




**Source:** ArcGIS Pro. Google satellite**.**

These sites covered the black soil flats and red to chocolate basaltic soils near Lismore to the lighter textured soils with less reliable rainfall near Tabulam and Bonalbo.

All sites recorded the number of cows and the area grazed for either the whole year or the period when the winter forage was grazed. The grazing days were also recorded.

Cows were weighed three times during the year; calving, joining and weaning. The calving dates were recorded precisely and reported on a weekly period on sites 1 and 2.

Cow fertility was monitored via manual pregnancy diagnosis or the calving dates the following year.

Calf weaning weights were recorded at all sites and converted to expected carcass weights giving red meat yield. Fifty percent of the calf non curfewed liveweight was taken as an estimate of the hot standard carcass weight.

The pasture yield from the paddocks was calculated by knowing, cow weights, grazing days and the area of the paddock. The cow intake was taken as 2.5% of the cow liveweight. The pasture yield was expressed as kgDM/ha /day. This was actually less than the pasture yield as there was always ungrazed pasture and pasture that was trampled or soiled.

Soil tests were taken on the sites if no recent samples were analyzed. The results were used to make fertilizer decisions on the paddocks in the trial.

The rainfall for Site 2 and Site 7 was taken as the rainfall from the Tuncester recording station 2km west of Lismore. The rainfall for Site 1 and Site 3 was taken as the rainfall from the Casino Airport recording station. Site 1 is located 20km west of the Casino recording site, while Site 3 is 17km Northwest of the Casino recording site. The rainfall over the three years is shown in Figures 3 and 4.

Below-average rainfall occurred at all sites in 2019, and above-average rainfall in 2021.

**Figure 3 Weekly Rainfall for Sites I and 3. Taken at the Casino Airport recording station**

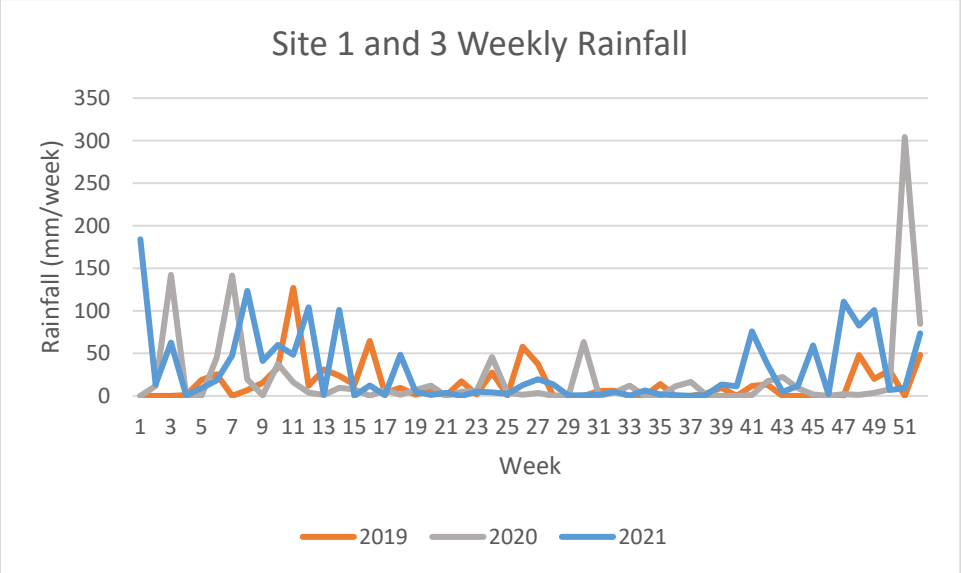
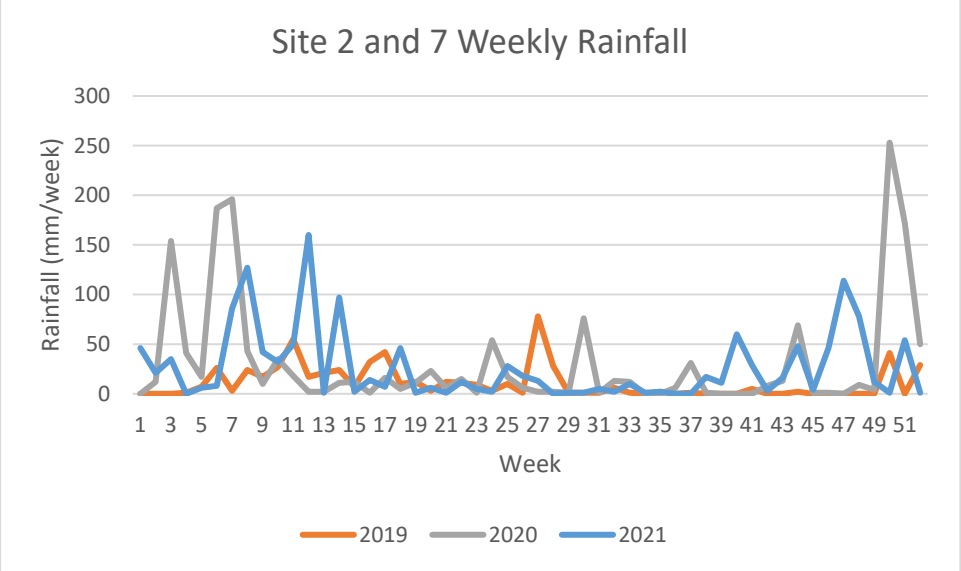



**Figure 4 Weekly Rainfall for Sites 2 and 7. Taken from the Tuncester recording station**




The performance of the trial group was compared to other parts of the property and the locality standard.

The differing management practices on the sites show the opportunities to use winter forage and tropical pastures throughout the region.

### 3.1.1 Site 1

Site 1 was located at Dyraaba, west of Casino on a 40ha site in a 243ha property, with a group of 38 to 40 Angus Friesian cross cows joined to an Angus bull. The female progeny was retained as replacement heifers and the steers sold as re-stocker weaners. The group stayed exclusively on the 40ha site for the three years of the trial.

The base pasture was primarily Seteria with some paddocks of Bissett creeping blue grass and Rhodes grass. Sixteen ha of the forty ha was direct drilled with oats (Wizard 55kg/ha or Saia 65kg/ha) and ryegrass (Vortex at 35kg/ha) in 2019 and 2020, however only twelve ha in 2021 due to the extremely wet conditions at planting.

Fertilizer application was generally 150kg/ha of ammonium sulphate after planting and two applications of 200kg/ha of Urea during the growing season.

The performance of the trial group was compared to other parts of the property and the locality standard.

### 3.1.2 Site 2

Site 2 was located at Caniaba southwest of Lismore. Stocking rate ranged from 42 head of two-year-old heifers and calves grazing 19ha in 2019, 34 head on 18ha in 2020 and 43 head on 30.5ha in 2021, depending on the growing conditions and rainfall. They were solely fed ryegrass and residual Seteria for 150days. A new group of Angus cross heifers were put into the monitored group each year. The calving rate was also recorded on the second year of calving.

Tetila ryegrass was direct- drilled or mulch seeded into the Seteria pasture. Urea applications were generally 200kg/ha.

### 3.1.3 Site 3

Site 3 was located at Doubtful Creek on a 280ha property northwest of Casino. In 2019, 35 cows grazed 45ha consisting of 13ha ryegrass and 32ha natural pasture for 176 days. In 2020, a group of 60 cows, some of the first calvers, grazed 25ha of ryegrass and 45ha of naturalized tropical grass pasture on alternate days. They had access to the ryegrass for 115 days.

Tetila ryegrass was mulch seeded into tropical grass pastures at 30kg/ha with ammonium sulphate at 250kg/ha after seedling emergence in 2019. However, in 2020, Tetila ryegrass, Saia oats, and Chicory were mulch seeded at 40kg/ha. Two applications of urea at 125kg/ha occurred, one after planting and the other mid-season.

### 3.1.4 Site 7

This site was located south of Lismore on the Wilson River floodplain. It was established in 2020 when Site 4 was destroyed by the Rappvile bushfires. In 2020, 80 Angus cows and calves grazed 25ha of ryegrass and a 19ha tropical grass runoff paddock. In 2021, 70 Angus cows and calves grazed 24ha of mulch sown ryegrass and an 8ha tropical grass runoff paddock.

Tetila ryegrass was mulch sown at 40kg/ha. Urea was applied in two applications of 140kg/ha. The calves were valued as re-stocker weaners even though they are stud Angus cattle.

## 3.2 Economic analysis

The winter forage /managed tropical grass project has shown benefits in all the productivity drivers and their combination gave an economic benefit as profit per hectare.

The profit per hectare was calculated for the core sites.

The breeding cows per hectare and their calving percentage were recorded. The cow and calf costs were recorded and expressed per hectare. The pasture costs: site preparation, seeding, seed cost and fertilizer cost and application costs were calculated. The total costs were the sum of the pasture costs and the cow and calf costs.

The calf income was recorded from sale results or calculation of expected income for cattle that were not sold, primarily replacement heifers.

The total costs/ha were subtracted from the calf income/ha to give the profit per hectare.

The benefit of the winter forage/managed tropical grass system was determined by subtracting the profit from the non-winter forage site from the profit of the winter forage site. This was expressed as dollar benefit per hectare.

## 3.3 Extension and communication

A detailed communication and extension plan was developed as a part of milestone 1 of this project to outline the intended activities to be delivered to engage with core and observer producers as outlined in the objectives.

Planned communication activities included seminars, field days, farm walks and group meetings, articles and case studies as outlined in Table 1.

**Table 1 Planned communication and extension activities**

| Activity | Responsibility | Target Audience | Key messages and must-have elements | Timing | Estimated reach |
|---|---|---|---|---|---|
| Farm walk | Tom Amey | Primary | Core group- Inspecting Forage/No forage site | 13/10/2019 | Core group plus others<br>20 |
| Case study | Tom Amey | Primary/secondary | Winter forage cv. Tropical pasture plus supplements | 15/2/2020 | NCMC 1400<br>Land 5,000<br>RW 5,000 |

| | | | | | |
|---|---|---|---|---|---|
| Seminar | Tom Amey | Primary/secondary | Winter forage opportunities in beef herds; 3 case studies.<br>Technical presentations | 1/3/2020 | Producers 130<br>Land 5,000<br>RW 5,000<br>ABC radio 10,000<br>Feedback Magazine |
| Norco training | Damon Bailey<br>Tom Amey | Primary/secondary | Production and management of winter forage systems | 8/3/2020 | 12 advisory staff |
| Farm walk | Tom Amey | Primary | Go No Go<br>Revised programmes | 15/3/2020 | Core group plus others<br>20 |
| Farm walk | Roger Bailey<br>Tom Amey | Primary/secondary | Progress of the winter forage production systems | 20/10/2020 | Local producers, Advisors 50 |
| Activity | Responsibility | Target Audience | Key messages and must-have elements | Timing | Estimated reach |
| Field day | Jo Levin<br>Tom Amey | Primary/secondary | Winter forage establishment, production and breeding herd performance | 20/4/2021 | Producers 60<br>NCMC 1400<br>Land 5,000<br>RW 5,000<br>ABC radio<br>10,000 |
| Farm Walk | John Gibson<br>Tom Amey | Primary/secondary | Cattle performance parameters and whole farm impacts | 18/10/2021 | Producers 50<br>NCMC 1400<br>RW 5,000<br>Land 5,000 |
| Field day | Ron Meldrum<br>Tom Amey | Primary/secondary | Tropical pasture production and management, prior to drilling winter forage.<br>Whole farm impacts, herd dynamics | March 2022 | Producers 60<br>NCMC 1400 |

| | | | | | |
|---|---|---|---|---|---|
| Case study | Ron Meldrum<br>Tom Amey | Primary/secondary | | May 2022 | NCMC 1,400<br>RW 5,000<br>Land 5,000 |
| Seminar | Tom Amey | Primary/secondary | 4 Case study presentations<br>Technical presentations<br>Adoption material | Late November 2022 | ABC<br>10,000<br>Feedback Magazine<br>NCMC<br>1400<br>RW<br>5,000 |
| Group Meeting | Tom Amey | Primary | Post project survey | December 2022 | Core group plus others<br>20 |

In addition, the Casino MeatUp forum agenda was developed based on the project, providing an additional extension activity not in the original communications plan. The virtual farm tour for the forum showcased the project with the four core producers speaking about their property and management practices.

## 3.4 Monitoring and evaluation

A monitoring, evaluation and reporting (MER)plan was developed for the project (see Appendix 7.1).

The plan included:

- Clear identification of practices and metrics being demonstrated and measured
- Collection of data on producer numbers and animals, and area potentially impacted by the project
- Pre-project surveys of producers to benchmark current knowledge and skills in relation to the subject
- Benchmark current practices in relation to the subject
- Post project surveys of producers to enable assessment of changes in:
  - Reactions (perceptions, enthusiasm etc.) because of the project
  - Knowledge, Attitudes, Skills and Aspirations
  - Practices
- Extent of and impact from communication/extension activities outside of the PDS project participants

ENGAGEMENT & ADOPTION PERFORMANCE METRICS

*Engagement*

Pre and post Knowledge, skills and confidence

Number producers directly and indirectly engaged

Practice change – intended and actual

*Productivity*

Production efficiency (Kg red meat / area unit)

Pasture productivity (kg DM/ area unit)

Stocking rate (breeding unit/ha)

Reproductive efficiency (weaning %)

Mortality rate (%)

*Enterprise Indicators*

Cost of Production ($/ kg red meat)

Gross Margin / Ha

Environmental

Ground cover (%)

# 4 Results

The results include the animal performance and pasture production, economic analysis of the performance, the extension and communication outcomes and the monitoring and evaluation of the project.

## 4.1 Demonstration site results

The results will be presented under the heading of each metric that had data recorded.

### 4.1.1 Soil tests

Soil samples were taken from winter forage growing sites and tropical pasture grazing area. Comments on the results for some essential elements are listed in Table 2.

