

Grazing Decisions: Trainer's Manual



Contents

Introduction	3
Pasture assessment	4
Herbage mass	4
Examples of various pasture density values	6
Ground cover	7
Herbage mass green content.....	9
Coaching Session: pre-planning.....	15
Coaching Session Outline	16
Initial meeting.....	16
Coaching session 1.....	17
Coaching session 2.....	18
Coaching session 3.....	19
Coaching session 4.....	20
Coaching session 5.....	21
Coaching session 6.....	22
Coaching session 7.....	23
Coaching session 8.....	24
Coaching session 9.....	25
Participant learning outcomes	26

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Introduction

Through this program participants will develop skills and knowledge in:

- Pasture assessment – estimating herbage mass, herbage mass green content and ground cover
- Setting herbage mass targets to maximise pasture productivity and the health of agricultural ecosystems
- Feed budgeting – having the right number of animals now and in the future
- Using climate forecasts in the feed budgeting process – probabilistic scenarios.

The program is comprised of:

- an initial group meeting,
- followed by 9 sessions over an 18-month period.

Each group will have up to 10 members from five (5) properties. Attendance from two (2) people per farm is strongly encouraged as a way to encourage adoption of new practices. Most sessions will be arranged around visiting paddocks on group member's farms to learn and practice the key skills and knowledge. Some sessions will be held indoors to work through feed budgeting and using climate forecasts in detail.

Decision making is the focus of the coaching program, recognising that most people use their gut (experience), heart (emotion, preference) and head (evidence) when making decisions. The coaching program will bolster the head aspect of making decisions to better complement the important aspects of experience and emotion.

The program skills and knowledge focus on improving the likelihood of a good decision turning into a right decision. Making a good decision relies on being sure to use all of the inputs (i.e. gut, heart, head) that are at our disposal. In reality, we can only influence whether we make a good decision or not. Whether that good decision turns into the right decision often depends on factors over which we have little information or control. For example, if after having assembled all of the information at your disposal to make a good decision, new or unexpected changes occurred (e.g. disease, market threat, legislation change, equipment failure), that decision might not turn out to be right. While that would be disappointing, it would still be considered to be a good decision (at the time). Focusing on making a good decision will improve the chances of that decision being right.

A coaching approach is taken with this program to tap into the considerable experience and knowledge that will already exist within the group, recognise that each person may have a different learning style, and to help participants to get the most enduring benefit for their farming business and family.

Pasture assessment

Herbage mass

Herbage mass is expressed as kilograms of dry matter per hectare (kg DM/ha) and is always expressed on a dry matter basis following cutting and oven drying. The dry matter content of pasture is lowest for lush new pasture and highest for dry/dead pasture and is typically in the range 20-80%. The method below is an easy way to estimate herbage mass and provides for consistency of estimates between different people on the same farm.

Step 1:

Measure pasture height (in cm) from the ground to the average height of the bulk of the leaves; do not extend leaves and do not measure to the top of seed heads.



Step 2:

Estimate pasture density in terms of kilograms of dry matter per hectare (kg DM/ha) for every centimetre (cm) of pasture height.

Guide to the estimation of pasture density

All values in this table are pasture density expressed as kg dry matter/ha per cm of pasture height

Temperate pastures

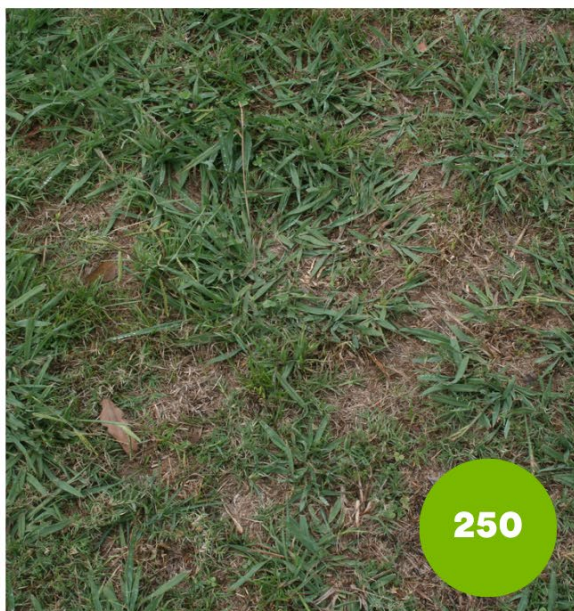
Description	Pasture density (kg DM/ha per cm)
Ground readily seen through sparse pasture	150
Ground seen through sparse pasture	200
Ground occasionally seen through average pasture	250
Ground not visible through average pasture	300
Good pasture	350
Dense pasture	400

Tropical pastures

Description	Pasture height (cm)		
	0-10cm	11-25cm	>25cm
Ground readily seen through sparse pasture	200	150	100
Ground occasionally seen through pasture	250	200	150
Ground not visible through pasture	300	250	200

Source: Kahn and Earl, Pasture Management Checklists. Agricultural Information & Monitoring Services.
<https://aimsag.com.au/software/> www.Ag360.com.au

