

Grazing Futures Evaluation Survey Report

DR GERRY ROBERTS, GR CONSULTING
MAY 2018

Contents

Executive summary	3
Practice change	3
Drought decision making	4
Grazing BMP	4
Seasonal conditions since 2015	4
Recommendations	4
Key findings and recommendations	6
1. The impact the GrazingFutures project has on decision making in drought	6
2. Current practices.....	6
3. Assessing the impact GrazingFutures has on practice change.....	6
4. Grazing BMP.....	7
5. Suggestions for the future.....	7
Background.....	7
Survey methodology.....	8
Content.....	8
Respondents	8
Response numbers	9
Modes of collection	9
Respondent selection	9
Collection principles	9
Collection and upload	9
Reporting	9
Survey findings	10
Industry context in which GrazingFutures has operated	10
1. Assessing the link between survey data and GrazingFutures project objectives	12
1.1 Introduction.....	12
1.2 GrazingFutures influence on practice change.....	12
1.3 Conclusion.....	17
2. Level of change in drought decision making.....	19
2.1 Introduction.....	19
2.2 Findings	19
2.3 Conclusion.....	20
3. Respondents' current practices	21
3.1 Introduction.....	21
3.2 Findings	22
3.3 Conclusion.....	28
4. Grazing BMP.....	29
4.1 Introduction.....	29
4.2 Findings	29
4.3 Conclusion.....	31
5. Other items of note	31

5.1 Introduction.....	31
5.2 Capitalising on other programs	31
5.3 Models of activities for the future	31
5.3 Changes to the survey format	32
6. Recommendations	32
Appendix 1 Adoption and Diffusion Outcome Prediction Tool (ADOPT).....	34

Executive summary

Western Queensland runs 25% of the State's cattle and most of its Merino sheep flock under better seasonal conditions. Severe drought since 2012 has dramatically reduced these numbers, impacting on grazing business income and with further impacts on the towns and communities depending on agriculture for their income. The Queensland Government has committed to improving drought preparedness and business resilience across western Queensland through the Drought and Climate Adaption Program, a key component of the Queensland Government's Rural Assistance and Drought Package.

The GrazingFutures project delivers a suite of training and extension services to support grazing businesses recover from—and prepare for—drought and other challenges. Grazing BMP accelerated workshops are a cornerstone of these services by helping graziers identify which aspects of animal production, grazing land management, and people and business they will benefit from extra knowledge and skills in the most. The GrazingFutures team focusses on needs identified by industry within the south, central and north-west from BMP workshops, surveys, direct feedback and consultation with graziers.

The extension and training service are delivered through a partnership of the Department of Agriculture and Fisheries, AgForce, Northern Gulf Resource Management Group, Southern Gulf NRM, Desert Channels Queensland and Southern Queensland NRM. GrazingFutures is also delivered with the support of regional farm financial counselling services, Royal Flying Doctor Service, Fitzroy Basin Association, FutureBeef and Leading Sheep. The GrazingFutures project also links with regional agribusinesses and mental health support programs.

GrazingFutures is already having an impact in its key quest to support grazing businesses in western Queensland to improve business resilience, drought recovery and future drought preparedness. The impact is taking place with grazing businesses in southern, central west and north west Queensland.

Survey data from 57 grazing business across the three regions show that significant numbers of attendee landholders are:

- Making drought decisions sooner
- Making changes they believe will be profitable to their animal production systems
- Making changes they believe will be profitable to their grazing land management practices, and
- Making changes to other business practices.

These changes are being made in response to activities designed and delivered by the collaborative team of GrazingFutures as landholders have clearly attributed project activities as the prompts for the changes they have made.

Practice change

Almost half (49%) of those surveyed made changes to either or both animal production and grazing land management practices. They are from all three regions.

Regionally the proportions reporting they had commenced or completed change were – South 65%, Central 30%, and North 53%. Of those making these changes all (100%) believe the changes made will lead to improved profitability.

This demonstrates that grazing businesses in western Queensland are being supported to make changes to improve their business through GrazingFutures activities.

In responding to this survey item some prefaced their response with the comment that they already knew what they needed to change, and/or had the intention to change, adding that GrazingFutures activity had, however, provided the prompt for making the change. As one landholder said, *Since GBMP we are more prepared to take the plunge to supplement breeding stock sooner, prior to that we knew we should but hadn't been prepared to do that.*

Others acknowledged the recency of their attendance at GrazingFutures activities as the reason for not yet having made an intended change e.g. *Because we only did the GBMP in Nov 2017 and it rained in the summer (2017/18) we haven't started yet, however we will start in the next month (May) to separate stock into classes.*

Drought decision making

Twenty-seven percent (27%) of landholders attending GrazingFutures activities report they will make decisions sooner in terms of drought. As one respondent said, '(Because) *We are now better able to do feed budgets...and we know how to measure mulga and use it in feed budgeting*'. A significant focus of GrazingFutures is improved drought capability and resilience of people and businesses, and making decisions sooner is part of that.

Grazing BMP

The majority (74%) of respondents have completed at least three (3) of five (5) Grazing BMP modules as part of their interactions with GrazingFutures. The majority report finding much in the module (?) content of value for their management activities e.g. *We went to get more education on how to conduct the business of managing the property and it has been valuable.* The remaining 26% had not done any modules.

Of the 42 completing Grazing BMP 48% have revisited their plans or resource materials provided with the modules. Their purposes for revisiting varied and examples are:

- *When feed budgeting*
- *When doing our 5-year plan which we review each year to set targets for property, personal, finance*
- *Looking for animal production information.*

Of those attending the Grazing BMP accelerated workshops 50% reported they were wanting to improve their management practices and 43% wanted to see how they sat against the industry standards.

Eighteen percent (18%) report going to find out more about how to decrease the impacts of drought on their grazing business.

Of the 42 attending the Grazing BMP workshops 62% identified future management training they wanted to attend.

Seasonal conditions since 2015

These impacts have been achieved while Western Queensland areas continue to experience extended drought, with 57% of the State still drought declared.

Drought is the predominant seasonal pattern reported by surveyed landholders across the project regions from 2015-2018, *No summer rain and only one lot of winter rain.*

Particularly drought affected were the Central west, South and mid-north Queensland regions where the drought had been in place since 2013. In the Gulf, respondents with more '*reliability in our seasons*', commented that while they didn't have drought they did have lighter seasons.

Most respondents reported significant and valuable winter rain in 2016 which grew winter species that burnt off in the hot summer that followed. They also said they then went straight back to drought until, *better late summer rain brought some relief in (March) 2018.*

Recommendations

The surveying technique of engaging respondents in a conversational manner has provided the opportunity to gather data that offers depth of understanding of the current impact of GrazingFutures for grazing businesses. From that data four (4) recommendations have been

made in this report that may be used by the project team to increase the impact of project activities.

These are:

Recommendation 1. It is recommended that for all future GrazingFutures activities, specific attention be given to design and delivery of them for impacts known to align with improved business resilience, drought recovery and future drought preparedness and that those delivering make clear reference to those applications 'on-farm'.

Recommendation 2: It is recommended that the project team use the ADOPT tool to assess the level of adoption and time to near peak adoption for effective pasture assessment, achieving self-selected pasture residual targets and increased use of business planning known to improve business resilience, and then use that information to develop an extension plan for impact on project objectives for improved drought management capacity for landholders.

Recommendation 3: It is recommended that narratives and case studies be developed with graziers who have made changes prompted by GrazingFutures activities, to gain a higher level of data (e.g. costs, actual returns etc) to further clarify the extent to which the project's impact is taking place with industry.

Recommendation 4. It is recommended that the GrazingFutures team examine how to deliver Grazing BMP program modules in ways that produce actions plans while the delivery also enhances the project's purpose to improve business resilience, drought recovery and future drought preparedness.

Key findings and recommendations

1. The impact the GrazingFutures project has on decision making in drought

It is important to note that 27% of attendees will make drought decisions sooner as a result of involvement in GrazingFutures activities.

That change is however the major practical improvement so far in drought management following from GrazingFutures activities. And that means there is still much that can be done to deliver on the purpose of the project to improve business and drought resilience.

For example, when asked 'How much have GrazingFutures activities assisted you to better prepare for managing your grazing business in times of drought?' 75% of respondents scored 6 or less on a 10-point scale, (where 1=Not at all, and 10=Very much). Also, of those respondents 47% scored the activities at one (1) on the scale.

Most respondents did not have an appreciation that the work of GrazingFutures partners is to support them to improve their levels of business and drought resilience.

Recommendation 1. It is recommended that for all future GrazingFutures activities, specific attention be given to design and delivery of them for impacts known to align with improved business resilience, drought recovery and future drought preparedness and that those delivering make clear reference to that application 'on-farm'.

2. Current practices

For each management practice considered there are some whose responses suggest they are operating at the 'above' standard and some who are 'at' or 'below' standard. While the proportions vary there are differences in level of standard (below, at, above) for each of the management practices examined.

Accumulated response data here suggest there are a number of possible practices to which directing the project's investments may be fruitful and examples are:

- The lack of use of more objective pasture assessment for available feed condition and quantity
- The timing of decisions on pasture condition and quantity
- The low levels of use of business plans, business performance analysis and financial risk management plans
- Landholder inability to at times meet self-chosen targets for residual pasture
- Strategies for calculating carrying capacity.

Recommendation 2: It is recommended that the project team use the ADOPT tool to assess the level of adoption and time to near peak adoption for effective pasture assessment, achieving self-selected pasture residual targets and increased use of business planning known to improve business resilience, and then use that information to develop an extension plan for impact on project objectives for improved drought management capacity for landholders.

3. Assessing the impact GrazingFutures has on practice change

Analysis of survey responses shows that surveyed landholders in all three regions made changes to animal production and land management practices and cumulatively their number represent 49% of those involved with GrazingFutures activities.

Regionally the proportions reporting they had commenced or completed change were – South 65%, Central 30%, and North 53%.

This demonstrates that grazing businesses in western Queensland are being supported to make changes to improve their business by GrazingFutures activities. As well all (100%) of those making changes believe the changes made will lead to improved profitability even though 86/88% report that the change will increase direct costs.

The expectation of profitability by all landholders making management changes as a result of GrazingFutures activities also demonstrates to the project team that the work of GrazingFutures is being effective in improving industry profitability.

Recommendation 3: It is recommended that narratives and case studies be developed with graziers who have made changes prompted by GrazingFutures activities, to gain a higher level of data (e.g. costs, actual returns etc.) to further clarify the extent to which the project's impact is taking place with industry.

