



MONITORING & EVALUATION ANNUAL REPORT

Drought and Climate Adaptation
Program (DCAP) Phase 2

Coutts J&R / July 2020



**Queensland
Government**

ACKNOWLEDGEMENTS

As in previous years, this M&E annual report draws on the milestone data from projects and interviews with stakeholders, project teams, the Steering Committee and project management. Without people willing to participate in this process, the richness of the data collected and the emerging stories of the projects from different points of view would not be possible. The time given has been much appreciated and valued.

This report reflects the dedicated and continued progress being made to better assist decision-makers in a variable climate and the gains made over the last year.

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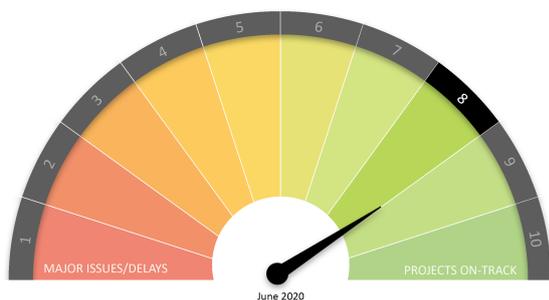
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SUMMARY

About this Report

This 2020 mid-term M&E annual progress report provides a program and project level update of The Drought and Climate Adaptation Program (DCAP) Phase Two M&E activities.

Program Status



About DCAP

DCAP is the Queensland Government's \$17.5 million initiative to improve drought preparedness and resilience for Queensland producers. The program began in 2016 with Phase One ending June 2017. Phase Two runs to June 2021 and at this stage consists of nine foundation projects *managed and funded through a series of partnerships with government and industry partners*. Five Innovation Fund projects were supported in 2019.

Progress

Stakeholders at all levels of the program considered that DCAP has been progressing very well against its objectives (avg. rating 8.2/10). The program has strong/positive support across the stakeholder groups. While the impacts of COVID-19 on overall progress is not yet clearly evident, its main effect was predicted to be delays to some project activities and potentially some milestone deliveries. At this stage there is confidence that despite COVID-19, DCAP's projects and the program overall are on track and have consistently been so over its life.

Impacts

The Benefit Cost Analysis for the project and sub-projects is being completed. Agrtrans has advised that ***the economic evaluation of DCAP projects has provided positive indicators of success.***

Many of the projects are still in the development and testing phase of outputs with positive feedback from stakeholders involved in the testing and process. Projects undertaking extension programs are reporting that engaged producers are rating information and outputs as very useful with an increasing number using new tools and frameworks to assist in decision-making.

To provide confidence that these indicative benefits will be realised more broadly and encourage adoption by decision-makers, there is a need for detailed on-the-ground case studies where 'real businesses' have used information, frameworks and tools and demonstrated benefits – and can provide practical feedback to benefit their peers. While there has been some progress on case study development (e.g. DAF8 and USQ4) to date, more needs to be done – specifically in capturing project influence and indications of economic or social (e.g. reducing uncertainty) benefits in this final stage of the project.

Program Management

There is an overall high level of satisfaction from stakeholders with the degree of interactions, program support and information received (avg. rating 8.7/10).

The program management is thought to be working particularly well by a number of stakeholders with the program manager noted to be providing *excellent support and doing a great job at letting people know what's going on*. The Steering Committee and governance of DCAP is thought to be *very sound* with the Independent Technical Reference Panel being seen to provide useful guidance about particular issues.

Collaboration and Integration

There has been increasing collaboration across the DCAP projects as it has progressed over time (see diagram at the end of this summary section). This is a strong indicator of good project management and providing space for collaboration. It has clearly benefited a number of project outputs (for example: the animation) and sends a very positive message about project efficiency and cohesion.

Given the stage of the program, there is a need for an easy to understand diagram depicting the different threads of DCAP, where they merge and complement each other and how they individually and collectively benefit Northern Australia.

Issues

Time pressures and work demands on project staff: Some projects commented on the level of workload they were experiencing, limitations of staff availability or capacity and the need to complete the work on the tools and outputs in the time remaining.

A sense of urgency to increase extension of the work: There were many comments made about the need to make even greater progress in developing awareness and increasing uptake from a number of projects.

A concern about attitudes, complexity and willingness of take-up: Despite the value that stakeholders are seeing from the work undertaken, there remains concerns about how to target the outputs to different groups and breakthrough the barriers and complexity surrounding some of the concepts and decision aids.

The need for ongoing work and funding to build on what has been developed: The gains made by DCAP have been significant. However, they require ongoing effort and investment to build on what has been started and develop the needed range of products and take-up to maximise effective decision-making with respect to variable climates across Northern Australia.

Opportunities

Working with engaged producers and other stakeholders in refining the tools, information resources and messages to maximise their usefulness and useability to different groups.

Continuing to work with the communication team to build awareness and benefits of project outputs to raise interest and stimulate active information seeking.

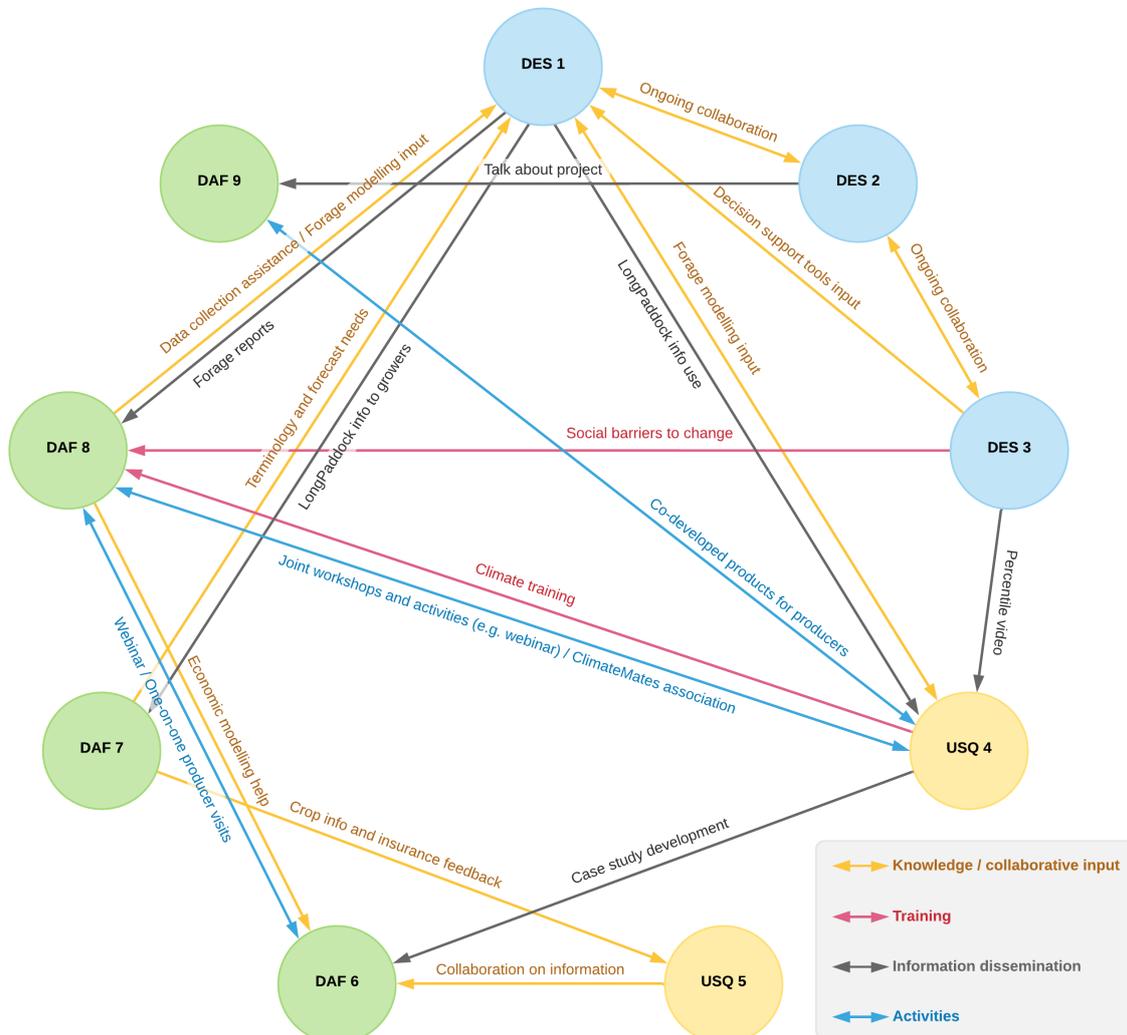
Continuing with extension efforts *within project resources* – and using distant engagement technologies where appropriate.

Maximising effort to engage, train and motivate those consultants, agribusiness and extension personnel who will continue to work in the regions with producers so that they continue as champions beyond the life of the projects.

Recommendations

- 1 Each project should review their objectives and planned extension outcomes within the available resources and constraints and plan for a realistic level of achievement with a focus on developing buy-in from continuing agribusiness and extension services.
- 2 A schema should be developed depicting the relationships between the different projects and outputs and how they complement each other and benefit different decision-makers across Northern Australia.
- 3 Increased emphasis should be put on capturing economic case studies of real businesses using and benefiting from the outputs of the different DCAP projects.

Increasing cross-project collaboration between projects is a highlight with the DCAP seen to be learning from each other and effectively working together. Please note that this diagram highlights inter-project collaboration and does not map collaboration with other organisations.



Summary of Findings

A summary of the findings against the Monitoring and Evaluation Log Frame (provided in the appendices) is provided below. The body of the report provides details around these different levels and the project contributions. **Note that a full summary with ‘traffic lights’ of progress against individual projects against milestones for 2019/20 is included in the appendices.**

END OF PROGRAM OBJECTIVES

| | |
|-------------|---|
| DCAP | <p>Scientific capacity and tools; awareness, understanding, skills and capacity; Increased uptake and application by industry, producers and their advisors; benefits arising from use and practice changes made by industries and producers.</p> |
| | <p>As of June 2020, there were approximately 1,105 recorded producers/growers changing practices representing 719 business, 9,607,050 hectares, 653,045 cattle, and 160,680 sheep*. This are very positive impacts to be recorded at this stage of the project and demonstrates the relevance and perceived benefits of the project information and outputs.</p> <p>Documented types of gains in capacity and practice change included:</p> <ul style="list-style-type: none"> • Increased understanding and use of forecasting/climate drivers • Management decisions impacted by heatwave advisory and experimental forecasts • Use of CliMate App to assist planning • Understanding of impact of natural catastrophes/role of insurance • Implications/impacts across different industries/regions • Drought management in a grazing context • Understanding implications of historical variability <p>Agtrans has advised that <i>the economic evaluation of DCAP projects has provided positive indicators of success - the current draft BCRs for the eight projects where impacts were valued range from 4.0 to 7.6; the simple average for the eight projects where impacts were valued was 5.3 to 1. [These are the current indicative preliminary results only and may still change based on feedback from DCAP management and project personnel on the final draft reports. The full analysis is currently being completed.]</i> The indicative results positively reflect the gains being made and the potential benefits arising from the project and is in keeping with returns from good RD&E programs.</p> |

**Figures are calculated from practice change numbers recorded in the DCAP M&E database, are only an approximate and could include overlap – the majority of practice change data was from projects USQ 4, DAF 7 and DAF 8.*



COMMUNICATION AND EXTENSION

DCAP

Overall program communication activities

Overall project to date:

- **365 Information materials** – including: 27 conference papers, 32 conference posters, 160 online/journal/newsletter articles, 66 web pages, 35 fact sheets, and 35 videos/podcasts
- **278 PR/Media** – including: 40 interviews, 14 media releases, and 224 social media posts

Comments:

- DCAP newsletter every 2 months – 9,523 distributed in March 2020
- DCAP website – 6,000+ views Aug 19 to Feb 20
- Social media/media/podcasts – strong coverage and access
- Individual projects also have/contribute to newsletters and use other communication channels to build awareness of specific activities and outputs.
- Stakeholders reported that the general level of awareness of the project was quite good with some mentioning strong industry connections being made including partner organisations. There was high level of awareness in this group about DCAP information in NRM/community group e-newsletters and websites, wider community workshops, program social media support/ e-newsletter, webinars and talking with other government departments.

Specific project extension activities

Overall project to date:

- **1,174 Activities** – including: 231 Workshops, 77 Field days/farm walks, 144 Forums/seminars, 490 One-on-one, 50 Webinars, 182 Other
- **13,644 Participants*** – including: 8,856 producers/growers and 4,788 others

Comments:

- A key development has been the doubling of Climate Mates (local champions) as part of USQ 4. Projects have adapted to COVID-19 restrictions by greater use of online meetings and workshops and virtual field days and paddock walks. These have been well received and will help also in challenges relating to large distances.

**participants are not unique and may include double ups (i.e. producers that have attended more than one activity)*



PRODUCTS AND TOOLS

DCAP

Key products and tools for supporting extension and producer use developed to date include:

Overall project to date:

- **331 Research** – including: 22 benchmarking, 31 bioeconomic and system modelling, 27 business analysis, 170 knowledge support, 17 options analysis, 130 research interviews, and 15 spatial analysis
- **549 Other** – including: 23 case studies, 10 decision support systems, 25 M&E tools, 64 narratives, 59 reports, and 368 other

- **48,114 FORAGE** report requests (DES 1)

Comments:

- Planned research outputs are on track and receiving positive feedback from stakeholders. These include:
 - **DES 1:** Forage Reports; Pasture Growth alerts
 - **DES 2:** Paleoclimate database; Improved heat maps across Australia
 - **DES 3:** Social research report
 - **USQ 4:** Multi-week and seasonal operation prototype forecast products
 - **USQ 5:** Insurance decision support prototypes for cotton and sugar; Insurance products for four industries
 - **DAF 6:** Comprehensive regional reports *practical whole of business economic approach to drought resilience*.
 - **DAF 7:** Progress on ground-truthing long lead time forecasts
 - **DAF 8:** Grazing Futures Database and recording system; Typical operation modelling for resilience
 - **DAF 9:** Progress in developing short and medium term experimental forecasts – extreme rainfall and temperature



RESEARCH AND DEVELOPMENT

| | |
|--------------|---|
| DES 1 | The inside edge for graziers to master Qld’s drought prone climate |
| | <p>The focus for this project is on undertaking research and developing tools around carrying capacity in the face of climate impacts on pasture growth. The project is seen to be continuing to make good progress despite some minor delays. It is reported that requests are increasing for access to forage reports with over 8,771 reports requested between April and June 2020 (an increase of 1,410 over the previous quarter). Stakeholders have commented on the high quality and consistency of the information and modelling – and its value. Development and improvements are continuing on a number of products and the Long Term Carrying Capacity report is yet to be released.</p> |
| DES 2 | Using palaeoclimate data to prepare for extreme events and floods in Qld |
| | <p>The project has made up for earlier delays and is seen as on track to deliver. Early work on developing the website and database has been completed with positive results and analysis showing the potential value of the data. There are good connections and collaboration evident with others in this field. There is more work to be done in developing the application of the analysed data and how to effectively communicate and engage with producers.</p> |
| DES 3 | Drought resilience and adaptation: A program of social research and knowledge support |
| | <p>This project was focused on better understanding the behavioural influences that impact on decision-making so that it can inform and guide communication and extension activities to be targeted and effective. The project has completed its final</p> |

report as well as supplementary outputs to capture key findings. Other projects have reported benefits gained through the insights from the research and there is some evidence of ongoing influence of its findings in the way in which drought is perceived, managed and communicated.

USQ 4 Northern Australia Climate Program

This project combines a strong research component around forecasting and implications (e.g. flash drought; floods; multi-year predictability; seasonal forecasts; pasture variability) with a strong engagement program – Climate Mates – that provides regionally-based engagement with producers. A major boost to the project has been the doubling of Climate Mates increasing its capacity to engage across the regions. While COVID-19 has limited face-to-face interaction and had an impact on activities, strong use of other communication media has helped progress the project with stakeholders remaining very positive about the project and achievements – and the potential benefits to producers in decision-making. Challenges remain in raising the priority level for producers to make the effort to engage and learn. Those that have engaged have taken the learning on-board.

USQ 5 Crop insurance

This project has continued to make good headway into its research and developing insurance understanding and products despite some minor setback with COVID-19 restrictions. It has delivered on concepts and prototype decision-support tools for informed decision-making in sugar and cotton. Collaboration continued to be strong with organisations, agencies and other projects (although the focus of the products has been on crops rather than the main DCAP focus on grazing). Despite the good progress, strong engagement and strong interest to date, there is a little way to go in gaining buy-in from individual growers and have a commercial product that both meets the business interests of commercial insurers and the premium acceptance of individual growers.

DAF 6 Delivering integrated production and economic knowledge and skills to improve drought management outcomes for grazing systems

This project is continuing to be seen to be progressing very strongly with very useful products. COVID-19 has changed the scope and nature of engagement with both extension and producers with greater use of online meetings and webinars. Good collaboration with other DCAP projects has continued with WA specifically highlighting the benefits to their industry. Stakeholders were very positive about the added value that project components and outputs have contributed to a practical whole of business economic approach to drought resilience. Despite the gains made with awareness raising, distribution of products and engagement, there remains a challenge in extending the work and helping producers and policy stakeholders to understand the complexities and effectively use the outputs in planning.

DAF 7 Use of BoM multi-week and seasonal forecasts to improve management decisions in Queensland’s vegetable industry

This project continues to be seen as being on-track and engaging well despite recent COVID-19 restrictions to ground-truth forecasts and predicted outcomes. Most collaborating producers attending meetings rated the usefulness of the outputs highly with many already reporting a greater understanding and use of forecasts. The value of directly working with the BOM has had obvious benefits in improving available

products. Improving long term accuracy will further add to the value already being reported by producers. Broadening the awareness and engagement of the broader industry is a challenge going forward.

DAF 8 **GrazingFutures: Promoting a resilient grazing industry**

This project is viewed as being on track despite significant interruptions of drought, floods and COVID-19. The project has continued to be very collaborative and linking in with other DCAP projects and other stakeholders running events and activities. Engaging producers experiencing ongoing drought and providing resources and tools to meet the different grazier contexts remains a challenge although a large percentage of those who have engaged report having made a change to their management as a result.

DAF 9 **Forewarned is forearmed: Proactively managing the impacts of extreme climate events**

The project is on track with stakeholders despite issues around COVID-19. The experimental nature of the work is hampering engagement to some degree and the ability to promote the outputs – with useable products not available until the end of the project. The project is increasingly collaborating with other DCAP projects and has a positive mutually-beneficial relationship with the BoM. Industry stakeholders who have been exposed to the experimental forecasts are very positive about what they have seen and how it can benefit the industry (there are also potential benefits outside of agriculture).

Innovation Projects

| | |
|-------------------------------|---|
| DES IP1 | PROGRESSING |
| Improving AussieGRASS | <ul style="list-style-type: none"> • Model Speedup Subproject • Model Calibration Subproject |
| ANU IP2 | ON TRACK |
| Consensus Forecasting | <ul style="list-style-type: none"> • Engagement with stakeholder group limited due to COVID-19 restrictions. • Forecast and case selection achieved. • Data extraction and manipulation achieved |
| DES IP3 | DELAYED |
| Affordable rain gauge | <ul style="list-style-type: none"> • Engagement with collaborator network limited due to COVID-19 • Test operability achieved – test device functioning well. • Delay in further development |
| DAF IP4 | POSTPONED |
| Ideas bank competition | <ul style="list-style-type: none"> • Postponed until 2021 due to COVID-19 impacting agribusiness |
| DES IP5 | PARTIALLY ON TRACK |
| Animation Storytelling | <ul style="list-style-type: none"> • Story Creation phase complete – partially – Concept and story development phase completed for STATISTICAL animation but still working on ideas for CULTURAL animation. |

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1. INTRODUCTION

1.1 Purpose of this Report

Phase Two of the Drought and Climate Adaptation Program (DCAP) is now in its end stages with completion due in 2022. This is the third annual monitoring and evaluation report for DCAP and provides a summary of project and program level activities over the last year, outputs and outcomes to date as well as identifying any emerging issues that may need addressing.

1.2 Background

DCAP is the Queensland Government's \$17.5 million initiative to improve drought preparedness and resilience for Queensland producers. It aims to do this *by delivering a range of research, development and extension projects, improve seasonal forecasting and provide tools and systems that will support producers in their decision-making*¹.

Phase Two runs to June 2022 and consists of nine projects *managed and funded through a series of partnerships with government and industry partners*¹. Phase One (July 2016 - June 2017) included 18 projects managed between the University of Southern Queensland (USQ) and the Department of Environment and Science (DES).

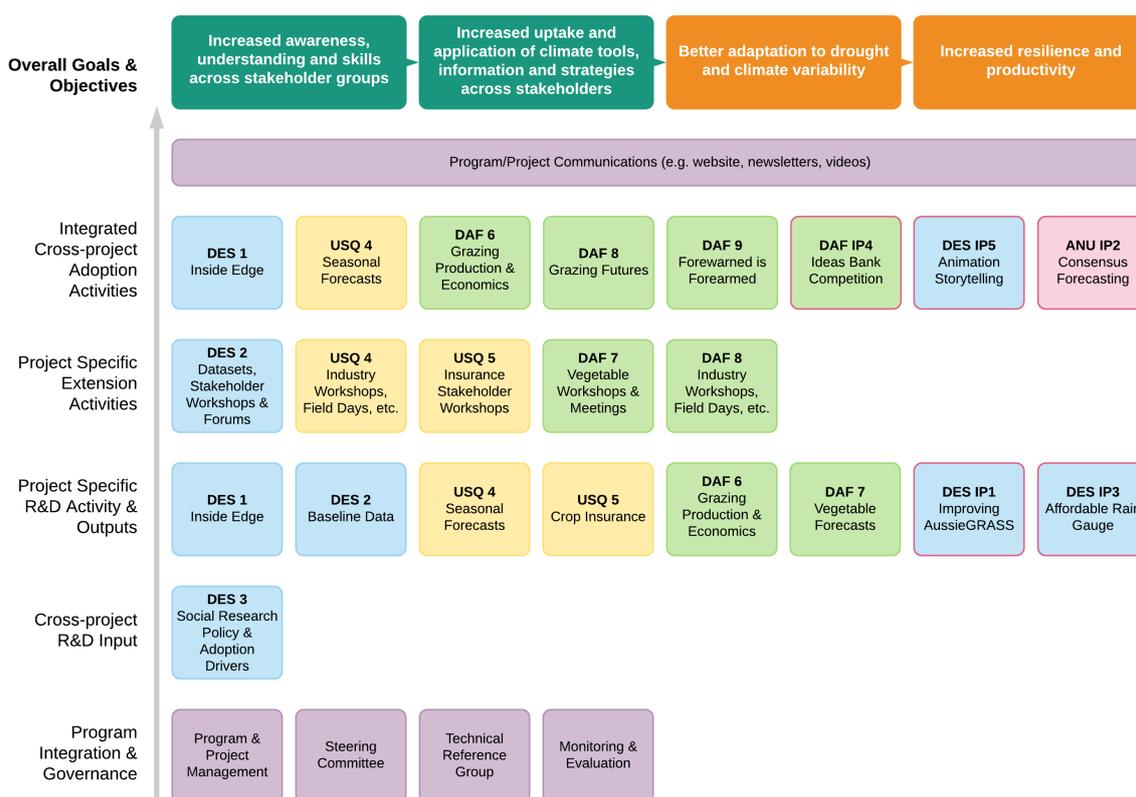
Other partnerships within DCAP Phase Two, including Meat and Livestock Australia (MLA) and the Bureau of Meteorology (BoM), will lead research into drought resilience, weather and seasonal forecasts, and mentoring programs. The GrazingFutures project is another major element of DCAP which aims to help Western Queensland graziers build resilience in their businesses and recover from drought as quickly as possible.

1.2.1 DCAP Round Two Projects

DCAP is comprised of a number of separate, but related projects each contributing to the overall goal of improving outcomes for producers in the face of climate related challenges. The following impact pathway diagram was developed in July 2019 to capture some of these relationships between projects and their roles in contributing to the program objectives. For this report it has been updated with the innovation fund projects to capture their contribution.

¹ <https://www.daf.qld.gov.au/environment/drought/dcap/about-dcap>

Figure 1: DCAP impact flow diagram (updated July 2020)



The *Monitoring and Evaluation Log Frame* developed at the outset of DCAP Phase 2 describes the program’s activities, process, outputs and outcomes and the associated performance measures (see Appendix 1).

1.2.2 Core Projects

Descriptions of each of the core DCAP projects are summarised below.

| | |
|--------------|--|
| DES 1 | The inside edge for graziers to master Qld’s drought prone climate |
| | <ul style="list-style-type: none"> Innovative research will be converted into information systems and processes to support Queensland graziers to manage drought and climate challenges more effectively. DES’s research will give Queensland graziers the “inside edge” to master our drought-prone climate, enabling proactive climate responsive business decisions. This project will yield climate-savvy graziers that will continuously adapt to Queensland’s variable and changing climate. |
| DES 2 | Using palaeoclimate data to prepare for extreme events and floods in Qld |
| | <ul style="list-style-type: none"> The project will use paleoclimate data to produce a 1000-year rainfall record for Queensland which better describes the risk of extreme droughts and floods. The Queensland agriculture sector will be supported in better understanding and preparing for extreme climate events with the extended short instrumental climate record going back over 1000 years. |

| | |
|--------------|--|
| DES 3 | Drought resilience and adaptation: A program of social research and knowledge support |
| | <ul style="list-style-type: none"> • Better understanding of the barriers to managing climate risk and preparing for drought will be used to improve information products and tools to support better decision making in the grazing industry. • This applied research project will engage directly with Queensland graziers, extension officers and scientists to identify barriers to drought preparedness, and strategies to assist the grazing industry to improve business resilience and adaptation to drought. |
| USQ 4 | Northern Australia Climate Program |
| | <ul style="list-style-type: none"> • Rainfall forecasts will be improved across northern Australia to help graziers make more informed management decisions. New forecasts will be introduced into grazer networks to allow ease of use and application of the information into management of grazing businesses. • Queensland graziers will be directly supported through improved seasonal climate forecasts, development of information products for grazer decision making and integration of this information into existing and new extension activities. |
| USQ 5 | Crop insurance |
| | <ul style="list-style-type: none"> • Improving climate risk insurance products for agriculture will support Queensland primary producers to independently manage climate risk more effectively. • Recommendations will be developed for agricultural industries and the insurance industry on how more affordable insurance products and viable markets for agricultural insurance products can be established and maintained for Queensland rural industries. |
| DAF 6 | Delivering integrated production and economic knowledge and skills to improve drought management outcomes for grazing systems |
| | <ul style="list-style-type: none"> • The economic impacts of grazing management decisions will be analysed to improve the capacity of businesses to manage the productivity and profitability challenges of droughts in Queensland. • The skills and knowledge of managers of Queensland grazing businesses will then be developed and supported to assess the economic implications of on-farm drought management decisions. |
| DAF 7 | Use of BoM multi-week and seasonal forecasts to improve management decisions in Queensland's vegetable industry |
| | <ul style="list-style-type: none"> • Improved temperature forecasts will be developed and customised to enhance farm management decision making in the Queensland vegetable industry and improve the capacity of the horticulture industry to manage climate variability and adapt to a changing climate. |
| DAF 8 | GrazingFutures: Promoting a resilient grazing industry |
| | <ul style="list-style-type: none"> • Supporting western Queensland grazing businesses to prosper and grow based on best management practice, science and industry experience. • Grazing businesses across western Queensland will identify and implement changes on-farm which improve business resilience to drought and climate extremes and deliver enhanced community and economic development outcomes. |
| DAF 9 | Forewarned is forearmed: Proactively managing the impacts of extreme climate events |

- Improving and customising forecasts of extreme rainfall and temperature events will be developed to help primary producers to make more informed short and medium-term management decisions to improve farm profitability in Queensland's grazing and sugar industries.

1.2.3 Innovation Fund Projects

The five Innovation Fund projects supported by the Steering Committee in the second half of 2019 are outlined below.

| | |
|----------------|---|
| DES IP1 | Improving AussieGRASS – the fine details (Dr Dorine Bruget) |
| | <ul style="list-style-type: none"> • October 2019 to December 2020 Improve the realism of the simulation. • Reduce artificial and arbitrary averaging and smoothing across disparate and non-linear biophysical inputs. • More able to fuse with modern remote sensing data. • Provide a sophisticated calibration/validation environment for model parameters using state-of-the-art optimisation technologies. |
| ANU IP2 | A consensus approach to Seasonal Climate Forecasting (SCF) in Queensland (Dr. Steven Crimp) |
| | <ul style="list-style-type: none"> • 1 October 2019 to 1 March 2021 • The consensus forecast would be determined by seasonally varying weightings determined by statistical aggregation and historical model performance. |
| DES IP3 | The affordable satellite rain gauge demonstrator (David Ahrens) |
| | <ul style="list-style-type: none"> • September 2019 to December 2020 • Demonstrate for 12 months the reliability of 15 custom-built tipping rain gauges, communicating any recorded data daily via Iridium satellite across Queensland in extremes of heat, cold, moisture and dust. • Ingest measured rainfall data into SILO • Provide specific data and rainfall mapping feedback via email to collaborating graziers • Change the cost performance proposition by deploying systems for under \$1000 per unit • Provide the basis for a future business case on a larger deployment – 100-500 units, using perhaps commercial manufacturing efficiency. |
| DAF IP4 | Ideas bank competition (Sam McGee) |
| | <ul style="list-style-type: none"> • 1 September 2019 to 30 July 20 • An online competition to increase engagement opportunities with producers and raise DCAP's profile. Entry ideas will be used to build a content bank for future case studies and shared information. |

DES IP5

Using an animation and story-telling approach to statistical and cultural concepts for drought management and climate adaptation in the Queensland grazing industry (Dr Jeanette Durante)

- February 2020 to November 2020
- Using a story-telling approach, the animation explains how to calculate and interpret rainfall percentiles, using a Queensland grazing context.