Examples of various pasture density values



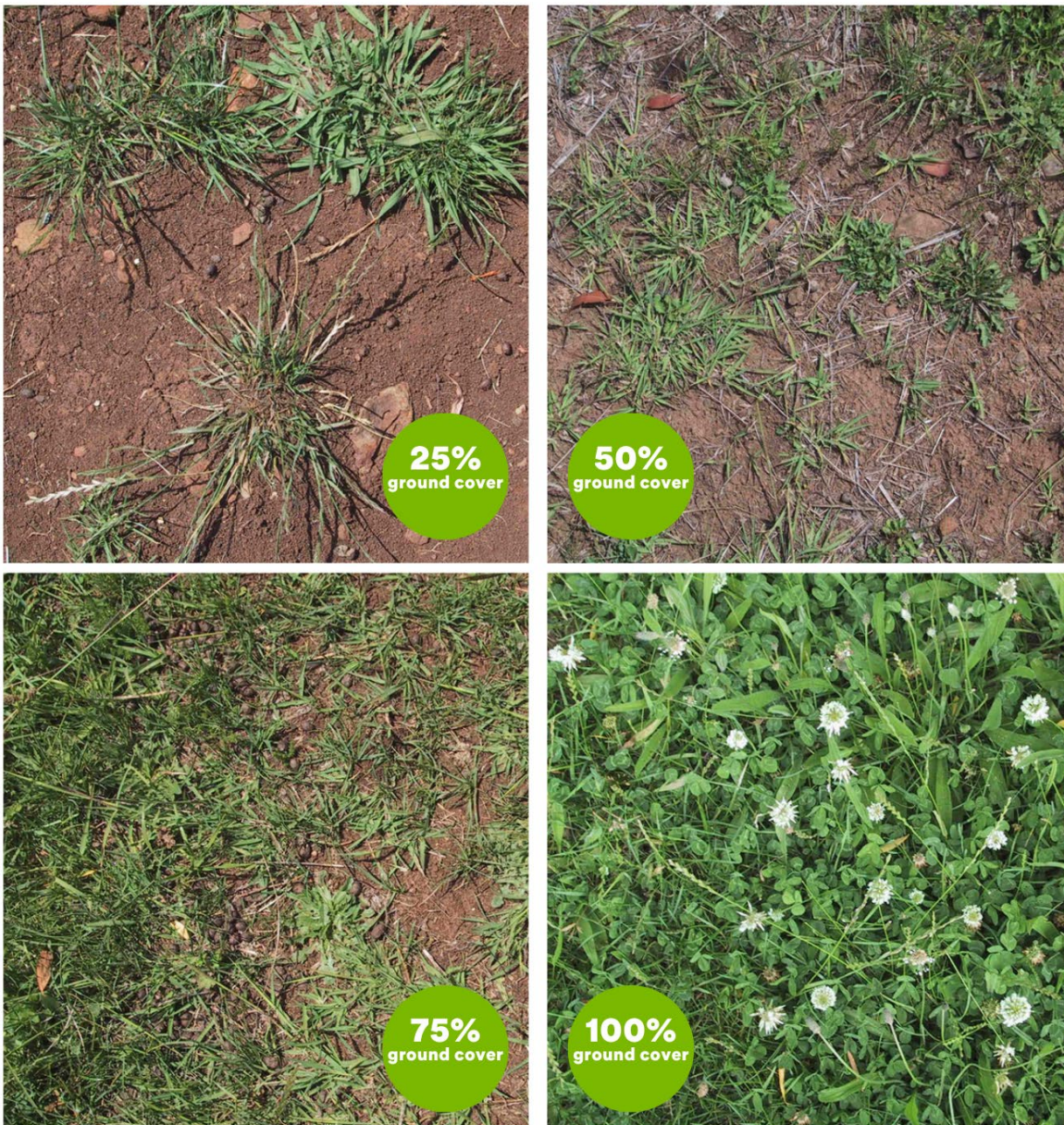
Step 3:

To calculate herbage mass, multiply pasture height X pasture density

(e.g. 10 cm X 250 kg DM/ha per cm = 2,500 kg DM/ha)

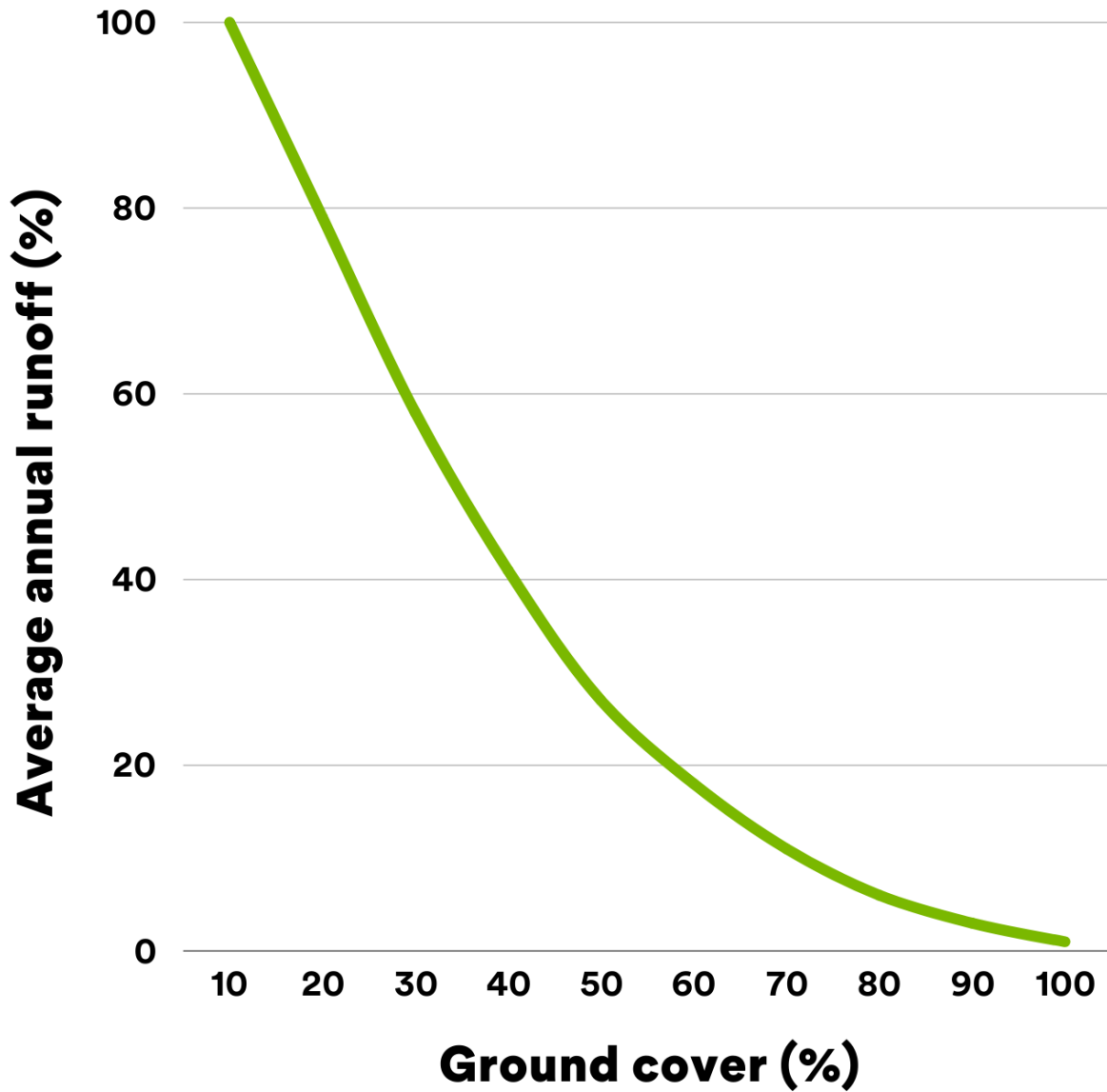
Ground cover

Ground cover is expressed as the percentage of ground (i.e. soil surface) that is covered and is not exposed soil. An easy way to think of this, is to consider if a raindrop could hit exposed soil. Covered ground reduces rainfall runoff, reduces weed germination, regulates soil surface temperature and conserves soil moisture.