**Table 2 Comments on soil test results**

| Element | Comment |
|---|---|
| Calcium | All the sites had Ca levels above the critical levels and would not limit pasture production. |
| Potassium | The soil levels varied and were lowest in land units that had a cropping history with limited K fertilizer inputs. |
| Magnesium | All the magnesium levels were above the level critical for optimum pasture production. |
| Phosphorus | Some sites had P levels that would be limiting pasture production, particularly legume growth. |
| Nitrogen | All sites were nitrogen responsive as expected from site with actively growing tropical grasses in summer. |
| Sulphur | The sulphur levels were marginal on some sites. These sites were generally the lower P sites as well. |
| pH | All sites had acceptable pH levels. |

| | |
|---|---|
| Organic matter% | Most sites had acceptable organic matter levels of greater than 3.5 % to 5.5% depending on soil texture. |
| Aluminium | Only one site had an exchangeable Al level that would affect pasture legume production. This site also had a lower than optimal pH. |
| Effective CEC | AS expected, the Cation exchange capacity was lowest on the lighter textured sites. |
| Copper | The copper levels were generally lowest on the lighter textured soils. |

### 4.1.2 Carrying capacity

The carrying capacity on each site was determined by the weight of the breeding cows and the pasture dry matter available. These figures are expressed as stocking rate; cows/ha.

From Table 3, At Site 1, the stocking rate ranged from 0.93 to 1.0 cow /ha on the trial site with winter forage and managed tropical grass. However, the tropical species sites had a stocking rate of 0.43 to 0.48 /ha. This is generally half of the rate of the trial site. The doubling of the carrying capacity on the trial site had a major impact on profitability.

Site 2 shows a stocking rate of 2.2 to 1.4 cows /ha. This is also double the stocking rate on the non-winter forage areas (Table 3).

Site 3, the stocking rate ranged from 0.86 cows per hectare to 0.77 cows /ha on the winter forage paddocks compared to 0.5 to 0.64 per ha on the non-forage paddocks (Table 3). This is lower than the other sites because there was a large run off area of naturalised pasture that the cows grazed on alternate days to the winter forage paddocks. However, the non-winter forage paddocks were better quality tropical grasses plus clover/vetch, which allowed a stocking rate of 0.5 to 0.64, which was higher than the natural pasture at Site 1.

Site 7 had a stocking rate of 1.8 to 2.2 breeding cows per hectare on the forage paddock compared to x0.9 to 1 per Ha on the non-winter forage site(Table 3). The cows grazed the winter forage during the day and ran off into a small paddock at night. This fitted the management strategy of monitoring cows and performing artificial insemination. However, as with Sites 1 and 2, the winter forage allowed double the stocking rate on those sites.

This increase in carrying capacity is above the projected increase of 50%.

**Table 3 Stocking rate and Calving % at the core sites**

| **Site** | **Year** | | | | | |
|---|---|---|---|---|---|---|
| | **2019** | | **2020** | | **2021** | |
| | | | | | | |
| **Site 1** | **Winter Forage** | **No Winter Forage** | **Winter Forage** | **No Winter Forage** | **Winter Forage** | **No Winter Forage** |
| Cows/ha | 0.93 | 0.43 | 0.93 | 0.48 | 1 | 0.45 |
| Calving % | 97 | 92 | 97 | 93 | 97 | 93 |
| **Site 2** | **Winter Forage** | **No Winter Forage** | **Winter Forage** | **No Winter Forage** | **Winter Forage** | **No Winter Forage** |

| | | | | | | |
|---|---|---|---|---|---|---|
| Cows/ha | 2.2 | 0.9 | 1.9 | 0.83 | 1.4 | 0.8 |
| Calving % | 90 | 84 | 96 | 94 | 97 | 95 |
| **Site 3** | **Winter Forage** | **No Winter Forage** | **Winter Forage** | **No Winter Forage** | **Winter Forage** | **No Winter Forage** |
| Cows/ha | 0.77 | 0.5 | 0.86 | 0.58 | 0.81 | 0.64 |
| Calving % | 94 | 90 | 94 | 92 | 95 | 92 |
| **Site 7** | **Winter Forage** | **No Winter Forage** | **Winter Forage** | **No Winter Forage** | **Winter Forage** | **No Winter Forage** |
| Cows/ha | N/A | N/A | 1.8 | 0.9 | 2.2 | 1 |
| Calving % | N/A | N/A | 97 | 94 | 96 | 93 |

### 4.1.3 Calving Percentage

A target calving percentage of 90% was achieved on all forage sites and the non-forage areas. This is above the region's calving percentage of less than 85%.

All four sites have extended joining periods, three at 12 weeks and one site up to 16 weeks; therefore, the rate is much higher than expected from a 9-week joining.

Table 3 shows that the non-forage sites only have a calving percentage of 2 to 5% below the forage sites. This could be explained by the non-forage sites having more standing pasture into winter. The extended joining period of 12 weeks could also contribute to the higher figure.

### 4.1.4 Re-joining date

The calving patterns at Sites 1 and 7 are shown in Table 3. and Table 4. The joining dates in 2019 are shown as the calving pattern in 2020, and so on for 2020 and 2021. I am using these two sites as the same group of cows were involved. Sites 2 and 3 had all the group or a high percentage as heifers, which moved to another group of cows the following year.

Site 1 (Table 4) - The calving pattern moved forward with 16 in the first 4 weeks in 2020 and 21 in the first 4 weeks of 2022. The calving pattern was consistent over the three years for the second and third 4-week periods. The fourth and fifth 4-week period showed a decline in calving's over the four years, as these cows had moved earlier in re-joining date and resulting calving date.

Site 7 (Table 5) - The calving dates were consistent for the 2019 and 2020 re-joining years. However, there was a decline in the number of cows calving in the first eight weeks of 2022. This was due to very wet conditions delaying ryegrass planting in 2021. As a result, the condition of cows was lower due to the seasonal impact, which caused some cows not to cycle when expected.

**Table 4 Calving dates at Site 1**

| | | | | |
|---|---|---|---|---|
| **Date and Week** | **2019** | **2020** | **2021** | **2022** |
| Week 1 (01/04/20) | - | 5 | 5 | 5 |

| | | | | |
|---|---|---|---|---|
| Week 2 | - | 3 | 4 | 6 |
| Week 3 | 6 | 4 | 3 | 5 |
| Week 4 | 5 | 4 | 5 | 5 |
| Four Week Summary | 11 | 16 | 17 | 21 |
| Week 5 | 4 | 4 | 3 | 4 |
| Week 6 | 5 | 2 | 3 | 3 |
| Week 7 | 2 | 2 | 2 | 3 |
| Week 8 | 2 | 3 | 3 | 2 |
| Four Week Summary | 13 | 11 | 11 | 12 |
| Week 9 | 2 | - | 1 | 2 |
| Week 10 | 1 | 1 | 2 | 3 |
| Week 11 | 2 | 2 | 2 | - |
| Week 12 | 1 | - | 1 | - |
| Four Week Summary | 6 | 3 | 6 | 5 |
| Week 13 | - | 2 | - | - |
| Week 14 | 2 | - | 1 | - |
| Week 15 | 2 | 2 | - | 1 |
| Week 16 | - | - | 1 | - |
| Four Week Summary | 4 | 4 | 2 | 1 |
| Week 17 | 1 | 2 | 1 | - |
| Week 18 | - | - | - | - |
| Week 19 | 2 | 2 | - | - |
| Week 20 | - | - | - | - |
| Four Week Summary | 3 | 4 | 1 | - |
| Week 21 | - | - | 1 | - |
| Week 22 | - | - | - | - |
| | Total 37 | Total 38 | Total 39 | Total 39 |

**Table 5 Calving dates for Site 7**

| Date | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Week 1 (15/4/20) | | 10 | 12 | 3 |

| | | | | |
|---|---|---|---|---|
| Week 2 | | 10 | 13 | 6 |
| Week 3 | | 13 | 10 | 3 |
| Week 4 | | 6 | 7 | 3 |
| Four Week Summary | | 39 | 42 | 15 |
| Week 5 | | 6 | 7 | 4 |
| Week 6 | | 7 | 8 | 4 |
| Week 7 | | | 6 | 8 |
| Week 8 | | 7 | 7 | 2 |
| Four Week Summary | | 20 | 28 | 18 |
| Week 9 | | 4 | 3 | 6 |
| Week 10 | | | 1 | 3 |
| Week 11 | | 2 | 3 | 7 |
| Week 12 | | | 2 | 5 |
| Four Week Summary | | 6 | 9 | 21 |
| Week 13 | | 10 | 1 | 5 |
| Week 14 | | 4 | | 6 |
| Week 15 | | | | 6 |
| Week 16 | | | | 7 |
| Four Week Summary | | 14 | | 24 |
| Week 17 | Total | Total 79 | Total 80 | Total 78 |

### 4.1.5 Cow condition score

Cow weights were recorded at all four sites, and a change in condition score of one was taken as a change of 70kg in the cow's liveweight. Sites 1 and 7 could record cow weights for the trial group and some cows on the non-forage areas of the property. Sites 2 and 3 did not record the non-forage cows as they were mature cows, and the trial groups were primarily 2yo or 3yo heifers.

From Table 6 - 9, it can be seen that the cows were weighed three times each year: calving, re-joining and weaning.

At Site 1 (Table 6), the difference in liveweight of the cows at calving, joining and weaning for the winter forage group was consistently higher than the non-winter forage group for the 2019 and 2020 years. The difference of 71kg to 94 kg was equivalent to a difference of at least one condition score. In the year 2021, the difference was 57 to 67kg, which was determined to be less than one condition score.

The cows at Site 1 lost body weight from calving to when the calves were weaned. In 2019 the loss was 57kg, with a large loss of 102 kg in 2020. The loss was 57kg in the 2021 year. Overall, this group of cows

on the winter forage sites were slightly underfed over the calving to weaning period. This group of cows are half-bred Friesian. Therefore, they have a higher milk production, which increases feed demand.

**Table 6 Cow weights at Site 1 at calving, joining and weaning for those on Winter forage (WF) vs no Winter forage (NWF)**

| **2019** | | | **2020** | | | **2021** | | |
|---|---|---|---|---|---|---|---|---|
| **Date** | **Weight (Kg)** | | **Date** | **Weight (Kg)** | | **Date** | **Weight (Kg)** | |
| | **WF** | **NWF** | | **WF** | **NWF** | | **WF** | **NWF** |
| 2/05/19 Calving | 666 | 595 | 5/04/20 | 672 | 604 | 24/04/21 | 647 | 590 |
| 23/07/19 Joining | 648 | 563 | 2/07/20 | 597 | 520 | 16/06/21 | 650 | 590 |
| 29/10/19 Weaning | 609 | 515 | 3/09/20 | 560 | 487 | 6/10/21 | 590 | 523 |

At Site 2 (Table 7), the heifers gained weight over the seventeen months from joining to when their calves were weaned. In the 2019-2020 period the heifers gained 170kg liveweight. A gain of 166kg liveweight occurred in the 2020-2021 year. These heifers entered the cow herd at an equivalent weight to the cows and had a calving percentage of 94%. The liveweight increase occurred with an increase in condition score of one unit. Generally, on the northern rivers, heifers that calve as two-year-olds have a very poor re-joining rate, some as low as 60%. (Pers. Com. Nathan Jennings)

**Table 7 Cow weights at Site 2 at calving, joining and weaning on Winter forage**

| | **2020** | **2021** |
|---|---|---|
| Calving Stage | Weight (Kg) | Weight (Kg) |
| Joining | 403 | 410 |
| Calving | 520 | 535 |
| Weaning | 573 | 576 |

The cattle at Site 3 (Table 8) also gained weight from calving to joining to weaning. About half of the group were three-year-old heifers and the balance being young cows.

In 2020 the group of cows gained 22kg liveweight from calving to nine months later when the calves were weaned. The performance of the group in 2021 was similar, with a gain of 18kg liveweight from calving to weaning. The winter forage group had a condition score of about 0.7 above the non-forage group of cows. The non-forage group of cows were not weighed.

**Table 8 Cow weights at Site 3 at calving, joining and weaning on Winter forage**

| | **2020** | **2021** |
|---|---|---|
| Calving Stage | Weight (Kg) | Weight (Kg) |
| Calving | 542 | 535 |
| Joining | 546 | 541 |
| Weaning | 564 | 555 |

At Site 7 (Table 9), the cows in the winter forage group also gained weight in the nine-month period from calving to weaning. The gain was not high enough to be recognised as a change in condition score.

The gains were 28kg, 15kg and 20kg in the 2019, 2020 and 2021 years, respectively. However, the non-forage group of cows lost weight of 15 to 28kg from calving to weaning.

**Table 9 Cow weights at Site 7 at calving, joining and weaning for those on Winter forage (WF) vs no Winter forage (NWF)**

| | **2019** | | **2020** | | **2021** | |
|---|---|---|---|---|---|---|
| | **WF** | **NWF** | **WF** | **NWF** | **WF** | **NWF** |
| Calving Stage | Weight (Kg) | | Weight (Kg) | | Weight (Kg) | |
| Calving | 593 | 563 | 586 | 550 | 569 | 532 |
| Joining | 602 | 561 | 592 | 549 | 573 | 535 |
| Weaning | 621 | 539 | 601 | 522 | 590 | 527 |

### 4.1.6 Calf weights at weaning

The calf weaning weights, as shown in Table 10, on the forage sites ranged from 105kg to 144 kg, estimated hot standard carcass weight. Insufficient weights were recorded on the non-forage sites to enable a comparison to be made over the four sites. However, at Site 1 and Site 7 the weaning weights from the non-forage paddocks were seen to be from 10 to 15 kg less than the forage group.

**Table 10 Calf Weight at Weaning (Kg HSCW) for the core sites**

| **Site** | **Year** | | |
|---|---|---|---|
| | **2019** | **2020** | **2021** |
| 1 | 133 | 138 | 141 |
| 2 | 117 | 119 | 140 |
| 3 | 115 | 110 | 105 |
| 7 | 144 | 143 | 138 |

The weaning weight per calf expressed as HSCE, when multiplied by the breeding cow stocking rate, provided the Red Meat/ha data (Table 11).

