Final report

PDS 1704: Improved pastoral feed base management

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Abstract

This project was established to demonstrate that the weaning percentage of sheep enterprises can be improved by testing feed quality of the pastoral feed base. The initial key focus of the project was to improve lamb survival rates and hence enterprise profits.

The project faced some significant challenges, with COVID lockdowns and then major flooding. Exceptional seasonal conditions were experienced through the project.

In consultation with the core project group the project was adapted to meet these challenges. To do this, a focus on identifying and using abundant seasonal feed surpluses was made, as this became the key interest of producers.

Through COVID and flooding the project remained relevant through:

- Meeting monthly on ZOOM with the core group and experts.
- Introducing new technology for Biomass and Groundcover assessment in the form of remote monitoring from CIBOLABS to replace pasture cuts. Gaining confidence in this new technology through paddock validation by producers.
- Focussing on identification of periods of surplus feed availability and its qualification.
- Partnering with Elders, Landcare Groups and North West Local Land Service to increase the reach of the project. Recording a series of seven key topic Webinars to report findings back to growers.

Major project outcomes were:

- Demonstrating the use of commercial pasture feed testing to measure seasonal feed quality, to better understand the implications of feed quality on ewe performance, a major driver of farm profit.
- Undertaking monthly meetings with the core project group to develop confidence in the remote technology (calibration of remote feed base monitoring with what producers saw in the paddock). Using remote gathered information to improve feed budgeting skills for animals on hand.
- Demonstrating how remote monitoring can be used in feed base decision making by identifying and quantifying feed surplus/deficiency periods. Using feed base information to develop skills around business opportunity investigation (Gross Margins on trade/agist options to quantify financial benefits).
- Demonstrating how the Australian Feed base Monitoring project (CIBO/MLA) on three properties can be used to budget feed and to create business opportunities.

Producer comment:

"The process of continually stopping to think about the quality of feed we have on the ground and objectively planning stocking rates around that has already helped making decisions to buy, hold or sell stock and impacted productivity."

Executive summary

"At this point we are developing confidence in the data to make key decisions. We hope we will get to that point in a year or so after we familiarise ourselves more with the maps and data and check it against what's actually happening in the paddock".

Walgett PDS Group member

The project demonstrated how remote monitoring technology can be used to assess the quantity of feed over the three case study properties. This technology allowed producers to identify periods of feed surplus and to value this surplus, by undertaking Gross Margin analysis on potential enterprises. The implications of the project are that producers in pastoral areas can now have access to technology that makes whole farm feed base budgeting quick and simple and clearly identifies periods of feed surplus or deficiency. Once confidence is gained in the information, more timely and accurate business decision making can occur, which has large implications for business profit. business.

The demonstration showed how the new remote monitoring technology, accessible on phones, mobile devices or desktop computers can replace manual, labour intensive, pasture cuts/drying. Once producers gain confidence in this information, will give early warning information as to periods of feed surplus or deficiency.

The pasture feed quality testing that was undertaken demonstrated how paddocks can be sampled, tested and results used to determine if the quality of the feed is sufficient to meet animal needs. In this project, feed testing showed quality of feed was able to meet animal needs. In lesser years, feed quality testing can be used to identify periods where supplementation may be needed and a proactive plan developed for this. The emphasis being on early information and active intervention, particularly at critical periods eg prior to or just after lambing for lamb survival.

This project was initially established in drought years, to demonstrate that the weaning percentage of sheep enterprises can be improved by improving ewe nutrition. The initial key focus of the project was to improve lamb survival rates and hence enterprise profits through quantification of feed quality and quantity, and supplementation of ewes when required.

However, in consultation with the core project group, the project changed focus as seasonal conditions improved and substantial feed surpluses became evident. Producers were interested in how to manage the abundant feed conditions being experienced.

Remote measurement technology was introduced to the project in a partnership with CIBOLABS. The project then linked into using/demonstrating the commercially available Australian Feed base Monitoring project (CIBO/MLA) as it became available. This allowed the project to demonstrate measurements of both feed quality (via feed base testing) and quantity (remote monitoring) and to discuss how this information could be used in decision making on property, particularly focussing on periods of feed surplus.

Information and learning were recorded in a series of seven webinars.

PDS key data summary table

Project Aim:
To demonstrate that the weaning percentage of sheep enterprises can be improved by improving ewe nutrition.

	Comments		Unit
Production efficiency benefit: Feed quality • Dry Matter % • Crude Protein% • NDF/Digestibility • ME (energy) • Fat • Ash	*These metrics were measured for one year via feed testing and impact of measurements discussed. Testing showed feed quality was not a limiting factor for production.*		
Production efficiency benefit: Feed quality Due to exceptional seasons, the main focus of the project was adapted to focus on surplus feed identification. Paddock level and whole farm Total Standing Dry matter and ground cover assessments were discussed on a monthly basis. Feed surplus periods were identified and scenarios developed quantifying the opportunities were worked through using an excel spreadsheet to gain confidence in the measurements and to quantify benefits.	*This was undertaken on a scenario basis. It showed clear business benefits were possible from identification and quantification of surplus feed periods.*		
Number of core participants engaged in project		7	
Number of observer participants engaged in project		23	
Core group no. ha		35000	
Observer group no. ha		60000	
Core group no. sheep		14000	hd sheep
Observer group no. sheep		50000	hd sheep
Core group no. cattle		300	hd cattle
Observer group no. cattle		1200	hd cattle
% change in knowledge, skill & confidence – core		100	
% change in knowledge, skill & confidence – observer		50	
% practice change adoption – core		33	
% practice change adoption – observers		20	
% of total ha managed that the benefit applies to		100%	

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1 Background

This project was initially established in drought years, to demonstrate that the weaning percentage of sheep enterprises can be improved by improving ewe nutrition. The initial key focus of the project was to improve lamb survival rates and hence enterprise profits through quantification of feed quality and quantity, and supplementation of ewes when required.

However, in consultation with the core project group, the project changed focus as seasonal conditions improved and substantial feed surpluses became evident.

Elders (Brett Smith) were key partners in this project, along with Rachel Dorney (Regional Agriculture Landcare Facilitator), Lana Andrews **(**Tamworth Regional Landcare Association) and Kate Pearce (North West Local Land Services Mixed Farming Officer). We acknowledge their time and resources contributed to this project.