Images: Judi Earl & Lewis Kahn – Pasture & grazing management for the northern tablelands of NSW

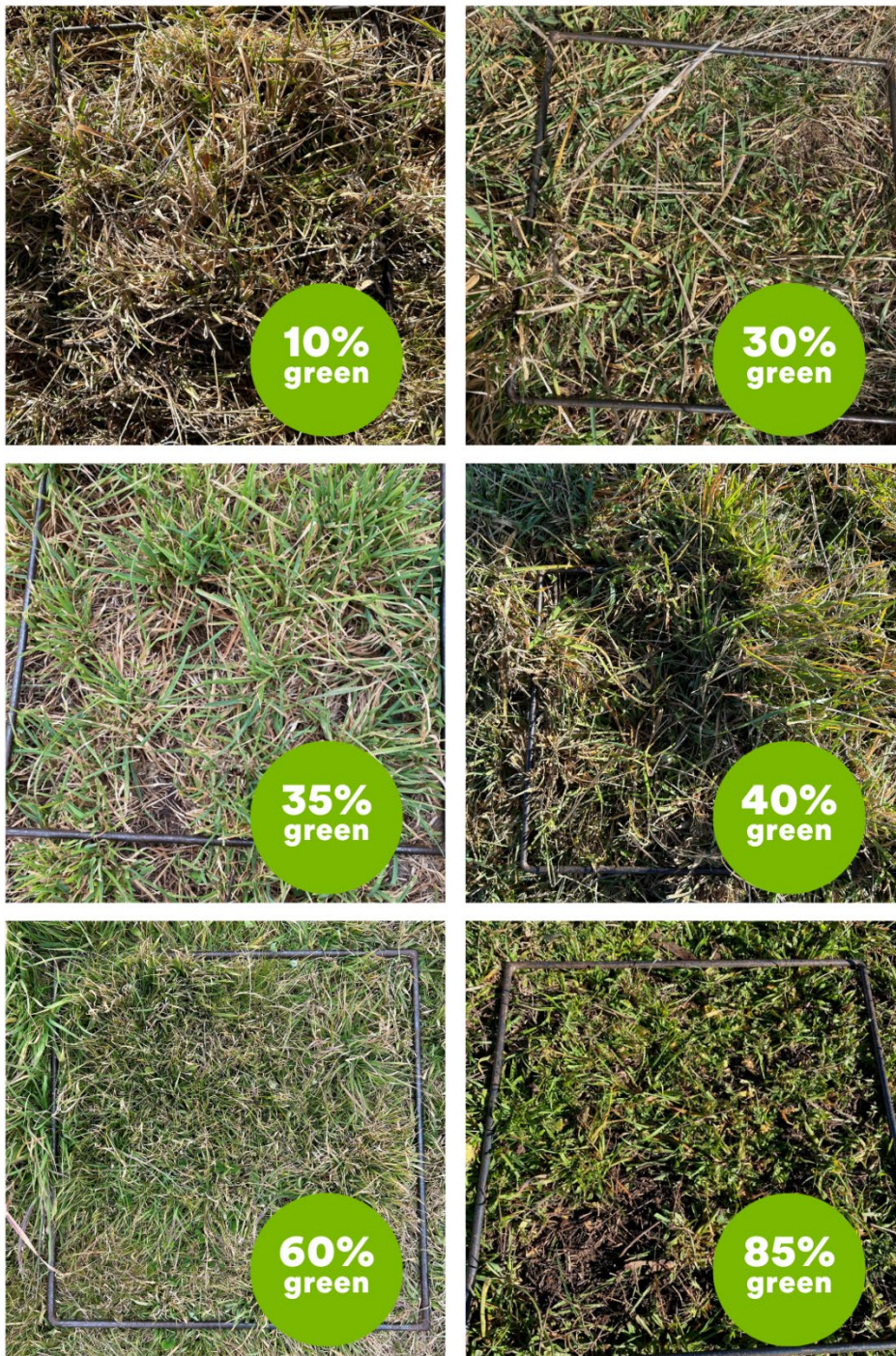
Average annual runoff decreases with more ground cover



Adapted from R.D. Lang (1979) The effect of ground cover on surface runoff from experimental plots.

Herbage mass green content

Herbage mass green content, also called green percent, is the percentage of herbage mass that is green, and is expressed on a dry matter basis following cutting and oven drying. It is easy to overestimate green percent because green leaves/stems have lower dry matter (i.e. more water) than dry/dead leaves and stems and herbage mass is expressed on a dry matter basis.

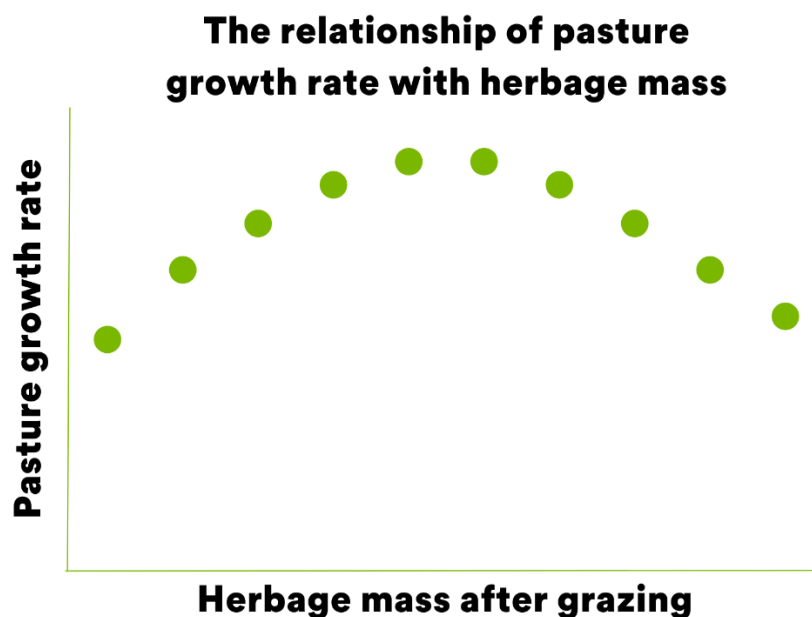


Setting herbage mass targets

There is a simple message when it comes to getting the most from your pasture — grass grows grass — but that is only true up to a point. Pasture growth rate increases as more herbage is left after grazing, until an optimum is reached, but thereafter the growth rate declines with more residual herbage mass. Changes in the plant explain this relationship:

- The ratio of shoot (above ground plant material) to root in established perennial grasses is variable and affected by various factors (e.g. soil fertility, soil water content) but is typically about 60:40. Grazing reduces the mass of shoots, and plants respond by reducing the mass of roots.
- If grazing reduces herbage mass to a very low level, plants will have few leaves to capture sunlight to fuel regrowth and instead look to draw upon their organic reserves in stem bases and roots. But the grazing will have reduced these reserves to low levels. Taken together, these changes explain the slow rate of regrowth of heavily grazed pastures.
- At high levels of herbage mass, shading of leaves by each other will reduce interception of sunlight. Access to sunlight is also typically hampered because plants will often be carrying a higher mass of dying and dead plant material. These changes explain the slow rate of regrowth of lightly grazed pastures.
- Finding the range in between these grazing extremes is key to maximising pasture growth rate, and the reason why setting minimum and maximum targets for herbage mass is an important part of grazing management and feed budgeting.