**Table 11 Red Meat Production Per Hectare from the core sites.**

| | **Year** | | |
|---|---|---|---|
| **Site** | **2019** | **2020** | **2021** |
| | **Red meat produced (Kg/ha)** | **Red meat produced (Kg/ha)** | **Red meat produced (Kg/ha)** |
| 1 | 123 | 128 | 188 |
| 2 | 248 | 183 | 204 |
| 3 | 90 | 81 | 64 |
| 7 | 216 | 277 | 132.5 |

### 4.1.7 Pasture production

The cow liveweight, the grazing days per paddock and the area of the paddock were used to calculate the annual forage yield from each paddock.

At Site 1. The grazing cycles were recorded daily. The three-year results are presented in Tables 12, 13 and 14 for the 2019, 2020 and 2021 years.

In 2019, the Otera paddock had pasture consisting of Bisset creeping bluegrass plus a small percentage of Rhodes grass and Seteria. The sheep paddock, with a base pasture of Seteria was direct drilled with Saia oats. Mahogany and Bonnie paddock also had a base pasture of Seteria and were drilled with ryegrass and oats. These heavier textured, damp paddocks had an abundance of Seteria in summer and ryegrass in winter.

**Table 12 Pasture production: Site 1. 2019**

| **Paddock** | **Area (ha)** | **Days grazed** | **KgDM/ Paddock/y** | **Kg DM/ha/y** | **Kg DM/ha/day** |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **Otera –** Blue grass and Setaria | 24 | 135 | 74,925 | 3,121 | 8.55 |
| **Mahogany –** Ryegrass and Oats | 4 | 67 | 37,185 | 9,296 | 25.4 |
| **Bonnie** – Ryegrass and oats | 4 | 70 | 38,850 | 9,713 | 26.6 |
| **Sheep** – Saia Oats | 8 | 93 | 51,615 | 6,452 | 17.6 |
| | | 365 days | | | |

In 2020, the paddocks were treated the same as in 2019, and the results in terms of kgdm/ha /day were very similar.

**Table 13 Pasture production: Site 1. 2020**

| **Paddock** | **Area (ha)** | **Days Grazed** | **KgDM/ Paddock/yr** | **KgDM/ha/year** | **KgDM/ha/day** |
|---|---|---|---|---|---|
| **Otera –** Blue grass and Setaria | 24 | 147 | 81,585 | 3,399 | 9.3 |
| **Mahogany –** Ryegrass and Oats | 4 | 70 | 38,850 | 9,713 | 26.5 |
| **Bonnie** – Ryegrass and oats | 4 | 67 | 37,185 | 9,296 | 25.3 |
| **Sheep** – Saia Oats | 8 | 82 | 45,510 | 5,688 | 15.5 |
| | | 366 | | | |

In 2021, the paddocks were treated in a similar fashion to 2019 and 2020. However, the Mahogany paddock was not direct drilled with ryegrass due to very wet soil conditions. This resulted in a much-reduced yield of 14kgdm/ha/day compared to 26 and 25 in the previous years.

**Table 14 Pasture production: Site 1. 2021**

| Paddock | Area (ha) | Days Grazed | KgDM/ Paddock/yr | KgDM/ha/year | KgDM/ha/day |
|---|---|---|---|---|---|
| **Otera –** Blue grass and Setaria | 24 | 169 | 98,865 | 4,119 | 11.3 |
| **Mahogany –** Ryegrass | 4 | 35 | 20,475 | 5,118 | 14 |
| **Bonnie** – Ryegrass | 4 | 66 | 36,630 | 9,157 | 25 |
| **Sheep** - Oats | 8 | 95 | 52,725 | 6,590 | 18 |
| | | 365 | | | |

The pasture production for Site 2 showed a pasture yield of from 19 to 30kgdm/ha/year for the period the heifers were grazing the winter forage.

It was very difficult to calculate the pasture production on Sites 3 and 7 due to the cows moving off the ryegrass paddocks for twelve or twenty-four hours.

### 4.1.8 Pasture quality assessments

Thirteen pasture samples were taken throughout 2021 and analysed by NSW DPI Wagga Wagga. These demonstrated the change in feed quality of the tropical grass as the plant matured. The pasture species, age of growth, date of sampling, sampling method and the resulting measures of acid detergent fiber (ADF), crude protein (CP), dry matter digestibility (DMD) and metabolisable energy (ME) are shown in Table 15.

The pasture quality components of ADF, CP, DMD and ME were graphed in combinations to show quality decline as the pasture regrowth aged.

It can be seen in Table 15 that as pastures mature and move out of the vegetative stage, all the measures of quality decline.

**Table 15 Pasture quality comparison**

| Sample | Description | Date | ADF | CP | DMD | ME |
|---|---|---|---|---|---|---|
| | | | | | | |
| 1 | Rhodes, vegetive; 4 weeks | 10/02/2021 | 27 | 18.3 | 76 | 11.4 |
| | | | | | | |
| 2 | Creeping blue grass: vegetive | 1/05/2021 | 32 | 13.6 | 69 | 10.3 |
| | | | | | | |
| 3 | Glycine; vegetive | 1/05/2021 | 31 | 15.5 | 69 | 10.3 |
| | | | | | | |
| 4 | Rhodes, mature, whole plant | 16/04/2021 | 39 | 7.3 | 57 | 8.2 |
| | | | | | | |
| 5 | Rhodes, mature, grab sample | 16/04/2021 | 39 | 7.6 | 58 | 8.3 |
| | | | | | | |
| 6 | Oats, 7 weeks | 21/05/2021 | 24 | 21.6 | 82 | 12.5 |
| | | | | | | |
| 7 | Rhodes/Seteria, Veg- 7 weeks, grab sample | 21/05/2021 | 35 | 9.5 | 63 | 9.2 |
| | | | | | | |
| 8 | Seteria, 5 weeks, grab sample | 10/03/2021 | 34 | 11.6 | 70 | 10.4 |
| | | | | | | |
| 9 | Seteria, mature, grab sample | 10/03/2021 | 37 | 7.2 | 61 | 9 |
| | | | | | | |
| 10 | Paspalum, mature, grazed | 25/05/2021 | 40 | 8.3 | 52 | 7.3 |
| | | | | | | |
| 11 | Paspalum/Rhodes | 20/05/2021 | 42 | 4.4 | 52 | 7.3 |
| | | | | | | |
| 12 | Creeping Vigna, grazed | 20/05/2021 | 34 | 11.8 | 59 | 8.6 |
| | | | | | | |
| 13 | Bahia/ Native, grass, mature | 8/06/2021 | 40 | 4.3 | 53 | 7.5 |

### 4.1.9 Observer group production data

The involvement of the observer group in trialing the program and collection of production data made them more open to take on board the core site results and hopefully assist their adoption of the winter forage program (Table 16).

**Table 16 Observer group production figures**

| Producer | Production | Year | | |
|---|---|---|---|---|
| | | **2019** | **2020** | **2021** |
| **A.**<br>141 ha property<br>40 ha site<br>4 ha ryegrass | Calving % | 94 | 92 | 94 |
| | Stocking Rate (Cows/ha) | 1 | 1 | 1 |
| | Kg RM/ha | 151 | 150 | 148 |
| | Cost/Kg RM ($) | 0.72 | 0.7 | 0.8 |
| **B.**<br>243 ha property<br>37 ha site<br>8 ha planted with ryegrass | Calving % | 97 | 94 | 97 |
| | Stocking Rate (Cows/ha) | 0.9 | 0.86 | 0.9 |
| | Kg RM/ha | 136 | 140 | 141 |
| | Cost/Kg RM ($) | 1.2 | 1 | 1.6 |
| **C.**<br>1,300 ha property<br>200 ha site<br>30 ha planted with ryegrass | Calving % | 93 | 90 | 91 |
| | Stocking Rate (Cows/ha) | 0.58 | 0.63 | 0.67 |
| | Kg RM/ha | 65 | 76 | 83 |
| | Cost/Kg RM ($) | 1.1 | 0.9 | 1 |
| **D.**<br>1,020 ha property<br>47 ha site<br>No Winter Forage | Calving % | 80 | 78 | 83 |
| | Stocking Rate (Cows/ha) | 0.5 | 0.5 | 0.5 |
| | Kg RM/ha | 56 | 58 | 64 |
| | Cost/Kg RM ($) | 0.6 | 0.58 | 0.58 |
| **E.**<br>1,080 ha property<br>750 ha running cows<br>No Winter Forage | Calving % | 89 | 88 | 90 |
| | Stocking Rate (Cows/ha) | 0.58 | 0.6 | 0.6 |
| | Kg RM/ha | 68 | 66 | 70 |
| | Cost/Kg RM ($) | 0.9 | 0.9 | 1.2 |

## 4.2 Economic analysis

The costs at each site included the cow and calf costs, pasture establishment and management costs.

The income from each site was the receipts from the calf sales each year.

The profit from the winter forage sites and the other parts of the property without forage were calculated.

The benefit per ha of the winter forage/ managed tropical grass program was the difference between the profit from the winter forage sites and the non-winter forage areas.

At all sites, the total costs were quite consistent, and the differences in profit were driven by the calf income and cow stocking rate.

The economic analysis with the resultant financial benefit per hectare for each core site is shown in Tables 17-20.

At Site1, the calf income in the drought year of 2019 was $604/ha. This increased to $990 in 2020 and $1,598 in 2021. This reflects a more than 200% increase in the $ /kg sale price. These increases

in calf income were reflected in the increased Profit/ha and Benefit/ha over the three years. The benefit increased from $42/ha in 2019, $547/ha in 2020 and a very pleasing $656 in 2021.

**Table 17 Economic Analysis for Site 1**

| **Site 1** | **2019** | | **2020** | | **2021** | |
|---|---|---|---|---|---|---|
| | **WF** | **No WF** | **WF** | **No WF** | **WF** | **No WF** |
| Cows/ha | 0.93 | 0.43 | 0.93 | 0.48 | 1 | 0.45 |
| Calving (%) | 97 | 92 | 97 | 93 | 97 | 93 |
| Cow Costs/ha ($) | 30 | 13.8 | 21.2 | 9.9 | 29 | 13 |
| Calf Costs/ha ($) | 9.6 | 4.40 | 6.4 | 3 | 12 | 5.6 |
| Pasture Costs/ha ($) | 300 | - | 215 | - | 214 | - |
| Total Costs/ha ($) | 339 | 18.2 | 243 | 12.9 | 255 | 19.6 |
| Calf Income/ha ($) | 604 | 242 | 990 | 688 | 1,598 | 704 |
| Profit/ha ($) | 265 | 223 | 1,222 | 675 | 1,343 | 687 |
| Benefit/ha ($) | 42/ha | | 547/ha | | 656/ha | |

At Site 2, the calf income in the drought year of 2019 was $1,215 and $2,506 in 2020. The weaning weights were similar. Therefore, the price /kg of the weaner was the driver of income. The calf income in 2021 had decreased from 2020 due to a reduced stocking rate due to the ryegrass being planted later due to wet conditions. The sale price per kg was similar to 2020, and the profit /ha showed a similar trend.

The benefit of the winter forage group compared to the other cattle on the property and in the locality was calculated to be $285, $1,183 and $567 in the 2019,2020 and 2021 years, respectively.

**Table 18 Economic Analysis for Site 2**

| **Site 2** | **2019** | | **2020** | | **2021** | |
|---|---|---|---|---|---|---|
| | **WF** | **No WF** | **WF** | **No WF** | **WF** | **No WF** |
| Cows/ha | 2.2 | 0.9 | 1.9 | 0.8 | 1.4 | 0.8 |
| Calving (%) | 90 | 86 | 96 | 94 | 97 | 95 |
| Cow Costs/ha ($) | 66 | 27 | 35 | 15 | 21 | 12 |
| Calf Costs/ha ($) | 5.3 | 2.1 | 10.7 | 4.6 | 3.1 | 1.7 |
| Pasture Costs/ha ($) | 390 | - | 349 | 0 | 363 | - |
| Total Costs/ha ($) | 461 | 29 | 394 | 173 | 386 | 13.7 |
| Calf Income/ha ($) | 1,215 | 498 | 2,507 | 1,093 | 2,169 | 1,230 |
| Profit/ha ($) | 754 | 469 | 2,112 | 929 | 1,783 | 1,216 |
| Benefit/ha ($) | 285 | | 1,183 | | 567 | |

At Site 3, there was a similar change in calf income and profit /ha from 2019 to 2020 and 2021. The benefit /ha increased from $36 in 2019 to $137 and $161 in 2020 and 2021 respectively.

**Table 19 Economic Analysis for Site 3**

| **Site 3** | **2019** | | **2020** | | **2021** | |
|---|---|---|---|---|---|---|
| | **WF** | **No WF** | **WF** | **No WF** | **WF** | **No WF** |
| Cows/ha | 0.8 | 0.5 | 0.8 | 0.6 | 0.8 | 0.6 |
| Calving (%) | 94 | 90 | 94 | 92 | 95 | 92 |
| Cow Costs/ha ($) | 4.3 | 2.7 | 5.7 | 3.3 | 4.7 | 5 |
| Calf Costs/ha ($) | 1.6 | 1 | 4.8 | 2.8 | 3.2 | 1.4 |
| Pasture Costs/ha ($) | 117 | - | 77.3 | 0 | 82 | - |
| Total Costs/ha ($) | 123 | 3.7 | 87.8 | 6 | 91 | 6 |
| Calf Income/ha ($) | 411 | 255 | 521 | 303 | 603 | 350 |
| Profit/ha ($) | 288 | 251 | 434 | 297 | 516 | 350 |
| Benefit/ha ($) | 37 | | 137 | | 161 | |

Site 7 data was only available for 2020 and 2021 as in year 2019, this site was an observer site.