1.3 About the Evaluation Process

The ongoing evaluation process over the life of DCAP's second phase includes the following:

1. Managing the monitoring and evaluation process in conjunction with the DCAP Program Manager.
2. Providing ongoing YourDATA management.
3. Developing feedback sheets and survey instruments/questionnaires and supporting training of project leaders at the sub project level.
4. Undertaking annual interviews with project staff and project leaders.
 - In 2020, the number of project team responses were: DES 1 [2], DES 2 [3], DES 3 [2], USQ 4 [1], USQ 5 [3], USQ 6 [2], DAF 7 [1], DAF 8 [2], DAF 9 [6]
 - Note that 68 individuals were interviewed overall with 12 contributing responses for more than one project.
5. Undertaking annual surveys of informed persons including producers and industry personnel engaged with DCAP projects.
 - In 2020 the number of stakeholders/participants/partners responses across projects were: DES 1 [5], DES 2 [3], DES 3 [4], USQ 4 [9], USQ 5 [5], USQ 6 [7], DAF 7 [9], DAF 8 [8], DAF 9 [4]
6. Facilitating independent expert panel/critical friends bi-annual review of program impact.
7. Assisting the Program Manager in annual reporting requirements, including regular progress reports on M&E; activities and summaries of data available on YourDATA; and an annual report against the DCAP logframe and objectives.

A full summary of the M&E activities contributing to this report is included in the appendices.

1.3.1 Benefit Cost

Mid 2019, the Steering Committee undertook a procurement process for a Benefit Cost Analysis (BCA) at the mid-term point of DCAP Phase 2. Agtrans was appointed as a result and have been working on completing an initial analysis. This included a workshop (4 March 2020) with all project leaders presenting updates on their projects and expected impacts. Coutts J&R also attended this workshop to provide M&E perspectives to Agtrans staff. The results of this mid-term BCA are expected to inform and refine DCAP's investment decisions moving forward. The draft report is due July 2020.

The BCA process was outlined by Agtrans in their presentation to project leaders in the March 2020 workshop:

- The BCA for the DCAP investment will be conducted following the 2018 Council of Rural RDC's Impact Assessment Guidelines
- The approach will be to identify and describe each project's objectives, activities and outputs, and outcomes
- Economic, environmental and social impacts associated with the outcomes then will be identified and described
- Pathways to impact will be mapped including risk factors along the pathways

Its deliverables are:

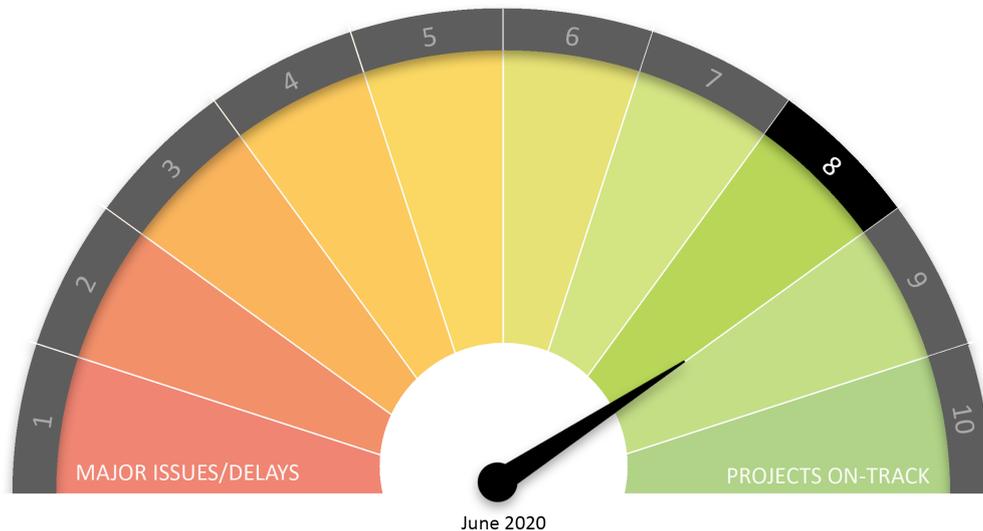
- The BCA process will be documented and an evaluation report will be produced for each DCAP project.
- Then the findings from each project evaluation will be aggregated and summarised and a whole of Program summary report will be produced.
- The report(s) will include both qualitative and quantitative analyses of the investment
- Investment criteria (including net present value, benefit cost ratio, internal rate of return, and modified internal rate of return) will be reported for the total investment and the investment by DAF only.²

At the time of this report, the draft BCA report was not available for reference.

² AgTrans PowerPoint presentation, March 2020, DCAP BCA workshop

2. FINDINGS

2.1 Overall Program



2.1.1 Summary Statement

Stakeholders at all levels of the program considered that DCAP has been progressing very well against its objectives (avg. rating 8.2/10). The program has strong/positive support across the stakeholder groups. While the impacts of COVID-19 on overall progress is not yet clearly evident, its main effect was predicted to be delays to some project activities and potentially some milestone deliveries. At this stage, there is confidence that despite COVID-19, DCAP's projects and the program overall are on track and have consistently been so over its life.

Many of the projects are still in the development and testing phase of outputs with positive feedback from stakeholders involved in the testing and process. Projects undertaking extension programs are reporting that engaged producers are rating information and outputs as very useful with an increasing number using new tools and frameworks to assist in decision-making.

There is an overall high level of satisfaction from stakeholders with the degree of interactions, program support and information received about the program (avg. rating 8.7/10). The program management is thought to be working particularly well by a number of stakeholders. The Steering Committee and governance of the program is thought to be *very sound* and the Independent Technical Reference Panel being seen to provide useful guidance about particular issues

There has been increasing collaboration across the DCAP projects as they have progressed over time (see diagram at the end of this Summary section). This is a great indicator of good project management and providing space for collaboration. It has clearly benefited a number of project outputs (for example, the animation) and sends a very positive message about project efficiency and cohesion.

2.1.2 Overall Progress

Continuing the trend of positive ratings in previous years, stakeholders at all levels of the program (project/program level and Steering Committee members) generally felt that DCAP has been progressing very well against its objectives (avg. rating 8.2/10). It is apparent that the program has strong/positive support across the stakeholder groups and there is satisfaction that despite COVID-19, its projects and the program overall are on track and have consistently been so over the last few years. The usefulness of cross collaboration between projects was also pointed out and it was noted that the team as a whole works well together. A couple of stakeholders commented about the Benefit Cost Analysis currently underway and were keen to see the results at a project level.

The value and importance of DCAP's work was highlighted by a number of stakeholders pointing out its legacy for industry and Queensland farmers as well as for the next generation (e.g. *the tools are being used in universities for the next generation of skills*). It was also noted as being innovative in a number of ways with the innovation fund supporting an animation project provided as an example. The program's long term funding was mentioned as helping to attract research applied across a *good cross section* of disciplines and was thought to have worked well.

One stakeholder commented that while a large number of projects were starting to see impacts some projects were harder to assess. Another noted that DCAP was a very positive program and while progress was good, *it wasn't as widespread as we would have liked*. Whether this was related to budget or other constraints was thought to be unclear. The potential for future government budget cuts and what that means for DCAP ongoing was also raised as a potential issue.



"That they have an innovation grant and are interested in something so left of centre as animation to communicate cultural and statistical concepts in the grazing industry is really innovative." (Project team member)

Impact of COVID-19

While the impacts of COVID-19 on overall progress is not yet clearly evident, its main effect was predicted to be delays to some project activities and potentially some milestone deliveries. Stakeholders interviewed did not appear to hold concerns that any project would be completely derailed. Concern was expressed about farmer engagement in the future by one stakeholder and another pointed out the disruptions around working from home including schooling and access issues around data on work servers.

Prompted by the program manager, project leaders had the opportunity to provide updates to the Steering Committee and Technical Reference Panel on the impacts of COVID-19 which are included in the individual project summaries. The observation from one interviewee was that the Steering Committee were satisfied with the responses so far and another noted that a risk assessment had been carried out. There were some positive responses to the increased online delivery of some activities (e.g. webinars) with a comment being made that it *allows more people to attend than normally would have given travel/time constraints etc.*



"Those milestones which are delayed (not at risk of being unmet), plans are afoot to make sure [they are] met in due course." (Project team member)

2.1.3 Management and Governance

Internal Communication and Engagement

There is an overall high level of satisfaction from stakeholders with the degree of interactions, program support and information received about the program (avg. rating 8.7/10). *There is no shortage of information and on a regular basis.* The program management is thought to be working particularly well by a number of stakeholders with the program manager noted to be providing *excellent support and doing a great job at letting people know what's going on.* It was noted that a good job had been done keeping the Steering Committee up to date. *The papers are very thorough with a good depth of analysis there.* It was also pointed out that the management had been adaptive where needed and *evolved over time to try to address issues.*

Other aspects mentioned to be working well at a program level included:

- Regular meetings (e.g. *work done in connecting the project leaders together twice a year. It is really good. It has a good balance there - meet frequently enough - but not too much*)
- Objectives/structure (e.g. *It has very clear objectives; way it is structured is class leading and also the layout and of accountability*)
- Reports generally submitted on time / the reporting process
- The long term funding
- Innovation projects adding value
- Projects established technical feedback
- *Informing the project about topics in the e-newsletter*
- Attraction of good research

Suggestions and opportunities identified included:

- Need for more resourcing around collaboration (e.g. *issues around collaboration - good if there was more resourcing*)
- Increased trainer capacity (e.g. *little bit more capacity on the trainer side*)
- More time needed to digest information (e.g. *Give me more time to read everything that I get*)
- Room for improvement (e.g. *the very basics are done but they could be done better*)
- More focus on agriculture
- Project share point for common understanding of DCAP objectives and to raise visibility of relevant events to increase collaborative opportunities (e.g. *if there were some events coming up that were relevant (workshop or field day) and the rest of us knew about it, we might be able to 'piggyback' off it.*)
- More time for project presentations at project leader workshops or more resources shared over the year (e.g. *20 minute presentations ... only really gives enough time to communicate at a really shallow level without speaking about what your project has done over the year.*)



“There has been good program management from year zero...”
(Steering Committee member)

Project Leaders' Workshop and Webinar

The February 2020 M&E snapshot report included feedback from the project leaders' August 2019 webinar and December 2019 workshop. Overall, these opportunities to get together and understand each other's projects were found to be very useful. Hearing from the Steering Committee at the December workshop was noted to be particularly useful with the question and answer session valued in particular. Hearing from each other also provides potential for further collaboration as project leaders noted the potential for more cross promotion and working together.

DCAP Innovation Funding

As noted in the February 2020 M&E snapshot report, five innovation projects were supported by the Steering Committee. These projects were noted by one of the stakeholders to have worked well for DCAP. They were described as *short sharp projects that will last a year and add extra value to the overall project – extra dimension to the short term activities.*

A new data collection section in YourDATA has been set up to collate milestone updates from these projects. COVID-19 was noted to have affected the projects in the following ways:

- **DES IP 1: Improving AussieGRASS** – Decline in work productivity with all DES staff working from home, due to connectivity issues. Potential impacts on second quarter milestones with possible delay in recruitment of HPC specialist.
- **ANU IP2: Consensus Forecasting** – Minor delays have been experienced. Selection of case study regions and models to use may take longer to reach consensus as stakeholder workshop unable to happen.
- **DES IP3: Affordable Rain Gauge** – No impacts noted
- **DAF IP4: Ideas Bank Competition** – Competition has been delayed to 2021 with remaining milestones needing to be carried over to the 20/21 financial year.
- **DES IP5: Animation Storytelling** – Meetings conducted online rather than face-to-face. No expected impacts on project delivery.

Steering Committee

The Steering Committee and governance of the program is thought to be *very sound*. It was noted that *the Steering Committee provides oversight and the Independent Technical Reference Panel provides guidance about particular issues*. That the Steering Committee is not afraid to ask questions and follow-up unsatisfactory answers was noted by one stakeholder as a positive while another said that they were *sincere people who want to make sure the outcomes are being adopted by farmers*.

Over the life of the project, Steering Committee meetings have consistently been rated as very useful in terms of updating participants on DCAP progress and issues (avg ratings across six meetings range from 8.4 to 9.4/10). There has also been a generally high level of satisfaction with DCAP's overall progress to date (avg ratings across six meetings range from 7.4 to 8.6/10) and the members' opportunity to provide input to the program (avg ratings across six meetings range from 8.3 to 9/10). A summary across all the feedback sheets for Steering Committee meetings can be found in the Appendix.

The meeting scheduled for April 2020 was cancelled due to COVID-19.

Technical Reference Panel

The Technical Reference Panel was expanded this year to include Andrew Ash. The members are:

- **Graeme Anderson**, Climate Specialist, Biosecurity and Agriculture Services Branch; Department of Jobs, Precincts and Regions, Victoria
- **Mark Howden**, ANU
- **Scott Power**, BOM
- **Andrew Ash**, AJ Ash and Associates, Queensland (new this year)

The group has met twice over the last period and provided feedback and input into the program. A brief summary of feedback is included below.

October 2019

- There was general agreement that the program was looking good and making good progress after some early delays. Interaction between projects was noted as positive.
- Provide guidance to project teams on more context to be included in impact narratives/case studies to show that other factors are taken into account beyond probabilistic forecasting.
- Further consideration of how to better incorporate pathways of destocking and restocking especially around the issues of genetics.
- Clarification of reliability and expected use of Paleo data.
- Consideration of broadening the final benchmark survey outside of Northern Australia.
- Consider implementing feedback on the accuracy of previous seasonal forecasting.
- Consider updating the BCA at the end of the project – and beyond

April 2020 (start of COVID-19)

- No big issues of concern or need - some challenges over engagement in next months
- Lot of assumed knowledge in use of Forage product NT feed outlook document might be a good simple traffic light approach to pasture growth
- Delivery of information September BoM outlook - when it moved to multi-week outlooks and seamless forecasts – access has tripled over the last few months. Notion of providing weather and climate information on seamless timescales has great potential benefits.
- Well researched case studies - in absence of demonstrated impact on the ground - will be important.
- Consider different ways of tackling climate information.

DCAP 3 advice

- Hold a workshop to develop collaborations further to discuss the future opportunities
- Take a user and political perspective – use of champions in different communities in Qld.
- Uptake and use - there is reasonable awareness of climate information and high awareness of some BoM SCO info but not great progress in overcoming the barriers to the use of the information.
- We need to clarify what practices we hoping to see, who are key partners for next five years who are working with land managers who are non-agency
- Look for other collaborators/service providers on the ground who are working with producers might be useful

Monitoring and Evaluation

The M&E process and reporting was noted by a few stakeholders as working well. It was commented that it has been *vigorous*, *very clear* about progress and reporting and *has been a consistent effort*. The reports and data management were also thought to have been good.

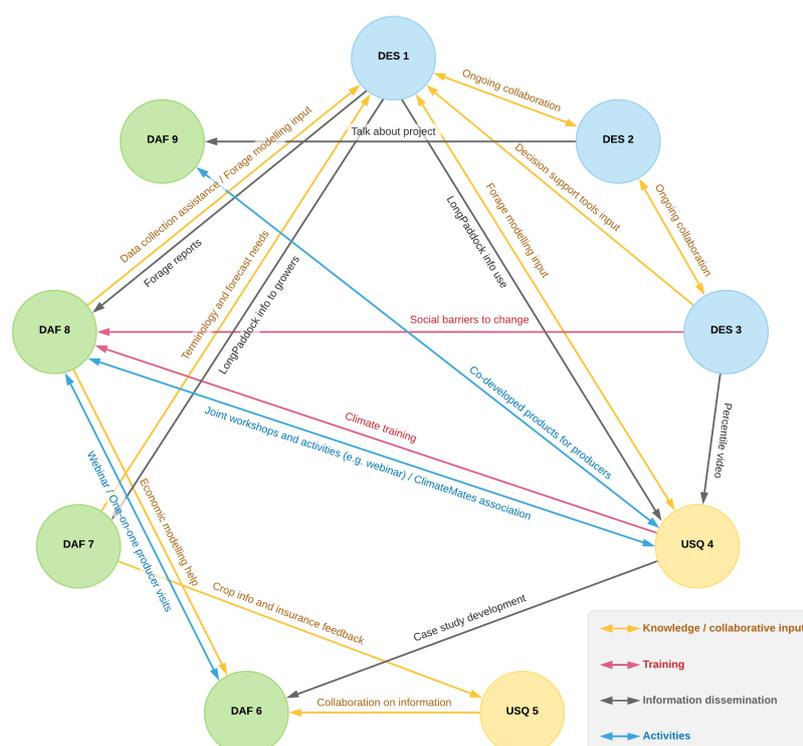
One stakeholder commented that they would prefer to be able to see reporting from other projects in YourDATA to enable increased collaboration. They noted: *for a project like mine where I have the potential to be working with a number of different projects, it's hard for me to know what's going on in those projects*. This has since been addressed.

2.1.4 Collaboration and Integration

The collaboration and interaction between projects was noted by some stakeholders as working particularly well and a *stand-out*. The point was made that now that projects are further along, there is more collaboration between projects as *there's more understanding of everyone else's projects and how they can link together, for example workshops for producers etc*. The relationship between DAF and USQ was particularly mentioned as was the social research and its use for all DCAP partners. *It gives the people insight on how the target audience is thinking and how to get their message across*.

The following diagram shows how DCAP projects are collaborating together on generating new knowledge, product development, joint activities and disseminating information further. There is no doubt that more informal and undocumented interactions between projects will have taken place and are being developed as projects mature. The point of this diagram is to build a picture of the lines and types of collaboration within the DCAP ecosystem. Note that this does not include external collaborations (e.g. Bureau of Meteorology, UK Met Office, SEQ Water). A number of projects are more focused this way including DES 2 and USQ 5.

Figure 2: DCAP project cross-collaboration (see summary for full-size figure)



2.1.5 Outputs and Communication

Program Level Communication

Industry awareness appears to be increasing

Stakeholders were asked about how well they thought (other) key government and industry stakeholders in drought and management of climate variability are aware and being informed about the program and its potential contribution. There was a relatively positive response from a number of stakeholders about the general level of awareness as being quite good (*I do feel that people know about the DCAP program, even in Victoria when I mention it.*). There was some who referred to strong industry connections being made including with partner organisations. One stakeholder noted that *all the major industry organisations in the state are aware of what we are doing*. Specific activities or initiatives promoting awareness were pointed out including DCAP information in NRM/community group e-newsletters and websites, wider community workshops, program social media support/ e-newsletter, webinars and talking with other government departments.

Feedback from the February 2020 Steering Committee meeting highlighted the need for communications to be focused on project results and outputs *including outcomes in farm changes and supply chain improvements*.

Each quarter, the DCAP communication officer produces an overview of the communication activities and any available reach and reaction data. The following table summarises DCAP's program level communication activities over 2019/2020. April-June 2020 saw a decrease in DCAP communication activities due to the industry support required by the DAF communication team for the COVID-19 response.

Table 1: 2019/20 Communication Activities

| Activity/Tool | Details | Reactions/Reach/Impacts | Comments |
|------------------------|--|---|--|
| DCAP newsletter | <ul style="list-style-type: none"> Sent every 2 months to Queensland Agriculture e-newsletter subscribers | <ul style="list-style-type: none"> August 2019 – distributed to 4,729; open rate of 49.46%; click through rate of 13.21% October 2019 – distributed to 6,865; open rate of 48.42%; click through rate of 12.70% DCAP promoted in Mango newsletter (Jul-Oct 2019) December 2019 – distributed to 7,510; open rate of 44.61%; click through rate of 12.30% January 2020 – distributed to 8,469; open rate of 45.01%; click through rate of 11.18% Between July 2019 and March 2020 - 30 DCAP articles promoted by FutureBeef (e-bulletins, website and social media) March 2020 – distributed to 9,523 | <ul style="list-style-type: none"> Open rates for the e-newsletters are well above industry averages of 5% Subscribers increased in March 2020 due to paid social media campaign for subscribers to Qld Ag news list and DCAP e-news. There are 546 new DCAP e-news subscribers as a result. Noted to be a more expensive campaign than expected – other avenues are being explored. This campaign was put on hold due to COVID-19. Project leaders are providing content for the e-newsletter when they can. |

| Activity/Tool | Details | Reactions/Reach/Impacts | Comments |
|--------------------------------------|--|---|---|
| DCAP website | <ul style="list-style-type: none"> Updated regularly Content sits also on NACP and FutureBeef linking back to DCAP primary site. | <ul style="list-style-type: none"> August 2019 to February 2020 – 6,391 views on LongPaddock DCAP page | <ul style="list-style-type: none"> It would be useful to understand the origin of visitors landing on the DCAP page (e.g. google search, e-newsletter link, other industry web page or newsletter etc). Also indications of time spent and downloads made of reports/tools etc could be useful to determine quality of visits. |
| Social media | <ul style="list-style-type: none"> Queensland Ag Facebook page FutureBeef Facebook Leading Sheep Facebook March 2020 - Social content is also being developed including DCAP staff profiles and weather forecast tips for producers. | <ul style="list-style-type: none"> August to October 2019 - 21 GrazingFutures, Inside Edge and Economics project posts on FutureBeef, 1 Leading Sheep October 2019 to 4 Feb 2020 – 4 posts Qld Ag page (reached 47, 413 people, had 2,616 engagements, and 1,071 clicks); FutureBeef 13 DCAP posts (151 reactions); Leading Sheep (3 posts with reach of 3,767 and 263 engagements) Feb-March 2020 – boosts to 2 Qld Ag social media posts reached 59,007 with 155 clicks; FutureBeef 3 DCAP posts (45 reactions, 10 shares) | <ul style="list-style-type: none"> Qld Ag, FutureBeef and Leading Sheep working together to share most relevant content and evaluation figures. Good collaboration appears to be happening between the three social media accounts extending reach to social media account holders. It would be good to see the sharing of posts for an indication of extended reach. |
| Media | <ul style="list-style-type: none"> Media coverage mentions tracked by Meltwater Media release planned announcing the new NACP Climate Mates when appointed. | <ul style="list-style-type: none"> July to September 2019 - 34 mentions of DCAP, mostly in relation to Drought Program Review recommending DCAP continues and DCAP helping a grazier; a cumulative reach 660,384 as calculated by Meltwater. October 2019 to 4 February 2020 - 54 mentions of the Drought and Climate Adaptation Program Canegrowers magazine – crop insurance article (circulation of 3,500) 1 Feb to 18 March 2020 – 9 DCAP mentions; a cumulative reach of 40,284 | <ul style="list-style-type: none"> It would be useful to know which articles were specifically program generated and linked to media releases. Note that reach of media coverage does not take cross-readership into account and people reading more than one source of news are counted multiple times. |
| Podcast | <ul style="list-style-type: none"> Produced for the 'surf n turn' podcast series – interviews with a vegetable grower, Neil Cliffe and Chelsea Jarvis from NACP | <ul style="list-style-type: none"> October 2019 to March 2020 – 309 listens (approx. 100 through apple podcasts) Paid Facebook advertising resulted in 41 listens on 16 January 2020 and a 100 listen boost in Feb-Mar 2020. AUSVEG and Growcom have promoted it in newsletters | |
| \$46,000 producer competition | <ul style="list-style-type: none"> Innovation fund project encouraging producers to share how they are managing and adapting to drought | <ul style="list-style-type: none"> Postponed to 2021 due to COVID-19 | |

Project Level Outputs

Stakeholders pointed out that the tools/activities being developed tended to be stakeholder driven and end user focused. One project team member said that all of their programs had *established technical feedback*. The opportunity afforded by DCAP to *engage with farmers* and directly address their problems was welcomed as was the relationships built with other organisations (e.g. BOM) and across the supply chain.



“It had all been initiated by the industry, we ask the industry what sort of tools that they want and we have actually gone out and built those tools.”
(Project Team member)

Examples of beneficial project outputs were noted by stakeholders interviewed to include:

- The tools that are being developed (e.g. increased downloads of Forage report).
- Paleo climate - *the record from a 100 to 1,000 years which is a better indication of what we might expect.*
- GrazingFutures Social extension officers making inroads in terms of producers and extension understanding. *They present and talk in a much better way that producers can understand.*
- Journal publications - *The success of the research has been outstanding*
- Case studies and narratives - *More of the extension projects are now producing case studies which [are] very good to demonstrate impact.*
- Use of social science to help engage and spread the message

R&D outputs

The following table summarises the types of research outputs emerging from DCAP projects.

Table 2: R&D outputs 2019/20

| Research Output | Number reported 2019/20* | Number Reported 2018/2019 |
|----------------------------------|--------------------------|---------------------------|
| Benchmarking | 10 | 10 |
| Bioeconomic and system modelling | 6 | 18 |
| Business analysis | 2 | 17 |
| Knowledge support | 70 | 95 |
| Options analysis | 4 | 7 |
| Research Interviews | 2 | 90 |
| Spatial analyses** | 7 | 5,372 |

*Figures based on data entered into the DCAP M&E database – accurate as of 9.7.20;

**For the Jan-Mar 19 reporting quarter DES 1 reported Forage Report requests in the spatial analyses outputs section. In all following reporting periods these were recorded as a single other engagement activity.

Information materials

Information materials developed from the research outputs were also reported. These are listed below:

Table 3: Information materials 2019/20

| Information Material | Number reported 2019/20* | Number Reported 2018/19 |
|-----------------------|--------------------------|-------------------------|
| Conference papers | 18 | 18 |
| Conference posters | 15 | 17 |
| eBulletin articles | 24 | 27 |
| Journal articles | 14 | 15 |
| Newsletter articles | 29 | 20 |
| Web pages | 30 | 20 |
| Technical fact sheets | 9 | 10 |
| Videos/podcasts | 14 | 16 |
| PR Media – interviews | 13 | 24 |
| Media releases | 2 | 7 |
| Social media posts | 120 | 76 |

*Figures based on data entered into the DCAP M&E database – accurate as of 9.7.20

2.1.6 Stakeholder Engagement Activities

Stakeholders shared engagement activities that in their opinion have been working particularly well including:

- Face-to face meetings were noted to have been *very well received*
- Enthusiasm of the trainers - *we can see the value behind the science and doing things in a particular way.*

In the 12 months to June 2020, projects across the DCAP program reported the following numbers and types of communication and engagement activities:

Table 4: Engagement activities 2019/20

| Engagement Activities | Number Reported 2019/20* | Number Reported 2018/19 |
|-------------------------|--------------------------|-------------------------|
| Workshops | 68 | 105 |
| Field Days | 34 | 27 |
| Forums/Seminars | 61 | 66 |
| One-one property visits | 141 | 175 |
| Webinars | 27 | 22 |
| Other* | 96 | 67 |

*Figures based on data entered into the DCAP M&E database – accurate as of 9.7.20; **e.g. online engagement, collaborations, stakeholder meetings, presentations at events, other group activities (note: DES 1 forage report requests were recorded as single other engagements in each reporting period – at least 22,294 forage report requests were received in 2019/20)

Through this engagement, projects reported the following engagement and impacts on those engaged. **Note:** these figures will include some degree of overlap - i.e. the same producer/ stakeholder may have been counted more than once – capturing cumulative numbers at separate activities over the year and across different projects. Also, not all activities were able to capture details on herd or flock sizes and area – so these maybe be understated.