4. Grazing BMP

Grazing BMP is a tool used in GrazingFutures delivery. Although it has proven useful, critics suggest it is not allowing sufficient planning to be done:

- Forty-two (42) of 57 in the surveyed group have completed three (3) or more modules of Grazing BMP and 15 have not completed any modules.
- Of those completing modules, 28 have revisited their plans or resource materials. Only one person had done a reassessment and none an audit.
- Only 18% report attending to find out more about how to decrease the impacts of drought on their grazing business.
- Twenty-six (26) identified training they wanted to attend, however only eight (8) have attended that further training.
- Attendee experiences of accelerated workshops
 - Attendees report finding much in the content of value in their management
 - Others recognised content learnt from previous workshops they'd attended
 - A number of attendees commented on how the workshops were run referring to what they interpreted as 'rushing', with insufficient time to write action plans.

Recommendation 4. It is recommended that the GrazingFutures team examine how to deliver Grazing BMP program modules in ways that produce action plans while the delivery also enhances the project's purpose to improve business resilience, drought recovery and future drought preparedness.

5. Suggestions for the future

Four (4) suggestions are made regarding the future of the project:

- One producer respondent suggested a networking model for GrazingFutures delivery that involves working with those landholders using recommended practices
- Another suggestion is that project activities include a 'Bring a problem' type section. It is a process that DAF has found successful in Producer Demonstration Site (PDS) activities in North Queensland (Dave Smith, pers comm). Similarly, feedback at the Mulga and Nutrition days held as GrazingFutures activities in south region strongly supported inviting landholders to bring their lick label so the presenter could comment on its effectiveness for meeting stock nutritional needs (Nicole Sallur, pers comm)
- A small number of other respondents suggest collaborating with fee-for-service operators delivering the same or similar programs (Grazing for Profit; KLR Marketing; MLA) to the same or similar audiences
- In the future it will be valuable if this survey work can more readily assess the impact of GrazingFutures through attribution. The format suggested is that of using 'before-and-after' project delivery assessment for recommended practices.

Recommendation 5. That the project team consider how these four (4) items can be used to increase the impact of the project investment.

Background

Western Queensland areas continue to experience extended drought, with 57% of the State still drought declared. Again it is Western Queensland that has been affected for the longest duration. It was only in April/May 2018 that rain in the Gulf shires saw them removed from the drought list.

Since the start of GrazingFutures rain recordings in much of western Queensland were above average for the June to September 2016. Predictive models and forecasts were for this climate pattern to continue into the 2016/17 summer months, however this did not eventuate for most districts in North, South and Central Queensland.

There were varying degrees of relief rain in parts of the Central west and in the Gulf region in the summer of 2017/18 with late falls in March being all that some areas received.

GrazingFutures includes the use of the Grazing BMP process. Grazing BMP is a self-assessment process that allows landholders to benchmark their current grazing and business practice against an industry-developed set of standards. Fitzroy Basin Association (FBA), AgForce Queensland and the Queensland Department of Agriculture and Fisheries (QDAF) developed it through work with a producer reference group. The then Department of Environment and Heritage Protection (DEHP) supported it.

In addition, GrazingFutures delivers activities identified as timely and relevant to industry from landholder requests following involvement in Grazing BMP modules or other activities as well as topics which are relevant to Grazing BMP standards, identified by landholders and science staff, as relevant to improved drought preparedness and resilience in drought.

GrazingFutures contributes to the Queensland Government's 2015 election promise to 'work concurrently with industry to develop a suite of measures that will assist producers to improve their climate risk management and drought preparedness strategies for the longer term'. This project will build more resilient businesses by helping beef and sheep producers make informed decisions to recover from the current drought and to better plan and manage for future droughts.

The survey work reported here assesses landholder responses to the delivery of GrazingFutures activities including changes made as a result of their involvement including changes in drought management.

The preparation of the survey report provides information relevant to components of the GrazingFutures project Strategic Plan. They are:

- It provides methodological support for the process of enhancing graziers' skills referred to in the strategic plan, and
- It provides for management of the strategic project risk that 'Graziers don't see value in the project – they don't get involved, there is industry disinterest and lack of engagement. Workshop/engagement fatigue is an issue'. This risk can be substantially reduced by being proactive and implementing the strategies suggested for the project team throughout this report.

Survey methodology

Content

The data interviewer in conjunction with DAF staff and regional co-ordinators involved in the project developed the survey content and format to assess progress to date and allow reporting on project achievements. The interviewer in discussion with the project staff modified the questions for use in surveying.

Respondents

Regional co-ordinators in Central and South and their teams provided the names and contact details of landholders who had completed the Grazing BMP modules and/or other project activities. In the North the coordinator selected respondents.

For Central and South regions coordinators provided other training workshops attended as part of GrazingFutures together with the names of delivery staff. This information was used by the interviewer to make connection to the landholders and support them in choosing to be involved in the survey by relating to the activities and deliverers. Deliverers in South and

Central regions provided maps of the properties listed. For North the respondents were from those who were involved with DAF staff in individual on-property and/or workshop extension activities, some of whom had completed Grazing BMP modules with NRM groups.

Confidentiality of survey information has been assured because the project team agreed to anonymity through separation of landholder details and survey responses.

Response numbers

Responses were collected across the three (3) regions with 20 landholders in South, 20 in Central and 17 in North, for a total of 57 which was three below the target number.

Modes of collection

Interviewing was conducted for half of those surveyed in South and Central as face-to-face interviews with on-property visits to the landholders. The remainder were interviewed by phone. For north all were conducted by phone.

Respondent selection

Landholders were selected by the interviewer for initial contact by geographic distribution across each region for South and Central. In the North respondents were selected by the delivery team. The second overlay was that of availability and willingness to respond to the survey. There were only a few who, when told the purpose, uses and process of the surveying, were unwilling or unable to be involved. A small number however proved un-contactable for a first contact.

Collection principles

During data collection the interviewer:

- Reminded respondents of the survey purpose
- Matched the speed of interviewing with the respondent's delivery
- Matter-of-factly reminded them that their own knowledge and experience should be taken into account when thinking about the role of GrazingFutures activities in prompting any change (the process was to seek disconfirming information particularly in relation to impacts that may or may not be attributable to the project and its interventions)
- Regularly checked for understanding
- Made notes in addition to the base data being collected where those notes assisted in explaining the responses.

Collection and upload

The process used was:

- An initial phone contact for interest, availability and date of collection (Central and South)
- Regional coordinator contacted landholders for involvement and survey questions sent (North)
- Survey emailed to respondent for their information and/or to have available during phone conversations (Central and South)
- Visit or phone as arranged to collect the information
- For face to face data collection recording of responses was made on hardcopy survey forms rather than on computer to allow face to face interactive discussion. Additional notes were added as soon as possible after the interview with notes for understanding and accuracy
- Uploading was done to the YourData site
- For phone data collection, responses were recorded directly on to the YourData site while talking with the landholder and expansions, corrections, explanations etc. were added soon after the interview.

Reporting

Purpose:

- To make an initial assessment of where the industry is sitting through this addition of a data set that is richer through the interaction that can take place in the interview process
- To assess the progress of the project to date
- Determine what the project team need to improve so the project's impact is meaningful for producers.

Outputs:

1. Link data collected to GrazingFutures objectives where it matches
2. Compare and contrast GrazingFutures data with that of Reef survey reports where available
3. Assess how much GrazingFutures is having an impact on landholder's businesses including what is known of cost/benefit
4. Identify what deliverers can learn about the project and its delivery including any gaps in what the project delivers
5. Provide an assessment of how the project is contributing to improved drought management/resilience.

Survey findings

The survey data collected from landholders is in four (4) clusters:

1. Data on changes made as a result of attending activities run as part of GrazingFutures delivery
2. Data on whether changes have been made in drought decision making
3. Data on the current practices in relation to Grazing BMP standards considered to be key to being better drought prepared – they are in the modules of Animal Production, Grazing Land Management (GLM) and People & Business
4. Data from those completing Grazing BMP modules as part of GrazingFutures delivery
5. Other items of note.

Note: Italicised items are the words of respondents.

Industry context in which GrazingFutures has operated

Understanding the environmental factors in which the project is operating is important when interpreting the findings. This section summarises landholders' descriptions of the current industry environment.

1. Seasons

Drought is the predominant seasonal pattern reported by surveyed landholders across the project regions from 2015-2018, *No summer rain and only one lot of winter rain.*

Particularly drought affected were the Central west, South and mid-north Queensland regions where the drought had been in place since 2013. In the Gulf, respondents with more *'reliability in our seasons'*, commented that while they didn't have drought they did have lighter seasons.

Most respondents reported significant and valuable winter rain in 2016 which grew winter species that burnt off in the hot summer that followed. They also said they then went straight back to drought until, *better late summer rain brought some relief in (March) 2018.*

- *In drought and hadn't improved until this summer*
- *Very poor, three dry years.*

Not everyone was affected in the same way with one landholder in the South west saying the three years for them were, *Not really a problem as we had young mulga and cattle have done well.* That however, was not the case for most, even in the mulga areas as they had been 'pushing' mulga in each of the three years.

A few northern cattlemen have drought strategies that include owning 'safer' country in the gulf and 'downs' country further inland and south. These few were of sufficient size to be able to manage to the conditions by moving stock to remain operational. One landholder in the

South reported having a similar approach having brought a mulga block in addition to country already owned east of Roma and they use the mulga for its reliability in times of drought.

2. Markets

For respondents the markets when selling cattle between 2015 to 2018 have been good and steadily rising while dipping in the drier periods when saleyard numbers increased, *Reasonably strong - they did go down in the dry times with big yardings.*

The better sale market prices have enabled and even encouraged landholders to manage numbers in the face of drought, for example:

- *Have been selling early as weaners to manage stocking rate because of dry and last year made profit and will again this year because of the markets*
- *Good markets and that makes decision making so much easier - when we can sell well, we will sell.*

Not all gained the same advantage which seemed to be influenced by the decisions made and the timing of them, *Not fantastic - when seasons were good we were holding stock and bought some too. Then when selling those stock off the market was not as good as it had got dry again.* The dry was because of no follow-up to the winter rain.