The calf income/ha and the profit/ha were high for both years due to the high stocking rate and the high weaner prices.

The benefit/ha from 2020 and 2021 was extremely high also due to the high stocking rates of 1.8 and 2.2 cows/ha and the high weaner price for the Angus weaners.

**Table 20 Economic Analysis for Site 7**

| **Site 7** | **2020** | | **2021** | |
|---|---|---|---|---|
| | **WF** | **No WF** | **WF** | **No WF** |
| Cows/ha | 1.8 | 0.9 | 2.2 | 1 |
| Calving (%) | 97 | 94 | 96 | 93 |
| Cow Costs/ha ($) | 22.7 | 11.2 | 28.7 | 12.9 |
| Calf Costs/ha ($) | 22.4 | 11 | 26.6 | 12 |
| Pasture Costs/ha ($) | 214 | 0 | 329 | - |
| Total Costs/ha ($) | 259 | 22.2 | 384 | 32.8 |
| Calf Income/ha ($) | 3,199 | 1,575 | 3,692 | 1,996 |
| Profit/ha ($) | 2,940 | 1,552 | 3,308 | 1,964 |
| Benefit/ha ($) | 1,387 | | 1,344 | |

## 4.3 Extension and communication

The extension and communication activities included seminars, field days, farm walks and group meetings. Articles were placed in the local press, industry newsletters and The Land. Radio interviews were undertaken to promote the events that were able to be attended by the broader beef industry.

Two case studies on core sites, Site 1 and Site 7, were produced in February and March 2023, respectively. The case studies highlighted the specific productivity drivers and outcomes for the two properties. Further details on the implementation and outcomes of the extension and communication plan are outlined in 4.3.1 & 4.3.2.

### 4.3.1 Events

In 2019, no events were undertaken, as there were no results to discuss. The group had an impromptu workshop at Site 1 to discuss the mechanics of the project and began developing the productivity driver mind map.

A seminar was conducted on 2/3/2020 attended by about approximately 70 people, including producers, front-line advisors and beef industry supply companies.

In 2021, the planned seminar could not proceed due to COVID-19 restrictions. It was later replaced with a farm walk that took place on 19/10/2022, which was attended by the core and observer producers, plus some invited friends. The mind map of productivity drivers in the northern rivers' beef breeding herds was further developed. See Figure 3.

The three farm walks were attended by the core producers, observers and interested producers associated with the project producers. The attendance ranged from 10 to 16 people. The group meetings followed the farm walks and were held after lunch.

A training seminar explaining the winter forage/managed tropical grass production system was conducted for the Norco advisory personnel from the northern rivers area, with 15 attending. A training day at Coffs Harbor for the Norco field staff and associated service industries, seed companies, and animal health companies was planned for February 2022. This was also cancelled due to the history-making floods.

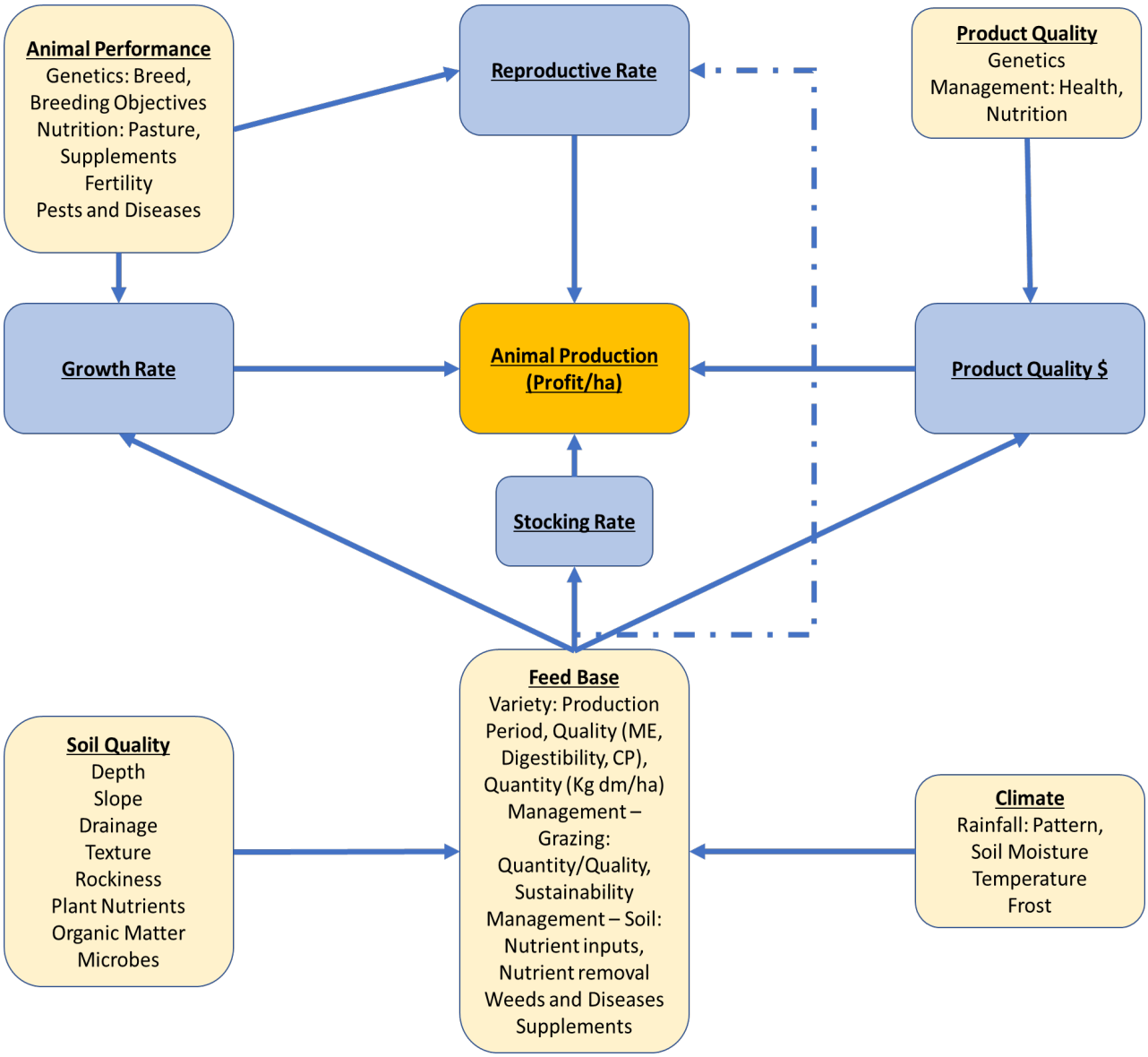
The group attended the MeatUp forum, and the Core producers answered questions from the audience. Of the 69 people who attended, 39 were producers, and the remainder were industry advisory personnel and supply company personnel.

**Core and Observer group meetings:**

An important component of the extension and communication with the group was the development of the mind map showing the productivity drivers: Stocking rate, Growth rate, Reproductive rate, and Product quality. Each of the productivity drivers was discussed at our group meetings by focusing on what could be done on the farm to improve them. See Figure 5.

The feed base area was the one that was the most important and able to be manipulated. It also had a direct impact on the productivity drivers, stocking rate, growth rate, product quality and reproductive performance.

**Figure 5 Grazing System Productivity Drivers mind map (identified by the group)**




Two figures from the Prograze manual were also discussed to highlight further the quality issues with tropical grass species and their feed quality when compared to temperate species. See Appendix 7.1 and Appendix 7.2.

Pasture quality (see Table 15) was related to animal performance by discussing the material developed by Nathan Jennings Senior advisory officer from the North Coast Local Land Services. See Appendix 7.2.

The components of animal performance were discussed as they impacted on growth rate and reproductive rate.

Soil quality was discussed as it can impact feed base components. Soil samples were taken from each of the group members' properties, and the results (Table 2) related to the pasture species and anticipated feed quality.

The group viewed minimal disturbance techniques of pasture establishment and pasture performance under different management, discussed the preliminary results, and further developed the productivity driver mind map.

### 4.3.2 Communication activities

**Event promotion:**

The seminar that was conducted in March 2020 at Casino and was promoted through a variety of channels, including the event flyer (Appendix 7.5) being published on the MLA website, MLA events updates, and articles placed in the "Rural Weekly, "Richmond River Express", Northern Cooperative Meat Company newsletter and "The Land" (Appendix 7.4).

Radio interviews were also undertaken to promote the seminar, which was attended by the broader beef industry.

A press release outlining the project appeared in the SALRC newsletter and Edition 4 of the Northern Cooperative newsletter. See Appendix 7.4.

A case study/article was written (Appendix 7.4.3) and vetted by MLA to run before the 2021 seminar, which was postponed due to COVID-19 and later cancelled due to extreme flooding.

The Casino MeatUp forum agenda was developed with a focus on the project. The flyer is attached in Appendix 7.5.

**Case studies and articles:**

A story filling the subtropical feed gap was distributed through MLA's weekly/Friday Feedback e-newsletter in July 2021 (See appendix 7.4.3).

The virtual farm tour, developed for the Casino MeatUp forum, showcased the project with the four core producers speaking about their property and management practices. Click here to access the virtual farm tour.

Two case studies were developed for February and March 2023 to highlight the specific productivity drivers and outcomes for the two specific properties (see Appendix 7.6). The case study Profitable Solutions for the Winter Feed Gap was published by MLA through the PDS Updates (See appendix7.4.4) and The Weekly e-newsletter in February 2023 (see Appendix 7.4.5) and appeared in the MLA Feedback Magazine for Autumn 2023.

## 4.4 Monitoring and evaluation

**a. The inputs for the project are outlined in the following.**

Four core sites and five observer sites were set up to capture input and output data. The core sites had a record of their project plan and input costs. Pasture and animal input costs were recorded for the three years of the project. Funds contributed by MLA covered professional fees, travel, farm walks/field days, seminars, and soil tests. The in-kind contribution from the group was estimated at $150,000. A steering committee comprising of the majority of the producer group plus three industry people was developed and met/communicated annually.

**b. The outputs from the project sites are as follows.**

The core producers monitored the breeding herd performance as a result of the treatments imposed.

New knowledge and data from the four core sites and five supporting sites were developed. Milestone reports were developed every six and twelve months.

Filling the winter feed gap on the core sites increased stocking rate and increased red meat production per hectare. The producers were encouraged to develop a productivity drivers mind map which helped them better understand the production system and focus on the productivity drivers that would give a balanced outcome.

Pasture and animal production costs, animal performance and financial outcomes were made available to the beef producers in the region.

Communication and extension activities including farm walks, field days, seminars, media releases and radio interviews were conducted to promote producer understanding of the production system. The farm walk/ field day and seminar program were hampered by the Covid 19 restrictions. A case study was developed and appeared in the Friday Feedback in July 2022. Another case study has been produced for publication in the Feedback magazine in early May 2023. A video featuring the PDS project was developed to be shown as the virtual farm tour at the Casino MeatUp forum on 6/12/2022. A shorter version can be developed to promote the PDS program.

Project update material was presented at the SALRC committee meetings and appeared in the SALRC newsletter.

**c. Changes in knowledge, attitudes and skills are documented in the following.**

All the core producers and observer producers have improved their knowledge of and confidence in the winter forage/managed tropical grass production system. Case studies and narratives come from the core group.

Knowledge of the feeding quality of the tropical grass species, as affected by management, was demonstrated by 13 pasture samples being analysed for crude protein, metabolizable energy and digestibility at NSW DPI at Wagga Wagga. A presentation and notes on rumen function supported these results.

The whole farm system mind map has assisted the group in identifying the productivity/ profitability drivers and developing management practices to influence them.

**d. Practice changes were documented and are outline in the following.**

The pre and post project surveys show there is an increase in knowledge and willingness to make a practice change. The producers are better managing their winter forage. However, they see big opportunities in better managing their tropical grasses by planting improved species and managing for quality and persistence. The producers who are unable to grow winter forage due to not having suitable land are using energy and protein supplementation at pasture to increase production.

The Casino Norco store winter forage seed sales have increased each year with 128t ryegrass seeds for the 2022 planting season. Increased seed sales in 2021 occurred even with unfavourable planting conditions.

**e. Benefits to the producers and industry are documented in the following.**

The project demonstrated, via a cost-benefit analysis, the financial advantages of the winter forage and managed tropical grass system. This analysis is in this final project report.

An interpretation of the whole farm benefits for the core sites will be presented in this final report.

**f. There are several general observations.**

The findings are applicable to audiences outside the Northern Rivers region of NSW. Lands east of the escarpment from Gympie to Bega are suited provided they have low slope and good soil texture and moisture characteristics.

All the sites with winter forage and managed tropical grasses were able to maintain their stocking rate and breeding herd performance all year round.

### 4.4.1 Knowledge, Skills and Confidence

An initial pre-project survey is shown in Appendix 7.3.2 was conducted to ascertain the baseline knowledge, skills and confidence of participating producers. This was followed up by a post project survey that was conducted nine months after all the data was collected, shown in Appendix 7.3.4. The results of the pre and post-project survey are available in Appendix 7.3.3 & 7.3.5.

The pre-project survey demonstrated that all the group members are very conscious that the herd's reproductive rate is a major driver of the productivity and profitability of the beef herd. The group believe breeding cow nutrition throughout the year has a major influence on the reproductive rate.

The stocking rate was also seen as a driver of profitability and productivity. We have already seen that the properties with a winter forage program have a stocking rate generally double that of the locality average.

The adoption of a winter forage/managed tropical grass program by the broader beef breeding community hinges on showing the reproductive rate and stocking rate benefits.

85% of core and observer producers indicated high confidence in implementing a winter forage/tropical grass program from the outset, with an average confidence rating of 8.3/10.

The post-project survey indicated that all participating producers increased their knowledge and skills from participating in the project. The confidence of producers in implementing a winter forage/managed tropical grass program increased with all producers rating their confidence above 9/10.