Table 5: Activity participants 2019/20

| Engagement Metric | Number Reported 2019/20* | Number Reported 2018/19 |
|----------------------|--------------------------|-------------------------|
| Producers/growers | 4,207 | 3,766 |
| Businesses | 1,324 | 1,386 |
| Number head cattle | 1,464,437 | 841,765 |
| Number head of sheep | 202,840 | 96,655 |
| Hectares | 40,749,734 | 48,295,312 |
| Non-producers | 2,949 | 1,405 |

*Figures based on data entered into the DCAP M&E database – accurate as of 9.7.20

Table 6: Summary of activity participant feedback (from feedback sheet data in the DCAP M&E database)

| Project | Activity | Feedback Example |
|---------|---|--|
| USQ 4 | Climate Variability and Grazing Risk Management Workshops (2019-20) | <ul style="list-style-type: none"> • 103 responses (6 Gin Gin, 14 Broome, 6 Katherine, 4 Winton, 12 Julia Creek, 14 Hughenden, 12 Charters Towers, 11 Alpha, 4 Emerald, 13 Cooktown, 4 Coen, 3 Ravenshoe) • 8.1 avg. rating (1-10 scale) – Usefulness of the workshops in terms of better considering climate risk issues to your industry/business • 7.7 avg. rating (1-10 scale) – Likelihood to use (or use to a greater extent) seasonal climate forecasting information in your future decision making • 7.9 avg. rating (1-10 scale) – Overall value of workshop in improving knowledge in incorporating climate information into business decisions • 8.6 avg. rating (1-10 scale) – Likelihood to access/use one or more of the tools presented • Example respondent comments: <ul style="list-style-type: none"> ○ “Great cover of all the basics! Great environment and speakers” ○ “More positive outlook on understanding tools that can be used with assistance to understand climate risk” ○ “It helps me a lot to make climate related decisions at the field level” ○ “Excellent overview of an interesting topic that we talk about, and stress over every day. Great explanation that gives knowledge that reduces the potential unknown.” ○ “By simplifying what seems to look as overly complex diagrams/maps” ○ “Good explanations of climate forecasting tools Graphs/Pictures” |
| | Climate Tools & Products Workshop Gin Gin (August 2019) | <ul style="list-style-type: none"> • 7 responses • 8.9 avg. rating (1-10 scale) – Usefulness of the workshop in terms of increasing knowledge of where to find climate information and tools online • 9.0 avg. rating (1-10 scale) – Likelihood to use (or use to a greater extent) seasonal climate forecasting information in your future decision making |

| | | |
|-------|--|--|
| | | <ul style="list-style-type: none"> 9.6 avg. rating (1-10 scale) – Likelihood to access/use one or more of the tools presented |
| DAF 7 | Granite Belt Grower meeting (May 2020) [new] | <ul style="list-style-type: none"> 3 responses Information seen as moderate to highly valuable (2 moderate 1 high) DCAP experimental forecast somewhat likely to influence planning for the summer 2020-21 season (1 yes, 2 somewhat) All respondents have some confidence in and use this DCAP Experimental Forecast as an additional info source. |
| | Lockyer Valley Experimental Forecast Forum (March 2020) [new] | <ul style="list-style-type: none"> 7 responses 4.9 avg. rating (1-6 scale) – value of the information presented at meeting 100% slightly to moderately improved (4 slightly improved and 3 moderately improved)– Knowledge and understanding of temperature forecasting after today’s presentation 57% a little (4 respondents) and 43% Yes (3 respondents) – After attending a previous experimental forecast meeting has the information you learnt / observed about weather forecasting tools influenced your decision making in the last year |
| | Lockyer Valley DCAP Meeting (November 2019) | <ul style="list-style-type: none"> 7 responses 5.3 avg. rating (1-6 scale) – value of the information presented at meeting 100% slightly to greatly improved (1 slightly improved, 3 moderately improved, 3 greatly improved) – Knowledge and understanding of temperature forecasting after today’s presentation 57% a little (4 respondents) and 43% Yes (3 respondents) – After attending a previous experimental forecast meeting has the information you learnt / observed about weather forecasting tools influenced your decision making in the last year |
| | Granite Belt DCAP Experimental Forecast Forum (September 2019) | <ul style="list-style-type: none"> 8 responses 5.5 avg. rating (1-6 scale) – value of the information presented at meeting 100% slightly to greatly improved (1 slightly improved, 4 moderately improved, 3 greatly improved) – Knowledge and understanding of temperature forecasting after today’s presentation 13% a little (1 respondents) and 75% Yes (6 respondents) – If you attended the previous experimental forecast end of season meeting has experimental forecast information influenced your decision making for the current extremely dry season |

2.1.7 Indications of Impact

New Understanding and Knowledge for Stakeholders

Stakeholders interviewed were asked if they had gained new understanding or insights about drought and climate variability as a result of their association with DCAP. There were some general comments about increases to knowledge across *a number of different things* including a *better general understanding of where the science is and where it is heading*. DCAP’s work overall exploring droughts and climate variability was pointed out with one stakeholder noting that there is a better understanding of *the capability within Queensland to develop solutions to some of the tricky long term issues*.

One stakeholder highlighted the complexity of the program in terms of what it was offering and trying to do (*tools, knowledge, understanding, products, processes to support agribusiness and to better manage climate variability*) within an also complex social landscape. They said, *what's appropriate for one on one farm, circumstances are different for neighbours. It is not a one size fits all. Everything is situational and enterprise dependant.*

There were some comments around DCAP's role in increasing awareness (particularly for end users) of already available knowledge and tools (e.g. Long Paddock) and also the importance of understanding what producers need and find useful.

Specific areas particularly mentioned included:

- Forecasting/climate drivers (e.g. *the major drivers with climate; learning more about the weather forecasting*)
- Impact of natural catastrophes/role of insurance (e.g. *when drought and heat waves hit there is really nothing else you can do but use insurance in those cases*)
- Implications/impacts across different industries/regions (e.g. *implications across the grain and graziers and more understanding of impacts in different locations*)
- Drought management in a grazing context (e.g. *what's involved in terms of drought management in a grazing context - every grazing property and every grazing enterprise is different and the way they manage for drought is different*)
- Historical variability (e.g. *historical variability is not necessarily a good representation of the underlying variability back through time*)

Practice Change Recorded

Where practice change was observed or captured, projects were asked to include details in the quarterly reports. Herd, flock numbers and hectares affected were not always able to be recorded and hence not captured. Recorded incidents of practice change reported in quarterly reports over the year were as follows:

Table 7: Practice change numbers 2019/20

| Practice Change Metric | Number Reported 2019/20* | Number Reported 2018/19 |
|-----------------------------------|--------------------------|-------------------------|
| Producers/growers making a change | 808 | 272 |
| Businesses represented | 555 | 117 |
| Head of Cattle affected | 369,894 | 209,351 |
| Head of sheep affected | 139,880 | 13,300 |
| Hectares of land affected | 6,194,298 | 2,741,002 |

**Figures based on data entered into the DCAP M&E database – accurate as of 9.7.20*

These are likely to be under-reported and there are more who indicated their intentions to make a change – as per the earlier table. Comments from individual projects around their reporting are included in the project summaries later in this report. This are very positive impacts to be recorded at this stage of the project and demonstrates the relevance and perceived benefits of the project information and outputs.

Narratives and Case Studies – Theory of Change in Action

Narratives are a mechanism for capturing change in action – resulting from interaction with information or activities from a project or program. The aim is to capture and record these as the project teams become aware of the change made – rather than (only) through a survey. Each instance is an actual case of change and it tracks the logic of how activities and outputs trigger, speed-up and/or support changes made.

Between July 2019 and June 2020 a number of impact narratives were drawn from interactions captured by DES 1 (4 narratives), USQ 4 (18 narratives – mostly from Climate Mates), DAF 7 (4 narratives), DAF 8 (6 narratives), and DAF 9 (1 narrative). Summaries of these are provided in the following tables to bring out the stories of change beyond the reported figures.

Table 8: Summary of example narratives (as recorded on the DCAP M&E database)

| Project | Example Narratives (shortened versions) |
|---------|---|
| DES 1 | <p>Project work assisting/improving advice/tools available:</p> <ul style="list-style-type: none"> • DES 1 rainfall posters and associated presentations/notes were used by a SE Qld agribusiness adviser to improve their clients' knowledge of rainfall forecasts and how to interpret them – directing any questions they could not handle to the Long Paddock website for more information. The adviser believed that the posters and DES 1 presentations were very important to their interactions with both farmers and those in support/associated industries, demonstrating that there is a great thirst for weather/climate data that can be presented in a visual form and simply explained. (June 2020) |
| USQ 4 | <p>Upskilling of landholders by Climate Mates:</p> <ul style="list-style-type: none"> • [Online – Facebook] Established a Facebook page 'Climate Info North Queensland' as a way to keep the region up to date on events, climate tools and climate forecasts. Page now has 330 followers, with a post warning about potential flooding, low temperatures and increased wind speed shared 149 times and reaching 66,724 people with 6,437 engagements. (June 2020) • [One-on-one] Discussion of Green date (CliMate app) and climate outlook with producer couple resulted in increasing their understanding of the Climate app tool and how to custom-calculate green date, as well as the IOD and ENSO climate drivers (June 2020). • [One-on-one] Producer use of the CliMate app to calculate green date resulted in reduced financial costs of carrying cattle through successive poor seasons, while also and reducing land degradation and decreasing land the land managers' stress and labour. (June 2020) • [Online – Presentation] Online meetings delivered by NGRMG and the CliMATES program provided timely and relevant climate information to 28 grazier's in Northern Australia, even amidst a global pandemic. Feedback suggested the meetings were a successful and valuable initiative, with one attending noting it was an efficient and cost-effective way of holding a meeting. (June 2020) • [One-on-one] A series of station visits to meet one-on-one with remote pastoralists to promote understanding of key climate drivers for the east Kimberley and VRD resulted in increased use of forecasting/climate tools and information, with two businesses making changes and two indicating they may in the future. (May 2020) • [Workshop] Climate Mate presenting workshop on climate drivers and forecasts to mixed audience resulted in increased attendee understanding on long term weather variances. (March 2020) • [Online - One-on-one] Remotely demonstrated the BoM forecast tools currently under development and discussed climate information with two NT producers – an overall positive experience with the pastoralists very interested in the new tools. (March 2020) • [Presentation] Climate outlook presentation for CHRRUP attended by 14 landholders/graziers resulted in a very positive reaction and substantial improvement in understanding of the main climate drivers – including some improved ability to carry out their own seasonal forecasting. (December 2019) |

- **[One-on-one]** One-on-one engagement with producers unable to attend workshops resulted in increased understanding of climate drivers and overwhelmingly positive feedback – with very favourable responses to the new tools being developed by BoM. (November 2019)
- **[Workshop]** Climate Mates presenting at NACP climate workshops in Central West QLD on climate information and management actions (e.g. forage budgeting, pregnancy testing) – hoped those attending will be motivated to learn more about the other management actions that they are not currently using and then implement these actions along with further use of the climate products. (September 2019)
- **[Presentation]** Presentation to 18 landholders at two Burnett Catchment Care Association (BCCA) risk assessment workshops resulted in a very positive reaction and substantial improvement in understanding of the main climate drivers – including some improved ability to carry out research and on-farm forecasting. (August 2019)

Upskilling of extension/service providers by Climate Mates:

- **[One-on-one]** Review and discussion of climate and weather apps with a Pilbara and Kimberley Extension Officer resulted in their increased awareness of the Windy data source (ECMWF).
- **[One-on-one]** Climate Mate upskilling WA Regional Agricultural Landcare Facilitators in climate information to pass on to pastoralists in the WA rangelands – Climate Kelpie animations were the most effective tool in communicating the complexity of climate science (August 2019)
- **[One-on-one]** One-on-one engagement with WA extension provider improves their knowledge of climate models and confidence using the Climate app. (August 2019)

DAF 7

Impact of Heatwave Advisory and Experimental Forecasts on grower decision making:

- Three business and supply chain managers from the Granite Belt region provided examples of where accurate long lead time forecast had allowed them to improve management decisions. For example, one grower manager decided not to plant based on forecasts predicting no sign of rain and above average maximum temperatures – they instead arranged a supply deal to source their summer vegetable requirements from a different region. (December 2019)
- Feedback from attendees at a November 2019 Lockyer Valley Industry update described how the DCAP experimental forecast information had improved and confirmed decision making for a number of attendees, with one describing how the information and contact provides guidance through science to better quality decision making. (November 2019)
- Feedback from attendees at a September 2019 Granite Belt Industry update highlighted the value of experimental forecasts, with many influenced and reassured by the forecasts to not plant crops in the upcoming summer season. (September 2019)

Partner organisations benefiting from project work:

- BoM staff provided feedback that the specific insights into horticulture that had been provided by the DAF 7 project relating to on-farm and supply chain impacts of weather and climate extremes and potential management decisions had been extremely useful in R&D – particularly in understanding how their forecasts were being used, their value, and for highlighting the need for potential new operational forecast products. The insights from project helped them to understand the needs of the users, how they can best use our forecasts and where our forecast systems have shortcomings. (March 2020)

DAF 8

Engagement activities improving producer knowledge and awareness:

- A climate focused webinar was run collaboratively with USQ 4 in May 2020 with a total of 40 participants (14 producers). All participants learnt a new skill or gained new knowledge with 93% agreeing they now had more information to make management decisions. One producer commented on having more certainty around stock purchasing decisions as they have a new method of assessing the most likely prospects for the coming season and rainfall. (May 2020)
- A “Technology for a Better Farm Field Day” was hosted by Echo Hills Farming Company in July 2019 as a result of a massive collaborative effort funded by GrazingFutures, the Maranoa Regional Council, and TRAIC. Nearly 100 primary producers from the south west attended with every attendee indicating that they had gained new knowledge or learnt a new skill from the event. (May 2020)

DAF 9

FWFA experimental climate forecasts improving farm management decisions:

- After learning about FWFA products and website at an informal presentation to DAF, a Surveillance Coordinator for Red Witchweed Biosecurity Response Project showed interest in accessing and evaluating some of the experimental rainfall products and were subsequently provided access to the experimental website. As a result of accessing the site and climagrams regularly and consistently over the last 15 months, the coordinator was able to improve their decisions about farm and surveillance planning activities with the potential cost savings and benefits from the use of the forecast products estimated to be the tens of thousands of dollars. (June 2020)

2.1.8 Benefit Cost Analysis

Agtrans has advised that *the economic evaluation of DCAP projects has provided positive indicators of success - the current draft BCRs for the eight projects where impacts were valued range from 4.0 to 7.6; the simple average for the eight projects where impacts were valued was 5.3 to 1. [These are the current indicative preliminary results only and may still change based on feedback from DCAP management and project personnel on the final draft reports. The full analysis is currently being completed.]*

The indicative results positively reflect the gains being made and the potential benefits arising from the project and is in keeping with returns from good RD&E programs. These results are based on the expected extra benefits that the tools, outputs and capacity building from the projects can achieve and the expected uptake/adoption and application of these across the producer and stakeholder community over time. They are also based on assumptions of the frequency of different seasonal conditions where the tools will provide the most benefits. A real value of such an analysis is forcing the issue to demonstrate thinking and pathways to impacts.

2.1.9 Issues/Opportunities

Increasing Awareness of Results and Improving Adoption

Stakeholders identified two key issues/opportunities when asked about maximising the outcomes of DCAP. The first was around extending and communicating the research results to end users to increase uptake/adoption and improve skills/decision making. This was a key focus for a number of stakeholders who were keen for the *time and resources* to be spent to ensure that *producers have access to and benefit from what the researchers are doing*. This included presenting information in a *practical and understandable way*, developing more good news stories / case studies and working on the provision of skills and knowledge to use the information. A couple of stakeholders mentioned the need to communicate with *policy makers and other engineers and scientific people, certainly in the government and maybe wider*. At the project level, the importance of ensuring project information / data / outputs are easily available/accessible was also commented on. *When the project finishes, we hope the extension teams will be able to access the information from this project.*

Other suggestions made around increasing awareness or communication in general included:

- Publish/peer-review results (e.g. *need to publish in journals and get peer-reviewed which gives credence to what is being done*)
- Improved/increased promotion of DCAP (e.g. *the communications officer could put together a short script so that before they give a webinar or presentation, they actually acknowledge the Drought and Adaptation Program*)

The Importance of Continued Funding

The second was focused on the importance of the continued funding of DCAP. Mention was made of increased brand awareness and projects *gaining traction*. There was a hope that the cost benefit analysis would endorse what the program is doing and help gain further investment or *provide guidance where to prioritise*. There was some concern about the impacts of COVID-19 on future funding. That DCAP was already on a longer funding cycle (i.e. 5 years rather than 3) was also pointed out as making a difference to the projects. One team member said that they were looking forward to other sources of funding... *we will be submitting an application to the farmers to extend the project for another 4 years*. Another noted the support they would need from the Queensland Government to commercialise the product being developed. The importance of integrating with the Drought Future Fund was also highlighted.

Other Issues/Opportunities

Other issues/opportunities noted included:

- **Moving away from drought focus to adaptation** (*If we can also move away from just focusing on 'drought' and move more into longer term 'climate adaptation', it will be a longer term priority; Climate adaptation also has the potential to be quite empowering - reframe it so that people can start thinking about it from a positive point of view.*)
- **Importance of considering on-ground and other impacts** (e.g. *area of improvement slightly is the R&D impact on the ground - we shouldn't lose sight of , not just industry impact, but the impact in policy sense*)
- **Importance of focusing on end user/stakeholder needs** (e.g. *how do you translate outputs into customer needs; continual improvements and continual innovation relevant to producers*)
- Need an operational long lead time forecasting system for agriculture
- Need to avoid duplication at a government level (e.g. *still the ongoing communication aspect between duplication at gov level or the potential of duplication*)
- Facilitate more collaboration (e.g. *facilitate collaboration, we spend some time and resources allocated to that, it would be beneficial and give some opportunities and good outcomes*)
- Needs more 'grunt' (e.g. *it will help Queensland farmers but it does need more grunt.*)
- Issues with restrictions of funding to partners only (e.g. *I thought it would be focused on whatever has the best ideas and not limit to the partners there. It is a closed shop.*)

2.1.10 Suggested Improvements

When asked for suggestions on what could be improved, Stakeholders contributed the following:

- Always room for improvement (e.g. *always more that could be done; always more we can do to get great visibility; reach of DCAP still leaves a fair bit to be desired; I don't know whether it is a budget issue or a priority issue*)
- Be aware of unnecessary duplication between State and Commonwealth

- Opportunity to replicate at a national level (e.g. *Engagement with Federal Government and the good bits replicated and a level with State Government and with other states and adjudications to try to translate to those areas*)
- Stronger link/awareness needed between DCAP and climate change/adaptation (e.g. *definitely the potential to at least make sure that other areas are aware of the Drought and Climate Adaptation Program and that DCAP is aware of other initiatives/activities going on in the climate change space*)
- Communication improvements (e.g. *better use of fact sheets; better support; need for more case studies; improved DCAP website with outputs on a standalone site*)
- Importance of DCAP guiding/contributing to policy discussion/direction (e.g. *as DCAP gets towards its later stages, be vocal about the outcomes and help government and introducing some of the outcomes that are in the DCAP report*)
- Need to improve engagement with producers/service providers (e.g. *extension officers focused on targeting primary producers and also engaging service with providers and reps to manage drought*)
- Difficulty generating interest without results/work still in progress (e.g. *work in action and it is more difficult to get people interested*)

2.2 Current Project Situations

These tables summarise the 2019/2020 findings from interviews with project leaders, team members and nominated stakeholders. It also includes information provided by project leaders in their project update presentations, YourDATA and their feedback to program management about the potential impact of COVID-19 on their progress. **Note that these tables are not intended to be a comprehensive summary of reporting against 2019/2020 milestones as this is included in the appendices.**

| DES 1 | The inside edge for graziers to master Qld's drought prone climate |
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| Evaluation overview | <i>The focus for this project is on undertaking research and developing tools around carrying capacity in the face of climate impacts on pasture growth. The project is seen to be continuing to make good progress despite some minor delays. It is reported that requests are increasing for access to forage reports with over 8,771 reports requested between April and June 2020 (an increase of 1,410 over the previous quarter). Stakeholders have commented on the high quality and consistency of the information and modelling – and its value. Development and improvements are continuing on a number of products and the Long Term Carrying Capacity report is yet to be released.</i> |
| Interviews | 2 project team members [2019: n=1]; 5 nominated stakeholders – 2 of these had a high level of awareness of the project (8/10) and one a low level (2/10). Two did not provide a rating. [2019: average awareness 7.7/10, n=3]. |
| Progress | <div style="background-color: #f4a460; padding: 5px; text-align: center; font-weight: bold;">SOME DELAYS</div> <ul style="list-style-type: none"> • COVID-19 impact: LCAT workshops delayed by restrictions |

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| | <ul style="list-style-type: none"> • Although the project was behind in some milestones, there was confidence that it would be completed on time. The sticking point was said to be the release of <i>the Long Term Carrying Capacity report</i>. • Stakeholders however continued to be positive about the project’s progress and the products being developed (<i>They are going very well; Very useful and necessary information.</i>) Comments were made about technical aspects of the project including the stability of the system, how it links science with long term activities, as well as the complexity of the underpinning information and modelling. It was also pointed out that a forage mobile app will be linked. <p><i>Progress to date has been very good – within a year of everything what we’d promised we’d do</i></p> |
| Key Outputs to date | <ul style="list-style-type: none"> • The second stage of quality control and assurance of GRASP and FORAGE has been ongoing and almost complete. The web interface development is continuing and will be completed after the Long Term Carrying Capacity report is released. • Revamped Long Paddock website • FORAGE Pasture Growth Alerts • FORAGE safe carrying capacity report – in progress • Publications • Property level forage reports • Videos (including joint animation video with DES 3 explaining percentiles) and webinars – accessible on Long Paddock website • Rainfall and pasture growth posters and map app • Updates to products: GRASP (updating land type parameters); FORAGE and AussieGRASS (updates to fire scar; presentation of AussieGRASS Maps). • Field assessments |
| Highlights and New Insights | <ul style="list-style-type: none"> • Stakeholders in 2019/2020 again highlighted the pasture growth alert report. The high quality and consistency of the information and modelling was pointed out by a couple of those interviewed (<i>It is an independent objective assessment that is publicly available and very useful as a reference point</i>). • At least 22,294 forage report requests were received in 2019/20 – 7,163 FORAGE reports were requested Oct -Dec 2019 an increase from the 6,360 reported in July-Sept 2019. <i>In 2019, the requests for FORAGE reports covered around 50 million hectares across the state.</i> LongPaddock website hit-rate continues to grow (~760 hits/day with about one-third new visits) • One stakeholder noted the <i>exciting</i> links between the Forage Long Paddock reports and climate information outlooks <i>with existing new grazing support products through AussieGrass and Forage sites.</i> |
| Collaboration | <ul style="list-style-type: none"> • The collaborative effort and two-way communication (including between departments) that has gone into the project development continued to be noted by stakeholders. |
| Stakeholder Awareness and product use | <ul style="list-style-type: none"> • Last year stakeholders interviewed noted increased awareness of forage reports with a couple having used the reports. For 2019/2020 stakeholders, the focus of their comments had shifted to listing known project products/outputs and their use (<i>The climate outputs have been excellent and distributed to clients in the bush; I potentialise topics for different districts in South West Queensland...</i>). • Specific products/outputs mentioned by stakeholders interviewed were pasture growth alerts (x3); Australia alerts; land type mapping; forage reports (x3); videos. • Long Paddock website hits are noted to be consistent with increased requests for forage reports per week/month.. <i>It’s really gratifying when the momentum keeps increasing when new reports are put out there.</i> |

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| | <ul style="list-style-type: none"> • An issue with stakeholder awareness was pointed out in relation to end users not recalling the particular program associated with a workshop or activity as there are so <i>many things going on</i>. • The Australian Minister for Water Resources and Member for Maranoa, Hon David Littleproud sent an email request for a set of rainfall posters. • <i>I use the Forage Reports all the time and recommended some of the instructional videos to different extension providers.</i> |
| Challenges and Opportunities | <ul style="list-style-type: none"> • In 2018/2019, there were no real issues identified as impediments to the project with stakeholders emphasising the importance of communicating outputs to industry/growers. This year, the focus of stakeholder comments has been around the challenges being faced by the project staff in particular. This included a <i>horrendous backlog of information to get out</i>. • There was some concern that staff could be burnt out with one stakeholder commenting that <i>it's driving us into the ground</i>. The challenge then is focused on staff retention and impacts on the time taken to <i>interpret science and turn it into products</i>. • There were also challenges identified around the use of the products including collaborators (how willing they are to use the products) and big pastoral companies (<i>less likely to tap into this stuff</i>). |
| Perceived Potential Benefits and emerging impacts | <ul style="list-style-type: none"> • This year, stakeholders again pointed out how the information helps <i>in grazing management decisions</i> and noted the project's <i>very strong potential given the useability of our products</i>. • As a result of promoting LongPaddock products at 12 events (workshops, field days, seminars and a webinar), several attendees commented that they would engage more with the products after being shown products' features, benefits (and uncertainties). • Workshop participants (Nov 2019) indicated an increased knowledge of the products with a "working" state of knowledge achieved as a result of the training. • <i>Assumption</i> that views of 'Understanding percentiles in climate data' video (437 in 8 months) translates to increased knowledge; <i>assumption</i> that ~700 visits per day to Long Paddock website translates to some increases in user knowledge. |

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| DES 2 | Using paleoclimate data to prepare for extreme events and floods in Qld |
| Evaluation overview | <i>The project has made up for earlier delays and is seen as on track to deliver. Early work on developing the website and database has been completed with positive results and analysis showing the potential value of the data. There are good connections and collaboration evident with others in this field. There is more work to be done in developing the application of the analysed data and how to effectively communicate and engage with producers.</i> |
| Interviews | Project leader, 2 team members and 3 nominated stakeholders (average awareness 7.0/10) |
| Progress | <p>POTENTIAL DELAYS</p> <ul style="list-style-type: none"> • COVID-19 impacts: Potential delay to Milestones 3 and 4 due to project team member additional care responsibilities, planned stakeholder workshop delays (from June 2020 to August 2020). It was noted that the forums planned for June would be delayed to August potentially. <i>Some delays but there are good reasons for those delays because they're contingent on other things and there's members of the team who've not only been affected by COVID but by other organisational challenges as well.</i> |

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| | <ul style="list-style-type: none"> • Other impacts on milestone delivery: expanded database scope and submission to Nature Scientific Data – will however lead to more robust and defensible database. • In 2018/2019, DES 2 was on track after earlier delays with good progress being made. Despite potential further delays emerging 2019/2020, stakeholders felt the project doing <i>really well</i> and staying on track <i>given where we are with the pandemic</i>. Project team members continued to communicate well and those employed by the project were getting the desired results. It was also pointed out that DCAP and SEQWater were understanding of the project's challenges and what was involved. |
| Key Outputs to date | <ul style="list-style-type: none"> • The database – continuing the general research <i>where we've been correlating them with the climate all over Australia, not just the State</i>. It was also noted that work is being done to <i>model water resource systems to see if their performance is worse back in the time before recorded data</i>. One team member noted that the correlation maps <i>have turned out really well</i>. • Final set of statistically improved heat map for the expanded area of the Australian continent has been completed and is currently under review • Paper summarising the DCAP 1 pilot project published in the Journal of Hydrology: Regional Studies. • The project website now includes a page with a storyboard explaining palaeoclimate and how the different assessments have been done • 2 x Project newsletters (March and September 2019). |
| Highlights and New Insights | <ul style="list-style-type: none"> • The useability of the website was again highlighted. Presentations by the project leader at international forums were noted to have gained attendee feedback that the project is <i>leading the world at creating an interface that has the user in mind to be able to use this paleo climate data</i>. <i>The feedback from that conference made us all really excited</i>. Another website highlight was noted as being how all the information has been collated from around the region and consolidated. • One stakeholder said that it was exciting how water modellers have linked to the <i>Silo</i> product <i>and have adjusted it to make it more useable</i>. |
| Collaboration | <ul style="list-style-type: none"> • Ongoing collaboration was noted with DES 1 and DES 3 with the project leader also presenting a talk to DAF 9. It was noted that the program manager and others with more knowledge across the projects, as well as the regular meetings made it <i>easy and simple</i> to facilitate collaboration. <i>It's really hard when you're in your project to know what other people are doing</i>. • In 2018/2019 stakeholders particularly noted the value of collaborators outside of DCAP including the Australian Paleoclimate research community as well as international links (e.g. University of Dublin). |
| Stakeholder Awareness and product use | <ul style="list-style-type: none"> • Outside of their usual involvement, two stakeholders (67%) had seen information about DCAP from other sources – e.g. Climate Mates newsletter, FutureBeef, Country Life • A couple of stakeholders thought that there had been increased awareness of the products and tools developed by the project although <i>not enough to uptake the product</i>. Major stakeholders were noted to be aware with the initial key user noted to be SEQ Water who are co-funders. Another stakeholder noted that while they'd seen the website, data and structure they haven't used any yet as it's <i>not available just yet</i>. • There has been little feedback on the effectiveness of the two newsletters to date. • The stakeholder forums were again raised as having worked very well and an idea for future roadshows up and down the coast was thought to be helpful in getting <i>the information out there and listening to the experts in the room</i>. • Some inroads were also noted to have been made with communicating the science to landholders who <i>can understand and use these tools</i>. |

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| Challenges and Opportunities | <ul style="list-style-type: none"> Challenges have been faced around the project team, particularly in terms of COVID-19, member's remote locations (Project Leader is in Dublin) and lining people up <i>at the right time</i>. Despite this it is felt like the benefits of an international team is worth the trade-off and has been managed well. Finding the time was also identified as a challenge as it is <i>no-one's full project, everyone's just doing it on the side</i>. The project's collaboration structure including universities, hydrology in DES and water corporation stakeholders was pointed out as being complex and creating a challenge <i>getting the right information at the right time for the right people to review with all the different skillsets</i>. Challenges were also identified around the project moving into the future in terms of what's next. Although researchers might think it's a good idea, the question is how willing and open extension officers and landowners will be to use the product. The other sticking point identified was the handover <i>from research to implementation into the government departments/agencies, to really understand it and be able to apply the information and make decisions using that knowledge</i>. Opportunities were noted as being the reporting (which was pointed out as helping the team to re-group) and the potential for more communication from project leads. |
| Perceived Potential Benefits and emerging impacts | <ul style="list-style-type: none"> As with 2018/2019 stakeholders, 2019/2020 responses indicated that it was a bit early in terms of potential benefits although one stakeholder pointed out its huge potential. The correlation of the different paleo records across the state (and continent) was pointed out and noted as going to be really good for people to gain a quick snapshot of where these records might have good application. Stakeholders again highlighted the potential of the project to improve better management of drought planning and risk. The information's use for running modelling and expanding the dataset was said to be useful <i>to give us a better picture to help understand what our future risks are, particularly in relation to climate change. If we have a better handle on what our natural variability is we're going to have a better handle on what change we're going to need</i>. |

DES 3

Drought resilience and adaptation: A program of social research and knowledge support

Evaluation overview

This project was focused on better understanding the behavioural influences that impact on decision-making so that it can inform and guide communication and extension activities to be targeted and effective. The project has completed its final report as well as supplementary outputs to capture key findings. Other projects have reported benefits gained through the insights from the research and there is some evidence of on-going influence of its findings in the way in which drought is perceived, managed and communicated.