The target group was 23 sheep producers in the Walgett District, many of whom were members of the Walgett Pastoral Profit Cluster, formed eight ago as part of the completed MLA/AWI Pastoral Profit program. Work done by the Pastoral Profit group highlighted the importance of weaning rate to Gross Margin Profit. Losses from joining (scanning) to weaning were identified as often being substantial, attributable to ewe nutritional status. This was a big loss of potential income for regional producers. This work was undertaken during significant drought years, with the nutritional status of the flock being a major issue and provided the impetus for this project.

The project was conducted in a run of exceptional seasonal conditions, where the nutritional status of the ewe flock was less of an issue to producers. New feed base issues such as identification of periods of feed surplus (and how to use this), and their quantification, became higher order issues for producers.

The project was adapted to focus on managing the feed base in times of abundance, to remain relevant and engage with producers around issues they saw as important at the time, while still focussing on the importance of the feed base to flock performance.

Early in the project, new technology became available which remotely measured Feed Biomass Production and Ground Cover measurements by use of satellite technology. This technology was seen as a “game changer” replacing existing labour-intensive methods of feed base measurements (pasture cuts, oven drying and weighing). Producers did not have the time (or motivation) to do these manual feed base measurement methods, even though the information was seen as important. The potential sources of error in these methods were also potentially high.

Using technology to gain this important feed base information on a mobile phone while in the paddock (as well as in the office) was enthusiastically received by the projects core producers.

Initial Remote measurement technology was introduced to the project in a partnership with CIBOLABS. The project then linked into using/demonstrating the commercially available Australian Feed base Monitoring project (CIBO/MLA) as it became available. This allowed the project to demonstrate measurements of both feed quality (via feed base testing) and quantity (remote monitoring) and to discuss how this information could be used in decision making on property, particularly focussing on periods of feed surplus.

To be able to demonstrate the benefits of the Australian Feed base Monitoring project, free to all MLA Levey Payers, was a positive outcome from the project and will allow ongoing benefits from this project.

The project-built capacity in the core grower group and advisers in how property can be loaded into the programs, the mapping process, how information is gathered, reported back and then used for flock decision making.

Information and learning were recorded in a series of seven webinars.

2 Objectives

Table 1 Outlines the original objectives of the project, and defines whether or not these objectives were met successfully.

Objective	*Achieved*	*Additional achievements:*
1. Have feed tested samples at the three core producer sites (each with two sites per property) over Winter, Spring, Summer and Autumn 2020/2022 Matching photo standards will be collected.	• Feed testing completed over the 2020 year. Photos collected. • In discussion with core group and given the exceptional seasons and COVID travel limitations which impacted sample collection) this part of the project was not intensively undertaken past 2020. • It was replaced with the additional feed base remote measurements, based on availability of new technology and high producer interest.	• *Project was able demonstrate remote measurements of Total Standing Dry matter and Ground cover over the three properties over the project, replacing time consuming pasture cuts.* • *Project trialled app based paddock recording technology for observations and photos.* • *Project was able to contribute to local calibration and development of the industry product.* • *Project recorded a number of webinars.*
2. Produce feed quality reports for Winter, Spring, Summer and Autumn 2020 to 2022 which will allow 30 pastoralists to understand the potential of their feed base to meet ewe requirements, and to identify periods where strategic supplementation may be required	• Produced feed quality reports for 2020 and at other strategic intervals. • Six core sites were established (three properties, each with two sites) • Core group members met each month to examine remote monitoring information and to discuss feed budgeting opportunities facilitated by CIBOLABS. • Given the exceptional seasons, no supplementation was required over the period.	• Wider group was engaged via email and zoom webinar recordings. Group meetings were not possible due to COVID and floods. • Confidence started to be developed in new remote monitoring technology

	• Periods of feed surplus were identified, amount quantified, and options discussed.	
3. Allowed group members to plan supplementation strategies and implement them in their flocks to lift weaning rates	• Given the exceptional seasonal conditions, weaning rates were high in the district. There was no interest in a focus on lifting weaning rates.	• A focus on using remote data to identify periods of high pasture growth, high levels of standing dry matter and surplus feed was undertaken. • Scenarios developed showing potential business benefits of this information, using CIBOLABS spreadsheet. • Seven webinars recorded.

3 Demonstration Site Design

3.1 Methodology

The following methods were used to establish three properties as demonstration sites.

Each property was established into the CIBOLABS system for remote monitoring, and had two sites (6 sites in total) for feed quality and initial dry matter assessments. Monthly meetings discussed real time feed supply and options.

1. Three group members self-nominated to become demonstration properties for the group. Located west of Walgett, Collerenabri and at Burren Junction. Each producer nominated two sites to be monitored on their properties for feed quality and dry matter cuts. In total seven participants formed the core of the project, with 15 other interested producers (22 in total).

2. Manual Dry Matter cuts and feed quality tests over the 2020 year were initially undertaken for each nominated site (6 in total). This process was disrupted by COVID lockdowns. Photos of monitoring sites were collected at the time of feed testing. See appendix for examples.

3. With new remote technology becoming available, and improved seasonal conditions, each property was established into the CIBOLABS program, producing outputs focussing on Total Standing Dry Matter (TSDM), ground cover and changes over each month. A live feed was set up for each of the properties.

4. The monthly remote Total Standing Dry Matter information was used to assess the potential of the feed base to meet ewe requirements, to identify periods where feed supplementation may be required, or to identify periods of feed surplus and the likely extent of surplus. Given the quality of the seasons experienced through the project, and the low stock numbers coming out of three years of drought preceding this project, producer focus was strongly on identification and quantification of periods of feed surplus.

5. A key aspect of the methodology was to generate confidence in the remote information and that it matched what producers saw in the paddock (informal calibration). A monthly

discussion was held with the core project team, each meeting focussing on one property as a case study and discussing findings and developing scenarios.

6. When potential surplus feed was identified, a CIBOLABS excel model/calculator was used to quantify Gross Margins from likely trading opportunities. This helped to further develop confidence in the results (Informal calibration) and to quantify potential value from this information. It was a valuable exercise.

7. Information and learning was captured in seven webinars which are to be hosted on a regional Landcare website.

The following methodology was used to establish the remote information for each property:

Cibo Labs provided each of the three core producers with a range of services which were set up as follows. Facilitation of this process by the project consultant and CIBOLABS was required:

1. For each property a secure, authenticated and auditable digital property record via MyFarmKey was created. This is an easy-to-use mapping and verification program. This enabled up to 30 years of historical satellite data to be obtained, to enable trends over time on the property to be examined.

2. Each map was linked to the Cibo Labs PastureKey service, this was quite easy. This enabled satellite remote sensing and data science to estimate feed supply for every hectare and to monitor changes in the feed base and land condition on a weekly basis. Outputs could be observed for each paddock and the whole property.