Fewer producers were buying and experiences varied. Some studied or followed the markets and chose more affordable lines:

- *Bought in 2016 after rain - wethers and ewes in June - ewes fair price and the wethers we got at a 'lucky' price*
- *Went for lighter northern heifers as cheaper cattle as we were looking for turnover cattle*
- *OK as did get a deal on PTIC (preg tested in calf) cows*
- *Bought wethers - paid for themselves in 2 shearings and we paid \$101/head.*

But it wasn't like that for all buyers. Some paid more than they wanted to have to pay:

- *Bought in 2016 when prices were high and had freight costs as well!*
- *Bought backgrounding stock - bought in and had to sell and sold for less than had paid for tax purpose (saved 30% tax).*

3. Drought subsidies

About 70% report receiving drought subsidies with 25% being for emergency water infrastructure. Other subsidies reported were:

- *Yes, QRAA drought subsidy*
- *Freight subsidy, which was a blessing*
- *Freight subsidy for feed*
- *Farm income support and freight for fodder*
- *Yes, family income support*
- *We're getting on farm household support but bailed out when we were retiring debt. We did get water infrastructure and freight rebates.*

4. Other things in the business

Approximately 11% have been involving themselves in succession planning:

- *Starting to bring daughter and son-in-law into running the business*
- *Have thought and talked fully with family about our succession plan.*

A number have purchased additional country to diversify and expand their businesses, sometimes it was in response to the ongoing drought conditions:

- *Bought more country – to make it a living area as shown by CashCow 2500-3000LSU, but it does mean we do owe more money*
- *Bought into a caravan park*
- *Purchased some additional country late 2017*
- *Lease earthmoving equipment and use it for income as well as the property*
- *Went from 3000 head to 0 in 2014, then bought another property because have had to agist stock.*

Exclusion fencing is being included in some development plans in the Central and South of the state to counter the adverse effects of dogs and manage the grazing pressure from kangaroos:

- *Have finished exclusion fencing and have 40,000 acres fenced with just channels not fenced. The fence gives us control and peace of mind*
- *I have completed 160 km of exclusion fencing with 14 km to go. Once it rains I expect the impact to be better control of grazing pressure from kangaroos and greater productivity per DSE (dry sheep equivalent). We have 245,000 acres or 300,000 acres protected with the 160 km of exclusion fence.*

Other things respondents described were:

- *There have been personal things happening in the business – the need to settle a family estate.*
- *Sold main property and downsized as a semi-retirement activity block and close to medical assistance for family member*
- *Son was home however has gone back to other highly paid work*
- *Carbon farming - for mulga we are involved and got a good price. It brought a welcome injection of capital plus we have Santos for oil and overall we have halved our debt and can invest in increasing carrying capacity e.g. by increased water points*
- *Removed some staff who were not productive, however had 70% stay on.*

1. Assessing the link between survey data and GrazingFutures project objectives

1.1 Introduction

Of the five (5) GrazingFutures objectives, the landholder survey data provides information on Objective 2 in particular.

Objective 2 reads, 'Support grazing businesses in western Queensland to improve business resilience, drought recovery and future drought preparedness.'

The level of impact relating to this objective can be considered from practice changes made by landholders as a result of GrazingFutures activities. This is possible because the assumption within the project context is that improved business resilience will improve landholders' potential for recovery from drought and assist them to better prepare for future droughts and other business risks.

1.2 GrazingFutures influence on practice change

Section 1 of the survey findings examines data to assess the impact GrazingFutures had directly or indirectly on practice change, with the main interest being changes to Animal Production, GLM and People & Business management practices that can improve capacity to manage in times of drought.

Three (3) data sources in the survey responses can be combined to report impact at this level. Those examined here are:

- a) Numbers considering changes following GrazingFutures activities
- b) Numbers seeking further information on their considered changes
- c) Numbers making changes following GrazingFutures activities.

1. Numbers considering changes following GrazingFutures activities

For landholders surveyed 74% report considering change during or after attending GrazingFutures activities (see Table 1a). This figure supports the perception that the GrazingFutures project is creating awareness of the opportunity for change in those attending events.

Table 1a: Landholders considering making changes as a result of GrazingFutures events

Value	Count	Percent
Yes	42	74%
No	14	25%
Maybe	1	1%

For South region the proportion was 80%, in Central it was 60% and for North it was 82%. (Note: For the North region, respondents were less able to limit the timeframe to since the GrazingFutures project started.)

In a 2017 survey in reef catchments of change after attending Grazing BMP or other extension activities in the previous 1 or 2 years, 90% of landholders reported considering changes. The comparison with GrazingFutures shows a 16% difference.

Of those responding 'Yes' in this GrazingFutures surveying to considering change, the changes nominated were mostly with animal production, GLM and business management. (See Table 1b.)

Table 1b Landholder considered making changes in these practices

Value	Respondent %
Animal production	
Supplementation	33%
Genetics and selection	30%
Weaner management	19%
Breeder management	16%
Heifer management	14%
Animal production – other	14%
Animal health	12%
GLM	
Property infrastructure (e.g. water and or fencing)	30%
GLM – other	14%
Pasture improvement and forage crops	12%
Carrying capacity improvements	9%
Assessment of available feed and calculation of forage budgets	9%
Adjustment of stocking rates based on available feed	9%
Adjustment of stocking rates to target a set amount of pasture left in paddocks at the end of dry season (quantity and cover)	7%
Maintenance of good land condition	7%
People and Business	
Herd and business records	23%
Occupational Health and Safety	19%

Value	Respondent %
Business management – other	7%
Other changes	
All – other	7%

The highest proportions of landholders considered changes related to animal production with all proportions greater than 12% with highs of 30 and 33%. While it is unclear what has prompted the level of animal production choices it is noticeable that 74% of landholders attended a Grazing BMP Animal Production module which was the main animal production 'workshop' on offer so far in GrazingFutures delivery in Central and South regions. As well 28% attended other animal production activities related to animal nutrition e.g. Mulga and Nutrition.

In the North region, where the extension activities are most frequently delivered to individuals, there is a similar emphasis on animal production as the change being considered by surveyed landholders.

2. Numbers seeking further information on considered changes

A next stage to examine is that of seeking further information. For attendees at GrazingFutures activities the proportions show 51% sought more information on their considered change (See **Table 1c**). For example:

- *At Grazing Fundamentals workshop, I talked to a grazier from Alpha who'd done the timber assessment so I could leapfrog mistakes*
- *(For) Bull selection, from an advisor, and to DAF about pasture improvement and supplementation*
- *Have been back to professional people at DAF and financial counsellor for additional information.*

Regionally the proportions seeking further information on their considered change were South 60%, for Central 35% and North 53%.

Table 1c Landholders seeking further information on a considered change

Value	Count	Percent
Yes	28	51%
No	27	49%

3. Number making changes after GrazingFutures activities

A final step in assessing the impact of GrazingFutures on changes related to management is the level at which 'considered change' carries through to actual change.

Table 1d shows responses from the surveyed landholders on changes commenced or completed following GrazingFutures activities.

Table 1d: Changes commenced or completed as a result of GrazingFutures activities including Grazing BMP and other extension activities

Value	Count	Percent
Yes	28	49%
No	29	51%

Regionally the proportions that commenced or completed change were South 65%, Central 30% and North 53%.

For reef catchments in the 2017 survey, 74% was the proportion that carried through to the commenced or completed stage of changing.

For GrazingFutures 28 landholders report making changes which shows a 25% decrease (74% to 49%) from those who'd considered making changes. Even the figure of 49% shows a significant proportion are making changes in their enterprises.

In responding to this survey item some prefaced their response with the comment that they already knew what they needed to change, and/or had the intention to change, adding that GrazingFutures activity had, however, provided the impetus for making the change. As one landholder described it, *Since GBMP we are more prepared to take the plunge to supplement breeding stock sooner, prior to that we knew we should but hadn't been prepared to do that.*

Others acknowledged the recency of their attendance at GrazingFutures activities as the reason for not yet having made an intended change e.g. *Because we only did the GBMP in Nov 2017 and it rained in the summer (2017/18) we haven't started yet, however we will start in the next month (May) to separate stock into classes.*

While less than 12 months since doing activities may be considered in the reasons for the smaller proportions making change in western Queensland, it is less likely to be the main cause because the same attendance/survey timeframes applied with reef surveys. The severity of the drought may be a larger causal factor with some influence from the difference in scale of operations between the different survey areas.

4. Numbers making changes to animal production

This section presents the perspective of landholders and uses their understanding of the terms as they use them in their animal production systems.

Of the surveyed group, Table 1e shows the numbers making changes to animal production.

Table 1e: Numbers making changes to animal production

Value	Count	Percent
Yes	22	39%
No	35	61%

Regionally the proportions making changes to animal production were South 45%, Central 20% and North 45%.

In the Reef 2017 survey, 34% of respondents reported making changes to animal production which is lower than both South and North. It may be assumed the 20% for Central is reflecting the lower overall change level taking place there because of the severity of the ongoing drought.

Examples of animal production changes reported after GrazingFutures as described by landholders were:

- *Taking a less sentimental view of breeder value, so if ours are not in calf then we sell them*
- *Better managing our heifer supplementation for mating at 300 kg*
- *In heifer management we've decreased joining window from 16 weeks to 12 weeks from what we learnt at Grazing BMP because in previous seasons we have sometimes needed two weanings as well as targeted nutrition for getting heifers to joining weights*
- *Use new vaccine - Vibrio for bulls and Pestie for heifers*
- *Tested dung samples with a consultant and got recommendations for supplementation of different classes of stock on different country types*
- *150 ha leucaena planted*
- *Now use phosphorus supplement in wet season as well and do it with blocks of 12% P.*

Landholders were able to describe their expectations of the impact for them of the changes made to animal production. (See Table 1f.)

Table 1f Landholder expectations of the impact changes made to animal production

Impact area	Expected range/impact
Proportion of herd	29-76%
Proportion of property	9.5% of changes on 80-100% to 38% of changes on 60-80% (range)
Time to see impact	14% immediately to 36% 1-2 years (range)
Improvement in ground cover	76% no
Increase in gross margin/AE	95% yes
Decrease in direct costs	86% no
Likely to increase profit	100% yes

5. Numbers making changes to grazing land management

This section presents the perspective of landholders and uses their understanding of the terms as they use them in their grazing land management systems.

For landholder respondents the numbers reporting change to grazing land management are shown in Table 1g.

Table 1g: Numbers making changes to land management

Value	Count	Percent
Yes	9	16%
No	46	84%

Regionally the proportions that commenced or completed change in land management were South 25%, Central 0% and North 24%.

For reef 2017 surveying where the emphasis is on retaining ground cover to limit run-off, 55% reported land management changes were commenced or completed. Comparatively the 16% across the GrazingFutures regions is lower.

Examples of land management changes reported after GrazingFutures events and as described by landholders were:

- *Vegetation management by thinning as well as water infrastructure and fencing; thinning since doing the mapping workshop where they gave us the land types*
- *Exclusion fence to manage the grazing pressure. GBMP convinced us to do the exclusion fence to get to the target of land condition*
- *Pasture improvement by planting legumes and oats to make hay as a fodder source*
- *Internal fencing will allow us to move cattle around to different paddocks and manage where they are grazing*
- *150 ha of leucaena prepared and planted*
- *Leucaena is 2 years old and we will now go to cattle weight improvement growth trials and our aim is to get them off 6 months earlier - leucaena is planted in the timber country as legislation stops us clearing. This is just the start and provided we get it going we will work towards 1000 ha*
- *Water points as Grazing BMP reinforced the need to be vigilant in managing where cattle can graze*
- *Now understand how to best utilise grasses e.g. we now know how long it takes to go to seed and how to manage it well through how heavily we stock it – so now we are giving paddocks a spell to grow the grass through to seed production*

Again, landholders were able to describe their expectations of the impact changes made to land management. (See **Table 1g**)

Table 1g Landholder expectations of the impact changes made to land management

Impact area	Expected range/impact
Proportion of herd	11-55% (range)
Proportion of property	33% of changes on 0-20%, to 33% of changes on 40-60% (range)
Time to see impact	44% 1-12mths, to 33% for 2-5yrs
Improvement in ground cover	100% yes
Increase in gross margin/AE	100% yes
Decrease in direct costs	88% no
Likely to increase profit	100% yes

6. Other changes made following GrazingFutures activities

Survey respondents also report changes in other aspects of business management (e.g. communication), livestock marketing and OHS. A total of nine (9) referred to doing things that were not animal production or land management i.e. 16% of respondents.