Interviews

Project leader and 4 stakeholders (awareness average 8.3/10)

Progress

COMPLETE

- COVID-19 impacts:** face-to-face delivery and meetings transitioned to webinars (e.g. Zoom and GoToWebinars). Written resources (e.g. fact sheets, checklists etc.) being developed instead of a workshop for Grazing Futures staff in Central West region (May 2020). The workshop will be reorganised when COVID-19 has de-escalated. No expected impacts on milestone delivery.
- Despite some of the limitations of working together *...its so hard being in lockdown...* most of the team and stakeholders interviewed didn't see a problem with completing the project. It was noted that the 'list' (of what could be done) continues to grow. There is some enthusiasm about what is coming out of the project... *It's on track and they have done some great work so far and looking forward to seeing the outcome!*

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| <p>Key Outputs to date</p> | <ul style="list-style-type: none"> • Final research report submitted – Steering Committee asked for a more detailed recommendations report that was then re-submitted in November 2019. • Additional material has included: <ul style="list-style-type: none"> ○ A two-pager report on discourse analysis and a report which looked at the interviews with graziers around cultural factors which influenced their decision making – reported as being well-received. ○ Started to develop a couple of case studies of examples (single page fact sheets) for people outside of the projects ○ Commenced writing a paper. |
| <p>Highlights and New Insights</p> | <ul style="list-style-type: none"> • Relationships – DAF staff going into the regions and being able to put a face to the name and building that trust. • The discourse analysis looked at the way mainstream media framed drought and what the implications might be in terms of cultural acceptance/views around drought. • Wrote a proposal for the DCAP innovation grant and got more funding to do more animations to communicate statistical and cultural concepts associated with drought and drought management. • Started to look at methods in social marketing related to user centred design – e.g. customer journey mapping. Ran a workshop in Charleville and looked at the key points of connection where extension officers are in contact with graziers and how we can make things easier for them/less problematic. • Put on a really good person to do the main body of the report. They worked in well with the team and related that back to DAF extension officers. • Very important link to make sure that programs are designed with people at the centre of it – a pretty fundamental project. • Great project and there is potential to really look at extension especially because we have amazing access to resources and development. • Very grateful to be part of it and would really like to see it continue because we have only scratched the service. |
| <p>Collaboration</p> | <ul style="list-style-type: none"> • Project staff continued to consult extensively with other projects. • Trying amongst the three Grazing Futures regions to make sure that they all know about the different things the project is doing in the different regions – including presentations at Grazing Futures project meetings • DES is putting together an internal website (which is going to also be available to other government departments) – requested a link for engagement and extension staff so that they can also access the entire site. There will also be a page which talks about how some of our work is of relevance to them. |
| <p>Stakeholder Awareness and product use</p> | <ul style="list-style-type: none"> • There was a reported increase in awareness of the project as a result of the interaction and presentations being made towards the projects' end. Quite a few webinars and presentations were undertaken – <i>got fantastic feedback and requests for future presentations.</i> • Outside of their usual involvement, all stakeholders (100%) had seen information about DCAP from other sources – e.g. FutureBeef Facebook, newsletters • Stakeholders interviewed reported having read sections of the report and having asked some questions directly related to their findings that apply to their work, with others reporting that they attend workshops where DAF extension officers will talk about their upcoming work. • Although it was not considered that there was yet a <i>full awareness across the industry around DCAP</i>, the comment was made that <i>those who need to know about it, will know about it</i> and (the project) <i>has a good name and that really helps.</i> |

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| | <ul style="list-style-type: none"> • A project team member observed that <i>there are definitely areas where we have uptake.</i> |
| Challenges and Opportunities | <ul style="list-style-type: none"> • It was reported by a project team member that <i>up until now we had that delay in engagement with DAF extension. Now the biggest issue is that (we) don't have the time to do everything!</i> • There was a concern that despite the findings from the project, <i>people's attitudes – there will be a lot of people who are old school and just like to do things in the way that they've always done it.</i> • There was opportunity seen to keep the awareness of the project and to keep developing the messages. |
| Perceived Potential Benefits and emerging impacts | <ul style="list-style-type: none"> • Despite a recognition that the project did not make decisions for extension officers in their use of the findings, the project has already succeeded in having an impact on thinking by some extension deliverers. <i>As one expressed it...we hear about the role of social scientists and how we can use that role. Because we have spent a bit of time with Fiona we can see the benefit of having her to look at our extension programs.</i> • Messages and benefits reported from the project include: <ul style="list-style-type: none"> ○ <i>Good to be reassured that our assumptions are being confirmed. It's important to check back in that what you're doing is still on the right track.</i> ○ <i>Affirmation of what I have been aware of before and touched base on the way we produce products – good to have their knowledge to refer to.</i> ○ <i>Improve the way we present our product to industry and target product to pinch points. It could highlight where we are wasting our time.</i> • Increased potential was seen for impacting on cultural and social shifts in the way that drought is perceived, managed and communicated. This was progressed through conversations with DES and DAF around implications (impact on campaigns) for communication projects/campaigns and Grazing Futures workshop attendees brainstormed ways to overcome cultural constraints to drought preparedness. |

| USQ 4 Northern Australia Climate Program | |
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| Evaluation overview | <i>This project combines a strong research component around forecasting and implications (e.g. flash drought; floods; multi-year predictability; seasonal forecasts; pasture variability) with a strong engagement program – Climate Mates – that provides regionally-based engagement with producers. A major boost to the project has been the doubling of Climate Mates increasing its capacity to engage across the regions. While COVID-19 has limited face to face interaction and had an impact on activities, strong use of other communication media has helped progress the project with stakeholders remaining very positive about the project and achievements – and the potential benefits to producers in decision-making. Challenges remain in raising the priority level for producers to make the effort to engage and learn. Those that have engaged have taken the learning on-board.</i> |
| Interviews | Project leader and 9 stakeholders (average awareness 7.7/10) |
| Progress | <div style="background-color: #4CAF50; color: white; padding: 5px; text-align: center; font-weight: bold;">ON TRACK</div> <ul style="list-style-type: none"> • COVID-19 impacts: Remote training has been undertaken (development of online modules) of new Climate Mates as much as possible. Extra leave has been taken by parents with school age children. Online delivery plans have been implemented...and we were able to think outside of the box... with no major impacts (potentially minor) |

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| | <p>expected on milestones. Could be some impact on Category C KPIs...we can't have the same impact as what we had with face to face.</p> <ul style="list-style-type: none"> • Progress on impact targets as at the end of March were reported as well underway to complete with progress to date for producers in the different levels of impact being: Category A 66%; Category B 145%; Category C 31%. • There was strong positive on progress and the project generally...fantastic...its moving along...going really well...on track and I hope this continues in the same manner and (they) find more funding. • MLA approved the April research milestone including the GoNoGo clause. |
| <p>Key Outputs to date</p> | <ul style="list-style-type: none"> • A range of multi-week and seasonal operational and prototype forecast products were made available for testing by Climate Mates – includes a new Chill Index. • New website that was launched in October last year with over 20,000 visitors to date • 16 Climate Training Video Modules developed plus a workbook to go along with the videos. • The Northern rain offset which has been produced by the project and is on the BOM website. • A review of the research was completed by Dr John MacBride – an independent reviewer – recommending that the research program be continued. • A Nature Climate Change paper on flash floods was published with others submitted to journals. It was noted that there had been 21 journal papers published, submitted or in-preparation from NACP • Model development is continuing including on-going testing of CoMorph. • Outputs completed prior to this reporting period included: a literature review; 8 papers commenced; and release of a Forecast system and development towards formulating a drought index CDI. |
| <p>Highlights and New Insights</p> | <ul style="list-style-type: none"> • Following the success of Climate Mates in the regions there has been a doubling of the resources for climate mates. Training is expected to be done remotely because of COVID-19 restrictions. This has been welcomed by both project team members and stakeholders interviewed with a report that there had been a <i>great amount of work done to communicate the results to the producers on the land in Northern Australia.</i> • It was seen to be very positive to have the Climate Mates attend the AMOS conference which was seen as <i>great for development.</i> • The completion took some time to get together but I am really happy the way they interact and they have a wide range of skills. |
| <p>Collaboration</p> | <ul style="list-style-type: none"> • There were reports of good links between the project and DCAP, MLA and USQ The project was seen by the project team as <i>nicely integrated.</i> The collaboration in all areas was seen as effective and timely and was seen to have contributed well to the success of the Climate Mates. • The level of interaction between the scientists at the BoM and with Climate Mates was seen as a most interesting aspect • There was positive feedback about support provided Chelsea - <i>her willingness to give us personal support for our individual landholders that are tailored to our area. To find Chelsea and for her to come up here has been really valuable. Decided we are going to partner more closely now because it is a win-win situation.</i> • A stakeholder noted that they were <i>very keen to see great benefits in keeping the relationships going. To have the support that is reliable, especially for the small communities.</i> |

Stakeholder Awareness and product use

- Outside of their usual involvement, eight stakeholders (89%) had seen information about DCAP from other sources – e.g. websites, Facebook, Country Life, Rural weekly, newsletters. A team member observed that there is good awareness of the program – *as the project goes on we will make a wider variety of people aware*. One observation was that *the Climate Mate information is great and there was a massive gap in extension in using basic climatology, we are behind Queensland in all of this*.
- It was noted that *there is quite a lot that has come out of that project, because of forecasts and the dry conditions everyone is finding it really interesting to put it into practice and see where the long term rainfall options are*. Stakeholders reported that the information was presented well.
- The project team reported that there is good two-way information from producers to researchers to better understand what the needs of the producers are. It was noted that *landholders were quite impressed that someone was coming to the communities that had local knowledge and was very good at involving them in the conversation – Chelsea is as good as listening and taking things on board as she was talking so it was a really good collaboration*.
- Tools that stakeholders reported that they associated with the program and had used included: the Northern Rainfall Onset Date tools; the BoM tool using Access-S; Climagram; 30 day Meteogram; Outlook forecast; Southern Range Forecasting; drought forecast.
- *There was an assumption* of some increase in broader awareness of DCAP with a Channel 7 interview, conference/workshop presentations, and social media/email activity (600 people).

Challenges and Opportunities

- There were a number of challenges raised in making the most of the (great) tools and information developed through the project. These included:
 - Determining which ones are the most appropriate in given situations and having people use it correctly.
 - Overcoming initial scepticism from people until they start using it – and encouraging them to do so.
 - Having producers to prioritise and to take a whole day out to come to the workshops (only getting about 6 participants)
 - Reliance on funding from the bureau for the climate model we use for the project to keep it working – on-going support will be needed beyond DCAP
 - The difficulty in training someone from scratch to assist with the project
 - Relevance to in Northern Australia – some concern by one stakeholder that it is more relevant for South Australia.
 - The scale of distance when it comes to Climate Mate and trying to reach production in these vast areas.
- The opportunities that were raised include:
 - Trying to encourage people to use the tools – get the message out to producers and educating them of what Megan can offer – with more extension.
 - Continue with the project - keep stakeholders up to date on what is happening through the research
 - A growing awareness of the outcomes from the project, outputs and other products is an asset across the state.
 - Obtain more dollars for funding and bring in the link for policy makers in the same conversation as DCAP staff and landholders.
 - Be prepared on planning because there are so many challenges that are happening all the time – people are trying to support people on the ground and with COVID-19 we are still connected and giving out the right information because of the project.
 - Climate Mate for our region (NT)

Perceived Potential Benefits and emerging impacts

- There was positive feedback from stakeholders interviewed about the value of the products and information from the project. A stakeholder stated that *newsletters are brilliant because they give you a prediction of what is going to happen with the weather*. Capacity of the project to *provide an outlook for primary producers to help with their decision making* was a common conclusion from stakeholders. Benefits highlighted included:
 - Certainly has potential to help farmers plan for seasonal dry conditions – *it will greatly assist farmers in planning their planting regimes to maximise rainfall*.
 - Expected significant cost savings by being able to program works around weather.
- It was reported that once landholders were taken through the BOM site *and all of the different sites that you can go to for the long range and short term weather forecasting (they) were saying that they didn't know how useful it can be and were going to take that information onboard and use it when making decisions*. This included understanding the difference between the weather models and the BOM outputs in some of the weather apps and their usability in terms of a grazier or irrigation
- Workshop participants over 2019* indicated they were much more likely to use (or use to a greater extent) seasonal climate forecasting information in their future decision making and access/use one or more of the tools presented. E.g. *One producer now uses the CliMate app to estimate things like green date and historical climate rainfall to help inform current on-property decisions*.
- **Practice change numbers:** 27 producers/growers (as recorded on YourDATA) – for example:
 - 17 workshop participants indicated they have used project information to support management decisions in their business.
 - NQ Qld producer regularly using the Monthly Climate Outlook (provided by NACP) as a result ordered more supplementation for the herd, which resulted in improved animal welfare conditions.
 - Producer using the CliMate app to estimate green date and historical climate rainfall to help inform current on-property decisions
 - Qld Gulf producer decided to partially restock and early wean in 2020 based, in part, on the climate outlook and past conditions.

USQ 5

Crop insurance

Evaluation Overview

This project has continued to make good headway into its research and developing insurance understanding and products despite some minor setback with COVID-19 restrictions. It has delivered on concepts and prototype decision-support tools for informed decision-making in sugar and cotton. Collaboration continued to be strong with organisations, agencies and other projects (although the focus of the products has been on crops rather than the main DCAP focus on grazing). Despite the good progress, strong engagement and strong interest to date, there is a little way to go in gaining buy-in from individual growers and have a commercial product that both meets the business interests of commercial insurers and the premium acceptance of individual growers.

Interviews

Project leader, 2 team members and 5 nominated stakeholders (average awareness 7.2/10 – all but one very aware)

Progress

ON TRACK

- **COVID-19 impacts:** It was noted by the project team that COVID restrictions could delay getting things done – with challenge to complete milestones because of the need to be talking and seeing farmers *and at the moment is not possible*. However,

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| | <p>once the COVID is lifted the team was optimistic that they will have <i>excellent support again to assist farmers with new products</i>. The team had events organised and <i>people coming from London to give a presentation (but) it all had to be postponed because of the virus – no (significant) issues other than that</i>. The team was hoping to run some sort of pilot with the sugarcane growers about the cyclone insurance but that could be impacted by the Coronavirus.</p> <ul style="list-style-type: none"> • It was considered that despite these relatively minor setbacks, <i>everything was running as you would expect, we meet our milestones and we get feedback from DAF so no issue</i>. It was noted that the project was almost at the stage of commercialisation but there is still a few hurdles to go and we seem to be on track with it all. • The project team and stakeholders were all very positive about the project and its progress and didn't see any real hurdles in completing their objectives. |
| <p>Key Outputs to date</p> | <ul style="list-style-type: none"> • Decision support tool prototypes have been completed for the sugarcane and cotton industries. • Case studies have been completed on what farmers think about the Cyclone Insurance options and the benefits it might have. It was noted that in the past case studies have been put on the QFF website. • Paper published 'Creating positive synergies between risk management and transfer to accelerate food system climate resilience', in the Journal of Climatic Change. • Outputs previously reported included: a Cyclone Insurance product report for Queensland agricultural producers; Insurance products for four industries - sugarcane, cotton, macadamias and wheat; Concept notes for livestock; horticulture and broadacre crops; and Modelling on experimental insurance products that examine the potential for innovative pathways to roll out 'market ready insurance' products. |
| <p>Highlights and New Insights</p> | <ul style="list-style-type: none"> • Highlights raised by the team and interviewed stakeholders included: <ul style="list-style-type: none"> ○ Meeting our clients and farmers expectations by designing new products - having the research match with the insurance business side of the project and then being able to test it with primary producers ○ Reporting information online through the system and people accessing the websites ○ Testing the insurance market – the research work that USQ had done in developing a map 4 category in the box system ○ Having a diverse lot of stakeholders. ○ The opportunity to develop new products for farmers and interest from the Queensland government for potential funding - <i>there is actually something on the table from the research and It could be commercialised effectively</i>. • The project was seen to be one of the more practical programs which is very Queensland focused – which will have good outcomes in terms of improving our knowledge and understanding on how we can adapt to drought. |
| <p>Collaboration</p> | <ul style="list-style-type: none"> • The project team reported that <i>the communication with the other partners is exceptional and good communication with team members</i>. This has included regular e-newsletters that are distributed and which are viewed as helpful. • The success of industry collaboration was seen to be reflected in the level of interest received from industry about a different way we are looking at insurance. The data provided by USQ and QFF was described as having met expectations for designing new products. QFF also had the DCAP program manager speak at related workshops. There has been good communication across projects and the project team has met with industry groups, partners and cane growers and had presentations at specific events. The collaboration between USQ, QFF and DCAP was reported to be working well and seen as a model for future projects. |

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| <p>Stakeholder Awareness and use of products</p> | <ul style="list-style-type: none"> • As with stakeholders from other projects, outside of their usual involvement, all stakeholders (100%) had seen information about DCAP from other sources – e.g. publications, online, interaction with other DCAP projects. • The results of collaboration with QFF (and others) was seen to have had a big impact on industry awareness of the project and the emerging products – and reflected in the interest being shown. • There was also an opportunity for target audiences within the Qld sugar industry to see project information as a result of CANEGROWERS magazine Policy Update column (3,500 circulation); and there were expectations of increased awareness after the USQ presentation and engagement with government and industry stakeholders. • Face to face meetings with stakeholders and producers was seen to be particularly useful. An example was used where there was industry engagement with one of the sugarcane commodity groups – <i>when we are talking to some of the producers and committee they are not looking forward to the presentation at all but at the end we seem to be the ones they are talking about. A stakeholder said that from the presentations It would appear to me that this project has got some potential to be offering some interesting insurance products to that agricultural sector.</i> • It was noted by a stakeholder that the project team was <i>very good at progressing and answering questions about products that they are suggesting – communicated well with us.</i> • While the project team observed that <i>the farmers have taken advantage of the information that we give them so that is good</i>, there was caution from some stakeholders who suggested that some growers aren't yet aware of the project and products and would be likely to be put off by high costs of premiums. The presence of a lot of information 'out there' for growers was seen to be a problem in some learning more about the project. |
| <p>Challenges and Opportunities</p> | <ul style="list-style-type: none"> • Earlier challenges reported were around obtaining data from government departments and the issues around addressing a wide number of different industries. • Challenges raised now included: <ul style="list-style-type: none"> ○ Attracting government support to proceed with the initial capitalisation of the project was seen as a major stumbling block. ○ Uncertainty around whether the concept works for the insurer or customer we are uncertain. ○ The need to have a (more) accurate prediction of rainfall ○ Matching farmers ability to pay the premium with the insurance company's ability to pay the outcome - to be actually commercial and negotiate an outcome with what has been found – to come up with a realistic premium for a realistic loss event. The challenge was for the company to make money but also be in a position to offer a product to a farmer who sees value in reducing their risk at a cost that they can afford. • The real opportunity in working through these challenges was seen to get farmers feedback on how they think we can do things in a better way. • It was also noted that they had a lot of detail on the parametric insurance – <i>able to do what if's and provide details needed to start looking at genuine decision making. They have provided good information and they have answered our questions.</i> |
| <p>Perceived Potential Benefits and emerging impacts</p> | <ul style="list-style-type: none"> • If the 'formula' can be found which attracts the insurance companies and the growers, then there were many benefits to be gained from a successful outcome identified. These included: <ul style="list-style-type: none"> ○ The cyclone insurance fund for sugar growers, that has been an interesting outcome and a huge benefit for agricultural in Australia. This was seen to have the potential to assist in managing cyclone (damage) – <i>might take a few years to get exactly what we need though.</i> |

- Extreme weather in horticulture can have some devastating effects on quality and the quality determines the price – you could insure a crop against a particular weather event.
- It was noted that this particular *insurance is very different from every other insurance product that we have ever dealt with, if you take out a policy and if there is a particular event that occurs such as if the temperature is above 35 degrees for three consecutive days and if the meteorological station is the closest to your farm records those three days above 35 degrees Celsius then you get a payout whether your crop is damaged or not.*
- A stakeholder pointed previously that it was very hard to have impact at this stage - we are educating the growers about the potential of insurance and managing our climate change. The overarching benefit was seen as having increased understanding in insurance and the use of it as a management tool within the stakeholders' network.

DAF 6

Delivering integrated production and economic knowledge and skills to improve drought management outcomes for grazing systems

Evaluation Overview

This project is continuing to be seen to be progressing very strongly with very useful products. COVID-19 has changed the scope and nature of engagement with both extension and producers with greater use of on-line meetings and webinars. Good collaboration with other DCAP projects has continued and WA has specifically highlighted the benefits to their industry. Stakeholders were very positive about the added value that project components and outputs have contributed to a practical whole of business economic approach to drought resilience. Despite the gains made with awareness raising, distribution of products and engagement, there remains a challenge in extending the work and helping producers and policy stakeholders to understand the complexities and effectively use the outputs effectively in planning.

Interviews

2 Project leaders and 7 nominated stakeholders (average awareness 7.8/10 – 2 stakeholders did not provide ratings on awareness)

Progress

ON TRACK

- **COVID-19 impacts:** April and May 2020 planned meetings with project participants in Charleville and Longreach moved to 'Microsoft Team' meetings. There may be impact on future north Queensland industry engagement/meetings in the second half of the year. Emphasis on second half of year may be on delivery of webinars. Reports are expected to be submitted on time (dependent on Animal Science review) and whether it is a possibility to spend extra time developing more scenarios for sheep/goats/beef rangelands enterprises.
- Stakeholders also commented about issues surrounding COVID-19 including the lack of face-to-face engagement and not being able to travel to *engage with those regional extension teams and develop those analysis*. It was noted that meetings had been put on hold.
- Stakeholders continued to be positive about the project. In 2018/2019 its structure was noted to have been key to success including engagement with regional DAF teams. This year, stakeholders focused on how much has been achieved in a relatively short timeframe (produced huge reports and scientific research) how well received the information has been, and its importance to the industry. One commented how *great* it was to be involved and share with producers. They said the project had *great information on how they [producers] can manage their business*.
- The project was said to have delivered all its milestones and outputs, even delivering more than was promised. Its good progress was also noted in 2018/2019.

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| <p>Key Outputs mentioned</p> | <ul style="list-style-type: none"> • Stakeholders mentioned a number of key outputs including completion of 4 major regional reports (<i>with lots of analysis despite the delays</i>), a growing number of scientific publications, case studies, and a spreadsheet. The tools to access some of the strategies were noted to be excellent, easier to access and readily available from the web. • The Mulga lands analysis and report was noted to be progressing steadily, with a scientific journal paper published and three additional papers under review following submission. • In specific extra interview questions, stakeholders were asked to comment on the usefulness of different elements of the outputs from the project: <ul style="list-style-type: none"> ○ Integrated production and economic information: (rating 9.3/10) – <i>comprehensive best science with local data that can be tested with different scenarios; most important part; the way of the future; the stuff people get interested in – the bottom line; transferability – helps identify conditions and stocking rates.</i> ○ Whole farm economics approach: (rating 9.2/10) – <i>doing the whole farm is the best way to do it; not been done before on this scale – combines biological and economic with meaningful messages on how they can manage their farm; very relevant; this is what producers are seeking – accounts for complexity; useful for financial literacy in industry – detailed, maybe too detailed; far more insightful than some benchmarking strategies.</i> ○ Impartial analysis of project results: (rating 9.6/10) – <i>impartial and transparent – valuable and can be modified for individual use; DAF has a great reputation for providing unbiased information; need the impartiality; very important; not pushing a barrow or trying to sell something.</i> |
| <p>Highlights and New Insights</p> | <ul style="list-style-type: none"> • The modelling that has been undertaken was seen as a good exercise for different regions and a baseline for different projects...<i>a really useful starting point and good way of checking if other investments are worthwhile.</i> As described in earlier feedback, the approach highlighted the importance of effective drought management components – preparation, responding and recovery. A reason for the success was seen as <i>having set up and working well with our regional teams – a close collaboration and engagement has been the key.</i> • It was explained by a stakeholder <i>that the work that the project does has never been done before in terms of the options for the regions and put into a report to be extended for people like me. It is one of a kind.</i> • The previous feedback indicating that stakeholders considered that the project was providing quality, accurate and relevant data was reinforced. The strategies to improve performance and the manner of the analysis was seen to be very rigorous with a stakeholder referring to the <i>very sound approach they use and they are very thorough in all the reports and work that they have done.</i> |
| <p>Collaboration</p> | <ul style="list-style-type: none"> • Collaboration over the 2019/2020 year has included: <ul style="list-style-type: none"> ○ The DAF extension teams (including outside of DCAP) engaged with were reported to have received the work very well and to have incorporated our work into their programs. On-going very close collaboration with the Grazing Future Team (DAF 8) was reported. ○ It was reported that USQ 4 was very interested in cross collaboration with DCAP economic projects and are very keen to collaborate with them as much as possible. Case studies are being developed using climate information from USQ 4. • The project team believed that without collaboration the project will be unsuccessful. <i>The rest of the DCAP is aiming to develop risk management and trying to link with our projects and to discuss how the risks could work together. Helps that we are all in the one DCAP project.</i> |

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| <p>Stakeholder Awareness and use of products</p> | <ul style="list-style-type: none"> • Previous feedback highlighted the value of the analysis, the significant amount of communication and extension and resulting awareness and different uses being made of the products – including in university courses. • As with stakeholders interviewed across all projects, outside of their usual involvement, all (100%) had seen information about DCAP from other sources – e.g. FutureBeef website/Facebook, emails/newsletters, DAF literature, Queensland Country Life magazine. • Communication was described as occurring through the DAF extension team – including one on one extension with DAF economist. Team members also presented at industry and scientific forums. Online material, spreadsheets and recorded webinars and presentations – a lot of views from all over the North asking questions and providing feedback – was reported to have been <i>really effective</i>. The webpage was described as being accessed as <i>people are emailing us out of the blue and there is excellent feedback</i>. • It was reported that they had handed out more than 1000 copies of the Fitzroy region report over an 18 month period. It is widely distributed and well received. Producers wanted to do some one on one with the framework for their own personal farms. • A stakeholder said that they were extending the material and the stakeholders are very aware – they have done a great job of keeping people in the loop. Specific products referred to by stakeholders included: <ul style="list-style-type: none"> ○ <i>Physical report, soft copy of the report, and slide shows and video. A real range of different content.</i> ○ <i>Seen their reports for the Fitzroy, Northern Gulf, Northern Downs and Central West – plenty of outputs and are very useful.</i> ○ <i>The summary of the data of the reports is exciting – surprised at how many producers were engaged surprised</i> • Stakeholders interviewed reported having been able to use the information from the analysis with one noting they had specifically used Breedcow templates and the ‘mega report’. It was also highlighted that the tools were being used and being crafted for WA, <i>it is making a community of practitioners – these are good tools to create collaboration and everyone benefits.</i> • Stakeholders interviewed were specifically asked what changes they had made to date as a result of project outputs. The responses included: <ul style="list-style-type: none"> ○ <i>Not the results but the tools that have been created</i> ○ <i>Provide clients with report and talk it through – using their figures</i> ○ <i>Lowering stocking numbers and not pushing their ground as hard and a lot more work in budgeting and not trying to push the asset as hard – they are getting some confidence in it – a real benefit.</i> ○ <i>Not at the moment – but once the virus is over and being able to have face to face conversations, it will be a great asset in dealing with things that are new.</i> |
| <p>Challenges and Opportunities</p> | <ul style="list-style-type: none"> • Logistics and time pressures appear to be the biggest challenges in the project. This included: <ul style="list-style-type: none"> ○ <i>The problem of data access– people within the government agencies has access to data but won't share the data</i> ○ <i>Internal within the group - delays and approving of our reports. That delay has taken 6 to 11 months and is unprecedented. The M&E processes does require a lot of work and effort even with a small project such as ours. The extent of time involved. We need some external people collecting that. It is very valuable but the time to do it is more than I anticipated when setting up.</i> ○ <i>Limitations in extending the work and the limited time frame to finish up. Ours is not on the same timeline, but to finish at the end of the year. Given the delays of COVID-19 and the internal delays, that is going to be our challenge. It was noted that the work needs to be followed up to some</i> |