3. A secure web address (URL) was provided to enable the most recent map and image products to be loaded. It did take some time to become familiar with the presentation of data. Imagery was updated each 5 days, which allow targeted and objective pasture assessments.

4. A GPS-based Mobile Apps was provided to support calibration (formal in informal). We were able to participate in the local calibration by cutting and drying quadrants at a number of GPS points, through a 12 month cycle. One key feature of the App is the capacity to upload and GPS locate photos onto the PastureKey Map.

5. Data was delivered through a simple web map interface within 24 hours of capture. It is stored on a one drive folder, easily accessible.

3.2 Economic Analysis:

Having identified periods of feed surplus from remote monitoring, using the CIBOLABS feed calculator we were able to quantify periods of feed surplus.

Gross Margin profits for different scenarios were calculated, commonly using trading steers or cattle agistment as an option, having identified and quantified the extent of any feed base surplus.

This was a very useful exercise and enabled producers to calculate the direct business benefits from the technology.

Example of how remote monitoring of the feedbase can assist practice change: Core Producer

Surplus feed: Initially identified by producer, surplus quantified by remote monitoring. Visual assessment and remote monitoring used in decision making.

Paddock size: 694ha

Enterprise added: Conservative number of 204 agistment steers introduced for 150 days, commencing May 2022. Heaviest taken out October 2022. Still running 70 steers to be removed mid March 2023.

Approx business benefit:

- Agistment income of over $17,000 gained.
- Confidence gained in remote monitoring.

4 Results/key findings

The key findings from the project are as follows:

4.1 Demonstration site outcomes (3 properties)

The demonstrations run on each of the three properties over the project showed how properties could be entered into the CIBOLABS remote monitoring system. It then demonstrated the potential business value of tracking changes in groundcover and Total Standing Dry Matter over time, identifying and quantifying periods of feed surplus.

The demonstration of this new technology showed how manual (time consuming) pasture quadrant cutting and weighing could be replaced with technology, available on a mobile phone in close to real time.

The ranges in feed value over 2020 were also demonstrated via feed testing, which elevated the conversation on assessing both feed *quality* and *quality*. In the season in which feed testing occurred, feed quality was not a limitation to production and hence was not a key interest to producers.

Examples of the types of information that can be provided from the technology follow. The key questions that producers asked in monthly meetings, with examples on how these questions can be answered, are documented using CIBOLABS examples:

Whole Property Feed profile:

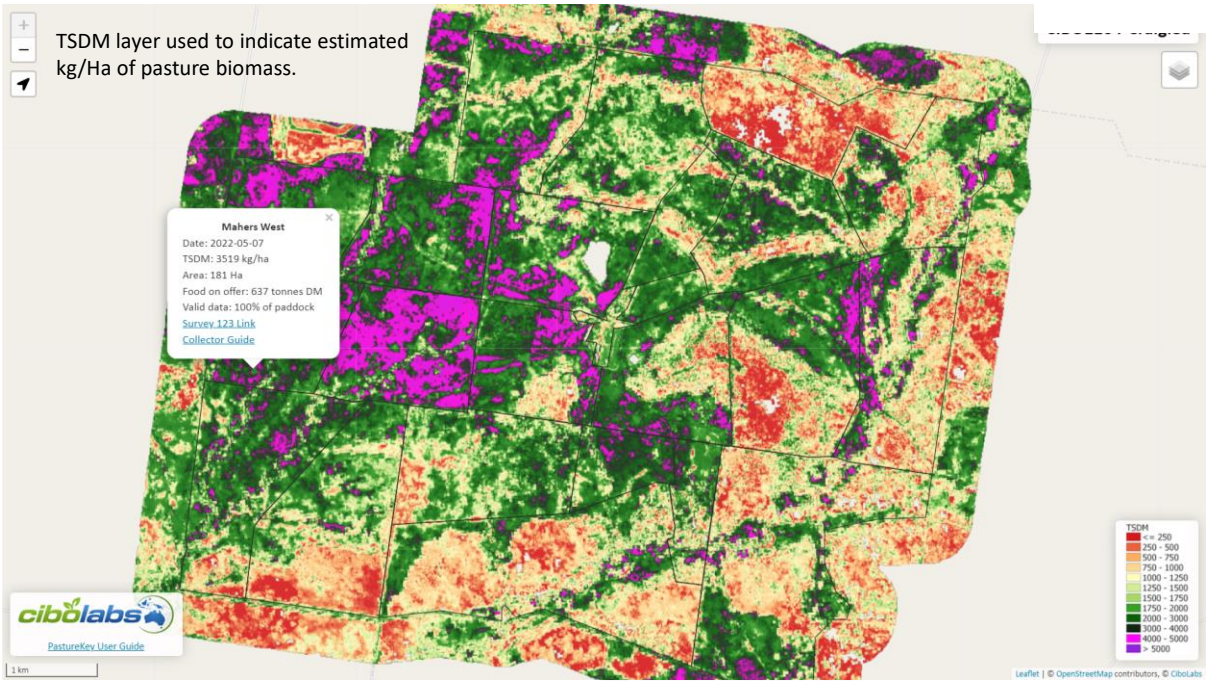
Producer Question: Do we have enough feed for our current stock numbers, is there a surplus? What are the trends on feed supply over time?

The slide below (Fig. 1) is an output from a property over a three-month period, showing Whole of Property Feed on Offer in total kg of dry matter (this is another term for Total Standing Dry Matter).

Figure 1 Example Feed on Offer (FOO/TSDM)