With this relationship in mind, minimum and maximum herbage mass targets can be implemented to graze pastures within the ideal envelope for optimal pasture growth. These targets may vary from region to region or with differing enterprise objectives. However, when there is a target in mind, it becomes easier to manage for ahead of time through the feed budgeting process.



Feed budgeting

Feed budgeting is the process of calculating the number of animals that can be carried on a property or paddock for a given amount of time and to achieve a desired level of herbage mass at the end of the period.

It requires:

- Being able to estimate herbage mass
- Estimating pasture growth rate
- Estimating the pasture intake of different livestock classes through Dry Sheep Equivalent (DSE) values.

Note that DSE is an acronym for Dry Sheep Equivalent, with a value (in NSW) of 1.0 DSE for a 50 kg dry sheep maintaining weight. It is based on the daily metabolizable energy requirement of that dry sheep at 50 kg maintaining weight (i.e. about 8 MJ metabolizable energy) and then all other DSE values are expressed as multiples, to account for species, live weight, growth rate, reproduction, and lactation status.

Pasture growth rates vary with species, soil type, soil fertility, time of year, seasonal conditions and management. As the coach you should be able to provide estimates for your region.

Experienced property owners know how many livestock that they typically carry on their properties but feed budgets provide extra confidence in those decisions, and can also account for uncertainty in seasonal conditions.

Feed budget example:

Grazable area (ha)	500
Start of period (date)	1/04/2024
End of period (date)	1/10/2024
Length of period (days)	183
Start herbage mass (kg DM/ha)	2300
Desired end herbage mass (kg DM/ha)	1500
Pasture growth rate (kg DM/ha per day)	3.0
Available feed (kg DM/ha per day)	7.4
Total DSE	3686
DSE/head	8.5
Total number of stock	434

Available feed = (start herbage – end herbage) ÷ length of period + pasture growth rate

Total DSE = (available feed x grazable area)

Total number of stock = (total DSE ÷ DSE/head)

Think of DSE values as a pasture allowance rather than anything to do with sheep. Their value is for ease of use because feed budgeting assumes that 1.0 DSE eats 1.0 kg/day of pasture (dry matter basis). A reasonable estimation of DSE values requires knowing production level and often DSE estimates are an approximation.

Guide to DSE values

	Sheep (dry) growth rate (g/d)					
Weight (kg)	0	50	100	150	200	300
20	0.4	0.6	0.9	1.2	1.4	1.9
25	0.5	0.8	1.0	1.3	1.5	2.0
30	0.6	0.9	1.1	1.4	1.6	2.1
35	0.7	1.0	1.2	1.5	1.7	2.2
40	0.8	1.1	1.3	1.6	1.8	2.4
45	0.9	1.2	1.4	1.7	2.0	2.5
50	1.0	1.3	1.6	1.8	2.1	
55	1.1	1.4	1.7	1.9	2.2	
60	1.3	1.5	1.8	2.0		
65	1.4	1.6	1.9	2.1		

	Cattle (dry) growth rate (kg/d)						
Weight (kg)	0	0.2	0.4	0.6	0.8	1	1.5
150	2.4	3.4	4.4	5.4	6.4	7.4	9.8
200	3.4	4.3	5.3	6.3	7.3	8.3	10.8
250	4.3	5.3	6.3	7.3	8.3	9.2	11.7
300	4.9	5.8	6.8	7.7	8.6	9.5	11.9
350	5.8	6.7	7.6	8.6	9.5	10.4	12.8
400	6.7	7.6	8.5	9.5	10.4	11.3	13.6
450	7.4	8.3	9.2	10.1	11.0	11.9	14.2
500	8.0	8.9	9.8	10.7	11.6	12.5	

	Weight (kg)	
Ewes	50	60
pregnant–single	1.1	1.3
pregnant–twin	1.2	1.4
lactating–single	2.1	2.4
lactating–twin	2.7	3.0

Note: average values for pregnancy (day 0-150) and lactation (day 0-100) with little weight change for ewes.

	Weight (kg)	
Cows	450	550
pregnant	8.0	10.0
lactating	13.0	16.0

Note: average values for pregnancy (day 0-270) and lactation (day 0-240) with a single calf and little weight change for cows.

Climate forecasts

In this program we focus on incorporating climate forecasts into feed budgets. To do this we use the online tool Ag360® that provides 6-month climate forecasts on a 5 km² grid for the whole of the Australian continent. Incorporating climate forecasts relies on accepting that forecasts provide a range of likely outcomes rather than a specific outcome.

In this example (Figure 1), the rainfall forecast for the coming 6-months is shown in various bands. The bottom of the lowest band indicates there is a 95% chance of getting at least this rainfall amount. The bottom of the next band up (75%) indicates a 75% chance of getting at least that amount and so forth until the top of the upper most band indicates a 5% chance. The rainfall amounts for each of these probabilities at 3 and 6 months into the future are also shown as an example on Figure 2.

While many people will focus just on the 50% rainfall amount (also called the median), we use the 25–75% band to represent the possible range in future rainfall amount. This also reflects that forecasts provide a range of possible future outcomes, and it is too much to expect forecasts to give a single forecast value with any confidence. Accepting this approach, takes away from planning on the basis of a single median seasonal outlook, and ensures that feed budgets and grazing plans can accommodate for the level of risk that a producer wants to take with regard to the probability of rainfall.