The producers have all used supplements of some kind at various points, indicating they are aware of the impact of the winter feed gap in their tropical species pasture system. 100% of the producers indicated that from the knowledge they had gained throughout the project they felt comfortable assisting other beef producers to embark on a winter forage/tropical grass program.

### 4.4.2 Adoption

100% of core producers and 80% of observer producers have adopted a winter forage/tropical grass program. All producers saw value in a winter forage/tropical grass program, indicating that they would encourage other producers to pursue a winter forage/managed tropical grass pasture program.

In addition, there was an increase in winter forage seed sales in the region during the project period, as reported by Norco at Casino, as seen in Table 18, which was used to give an indication of the uptake of the program.

**Table 18. Norco Casino Winter forage seed sales.**

| | Year |
|---|---|

| Seed Species Sold (Tonne) | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Ryegrass | 80 | 75 | 120 | 128 |
| Oats/Wheat/Barley | 60 | 53 | 38 | 28 |

### 4.4.3 Observations and continued support

The facilitator intends to continue mentoring the producers in the core group and observers for a year following the completion of the project. Five of the producers have had one-on-one support to date. The group showed a preference for this activity rather than a meeting to present the outcomes. The group also requested assistance in using the Carbon Calculator developed by Prof. Richard Eckard.

Three producers are involved in new projects being conducted by Southern Cross University and Local Land Services, with one project investigating which tropical pasture species are most tolerant to pasture dieback and which species recover after infection. Pasture dieback has now been found at many localities in the North Coast region. The other project is monitoring soil carbon level changes following improved pasture management techniques.

# 5 Conclusion

The project, winter forage/managed tropical grass provided some valuable data in terms of opportunities to increase the productivity of the beef breeding herds in the Northern Rivers region of New South Wales.

The productivity driver most impacted by sowing winter forage and managing tropical grass was an increased year-round stocking rate. This was due to the winter forage filling the traditional winter feed gap that occurs in a tropical grass pastures pasture system. The winter forage produced enough quality feed to support more than one breeding cow per hectare on most sites in this period of traditionally extremely low pasture production.

The better management of the tropical grass had the primary impact of improving the feed quality. This occurred through the slashing or mulching the tropical grass in late summer in readiness for direct drilling the winter forage in Autumn. The regrowth tropical grass in late summer and early autumn had a higher digestibility, crude protein and metabolizable energy level which resulted in better animal performance.

The mulched and heavily grazed tropical grass paddocks were suited to sowing the winter forage via direct drilling or mulch planting.

In spring, the tropical grass was very responsive to any rainfall due to the residual nitrogen in the soil that had escaped capture by the shallower-rooted winter forage plants. This grass then provided high-quality grazing in November when the oats and ryegrass had hayed off.

The cow's increased reproductive rate was the second most important productivity driver in the project. This was driven by the cows grazing winter forage being about one condition score higher at joining than cows on tropical grass pasture. The cows joined earlier had a higher conception rate and probably produced more milk.

The increased calf growth rate was the third productivity driver affected. This was due to the higher milk supply from their mothers, plus the high-quality forage available to them at a young age. This allowed the calves to reach the desired weaning weight earlier and be sold earlier. The reduced

lactation period of the cows also contributed to higher weight gain and increased body score in the dry period before the next calving.

The quality of the calves in terms of gaining a higher $/kg lwt at the sale comes under the product quality productivity driver.

With higher carrying capacity generated and the breeding cows confined to a smaller area of the property, the land units less favourable to breeding cows could be used to graze replacement heifers or trade cattle.

The increased in the stocking rate, reproductive performance, growth rate and product quality increased the profit per hectare from the winter forage sites. The increased red meat produced per hectare and per breeding cow will have a positive impact in reducing the GHG emissions as calculated by Professor Richard Eckard's carbon calculator.

The increased calf turnoff/ha from the subtropical region east of the escarpment, which generally has favourable rainfall, moves into the tablelands and slopes regions where the beef breeding herds are more severely impacted by drought. This region was traditionally known as the calf nursery for NSW.

The participants increased their knowledge of planting winter forage. However, the biggest impact was the increased knowledge in terms of managing the tropical grass to increase feed quality. Their knowledge of the required pasture quality for the desired performance of different cattle classes has increased.

An area of further research is the management of tropical pastures is to increase quality and persistence. The defoliation frequency and intensity of our grasses such as Kikuyu, Seteria, Rhodes grass, Panic and Creeping blue grass and the impact on the production parameters is required knowledge.

The grazing management of the tropical legumes also needs further research. The timing and intensity of grazing of trailing legumes of particular importance for persistence.

Tropical grasses can also be managed to allow temperate legumes such as white clover to grow in the cooler months without impacting persistence.

The concept of strategic grazing of our tropical species needs to be developed to generate more quality feed and allow the persistence of these perennial grasses. A strategy of reduced grazing of the trailing legumes in late summer can provide good quality herbage in late Autumn-early Winter when the winter forage paddocks are not ready for grazing.

## 5.1 Key Findings

There are five key findings:

- The traditional winter feed gap can be filled by winter forage and produce a positive economic benefit ranging from $37 to $1,344 per hectare.
- Better managing the tropical grasses can increase the feed quality and increase animal performance. The year-round stocking rate was generally doubled. The breeding herds calving rate increased and the days to re-joining decreased.
- The winter forage/managed tropical grass system increased all the beef breeding herd productivity drivers and generated whole farm benefits.
- The system increased the red meat produced per hectare. Production ranged from 90kg HSCW/hectare to 248kg HSCW/hectare. This was primarily due to the increased stocking rate.
- The winter forage /managed tropical grass system allowed cattle numbers to be maintained through the drought year of 2019 and be highly productive in the following years.

## 5.2 Benefits to industry

There are four broad benefits identified from the project.

Firstly, the project has shown that the productivity, profitability of the sustainability of the Northern Rivers beef breeding herds can be increased by better managing the feed base. The better management of the tropical grasses and the sowing/direct drilling of winter forage increased the productivity drivers.

Secondly, the whole red meat industry can benefit from the project outcomes with efficient production of red meat, supplying quality food to our nation and providing export income.

Thirdly, the productivity drivers investigated and reported on can be employed by the wider beef industry to decrease the carbon footprint of the individual farms which then can benefit the whole red meat industry.

Fourthly, producers generally resist change and are slow to adopt research outcomes. There are other drivers apart from economic benefits to be investigated. More thought needs to be given to a mentoring system where a successful producer with appropriate knowledge can work with young producers and help implement the adoption of research outcomes.

# 6 References

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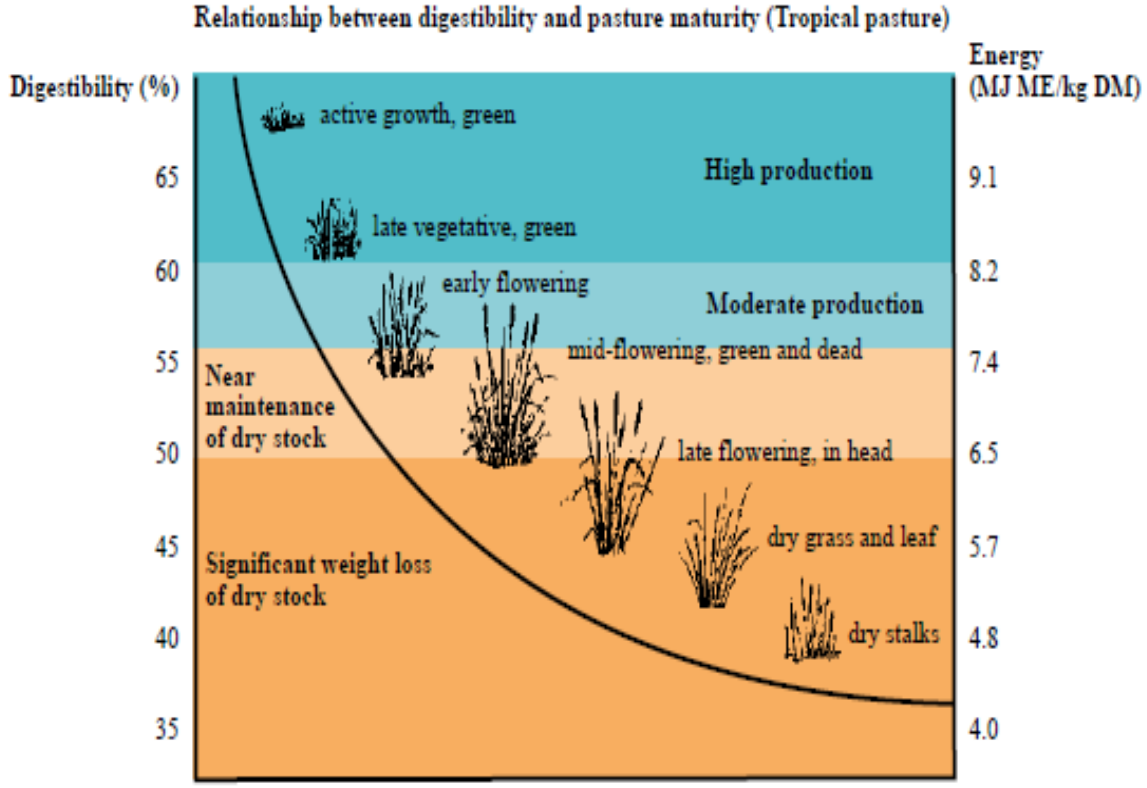
# 7 Appendix

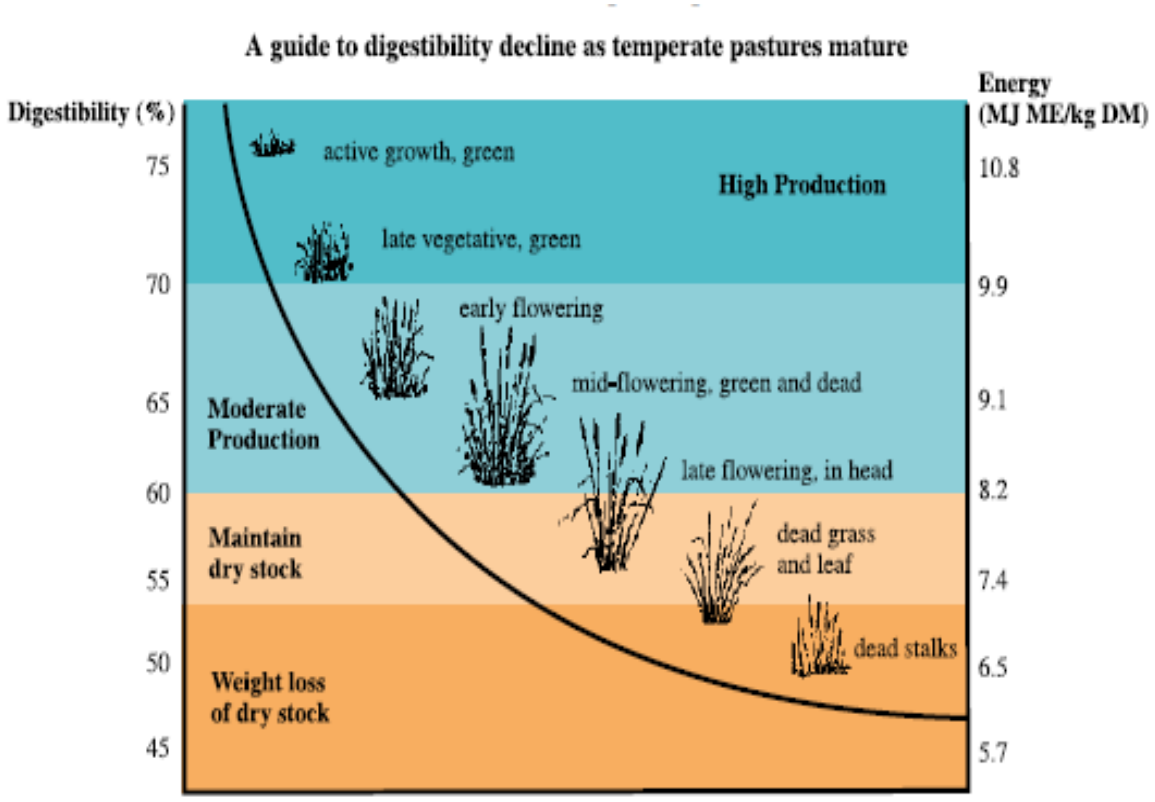
## 7.1 Appendix 1. Pasture quality decline with maturity. Tropical and Temperate pastures. (Prograze)

### 7.1.1 Tropical Pasture Species




Source: Prograze: Profitable, Sustainable Grazing. 9th edition. www.dpi.nsw.gov.au
https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/1363509/Prograze-manual-full.pdf

### 7.1.2 Figure 2. Temperate Pasture Species




Source: Prograze: Profitable, Sustainable Grazing. 9th edition. www.dpi.nsw.gov.au
https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/1363509/Prograze-manual-full.pdf