Examples of other changes made by landholders were:

- *Have the decision-making matrix from the GrazingFutures workshop on decision making and we use it in decisions for all of our business. It is a very useful tool as it gives a percentage rating for the result e.g. 70% we go ahead with action and if 30% do not*
- *Updated wills and Power of Attorney because we are at retirement age and so now have a plan towards retirement since doing Grazing BMP*
- *For biosecurity we now have a book to be signed*
- *Quarterly meetings of the 3 partners to discuss the budget so there are no surprises*
- *Keep more of a check on OHS and for ourselves to recognise that we should take a break regularly or annually*
- *OHS, prepared maps for giving to contract workers who come on to the property.*

1.3 Conclusion

Analysis of survey responses shows that landholders in all three regions made changes to animal production and land management practices and cumulatively their number represent 49% of those involved with GrazingFutures activities.

These changes are being made in response to activities designed and delivered by the collaborative team of GrazingFutures as landholders have clearly attributed project activities as being the prompts for changes. Landholders have made this clear even when offered the opportunity to identify other more significant prompts.

Regionally the proportions reporting they had commenced or completed change were – South 65%, Central 30% and North 53%.

The changes made demonstrate one way that Objective 2 of the project is being delivered i.e. grazing businesses in western Queensland are being supported to make changes to improve their business resilience. That this is the case is supported by the fact that all (100%) of those making changes believe the changes made will lead to improved profitability even with 86/88% reporting that the change will increase direct costs.

While expectation of profit does not constitute actual profit, it is possible to make a general assessment of what it may mean more broadly. The assessment is that 49% of those attending GrazingFutures activities and making a change in animal or land management practices, do so with the belief they will be more profitable. Change theory suggests that such beliefs can be assumed to arise from:

- Their own experiential knowledge of management
- Together with the knowledge gained from the project activities they attended.

The latter point may be included because in the survey conversations landholders were able to attribute the change to knowledge gained at project activities, having first been encouraged to take into account their prior knowledge.

Comparatively in a survey for reef catchments on Grazing BMP and other extension activities in 2017 it was a higher proportion that commenced or completed change at 74% and for GrazingFutures it was 49%.

As well as the changes already mentioned, 16% of respondents referred to making changes to other aspects of their business e.g. instituting quarterly partner business meetings.

Narratives and case studies with other graziers who have made similar changes can be used to yield a higher level of data e.g. reasons for choosing the change, costs, actual returns etc. These can clarify the extent to which the impact is taking place with businesses. Landholders in this survey will not be able to be approached for this additional data using information from the survey because the project team agreed to anonymity through separation of landholder details and survey responses. Calls for volunteers on the topics reported here may be one way for the project team to gain relevant involvement.

The difference in level of change made by graziers in the GrazingFutures regions when compared to coastal catchments, is 25%.

Two qualifying factors may be considered. First, while drought was present in coastal catchments they were not as lacking in rainfall for the longer duration as is the case for most of the GrazingFutures project regions. This may have influenced the level of change for as one landholder put it, *Grazing BMP probably came at not quite the right time - around here we are all a bit stressed from drought!*

Second, the Grazing BMP program has been running for more than six (6) years in coastal areas and it is surrounded with much publicity and program support because of the established link to reef water quality. GrazingFutures is a project that is yet to complete its second year of operations and may be building momentum which Grazing BMP has in coastal catchments.

None-the-less the difference provides a prompt for the project team and partners to continue to consider how to design and deliver activities that increase the impact of the project's investments. One way to attend to design and delivery for impact may be through the application of what extension theory says about:

- Matching a change to client needs (adult learning)
- Beginning where the client is at (adult learning)
- The process of learning for making change (experiential learning), and
- Known structural pathways to change in agricultural settings (Bennett's Hierarchy: Bennett & Rockwell¹ ; ADOPT: Kuehne² *et al.* 2017).

Also, there is a difference within the project between the proportion of people making change in animal production management (39%) and land management (16%). This suggests the project team can explore what key standards, identified as relevant to improved drought capability, are linked to either of these facets of management to assess the implications for future delivery. Such considerations in future delivery also need to begin with the adult learning principle of 'beginning where the client is at' to create meaningful, impactful events that are evidentially profitable.

Recommendation: It is recommended that narratives and case studies be developed with graziers who have made changes prompted by GrazingFutures activities, to gain a higher level of data (e.g. costs, actual returns etc) to further clarify the extent to which the project's impact is taking place with industry.

¹ Rockwell, K and Bennett, C (2004) Targeting Outcomes of Programs - A Hierarchy for Targeting Outcomes and Evaluating Their Achievement. Faculty Publications: Agricultural Leadership, Education & Communication Department, University of Nebraska, USA.

² Geoff Kuehne, Rick Llewellyn, David J. Pannell, Roger Wilkinson, Perry Dolling, Jackie Ouzman, Mike Ewing (2017) Predicting farmer uptake of new agricultural practices: A tool for research, extension and policy. *Agricultural Systems* 156 (2017) 115–125.

2. Level of change in drought decision making

2.1 Introduction

Increasing drought management capacity is central to the purpose of GrazingFutures. In particular it is referred to in project Objective 2 to improve business resilience, drought recovery and future drought preparedness.

This was investigated from two perspectives in this survey:

- The first was whether attendees would make drought management decisions sooner, and
- The second was how much project activities had assisted attendees to better prepare themselves for managing in times of drought.

2.2 Findings

Twenty-seven percent (27%) of landholders attending GrazingFutures activities report they will make decisions sooner in terms of drought. As one respondent said, '(Because) *We are now better able to do feed budgets...and we know how to measure mulga and use it in feed budgeting*'. A significant focus of the GrazingFutures is improved drought capability and resilience of people and businesses, and making decisions sooner is part of that.

In relation to the broader question of improvement in drought preparedness, 75% of GrazingFutures attendees scored 6 or less on a 10-point Likert scale (1=Not at all;10=Very much) when asked, *how much have (GrazingFutures) activities assisted you to better prepare for managing your grazing business in times of drought?* And of those 47% scored the activities a one (1) on the scale. There were no scores of 10.

When asked for comments on why activities didn't prompt change in their drought management, landholders said for example:

- *Already have a plan and trigger points which we use*
- *Will stay the same so will destock first, then agist*
- *Always have had a drought plan in my head*
- *Grazing BMP would have been useful for locals who had no experience other than around here*
- *Haven't changed any drought plans as GrazingforProfit covered all of this – it was the start (for us) - now when go to other things we are only refining what we do*
- *No new messages (on drought) in the BMP or other workshops - probably if we have a problem it is that we have no strategy for good times*
- *Our experience, plus education such as RCS and KLR marketing training already contributes to better drought decision making.*

There were only 25%, one quarter, who rated activities as seven (7) to (9) on the scale of GrazingFutures activities contributing additional information to their drought preparedness.

Of those reporting making change to their drought management, when asked how or what they'd do differently, they said for example:

- *We are prepared better with more knowledge e.g. spelling growing grass to allow seed head production*
- *Aqua Downs field day was 9/10 for drought preparation*
- *Have drought plans but could tweak our ideas and also do that from the ideas of others who attended at the workshops.*

At one level it may be assumed that improvement in business productivity and profitability equates to better preparedness for drought e.g. one landholder said it as, *'If we stay on 0.3kg gain/day then we won't be here, so we need to get better productivity!'* Data collected here however, suggest that for attendees at GrazingFutures activities profitability may not wholly be seen by the business and its people as having them better prepared for drought.

A reason for this claim is that 49% of landholders who've made a change following GrazingFutures activity, all expect their change will be profitable, however, few have rated the

GrazingFutures activities highly as making a significant increase in their capacity to manage in times of drought.

As well it is only an even lesser proportion who are making drought decisions sooner. This too suggests a lack of recognition of GrazingFutures activities contributing to their capacity to improve business resilience, drought recovery and future drought preparedness.

There is an additional item to this line of reasoning that GrazingFutures activities are not yet seen by the majority as a means of improving drought management capability. It is the fact that when asked if they would make drought decisions sooner, 67% replied 'No' with a further 6% reporting they were 'Unsure'.

2.3 Conclusion

It is important to note that 27% of attendees will make drought decisions sooner as a result of involvement in GrazingFutures activities. It is a practical measure of improvement in drought management following from GrazingFutures project activities.

In relation to improvement in drought preparedness, 75% of GrazingFutures attendees scored 6 or less on a 10-point Likert scale when asked, *How much have GrazingFutures activities assisted you to better prepare for managing your grazing business in times of drought?* And of those 47% scored the activities a one (1) on the scale.

Additionally, when asked if they would make drought decisions sooner, 67% replied 'No' with a further 6% reporting they were 'Unsure'.

While acknowledging the 27% who will make decisions sooner, it is however useful to also consider the low numbers acknowledging changes to their drought management capability in response to GrazingFutures activities.

Possible interpretations may be that the majority:

- Remain satisfied with their current drought strategies even after attending GrazingFutures activities, and this is supported by the shift of 27% to 'sooner' rather than 'different' decisions, or
- Were unable to find sufficient reason to make a change in their drought management from the GrazingFutures activities, or
- Have been influenced by the duration and severity of the current drought to have already modified their earlier drought strategies and revise how and when to make decisions in future droughts.

This suggests that overall the greatest impact of GrazingFutures on drought management has been among the 27% who now report they will make drought decisions sooner.

Taken all together the information in Section 2 suggests that while drought capability has improved for some with 'sooner' decision making, the project team can continue to consider what more is necessary to expand the project's impact on Objective 5. Objective 5 is to, 'Analyse and document key learnings from grazing businesses adopting objective measurement to enhance drought recovery, increase future drought preparedness and plan for other business risks.'

One way to do this may be to collect narratives initially on what drought management benefit landholders believe they will gain from change in animal production, land management etc and how they see their chosen change translates to improved drought management. From this the team may learn more about how and what attendees understand drought management to be, and document that knowledge. From what is learnt the team may also gain knowledge on how to integrate drought risk mitigation with mitigation of other business risk.