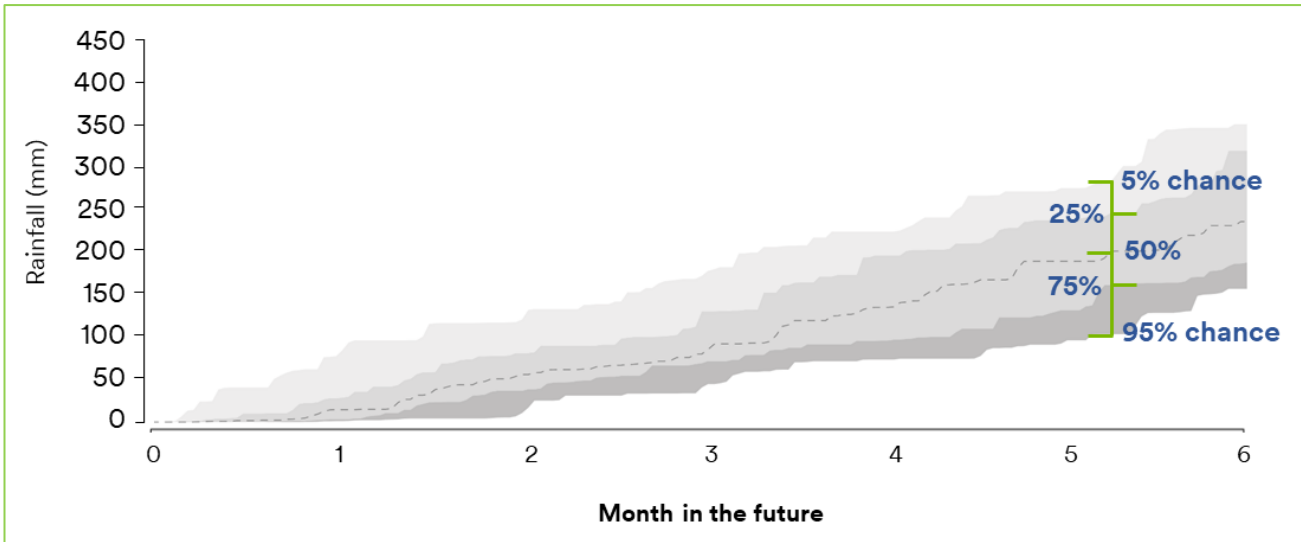


Figure 1

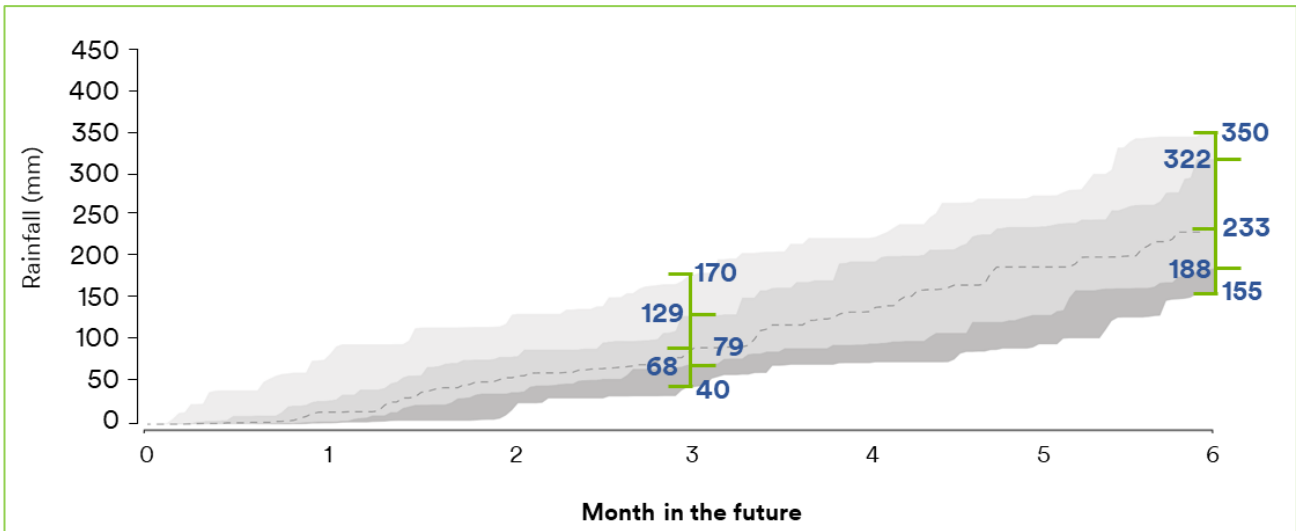


Figure 2

Ag360.com.au

Ag360 has been developed to record management information and to display forecasts for rainfall, soil moisture, herbage mass, animal performance, and animal wellbeing. It incorporates climate forecasts with existing soil moisture and information about pastures and livestock into industry-validated models. While it is useful to know the basics of feed budgeting, Ag360 calculates feed budgets for users and allows the evaluation of different risk scenarios.

Coaching Session: pre-planning

Session times

Before setting session times for the templated agendas, it's important to consider some factors that may impact your attendees:

- Travel time for coach and participants to arrive on site
- Time of year and likely weather challenges (eg. extreme heat/cold; snow; rain; thunderstorms)
- Length of session, allowing farmers to complete daily duties either in the morning or afternoon
- Farmers with young children may have school drop off or bus pick up times that will affect attendance.

It is also important to discuss with each group at the first session if there are any commitments (days of the week or start or finish times) that sessions should be arranged around.

Using the project plan templates

In the provided agenda templates, we have outlined session flows and indicative times. The left-hand column has been left blank for you to insert local times.

Additional documents

Please refer the participants to the formatted pasture assessment recording sheet to keep a record of their assessments.

External experts

External experts, especially ones known to or recognised by your participants, are important for reinforcing knowledge shared during the coaching process.

For an example of how to incorporate external experts, see the templated agenda for coaching session 5 in the next section.

External experts are also an excellent inclusion for events held as part of the coaching project, but targeted to the wider community, not just immediate group participants.

Coaching Session Outline

Initial meeting

Location: Indoors at neutral location in town & nearby park/paddock

	30 mins	Arrive and meet group members Attendance form and hazard assessment signing Participants to introduce themselves to the group
	30 mins	Outline of day Pasture management concepts and benefits of forage based grazing practices Describe format of coaching project and group sessions Discuss 'Participant learning outcomes' Introduce pasture assessment handbook
	30 mins	Introduction to Ag360 Participant questions
	10 mins	Initial participant survey
	20 mins	Morning tea
	45 mins	Pasture assessment in nearby park/paddock
	60 mins	Participant to establish an Ag360 account
	15 mins	Hazards and biosecurity during coaching sessions Date for next meeting
	60 mins	Light lunch
		Close (Total 5 hrs)