## 7.2 Beef cattle nutrient requirements. (NC LLS)

| Live weight (kg) | Growth rate (kg/day) | Metabolisable Energy requirement (MJ/ME/day) | Minimum energy concentration of feed source (MJ/ME/Kg/DM) | Minimum crude protein of dietary dry matter (%) | Minimum amount of feed required to meet energy requirements based on energy concentrations presented (kg DM/hd/day) |
|---|---|---|---|---|---|
| **Steers and heifers** | | | | | |
| 200 | 0.5 | 48 | 8 | 11 | 6 |
| | 1.0 | 68 | 11+ | 13 | 6 |
| 300 | 0.5 | 64 | 7 | 10 | 9 |
| | 1.0 | 89 | 9.8 | 13 | 9 |
| 400 | 0.5 | 77 | 7 | 9 | 11 |
| | 1.0 | 100 | 9 | 13 | 11 |
| **Dry pregnant heifers** | | | | | |
| 400 mid pregnancy | 0.5 | 79 | 7.2 | 10 | 11 |
| 450 late pregnancy | 0.5 | 85+ | 7.7+ | 10 | 11 |
| 500 mid pregnancy | 0.5 | 86 | 7.2 | 9 | 12 |
| 500 late pregnancy | 0.5 | 107+ | 9+ | 9 | 12 |
| **Lactating first-calf heifer (range depends on level of milk production)** | | | | | |
| 450 | 0.5 | 120-140+ | 10+ | 11 | 12 |
| 500 | 0.5 | 130-153+ | 10+ | 11 | 14 |
| 550 | 0.5 | 135-158+ | 10+ | 11 | 15 |
| *Maintenance diets are only suitable for cattle in good body condition i.e. Fat Score 2 or above. Cattle in Fat Score 1 or below need to be fed to gain weight therefore use 0.5kg daily growth rate* | | | | | |
| **Lactating mature cows (range depends on level of milk production)** | | | | | |
| 500 | 0 | 90-130 | 7+ | 10 | 14 |
| | 0.5 | 115-150 | 8.2+ | 10 | 14 |
| 550 | 0 | 97-135 | 7+ | 10 | 15 |
| | 0.5 | 120-157 | 8+ | 10 | 15 |
| 600 | 0 | 100-139 | 7+ | 10 | 16 |
| | 0.5 | 122-160 | 8 | 10 | 16 |
| 650 | 0 | 105-140 | 7+ | 10 | 17.5 |
| | 0.5 | 127-165 | 8 | 10 | 17.5 |
| **Dry mature cows** | | | | | |
| 500 empty | 0 | 54 | 7 | 8 | 8 |
| | 0.5 | 85 | 7+ | 8 | 13 |
| 500 late pregnancy | 0 | 75 | 7+ | 9 | 11 |
| | 0.5 | 107+ | 9+ | 9 | 12 |
| 600 empty | 0 | 61 | 7 | 8 | 9 |

Source: Beef cattle health and husbandry for the NSW North Coast. 6th Edition.
P. Kemsley, N. Jennings. North Coast Local Land Services, www.lls.nsw.gov.au
https://www.lls.nsw.gov.au/regions/north-coast/articles,-plans-and-publications/beef-cattle-guide

## 7.3 Monitoring Evaluation and Reporting

### 7.3.1 Monitoring Evaluation and Reporting Plan

## MER Plan: Producer Demonstration Sites

**Project name** __Winter forage Tropical grass Systems for Cattle L. PDS.1907

| Evaluation level | Project Performance Measures<br>(Please fill in and delete example) | Evaluation Methods<br>(Please fill in and delete example) |
|---|---|---|
| **Inputs – What did we do?**<br>Describe the planned and expected inputs involved in your project, including funds, resources, development & projects structures | 4 on farm demonstration sites capturing input and output data.<br>6 other sites capturing some data to support the data generated from the four main sites.<br>10 sites represent 6,000head of cattle.<br>100 observers representing 30,000 head of cattle.<br>Funds of 22,000 pa from MLA used for professional fees, travel, field days/farm walks and seminars<br>In kind funds of $150,000 from core producers<br>Project manager appointed<br>Steering committee appointed. Meet biannually | • Record of project plans<br>• $ inputs<br>• Project steering committee notes |
| **Outputs - What did we do?** Describe the outputs planned/expected from your project, including engagement activities & products from demonstration sites | Core producers monitoring breeding herd performance as a result of the treatment imposed<br>New knowledge and data from the 4 Demonstration sites and 6 supporting sites<br>o Fill the winter feed gap and increase the red meat produced per ha and decrease the cost to produce kg of red meat<br>o Have primary and secondary producers understand the beef breeder production system and be able to manipulate the relevant components.<br>Pasture and animal production costs, animal performance and financial result available to other beef producers<br>Communication and extension activities; farm walks, field days, seminars to promote producer understanding of the system.<br>Media releases; The Land, Rural weekly NCMC newsletter for broader exposure. | • Data from demonstration sites<br>• Milestone reports compiling and analysing data<br>• Field day and farm walk outputs<br>• Compilation of media activities |

| | | |
|---|---|---|
| **Changes in knowledge, attitudes and skills - How well did we do it?** Describe the changes in KASA that you are planning to achieve. | All the core producers have a greater knowledge of the winter forage tropical grass system for breeding herds.<br>80% of the core producers (10) have increased their knowledge of and have adopted the production system.<br>50% of the observers have a greater working knowledge of the Winter forage Tropical grass production system | • Case studies and narratives from the core group (10)<br>• Pre and Post project surveys<br>• Post event surveys and feedback sheets |
| **Practice changes –** Has it changed what people do? | 10 core producers plus 100 observers have adopted Winter forage / tropical grass system for beef breeding herds | • Pre and post project surveys<br>• Post event surveys and feedback sheets<br>• Winter forage seed and fertilizer sales from the Norco stores. |
| **Benefits – Is anyone better off?** Describe the benefits that you are expecting to achieve as a result of the project | Demonstrated cost benefit analysis from producers adopting winter forage / tropical grass system for beef production | • Benefit /cost analysis at a property level<br>• Data captured from the co-operating reseller-Norco |
| **General observations / outcomes –** Is the industry better off? | • Applicability of findings to outside of the primary and secondary audiences<br>• Outputs and outcomes from steering committee in relation to expected and unexpected outcomes | • Steering committee notes<br>• Final reports |

### 7.3.2 Pre-project survey template

# MLA Producer Demonstration Sites
# Pre project survey
# Core Participants

**PDS Name**: Winter forage Tropical grass Systems for Cattle

**PDS Code**: L.PDS.1907

The following questions are used to determine your level of understanding of *[insert topic]*. The knowledge and skills audit is used at the start and completion of the program to allow individuals to track their skill development and adoption of new practices. It will also be used:

1. To improve the content of future project meetings; and
2. As part of the evaluation process for the project

The information will be completely confidential and individuals will not be identified in the analysis of data.

**Name**:

_____

**Date:** / /

MLA may contact me to further assess the impact of their programs? ☐ Yes ☐ No

MLA may send me newsletters and inform me of future events? ☐ Yes ☐ No

## Section A – Demographic Information

### A1. Your contact details

a. Property name.....

b. Business / trading name.....

c. Property address.....

d. Postal address .....

e. Email address .....

f. Phone.....

g. Mobile.....

**A2. What area do you manage?** *(please write the number of hectares that you managed)*

a. Hectares.....

**A3. What numbers of livestock do you run?** *(please write the number of head against each of the categories of livestock that you run)*

a. Number of beef breeders .....

b. Number of cattle turned off per year.....

c. Total number of cattle .....

d. Number of ewes .....

e. Number of lambs turned off per year.....

f. Total number of sheep .....

g. Number of goats turned off per year .....

h. Other .....

## Section B – Knowledge and Skills *(If you do not know, please select the 'Unsure' option)*

**B1. In our subtropical environment in which months does a feed gap exist for your breeding herd.**

**B2. What methods are available to fill the feed gap**

**a.**

**b.**

**c.**

**B3. Have you used Energy/Protein/Trace element supplements?**

**B4. Have you used winter forage to fill the feed gap**

**B5. How much forage does a 500kg liveweight cow with a 3 months old calf require to maintain her body condition score**

**kgDM/day**

**B6. What condition score do you require your cows to be in at joining**

**B7. What impact will a low condition score have on the rejoining time and the pregnancy rate of the herd.**

**B8. What calving rate are you satisfied with in your herd with your present management and cost structures (tick one)**

a. 70%

b. 80%

c. 90%

**B9. How can you increase the beef production /ha from your breeding herd.**

**a.**

**b.**

**c.**

**B10. What are the impediments to using an oats/ryegrass system to fill the winter feed gap on your property.**

**a.**

**b.**

**c.**

**d.**

## Section C – Confidence and Practices

**C1. How confident are you in *[implementing a winter forage programme]*?**

*(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Poor | | | | | | | | | Excellent |

**C2. Do you currently use the following practices?**

| | Normal practice | Sometimes | Rarely | Never | Not Applicable |
|---|---|---|---|---|---|
| *Some form of winter forage* | | | | | |
| Energy/protein/trace element supplementation | | | | | |

**C3. For the key metrics you are seeking to demonstrate in this PDS, please advise what is your current performance**

| **Metric** | **Current performance** |
|---|---|
| **Year round breeder stocking rate** | |
| **Calving rate** | |
| **Weaning weight** | |
| **Beef produces; kg/ha** | |

### 7.3.3 Response to Group Pre Project-Survey

**1. Which one of the following do you consider to be the best indicator of the productivity and profitability of your beef breeding enterprise.? The responses are shown in the following table.**

| Indicator | Positive response |
|---|---|
| Profit/cow | 2 |
| Cattle income/ha | 2 |
| Cattle Profit/ha | 8 |
| Red Meat Produced/ha | 3 |

Eight of the group nominated cattle profit /ha as the best indicator of productivity and profitability of their beef cattle enterprise.

**2. Which are the most important drivers of productivity and profitability in your beef enterprise.?**

The choices are shown in the following table.

| Drivers | 1st | 2nd | 3rd | 4th |
|---|---|---|---|---|
| Stocking rate | 5 | 6 | 1 | 3 |
| Reproductive rate | 9 | 6 | 0 | 0 |
| Growth rate | 1 | 2 | 11 | 1 |
| Product quality | 0 | 1 | 3 | 11 |

Stocking rate gained 5 first picks and 6 second selections.

Reproductive rate was the most popular response, gaining 9 first picks and 6 second choices.

Growth rate was the third pick of eleven of the participants.

Product quality was also the fourth choice of eleven of the participants.

**3. What is the biggest impediment to your year-round stocking rate.?**

All responses nominated winter feed gap and weather conditions.

**4. What is the biggest constraint to performance of your cattle?**

All responses were winter feed gaps and weather conditions.

**5. Of the Productivity/Profitability drivers in Question 2, which two are the most applicable to you?**

Eleven of the of the fourteen responses nominated Stocking rate and Reproductive rate. The remining three nominated Reproductive rate and Growth rate. All fifteen had Reproductive rate as one of their first two choices.

**6.** All had breeding programs with clear breeding objectives.

**7.** All have Breeding objectives that are market driven.

**8.** All have flexibility in their breeding programs.

**9**. All nominated that the days program segment on breeding objectives bull selection and the use of EBV's has given them more confidence in this management area.

### 7.3.4 Post-project survey template

# MLA Producer Demonstration Sites

# Post-project Survey

**PDS Name**: Winter forage Tropical grass Systems for Cattle

**PDS Code**: L.PDS.1907

The following questions are used to determine your level of understanding of *[insert topic]*. The knowledge and skills audit is used at the start and completion of the program to allow individuals to track their skill development and adoption of new practices. It will also be used:

1. To improve the content of future project meetings; and
2. As part of the evaluation process for the project

The information will be completely confidential, and individuals will not be identified in the analysis of data.

**Participant** **Name**: -

**Date:** / /

MLA may contact me to further assess the impact of their programs? ☐ Yes ☐ No

MLA may send me newsletters and inform me of future events? ☐ Yes ☐ No

I have read, understood and accept the terms of MLA's "PDS Participant Consent & Release" (see appendix 1) ☐ Yes ☐ No

**Participant** **Signature**: -

# Section A – Demographic Information

### A4. Your contact details

i. Property name.....

j. Business / trading name.....

k. Property address.....

l. Postal address .....

m. Email address .....

n. Phone.....

o. Mobile.....

**A5. What area do you manage?** *(please write the number of hectares that you managed)*

p. Hectares.....

**A6. What numbers of livestock do you run?** *(please write the number of head against each of the categories of livestock that you run)*

c. Number of beef breeders .....

d. Number of cattle turned off per year.....

q. Total number of cattle .....

r. Number of ewes .....

s. Number of lambs turned off per year.....

t. Total number of sheep .....

u. Number of goats turned off per year .....

v. Other .....

## Section B – Knowledge and Skills *(If you do not know, please select the 'Unsure' option)*

**B1. In our subtropical environment in which months does a feed gap exist for your breeding herd.**

**B2. What methods are available to fill the feed gap**

**a.**

**b.**

**c.**

**B3. Have you used Energy/Protein/Trace element supplements?**

**B4. Have you used winter forage to fill the feed gap**

**B5. As a result of this project, has your knowledge and skill in relation to filling the winter feed increased?**

**Yes / No**

**B6. How much forage does a 500kg liveweight cow with a 3 months old calf require to maintain her body condition score**

**kgDM/day**

**B7. What condition score do you require your cows to be in at joining**

**B8. What impact will a low condition score have on the re joining time and the pregnancy rate of the herd.**

**B9. What calving rate are you satisfied with in your herd with your present management and cost structures (tick one)**

a. 70%

b. 80%

c. 90%

**B10. How can you increase the beef production /ha from your breeding herd.**

**a.**

**b.**

**c.**

**B11. What are the impediments to using an oats/ryegrass system to fill the winter feed gap on your property.**

**a.**

**b.**

**c.**

**d.**

**B12. What component of the project has assisted you the most. Growing winter forage and better managing the forage or growing improved tropical grasses and better managing them.**

**B13. Would you encourage other producers to pursue a winter forage/ managed tropical grass pasture programme.**

## Section C – Confidence and Practices

Notes for PDS Coordinator *(to delete)*

These questions will need to be customised by you, targeting the topics and practices you will be covering as part of your PDS. For question C3, please insert the baseline data question that is needed to demonstrate the impact of the project (relevant to the practices mentioned in question C2).

**C4. How confident are you in *implementing a winter forage/managed tropical grass programme*?**

*(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| Poor | | | | | | | | | Excellent |

**C5. Do you currently use the following practices?**

| | Normal practice | Sometimes | Rarely | Never | Not Applicable |
|---|---|---|---|---|---|
| *Some form of winter forage* | | | | | |
| Energy/protein/trace element supplementation | | | | | |

**C3. After seeing the results of the project, have you / do you intend to try winter forage**

**Yes / No**

**C4 For the key metrics being demonstrated in this PDS, please advise what is your current performance**

| **Metric** | **Current performance** |
|---|---|
| **Year round breeder stocking rate** | |
| **Calving rate** | |
| **Weaning weight** | |
| **Beef production; kg/ha** | |

***C5. With the knowledge you have gained over the last 3 years, do you feel comfortable to assist other beef producers to embark on a winter forage/ tropical grass programme.***

**Yes / No**

### 7.3.5 Response to the post project survey

**B1. In our subtropical environment in which months does a feed gap exist for your breeding herd.**

**June to October was accepted.**

All the group were correct.