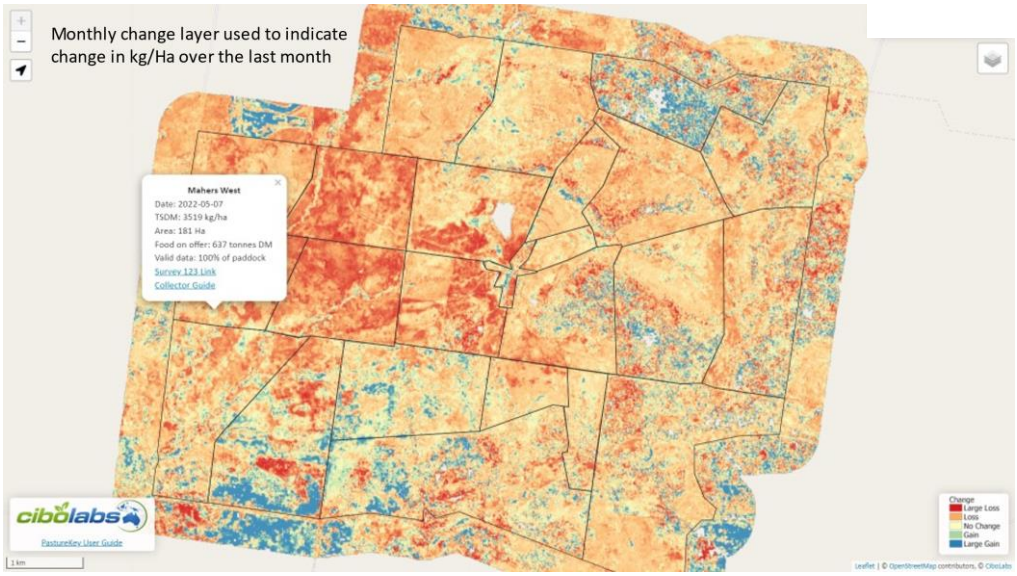
The slide below (Fig. 2) is a different farm showing how Total Standing Dry Matter (kg/ha) can be represented across the property on an individual paddock basis. Paddock boundaries can be seen as lines. On this map, a different colour represents a different level of Total Standing Dry Matter (kg/ha).

Figure 2 Example Map of TSDM on a paddock basis



The slide below (Fig. 3) shows the *monthly change in* Total Standing Dry Matter (kg/ha), a measure of pasture growth rate. These changes are represented by different colours on the map. Areas of faster growth and slower growth can be identified and can allow more effective grazing planning to be undertaken.

Figure 3 Example monthly change Total Standing Dry matter (kg/ha) on a paddock basis



Example summary feed test information:

Producer Question: Is the quality of the feed sufficient for the livestock needs at the time?

The slide below (Fig. 4) summarises a feed test result and shows a photo of the paddock feed at the time of sampling, for informal visual calibration by producers. Feed test results can be compared to published standards to determine if paddock feed quality can meet animal requirements at the time. The value of having a Nutritionist to work with Producers was discussed, particularly in times if supplementation was needed.

In this example they were able to.

Figure 4 Example Summary feed test results and photos of what the paddock feed looked like.

A feed test and nutritional advice is essential…..

Feed Central quality test			
Feed test results for average/bulked transect			Dry matter
ME (MJ/kg)	NDF %	Protein %	Ave for transect (DM/ha)
9.2	53	9.2	1224

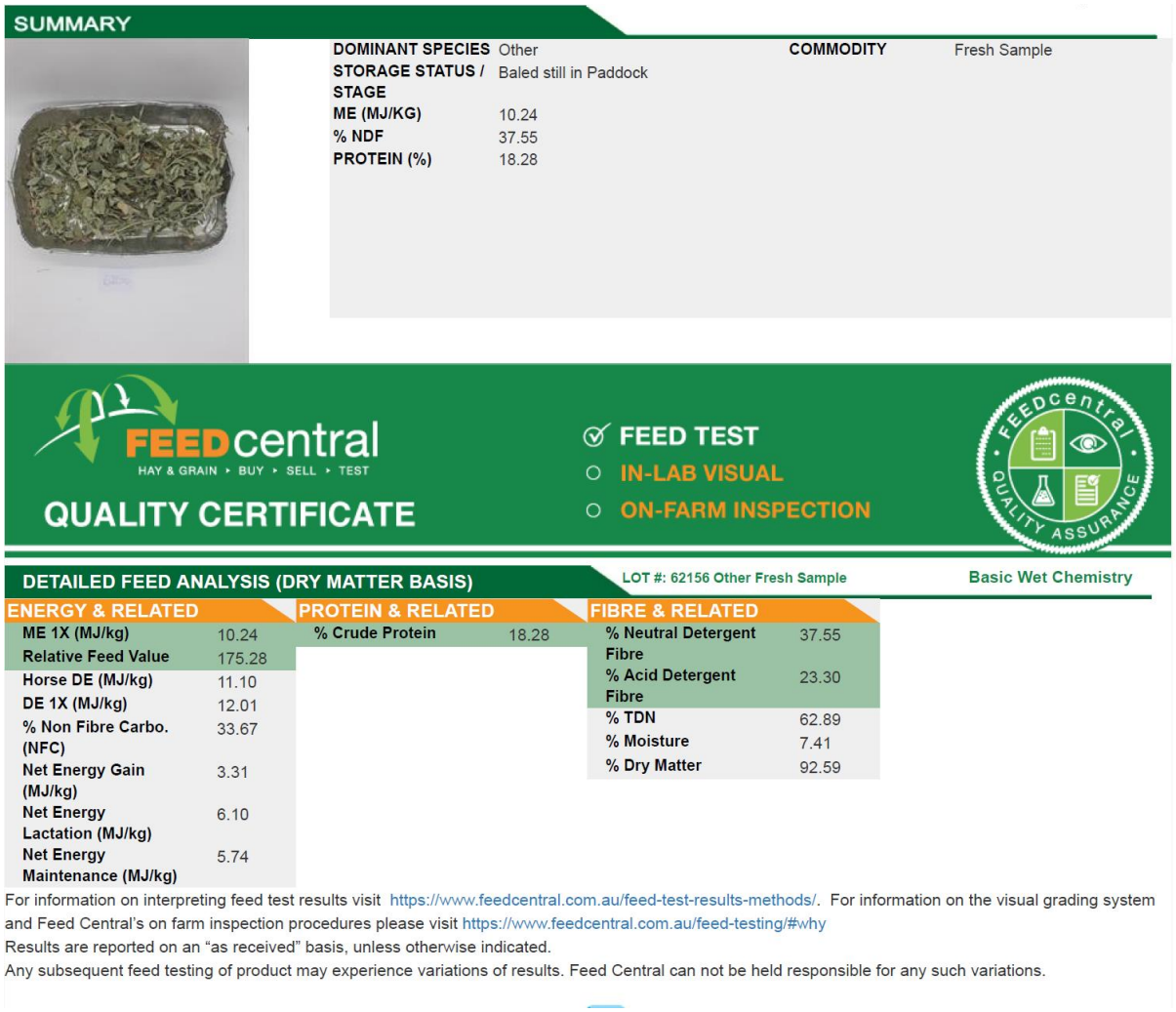
Example of a full feed test:

Producer Question: is a feed test hard to do? How do you do a feed test? What information can you get back?

The example below (Fig. 5) shows a full feed test from a sample gathered in the project and sent via parcel post to Feed Central, using one of their supplied sample bags. The cost of this test was $77.

Further information can be found: https://www.feedcentral.com.au/feed-testing-page.