Coaching session 1

Location: On farm

	10 mins	Arrive at Farm 1, allow for late arrivals
	40 mins	<ul style="list-style-type: none"> • Attendance form and hazard assessment signing • Check if introductions required to ensure everyone knows each other • Check what people thought of first meeting: any questions about the cascade of effects from managing within pasture envelope; or about the role of Ag360; others • Ask who has gone out and estimated herbage mass using the height x density technique; discuss • Review 'Participant learning outcomes' • Recap the purpose of the coaching sessions and today's plan: <ul style="list-style-type: none"> ○ Estimate herbage mass in each of the two paddocks per farm ○ Ask property owner/manager to describe history of the paddock (stock, fertiliser, etc) ○ Discuss Ag360 rainfall forecasts ○ Explain requirement for data entry into the handbook • Ask property owner/manager to describe farm and operation
	40 mins	<p>Assess Paddock 1</p> <ul style="list-style-type: none"> • Property owner/manager to describe paddock history • Visit three locations in paddock to estimate herbage mass (height x density); herbage green %; dominant legume/herb; ground cover; weed identification and % of paddock; pasture species identification • Combine to decide on paddock average
	40 mins	<p>Assess Paddock 2</p> <ul style="list-style-type: none"> • Property owner/manager to describe paddock history • Visit three locations in paddock to estimate herbage mass (height x density); herbage green %; dominant legume/herb; ground cover; weed identification and % of paddock; pasture species identification • Combine to decide on paddock average
	20 mins	<p>Morning tea</p> <p>Time to cover off on any other questions/interests</p>
	20 mins	Travel to Farm 2
	10 mins	<p>Arrive Farm 2</p> <ul style="list-style-type: none"> • Ask property owner/manager to describe farm and operation
	30 mins	Assess Paddock 1
	30 mins	Assess Paddock 2
	30 mins	Travel to Farm 3
	45 mins	<p>Arrive Farm 3 and have lunch</p> <ul style="list-style-type: none"> • Report Ag360 rainfall forecast for next two months for each farm
	10 mins	Ask property owner/manager to describe farm and operation
	30 mins	Assess Paddock 1
	30 mins	Assess Paddock 2
	15 mins	<ul style="list-style-type: none"> • Closing discussion • What people need to do when they go home • Future expectations/Next meeting date
		Close (Total 6 hrs 40 min)

Coaching session 2

Location: On farm

	10 mins	Arrive at Farm 1, allow for late arrivals
	40 mins	<ul style="list-style-type: none"> • Attendance form and hazard assessment signing • Check what people thought of last coaching session; discuss questions • Are you comfortable with estimating pasture height and density to calculate herbage mass? • Recap the purpose of the coaching sessions and today's plan: <ul style="list-style-type: none"> ○ Estimate herbage mass in each of the two paddocks ○ Ask property owner/manager to describe history of the paddock (stock, fertiliser, etc) ○ Discuss Ag360 rainfall forecasts ○ Ensure data entered into the handbook • Ask property owner/manager to describe farm and operation (new farms only)
	40 mins	<p>Assess Paddock 1</p> <ul style="list-style-type: none"> • Property owner/manager to describe paddock history • Visit three locations in paddock to estimate herbage mass (height x density); herbage green %; dominant legume/herb; ground cover; weed identification and % of paddock; pasture species identification • Combine to decide on paddock average
	30 mins	<p>Assess Paddock 2</p> <ul style="list-style-type: none"> • Property owner/manager to describe paddock history • Visit three locations in paddock to estimate herbage mass (height x density); herbage green %; dominant legume/herb; ground cover; weed identification and % of paddock; pasture species identification • Combine to decide on paddock average
	20 mins	<p>Morning tea</p> <p>Time to cover off on any other questions/interests</p> <ul style="list-style-type: none"> • Discuss how participants are going navigating Ag360 and highlight importance of settings (eg. productivity slider; soil texture; herbage mass entry; stock rotation; livestock key dates)
	30 mins	Travel to Farm 2
	10 mins	<p>Arrive Farm 2</p> <ul style="list-style-type: none"> • Ask property owner/manager to describe farm and operation
	30 mins	Assess Paddock 1
	30 mins	Assess Paddock 2
	20 mins	Travel to Farm 3
	45 mins	<p>Lunch</p> <ul style="list-style-type: none"> • Comparisons of rainfall forecast (quote range 25-75th bands) and actual rainfall received over the last two-month period • Report Ag360 rainfall forecast for next two months for each farm
	30 mins	Assess Paddock 1
	30 mins	Assess Paddock 2
	20 mins	<ul style="list-style-type: none"> • Closing discussion • What people need to do when they go home • Future expectations/Next meeting date
		Close (Total 6 hrs 25 min)

Coaching session 3

Location: On farm

	10 mins	Arrive at Farm 1, allow for late arrivals
	40 mins	<ul style="list-style-type: none"> • Attendance form and hazard assessment signing • Check what people thought of last coaching session; discuss questions • Are participants comfortable with estimating pasture height and density to calculate herbage mass? • Recap the purpose of the coaching sessions and what we plan to do today: <ul style="list-style-type: none"> ○ Estimate herbage mass in each of the two paddocks ○ Take pasture cut in at least one paddock per farm, sort into green/dead and oven dry (green/dead sort and oven dry) ○ Ask property owner/manager to describe what has happened with the paddock since the first session (stock, fertiliser, etc) ○ Ensure data entered into the handbook ○ Discuss Ag360 rainfall forecasts
	20 mins	<p>Assess Paddock 1</p> <ul style="list-style-type: none"> • Property owner/manager to describe paddock history since last visit • Visit three locations in paddock to estimate herbage mass (height x density); herbage green %; dominant legume/herb; ground cover; weed identification and % of paddock; pasture species identification • Combine to decide on paddock average <p>Complete a pasture cut process for a quadrat sample (green/dead sort and oven dry)</p>
	30 mins	Assess Paddock 2
	30 mins	<p>Morning tea</p> <ul style="list-style-type: none"> • Time to cover off on any other questions/interests • Show Ag360 printed rainfall/soil moisture/pasture availability and how we are using the information for farm decision making
	15 mins	Travel to Farm 2
	5 mins	<p>Arrive Farm 2</p> <ul style="list-style-type: none"> • Ask property owner/manager to describe what has happened with the paddocks since last visit (stock, fertiliser, etc)
	30 mins	<p>Assess Paddock 1</p> <p>Complete a pasture cut process for a quadrat sample (green/dead sort and oven dry)</p>
	30 mins	Assess Paddock 2
	45 mins	<p>Lunch</p> <ul style="list-style-type: none"> • Comparisons of rainfall forecast (quote range 25-75th bands) and actual rainfall received over the last two-month period • Report Ag360 rainfall forecast for next two months for each farm
	15 mins	<ul style="list-style-type: none"> • Closing discussion • What people need to do when they go home • Next meeting date
		Close (Total 4 hrs 30 min)