**B2. What methods are available to fill the feed gap**

**a. Winter forage**

**b. Hay/ silage**

**c. Energy/ protein supplements**

All selected the a, b, and c options. The majority selected winter forage.

**B3. Have you used Energy/Protein/Trace element supplements?**

All had used supplementation.

**B4. Have you used winter forage to fill the feed gap**

60% of the group had used winter forage. The remainder believed they did not have appropriate land units for winter forage.

**B5. How much forage does a 500kg liveweight cow with a 3 month old calf require to maintain her body condition score. (kgDM/day)**

**All answers were between 12.5 and 15.**

All accepted as correct.

**B6. What condition score do you require your cows to be in at joining.**

**Answers ranged from 2.5 to 3.5 as the minimal condition score.**

All correct.

**B7. What impact will a low condition score have on the re-joining time and the pregnancy rate of the herd.**

**Extend re-joining time and decrease pregnancy rate.**

All the group were correct.

**B8. What calving rate are you satisfied with in your herd with your present management and cost structures (tick one)**

a. 70%

b. 80%

c. 90%

(All those who have grown winter forage or had supplementary fed, answered 90%.

The non forage members or those with reproductive issues on their property answered 80%)

**B9. How can you increase the beef production /ha from your breeding herd.**

a. Increase the stocking rate.

b. Increase the cow's calving percentage.

c. Increase the calf weaning weight.

All the group selected a, b and c which are correct.

**B10. What are the impediments to using an oats/ryegrass system to fill the winter feed gap on your property.**

a. Unreliable rainfall during the growing season

b. No suitable land

c. Too wet or too dry at planting

d. Not sure of the economic return

All the group answered with at least 3 of the above. Some included that contractors were difficult to find, not sure what forage variety to use, grazing management would be too difficult.

**B11. What component of the project has assisted you the most. Growing winter forage and better managing the forage or growing improved tropical grasses and better managing them.**

Eighty percent of the group answered that growing and managing tropical pasture information assisted them the most as this information has been lacking.

**B12. Would you encourage other producers to pursue a winter forage/ managed tropical grass pasture program.**

All answered yes, even those who have not grown winter forage themselves.

## Section C – Confidence and Practices

**C1. How confident are you in *implementing a winter forage/managed tropical grass program*?**

*(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|
| Poor | | | | | | | | | Excellent |

All answered 9 or 10

**C2. Do you currently use the following practices?**

| | Normal practice | Sometimes | Rarely | Never | Not Applicable |
|---|---|---|---|---|---|
| *Some form of winter forage* | 40% | 20% | | 20% | 20% |
| Energy/protein/trace element supplementation | 60% | 20% | 20% | | |

They have all used supplements of some kind. This indicates they are aware of the impact of the winter feed gap in their tropical species pasture system.

**C3. For the key metrics being demonstrated in this PDS, please advise what is your current performance. The results are shown below.**

| **Metric** | **Current performance** |
|---|---|
| Year round breeder stocking rate | 0.5 to 1.2 breeding cows /ha |
| Calving rate | 78 to 98% |
| Weaning weight | 190 to 400kg liveweight |
| Beef production; kg HSCW/ha | 56 to 270 |

*There was a very wide range in all answers which coincided with their land quality and if they used supplements or winter forage.*

***C4. With the knowledge you have gained over the last 3 years, do you feel comfortable to assist other beef producers to embark on a winter forage/ tropical grass program.***

All the group members answered Yes

## 7.4 Articles

### 7.4.1 Richmond River Independent article.

AG NEWS

# Winter forage brings beef bucks

LAND OF PLENTY: Trial group at Dyraaba heavily grazing setaria pasture before sowing with ryegrass and oats. Photo: Contributed

GROWING a winter forage cuts beef feed costs and boosts animal production for farmers in the region.

By growing a winter forage crop, producers in a trial spanning Newcastle to Gympie are on track for an increase in year-round stocking rate; lifting breeding cow conception rate to 90% and getting calf liveweight at six months up by 30%.

In the first year, the sites in the trial got less than half the normal annual rain. However, the ones that grew winter forage maintained stocking rate at double the regional norm.

The highest stocking rate was 2.2 breeding cows per hectare at a site near Lismore. Pregnancy rates from the group were around 90% – compared to 75–80% in the region.

Increased calf growth rates allowed them to be weaned younger and gave cows a longer dry period so they calved in a higher condition score the following year. Some supplementary feeding was needed on most sites at the height of the drought in November–December but the winter forage sites had no feeding or were able to feed less than non-forage sites.

The results of the second season are being collated but none of the winter forage sites has needed supplementary feeding.

Sites west of Casino had reduced rain in the winter/spring period and this cut winter forage production but stocking rates were maintained throughout the year. As the trial heads into its third winter, the exceptional wet conditions are hampering land preparation.

The high cattle prices should encourage producers to increase stocking rates, calving percentage and calf growth rates by using a winter forage program, Tom Amey said. Tom is a beef producer and the facilitator of the Meat & Livestock Australia project. He is planning a field day for September.

### 7.4.2 Pre-seminar story/Press Release: Northern Cooperative Meat Company & SALRC newsletters

Winter Forage

Beef Producer Seminar

Casino RSM Club

Monday 2nd March 9:30am Start

***Winter Forage "is it Profitable, does it increase my herd productivity, is there a return on my investment"?***

These are important questions a group of local producers are on a quest to find answers to.

A Beef Producers Seminar will present and discuss our first season's results from an MLA funded project conducted on the Northern Rivers in conjunction with Norco, NCMC and local cattle producers.

The seminar will provide practical and technical information on production and management of winter forages in tropical grass systems. Three local producers who grazed Rye grass or Oats in the past winter will present detailed trial results from their properties including costs, kilograms of beef gained, fertility rates, financial returns etc.

The project is looking at the productivity and profitability impacts of winter forage in tropical grass systems for beef breeding herds. The project runs for three years and the direction will be determined by feedback from producers in the core group.

Project facilitator, Tom Amey, stated *'this project has the ability to demonstrate the productivity and profitability benefits in beef breeding herds by growing winter forage and better managing the tropical grasses. It will evaluate and quantify the benefits of increase in year round stocking rate, calving percentage and weaning weight'.*

The use of winter forages may be an important piece of the puzzle in the grazing system this season if the limited rainfall hampers the growth of tropical grasses in late summer/autumn period.

Seminars, field days and farm walks will be conducted on several different properties over the 3 years life of the project.

Joe Leven, Member Services 0427 108 861.

### 7.4.3 MLA publication - The Weekly/Friday Feedback: Filling the subtropical feed gap July 2021

Filling the subtropical feed gap | Meat & Livestock Australia

**Filling the subtropical feed gap**

23 July 2021


In the humid subtropic regions of NSW, filling the winter feed gap is a challenge that many producers face when seeking to boost stocking rates and overall productivity on-farm.

For the past two years, beef producer Tom Amey has hosted an MLA Producer Demonstration Site (PDS) project on each of his two properties, 'Araucaria' at Mummulgum and 'Greenmount' at Dyraaba, to investigate a viable solution to the winter feed shortage he experiences across his enterprise.

These sites were hosted as part of a PDS project Tom led with other producers in the West Casino region, which trialled the use of ryegrass alongside increased management of tropical grasses as a means of boosting winter forage available in the area.

**Initial results**

By managing tropical grasses with increased grazing pressure over the summer and introducing ryegrass as winter forage, Tom and the other producers involved in the project found that stocking and conception rates improved significantly on their sites despite unusually dry conditions.

"2019 was a disaster season, but we retained the group of cows on the ryegrass without supplementation," Tom said.

"What is important is managing your tropical grasses in summer, making sure you're keeping the grazing pressure on them so you don't have a mass of poor quality feed.

"That way you can actually direct drill[1] the ryegrass in autumn to fill the winter feed gap."

Despite the dry conditions, all sites trialling the ryegrass/managed tropical grass system were able to maintain a stocking rate that was double the regional norm during the entire first year of the project.

Pregnancy rates in beef breeding herds run on the sites were also higher than average during this time, sitting at over 90% compared to the 75-80% pregnancy rate typically seen in the region.

The need for supplementary feed during these dry conditions was significantly lower on the sites compared to the rest of the region, with the system ensuring more feed was on hand during this time.

**Productivity gains continue**

The positive increases in productivity continued into 2021, the second year of the project, where stocking rates on the sites were around one breeding cow per hectare – up to two times the regional average – and conception rates remained at over 90%.

Increased calf growth rates were also reported on the sites during both years of the project. This allowed calves to be weaned or marketed at a younger age to enable the cows a longer dry period and calving in a higher condition score the following year.

Tom was particularly pleased with the increase in productivity he saw on the PDS sites he hosted on his own properties.

“The average stocking rate for the Araucaria property is one cow to a bit over a hectare whereas on Greenmount, it’s usually one cow per two hectares,” Tom said.

“However, the ryegrass system has allowed us to get up to the same stocking rate and performance on Greenmount as what we get from Araucaria.”

The higher stocking rate Tom was able to achieve by adopting the ryegrass/managed tropical grass system on Greenmount has subsequently enabled him to increase the size of his herd significantly and sell more calves.

“Filling the winter feed gap has allowed me to run more cattle throughout the year,” Tom said.

“By having the winter forage system – by running those 75-80 cows in this system at Dyraaba – it means the rest of the property’s left over to grow out my joiner heifers and get them up to the point of calving.”

**Food for thought**

As productivity gains continue to be observed across all project sites, Tom is keen to ensure other producers in the area are aware of the benefits of using the ryegrass/managed tropical grass system to fill the winter feed gap.

“This winter forage system is applicable from Gympie to Newcastle – it can be used all the way east of the range,” Tom said.

“When you look at the cost of buying land in these areas, if you can actually double the stocking rate on your property by just investing a bit in winter forage it’s a major, major plus.”

**Lessons learned:**

- Keeping grazing pressure on tropical grasses in summer enables ryegrass to be direct drilled in autumn to fill the subtropical winter feed gap.
- Filling the winter feed gap can help boost stocking rates, pregnancy rates and calf growth rates in cattle herds.

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**Footnotes**

1. ‘Direct drill’ is when the seed is planted into the soil without any prior soil cultivation taking place.

### 7.4.4 MLA Publication - The Weekly: Profitable solution for winter feed gap February 2023

Profitable solution for the winter feed gap | Meat & Livestock Australia

**Profitable solution for the winter feed gap**

13 February 2023

*Callum and Tom Amey*

Beef production in the NSW Northern Rivers region, and more widely the lands east of the tablelands extending from Gympie to Newcastle are based on tropical grass pasture species.

There is a deficit in pasture growth and/or quality in this region during late autumn, winter and early spring. This feed gap results in multiple productivity issues in beef breeding herds which include a decrease in:

- the year-round stocking rate
- the condition score at calving and a delayed and decreased re-joining rate
- conception rates
- milk production and calf growth rate
- pasture quality and ground cover.

An MLA Producer Demonstration Site (PDS) project demonstrated the impact of filling the winter feed gap with annual forage such as ryegrass or oats which has led to an increase in profit of up to $656/ha.

Tom Amey, the PDS project facilitator along with his son Callum had one of the core sites on part of their Dyraaba property.

"I have been direct drilling ryegrass into my setaria pastures for several years. I knew I was gaining some benefits, but I didn't analyse the system to quantify the benefits," Tom said.

"I was pleasantly surprised when the three-year results were analysed – the results from the other three core sites were also very pleasing."

**Boost carrying capacity**

The outstanding impact was the increase in the annual carrying capacity. The 40ha site of tropical grass had 16ha direct drilled with ryegrass and oats and carried an average of 38 breeding cows throughout the three years. This was double the carrying capacity of other parts of the property without winter forage.

“This allowed me to concentrate some of the breeding cows on a smaller area and use the freed-up land to grow out my heifers,” Tom said.

An increase condition score of more than one at calving compared to the non-winter forage group flowed on to give benefits such as:

- earlier return to service
- higher conception rate
- allowed the cows to produce more milk and increase the weaning rate of their calves.

The quality of feed produced from the setaria pasture also increased due to mulching in late summer in preparation for drilling the ryegrass – and later accessing the residual nitrogen at the end of spring.

**Sustainability benefits**

In some paddocks the soil organic matter has increased to 11% (12cm sampling depth) over twenty years due to the increased pasture biomass and increased plant material on the soil surface. The surface organic matter gives many benefits such as:

- soil moisture retention
- decrease erosion
- decreased weed invasion
- reduced trampling.

“I have used the carbon calculator developed by the University of Melbourne and the project results have encouraged me to further increase the productivity of my properties,” Tom said.

Tom explains the Dyraaba property is 179t of Net Farm Emissions ahead while the Simpkins Creek property is 338t Net Farm Emissions behind.

“I only need to reduce the total emissions by 159t to be carbon neutral. I have a plan for this over the next two years and I have been paying a lot of attention to the biodiversity on both properties,” Tom said.

“I can increase my profitability and increase the quality of habitat for all the creatures.”

**A lifesaver during drought years**

Tom found the drought year of 2019 enlightening with the 40ha trial area carrying 37 breeding cows with no supplementation.

“They did lose about 80kg live weight from calving to weaning however, they were still very strong and fertile. The conception dates and rates moved forward to give an earlier calving the following year.

“Other groups of breeding cows without access to winter forage consumed up to $300 worth of pellets/head (12MJ ME and 14% crude protein).

"It's great to get productivity benefits and sustainability benefits such as increased soil organic matter. However, my beef enterprise is a business and in the drought year of 2019 the difference in profit from the winter forage group and the others was a profit per ha of $42.00.