Figure 5 Example full feed test results



SUMMARY

DOMINANT SPECIES	Other	COMMODITY	Fresh Sample
STORAGE STATUS / STAGE	Baled still in Paddock		
ME (MJ/KG)	10.24		
% NDF	37.55		
PROTEIN (%)	18.28		

FEEDcentral
HAY & GRAIN • BUY • SELL • TEST

QUALITY CERTIFICATE

- ☑ FEED TEST
- ○ IN-LAB VISUAL
- ○ ON-FARM INSPECTION

DETAILED FEED ANALYSIS (DRY MATTER BASIS) — LOT #: 62156 Other Fresh Sample — Basic Wet Chemistry

ENERGY & RELATED		PROTEIN & RELATED		FIBRE & RELATED	
ME 1X (MJ/kg)	10.24	% Crude Protein	18.28	% Neutral Detergent Fibre	37.55
Relative Feed Value	175.28			% Acid Detergent Fibre	23.30
Horse DE (MJ/kg)	11.10			% TDN	62.89
DE 1X (MJ/kg)	12.01			% Moisture	7.41
% Non Fibre Carbo. (NFC)	33.67			% Dry Matter	92.59
Net Energy Gain (MJ/kg)	3.31				
Net Energy Lactation (MJ/kg)	6.10				
Net Energy Maintenance (MJ/kg)	5.74				

For information on interpreting feed test results visit https://www.feedcentral.com.au/feed-test-results-methods/. For information on the visual grading system and Feed Central's on farm inspection procedures please visit https://www.feedcentral.com.au/feed-testing/#why
Results are reported on an "as received" basis, unless otherwise indicated.
Any subsequent feed testing of product may experience variations of results. Feed Central can not be held responsible for any such variations.

4.2 Economic evaluation

The project was initially established with economic analysis to be based on examining the profitability of improving reproductive rates in the ewe flock, under poor (limited feed base) seasonal conditions.

With a run of exceptional seasons being experienced during the project, along with low stock numbers coming out of drought, meant that feed base conditions were not a limiting factor through the project. Ewe condition was excellent. Weaning rates were exceptional. Producers were more interested in identifying periods of feed surplus and quantifying the magnitude of the additional feed.

The new technology that became available during the project via CIBOLABS simplified this complex and time consuming task and became a potential game changer.

The projects economic analysis was refocussed to examine business opportunities during times of feed abundance. This analysis had two components:

1. Identifying and quantifying periods of feed surplus (kg/ha Dry Matter) over the property
2. Generating potential business opportunities and doing a Gross Margin Profit analysis to create a potential Gross Margin ($)

At monthly meetings the core group examined of the CIBOLABS remote monitoring maps for one case study property. When a potential forage surplus was identified from the property maps, we loaded information on the feed surplus into the forage budget calculator, undertaking some "what if" scenarios based on feed surplus. CIBOLABS developed a forage budgeting calculator, which was made available to the project, and used to convert surplus feed (kg/ha Dry matter) into number of animals.

A Gross Margin Analysis was then undertaken, using an industry calculator.

The process of the economic analysis was therefore:

1. Identify and quantify feed surplus (whole property kg/ha Dry Matter) as indicated by the satellite monitoring (Total Standing Dry Matter Summary Maps and One Drive data)
2. Use CIBOLABS forage calculator to quantify how many animals could be run and a timeframe.
3. Determine a potential business opportunity (such as a cattle trade or agistment) based on historical experience and suitability/preference of the producer.
4. Undertake Gross Margin Analysis for the calculated numbers to estimate potential Gross Margin ($) using an industry calculator.

The worked example following shows how the remote monitoring, feed calculator and gross margin can be combined to give powerful business information:

Table 2 Remote monitoring, feed calculator and gross margin combined to give powerful business information

Information Source:	**Information**	**Details**
Remote monitoring CIBOLABS	Surplus dry matter identified	Use Maps and data
Forage Calculator	Approximate numbers of steers @ 0.7 AE	758 Animal Equivalents (AE) for 5 months Equivalent to approx. 1000 hd
Industry Gross Margin Calculator	Gross Margin/head (using industry calculator)	$120/hd
	Potential Gross Margin from Trade	**$120 000**

Note: Animal Equivalents information is in common use in the northern beef industry, further information can be found: https://futurebeef.com.au/resources/application-of-updated-animal-equivalents-ae-approach/

This is a substantial potential trade and indicates the quality of the seasons being experienced and the low stock numbers as properties emerged from drought. Using a commercial agistment scenario for comparisons, a Gross Margin range of $70 000 to $91 000 was also calculated.

Once a surplus in Total Standing Dry Matter was quantified a range of business opportunities could be investigated.

Owners access to capital, livestock preferences, property infrastructure and RISK appetite could also be discussed as part of the business decision making process instigated by the available feed surplus that could be estimated.

The example above demonstrates using the Remote Monitoring, Forage Budgeting Calculator and Gross Margin Calculator *in combination* can provide valuable information for decision making.

It should be emphasised in this demonstration project, producers were not yet fully confident in the remote monitoring information. They felt that the remote monitoring needed to be calibrated from a practical sense with what they saw in the paddock (informal calibration). They had not yet built up the confidence to undertake the identified scenario trades. However, they saw benefits in the information and the possibilities.

Confidence in the technology will develop over time.

The value of these demonstrations to business decision making was clear.

4.3 Extension and communication

We were unable to achieve our planned outcomes in this area of the project due to a combination of COVID lockdowns and floods. However, we were able to adapt and make some good progress.

There has been a lot of learning created from this project. To capture this we recorded a series of seven webinars (15-20 min duration) which are being hosted on an industry YouTube channel.

In doing this, we have left an ongoing extension and communication legacy for the project. These webinars are hosted at:

https://www.youtube.com/playlist?list=PLZC3X9teSJeoWJu4A_ZX3j0hmObelBPwM

COVID lockdowns, and the constraints caused by exceptional flooding (and elongated property isolation) created challenges to the management of the project in general, particularly the capacity to engage and connect with producers in the ways we had planned.

We commenced using monthly ZOOM meetings to continue with the extension and communication strategy, however this did not suit everyone with internet connection issues and speeds making this sometimes problematic.

Producers comfortability with using ZOOM technology was also an issue.

The project ran monthly communication/extension sessions vis zoom with up to seven participants at each session. Further information was disseminated via email and via phone. Brett Smith (Elders) took on this role and was excellent at it. A number of social media post were created and shared in the networks. We are working with project partners to edit the Webinar recordings further.

4.4 Monitoring and evaluation

The monitoring and evaluation plan was based on face-to-face contact being the main communication and extension mechanism.