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| | <p>degree - <i>in the department they are very good at doing a project and throwing it on the desk and walking off.</i></p> <ul style="list-style-type: none"> ○ It is not a silver bullet and the complexity is where the value is – trying to simplify it is going to require intensive and ongoing support. <i>Delivering the message – a fine balance between commercially viable and de-stocking.</i> It was noted that (some) of the work does not match up with industry paradigms and <i>there is a challenge in convincing higher executive levels of industry of the value.</i> ○ The collaborative time needed to get everyone together – <i>up until now it has not been a problem, so I believe it will continue to be managed well</i> ○ The way in which it is applied and Government assistance packages – <i>how you go about affecting that.</i> ○ To create a wider awareness – <i>there is a lack of awareness on all levels, e.g. farmers and managers, especially at a higher level. If they are aware of these mutually they will make better decisions.</i> <ul style="list-style-type: none"> ● Previous feedback raised the protracted review process of the project, the size and distances involved in the project and delays from the large flood event. ● Webinars and videos were seen to be an opportunity for broader awareness. It was explained that <i>the potential is huge and as long as we keep promoting and not let it fall off. The extension part of it is important and to keep delivering the benefits on several fronts from lands and the environment and back to the producer.</i> |
| <p>Perceived Potential Benefits and emerging impacts</p> | <ul style="list-style-type: none"> ● Previous feedback about benefits from this project highlighted the value that had already been contributed around a <i>whole of business economic approach</i> to becoming drought resilient – which related to preparing, managing and recovering from drought. It was also seen to be unbiased. ● Current feedback by stakeholders was very positive about the value of the work undertaken and its potential to benefit producers. This included: <ul style="list-style-type: none"> ○ Western Australia stakeholder reported <i>using the suite of models to great effect – to have a herd model that has changed over time is a very useful alternative. In WA we have processed the analysis and them to local conditions – with the ability to contact and discuss the results has been really valuable.</i> WA's point of view is that we have a lot of room for improvement compared to the rest of Australia and this is very valuable to us ○ The reports <i>that they are putting out around strategies for drought preparedness is very insightful – particularly valuable for the district and to think through using these tools and analysis and tease out the best strategies.</i> ○ Another commented that <i>there is huge potential as for the first time ever, it has combined data and biologically in what happens to a business and what is going to happen to someone's livelihood. It is invaluable.</i> ○ <i>Fantastic tool to help producers in different regions build resilience – useful as it is already there so they don't have to explore the options themselves.</i> ○ <i>The analysis would help put them into a better place to prepare for drought. What land capacity looks like and productive capacity, given where they are at the time, and improve the productivity and profitability.</i> ● Comments were also made around the ease of use, the dispelling of myths and the value in guiding recovery ● It was noted the project does not have the resources within the small project team to collect practice change data. |

| DAF 7 | Use of BoM multi-week and seasonal forecasts to improve management decisions in Queensland's vegetable industry |
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| Evaluation overview | <i>This project continues to be seen as being on-track and engaging well despite recent COVID-19 restrictions to ground-truth forecasts and predicted outcomes. Most collaborating producers attending meetings rated the usefulness of the outputs highly with many already reporting a greater understanding and use of forecasts. The value of directly working with the BOM has had obvious benefits in improving available products. Improving long term accuracy will further add to the value already being reported by producers – and broadening the awareness and engagement of the broader industry is a challenge going forward.</i> |
| Interviews | Project leader and 9 nominated stakeholders (average awareness 8.1/10) |
| Progress | <div data-bbox="432 640 785 696" style="background-color: #4CAF50; color: white; text-align: center; padding: 5px; margin-bottom: 10px;">ON TRACK</div> <ul style="list-style-type: none"> • COVID-19 impact: The restrictions have meant a reliance on video conference delivery of Granite Belt Experimental Forecast meeting and other engagement meetings. Lack of face to face discussions potentially impacts on information exchange and level of personal engagement, however it was not expected to impact on project delivery. • There was very positive stakeholder feedback about progress to date, the approach being taken and the value that is seen coming from the project. |
| Key Outputs to date | <ul style="list-style-type: none"> • Outputs highlighted previously included: Ground-truthing of 19 long lead-time forecasts against BOM readings; the issuing of experimental forecasts in the Lockyer, Granite Belt and Bowen; heatwave advisory notices; monthly emails and heatwave advice. • In this period, a statistically-based system that underpins and standardises the methodology and processes used to interpret DCAP BOM data was finalised, tested and adopted. • A successful meeting was held in Granite Belt in September 2019 with 8 businesses represented amidst the drought conditions. The Experimental Forecast was presented and discussed in terms of relevance to business decisions. A forum on this topic was also held in the Lockyer in March 2020. • An end of season zoom meeting was held in May with the collaborating Granite Belt businesses. • A magazine article was included in the Granite Belt Advertiser magazine and a poster completed highlighting project outputs. |
| Highlights and New Insights | <ul style="list-style-type: none"> • Previous highlights included: work with big producers to analyse economic impacts of extreme temperatures; feedback from producers about the quality, accuracy and relevance of data being provided; and reported increased understanding in interpreting forecasts. • Feedback this period included: the reported usefulness of the maximum temperature forecast for industry and helping them make relevant decisions; and improved accuracy in modelling. |
| Collaboration | <ul style="list-style-type: none"> • Previous collaboration highlighted included working closely with the BOM on ACCESS-S; assisting USQ 5 with horticulture examples for insurance calculations; assisting DAF 9 with a graphic presentation; and collaborating with DES and Long Paddock. This collaboration has continued over the last period – including working closely with big corporate growers. • The good communication with the BOM was reported as continuing with <i>them taking key suggestions on board – and have made the way they present experimental forecasts used for insurance projects more user friendly.</i> |

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| <p>Stakeholder Awareness and use of products</p> | <ul style="list-style-type: none"> • Outside of their usual involvement, three of the nine stakeholders (33%) had seen information about DCAP from other sources – e.g. emails/websites. • Previously it had been reported that: 47 Queensland based vegetable businesses and supply chain managers were actively involved in experimental long lead-time project work; growers who attended meetings had acted on information presented; the value of the communication they were receiving – as well as a number of examples of individual businesses benefiting from decisions made as a result. • It was reported that the project engaged in a meaningful way with producers in the Lockyer Valley or Granite Belt – face to face meetings and interviews, bimonthly newsletters with an updated forecast, and pre/post season meetings. • The type of responses raised in interviews reflected a high level of interest in the project and its outputs... <i>Everyone that is coming is happy and they keep coming.</i> There was positive feedback on the information provided and tools available as well as the expertise and availability of the project team... <i>regular reports from the project and if we have any questions or challenges, we can pick up the phone and have a discussion.</i> • Stakeholders also referred to increased knowledge/understanding resulting from the project. This is reflected in the following comments: <ul style="list-style-type: none"> ○ <i>Starting to understand what meteorologists are measuring and using it amongst themselves</i> ○ <i>Learnt a lot about cold modelling and how it reacts with the IOD – learnt how to plan our farm looking forward</i> ○ <i>Getting the language that we are all talking is the most valuable part – building a language for learning</i> ○ <i>About heat waves and how I look at the temperature, rainfall</i> ○ <i>Accuracy of the longer-term forecast has been quite interesting and they talk about the high averages and it's relevant the way it is reported.</i> • There were some concerns about how much those outside of the meetings were aware of the project at this stage...(the wider industry is) <i>sort of aware but they could know more about its purpose – could be more industry association involvement.</i> • Attendees at the Lockyer Valley Experimental Forecast forums were asked about the impact exposure had had on them and their usefulness - 80% at the November meeting responded that the forecasts were moderately or quite useful. 77% of attendees at the September Granite belt meeting also rated them as moderately or quite useful. |
| <p>Challenges and Opportunities</p> | <ul style="list-style-type: none"> • Previously a challenge was raised in being able to get an operational product out of BOM at end of the project. Other challenges revolved around the need for accuracy and hence confidence in the products and in getting the information out to the broader group of growers. • Challenges raised in the more recent interviews were also focused on the need to ensure longer term and more accurate forecasts - with an edge over existing forecasts...<i>when you compare it to other information sources (e.g. Landline) they're coming out with long range forecasts that are equally as accurate and for a similar sort of time frame.</i> Local specificity was also raised...<i>very different climate to 50 kms either side of us as we are always 6 degrees hotter or colder – would be good to have something a bit more specific.</i> The need for information on wind speed and direction was also raised by a grower. • Increasing lead times was also raised... Need more notice for major weather events e.g. with the heatwave... <i>The more notice we can get about particular heat events the more we can plan and put things in place to mitigate the effects...</i> <i>The more time you have the longer you can run the trials – you can find out how accurate you are with long term forecasting</i> • Reducing the complexity and increasing the ease of understanding trends and implications was also raised: <i>The way they present it is very hard to understand. We don't really need to know the finer details and they work on average but that changes</i> |

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| | <p><i>every year so farmers get confused; and BOM site is that it seems to have so much information that you can get lost quite easily</i></p> <ul style="list-style-type: none"> • The on-going drought situation was seen as a limitation...<i>can't do much about the drought situation and because of the seasonal weather they have been sending out heatwave alerts as well as rainfall.</i> • The other challenge – and opportunity - was expanding the work that has been undertaken to date: <i>The knowledge is there; the technology is there - is there enough budget to get it done; Getting it rolled out further afield. I deal with the Granite Belt and the Lockyer one, but we have growers around the country so that'd be the challenge getting it further out there; and These sorts of things do really well if they are driven by a larger industry organisation (e.g. Growcom, Granite Belt Growers Association or QLD Strawberry Growers), if you want to get that real penetration into an industry having those guys on board gives it another level of credibility and drive.</i> • Reviewing what consumer needs are and responding to those needs and to continue being available for discussion was seen as an opportunity. |
| <p>Perceived Potential Benefits and emerging impacts</p> | <ul style="list-style-type: none"> • Previous benefits reported referred to: changes in the way the BOM was displaying forecasts; improved BM understanding in relation to Horticulture; raised awareness of Queensland growers in relation to heatwave forecasts; and the potential benefits for decision making related to weather. • The involvement with the BOM continued to show benefits – a meeting at BOM head office (Dec 2019) strong positive feedback on impact of project information on BOM R&D and Agriculture program. ... <i>This is critical information to help us target future improvements to our ACCESS-S modelling system that will lead to improved uptake of and benefit from Bureau multi-week/seasonal forecasts by the horticulture industries.</i> • Stakeholder feedback was that the information was continuing to be used by collaborators in decision making: <i>Very informative and it's great for forward planning of our planting schedules; Allowed me to hold things back or move things forward depending on the data that's been given to us, so that we can pre-plan things 6 months ahead; Definitely made our business more cautious regarding making decisions moving forward, so I'm using the data to hedge my bets on what we need to do; Getting information from BOM and making things clearer for us to understand; Phenomenal! From a producer's point of view to able to get the long-term outlook is really amazing; The potential of the project is really great because it applies to our business in making decisions 3,4 or 6 months ahead.</i> • The common view was that <i>long term benefit of this system is you save loss of production; and better informed decisions – with the modelling you have an insight into what the future holds for that 3-4 months period. Even though it doesn't make you money, it can save you money by the decisions you make based on that information.</i> • Practice change numbers: 115 producers/growers across 13,800 ha (as recorded on YourDATA) – for example: <ul style="list-style-type: none"> ○ Collaborating DCAP vegetable business and supply chain managers have indicated they have developed an improved understanding of climate drivers, BoM operational forecast products and consider the DAF 7 experimental forecast and bi-monthly updates a useful source of extra information when making business planning decisions. ○ Electronic anonymous survey responses from our collaborators during local update meetings indicate their business decisions are impacted and influenced by our experimental forecasts. |

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| Evaluation overview | <i>This project is viewed as being on track despite significant interruptions of drought, floods and COVID-19. The project has continued to be very collaborative and linking in with other DCAP projects and other stakeholders in running events and activities. Engaging producers experiencing ongoing drought and providing resources and tools to meet the different grazier contexts remain a challenge although a large percentage of those who have engaged report having made a change to their management as a result.</i> |
| Interviews | 8 nominated stakeholders (average awareness 7.9/10 – all but one with very high awareness) |
| Progress | <div style="background-color: #76b82a; color: white; padding: 5px; text-align: center; font-weight: bold; margin-bottom: 10px;">ON TRACK</div> <ul style="list-style-type: none"> • COVID-19 impact: Grazing Futures team is adapting and ramping up Zoom/webinar delivery of activities (e.g. virtual paddock walks, field day). A number of planned events had been cancelled or postponed. There is a high level of awareness of not overdoing online delivery with producers and delivering services based on their needs and issues. Minimal impacts are expected on the project and milestone delivery although this could become more significant if restrictions continue – or a re-imposed. • The general view of the project team and stakeholders is that the project is progressing very well – despite unforeseen challenges with the earlier flooding and then COVID-19. There were positive comments about the management and running of the project. |
| Key Outputs to date | <ul style="list-style-type: none"> • Previously reported outputs have included the GF database and recording system being trialled; modelling of a typical operation in the Northern Downs; and a Grazing framework. • <i>Key Project Documents and Templates booklet has been AWESOME – so much information at the start of a program, it's brilliant for reference.</i> |
| Highlights and New Insights | <ul style="list-style-type: none"> • Highlights described were around the flexibility of the project and its adaptive nature given the distance, different issues and variable environments in which it is working. |
| Collaboration | <ul style="list-style-type: none"> • Previous feedback on collaboration reported strong engagement across a number of DCAP projects, facilitated collaboration between partners and on-going collaboration with regional partners such as AgForce. • The project team and stakeholders have continued to report a lot of the benefit from the strong collaboration between members and other stakeholders with networking and building – described as a providing a single point of contact for extension providers. An example was given of a four day Grazing Futures workshop last October in Townsville - <i>really encouraging and motivating to meet people with very similar objectives but coming from totally different areas and regions with different challenges and opportunities but with an overarching goal.</i> • The collaboration was seen as going particularly well over the last 12-18months - <i>it's really hit it's straps.</i> The range of collaborators is good and the potential for those collaborators to work towards business and drought resilience in the clientele is really high. The relationship between DAF and DES was seen as going well. |
| Stakeholder Awareness and use of products | <ul style="list-style-type: none"> • Outside of their usual involvement, six of the eight stakeholders (75%) had seen information about DCAP from other sources – e.g. emails, word of mouth, Climate Mates, Events, Reports. • Previous reporting highlighted the large number of industry training events and activities that were led or partnered by the team, the high participation of graziers and industry stakeholders. Workshops were rated highly in terms of value with a high indication of participants acting on what they had heard. A survey in May 2019 of 59 graziers indicated that half had made changes as a result of engaging with the project |

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| | <ul style="list-style-type: none"> • A 'Better forecast, better production' climate focused webinar was produced with NACP (USQ 4) with 40 participants across two webinar sessions. It was reported that attendees were <i>highly satisfied and thought it valuable</i>. All felt they had gained a skill or new knowledge to apply to making management decisions. • Stakeholders reported that the project name 'Grazing Futures' was getting more recognised (perhaps more so than DCAP as a brand)... <i>people are seeing its application to drought situations for themselves to learn from...although another pointed out that (I) don't think that graziers pay much attention to who the provider is; however they do know when they can't get access to a service that they need and/or they do appreciate when they can get access to activities that are run under the DCAP banner</i>. Another was of the opinion that <i>most graziers seem aware of it and who the main players are and what opportunities are available to them</i>. • There was a view that the project had made gains in engaging within the project with graziers with a comment that it was <i>good to see repeat engagement and slow but steady growth in numbers of people coming on board</i>. A stakeholder said they were impressed with the engagement they have achieved in challenging circumstances. • On the other hand, there were some concerns that awareness needed to improve with comments by some stakeholders about awareness by producers was still low and one comment that <i>If new people come on aboard they don't necessarily get to attend meetings, so those people in those agencies might not be aware so much</i>. • There were some comments from stakeholders about personal use they were making of products: <i>(I) get official reports sent to me and I also contribute to those reports and they're all really beneficial to get up to speed on the project; (I) use very regularly the online tools on Long Paddock. I refer to the forage reports quite extensively</i>. |
| <p>Challenges and Opportunities</p> | <ul style="list-style-type: none"> • Previous challenges raised included: external events (drought, floods, industry politics); ability to cover the large area; need for individual follow up; heavy workloads; improving extension processes and the lack of consultants in terms of legacy. • Current challenges raised included the impact of drought and the difficulty with people implementing recommendations... <i>Hard when people are in survival mode to be doing any sort of practice change; and the main challenge would be to continually carry the message that whatever it is that they (the deliverers and the collaborators) are doing, how does this apply to the drought situation and how will this help me build my resilience in the face of drought and how will this improve my situation after the drought</i>. This concern was raised in different ways by stakeholders - <i>While I think the project is providing good activities, it's not always clear to people who are attending how they can use these to better prepare their business and their production system for drought</i>. • Engaging people in drought was seen as a problem... <i>Challenge in engaging landowners or graziers, when they are challenged with seasonal conditions such as the drought; Challenging because of no or low rainfall</i>. Distance was also seen to be a problem with engaging. • The need to provide different products for different types of producers was also raised...<i>There are producers that are very aware and active and producers that are not active at all and have a very basic understanding – those need different information so it is difficult to engage them all in the same project; More thought on the topics of how to assist each person to follow through – someone locally who can follow through and give a bit of assistance would be fantastic. Someone to touch base and check if they understood it and find out the next step</i>. • The project was described by one stakeholder as <i>quite ambitious in its goals and objectives - challenging to measure and quantify benchmarks of what the change can be over 2000 or 3000 graziers</i>. The <i>very limited funding opportunities in the way of grants for the bigger projects; Perhaps a little underfunded for the amount of expectation timewise for the things they want done- e.g. the 6monthly follow up with all the people who have participated in the program. Just to ring everyone is a huge time factor let alone all the case studies etc</i>. • This was seen to be confounded by the relative inexperience of some staff... <i>and while they have grown in capacity and capability it brings limitations to what can be achieved</i>. |

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| | <ul style="list-style-type: none"> • An opportunity was seen in being able to formalise some sort of producer program to get recognition for having gone through a climate variability training or one-on-one extension work. • Another opportunity raised was to...<i>build together rather than organisations going down their own path and just doing things alone.</i> • Improving extension and better engaging the industry was raised as an opportunity - <i>Encouraging people to be actively involved in those meetings which does come down to a cost of course and just to encourage them to attend anything that we do. More involvement of producers in the region regarding the service and information that they would like.</i> |
| <p>Perceived Potential Benefits and emerging impacts</p> | <ul style="list-style-type: none"> • Previous feedback was very optimistic about the project potential and the benefits it could bring to building resilience – in the broadest sense. • This optimism has continued amongst the team and stakeholders aware of the project: <i>Potential is high – they've got the connections to the grazing industry, the collaborators to work with them and there is so much willingness to do; and Made a difference with certain individuals – has the capability and capacity across the project area.</i> • DCAP presence/presentations was viewed as beneficial at the Grazing Futures networking Townsville event (over 50 participants including DAF, NRM, JCU, CSIRO, MLA, Industry Recovery and agribusiness representatives). • Grazing Futures events were reported as resulting in producers gaining new knowledge and skills (35%). Grazier enquiries (2) indicated some impact on awareness; there was an <i>assumption</i> that 10 industry presentations and 12 networking opportunities will have impact on target audience awareness of DCAP project. • There was a view that <i>the stimulus platform is not perfect but it is a quantum leap to what existed previously – it has grown the capacities and capabilities of the DAF staff.</i> A stakeholder noted this was the first time they had service in the west and another was confident that, given the length of the project, <i>producers could be put in the right direction.</i> • Based on participant feedback from Oct-Dec 2019 events (21) 24% of producers intend to make a change in the next 12 months and 16% will make an immediate change within their business • There were optimistic comments about the project potential (e.g. by the end of the projects I would like to think there are outputs that would be a value to industry managing climate going forward; has huge potential and really good thing for the west - will take a while and capacity building within our team and they are certainly developing very good skills and a very good network) • Importance of project in building resilience was seen as a key benefit (e.g. all about resilience so the broader approach to that - even the mental health aspect) |

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| <p>DAF 9</p> | <p>Forewarned is forearmed: Proactively managing the impacts of extreme climate events</p> |
| <p>Evaluation overview</p> | <p><i>The project is on track with stakeholders despite issues around COVID-19. The experimental nature of the work is hampering engagement to some degree and the ability to promote the outputs – with useable products not available to the end of the project. The project is increasingly collaborating with other DCAP projects and has a positive mutually-beneficial relationship with the BoM. Industry stakeholders who have been exposed to the experimental forecasts are very positive about they have seen and how it can benefit the industry (there are also potential benefits outside of agriculture).</i></p> |

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| Interviews | 2 Project leaders and 4 nominated stakeholders (average awareness 5.8/10 – two very involved and two with limited involvement) |
| Progress | <div style="background-color: #4CAF50; color: white; padding: 5px; text-align: center; font-weight: bold; margin-bottom: 10px;">ON TRACK</div> <ul style="list-style-type: none"> • COVID-19 impact: Despite potential impact on IRG feedback if the opportunity for face-face and one-one is restricted, the project is seen as being on track. Planned activities such as the on-ground climate mate training was postponed. • It was reported by the project team that there were no major hurdles - <i>people communicated well and any issues addressed before they turn into anything major.</i> • Stakeholders reported that there was regular contact with Neil and his group <i>and the progress has been great</i> and that <i>the tools and information they are producing are quite good, if they could get that accuracy it could be very beneficial.</i> |
| Key Outputs to date | <ul style="list-style-type: none"> • The experimental forecast is up and running. • New products for extreme rainfall have been added to the FWFA website. • A case study has been completed about one sugar industry user and how they perceived the value of the site and value of products on the site and the benefits they have managing to achieve in terms of bio security impacts. This was drafted and circulated to other projects. |
| Highlights and New Insights | <ul style="list-style-type: none"> • Previous highlights included: seeing the long-term BoM forecasts; stakeholders referring to having improved confidence in forecast accuracy which enhances their decision-making capacity; and the impact of visual presentation of the data. • Current highlights also centred around improvements in forecasting as well as having an experimental forecast site and products <i>which make it easier</i>. Specific project gains were described as: <ul style="list-style-type: none"> ○ <i>Producing products delivering a forecast range of different things rather than conventional multi-week and seasonal elements – e.g. forecasts for next two weeks, forecasting distribution of rainfall more effectively, and forecasting rainfall extremes (top and low ranges). forecasts in this format are more valuable for producers providing rainfall and temp forecasts for their business decisions.</i> ○ <i>Bureau have produced multi-time scales and rainfall products in the one product – rather than single products adding up to five, there are multiple products in one suite of products. This is a bonus, to have one product broadened to include more. So will deliver more than expected from the first product to be made operational.</i> |
| Collaboration | <ul style="list-style-type: none"> • Previous feedback on collaboration highlighted the value being gained through collaboration with DAF 7 (Horticulture). • Collaboration appears to have increased in the last period. This has included: with other DCAP projects - <i>where appropriate DAF 9 products are showing up with NACP products – exposure to those product suites and examples are happening;</i> and with other stakeholders - <i>given the distance of people working in the project and with the different groups, some are in University, Government and State Government and independent contractors generally, it has worked really well.</i> • The value of collaboration with the BoM was also raised: <i>Useful feedback over past two years on the experimental products. The bureau has been responsive based on the limitations of their own teams and helped where possible to respond – on how products are presented and how and adding new stations to the data set. They have been good to work with; and A good example would be one of the forecasters bureau is putting out at the moment and I had a suggestion which I thought it would make it easier for producers to use that information and I think in a couple of hours they were emailing the bureau staff and said that we think it is a good idea and we will be including that in our forecast.</i> |

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| <p>Stakeholder Awareness and use of products</p> | <ul style="list-style-type: none"> • Outside of their usual involvement, two of the four stakeholders (50%) had seen information about DCAP from other sources – one respondent mentioned MLA emails. • Previous feedback on awareness and use of products highlighted the limited awareness at the time although those stakeholders who were aware referred to the usefulness of the project outputs and tools that they had seen and some use of information. Reports were seen to be valuable in providing resources to extension. • It was explained by the project team that <i>the big challenge is industry engagement through reference groups (working with three beef and one sugar group). Face-to-face promotion in different activities – whenever we have workshops with sugar or grazing, we present products as works in progress promoting at those venues – been useful. Working with experimental products was seen as a limitation: One of the issues is that we are producing experimental forecasts so it is hard to engage and get excited about it till it is publicly available. Trying to engage with sugar industry to see which match of products best fits their decisions then to develop narratives and case studies showing this as an output and how it can be applied to their decisions.</i> • Stakeholders interviewed have referred to awareness of more products, email forecasts and reports completed with one noting...<i>this whole thing is no longer a pipe dream, the tools are actually real!</i> A stakeholder noted that...<i>it is interesting to get the emails they send out but they also send out the forecast from different parts of the world organisations and agencies and that has been interesting and I guess this forecasting tool I use in conjunction with other tools I can access so I am always comparing.</i> • The long term nature of the forecasts was seen as an advantage: <i>As end-users we're always looking for something a lot longer term – [as a result of the DAF 9 forecast] I knew about forecast for today 25 days ago – and in our business that's critical; and Neil was showing us an actual breakdown of the week e.g. saying we think it's going to be a wet month but it actually looks like being the last week of the month. So that is really useful information.</i> • Stakeholders seemed unsure about how well the project and its outputs were known in the industry. One reported that local stakeholders were aware; another (Charters Towers) did not think it was well-known; another noted a lack of a recent update to the industry as a group – although it was pointed out that...<i>Neil presented at the project at the catalyst forum which was a lot of industry people.</i> |
| <p>Challenges and Opportunities</p> | <ul style="list-style-type: none"> • Previous challenges raised included: distilling the depth of information down to important outputs for users; meeting accuracy expectations of users; providing the assistance needed to interpret forecasts; communicating information in easy to understand and accessible ways; the need for more trialling; and the need for increased communication with industry. Opportunities included looking at wind forecasts and being more engaged with industry. • Current challenges highlighted the experimental nature of the work not operational until the end of project. As a stakeholder put it, <i>about 6 months ago I started to get really excited because it looked as though there was something happening but then I realised that with this type of information you can't race it through. It has to be really tested for accuracy etc. so we just have to wait.</i> The project team emphasized that <i>products are all experimental. Producer reference groups have to bear in mind these are experimental rather than actual products to test. Ordinarily with forecasting tools, they would be able to assess how they would be able to apply them. But we are encouraging them to regard these as experimental and to take a conservative view and not make decisions. This hamstrings their capabilities.</i> • Engaging with reference groups was raised as a difficulty...<i>engagement with reference groups difficult. The products are experimental and face to face works best.</i> This was further explained: <i>Engagement with reference groups has not been as good as could have been. It is more of a one way flow of information. Not as active engagement as might have been with either face-to-face or different engagement techniques. Users have been invited to webinars, but there has only been patchy engagement. Where contacted individually it has been reasonable engagement, but depends on people responding to emails.</i> |

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| | <ul style="list-style-type: none"> • Another challenge raised was crop factors: <i>Cane potentially has an issue because it's in the ground for 5 years so you plant it and then in year 3 you get the worst year but don't know it; and all the other external factors (like COVID now) and also sugar prices, so that even if you have the best possible tools available to help with planting decisions etc things still don't go right.</i> On the other side, a stakeholder noted...<i>I really think it's excellent particularly for short term crops.</i> • A number of opportunities were raised to progress the project and understanding about it. These included: <ul style="list-style-type: none"> ○ Developing training modules as a solution to limited interstate travel ○ Producing more narratives and case studies to show value and to show impact. ○ Have extension people explaining it and encouraging use – and getting tools in the hands of actual end-users ○ Fine tuning the trial products so they are simple to use – and that they are relevant and accurate – this will ensure uptake. ○ Include in the Best Management Practice Framework ○ General awareness raising including demonstrating how forecasting products could add value. |
| <p>Perceived Potential Benefits and emerging impacts</p> | <ul style="list-style-type: none"> • Previous benefits and impacts raised included: potential production gains through improved understanding/interpretation of forecasts and hence improved decision-making; and environmental benefits through better guiding Nitrogen application. • The project was described as potentially adding value or saving costs through: e.g. <i>Extreme rainfall product – matching to nutrient management decisions and forecast products could be used to defer or change fertiliser application options based on that forecast. Otherwise they might lose fertiliser off blocks which would then run off into the Barrier reef. So there are financial and environmental costs to using the forecasting products.</i> • The benefits that could be gained from better forecasting were understood by stakeholders interviewed: <i>The accuracy of three months out prediction is excellent. And also the fact that it's now not just rain but also days above 35 degrees so for graziers, that type of information is critical for animals; and We grow sugar and peanuts and soybeans and a lot of the time we're making decisions based on a 5 or 7 day weather event and not really knowing what's going to happen. So we see this tool as allowing us to make long term decisions as in 30 or 60 or 90days which helps in making a better commercial decision.</i> • Benefits were also seen from the milling side: <i>this has been an excellent project for a sugar milling company where we make lots of decisions around rain weather events and cold weather events; the sugar industry is really struggling to survive particularly in our region so that any tool we can get to help make good commercial decisions is going to be a god-send and I believe will actually help save the local industry.</i> • Benefits were seen to potentially go beyond agriculture: <i>Overall very exciting. Should have good outcomes not just for agricultural but any sector interested in weather (tourism, mining, local government). It will have applications and use beyond agriculture.</i> • Practice change numbers: 5 producers/growers across 8,000 ha and 1 Other (as recorded on YourDATA) – for example: <ul style="list-style-type: none"> ○ DAF staff using FFWF to schedule control methods for red witchweed control in cane growing areas. ○ As a result of on-one-on discussions about a Southern Hemisphere Major Stratospheric Warming event that was predicating drier than normal spring, five producers indicated they would continue to prepare for drier than average period ahead by ordering more feed, improving water supplies and further reducing stock numbers. |

2.3.1 Innovation Project Updates

The five innovation projects are at various stages of development. COVID-19 restrictions have caused some problems with engagement in three projects (DAF IP4 being postponed until 2021) with others progressing and making headway with some minor issues.