An approach which may prove helpful in bringing together the multiple strands required to engage producers in drought management is Design Thinking. The project team may use this as a creative approach to dealing with ambiguity and generating new ideas. The suggested

method is the one most used currently and presents as the five-step Stanford process. It is a quick and democratic way to reframe challenges and ideate solutions to what are becoming known as 'wicked problems' (complex/difficult) using a holistic systems-thinking approach. Strand one for GrazingFutures can emerge from the empathic understanding gained through collecting the narratives referred to earlier.

Additionally, in the 2018/19 landholder survey, an item can be added that provides an opportunity for respondents to comment on how any productivity and business changes made were more or less beneficial to their business in times of drought.

Finally, in relation to changes made in drought management and acknowledged by attendees as arising from GrazingFutures activities, it is useful to refer to two points.

- First, at no stage did the interviewer ask landholders if they were aware of the business resilience and drought recovery focus of activities they'd attended. One referred to Grazing BMP in the conversation as, *Grazing BMP was not about preparing for drought, it was more about good practices.*
- Second, no landholders volunteered a response that activities were about drought. The latter suggests there was not explicit reference to how any activities they'd attended were being presented in a way to enhance business resilience and drought recovery.

This prompts three suggestions.

- First, the 2018/19 survey include an item/s exploring attendees understanding of the context in which activities are presented
- Second, for activity presenters to design their activities so they are demonstrably linked to one or more aspects of improving business resilience, drought recovery and future drought preparedness, and
- Three, in the promotion, invitation and delivery stages the delivery team make explicit reference to the context as being business resilience and drought recovery.

These changes may then be expected to increase the potential for improvement in business resilience and drought recovery while meeting a need which one producer expressed as, *It would be good if more information on drought management practices could be included and even if it could form a whole section of the BMP program, as it is important for the people in drought times for their well-being.*

Recommendation. It is recommended that for all future GrazingFutures activities, specific attention be given to design and delivery of them for impacts known to align with improved business resilience, drought recovery and future drought preparedness and that those delivering make clear reference to that application 'on-farm'.

3. Respondents' current practices

Section 3 of survey findings refers to the level of current practices in relation to the key Grazing BMP standards identified as relevant to drought management capacity. The key standards are in the three areas of Animal Production, Grazing Land Management (GLM) and People and Business.

Stock type run by surveyed landholders are 38 have 100 or more cattle, 14 have more than 200 sheep and six (6) landholders run some goats with sheep and/or cattle.

3.1 Introduction

Although unable to explore the full range of management practices within the key standards and keep the survey to an acceptable length, indicative items were included from each of the three modules.

Animal Production included:

- Heifer management
- Breeder management
- Decisions on nutritional requirements of animals

GLM included:

- Capacity to manage land types differently
- Method of assessing pasture quantity and condition
- Residual pasture targets
- Calculated carrying capacity
- Property map and its use

People and Business

- For 10 businesses practices e.g. annual budgets, landholders were invited to say which they used in their usual business management.

All were chosen from the project document *Key Grazing BMP standards for business and drought resilience*, prepared by the project team from landholder suggestions in project activities and science people in the project team.

From the collective responses to these items some comment can be made about the level current practice.

3.2 Findings

Animal production

This section presents the perspective of landholders and uses their understanding of the terms as they use them in their animal production systems.

1. Heifers

For heifer management 32% separate them until their 2nd calving, 54% separate them for their 1st calving and 14% run them with other breeders.

These figures show heifer separation is common and when not done there are reasons, for example:

- *Not enough fencing yet and when there is we will keep weaner heifers separate through to their 1st calf*
- *Because of smaller number of heifers, we don't run them separately*
- *Do run separately again now, was unable to do that in the aftermath of the fires.*

It is of interest to note that often those separating heifers through to their 2nd calving do so to improve the proportion rearing a calf for the second time:

- *We do it because our heifers have had problems getting in-calf for their 2nd calf*
- *To overcome the bottleneck of poor breeding outcomes as 2nd calf heifers.*

And the continued separation has been to improve their nutrition leading to improved calving rate:

- *So we have shifted our 2nd calf heifers to the better paddocks*
- *Put heifers in better body condition in one paddock and lighter heifers in a better paddock, then bring them all together for joining.*

To avoid the problem of a poor second calving, one landholder reported starting females later for their breeding life, *We keep heifers for an extra year before mating so they are at the needed weight to overcome problems with getting the 2nd calf in the following year.*

A few landholders report not running heifers alone in their calving paddock and the reason given is to provide experience from older cows who are also calving:

- *It seems to be a good idea to have a few older cows with heifers to teach them about calving and grazing*
- *We join heifers separately and once pregnant we put them in with older cows for mothering training, especially for them to know to stay and protect their calf from dogs in our country.*

2. Breeders

For breeder cattle, 78% of landholders report keeping whole herd records of reproduction and 22% are doing so individually. For sheep it is whole flock records for all and for goats no one reported keeping any substantial records.

Others report planning to move more into individual recordings, including for sheep.

- *Keep branding rates and pregnancy rates already and are now moving to individual records on the recommendation from Tim Emery. For bull selection we use of EBVs and our main focus for genetics and selection is breeder reproduction*
- *Individual records is on the list for the future. We need the scanner and will link it to Phoenix. There has been anthrax in the district and we decided to vaccinate and it would have been ideal to use Phoenix (to record it) but we were panicked as neighbours had deaths so we just did it without recording it*
- *Will start individual records for genomics, which is coming in the future*
- *Intention is to individually record sheep as we are researching an accelerated breeding program. It will be computer based and we'll keep record using electronic ear tags.*

While whole herd and flock recording is valuable, productivity gains may be expected to be greater from the control that can be exerted on assessment and selection for individual productivity.

3. Animal nutritional requirements

For 60% of cattle producers, and for 30% of sheep and goat producers, they report having set times seasonally or as part of the breeding cycle, when they check feed quality and amount and when one or both drop they make changes to stocking rates or the quality of feed.

All landholders gave the impression they are aware of available amount of feed when deciding on animal nutritional requirements. (See Section 3.2, item 4 GLM.)

For those observing pasture condition it is most often assessed by density or abundance of desirable perennial grasses. Other observations include the softness or firmness of dung and attention to the stage of breeding cycle e.g. pre-lambing or pre-calving, and to known local influences e.g. frost.

One sheep producer referred to the advance warning given of dropping feed quality, by observing kangaroo feeding times, *Following rain, when there are roos and sheep working a paddock, it is time (to make changes) as I see roos coming out to graze at (the earlier time) 4 pm or 5 pm rather 6 pm.*

The way landholders make changes to nutrition for stock include:

- *Rotate paddocks, and once feed is dry give protein lick however it depends on the season, more rain equals more choices*
- *In our mulga we change for the season and have a dry season lick and a wet season lick*
- *Kynophos and salt licks out all the time and also feed dry season lick*
- *Look at pasture and move cattle around*
- *Start early to evaluate feed regularly and amend supplement when needed*
- *After first frost, stock are on Anapro within 2 wks. Have been doing that for 10 years.*

The remaining 40% of beef producers and 70% of sheep and goat producers are not checking feed quality and quantity at set times seasonally. Responses suggest they are mostly using observations of animal condition and possibly overall amount of pasture. These are less recommended methods in relation to industry standards and project team members may want to consider how to promote higher standards of assessment and design project activities accordingly.

4. GLM

1. Capacity to manage land types differently

Forty-seven percent (47%) of landholders are able to manage most land types separately either through fencing to land type or having large tracts of the same land type.

For 35% they are able to manage some land types separately and for 18% they are unable to manage any types separately. For the latter it is because of less fencing and/or more landscape variability.

Capacity to manage land types separately enables a higher standard of control of the grazing land in terms of pasture productivity, residual levels and erosion control. These are three factors relevant to overall productivity. Considering that only about half of surveyed landholders currently have the capacity it may be valuable for the project team to explore the relevance of this to their project objectives related to drought.

2. Assessing pasture quantity/condition

This section presents the perspective of landholders and uses their understanding of the terms as they use them in their land management systems. It means that in this particular case although the question asked about assessing land condition, almost all landholders used it in a way which conveyed a seasonal perspective even for most of those who said they use the ABCD model. For example, regular comment was made as 'available feed'. For that reason the term pasture condition has been used in the report.

The options for assessment of quantity are shown in Fig 3a with 74% assessing visually in place of more objectivity with photo-standards, paced squares or sampling and cutting.

Fig 3b shows the options for assessing pasture condition with again the dominant method being the visual option which in this case is the quantity and condition of known desirable species.

Both sets of data suggest there are other methods for more accurate decision making, e.g. comparison of the available feed with photo-standards of the land type and its condition. The enhancement of these decisions can realistically be expected to extend to business success for situations where drought is beginning or progressing.