The project monitoring and evaluation plan was difficult to implement, given that most sessions were run remotely.

Feedback from the project core group has been gathered and reported below:

"The process of continually stopping to think about the quality of feed we have on the ground and objectively planning stocking rates around that has already helped making decisions to buy, hold or sell stock and impacted productivity."

"At this point we are developing confidence in the data to make key decisions. We hope we will get to that point in a year or so after we familiarise ourselves more with the maps and data and check it against what's actually happening in the paddock."

"It will be a powerful management tool to walk in a paddock, see what the satellite tells us on our phone and be confident that what we see is what's measured."

The project really changed. We have all got confident in managing in drought, we've had three years to practice, but to manage in times of feed surplus is new. This information can be really useful to help quantify how much feed is really there and we can soon work out how much we need for the animals on hand. It can build confidence in identifying times and amounts of feed surplus."

"Gives the ability to make use of the above average years as this is an opportunity sometimes missed. Most producers are good are managing downside through being conservative in the lean years but not so good at managing upside."

"A great tool for improving grazing management as it can be better calculated the amount of dry matter being removed vs how much is on hand".

"I could see we had a surplus feed, but through this trial the amount of surplus became apparent. This gave me confidence to go out and bring in agistment cattle with a lot more confidence than I would normally have".

5 Conclusion:

Key findings of the demonstration are as follows:

5.1 Feed base Quality Testing:

While feed base testing has been able to undertaken for some time by the industry, its uptake by pastoral producers is generally low.

This project demonstrated the practicalities of how feed base testing can be undertaken, from paddock level sampling, coordination and how the feed test results can be used in the business. By taking photos at the sampling site, producers were able to link feed test results with a visual image of paddock feed (eg species and stage of growth).

Due to the exceptional seasons experienced in this project, feed quality was of a level that supplementation was not required. Animal performance levels were of a high standard.

In more typical season conditions, feed base testing will be more valuable, identifying periods where animal needs may not be able to be met from the paddock feed and supplementation may be required. Strategies can be developed for each property at that time.

Producers are now aware that feed base monitoring is a practical and low-cost tool they can use to assess the quality of paddock feed.

5.2 Remote monitoring (Feed Quantity)

An important outcome of the project was the demonstration of the establishment of the three properties into the CIBOLABS live feeds for real time remote monitoring. A focus on how this technology can be used to estimate Total Standing Dry Matter (kg/ha), at paddock and whole farm level was very beneficial. This is particularly the case given the low cost of this information and its high potential benefit.

In the past pastoral producers have not had the time, and some cases the equipment or expertise, to accurately assess whole farm Total Standing Dry Matter. This has now changed and the project was a powerful demonstration of this potential game changing information.

To have real time information on Pasture Growth rates, TSDM and Ground cover available on a mobile phone or iPad was a revelation.

There were five important outcomes from this demonstration:

- Demonstrating how properties can be loaded into the CIBOLABS system.
- Demonstrating the types of information available from the program as outputs
- Developing confidence that what is seen in the CIBOLABS program (satellite) corresponds to what the producers sees in the paddock (confidence and practical calibration)
- How feed testing can be used to identify feed base quality issues
- Discussing how this information can be used for better decisions.

5.3 Benefits to industry

The economic benefits of the knowledge demonstrated in this project will vary from property to property and year to year.

The economic case study outlined in this report shows that feed base information, such as that demonstrated, can have a substantial business outcome for producers in good seasons. It is also highly likely that producers will derive substantial benefits from this feed base information when seasons are less than abundant, through early warning on impending feed quality or quantity issues.

Producers have said they need a period of time to develop practice in using the software and in interpreting the information. The practical calibration of what they see in the paddock with what the remote monitoring tells them is a main part of building confidence.

It is important to note that producers will need facilitation into the CIBOLABS system and need to gain confidence in its outputs to derive full benefit from the information.

When confidence is gained, this information could be a game changer for the industry.

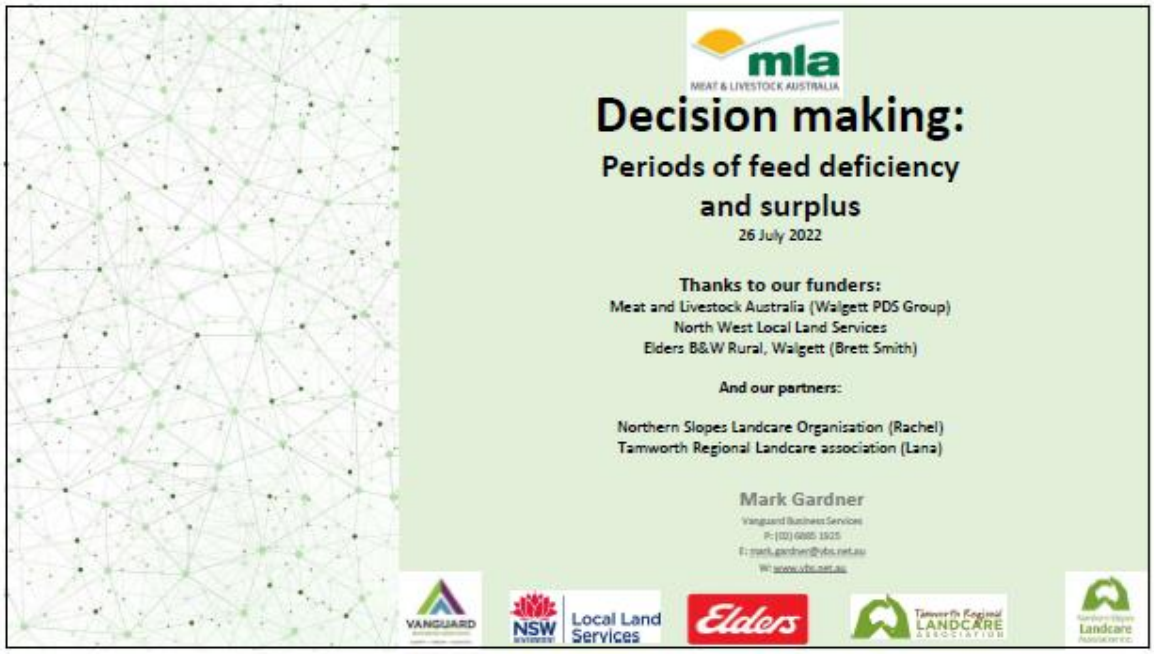
5.4 Future research and recommendations

Future work could focus on assisting producers to use the Australian Feed base Monitoring project (CIBOLLABS/MLA). This project has demonstrated clear benefits.