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| DES IP1 | PROGRESSING |
| Improving AussieGRASS | <ul style="list-style-type: none"> • Model Speedup Subproject – delays on fine scale memory alignment improvements – consultant unavailable for 2 weeks; new 1 km resolution model input grids completed and tested; rarely used model subroutines such as tree growth, harvesting grass for biofuel and synthetic fire have been tested at 1km. • Model Calibration Subproject – latest stock numbers and updated SILO data have been incorporated into the calibration runs. There are some issues – PEST diagnosis software; automated iterations. |
| ANU IP2 | ON TRACK |
| Consensus Forecasting | <ul style="list-style-type: none"> • Engagement with stakeholder group limited due to COVID-19 restrictions. • Forecast and case selection achieved – SE and CW Queensland regions confirmed – different rainfall distribution. SE also includes urban. • Data extraction and manipulation achieved – Hindcast data extracted from all five operational models for available period. |
| DES IP3 | DELAYED |
| Affordable rain gauge | <ul style="list-style-type: none"> • Engagement with collaborator network limited due to COVID-19 • Initial orders and development achieved • Test operability achieved – test device functioning well. • Build sample – delayed – 10 devices constructed and basic testing completed – code changes needed to be undertaken. • Test warning system – delayed – delay in producing functional gauges and expanded requirements. • Establish collaborator network – delayed – COVID-19 restrictions at first then waiting for gauge production to robust functional system. • Build sample/prototype – delayed • Develop data ingest and reporting - delayed – moved to Amazon Simple Message Queue and flexible MySQL cloud based systems. |
| DAF IP4 | POSTPONED |
| Ideas bank competition | <ul style="list-style-type: none"> • Postponed until 2021 due to COVID-19 impacting agribusiness |
| DES IP5 | PARTIALLY ON TRACK |
| Animation Storytelling | <ul style="list-style-type: none"> • Story Creation phase complete – partially – Concept and story development phase completed for STATISTICAL animation but still working on ideas for CULTURAL animation. |

3. DISCUSSION AND RECOMMENDATIONS

3.1 Awareness, Reach and Extension

When project team members and stakeholders were asked about challenges facing the projects, there were some common themes. These are:

- **Time pressures and work demands on project staff:** Some projects commented on the level of workload they were experiencing, limitations of staff availability or capacity and the need to complete the work on the tools and outputs in the time remaining.
- **A sense of urgency to increase extension of the work:** There were many comments about the need to make even greater progress in developing awareness and increasing uptake from a number of projects.
- **A concern about attitudes, complexity and willingness of take-up:** Despite the value that stakeholders are seeing from the work undertaken, there remains concerns about how to target the outputs to different groups and break through the barriers and complexity surrounding some of the concepts and decision aids.

There is some good evidence that the DCAP communication efforts are yielding good results. Stakeholders interviewed reported seeing project communication through a number of media and some reported a growing awareness in their industries. It was reported, for example, that in January 2020, the DCAP newsletter was distributed to 8,469 with an open rate of 45.01% and click through rate of 11.18% - with an increased distribution in later editions.

Such communication is critical in providing awareness and in developing interest – and in some cases, directly prompting people to look further and access information (for example, the 11% that clicked through the newsletter), however, the challenges raised above focus on how to facilitate going beyond awareness to break through entrenched attitudes, reduce complexity and gain confidence in the use and value of the products and information in practice. The challenges of drought, floods, distance and COVID-19 all add to this challenge and growing pressures.

Given this stage of the project, there is a need for project teams to take a serious look at what is possible and practical within the resources and time frame left in this project phase and (re)set meaningful goals. The focus should be on:

- Working with engaged producers and other stakeholders in refining the tools, information resource and messages to maximise their usefulness and useability to different groups.
- Continuing to work with the communication team to build awareness and benefits of outputs of the project to raise interest and stimulate active seeking of more information.
- Continuing with extension efforts *within their resources* – and using distant engagement technologies where appropriate.
- Maximising effort to engage, train and motivate those consultants, agribusiness and extension personnel who will continue to work in the regions with producers so they continue as champions beyond the life of the project.

The benchmark survey to be undertaken at the end of this project phase will provide a good indication of progress of awareness, use and potential benefits of the DCAP effort to that point and will provide the basis for guiding further development, communication and extension actions beyond DCAP 2.

Recommendation 1

Each project should review their objectives and planned extension outcomes within the available resources and constraints and plan for a realistic level of achievement with a focus on developing buy-in from continuing agribusiness and extension services.

3.2 Collaboration and Integration

There has been increasing collaboration across the DCAP projects as it has progressed over time. The diagram provided earlier in this report provides an indication of how strong this collaboration is and how it is drawing the different components more closely together. This is a great indicator of good project management and providing space for collaboration. It has clearly benefited a number of project outputs (for example, the animation) and sends a very positive message about project efficiency and cohesion.

When going through the individual projects, however, there is some difficulty in fully understanding where each component sits in relation to the others. There are different emphases in the type and use of forecasts, the industries targeted and the uses intended for them – for example, stocking rates, planning times, insurance decisions. There appears to be overlaps and some lack of connections.

Given the stage of the program, there is a need for an easy to understand diagram depicting these different threads, where they merge and complement each other and how they individually and collectively benefit Northern Australia. The relationship and interaction with the BoM sits at the core of many of the projects and this could well form the centre of such a depiction. There is also increasing evidence of the potential contributions and which sectors/groups can benefit from these.

Recommendation 2

A schema should be developed depicting the relationships between the different projects and outputs and how they complement each other and benefit different decision-makers across Northern Australia.

3.3 Impacts and Measurement

The Benefit Cost Analysis currently being completed is indicating a sound return on investment from the project work across DCAP. This is very encouraging and shows the potential benefits that can flow from investment in a project on this scale. It has certainly progressed the thinking and tools available around improved decision making in such a variable climate - when profits and business survival are so impacted by climate.

As discussed at the start of this section, to realise these benefits, the information and tools need to be known, understood, seen as beneficial and consequently used by decision-makers. As pointed out, it is not as simple as just making people aware of what is available. While formal Benefit Cost Analyses are useful when demonstrating the value of a project investment, individual business owners need to be convinced that an innovation is of value to their business and worth the effort and investment to use.

Some projects – for example DAF 7 - have provided narratives/examples of direct benefits to individual business using the information. Others have this information built into products and reports. For individual businesses to seriously look at uptake and for DCAP to clearly demonstrate to investors that the Benefit Cost Analyses indicative returns can be realised, there is a need for detailed on-the-ground case studies where 'real businesses' have used information, frameworks and tools and demonstrated benefits – and can provide practical feedback to benefit their peers. While there has been some progress on case study development (e.g. DAF8 and USQ4) to date, more needs to be done – specifically in capturing project influence and indications of economic or social (e.g. reducing uncertainty) benefits in this final stage of the project

Recommendation 3

Increased emphasis should be put on capturing economic case studies of real businesses using and benefiting from the outputs of the different DCAP projects.

APPENDIX 1: DCAP LOGFRAME

Program Level M&E Log Frame (original)

| Program levels | Program Projects, Activities & levels | Performance Measures | M&E Methods |
|----------------------------------|---|---|---|
| Long Term Goal | More resilient and productive primary production able to better plan, adapt and manage drought and climate variability. | Trends in rural industry performance over time in relation to previous performance – especially in the face of extended challenging conditions: <ul style="list-style-type: none"> • Numbers of enterprises • Productivity • Profitability • Social indicators • Environmental indicators | <ul style="list-style-type: none"> • ABARES • Other industry statistics • Case studies |
| End of program Objectives | <ul style="list-style-type: none"> • Increased scientific capacity and tools to monitor, predict, advise and plan for climate variability. • Increased awareness, understanding, skills and capacity of industries and producers to make most effective use of tools and information supporting their management of drought and climate variability. • Increased uptake and application by industry, producers and their advisors of available tools, information, practices and strategies to more effectively manage and be productive and profitable in a variable climate context. • Benefits arising from use and practice changes made by industries and producers. | <ul style="list-style-type: none"> • Extent of increased scientific capacity and tools available for purpose across the projects – numbers, types, access, reliability, gains in skills and knowledge by researchers. • Extent of gains in awareness, understanding, skills, confidence, access and the extent of use of tools and knowledge, actions within the target industries and producer communities (type, size, locations affected). • Actual or indicative costs and benefits arising from use of information and tools. • Barriers and issues emerging through program and projects. | <ul style="list-style-type: none"> • Collated M&E impact data from across participating projects provided in a consistent format and metrics. • Survey/interviews with informed persons and industry representatives re project engagement and impact. • Selected narratives and case studies showing impact of tools, information, training and/or extension on changes made and their benefits. • Benchmarking promoted web-survey of producers in the program/project target zone in relation to their awareness and use of tools and practices – at |

| Program levels | Program Projects, Activities & levels | Performance Measures | M&E Methods |
|---|--|--|---|
| Communication & extension projects and activities | <p>Overall Program Communication Activities:</p> <ul style="list-style-type: none"> Website Newsletter <p>Specific Project Extension Activities:</p> <p><u>Proactive engagement with end-users</u></p> <p>DAF 6:</p> <ul style="list-style-type: none"> 7 x 2-day workshop in each region with a 1-day follow up <p>DES 2:</p> <ul style="list-style-type: none"> Electronic quarterly update Newsletter, Bi-annual workshops for the investigators An annual forum for partners and regional stakeholders A national workshop in Year 3 <p><u>On-going industry engagement</u></p> <p>USQ 5:</p> <ul style="list-style-type: none"> Facilitated discussions (workshops) between farm businesses and insurance industry <p>DAF 7:</p> <ul style="list-style-type: none"> Active engagement and two-way communication with supply chain participants through targeted workshops Recommend to BoM the development of Operational Products from these experimental forecasts, which will improve the capacity of primary producers to manage climate variability <p><u>Underpinning support for all projects</u></p> <p>DES 3:</p> <ul style="list-style-type: none"> Provide on-going social scientific knowledge and expertise to support the responsive, user-friendly design and implementation of drought-related decision support tools, and increase their adoption in targeted groups | <ul style="list-style-type: none"> Appropriateness, quality, reach, engagement, access and reactions from participants engaged in extension and communication activities across projects. Value that underpinning support provided in the extension and communication process. | <p>commencement of project and at intervals/completion.]</p> <ul style="list-style-type: none"> Collated M&E engagement and feedback data from across participating projects provided in a consistent format and metrics. Questions in other survey/interview cross-project activities. [Annual] Interviews/surveys with project leaders |

| Program levels | Program Projects, Activities & levels | Performance Measures | M&E Methods |
|----------------------------------|--|---|--|
| | <p>USQ 4:</p> <ul style="list-style-type: none"> Integrate and embed climate forecast information into northern Australia grazing industry - Grazing BMP, Business Mentoring for the Australian Meat and Livestock Sector, GLM Edge, and PGS. | | |
| <p>Products and Tools</p> | <p>Products for understanding underlying science:</p> <p>DES 2:</p> <ul style="list-style-type: none"> A time series application-ready online database High-resolution long-term datasets from selected sites Identification of new or improved flood management <p>DES 3:</p> <ul style="list-style-type: none"> report for consultation containing recommendations regarding the policy drivers that can best enable stakeholders to work together to negotiate the 'cultural' transition to drought resilience and adaptiveness [Potential] literature reviews, research syntheses, and extension material <p>USQ 4:</p> <ul style="list-style-type: none"> 'flash drought' prototype forecast improved seasonal forecast prototype products <p>USQ 5:</p> <ul style="list-style-type: none"> Matured 'market ready' insurance products for sugarcane and cotton industries – Tailored climate information systems and seasonal forecasting systems Detailed affordability analysis with farmers/farmers' organisations Clear recommendations on maintaining sustainable insurance Policy documents indicating success of different government support options. User friendly decision support tool <p>Tools for extension and training:</p> <p>DAF 6:</p> <ul style="list-style-type: none"> Herd/flock models and case studies; Synthesis report | <ul style="list-style-type: none"> Number, type, purpose, appropriateness, accuracy, rigour, quality, user-friendliness and accessibility of products and tools developed. | <ul style="list-style-type: none"> Reports from projects. Evidence of peer and user review and testing Feedback from questions on surveys, interviews or feedback forms [Annual] Interviews/surveys with project leaders |

| Program levels | Program Projects, Activities & levels | Performance Measures | M&E Methods |
|--|--|---|--|
| | <p>DAF 7:</p> <ul style="list-style-type: none"> • Documented management decisions • Enhancement of the POAMA Experimental product <p>General project and program products and outputs:</p> <ul style="list-style-type: none"> • Milestone and final reports • Papers, chapters and books | | |
| <p>Research & Development projects and activities</p> | <p>DES1: The Inside Edge for graziers to master Qld's drought prone climate</p> <p>DES 2: Baseline – using paleoclimatic data to plan and prepare for extreme events and floods in Qld</p> <ul style="list-style-type: none"> • Analysis of 2-3000 yr data in 3 regions. <p>DES3: Enabling drought resilience and adaptation: A program of social research and knowledge support</p> <ul style="list-style-type: none"> • Engage directly with drought-affected graziers through social research exploring the cultural contexts of drought vulnerability and resilience, and the socially acceptable changes that can be made <p>USQ 4: Northern Australia Climate Program – seasonal forecasts</p> <ul style="list-style-type: none"> • Fundamental climate research and deliver major advances in multi-week, seasonal and longer-term climate forecasting. • New and advanced products for use in drought monitoring, planning and prediction for producers and policy makers. <p>USQ 5: Producing enhanced crop insurance systems and associated financial decision support tools – Phase 2</p> <ul style="list-style-type: none"> • investigate how re/insurance companies, agricultural industries and government can establish and maintain a liquid and viable market for agricultural insurance in Queensland, and Australia. <p>DAF 6: Delivering integrated production and economic knowledge and skills to improve drought management outcomes for grazing systems</p> | <ul style="list-style-type: none"> • Type, purpose and extent of R&D as per plans – completion of trials, demos, and reports results. • Rigour and reliability • Extent of involvement of end-users in research planning. • Issues, barriers and learning emerging from the process | <ul style="list-style-type: none"> • Collated data from across the projects • Evidence of peer review of results • [annual] Interviews/surveys with project leaders |

| Program levels | Program Projects, Activities & levels | Performance Measures | M&E Methods |
|---|--|--|-------------|
| | <ul style="list-style-type: none"> • Synthesis of scientific knowledge on the effect of drought management strategies on pasture resilience and quality, animal nutrition and productivity. <p>DAF 7: Use of BOM multi-week and seasonal forecasts to facilitate improved management decisions in Qld's vegetable industry</p> <ul style="list-style-type: none"> • Ground-truth ACCESS-S1 multi-week and seasonal forecasts • Document management decisions which can be significantly improved <p>DAF 8: GrazingFutures: Promoting a resilient grazing industry – BMP</p> <p>DAF 9: Forewarned is Forearmed: Equipping Farmers and agricultural value chains to proactively manage impacts of extreme climate events</p> | | |
| <p>Underpinning structures, processes and management</p> | <ul style="list-style-type: none"> • Organisational involvement • Overall Management and coordination. • Advisory and management committees • Budget • External factors impacting on program and projects | <ul style="list-style-type: none"> • Extent of partner and project leader satisfaction with the management processes and support • Extent of satisfaction by management and advisory group members of their role and input • The meeting of program reporting requirements and budget management • Issues and barriers impacting on program management | |

APPENDIX 2: M&E ACTIVITIES

The following table summarises the M&E activities underpinning this report

| M&E activity | Details |
|--|--|
| Report writing | <p>Reports are based on data collected through M&E activities and align with the DCAP M&E logframe developed at the beginning of Phase Two.</p> <ul style="list-style-type: none"> • 2 annual reports • 4 snap-shot reports • 2 industry benchmarking reports |
| Annual stakeholder survey | <p>Project leaders and the DCAP management team were asked to provide contact details of stakeholders who could provide feedback about their project. Interviewees included (actual numbers interviewed are included in project summaries in main body):</p> <ul style="list-style-type: none"> • Project leaders/team members • Stakeholders • Project Participants • Others • Steering Committee Members |
| YourDATA development and management | <ul style="list-style-type: none"> • Deployed a new section to capture Innovation Project reporting data • Updated Milestones for various projects. • Added/modified some data fields based on project feedback (e.g. research interviews) • Added new users as required • Added new feedback sheets as required • Provided technical support to Project Manager and Project Leaders as required – all issues successfully resolved. |
| Supporting project leaders | <p>This includes participating in team meetings as well as consulting with individual projects (e.g. NACP)</p> |

| M&E activity | Details |
|----------------------------------|--|
| Supporting documents | Coutts J&R produced documents include: <ul style="list-style-type: none"> • July 2020 Annual M&E report (this document) • M&E Snapshot Report (Feb 2020) • July 2019 Annual M&E report |
| Technical Reference Panel | Two meetings with the TRP. Panel members are: <ul style="list-style-type: none"> • Facilitator – Jeff Coutts (Coutts J&R, Toowoomba) (DCAP M&E service provider) • Graeme Anderson, Climate Specialist, Biosecurity and Agriculture Services Branch; Department of Jobs, Precincts and Regions, Victoria • Mark Howden, ANU • Scott Power, BOM • Andrew Ash, AJ Ash and Associates, Queensland (2019 +) <p><i>Technical Reference Panel support staff</i></p> <ul style="list-style-type: none"> • Land Management Unit Director – Vern Rudwick (DAF, Brisbane) • DCAP program management – Neil Cliffe (DAF, Mackay) • DCAP program support – Damien O’Sullivan (DAF, Kingaroy) |

APPENDIX 3: PROJECT MILESTONE UPDATES

Current Status Key:



Achieved



On-track



Delayed

Note: Only includes milestones with updates recorded in 2019/20 (data accurate as of 13.7.20)

| Milestone | Due Date | Milestone Description | Updates | Current Status |
|--------------|---|--|--|----------------|
| DES 1 | The inside edge for graziers to master Qld's drought prone climate | | | |
| 3 | 30/04/2018 | Develop an extension training package for DSITI's FORAGE Pasture Growth Alert report and deliver it through the DAF extension network and promote through the Long Paddock and Future Beef websites to complement existing extension training packages for FORAGE reports | Achieved (15/07/2019) The release of the FORAGE Pasture Growth Alert in late May 2019 has been actively promoted on social media and FutureBeef and DAF eBulletins. DAF extension officers, consultants and climate mates are aware of the Pasture Growth Alert, and promoting it, together with the efforts by DES officers at workshops, meetings, webinars, face-to-face and conferences. An awareness video is being finalised. | |
| 4 | 31/12/2018 | Work with both DAF sorghum cropping and beef extension officers, producers and consultants to learn from the successful approaches used in cropping to develop simple rules of thumb in response to seasonal forecasts i.e. selecting seasonally and regionally suitable hybrid cultivars and management agronomy for sorghum cropping. Similarly, for grazing systems we propose to test and convey simple rules of thumb, if possible, for moving/selling/buying/agisting livestock numbers and pasture management techniques including paddock spelling and the use of fire | Achieved (15/07/2019) Rules of thumbs have been developed for the grazing industry, based on past, existing and future conditions. The Pasture Growth Alert is based on these. Assessments for sorghum cropping have been developed as well. | |

| Milestone | Due Date | Milestone Description | Updates | Current Status |
|-----------|------------|---|--|---|
| 5 | 31/05/2018 | FORAGE Pasture Growth Alert report available for general users to subscribe to on the Long Paddock website | Achieved (15/07/2019) The prototype FORAGE Pasture Growth Alert was released and made available on the Long Paddock website in late May 2019. Users are able to subscribe for a monthly, 2-monthly or 3-monthly update in their email. It has been actively promoted on DAF and FutureBeef social media, and eBulletins, and will be further promoted in speaking slots at NBRUC and Australian Rangelands Conference. |  |
| 6 | 30/11/2018 | Complete the first stage of quality control and quality assurance of GRASP calculator with enhanced parameterisation and validation from grazing trials and satellite-derived data | Achieved (15/07/2019) The first stage of quality control and improvements to the GRASP model have been completed. These include green cover analysis - comparing satellite-derived green cover with modelled green cover, using flux tower and other measurements to correct evapotranspiration calculations, updating land type parameters, and comparison of carrying capacity values with APS spatial records for the property owners' estimates of potential maximum livestock numbers. |  |
| 7 | 31/05/2019 | Evaluation (e.g. liveweight gain, soil loss, potentially financial measures) of climate responsive stocking rate decisions including evaluating the utility of ACCESS-S and other forecast technology combined with an assessment of current antecedent conditions for grazing applications | Achieved (15/07/2019) The use of Access-S in crop and pasture modelling has been compared with existing seasonal forecasting options (POAMA, SOI, SOI phase and IRI forecasts). Access-S did not improve the outputs from crop or pasture models over existing seasonal forecasts. Access-S showed lower levels of skill to predict sorghum grain yield than POAMA. The skill to predict sorghum yields was affected by crop management practices such as soil water content at sowing, planting date and hybrid choice. Modelled pasture growth is better predicted using SOI or SOI phase, but the latter can result in sudden changes in outlook when there is a phase change. IRI forecasts are the most consistent, but not quite the skill of SOI or SOI phase. Use of Access-S resulted in good skill for some situations, but often predicted high growth when there was in fact very low growth. |  |
| 8 | 31/05/2019 | Develop an extension training package for the FORAGE Safe Carrying Capacity report and deliver it through the DAF extension network and promote through the Long Paddock and Future Beef websites to complement existing extension training packages | Delayed (05/02/2020) The long term safe carrying capacity report is only available by request. Support material, including web text, 2-page user guide, a detailed user guide has been drafted and will be finalised when the final version of the report is available on the web. An awareness video, instructional video and webinar will be produced and loaded onto the long paddock website later. Outlines of these support products have been developed. |  |
| 9 | 31/05/2019 | Further enhance the safe carrying capacity report to enable users a "what-if" evaluation of changing property layouts to assess management decisions and climate change impacts | Delayed (10/07/2020) The consultants have completed the updates, and these are in the process of being tested and reviewed. It is expected that the MyFORAGE web interface will be available soon after the release of the Long Term Carrying Capacity report. |  |
| 10 | 31/07/2019 | FORAGE Enhanced Safe Carrying Capacity report available on the Long Paddock Website | Delayed (05/02/2020) The safe carrying capacity report was released at a training day in Rockhampton in November 2019. It is not yet available on the Long Paddock website, as it will be updated with the land type parameters for different regions and improvements made with feedback from the soft release. The report results have been tested against benchmark properties and through a number of options, including feedback through the soft release with extension officers and consultants. |  |

| Milestone | Due Date | Milestone Description | Updates | Current Status |
|--------------|--|--|--|---|
| 11 | 30/11/2019 | Complete the second stage of quality control and quality assurance of GRASP and FORAGE with emphasis on liveweight gain, runoff and soil loss including a documented procedure for management of the DAF/DSIT1 land type parameters which includes version control | Delayed (05/02/2020) The quality control of GRASP and FORAGE has been ongoing, with a range of improvements having been made. The soil water balance model in GRASP/AussieGRASS was independently reviewed through the Queensland Water Modelling Network, and found to be comprehensive and easily able to incorporate many aspects of the impact of climate change. Step-change improvements have been made in the representation of evapotranspiration and nitrogen use. Updates with the land type parameters and liveweight gains are continuing. However, this milestone could be considered to be largely completed. |  |
| 12 | 31/03/2020 | Enabling users to provide property-specific information to improve the accuracy of carrying capacity by including land condition assessments, forage preference and information guided by LCAT and new satellite-derived ground cover products. | Delayed (08/04/2020) The web interface continues to be developed and the improvements are not anticipated to be released until after the FORAGE Long Term Carrying Capacity report is released. LCAT is recently released by DAF, and the LCAT workshops delayed by the COVID-19 pandemic. |  |
| 13 | 31/05/2020 | Evaluation of the benefits of using ACCESS-S and other seasonal forecast technology (e.g. SOI-Phase new baseline, SPOTA-1 long lead, and the International Research Institute for Climate and Society (IRI) multi-model) to achieve greater productivity for the Queensland grazing industry | Achieved (10/07/2020) Different outlook systems have been tested for use in pasture modelling and sorghum growth modelling. Seasonal rainfall forecasts using ACCESS-S1 have not provided significant benefits for estimating the sorghum yield in the season ahead when compared to the previous model (POAMA 2). However the project identified opportunity to use ACCESS S products to support the emerging practice of sowing sorghum, a summer crop, in winter. This practice is designed to minimise the likelihood of heat and drought stresses on the sorghum around flowering, and increase the chances of double cropping a winter crop after an early harvest and short summer fallow. Winter sown sorghum needs to be sown with soil temperatures at sowing depth of 12C or higher; conditions that should last at least for a week or two after sowing. Temperatures below 12C during germination and emergence will cause poor emergence and highly uneven crops. The project identified that ACCESS S1 shows skill to forecast soil temperatures for the first fortnight after sowings during mid-July and early August. When comparing the benefits of different seasonal forecast technology in pasture growth modelling, ACCESS-S is an improvement on the currently-used SOI Phase and IRI multi-model for average conditions, but tends to forecast above average seasonal conditions in years that result in well below average conditions. This is a high risk for farm productivity and resource sustainability, and as a result, AussieGRASS and FORAGE continue to use the existing technologies in pasture growth outlooks. |  |
| DES 2 | Do we really know our baseline climate? Using palaeoclimate data to plan and prepare for extreme events and floods in Qld | | | |
| 1 | 31/08/2017 | Collaborative agreement signed | Achieved (29/01/2019) Progress: <ul style="list-style-type: none"> • Collaborative Research Agreement between DES and Seqwater was an extended process but was fully executed October 2018. • Contract with Dr Jacky Croke, Catchment Connections, Centre for Catchment and Flood Management, was signed in October 2018. |  |

| Milestone | Due Date | Milestone Description | Updates | Current Status |
|-----------|------------|---|---|---|
| | | | <ul style="list-style-type: none"> Formalisation of additional collaborators, University College Dublin and the Victorian Department of Environment, Land, Water and Planning (see attached letter of support from DELWP). Recruitment process for Research Assistant commenced November 2018 and Sahar Mozdhehi was appointed December 2018. Project website planned and commissioned – draft site completed 1/12/2018 with an estimated go-live date of January 2019. Project newsletter planning – stakeholder mapping in consultation with funding partners and collaborators. First edition of the project newsletter planned to be distributed February 2019. | |
| 2 | 31/07/2019 | Collate all proxy meta-data to produce a time series dataset showing the variability of rainfall, floods and droughts over the last 2000-3000 years for all of Queensland | Achieved (30/08/2019) The database containing palaeoclimate proxy records has been completed and is a critical milestone for the project. As the key data repository, proxy records can now be easily extracted for statistical analysis that will underpin the development of a 1000-year long rainfall reconstruction for the three case study areas of Southeast Queensland, Wet Tropic and Fitzroy catchment. The database contains more than 300 climate proxy datasets that span the last 1000 years and have been derived from a range of natural archives. |  |
| 3 | 31/12/2019 | Statistically analyse the dataset to ensure quality assurance | <p>Achieved (04/07/2020) The final set of statistically improved heat map for the expanded area of the Australian continent has been completed and is currently under review by the project team, despite Covid-19 impacting the progress and the expected completion timeframes. Sign off of this technical component for publication by other project team members is scheduled to occur via zoom meeting in early July.</p> <p>The finalisation of this work and associated publication (for submission to Nature Scientific Data) will greatly benefit from the appointment of a new Post Doc, Micha Campbell, due to start in mid-July. Micha's skills in data analysis, programming and experience in palaeoclimate science is a significant achievement for the project. Micha's experience will be invaluable for finalising the database to satisfy the stringent quality requirements of the journal. The timing of this appointment is also significant given the uncertainty and current challenges being experienced within the university sector due to Covid-19, which limited ability of Ben Henley to contribute as planned. The revised publication draft submission timeframe is mid- September 2020.</p> |  |
| 4 | 31/12/2019 | Produce application-ready dataset in the right format for use in stochastic modelling | Delayed (04/07/2020) Progress on the application ready data sets is happening in tandem with the statistical and quality assurance tasks. Preliminary model runs have taken place using selected catchment outputs. The team made the decision to slow the rate of progress on this as we were spending considerable time doing this task and then following preliminary results from the statistical/heat map tasks, would have to re-do the model runs. It now makes better use of time to complete steps above to ensure full compliance and that the resultant data sets are as compliant as possible. It is anticipated this phase will be fully complete by the next milestone report. While it may appear as if delays have occurred, it should be appreciated that the scope of this phase is now at the continental scale, and not at the state or catchment scale. This will significantly enhance the application of the |  |

| Milestone | Due Date | Milestone Description | Updates | Current Status |
|---|------------|--|--|---|
| | | | products emerging from the project but does result in longer model run times. With appointment of a new Post Doc, Micha Campbell, due to start in mid-July, this work should be completed by September 2020. | |
| 5 | 31/07/2020 | Application of the dataset for a test case of water security planning modelling of a selected catchment (e.g. Lockyer in SEQ) | Delayed (04/07/2020) Planning of the stakeholder workshops is currently on hold until the project team investigate alternative stakeholder engagement options with Seqwater due to restrictions to travel and social interactions due to the Covid19. At this stage the stakeholder workshops that were originally planned for June 2020 have been delayed until at least August 2020, and we are investigating the feasibility of running them as online sessions with Seqwater stakeholders. |  |
| 7 | 31/08/2021 | We will organise annual workshops for the investigators and an annual forum for partners and regional stakeholders to discuss research progress, develop criteria for the optimisation of the stochastic modelling and to seek feedback on the application of the science; ~ August 2018, 2019, 2020, 2021 | Delayed (04/07/2020) Planning of the stakeholder workshops is currently on hold until the project team investigate alternative stakeholder engagement options with Seqwater due to restrictions to travel and social interactions due to the COVID19. However at this stage the stakeholder workshops that were originally planned for June 2020 may have to be delayed until August 2020. |  |
| DES 3 Enabling drought resilience and adaptation: A program of social research and knowledge support | | | | |
| 5 | 13/07/2019 | Draft synthesis report on the cultural context of drought resilience and adaptiveness. Containing recommendations for drought policy. | Achieved (27/09/2019) Draft report was delivered on time, feedback has been received and final version sent to (acting) DCAP Manager for uploading on the Long Paddock site |  |
| 6 | | Results from social research integrated into policy advice, co-innovation activities and DSITI knowledge support plans. Throughout the remainder of DCAP2. | On track (09/12/2019) Results of social research communicated to multiple audiences including the Grazing Futures project workshop, the Qld Science Communicators Network, DES climate change policy teams, DES Science partnerships, DES and DAF communications teams, the DCAP Project leaders team meeting. Supplementary document specifying potential actions to meet DES 3 social science recommendations disseminated. |  |
| USQ 4 Northern Australia Climate Program | | | | |
| 4r | 01/01/2019 | Research Project: Research ACCESS-S forecast data to available to interface to decision making tools e.g. Rainman/ClimateARM, GRASP (basic products – daily rainfall, temperature at 5km resolution). Document describing improvements in the latest UKMO GC. Version general circulation model relevant to project needs for Northern Australia. Prototype MJO-based and similar wet | Achieved (1/07/2019) Research Milestone 4 has been achieved. A document outlining achievements that includes images and further detail can be found in Appendix A. The 5km calibrated hindcast and real-time forecast data is now available to USQ to interface to decision making tools. All the variables normally required for agricultural applications are available. This is made available through the following mechanisms: <ul style="list-style-type: none"> All ACCESS-S1 hindcasts are available through the National Computational Infrastructure server |  |