Coaching session 4

Location: Indoors with Wi-Fi

	10 mins	Arrive at venue
	30 mins	<ul style="list-style-type: none"> • Attendance form and hazard assessment signing • Discuss rainfall forecast amount for next two months. How accurate has Ag360 been for the last 6 months? • Who's confident in estimating herbage mass, ground cover and herbage green percent? • Hands up for those who feel they have improved over the last 6 months • What areas are the trickiest areas of the pasture assessments? • Who still has their ruler, who uses another way for measuring pasture height?
	20 mins	<ul style="list-style-type: none"> • Show green percent library from pasture cuts • Guessing game with green percent photo slides
	15 mins	<ul style="list-style-type: none"> • Discuss herbage mass findings and farm specific herbage mass data
	30 mins	<ul style="list-style-type: none"> • Purpose of the coaching sessions and what we plan to do today: <ul style="list-style-type: none"> ○ Review each Ag360 account for rainfall, soil moisture and pasture availability and discuss a response (stocking rate, feed requirements) for each farm ○ Discuss a response for planning and decision making per farm • First farm Ag360 discussion
	20 mins	Morning tea
	20 mins	Second farm Ag360 discussion
	20 mins	Third farm Ag360 discussion
	20 mins	Fourth farm Ag360 discussion
	20 mins	Fifth farm Ag360 discussion
	15 mins	<ul style="list-style-type: none"> • We want to use the coaching sessions to discuss what the forecasts are indicating and use the time to discuss what decisions could be made and utilise group input • Give me a call if you need a hand to keep Ag360 up to date • Next meeting date
		Close (Total 3 hrs 40 min)

Coaching session 5

Location: Outdoors – Natural Capital (example: water quality; biodiversity)

The detail below is for water quality. Trainers are encouraged to customise for their group.

	10 mins	Arrive at venue
	30 mins	<ul style="list-style-type: none"> • Attendance form and hazard assessment signing • Sample the water to identify invertebrates • Discuss with the group sensitivity tolerance and habitat preference
	40 mins	<ul style="list-style-type: none"> • Discuss the water sampling equipment used for on farm monthly water sample collections. • Explain the water quality tests being completed, ideal thresholds, importance and contributing factors. Including: <ul style="list-style-type: none"> ○ Phosphorus ○ Nitrogen ○ Turbidity ○ Electrical conductivity (salinity) ○ pH ○ Temperature ○ Dissolved oxygen
	20 mins	<ul style="list-style-type: none"> • Discuss ground cover and run off relationship • Pasture height slowing water movement • Impact on aquatic ecosystem from soil and manure rich run off • Larger catchment overview for each group (where does their catchment run from and to) • Aquatic ecology team to leave
	20 mins	Morning tea
	20 mins	<ul style="list-style-type: none"> • Discuss rainfall forecast from Ag360 • Mid-way participant survey
	20 mins	Pasture assessment with the group in nearby location
	15 mins	<ul style="list-style-type: none"> • Discuss any topics of interest • Next meeting date • Remind of offer to have phone call to discuss Ag360, climate forecasts and feed budget
		Close (Total 2 hrs 55 min)
		<p>Some resources that may be helpful to have ready for the day:</p> <ul style="list-style-type: none"> ○ Photos of likely bugs and what their presence indicates ○ Photos of algal blooms/algae ○ Where participants can send water samples for suitability testing of drinking water and stock water

Coaching session 6

Location: Indoors with Wi-Fi

Coach to organise phone meetings with every participant to update account and talk about monthly long-term rainfall medians to be used for coaching session.

	10 mins	Arrive at venue
	20 mins	<ul style="list-style-type: none"> • Attendance form and hazard assessment signing • Pasture assessments completed prior to and discuss at meeting • Demonstrate how to access long term weather station values for those who don't have records or long-term median in Ag360
	40 mins	<ul style="list-style-type: none"> • How has the last few months been for each participant on farm • Each participant to describe how they are using the pasture assessment skills for decision making • Each participant to describe how Ag360 is contributing to their decision-making process on farm
	120 mins	<ul style="list-style-type: none"> • Explore climate forecasts using yearly comparison graph per month per farm • Encourage comparison of forecast to long-term medians per farm • Ensure Ag360 account is up to date and discuss forecast pasture availability related to time of year • Explore farmers next decisions of grazing strategy and stock numbers – discuss as group • What is one change on farm from the pasture availability predictions that each participant will consider implementing
	15 mins	<ul style="list-style-type: none"> • Discuss any topics of interest • Next meeting date
		Close (Total 3 hrs 25 min)

Coaching session 7

Location: On farm

	10 mins	Arrive at Farm 1
	10 mins	<ul style="list-style-type: none"> Attendance form and hazard assessment signing Overview of day
	20 mins	<p>Assess Paddock 1</p> <ul style="list-style-type: none"> Property owner/manager to describe paddock history since last visit Visit two locations in paddock to estimate herbage mass (height x density); herbage green %; dominant legume/herb; ground cover; weed identification and % of paddock; pasture species identification Combine to decide on paddock average <p>Complete a pasture cut process for a quadrat sample (green/dead sort and oven dry)</p>
	20 mins	Assess Paddock 2
	20 mins	<ul style="list-style-type: none"> Report Ag360 rainfall forecast for next two months for each farm Evaluate how well Ag360 is forecasting rainfall for each farm
	20 mins	Morning tea
	90 mins	<ul style="list-style-type: none"> Participants to discuss review of forecast vs decisions made per farm since start of coaching sessions How have you been using Ag360 so far Did the coaching session skills and/or Ag360 information contribute to decision making over the last year
	20 mins	Travel to Farm 2
	30 mins	Lunch
	5 mins	Ask property owner/manager to describe what has happened with the paddocks since last visit (stock, fertiliser, etc)
	20 mins	<p>Assess Paddock 1</p> <p>Complete a pasture cut process for a quadrat sample (green/dead sort and oven dry)</p>
	20 mins	Assess Paddock 2
	15 mins	<ul style="list-style-type: none"> Discuss any topics of interest Next meeting date
		Close (Total 5 hrs 0 min)

Coaching session 8

Location: On farm

	10 mins	Arrive at Farm 1
	10 mins	<ul style="list-style-type: none"> • Attendance form and hazard assessment signing • Overview of day
	20 mins	Assess Paddock 1 <ul style="list-style-type: none"> • Property owner/manager to describe paddock history since last visit • Visit two locations in paddock to estimate herbage mass (height x density); herbage green %; dominant legume/herb; ground cover; weed identification and % of paddock; pasture species identification • Combine to decide on paddock average
	20 mins	Assess Paddock 2
	20 mins	<ul style="list-style-type: none"> • Report Ag360 rainfall forecast for next two months for each farm • Discuss pasture cut results from last session
	20 mins	Morning tea
	60 mins	<ul style="list-style-type: none"> • Discuss what the 6-month forecast looks like (rainfall/soil moisture/pasture availability) • How is each farm planning to manage for the next 6 months • Ag360 review of property (tell a story)
	20 mins	Travel to Farm 2
	20 mins	Assess Paddock 1
	20 mins	Assess Paddock 2
	45 mins	Lunch <ul style="list-style-type: none"> • Discuss any topics of interest • Next meeting date
		Close (Total 4 hrs 25 min)

Coaching session 9

Location: Central location

Multiple sessions on offer (combine groups and invite all to each day to meet other participants).