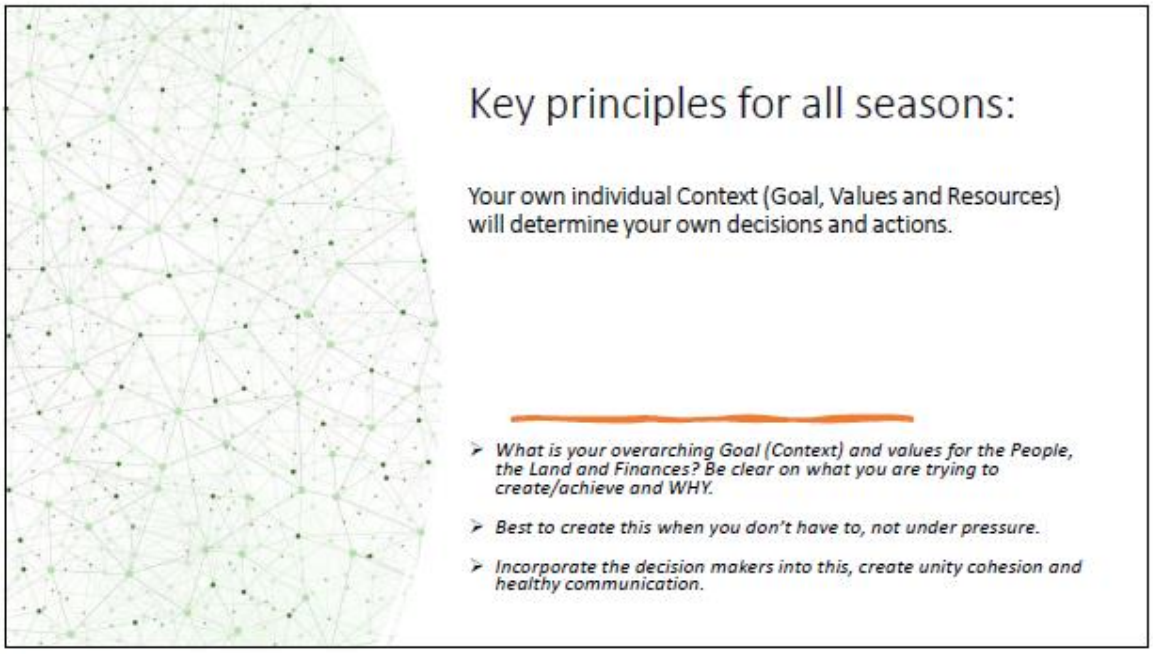
Further work could focus on developing business case studies on the benefits of using this information to make more informed business decisions.

6. APPENDIX:

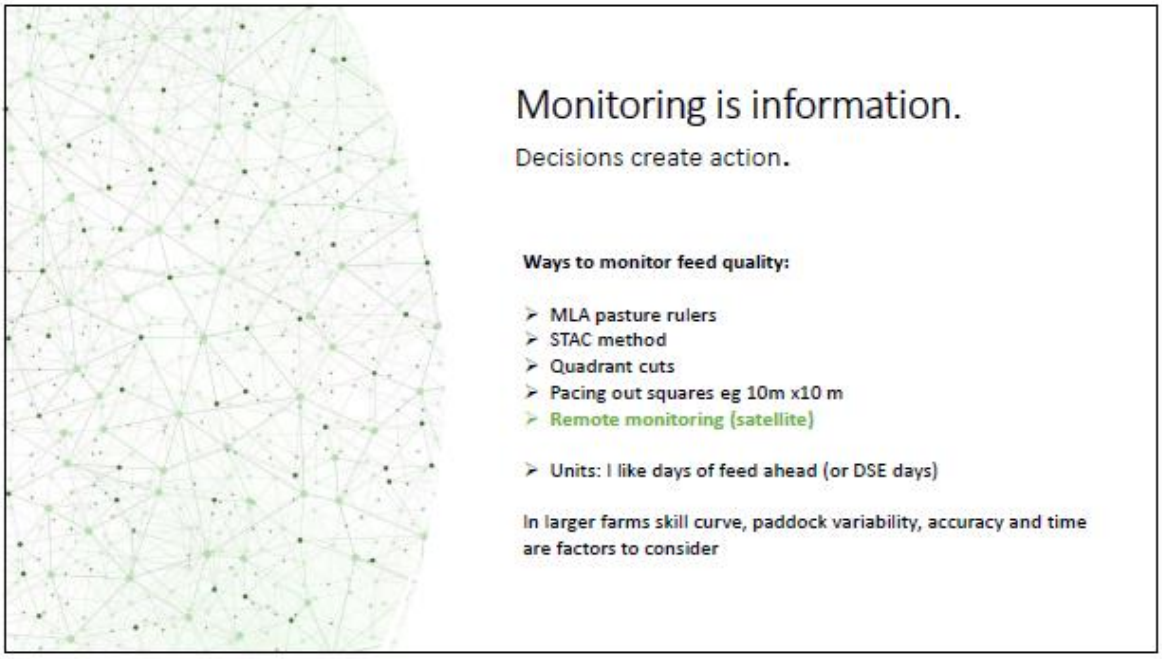
6.1 Webinar on how remote feed base information can be used for better decision making.