Fig 3a. How pasture quantity is assessed

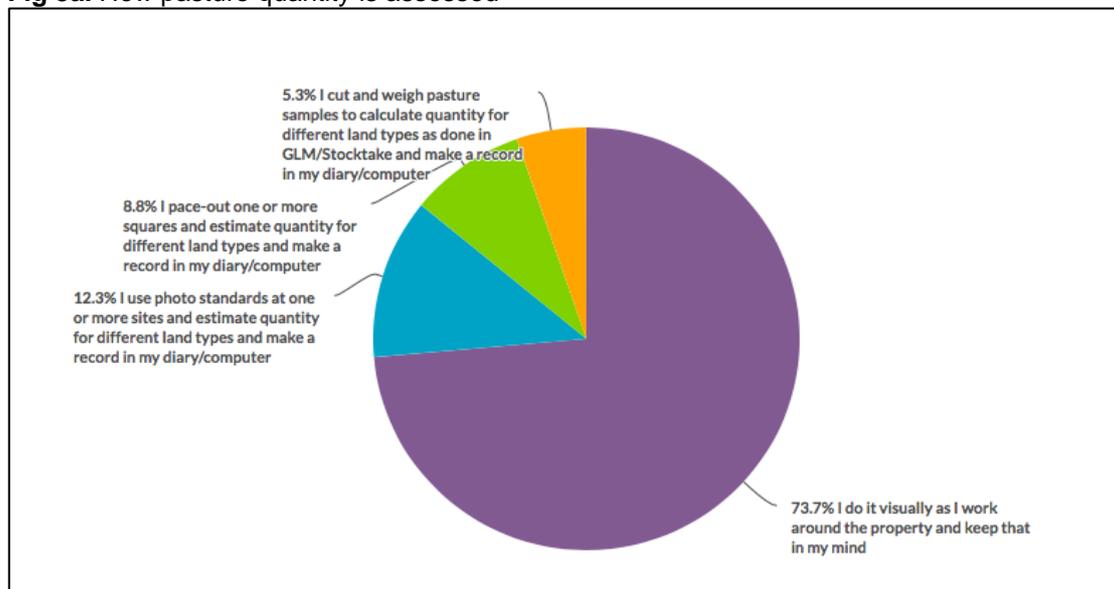
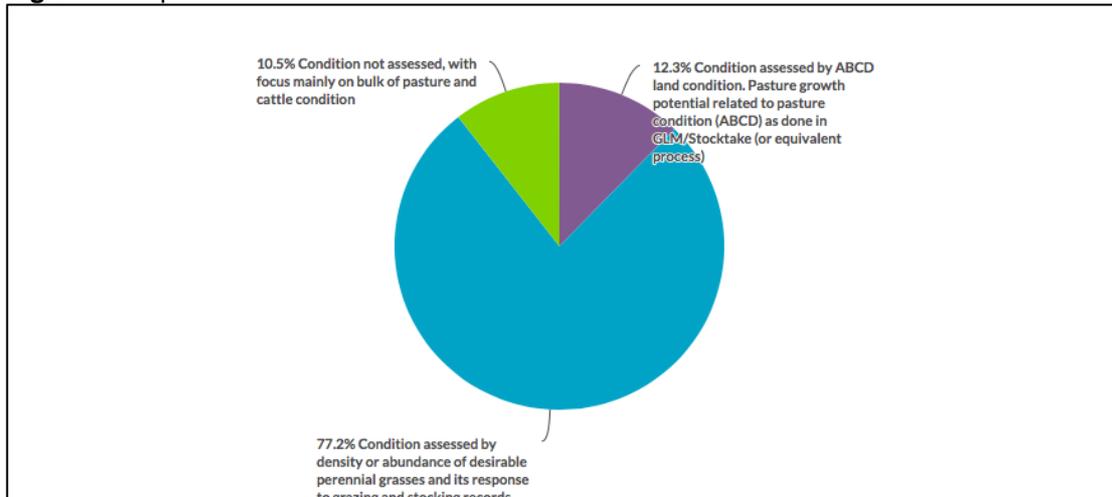


Fig 3b. How pasture condition is assessed



This data showing less objective assessment may be contrasted for discussion purposes with that of Section 3.2 sub-section 3, where 60% of cattle producers and 30% of sheep and goat producers are assessing standing feed for their livestock. The discussion question then becomes, how effectively is the visual assessment being done by landholders? So, while it is true that experience with visual observation will improve accuracy, if the learning outcomes arise only from having enough feed or going low i.e. below residual pasture targets, then the effectiveness of decisions appear to have scope for improvement through the addition of some form of objective assessment too.

Two comments are relevant here. First, many landholders in the survey group at some time referred to, *a lack of time*, and sometimes labour, to take on management practices different to those they now use. Second, some producers report, *keeping a paddock*, or *keeping something up my sleeve*, as their method of allowing for error in their assessment. One more fully described it in this way, *In this area we can expect some summer and winter rain but can't rely on a (start) date so need to be conservative in how we manage the feed on hand*.

This is an area of management practice that the GrazingFutures team may find of practical benefit to focus on for future activities. One way to begin may be to put the recommended objective methods for quantity and condition assessment through the CSIRO developed ADOPT model for time it will take to achieve 50% adoption. From this they can use the elements of the model to consider whether to pursue one, or other, or none, of the recommended methods. Their choice will define an extension target to use in the design of activities for impact.

5. Residual pasture targets

The proportions of landholders reporting knowledge of a green date is 54%. However, it is only a few who have calculated it for their property or area. One who has said, *For our property 80 - 90 % of the time, the 100-year records show that January gets the rain with follow up rain*.

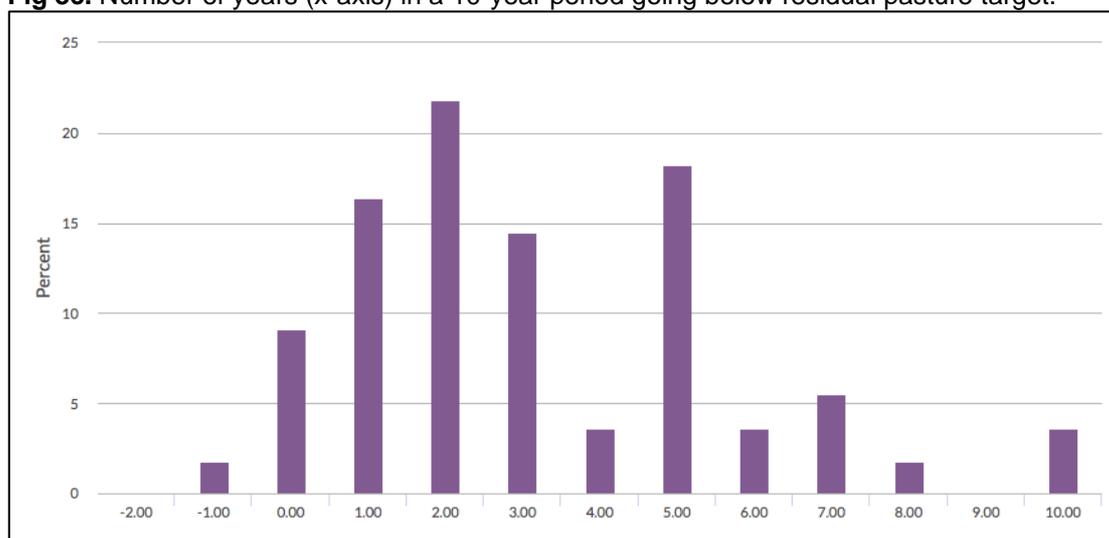
Most respondents however give wider ranging start times, for example:

- *Talk together with other graziers looking at rainfall expectations, we can expect a break in December/January if we are to get one*
- *From spring onwards, we can expect storms*
- *Look for a break in early spring*
- *Rain can be anytime between November and April.*

In the survey 67% report having a residual pasture target for when the rain arrives, however overall only 58% were able to give a measurable figure. Linked to this is the assessment by 35% of landholders that in from four (4) to 10 years in any 10-year period, they are unable to meet their self-chosen target (see **Fig 3c**). This happens even when, *I know the benefit in*

leaving more of plant for it to grow quicker after rain! This is a similar finding to that for the reef catchments Grazing BMP survey referred to elsewhere in this report.

Fig 3c. Number of years (x-axis) in a 10-year period going below residual pasture target.



In Section 3.2 sub-section 3 above the question was raised about the effectiveness of only visual assessment when making decisions on pasture quantity and condition. The fact that 35% of respondents go below self-chosen residual pasture targets four (4) or more years in a 10-year period, would seem to be another indicator of the lack of effectiveness of some respondents' use of visual assessment methods.

There are however, specific instances in which maintaining the target is made less easy. Examples given in this survey work were:

- When the live export market was stopped in 2013
- Kangaroos in large numbers ate the reserved feed
- Unwillingness to sell stock to reduce numbers when market prices are low.

The project team may want to consider exploring any already available data on what happens in the sphere of meeting pasture residual targets by producers who are 'deemed' more successful. An example starting place may be the independent report released this year (2018) by Ian Maclean and Phil Holmes, of the characteristics of the top 20% of landholders in North Australia.

6. Carrying capacity

The value of having a strategy for understanding and managing carrying capacity is considered valuable in business decisions including in times of drought. **Table 3a** shows the proportions of surveyed landholders who have or don't have such a strategy and how they practice its operations. In discussion they were responding to the survey item, 'Have you calculated a long term carrying capacity for either whole of property or per paddock?'

Table 3a Have you calculated a long term carrying capacity?

Option	Percent
Not really, but I do have a general figure I use, which is from my experience on the property	39%
Yes	30%
I calculate a figure each year from the feed available at the end of the wet season	15%
No	9%
I had safe stocking rate calculations done for me	7%

Of respondent landholders 48% do not currently have a strategy for establishing stocking rate for their property either overall or annually. When the project team is considering where to direct the activities of the project, it is something for them to keep in mind because of its practical relevance to management of pastures.

7. Property maps

Fundamental to managing a grazing property is understanding the landscape and the features of the land system in which production is taking place. Mapping is important in this process and being able to manipulate computer maps can enhance both landscape and land system knowledge.

In this survey 65% of landholders report having and using their computer-based mapping system in the last 12 months. (See Table 3c) Examples of use include:

- *Harvesting of timber*
- *For wind direction last weekend for cotton spraying next door;*
- *Re-fencing a paddock in January*
- *Mountain bike race route design*
- *For GABS (bore drain replacement) scheme for poly lines and tanks*
- *May look at it monthly as we talk about what is happening*
- *For paddock sizes, to measure country blade-ploughed and for water distribution circles*
- *Designing were to put trough circles*
- *For including the new country we purchased late 2017*
- *Updated with new improvements*
- *Hardcopy for backpackers for mustering.*

Table 3c Type of mapping system being used

Option	Percent
Both hardcopy/wall-board and a computer-based	42%
A computer-based one (only)	23%
A hardcopy only on paper/wall-board or similar and drawn to scale	31%
In my head only as I know my property well	4%

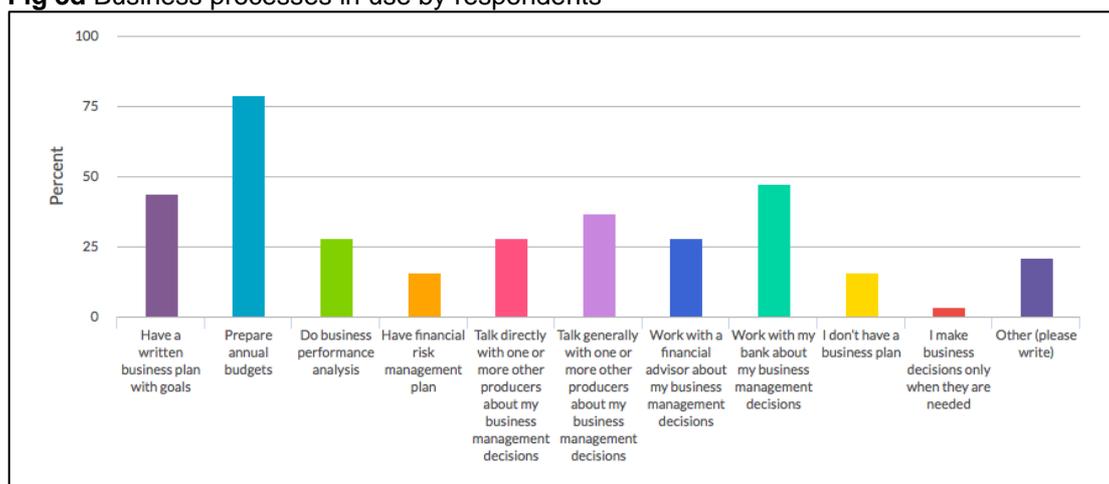
Computer mapping systems are the main current format used and in discussions landholders with these systems often comment on their usefulness.