	15 mins	Participant sign in
	15 mins	Welcome and overview of day Project partners to speak
	45 mins	Guest speaker/s – human wellbeing/motivation/support outside of project
	30 mins	Morning tea
	60mins:	Trip down memory lane, include photos. What we did and how we went about it. Who feels they made progress? Encourage landholders to share their experiences.
	15 mins	Pasture assessment <ul style="list-style-type: none"> ○ Slide of pictures of pasture assessment technique (measuring pasture height; density; pasture cuts to confirm density) ○ Turn to your neighbour to discuss “how do you assess your pastures?” ○ Group discussion (ruler, hands, eye, while moving through paddock, special visit, write it down, put in phone)
	30 mins	Understanding climate forecasts <ul style="list-style-type: none"> ○ Rainfall – actual vs interpolated; forecasts versus actual rainfall per farm “who is looking for a range of possible forecasts, not just one number” ○ Show live Ag360 current 6 month forecast
	15 mins	Incorporate climate forecasts into feed budgets to make decisions <ul style="list-style-type: none"> ○ “Talk about a situation when you used Ag360 to help your decisions about future events”
	45 mins	Natural capital monitoring results Example: Final water monitoring results, water quality pretty good across all sites, couple of trends of interest Discuss impact of grazing management on natural capital
	15 mins	<ul style="list-style-type: none"> • Reflection on what we have heard today • Reflection on the progress the coach has seen through the program • Appreciation of their continued commitment, sharing of knowledge and experience and for hosting us on their properties • Future coaching program possibilities • Awards – participation certificate • Final participant evaluation • Photos with participants
	45 mins	Lunch
		Close (Total 4 hrs 30 min)

Participant learning outcomes

Knowledge, skills, confidence and practice change outcomes for participants.

	Knowledge	Skills	Confidence	Practice Change
Pasture assessment				
Herbage mass (kg dry matter/ha)	<p>Herbage mass is estimated by multiplying the height of pasture (average tops of leaves, not seed heads) by the estimated density of pasture to give a value in kg dry matter/ha</p> <ul style="list-style-type: none"> How to estimate pasture height How to estimate pasture density 	<p>Be able to:</p> <ul style="list-style-type: none"> Estimate the average height of pasture for a paddock Estimate the average pasture density for a paddock Calculate average herbage mass for a paddock 	High level confidence (score 4 of 5) minimum for all skills	<p>Think in terms of herbage mass when assessing pastures and feed supply for livestock.</p> <p>This may be in addition to other experiential ways of assessing pastures and feed supply for livestock.</p> <p>Incorporate the skill in day to day activities</p>
Herbage mass green content (% of dry herbage mass)	<p>Herbage mass green content is a difficult subjective assessment made with the knowledge that much of the dead component of pasture is often hidden at the base of the pasture.</p> <p>There is tendency to overestimate green content because it is expressed on a dry matter basis and the moisture content of green leaves can be 2-4 times that of dead leaves.</p>	<p>Be able to:</p> <ul style="list-style-type: none"> Estimate the herbage mass green content to within 10% points of the true value Estimate herbage mass green content for a paddock 	Med-High level confidence (score 3-4 of 5) minimum for all skills	<p>Think in terms of herbage mass and green content when assessing pastures and feed supply for livestock.</p> <p>This may be in addition to other experiential ways of assessing pastures and feed supply for livestock.</p> <p>Incorporate the skill in day-to-day activities</p>
Ground cover (%)	<p>Ground cover is a difficult subjective assessment and includes anything (eg. litter, dung, sticks, rocks) that prevents a raindrop from hitting bare soil.</p> <p>There is tendency to underestimate ground cover because of the temptation to fixate on bare patches.</p> <p>Ground cover reduces rainfall runoff, weed germination and conserves soil.</p>	<p>Be able to:</p> <ul style="list-style-type: none"> Estimate ground cover to within 5-10% points of the true value Estimate ground cover for a paddock 	Med-High level confidence (score 3-4 of 5) minimum for all skills	<p>Think in terms of herbage mass, herbage mass green content, and ground cover when assessing pastures and feed supply for livestock.</p> <p>This may be in addition to other experiential ways of assessing pastures and feed supply for livestock.</p> <p>Incorporate the skill in day to day activities</p>

	Knowledge	Skills	Confidence	Practice Change
Forage planning				
Feed budgeting	<p>Feed budgets are a process for determining how many livestock can be carried for a given period and with an estimated amount of herbage.</p> <p>Feed budgets use Dry Sheep Equivalent values (DSEs) as a means for estimating herbage consumption by livestock.</p> <p>Optimise animal performance and pasture recovery.</p> <p>Feed budgets need to be regularly reviewed as circumstances change and/or end of period is approaching.</p>	<p>Be able to:</p> <ul style="list-style-type: none"> • Calculate feed budgets or use Ag360 for this purpose • Assess herbage mass for paddock/s • Allocate DSE values for different classes of livestock • Develop plans for changes to stocking rate to adapt to climate while achieving production objectives and herbage mass targets • Review and re-plan as required 	<p>Med-High level confidence (score 3-4 of 5) minimum for all skills</p>	<p>Calculate feed budgets (or obtain through Ag360) to guide decisions about stocking rate and grazing plans.</p> <p>This may be in addition to other experiential ways of determining carrying capacity and grazing plans.</p> <p>Incorporate the skill in day to day activities</p>
Setting herbage mass targets to maximise pasture productivity and the health of agricultural ecosystems	<p>Managing pastures requires the setting of herbage mass targets (minimum and maximum), with key times being the start and end of the growing seasons.</p> <p>The targeted minimum level of herbage mass should not fall below specified value or will negatively impact pasture recovery.</p> <p>The targeted maximum level of herbage mass should not exceed specified value or pasture growth rate and quality decreases.</p> <p>Maintaining herbage mass within the lower and upper targets will result in better ground cover which benefits the environment and local waterways.</p>	<p>Be able to:</p> <ul style="list-style-type: none"> • Set and track progress against herbage mass targets 	<p>Med-High level confidence (score 3-4 of 5) minimum for all skills</p>	<p>Set herbage mass targets, track progress against the targets.</p> <p>This may be in addition to other experiential ways of determining carrying capacity.</p>

	Knowledge	Skills	Confidence	Practice Change
Using climate forecasts (scaled to farm level) in the feed budgeting process	<p>Weather forecasts are probabilistic, meaning the forecast is in a range of possible values and is not a single value.</p> <p>Probabilities are directly related to the level of risk you are comfortable with and able to manage.</p> <p>Using a number of climate scenarios provides advance warning for development of risk management plans.</p>	High level use of Ag360	Med-High level confidence (score 3-4 of 5) minimum for all skills	High level use of Ag360