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| | | <p>season onset forecast products available in real time for trial, including supporting documentation of skill.</p> | <ul style="list-style-type: none"> • A research server has been set up at the Bureau to allow USQ to access 5km data from the real time forecasts. This will enable USQ to interface their agricultural models to ACCESS-S data and opens up the possibility of producing BoM prototype products on a USQ cloud server (which would allow further tailoring to users at USQ). This research server is also flexible enough that more value-added ACCESS-S1 data can be provided to USQ (e.g. MJO indexes, monsoon onset probabilities, etc). • BoM has set up an operational data server to provide ACCESS-S1 calibrated 5km data to commercial customers (subscription service). This has the added benefit that any prototype products developed by USQ/BoM based on the BoM research server and run on the USQ cloud server can in the future be transitioned to using the BoM operational server as an operational service beyond the lifetime of the project (subject to potential subscription fees). • BoM will host a visit from USQ IT scientist to explore how best to use the data on the BoM servers to drive models such as GRASP etc. • Further information is available at: http://poama.bom.gov.au/project/nacp/index.htm | |
| | | | <p>Key evaluation work and improvements in the latest UKMO model include: NACP UKMO now have two USQ employees working to improve the next version of the coupled model. Dr Matt Hawcroft working on model evaluation and Dr Sally Lavender working on convection parameterization. The main focus is to improve UKMO GC5 (atmosphere model GA9), which will form the basis for ACCESS-S3; A full report is shown in Appendix B</p> <ul style="list-style-type: none"> • The unique setup of an Australian-based project directly supporting UKMO-based researchers appears to be working well and seems to have overcome some earlier difficulties (e.g. previous projects) to engage with the model development in a meaningful way; • Mean state precipitation and temperature summer (Dec/Jan/Feb) biases over Australia have reduced considerably; • The structure and variability of tropical Pacific precipitation has improved, including the frequency of El Niño occurrence in the model climate, providing promise for seasonal prediction of a key control on monsoon precipitation; • The structure and propagation of the Madden-Julian Oscillation (MJO), a key feature of tropical intraseasonal variability, improves greatly, suggesting greater ability to predict active/break phases may be achievable; • Large reduction in temperature biases in the Southern Ocean, which can impact tropical performance in the model through altering the circulation; • The frequency and spatial distribution of the smaller scale convective events which dominate tropical precipitation generally improve, including over northern Australia; • Certain key errors persist in the model and will be a core focus of work within NACP, including errors in both the mean state and variability of Indian Ocean sea surface temperatures and precipitation, which have impacts in northern Australia via modifying the atmospheric circulation. New diagnostic techniques recently developed at the Met Office will greatly assist in understanding the mechanisms which cause these biases and will allow analysis of their remote impacts; • Looking further forward in the model development pipeline, one of the Senior Research Fellows (SRFs), Sally Lavender, is heavily involved in developing a new convection | |

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| | | | <p>scheme, CoMorph, which will likely be a core component of the next model version, GC5. In the tropics, most precipitation is from convection and the ability to represent the timing and intensity of these rainfall events is key to predicting both local weather and climate, but also has remote impacts since heating in the tropical atmosphere associated with rainfall can substantially modify the wider circulation. Initial results indicate that the new scheme may well considerably improve our ability to represent this key process.</p> <ul style="list-style-type: none"> The work on analysing the Queensland floods of February 2019, both at BoM and at UKMO, has significantly helped to demonstrate the value of the project and mitigate potential funding risks. <p>Prototype MJO-based product:</p> <ul style="list-style-type: none"> MJO index forecasts are now formally part of the ACCESS-S1 Forecast Visualisation Tool pipeline, producing daily-updated forecast plumes out to 35 days of the Wheeler and Hendon (2004) Real-time Multivariate MJO (RMM) index. The skill of these MJO forecasts have been documented in the journal publication: Marshall, A. G., & Hendon, H. H. (2018). Multi-week prediction of the Madden-Julian oscillation with ACCESS-S1. <i>Climate Dynamics</i>, 52, 2513-2528. <p>Northern rainfall onset (NRO) product:</p> <p>The NRO product is now formally part of the ACCESS-S1 Forecast Visualisation Tool pipeline http://poama.bom.gov.au/access-s1/nacp/, producing real-time forecast maps showing the probability of earlier than observed median onset for the 2019/2020 wet season. The first forecasts shown are initialised on 22 June and indicate a strong likelihood of later than median onset across the far north, consistent with POAMA forecasts. The NRO calculations are performed on the calibrated precipitation forecasts.</p> <ul style="list-style-type: none"> The skill of ACCESS-S1's hindcasts of the NRO over 1990-2012, as well as observed NRO dates, variability and trends (and supporting documentation) can be viewed at: http://poama.bom.gov.au/project/nacp/nar_obs.html; included in the skill assessment of the NRO for each year are maps of the probability of early onset, percentage correct, and Brier skill scores. Hindcast skill of ACCESS-S1 for the NRO presented at AMOS-ICTMO 2019 in Darwin on 14th June. New observed median NRO and ACCESS-S1 hindcast skill maps have been generated to replace the old POAMA skill maps operationally (by 1st August 2019). A journal paper describing the NRO and the hindcast skill of ACCESS-S1 (including the raw output, bias corrected and calibrated data) is currently in preparation. The study shows that the greatest improvement in the prediction of the NRO is found in the hindcasts that have been calibrated. <p>Events attended by BOM/UKMO for NACP</p> <ul style="list-style-type: none"> NACP annual project meeting - 10 June 2019 NACP Climate mates training workshop – 13 June 2019 Discussions with visiting UKMO scientists working on NACP (3-14 June 2019) Presentations and discussions related to NACP at AMOS (11-14 June 2019) | |

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| | | | Our USQ partners and other project stakeholders have placed great value on the attendance of a BoM researcher at their extension workshops. Matt W participated in workshops from Broome to Katherine and received very positive feedback. Oscar Alves or Andrew Marshall will attend the next series in the southern and central NT. Where possible these workshops are being conducted in collaboration with the Bureau's Climate Guides project. | |
| 4d | 01/01/2019 | Development Project: Review of drought indices and Drought Monitor (minus in-situ ground-truthing) by advisers and producers. A network of regional experts in place for in-situ assessment of Drought Monitor and their training completed. Prototypes of new generation tools are tested in-house and available for testing by advisers. Restricted use Website completed and tested. Climate Outlook communicated monthly. | <p>On track (01/07/2019)</p> <ul style="list-style-type: none"> • A prototype Drought Monitor has been developed using a combination of four Drought Indices (CDI) (Appendix C). • Updated Drought Indices and the Drought Monitor were presented to the Climate Mates at the meeting on 13 June 2019. • The following drought indices have been updated to include May 2019: • Standard Precipitation Index (SPI) monthly, 2-monthly, 3-monthly, 6-monthly, 9-monthly, 12 monthly • Standard Precipitation Evaporation Index (SPEI) monthly, 2-monthly, 3-monthly, 6-monthly, 9-monthly, 12 monthly • Potential Evaporation Transpiration (PET) monthly • Self-calibrated Palmer Drought Severity Index (self-calibrated PDSI) monthly • Palmer Hydrological Drought Index (PHDI) monthly • Palmer Modified Drought Index (PMDI) monthly • Palmer Z Index (Z Index) monthly. • Climate Mates and regional associates reviewed both products and were trained on ground truthing. • Climate Mates and Regional Associates reviewed and were trained in new BOM prototype products including climograms, tercile and quintile forecasts, multi-week forecasts, etc. • The Climate Outlook Review and Climate and Weather Newsletter are communicated monthly/weekly directly to a network of 544 people and are also passed on to the distribution networks of the Climate Mates. • The Forecast Visualisation Tool (http://poama.bom.gov.au/access-s1/nacp/), the MJO forecast and the Northern Rainfall Onset have been presented to the Climate Mates and Regional Partners and are being tested. • The NACP website currently sits on a USQ test server and will be ported onto a cloud server after final approvals in the coming weeks. • Two scientific papers have been prepared as case studies; one showing that variability of annual rainfall and pasture growth have increased, and one showing the value of seasonal forecasts to a stocking rate / pasture availability / price decision for a northern beef herd varied between \$0-14 / ha. |  |
| 5d | 01/09/2019 | Development Project: Review of Drought Monitor (including in-situ ground truthing) by advisers and regional experts. Drought Monitor fully operational on web, updated fortnightly and ground-truthed by | <p>Achieved (26/09/2019)</p> <ul style="list-style-type: none"> • Drought Indices: Drought indices are updated monthly and are available on a prototype website that has restricted access. Considerable progress has been made |  |

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| | | regional experts monthly. Prototype of Drought Outlook on restricted web and available for testing by advisers and regional experts. Satellite data evaluated as a tool to enhance Drought Monitor. Website available for advisers and producers. New generation tools distributed and used by advisers and producers. | <p>towards the automation of producing and publishing the drought indices to the public. Drought indices are likely to be available to the public by mid-September 2019.</p> <ul style="list-style-type: none"> • Drought Monitor: The development of a Drought Monitor product has continued and maps are now available on a restricted access prototype website starting from January 2010 to June 2019. It is planned to produce Australian Combined Drought Indicator (CDI) maps as far back as May 1997. • The Drought Monitor (or CDI) maps have been developed using the weightings from previous research in other countries and have not yet been validated for northern Australia. Machine Learning is currently being used (e.g. Principal Component Analysis (PCA), Data Mining) to explore the optimal CDI input parameter relationships/weighting. • The CDI maps are available for viewing on a non-restricted website where extension officers, Climate Mates and other local experts have begun to provide feedback to ground truth observational data and corresponding indices. A Drought Condition & Impact Reporting website will be set up to record the feedback. • The NACP drought work was presented to the Drought Declaration Review Committee on 28 November 2018 to members Ruth Wade and Charles Burke. The resulting report (released June 2019) has recommended a more science based approach to the drought declaration / revocation process in Queensland. As a result, the Drought Monitor is now the preferred tool for the Queensland Government to progress this important policy initiative. • Presentations of the Drought Monitor work have been given at the AMOS Conference (Darwin June 2019) and at the Qld Government Drought Declaration Meeting in July 2019. | |
| 5e | 01/09/2019 | Extension Project: Mid-year progress review completed and reported against MERI plan. | Achieved (27/09/2019) Extension milestone 5 was completed on-time. The report associated with this milestone is attached to the DCAP quarterly report for the third quarter 2019 |  |
| 6r | 01/04/2020 | Research Project: Results from social research integrated into policy advice, co-innovation activities and DSITI knowledge support plans. Throughout the remainder of DCAP2. | <p>Achieved (31/03/2020) Milestone 6 is approved by MLA including the GoNoGo clause</p> <p>Multi week and seasonal products</p> <ul style="list-style-type: none"> • A range of multi-week and seasonal operational and prototype forecast products are now available for testing by NACP Climate Mates. This includes: • Operational multi-week products are now available (since Sep 2019) on the Bureau's climate outlooks website http://www.bom.gov.au/climate/outlooks/#/rainfall/summary • A new Chill Index developed jointly between NACP and FWFA projects in response to Northern Australia's needs is now available on the NACP prototype products web page http://poama.bom.gov.au/access-s1/nacp/. This product was in response to better forecasts events such as the Feb 2019 Northern Australia floods, where hypothermia was a big contributor to animal loss. • Several new FWFA products are now also available on the NACP website for trial by Climate Mates. This includes: <ul style="list-style-type: none"> ○ A range of products associated with cold extremes ○ Hot/cold days plumes |  |

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| | | | <ul style="list-style-type: none"> ○ THI probability scenarios ○ Rainfall extreme related products (to appear in the next month). <p>Review of research</p> <ul style="list-style-type: none"> • The research was reviewed by Dr John McBride an independent reviewer and the report was submitted to MLA and DCAP in November 2019. Some recommendations were made including that the research programme be continued with a follow-up four year programme (Appendix A). A POAP has been prepared for a NACP phase 3 (NACP3) and is shown in Appendix H. • Products Research • Flash droughts - a paper on climatology and variability of the Evaporative Stress Index (ESI) and its application to drought has been submitted to a journal • The 2019 flash drought event affecting Eastern Australia including southeast QLD is being documented in a journal paper • The Evaporative Stress Index (ESI) data for indicating flash droughts has been computed from calibrated ACCESS-S1 hindcasts, and is now completed. This is now in the evaluation process with a presentation of preliminary results done at AMOS 2020 • A paper assessing the skill of ACCESS-S1 hindcasts with respect to the northern rainfall onset was submitted for review in the journal Climate Services. We can also analyse the performance of our first operational onset forecast for the 2019/2020 wet season. In Figure 1 below, ACCESS-S1 was predicting a low 20-30% chance of early onset over most of central and northeast Australia. Observations show widespread late onsets, meaning overall, the first onset forecast from ACCESS-S1 was successful. • An abstract has been submitted (which will be followed by a short paper) on the multi-week prediction of the Feb 2019 northern Queensland floods by sub-seasonal models, that will form part of a wider set of case studies on extreme event prediction. • Nature Climate Change paper on "Flash droughts present a new challenge for sub-seasonal-to-seasonal prediction" was published. <p>Multi-Year Prediction</p> <ul style="list-style-type: none"> • Collaboration on multi-year research has been initiated with ECMWF. ECMWF have provided access to their 2-year hindcasts, which go back 110 years and have two start dates. This will be a very valuable resource to understand the potential for multi-year prediction in Northern Australia, a key project milestone. • A paper on observed multi-year rainfall variability over northern Australia is currently under minor revision in Nature Scientific Report. • Research is underway in revisiting the relationship between Indian summer monsoon and onset of Australian summer monsoon, which could be potentially vital for multi-year rainfall prediction over northern Australia. <p>Model Development</p> <ul style="list-style-type: none"> • Continued testing of CoMorph in different model configurations for better modelling of convection | |

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| | | | <ul style="list-style-type: none"> The sensitivity of convection to tropospheric humidity in different configurations of the current UM convection scheme is being documented in a journal paper Testing of CoMorph in global AMIP runs have shown promising preliminary results with regards to the MJO. This will lead to a more detailed analysis of the MJO under different configurations of CoMorph over the coming months Ongoing work on predictability of the early 2019 Queensland floods using a model ensemble approach at the Met Office. This work is building an analysis framework to be applied more widely to understand regional mechanisms that influence predictability. Work started on evaluating the mechanisms that caused the 2019 IOD event, how predictable the event was, and its impacts in Australia, were completed using Met Office, BOM and ECMWF seasonal prediction systems. This work feeds into wider research on improving coupled model performance in the Indian Ocean and therefore sub-and seasonal predictability. <p>Misc</p> <ul style="list-style-type: none"> Catherine de Burgh-Day will join the NACP team in April to work on model development at BoM in collaboration with UK Met Office Oscar Alves visited the UK Met Office to discuss NACP and other issues with NACP and UK Met Office scientists based at UK Met Office Annual NACP science workshop was held in Melbourne in Nov 2019, which included a review of the projects science component by Dr John McBride and interaction between researchers and Climate Mates. Tim Cowan and Sharmila Sur presented their latest research at the 2019 International Tropical Agriculture Conference in Brisbane in Nov 2019 https://www.queenslandcountrylife.com.au/story/6500830/tropics-spotlighted-in-warming-world/?src=rss), and afterwards, visited USQ in Toowoomba. Sally Lavender presented her latest research at the ParaCon plenary held in Cambridge in Dec 2019 <p>Publications NACP Publications – 21 journal papers either published, submitted or in-preparation (Appendix E)</p> | |
| 6d | 01/04/2020 | <p>Development Project: Review of Drought Outlook by advisers and regional experts. Drought Outlook fully operational on web, updated fortnightly. Drought indices and Drought Monitor updated fortnightly. Integrated climate, biophysical and herd model output tested for use as DS tool. Case studies planned with producers.</p> | <p>On track (26/09/2019) UPDATE AS OF 30 January 2020</p> <ul style="list-style-type: none"> Drought Indices and the Drought Monitor prototype are available on NACP's prototype website, updated monthly. Drought Indices and Drought Monitor products are fully operational on the NACP website. Subscription automation services (for the Climate Outlook, Climate and Weather Newsletter, etc.) are fully operational and can be accessed on the website. A hindcast for the Drought Monitor prototype has been completed, with maps available from April 1992 to December 2019. Development on the Drought Outlook is underway, and prototype maps have been produced for October-December 2019. |  |

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| 6e | 01/04/2020 | Extension Project: Year-end extension progress reviewed against annual KPI and reported, including feedback on implementation of service improvements from mid-year review, progress towards meeting objectives, outputs, delivery of x Category A, B and C engagement and further improvements actioned. Year-end research reviewed through extension delivery and 'climate mates' network and dialogue on progress towards meeting forecast, tool and product needs held with USQ, BoM and UKMO research teams. Review/Stop/Go decision based on progress of project | Achieved (31/03/2020) Milestone 6 was achieved on-time and report was approved by MLA |  |
| 7e | 01/11/2020 | Extension Project: Mid-year progress review completed and reported against MERI plan. | On track (31/03/2020) Milestone 7 is on track to be completed on-time. NACP was recently awarded funding to double the Climate Mate program. Interviews have been conducted and appointments are expected to be completed in April. Training of the new Climate Mates will likely occur in May or June and will need to be completed remotely due to COVID-19 restrictions. Progress is well underway to complete Category A, B, and C targets on time: Category A, Producers: 66% complete, Others: exceeded Category B, Producers: 145% completed, Others 454% Category C, Producers: 31% completed, Others 40% |  |
| 7r | 01/11/2020 | Research Project: Project Model improvements implemented in UKMO GC (likely GC version 5) ready for inclusion in ACCESS-S3 at BoM. Wet season break forecast prototype products released for trials based on ACCESS-S. Upgrade data server to include new prototype forecast products from ACCESS-S in digital form. | On track (08/07/2020) <ul style="list-style-type: none"> Design and development of the ACCESS-S1 post-processing pipeline, through which NACP prototype products are developed and produced in realtime (up until April) Ported the ACCESS-S2 Hindcast Suite to the National Computational Infrastructure (NCI) machine Gadi in preparation for running hindcasts there (April onwards) Presented on the ACCESS-S1 post-processing pipeline and Bureau multi-week forecast products to online EGU attendees (May 2020) Released new northern rainfall onset forecast for 2020/21 (Jun 2020). Testing the new monsoon burst probabilistic forecasts using three different rainfall thresholds. Plan is to release this to the NACP Forecast Visualisation Tool (FVT) by September/October in time for the 2020/21 season. Currently analysing ACCESS-S1 hindcasts against observations to get an indication of predictive skill and tweak definition (Ongoing). Continued with evaluation of CoMorph the new proposed global convection model (ongoing). Development of Aquaplanet simulations for further analysis of the MJO in the MetUM under different configurations (ongoing). Writing up sensitivity of convection to relative humidity results under different configurations of the Unified Model (ongoing). Completed Climate Mate training videos on the northern rainfall onset and monsoon bursts, ACCESS-S1 post-processing pipeline, flash drought and convection and the |  |

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| | | | new convection scheme., ENSO, MJO, IOD and SAM, Australian Monsoon, Ocean and Atmospheric circulation and drought | |
| 7d | 01/11/2020 | Development Project: Validate Drought Monitor. Fortnightly updates of Drought Monitor and Outlook maps. Monthly ground truthing of Drought Monitor. Case studies completed. | <p>On track (08/07/2020)</p> <ul style="list-style-type: none"> Five case study interviews have been conducted and transcribed and draft narratives are being finalised for approval by participating producers. These represent the range of pastoral regions across the NACP project area (SQ, CQ, NWQ, NT, NWWA). Feedback from producers interviewed is that the Climate Mates have significantly improved understanding of and access to climate information and its use in decision-making, where relevant; however, the targeting of the climate information produced to particular key climate-sensitive decisions is critical. Released new northern rainfall onset forecast for 2020/21 (Jun 2020). Testing the new monsoon burst probabilistic forecasts using three different rainfall thresholds. Plan is to release this to the NACP Forecast Visualisation Tool (FVT) by September/October in time for the 2020/21 season. Currently analysing ACCESS-S1 hindcasts against observations to get an indication of predictive skill and tweak definition (Ongoing). |  |
| USQ 5 Producing enhanced crop insurance systems and associated financial decision support tools – Phase 2 | | | | |
| 7 | 30/06/2019 | Report on modelling and simulated experimental insurance products that examine the potential for innovative pathways (e.g. 'discretionary mutual funds') to rollout 'market ready insurance' products. | Achieved (02/07/2019) Please see attached report titled "DCAP milestone 7 CANEGROWERS DMF.pdf" |  |
| 8 | 30/09/2019 | Detailed report that informs the cost-effective innovative pathways of commercialising 'market ready' products for sugar industry. | Achieved (08/10/2019) Please see attached Milestone 8 report as well as complementing flyers which outline the cyclone insurance product that has been developed |  |
| 9 | 31/12/2019 | Decision support tool prototype available that allows (based on climate risks, production and financial outcomes, and availability of insurance products) informed decision making – focussing on sugar industry. | Achieved (22/01/2020) Please see attached Milestone 9 Cyclone DSS report |  |
| 10 | 31/03/2020 | Decision support tool prototype available that allows (based on climate risks, production and financial outcomes, and availability of insurance products) informed decision making – focussing on cotton industry. | Achieved (30/03/2020) Please attached report - Milestone 10 |  |

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| 11 | 30/06/2020 | Report on facilitated workshops with key industries and government on alternative mechanisms for managing climate risks, including potential pricing of insurance products with government support, options to use stakeholders' levies to support insurance premium, and options for government to set up agriculture re/insurance disaster fund. | Achieved (06/07/2020) Please see Milestone 11 report for details |  |
| DAF 6 Delivering integrated production and economic knowledge and skills to improve drought management outcomes for grazing systems | | | | |
| 7 | 30/12/2020 | <p>Submission of a scientific report detailing analysis of the effect of alternative management strategies designed to improve drought resilience for the Mulga Lands.</p> <p>Submission of a final report summarising the outputs, achievements, and key recommendations from the project.</p> <p>Completion of workshops, where required, for producers, advisors and agribusiness representatives in each of the target regions.</p> <p>Submission of a draft journal paper resulting from project results.</p> | <p>On track (27/03/2020)</p> <p>19/06/20 Work towards the Mulga lands analysis and report is progressing steadily. One scientific journal paper has been published and 3 additional papers are submitted and in various stages of the review process. Workshops and producer extension is continuing as best possible given Covid-19 restrictions.</p> <p>27/03/20</p> <ul style="list-style-type: none"> • Work is continuing towards defining a representative property and developing scenarios for the 6th (and final) regional report centred on the Mulga Lands region. Fred Chudleigh met with the regional DAF team in Charleville the week of the 16/03/20. Additional meetings were scheduled in Charleville for the week of the 20/04/20 and the 18/05/20 to progress the analysis. However, these meetings are unlikely to go ahead due to COVID-19 travel restrictions. We will investigate options for progressing the analysis remotely. This report is due to DCAP on the 30/12/20. • One journal paper is published, a 2nd accepted with revision and third paper has been submitted this quarter. • Workshops and producer extension is continuing in all regions as detailed in quarterly reports. <p>2019</p> <ul style="list-style-type: none"> • Three dedicated producer workshops were held in Central Queensland to extend the results of the Fitzroy regional analysis in April 2018. Additionally, seven phosphorus supplementation workshops were held in the Fitzroy and Burdekin regions which included results from our DCAP analysis indicating the economic importance of effective and appropriate P supplementation. DAF extension officers continue to incorporate relevant results from our work in workshops conducted as part of their wider extension program. Subsequent to these events, workshops continue to be held in CQ on an ongoing basis and extension events have now also been held in the Northern Gulf, Northern Downs and Central West Mitchell Grasslands regions. |  |

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| | | | <ul style="list-style-type: none"> • A paper has been presented at the AARES Annual Conference in February 2019 and is available on-line. This paper reports results for the economic benefit of genetic improvement of fertility in northern beef herds. • A draft scientific journal paper submitted to 'Animal Production Science' which includes DCAP project results indicating the economic importance of phosphorus supplementation for beef cattle has been accepted with minor revision (June 2019). • 9 recorded presentations and accompanying spreadsheet examples have been prepared to assist producers in assessing drought response and recovery options. • Printed hard copies of the Fitzroy report are being distributed rather than fact sheets (520 in Q4 2018-19 alone) due to the demand from producers and industry professionals for full detail of the analyses and results. • We have produced a web page with links to project products and information and believe that in conjunction with the social media promotion we have been conducting that this may replace the need for fact sheets as an awareness raising product. | |
| DAF 7 | Use of BoM multi-week and seasonal forecasts to facilitate improved management decisions in Qld's vegetable industry | | | |
| 9 | 30/06/2019 | <p>A Report – "Second year of ground-truthing ACCESS-S1 multi-week and seasonal forecasts and hind-casts, in collaboration with vegetable industry supply chain participants".</p> <p>Improved management decisions identified, assessed and documented. Quarterly Report on project activities, outcomes and outputs submitted.</p> | <p>Achieved (02/07/2019)</p> <p>Have improved management decisions been identified?</p> <ul style="list-style-type: none"> • Yes, collaborating business managers recently participated in a small group discussion (4 to 8 business owners) and written task during their local DCAP Experimental Forecast update meeting to identify management decisions they would consider reviewing and altering. Project staff did not contribute to these discussions, ensuring commercial realism (page 27) • Example: business owners said they would, change and finesse planting schedules based on forecasts, select and choose varieties to match forecast conditions. Supply chain managers indicated they would consider changing supply locations, review crop selections and size of each production order by location and volume. <p>Have these decisions positively impacted risk and profitability, and/or product quality and reliability of production and supply?</p> <ul style="list-style-type: none"> • Yes, we have documented real life examples and anecdotes that demonstrate how the DAF#7 Heatwave Advisories as well as the long lead-time experimental forecasts combined with our informative pre and post season Experimental Forecast meetings have allowed business managers to better manage climate extremes. Product quality, marketable yield, business efficiency and supply reliability have all been positively impacted by our work to date. <p>Our collaborators view the DCAP Experimental Forecasts a science based piece of information that they will consider when thinking about management decisions. The information will help better inform their business decisions</p> <ul style="list-style-type: none"> • Collaborator quote. "This is perhaps one of the most worthwhile projects undertaken by a government department in a long time. SURELY HAVING A BETTER |  |