All landholders who attended GrazingFutures Mapping workshops have found them valuable. Some who are unfamiliar with computer mapping systems and computers have reported that they struggled to use them after only one session and will require multiple sessions to become competent. This latter point is one for the project team to keep in mind when initiating mapping activities.

8. Business processes

The majority of landholders, 79% report preparing and using annual budgets. This and other business management practices selected by landholders in this survey are shown in Fig 3d.

Fig 3d Business processes in use by respondents



There are 44% with a written business plan, *Our business plan is for 5 years*, however most update it only irregularly. There are 28% doing business performance analysis, *Business performance assessment too came from GFP (GrazingforProfit)*, and only 16% having a financial risk management plan in some form, *Our financial risk management is off-farm assets and fixed interest loans*.

Those working with a bank in relation to financial and business matters are 48%. The percentage of landholders with no business plan other than in their heads is 16%, *Business plan is in my head, for example we sell when there's no wet season and restock only to amount of rain and feed grown*.

Given the emphasis in GrazingFutures documents on improving business resilience, the level of current business practices suggests there is scope e.g. business performance analysis and risk management planning, in which to consider how to make a significant difference to what is already happening.

3.3 Conclusion

While the proportions vary there are differences in level of standard (below, at, above) for each of the management practices examined in this section. This is might be expected in a population.

The current practices levels recorded in Section 3 may have a role in future comparisons for change in the level across the industry. The levels for practices also provide an immediate source of data for project staff to decide where activities can be designed and delivered to maximise the impact of the project.

The data suggest there are a number of practices to which it is possible to direct the project's investments and they are shown here:

- The practices of those beef, sheep and goat producers who are not checking feed quality and quantity at suitable times to make informed, timely decisions on animal nutritional requirements
- How effectively is the visual assessment being done by landholders for available feed condition and quantity? This is an area of management practice that the GrazingFutures team may find of practical benefit to focus on for future activities. One way to begin may be to put the recommended options for quantity and condition assessment through the CSIRO developed ADOPT model for time it will take to achieve 50% adoption
- With 49% of landholders unable to meet self-chosen targets for residual pasture it may be worthwhile to consider exploring any available data on what happens in the sphere of meeting pasture residual targets for producers who are 'deemed' more successful
- Given the practical relevance of carrying capacity to management in times of drought, and with 48% of landholders not currently having a strategy for establishing carrying capacity, there appears to be scope for attention to this aspect of management

- Computer mapping systems are being demonstrated as useful by 65% of surveyed landholders. Of the other 35% some report difficulty in learning the system for their own property situation, and
- There appears much scope for the project to create an impact in business planning and performance areas given that there are:
 - 56% of businesses without a written business plan
 - 72% not doing any business performance analysis, and
 - 84% with no form of a financial risk management plan.

The material presented in Section 3 of this report indicates that there are a proportion of landholders who are following practices below industry standard. Within the 43 standards (21 of them key) selected as relevant to support grazing businesses improve business resilience, drought recovery and future drought preparedness, there is subject matter for future work for GrazingFutures.

Recommendation: It is recommended that the project team use the ADOPT tool to assess the time to peak adoption level and time to near peak adoption, for effective pasture assessment, achieving self-selected pasture residual targets and increased use of business planning known to improve business resilience. It is further recommended the GrazingFutures then use 'What if?' scenarios to develop an extension plan for impact on project objectives for improved drought management capacity for landholders. (See **Appendix 1** for details on the reasons for suggesting ADOPT as the methodology for delivering on this recommendation.)

4. Grazing BMP

4.1 Introduction

GrazingFutures documents describe the role of Grazing BMP in the project as allowing Department of Agriculture and Fisheries (DAF) staff and their collaborating partners to tailor the support to grazing businesses within their region. It has been used in the prioritisation of activities associated with business resilience and drought recovery.

In this way it has formed part of the way the project team has responded to project Objective 1, Prioritise the delivery of workshops, training and targeted support within the themes of people and business, grazing land management and animal production based on verifiable industry needs, data and regional drought conditions.

For that reason, it warrants future attention to how attendees have engaged with those modules delivered.

4.2 Findings

1. Numbers

Forty-two (42) of those in the surveyed group have completed three (3) or more modules of Grazing BMP and 15 have not done any modules.

Of the 42 completing Grazing BMP, 48% have revisited their plans or resource materials provided on the day. Their purposes varied and examples are:

- *When feed budgeting*
- *When doing our 5-year plan which we review each year to set targets for property, personal, finance*
- *Looking for animal production information*
- *Biosecurity recommendations for our caravan park for weed management*
- *Have looked at USB (resources) when we were talking about management topics to check land condition assessment and soil type materials*
- *When water planning for the property.*

Only one person had done a reassessment and they had been involved first in an early pilot Grazing BMP program and returned to it in a workshop run for GrazingFutures. None of those surveyed has done a Grazing BMP audit.

Of those attending the Grazing BMP accelerated workshops 50% reported they were wanting to improve their management practices and 43% to see how they sit against the industry standards.

Only 18% report going to find out more about how to decrease the impacts of drought on their grazing business.

Of the 42 attending the Grazing BMP workshops 26 identified training they wanted to attend and eight (8) have attended their training.

2. Attendee experiences of accelerated workshops

A significant number of attendees report finding much in the content of value for their management activities e.g. *We went to get more education on how to conduct the business of managing the property and it has been valuable.*

A number of others recognised content in the workshops from previous workshops they'd attended e.g. *I had attended other activities and so had covered what was in the Grazing BMP workshop.* Considering the fundamental nature of the management of grazing enterprises and the fact that attendees had been to multiple management training activities over multiple years, this statement is not surprising.

It is also of interest to note of the 42 respondents who attended Grazing BMP modules none objected or made any comment about the terminology of 'below', 'at' or 'above' standard. In fact 43% said they attended to see where they sat against industry standards which implies wanting to make the comparison. The consistency of these two items suggests that landholders are satisfied with the wording of the Grazing BMP assessment process as it is.

A number of attendees did comment about how the accelerated workshops were run referring to what they interpreted as 'rushing', 'getting bums on seats' and 'tick-boxing'.

- *Some segments of the GBMP workshop were a bit rushed as we wanted more info on many of the topics*
- *Disappointed at workshop that it was up to us to do action plan at some other time because there was no time really to do it and actually making a plan wasn't encouraged. For example, the organisers said, 'Make some notes of what you want to do'. Seemed like they wanted bums-on-seats (numbers) rather than generate the long-term benefit to business and which comes in the planning*
- *Problems I saw with GBMP were compounded when we were only given USB supporting information and we were sent a confirmation email with our action plan and self-audit info for only 1 of 5 modules done (People & Business) - Which means we can't go back and look at the other modules we worked on*
- *Found it more or less useless as it came across as a benchmark, tick-box thing – they gave a bit of overview, then had us fill in boxes. It was not for learning, which I could understand if BMP is for only showing the public the industry is doing what it is supposed to do*
- *I thought there was an undertone in the Grazing BMP workshop of compliance i.e. wanting us to present that we were doing the right thing and not all contaminating the reef. I didn't think it was a positive or negative undertone.*

The appearance of comments relating to tick-boxing and being rushed is consistent with comments at times recorded in the Grazing BMP reef catchments surveying mentioned elsewhere. One reef catchment landholder put it like this in 2017, *Grazing BMP was only short and all modules were done quickly and it did not give us the skills to make any changes. I am concerned that Grazing BMP doesn't provide the education to improve people's skills to do things better for example, people who are doing set stocking will not find it easy to change and won't do it after only doing Grazing BMP.*

3. Audits

One attendee had been involved in the development of Grazing BMP program. When asked for any tips on getting landholders through to the audit stage they replied, *Let those at the (module) workshops know the ultimate goal for the program and their business is to have an independent audit so there is 'evidence' to show that the industry is managing land well.*

4.3 Conclusion

Grazing BMP has proven useful for the majority of attendees and it is to be expected that in an industry best management program some will have received the content in other formats when previously learning about management.

The perceptions expressed by a number of those surveyed that the work of the modules was of a tick-box, bums-on-seats type is something which the project team needs to address so the business and management planning aspect of the program is not lost.

That only eight (8) of 26 with training requirements have been to suitable training can in part be understood from the recency of when the Grazing BMP accelerated workshops were run. Most of the workshops were run in the 2017. With that in mind the provision of events that provide opportunities for landholders to attend nominated training is part of the brief the project team must meet.

Recommendation: It is recommended that the GrazingFutures team examine how to deliver Grazing BMP modules in ways that produces actions plans while also enhancing the project's purpose to improve business resilience, drought recovery and future drought preparedness.

5. Other items of note

5.1 Introduction

In this section are other items noted in discussions with survey respondents. They are presented here in the spirit in which they were offered by respondents i.e. what 'might be' possible.

5.2 Capitalising on other programs

There were occasional comments on how this (GrazingFutures) and other projects are delivering what other providers are delivering. For example,
- *Not really a fan of Grazing BMP because it has a focus on production criteria rather than sustainable production methods e.g. it doesn't include much on ground cover.*
GrazingforProfit gave us the greatest transformation for our change of attitude and our production system.

As well as GrazingFutures, other deliverers referred to were MLA and KLR Marketing. The question posed by these producers was, Can DAF or GrazingFutures, partner with these other providers to the advantage of producers?

It is recognised that DAF is an organisation that delivers public good as a not for profit provider and that the others are fee-for-service providers. It would therefore need a creative solution that provided a suitably even sharing or responsibility and return, not necessarily in monetary terms, but rather in achieving project objectives.

An active example may be the NQ Dry Tropics 'Pioneer' program. It enables volunteer landholders in some specially selected parts of reef catchments, to attend GrazingforProfit schools and other programs as one of NQ Dry Tropics' approaches to achieving changes in grazing management.

5.3 Models of activities for the future

1. Networks

One producer respondent suggested a model for GrazingFutures delivery. They suggested that, *A model that could work more efficiently may be a network of like-minded progressive*

producers who will embrace or maintain recommended changes. They can then be case studies or role models for the rest of the grazing industry. They are acting as a live testimonial for the changes that early adopters use and who are using DAF recommendations. Examples of groups of that kind are: 1) Malanda BeefPlan group, which works well in that more intensive area; 2) the 3-Rivers group that put together the code of practice for themselves as beef producers. It may be that the area they are drawn from needs to be no bigger than 100 kilometres.

2. Bring a problem

Another suggestion is less complex and is, *That field days are good when they include sessions on 'Bring a problem.'*

The purpose is to focus attention on what producers currently have in front of them as well as what a project is being funded to deliver. Such a model has been found successful in getting attendance and learning on-the-up in Producer Demonstration Site (PDS) work in North Queensland (Dave Smith, DAF, Charters Towers pers comm). Additionally, it uses the adult learning principle of 'begin where the learner is at' which is a well acknowledged starting point in extension delivery.