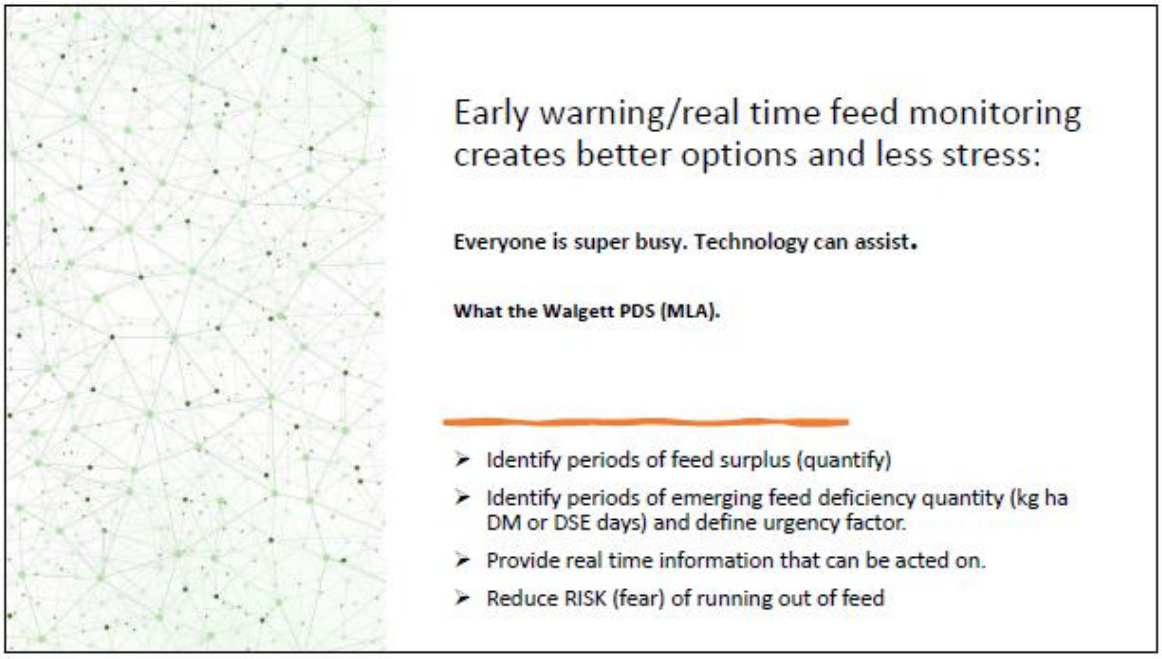
1



2


Monitoring is information.
Decisions create action.
Ways to monitor feed quality:
MLA pasture rulers
STAC method
Quadrant cuts
Pacing out squares eg 10m x10 m
Remote monitoring (satellite)
Units: I like days of feed ahead (or DSE days)
In larger farms skill curve, paddock variability, accuracy and time are factors to consider

3


Early warning/real time feed monitoring creates better options and less stress:
Everyone is super busy. Technology can assist.
What the Walgett PDS (MLA).
Identify periods of feed surplus (quantify)
Identify periods of emerging feed deficiency quantity (kg ha DM or DSE days) and define urgency factor.
Provide real time information that can be acted on.
Reduce RISK (fear) of running out of feed

4


Monitoring is information.
Decisions create action.
Information from technology can be real time, quantifiable and accessible.
It can come to your phone, iPAD or computer. Its easy.
Needs set up and confidence building.
Provides information, doesn't tell you what to do.
Information
Options (Research)
Weigh up Best Option (Context)
Decide and evaluate

5


Technology can give early warning:
Can save time. Can be accurate.
See CIBOLABS TALK
"At this point we are developing confidence in the data to make key decisions. We hope we will get to that point in a year or so after we familiarise ourselves more with the maps and data and check it against what's actually happening in the paddock.
The process of continually stopping to think about the quality of feed we have on the ground and objectively planning stocking rates around that has already helped making decisions to buy, hold or sell stock and impacted productivity."
Walgett PDS Group member
cibolabs

6


Feed quality is important:
Identify quality of feed via Feedtest
To determine the nutritional value of your feed/to determine the quality of feed
To determine the value relative to physiological state
To determine if you need to supplement your ration (and with what)
So you can finish your product appropriately

7

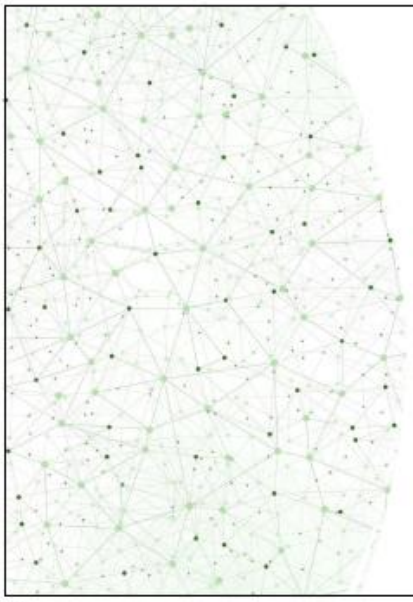

If pasture growth is slowing....
With early information you have options. Time is your friend.
With later information, time is the enemy. Pressure can alter decision making, options can be less.
Best to have time to better match carrying capacity and feed within your own context (goal)
Supplementation can assist if quality becomes an issue

8

Reducing numbers *and* improving flock productivity with eID

Reduce numbers from the bottom of the flock performers up.

9



Assess feed on hand, current animal needs and the time period…

- Quantity and Quality of feed on hand
- How many days of feed do you have for current animals on hand?
- Recovery period for pastures is assessed (be conservative) and number of animals that can be carried calculated.
- Plan for best use of (low cost) pasture feed first, considering the needs for natural capital.
- Exit points: Use some scenarios. Have one for the worst case.
- Minimise feeding where possible (cost), but its always an option. Feed in confinement where possible (infrastructure capacity) and impact on humans.
- Maintain an engine room (core breeders) where possible (Context)
- Use a nutritionist to determine animal needs and do costings at the time…..

10

A feed test and nutritional advice is essential.....

Feed Central quality test			
Feed test results for average/bulked transect			Dry matter
ME (MJ/kg)	NDF %	Protein %	Ave for transect (DM/ha)
9.2	53	9.2	1224

11

Assess quality of pasture feed, animal needs and the time period needed...

12


If pasture growth is speeding up….feed surplus
With early information you have many options. Time is your friend.
Quantify and build confidence in the extent of surplus feed, assists decide on options.
You can choose to add animals (many options), keep own animals for longer (production), use DM in other ways (Natural Capital) etc.....
Depends on your context....

13


Summary:
Early warning monitoring: Feed on hand vs Animal needs (DSE days)
Technology can give real time and time efficient measures BUT there is a confidence curve
Feed quality is important and can be assessed
Make decisions within a Holistic Context (goals)
Always use a nutritionist if supplementing or full feeding.

14

6.2 Example of feed test results and photos

Photos following shows sites where Dry Matter samples were manually gathered, for feed testing and dry matter calculations. A photo, Standing Dry Matter estimate (kg/DM/ha and %) and pasture height result is presented for each site. This was a very time consuming process and largely replaced by remote monitoring via CIBOLABS program.

Wattle Pdk	Heights (cm)	DM %	Converted kg/DM/ha
T1:R1	54	28	584

	Heights (cm)	DM %	Converted kg/DM/ha
T1:R5	23.9	43	2060

Wattle Pdk	Heights (cm)	DM %	Converted kg/DM/ha
T1:R10	12.4	61	2084

Wattle Pdk	Heights (cm)	DM %	Converted kg/DM/ha
T2:R1	129	68	1468

Wattle Pdk	Heights (cm)	DM %	Converted kg/DM/ha
T2:R5	11.1	48	668

Wattle Pdk	Heights (cm)	DM %	Converted kg/DM/ha
T2:R10	17.9	50	480