"Carrying the cows through the drought year allowed me to capitalise on the better weather conditions and cattle prices in the following years so in 2020 and 2021, the benefit was $547/ha and $656/ha respectively."

The PDS trial was an important part of the Casino MeatUp forum held at the end of 2022. The productivity drivers were discussed and related to the whole farm system.

**On-farm profile**

Tom and Cathy Amey

- Beef cattle properties 'Araucaria' at Simpkins creek (345ha) and 'Green Mount' Dyraaba (243ha).
- The trial site was located at Dyraaba, 25km west of Casino.
- 300 breeding cows producing 283 calves annually – total 730 head.

### 7.4.5 MLA Publication - Feedback Magazine, Autumn 2023:

Profitable solution for winter feed gap, Page 18 & 19 - Meat & Livestock Australia : Feedback Magazine : Autumn 2023 by Meat... - Flipsnack

## 7.5 Event Flyers

### 7.5.1 Casino MeatUp forum flyer and agenda

meatup FORUM

mla MEAT & LIVESTOCK AUSTRALIA

# Casino, Tuesday, 6 December 2022

Venue Casino RSM Club, 162 Canterbury St, Casino NSW
Time 9.00am – 6.00pm

## About MeatUp

MLA MeatUp Forums, first held in 2021, deliver the latest in red meat Research, Development and Adoption (RD&A) and are held throughout southern Australia. MeatUp Forums are designed by producers for beef, sheep and goat producers through the input of Regional Producer Working Groups.

This means the program is purposely designed to be relevant to the needs and interests of red meat producers in the local region that MeatUp is being held.

MeatUp Forums are an MLA initiative and delivered by Pinion Advisory.

## Why should I attend MeatUp?

- Hear about the latest, locally relevant on-farm RD&A
- Hear from and network with leading producers, industry representatives, advisors and researchers
- Gain insights into tools and programs available as next steps to improve your business
- Identify opportunities to drive on-farm productivity and profitability

## Event features

- Producers sharing practical, commercial insights via case study presentations
- Topics addressing key priorities for red meat businesses such as reproduction, feedbase, profit drivers, decision making and sustainability
- RD&A and market update from MLA
- Be taken on a virtual farm tour and engage with the host/s during an interactive Q&A session
- Local catering with a red meat focus and networking drinks to wrap up the day

Cost:

- MLA Member $25 GST inc
- Non-member $50 GST inc (includes researchers, Department staff, service providers and producers who are non-MLA members)

To register, visit
**mla.com.au/meatup**

Contact
Pinion Advisory
P: 1300 746 466
E: meatup@pinionadvisory.com

meatup FORUM

mla MEAT & LIVESTOCK AUSTRALIA

## Program Casino, 6 December 2022

| |
|---|
| 8am Registration desk opens, tea and coffee available |
| 9am Proceedings commence |
| **Session 1: Welcome** |
| Welcome – *Natasha Searle, MeatUp Forum Project Manager, Pinion Advisory and Tom Amey, NSW MeatUp Forum Working Group* |
| MLA welcome and update – *Sally Leigo, Program Manager of Adoption, Meat & Livestock Australia* |
| **Session 2: Setting the scene** |
| Beef productivity drivers and their effect in a whole farm system – *Cameron Allan, Meat & Livestock Australia* |
| 10.20am – 10:50am Morning tea |
| **Session 3: Feedbase updates** |
| Filling the winter feed gap: Incorporating winter forage options into the tropical feedbase – *Nathan Jennings, Local Land Services* |
| Pasture dieback: Diagnosis, management and impact on the local environment – *Suzanne Boschma, NSW DPI* |
| **Session 4: Carbon update** |
| Carbon neutral by 2030: What can be done in your production system to reach the industry target? – *Dr Richard Eckard, University of Melbourne* |
| 12.55pm – 1.55pm Lunch |
| **Session 5: Beef updates** |
| Improving within-breed genetic evaluation and developing multi-breed genetic evaluation with the Southern Multi Breed Project – *Brad Walmsley, NSW DPI* |
| Producing restocker cattle for existing and future markets – *Alastair Rayner, Rayner Ag and Roger Bailey, Rappville* |
| Managing parasite burden in challenging environments – *Phil Carter, Local Land Services* |
| 3.35pm – 4.00pm Afternoon tea |
| **Session 6: Virtual farm tour** |
| Winter forage and managed tropical grasses MLA Producer Demonstration Site Project<br>Host producers:<br>– *Tom Amey, Araucaria*<br>– *Ronny Meldrum, Compton Farms*<br>– *Joe Leven, Cabra Glebe*<br>– *John Gibson, Medlym* |
| **Session 7: Wrap-up** |
| Tying it all together in our farming systems, to achieve the best outcome – *Cameron Allan, Meat & Livestock Australia* |
| Wrap-up, evaluation and networking drinks – *Georgia McCarthy, MeatUp NSW Event Coordinator, Pinion Advisory* |
| 5pm Networking drinks and canapes |
| 6pm Event concludes |

* This event will run in accordance with relevant State and Federal Government restrictions and advice. As an event attendee you agree to adhere to the State and Federal Government COVID health advice. If at the time of the event, either you, or any other members of your group are feeling unwell or are subject to a self-quarantine or self-isolation period, you agree not to attend the event. If circumstances require this event to be rescheduled, registrations (and any accompanying fees paid) will be transferred to the new date. In accordance with the MLA Terms and Conditions refund of registration fees will be paid to those unable to make the new date upon receipt of written notification of your inability to attend. If the event is cancelled, MLA will refund any registration fee you have paid.

### 7.5.2 MLA seminar March 2020, Event flyer.

# Pasture soils workshop with Alan Coates

## *Dig up the past, plan for the future*

**Kyogle area - 23rd and 24th March 2020**

**These soil workshops will provide practical information for graziers in the Upper Richmond River catchment on soil structure and health, addressing and managing soil constraints, paddock indicators that help identify soil issues, and management practices to improve soils.**

**Included in the day is a Soil Pit examination to understand better the rarely viewed world below pasture and a paddock walk and discussion.**

**Alan Coates is an experienced agronomist, teacher and researcher with decades of experience working in dairy, macadamia and horticultural businesses in northern NSW and south east Queensland.**

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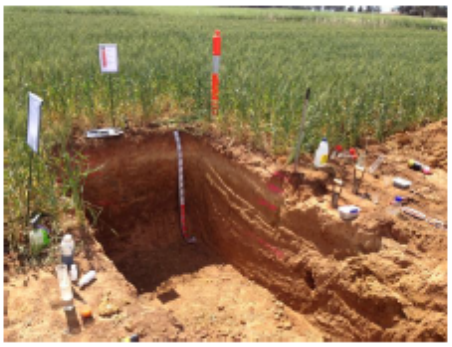

**Dates: Monday March 23rd and Tuesday March 24th 2020**
**Time: 9 am until 12.30 pm**

**Location: to be confirmed**
**Register by contacting Joe Leven, NCMC Member Services 0427 108 861**

The half day workshops will be presented on two properties in the Kyogle area.
Directions to this event and further information will be provided upon registration.
This event is coordinated by **Border Ranges Richmond Valley Landcare Network** and **The Northern Cooperative Meat Company** with funding from National Landcare Programme.

NCMC

Australian Government | National Landcare Programme

Border Ranges - Richmond Valley Landcare Network

## 7.6 Producer Case Studies

### 7.6.1 Case study for Site 1

Tom and Cathy Amey

Beef cattle properties “Araucaria” at Simpkins creek(345ha) and “Green Mount” Dyraaba (243ha)

The trial site was located at Dyraaba. 25km west of Casino.

Carry about 300 breeding cows producing 283 calves annually. Total about 730 head.

Beef production in the New South Wales Northern Rivers region, and more widely the lands east of the tablelands extending from Gympie to Newcastle, is based on tropical grass pasture species.

However, there is a deficit in pasture growth and/or quality in this region during late Autumn, Winter and early Spring. This feed gap results in multiple productivity issues in the beef breeding herds, which include:

- Reduction in the year-round stocking rate
- Reduction in the condition score at calving and a delayed and decreased re-joining rate
- A decrease in conception rates
- A decrease in milk production and calf growth rate
- A decrease in pasture quality and ground cover.

A PDS project was undertaken to demonstrate the impact of filling the winter feed gap with annual forage such as ryegrass or oats.

The project, Winter forage/Managed Tropical Grass, is now complete, and the final report is being written.

Tom Amey, the project facilitator, along with his son Callum, had one of the core sites on a part of their Dyraaba property. I opted to manage a site because I’m of the belief that you don’t ask anyone to do something if you’re not prepared to do it yourself. Tom said.

I have been direct drilling ryegrass into my setaria pastures for a number of years. I knew I was gaining some benefits; however, I didn’t analyse the system to quantify the benefits. I was pleasantly surprised when the three-year results were analysed. The results from the other three core sites were also very pleasing.

The outstanding impact was the increase in the annual carrying capacity. The 40ha site of tropical grass had 16ha direct drilled with ryegrass and oats and carried an average of 38 breeding cows throughout the three years. This was double the carrying capacity of other parts of the property without winter forage and the local properties. This has allowed me to concentrate some of the breeding cows on a smaller area and use the freed-up land to grow out my heifers.

An increase condition score of more than 1 at calving compared to the non-winter forage group flowed on to give benefits in earlier return to service and higher conception rate.

This increased body condition allowed the cows to produce more milk and increase the weaning rate of their calves.

The feed quality produced from the setaria pasture also increased due to mulching in late summer in preparation for drilling the ryegrass and later accessing the residual nitrogen at the end of Spring.

In some paddocks the soil organic matter has increased to 11% (12cm sampling depth) over twenty years due to the increased pasture biomass and increased plant material on the soil surface. The surface organic matter gives many benefits in soil moisture retention, decrease erosion decreased weed invasion and reduced trampling.

I have used the C calculator developed by the University of Melbourne. The project results have encouraged me to further increase the productivity of my properties. Filling the winter feed gap at the Dyraaba property. The Dyraaba property is 179 t of NFI ahead while the Simpkins Creek property is 338t NFI behind. I only need to reduce the total emissions by 159t NFI to be carbon neutral. I have a plan for this over the next two years. I have been paying a lot of attention to the biodiversity on both properties. I can increase my profitability and increase the quality of habitat for all the creatures. I encourage beef producers to access the C Calculator from the MLA site and have a go.

The drought year of 2019 was enlightening with the 40-ha trial area carrying 37 breeding cows with no supplementation. They did loose about 80kgLW from calving to weaning however, they were still very strong and fertile. The conception dates and rates moved forward to give an earlier calving the following year.

Other groups of breeding cows without access to winter forage consumed up to $300 worth of pellets /head. (12MJ ME and 14% crude protein)

Its great to get productivity benefits and sustainability benefits such as increased soil organic matter. However, my beef enterprise is a business. In the drought year of 2019 the difference in profit from the winter forage group and the others was a profit per ha of $42.00.

Carrying the cows through the drought year allowed me to capitalise on the better weather conditions and cattle prices in the following years. In 2020 and 2021 the benefit was $547/ha and $656/ha respectively.

The PDS trial was an important part of the Casino MeatUp forum. The productivity drivers were discussed and related to the whole farm system. The virtual farm tour highlighted the four core producers in the trial. The video will be posted on the MLA site in the PDS area.????

### 7.6.2 Case study for Site 7.

John, Ellen and Rodney Gibson

Medlyn Angus Stud.

Gunderimba, South Lismore.

Sowing winter forage and better managing the tropical grasses has provided many productivity benefits in the breeding cow herd for the Gibson family in North east NSW.

The Gibson family run 120 Stud Angus cows and replacement heifers and yearling bulls grazing 194 ha near Lismore, northern NSW.

The weaner heifers are grown out and 30% are retained for the stud herd replacements and the others sold to other studs or to commercial producers.

The best weaner bulls are retained and grown out to be sold as 2yo at the Medlyn annual bull sale.

The property consists of light clay river plain and chocolate clay loam undulating basaltic ridges.

Summer grasses are Rhodes grass, Setaria , Kikuyu and Paspalum. Ryegrass is planted in Autumn to supply high quality feed in winter/spring period when the breeding cows have the highest feed quality and quantity demand.

The Gibson family hosted a core producer site in the MLA funded PDS (Producer Demonstration Site) program.

The trial group of 70 to 80 cows grazed 25ha of ryegrass during the day and about 8ha to 19ha of tropical grass runoff area at night.

The ryegrass was mulch seeded in April after the pasture had been heavily grazed. Some paddocks that are invaded with the aggressive weed Torpedo grass (Panicum repens) were sprayed with glyphosate, Crucial at 4litres/ha.

Torpedo grass is encroaching and dominating the tropical grass pastures on the river plain and is rapidly becoming a major grass weed in the locality, John said. He is looking at the options of double cropping each year with ryegrass and a tropical forage such as millet as a means of eradication of the torpedo grass.

John has shown that the trial area of 34 to 43ha with 25 ha sown with ryegrass has doubled the year-round carrying capacity of the site. A breeding cow/ha rate of 1.8 in 2020 and 2.2 in 2021 was achieved which was double the non ryegrass areas and the district average. This was a similar pattern with the other three core sites, where the locality stocking rate was doubled when the winter forage/managed tropical grass programme was undertaken.

The cow condition score was consistently higher, 0.5 to 1, on the winter forage areas. This has a flow on effect to re -joining dates, cow fertility, milk production and calf growth rates, John said.

The net benefit /ha of the winter forage/managed tropical grass sites was calculated as the difference between the profit on the trial site and the non-winter forage sites. The increased profit per hectare of more than $1,000 was generated from the winter forage /managed tropical demonstration site.

The benefit of the ryegrass system became very evident in 2022 when, as a result of the most severe flooding in recent history, the soil conditions were saturated throughout the planting period, and no ryegrass was planted. This resulted in some supplementary feeding of the breeding herd and all the young bulls and replacement heifers being moved away on agistment. John said.