5.3 Changes to the survey format

In the future it will be valuable if the continued use of this survey work can more readily assess the impact of GrazingFutures i.e. be able to attribute to the project a practice change that improves drought resilience.

The format suggested is that of using some practices in Section 3 above, Current management practices, in a 'before-and-after' structure. That will enable respondents to say whether they have adopted, improved their level of operation or maintained their current position in the designated management practices.

Such a process can demonstrate impact for individuals and in doing so provide an estimate of impact across the population.

Recommendation: That the project team consider how these four (4) items in Section 5 can be used to increase the impact of the project investment.

6. Recommendations

These recommendations are made in a priority order that takes into account the project objectives to be delivered for investors and to achieve the purpose of the project for landholders i.e. to improve business resilience, drought recovery and future drought preparedness.

Recommendation 1. It is recommended that for all future GrazingFutures activities, specific attention be given to the design and delivery of them for impacts known to align with improved business resilience, drought recovery and future drought preparedness and that those delivering make clear reference to that application 'on-farm'.

Recommendation 2: It is recommended that the project team use the ADOPT tool to assess the level of adoption and time to near peak adoption for effective pasture assessment, achieving self-selected pasture residual targets and increased use of business planning known to improve business resilience, and then use that information to develop an extension plan for impact on project objectives for improved drought management capacity for landholders.

Recommendation 3: It is recommended that narratives and case studies be developed with graziers who have made changes prompted by GrazingFutures activities, to gain a higher level of data (e.g. costs, actual returns etc) to further clarify the extent to which the project's impact is taking place with industry.

Recommendation 4. It is recommended that the GrazingFutures team examine how to deliver Grazing BMP program modules in ways that produce actions plans while the delivery also enhances the GrazingFutures project's purpose to improve business resilience, drought recovery and future drought preparedness.

Recommendation 5. That the project team consider how the four (4) items in Section 5 of this report may be used to increase the impact of the project investment.

Appendix 1 Adoption and Diffusion Outcome Prediction Tool (ADOPT)

1. The ADOPT tool and the GrazingFutures project

The application of ADOPT by GrazingFutures regional teams will increase their conceptual understanding of the adoption process required for each practice they are promoting in management to improve business and drought resilience. This process can be expected to strengthen their approach to design of extension activities through being able to use evidence-based information to design the extension program overall as well as the extension activities within the extension program.

ADOPT can provide predictions for a grazing practice's likely level of adoption and time to near peak level of adoption. It does that through responses to 22 questions in a spreadsheet of factors influencing adoption in a chosen setting. The factors are ones research and practice show are elements of the adoption process (Kuehne *et al.* 2017).

The origin of the tool followed from the meta-review by Pannell *et al.* (2006) and on-going support by the CRC Future Farm Industries from 2007 (Llewellyn 2017). Since then the tool has been taken to its current form through research and development work by CSIRO and University of WA. Its most recent iteration is presented by Kuehne *et al.* (2017).

Importantly for users of ADOPT the design enables it to produce a result without requiring survey data to answer the questions in the tool (Kuehne *et al.* 2017). As well, it has been validated by the ADOPT team with past and completed adoption of practices (e.g. Auto-steer tractors; saltbush) to show it is effective in its claims. They report "strong" correlations with predictions made now using the tool.

As yet there are no publications of ADOPT's use in western Queensland's grazing settings.

Its application is suggested for GrazingFutures for two main reasons:

- The first is that the tool has a foundation in meta-reviews of adoption literature, and includes on-going development work by the ADOPT research team on adoption in agriculture (Kuehne *et al.* 2017), and
- The second is the methodology of using a multidisciplinary 'group' with local industry knowledge to answer the questions and this enables it to be matched to local areas and practices. For example, there are three (3) such target practices named in Recommendation 2 of the report, and they are effective pasture assessment, achieving self-selected pasture residual targets and increased use of business planning known to improve business resilience.

The two reasons are suggested with the understanding that using ADOPT to assess adoption level and time to near peak adoption will provide material for evidence-based decisions when the GrazingFutures team designs extension programs for the region.

2. The logic for choosing ADOPT

The interaction among four elements provides the conceptual framework for the ADOPT tool. The four-quadrant model is shown in Figure 1. The elements are:

- The characteristics of the practice that influence its **relative advantage**
- The characteristics of the population that will influence their **perceptions** of the relative advantage of the practice
- The characteristics of the practice influencing the **ease and speed** of learning about the practice, and
- The characteristics of the potential adopters that will influence their ability to **discover and learn** about the practice.

As well the ADOPT tool uses known factors relevant in agriculture to predict time to proportional population adoption on the diffusion S-curve. In particular the current version provides "...predictions of a practice's likely rate and peak level of adoption as well as estimating the importance of various factors influencing adoption" (Kuehne *et al.* 2017). It is

these factors and their demonstrated influence on adoption that will provide perspective to those working in GrazingFutures.

Fig 1 A model of the conceptual framework of the ADOPT tool

	Learning	Relative Advantage
The Population	Population-specific influences on the ability to learn about the innovation	Relative advantage for the population
The Innovation	Learnability characteristics of the innovation	Relative advantage of the innovation

In the variety of settings in which GrazingFutures operates it is of particular merit that the ADOPT tool can be localised to target populations e.g. grazing in central western Queensland. It does so through having a multidisciplinary group with local knowledge relating to the factors, contributing when using the tool.

3. References that support ADOPT's conceptual and practical usefulness in design for extension

- Geoff Kuehne, Rick Llewellyn, David J. Pannell, Roger Wilkinson, Perry Dolling, Jackie Ouzman, Mike Ewing (2017) Predicting farmer uptake of new agricultural practices: A tool for research, extension and policy. *Agricultural Systems* 156 (2017) 115–125.
- On-line, The ADOPT Workshop which includes the four-page document on download, titled **ADOPT: a tool for evaluating adoptability of agricultural innovations**. URL: <https://www.udemy.com/adoptworkshop/learn/v4/t/lecture> [accessed 17/09/2018]
- David C. Rose, William J. Sutherland, Caroline Parker, Matt Lobley, Michael Winter, Carol Morris, Susan Twining, Charles Ffoulkes, Tatsuya Amano, Lynn V. Dicks (2016) Decision support tools for agriculture: Towards effective design and delivery. *Agricultural Systems* 149 (2016) 165–174.
- Emanuele Pierpaolia, Giacomo Carlia, Erika Pignattia, Maurizio Canavaria (2013) Drivers of Precision Agriculture Technologies Adoption: A Literature Review. *Procedia Technology* 8 (2013) 61 – 69.
- Elizabeth Hobman and Bruce Taylor (2018) **Understanding the human dimensions of landholder innovation and stewardship** - Identifying indicators of a culture of innovation and stewardship, and land management practice change. RP190 Stage 1 Milestone Report, CSIRO Land & Water.
- D. J. Pannell, G. R. Marshall, N. Barr, A. Curtis, F. Vanclay and R. Wilkinson (2006) Understanding and promoting adoption of conservation practices by rural landholders. *Australian Journal of Experimental Agriculture*, 2006, 46, 1407–1424
- Llewellyn, R. (2017) The UWA Institute of Agriculture newsletter, Dec p4.

4. Examples of ADOPT's application

1. *New perennial legume for low rainfall grazing* [URL <https://adopt.csiro.au/Example> accessed 17/09/2018]

- This example refers the innovation practice of using a new perennial legume species for grazing in low rainfall areas. The new perennial legume species has been found to be more drought tolerant than lucerne and able to grow on soils where lucerne has failed in the past. It has slightly less feed quality than lucerne but offers greater groundcover in summer to protect soils from erosion.
- It showed a peak adoption of 27% of the target population and a time to near peak adoption of 15 years.

2. *Extension officer potential to learn where to direct extension effort*

- While this is not a fully formed use of the tool because it didn't use a complete multidisciplinary group, it does provide an actual example of an extension outcome when using a 'What if?' process in conjunction with the tool.

- It was an impromptu demonstration of using the tool which I conducted with only two (2) DAF staff. The time to near peak and level of peak adoption were not recorded.
- The practice chosen was replacing diesel motors with solar power for pumping water for stock in the local catchment. Diesel power was the most common practice while economic data showed the benefit to solar as being of considerable relative economic and management advantage.
- The DAF staff mentioned wishing to use this example as they were trying to understand why landholders were reluctant to change when the relative advantages were, “so evident”.
- In using ADOPT the two DAF staff answered the questions from their local knowledge. Once completed we examined and discussed the product and its report.
- In doing so we ran What if? scenarios in the responses to questions to see the impact on the S-curve.
- In doing so it revealed an example of what could be useful piece of knowledge for extension planning
- Using ‘What ifs’ showed that the landholders most likely to make the change to using solar power were those whose diesel motors were eight (8) years or older. The reasons were that diesel motor life was considered to be ten (10) years and landholders with motors eight years and up were known (local knowledge) to begin enquiring into the cost of replacements when doing budgets etc.

5. Who to have present in the multidisciplinary group when GrazingFutures is using the tool

The project team overall and the three regional teams are partnerships across organisations and service groups working with the grazing industry.

The multidisciplinary group of 12-15 can usefully consist of:

- One or perhaps two (depending on desired total number) people from each partner group and who are considered to have a sound practical awareness of the grazing industry in the region and the specific practice in particular
- Two landholders with experience in adopting the practice (or other practices if direct experience is not available)
- At least one commercial Agribusiness representative
- At least one representative involved in rural banking.

6. Who to have represented in the extension planning that follows

This can usefully be all GrazingFutures staff who attended the session of the multidisciplinary group as well as any other regional team members. Ideally it will also include one or two others with experience in designing extension programs in western Queensland.

7. A workshop approach for using ADOPT in GrazingFutures

Stage 1. Applying Adopt

- Select and invite relevant people to be in the multidisciplinary group
- Facilitate the multidisciplinary group to use the tool’s 22 elements of adoption with each of the practices in **Recommendation 2** and record the output report
- Using each report facilitate the multidisciplinary group through What if? scenarios
- Record the changes in impact and identify which factors influencing adoption (of the 22 on offer) can usefully be the focus of future GrazingFutures activities to generate greatest impact at a local level
- Look for links between the factors generating greatest impact for effective pasture assessment and for delivering on self-selected residual pasture targets.

Stage 2. Designing the extension plan

- Convene the local GrazingFutures team in total including those in the multidisciplinary group, plus the additional people who have particular experience in designing extension programs

Use the material from Stage 1 to create an extension program for increasing the landholder numbers using effective pasture assessment, delivering on self-selected pasture residual targets and on business planning known to improve business resilience.