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| | | | UNDERSTANDING ON OUR EVER CHANGING CLIMATE has to be the greatest management tool for grower that he can use" (from Ray B) | |
| 10 | 30/06/2019 | <p>Review first two years of ground-truthing ACCESS-S1 multi-week and seasonal and retrospective case-studies from the hindcasts – (if positive outcome of Stop/Go mid-term review, and the project is to continue)</p> <p>Key review questions to be answered: -</p> <ul style="list-style-type: none"> • Is there sufficient skill for these forecasts to be useful? Do the forecasts offer the potential for improved management decisions? • Have improved management decisions been identified? • Have these decisions positively impacted risk and profitability, and/or product quality and reliability of production and supply? | <p>Achieved (02/07/2019) Stop / Go Milestone Highlights.</p> <p>Since February 2018 (17 months) when we began using our dedicated ACCESS-S1 based regional LV and GB experimental DCAP forecast model to engage with our collaborators we have;</p> <ul style="list-style-type: none"> • Worked closely with BoM R&D staff in developing our DCAP vegetable region climate model. • Organised and held 5 DCAP Experimental Forecast Forums (each is a 2 to 2.5 hour long informative, educational presentation, including an interactive discussion session). • Developed and distributed 19 bi-monthly experimental forecasts for our collaborating business managers in the Lockyer Valley, Granite Belt and Bowen regions. • Developed and issued 5 Heatwave Advisory warnings to collaborating businesses (during summer). • Held over 50 one on one DCAP related discussions with our project collaborators. • Organised seven dedicated meetings with DCAP collaborators to discuss and document what management decisions they would change if they had access to a reliable long lead-time forecast. • Conducted 5 surveys of collaborating businesses in both the GB and LV region to measure and monitor the impact of information presented by the DAF #7 project team and gauge the appetite for and interest in this DCAP experimental forecast work (in addition to Coutts JR). • Assessed the accuracy of all forecasts to-date and discussed this with all our business collaborators and BoM R&D staff. <p>External and cross-industry interactions.</p> <ul style="list-style-type: none"> • DAF#7 presented an overview of the projects results to a Farmers for Climate Action local meeting held in April 2019 in Stanthorpe (180 attendees). • DAF#7 presented (via webinar) to the Victorian based Birchip Seasonal Climate forecasting Community of Practice group in April 2019. This presentation resulted in requests for follow up information from both BoM and CSIRO staff who attended the webinar. • DAF#7 has met with the DCAP Insurance project staff (USQ) on multiple occasions and provided them with documented specific horticultural crop information and critical temperature and yield impact information to assist their understanding and their work. <p>Do the forecasts offer the potential for improved management decisions?</p> <ul style="list-style-type: none"> • Both the collaborating vegetable grower business's as well as the supply chain managers have stated and given practical examples of how valuable a skilful long lead-time forecast is to their respective operations. A long lead-time forecast is a vital management tool and we have documented real world examples (\$ impact) of the positive impact on crop yield, and farm gate prices that have been achieved since our |  |

| Milestone | Due Date | Milestone Description | Updates | Current Status |
|-----------|------------|--|--|---|
| | | | <p>DCAP project team has been communicating forecast interpretation information and working closely with our collaborator business partners</p> <ul style="list-style-type: none"> • Example: A nationally significant Green Bean and Sweet Corn grower explained how beneficial this information can be to them. Planting times (usually weekly) can be adjusted (spaced out further) if they are aware of extended periods of above average temperatures in advance (i.e. at seeding, 8 to 12 weeks before scheduled harvest date. This prevents sequential plantings maturing faster and catching up to each other by harvest time. In a highly perishable crop with a 5 day shelf life (e.g. Green Beans) this results in the unwanted bean plantings being ploughed in which is a complete waste of time, labour, money, fertilizer, water other business resources. | |
| 11 | 30/09/2019 | <p>Granite Belt Vegetable Industry Engagement and Communication of work program for the Summer 2019/20 season.</p> <p>Workshop with growers and supply chain participants conducted; multi-week and seasonal forecasts; and improved management decisions discussed. Quarterly Report on project activities, outcomes and outputs submitted.</p> | <p>Achieved (11/10/2019) A very positive successful meeting was held in the Granite Belt on the 16th of September. This was achieved despite bush fires threatening farms and the township the week before. Eight businesses were represented and in a normal year they would all turn over in excess of \$1M and employ many local staff.</p> <p>The severe drought last summer saw irrigation dams emptied along with nearly all local and nearby sources of irrigation water depleted.</p> <p>The majority of local businesses will not be able to grow vegetables this summer! This will have major impact on the businesses, local employment and the local economy.</p> <p>Our DCAP team presented the Experimental Forecast for the next three months as well as discussing and presenting a rainfall analysis of all historical rainfall compared to the last 12 months.</p> <p>Attendees also completed a written exercise allowing them to explain how the DCAP Exp Forecast work to date had assisted their thinking and business decisions.</p> |  |
| 12 | 31/12/2019 | Quarterly Report | <p>Achieved (27/03/2020) Milestone activities and report completed for the March 2020 quarter.</p> <ul style="list-style-type: none"> • Cost benefit information submitted to consultant and I have responded to a request to clarify some aspects of our work so as to assist the consultants understanding. • Successful Lockyer Valley face to face interactive Experimental Forecast Forum was held in early March. • Documented feedback from a collaboration nationally significant supply chain management business outlining their use of our information to make better informed management decisions. |  |
| 14 | 30/06/2020 | <p>Granite Belt Vegetable Industry Engagement and Communication of work program for the Summer 2020/21 season.</p> <p>Workshop with growers and supply chain participants conducted; multi-week and seasonal forecasts; and improved management decisions discussed. Quarterly Report on project activities, outcomes and outputs submitted.</p> | <p>On track (01/06/2020) Collaborating DCAP vegetable business and supply chain managers have indicated they have developed an improved understanding of climate drivers, BoM operational forecast products and consider the DCAP DAF#7 experimental forecast and bi-monthly updates a useful source of extra information when making business planning decisions. Our collaborating Qld business managers indicated (by anonymous survey) that they learn new information when they attend their regional DCAP Experimental Forecast Forum.</p> <p>Our collaborators consider the project information valuable and of benefit to their business decisions.</p> |  |

| Milestone | Due Date | Milestone Description | Updates | Current Status |
|-----------|-----------------------------|-----------------------|---|---|
| | | | <p>In early May the Qld based project team held a successful on-line (Zoom) end of season (summer production area) meeting with our Granite Belt collaborating business managers. Dr Debbie Hudson our BoM (Melbourne) based team member took the opportunity to join this presentation and was able to respond to collaborator questions.</p> <p>A magazine article in the Granite Belt Advertiser magazine will highlight the Queensland Governments DCAP initiative and raise awareness among the general public both in the Granite Belt and the surrounding districts of our local weather forecast project work.</p> <p>The project team, with assistance from our DCAP communication team completed a Poster highlighting the project outputs to-date and the overarching DCAP initiative funded by the Qld Government.</p> <p>Anonymous feedback from our collaborating business managers both in the Granite Belt and Lockyer Valley indicates an ongoing high level of support and regard for our project work and our effective engagement with collaborating businesses.</p> | |
| 15 | 30/09/2020 Quarterly Report | | <p>Achieved (06/01/2020) Extension and education activities.</p> <ul style="list-style-type: none"> • The project team held a very successful DCAP Lockyer Valley Exp Forecast Forum conducted on the 4th of November 2019. During this 3 hour interaction with collaborating vegetable growing business owners and supply chain co-ordinators the project team reviewed and assessed the accuracy of the DCAP Experimental Forecasts for the preceding winter growing season (April – August) and the also reviewed forecast accuracy for September and October 2019. • The project team then presented and discussed the DCAP Experimental Forecast for November, December 2019 and January 2020. • The DCAP Experimental Forecast encompasses maximum and minimum temperatures as well as rainfall and predicts the likelihood of these parameters being above, below or near the historical monthly mean (1990 – 2012 inclusive) of the forecast location. • Education and collaborator knowledge improvement and upskilling are an important focus at these local small group (high industry value) start and end of season forums. Not only was an experimental forecast presented and explained but the DCAP project team also spent time explaining and showing the historical accuracy (skill) of Aust Bureau of Meteorology forecasts in the Experimental Forecast months and exact location. • All project team members were actively involved in this Experimental Forecast Forum presentation and the ensuing one on one discussions with our collaborating business collaborators. • Project team members conducted a written exercise with our business owners and supply chain collaborators in the Lockyer Valley as part of the November forum. This “anonymous input” written exercise asked our collaborators how “in their opinion the DCAP Exp Forecasts had assisted them to make improved management decisions”. |  |

| Milestone | Due Date | Milestone Description | Updates | Current Status |
|-----------|----------|-----------------------|--|----------------|
| | | | <ul style="list-style-type: none"> • During the Oct – Dec 2019 quarter the project team have developed 2 DCAP Experimental Forecasts for both the Lockyer Valley and Granite Belt regions and 1 DCAP Experimental Forecast for the Bowen Region. No vegetables are grown in Bowen during the hot humid summer season. • The Qld based DCAP team members held a face to face meeting with a number of BoM R&D staff (including our DCAP, BoM team member Ms Debra Hudson) in early December 2019 at BoM's Melbourne Head Office. Neil Cliffe the DCAP Program Manager was also actively involved in this meeting and subsequent project discussions. <p>Practice Change.</p> <ul style="list-style-type: none"> • In a section of the DCAP Lockyer Valley Experimental Forecast Forum ---- after seeing and discussing the Exp F'cast for November, December 2019 and January 2020 all attendees were given a piece of piece of paper containing two questions and asked to jot down dot points based on their own business and decision making. <ul style="list-style-type: none"> ○ 1. Has the DCAP "experimental" forecast information session had any impact on your thinking or business plans? ○ 2. Do you consider this L Valley DCAP Long Lead Time Experimental Forecasting work useful? Why? ○ The folded piece of paper was left on a table at the end of the 3 hour session, no names were asked for so that respondents could provide confidential (honest) comment. The collated and transcribed responses from all attendees is attached. Refer to Lockyer Valley Collaborator business decision impact. • Lockyer Valley Collaborator business decision impact of DCAP DAF #7 Experimental (long lead time) Forecast direct from collaborating business and supply chain managers. • Document is available in LV Meeting 4 folder and was attached to Qtr Rpt. <p>Research (inc. analysis, benchmarking, modelling).</p> <ul style="list-style-type: none"> • During this quarter the DCAP DAF#7 team finalised, tested and adopted a statistically based system that underpins and standardises the methodology and processes used to interpret DCAP BoM Experimental forecasts. This statistics based standardisation process ensures consistent interpretation of all forecasts, removing human based (operator) variation from the forecast interpretation process. • All DCAP Experimental Forecast interpretations to date have been re-visited and re-evaluated to ensure consistency and accuracy of past forecasts. No major changes in past forecast interpretations and accuracy were detected and the entire Exp Forecast data set is accurately interpreted and entirely consistent. <p>Videos/podcasts.</p> <ul style="list-style-type: none"> • We liaised with the DCAP media team and arranged for a collaborating Lockyer Valley vegetable production business owner to be interviewed for a podcast that is soon to be available now available on the Queensland Agriculture Podcast site (https://www.daf.qld.gov.au/news-media/podcasts). | |

| Milestone | Due Date | Milestone Description | Updates | Current Status |
|-----------|----------|-----------------------|---|----------------|
| | | | <p>Comments on staff PD activities.</p> <ul style="list-style-type: none"> • Qld staff members attended and discussed forecast interpretation and technical issues with BoM R&D staff. • BoM R&D and several other BoM Head Office staff attended these discussions and said they benefited greatly from hearing "first hand" how veggie growers were impacted by and could benefit from early knowledge of unusual (extreme or unusual) weather events. <p>Project performance highlights. Highlight for target clients</p> <ul style="list-style-type: none"> • Attached example of recent Heatwave Advisory December 2019 • Project issues collaborating regional business Heatwave Advisory warnings to highlight an impending, approaching Heatwave so that business managers can better prepare for the impact (improved management decisions). We raise awareness of the information and drive clients to the official BoM site. • Collaborating business managers and supply chain managers in both the Granite Belt and Lockyer Valley have developed increased trust in the DCAP experimental forecasts and now take the information into account when making business decisions. The maximum temperature 3 month lead time forecast has to date been useful for decision making and forward planning. <p>Industry Impacts.</p> <ul style="list-style-type: none"> • * 80 % of confidentially surveyed business managers at the November 2019 DCAP Experimental Forecast Forum though the DCAP Exp Forecasts were moderately useful (20%) or Quite useful(60%), while at the September Granite Belt meeting the business mangers asked the same question indicated moderately useful(14%), quite useful(57%). This work has a high level of industry support and engagement. • Example rainfall graphic turning numbers on paper into a graphic information and decision tool • Informative graphic highlighting current rainfall deficit that was used at a recent Lockyer Valley meeting. Rows of numbers don't paint a picture like this. January to November rainfall this year compared to "average". One grower saw this and had the next day made a decision not to plant a summer pumpkin crop, "no rainfall to replenish underground water combined with extreme temperatures forecast for summer mean I will struggle to get a viable crop and will waste a lot of valuable water trying". Then went on to say "I would rather save my underground water for winter crop when temperatures will be lower and chances of high quality crop higher" • Project work is well received by industry who relish the opportunity to contribute and be involved in this work area. Industry is benefiting by improved knowledge and understanding of climate forecasting. BoM is benefiting by gaining a better understanding of the value of the vegetable sector and DCAP staff have helped improve BoM's forecast layout and terminology, enhancing its usefulness to Agricultural users. Given the ongoing extreme heat and crippling drought impacts affecting Queensland vegetable and agricultural producers this DCAP regionally focused experimental forecast initiative is a great example of government research and effort directly addressing industry needs. | |

| Milestone | Due Date | Milestone Description | Updates | Current Status |
|--------------|---|--|--|---|
| DAF 8 | Grazing Futures: Promoting a resilient grazing industry | | | |
| 3 | 31/01/2020 | 6-month progress report | Achieved (05/12/2019) Reporting completed by 5 December 2019. |  |
| DAF 9 | Forewarned is forearmed: Equipping farmers and agricultural value chains to proactively manage the impacts of extreme climate events | | | |
| All | All milestones | On-track (13/07/2020) All milestones are either achieved/on-track | |  |

DRAFT

APPENDIX 4: FEEDBACK SHEET SUMMARIES

(July 2019 – JULY 2020)

Steering Committee & Project Leader Meetings



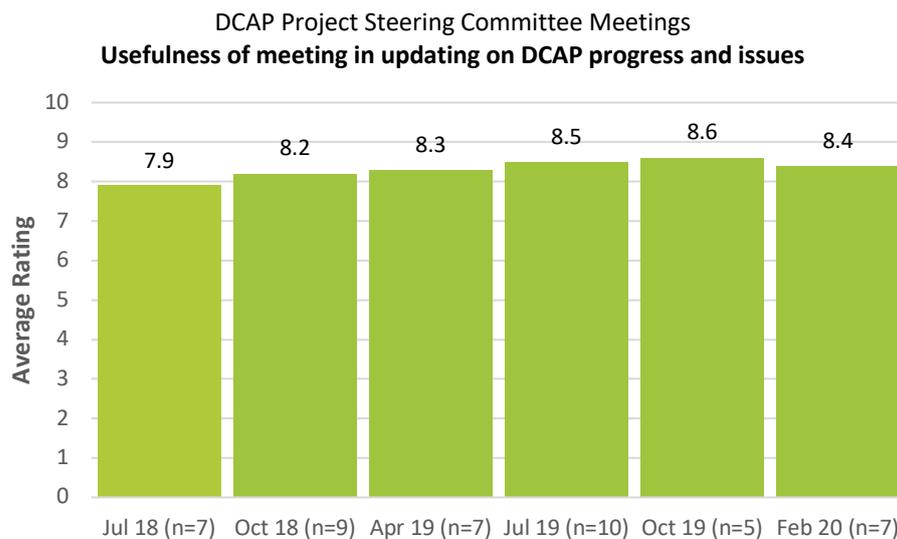
PROJECT STEERING COMMITTEE MEETINGS

Six Meetings:

- 18 July 2018 (7 respondents)
- 25 October 2018 (9 respondents)
- 16 April 2019 (7 respondents)
- 23 July 2019 (10 respondents)
- 29 October 2019 (5 respondents)
- 20 February 2020 (7 respondents) **[new]**

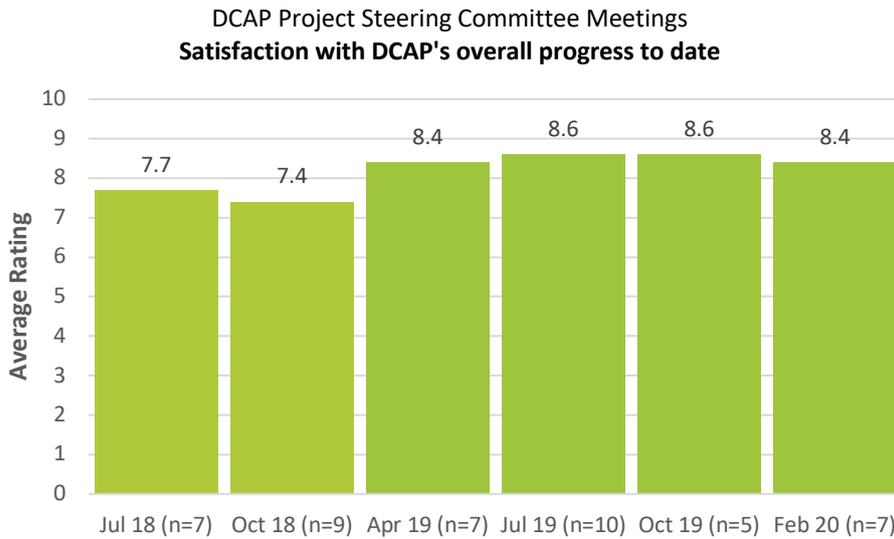
Meetings were consistently (and increasingly) rated as highly useful in terms of updating steering committee members on DCAP progress and issues – overall average rating of 8.3 on a 0-10 scale with a range of 7.9 avg. (Jul 18) to 8.8 avg. (Oct 19).

-  **Comments from the February 2020 meeting included:** *The showcase presentations are really helpful.*



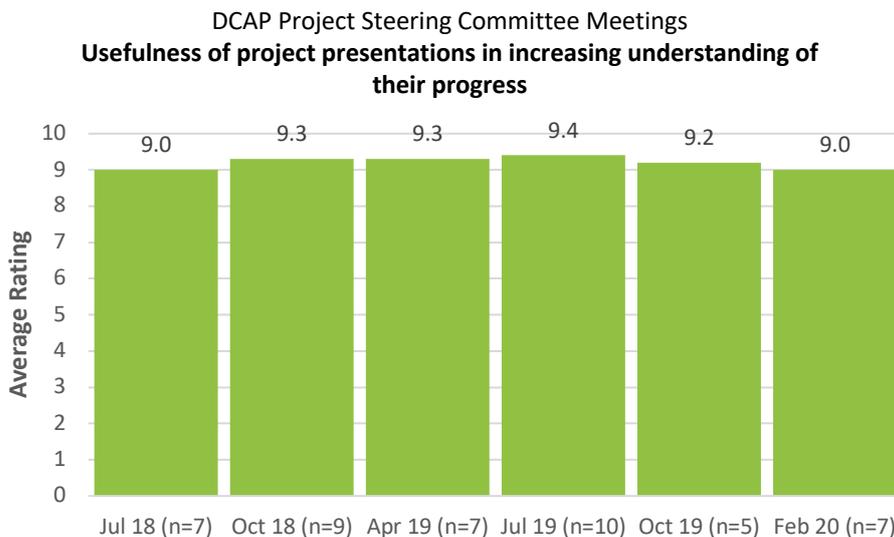
Members continued to be very satisfied with DCAP’s overall progress – overall average rating of 8.2 on a 0-10 scale with a range of 7.4 avg. (Oct 18) to 8.6 avg. (Jul 19 & Oct 19).

- **Comments from the February 2020 meeting on opportunities included:** *Greater focus on communication about DCAP and the project results (via social media in particular); Better, targeted communication of project outputs; Expand climate mates - DCAP communications need to link to outcomes in farm changes and supply chain improvements; Greater partnering.*
- **Comments from the February 2020 meeting on potential issues included:** *State election 2020 and engagement with potential future government; Lack of delivery of high quality evaluation case studies by projects; Communication of successes continuing to be a challenge*



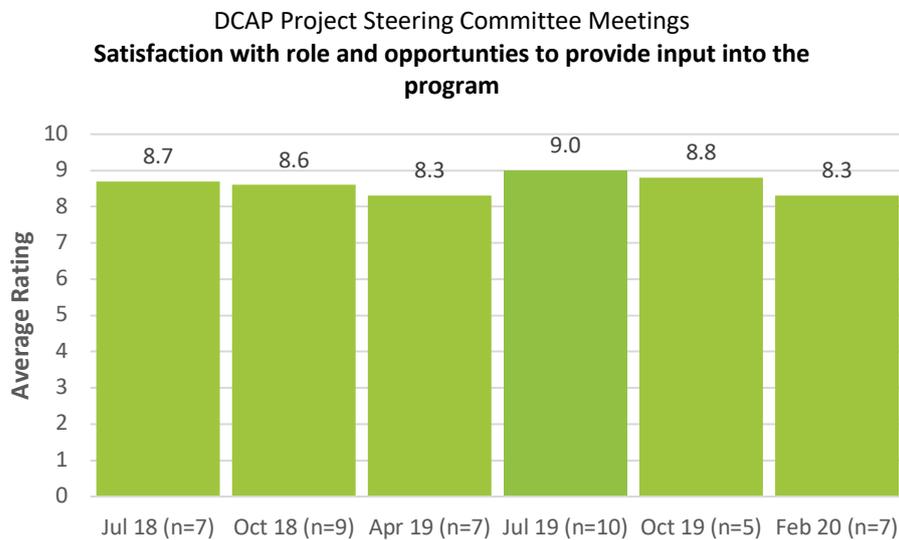
Project presentations were always highly useful in increasing members’ understanding of where projects were up to – overall average rating of 9.2 on a 0-10 scale with a range of 9.0 avg. (Jul 18, Feb 20) to 9.4 avg. (Jul 19).

- **Comments from the February 2020 meeting included:** *LTCC (Long term carrying capacity) potentially an interesting tool but need to ensure limitations to extrapolation are clearly communicated; Good presenters and good works; Both presentations were clear and concise. While different, both presenters were engaging in their own way*



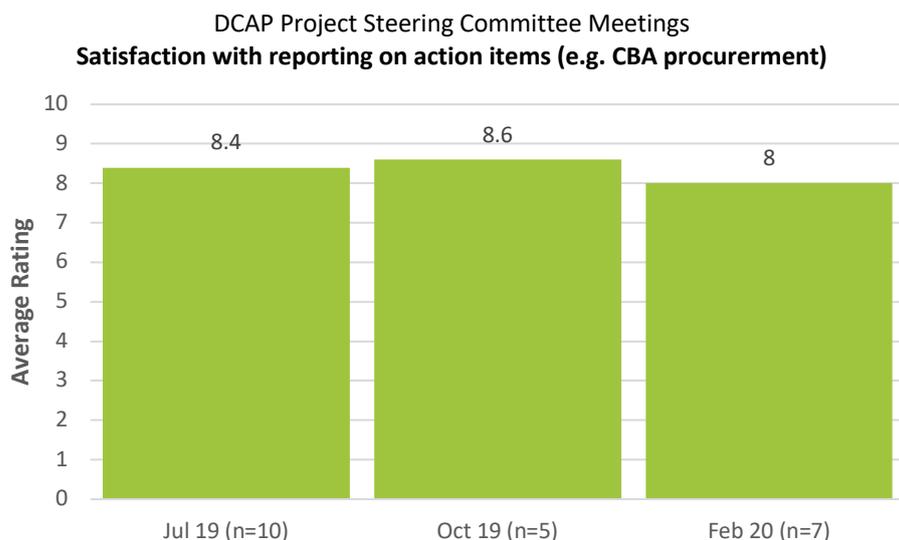
Members were very satisfied with the extent of their roles and the opportunities to provide input into the DCAP program – overall average rating of 8.6 on a 0-10 scale with a range of 8.3 avg. (Apr 19, Feb 20) to 9.0 avg. (Jul 19).

-  **Comments from the February 2020 meeting included:** *I'll seek further advice from my stakeholders.*



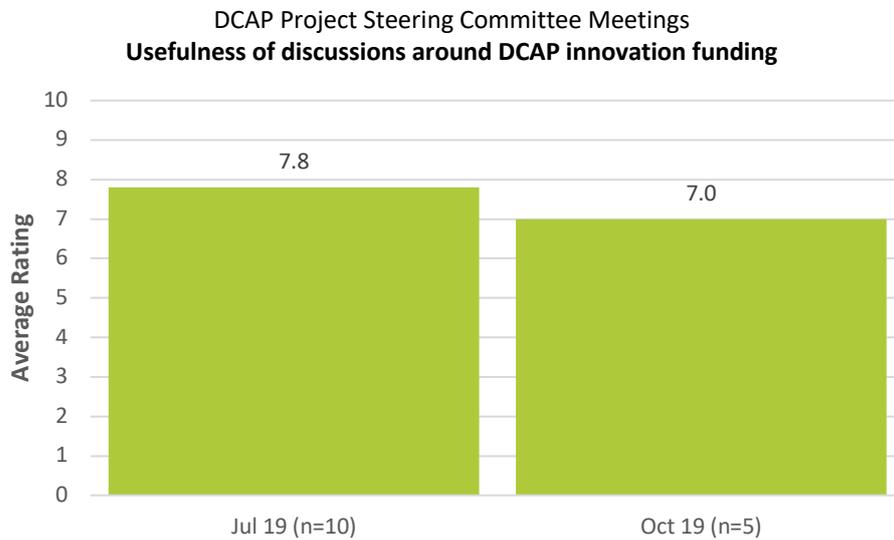
Members at the July 2019, October 2019, and February 2020 meetings were very satisfied with reporting on action items (e.g. CBA procurement, extending evaluation funding, update on innovation projects, and communications strategy) and the resulting discussions – overall average rating of 8.5 on a 0-10 scale.

-  **Comments from the February 2020 meeting included:** *Some of the summary material is a bit repetitive, but I need to look through it all just in case there is new information in one of the many tables.*



Members at the July and October 2019 meetings felt the discussions around DCAP innovation funding were quite useful – overall average rating of 7.0 on a 0-10 scale.

- **Comments from the July 2019 and October 2019 meetings included:** *Gave clear guidance and way forward to progress priority ideas; Seemed to go around in circles – however very good spreadsheet and detail; Through the innovation project development process, I think we lost sight of what might be an approach to truly identify an innovative breakthrough for DCAP.*



Other comments provided by February 2020 meeting respondents included:

- *Managing state election campaign and outcome re future funding -> 'prepare the ground' for continuation.*
- *Good progress.*
- *Positioning of DCAP in a national context that is evolving will be a significant challenge.*



PROJECT LEADER WEBINARS

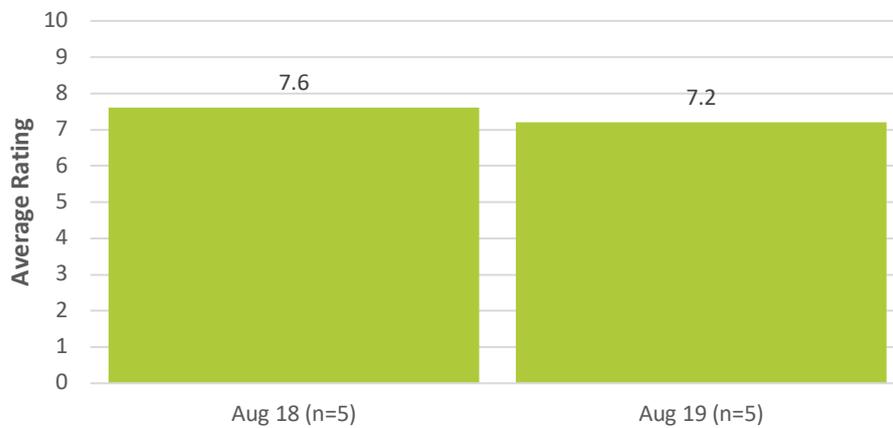
Two Webinars

- 7 August 2018 (5 respondents)
- 16 August 2019 (5 respondents)

Project leaders found the webinars quite useful in terms of (better) understanding the progress of DCAP projects and any issues – overall average 7.4 on a 0-10 scale.

- **Comments from the August 2019 meeting included:** *Good to have the update TED talks - gives a good overview of where individual projects and the program as a whole is going. Also highlighted potential to link in with some projects; I think it is useful but could be done more efficiently - maybe say the top achievement next steps and any issues but cut people off if they talk too long; Good way of being aware of other project activities and aims.*

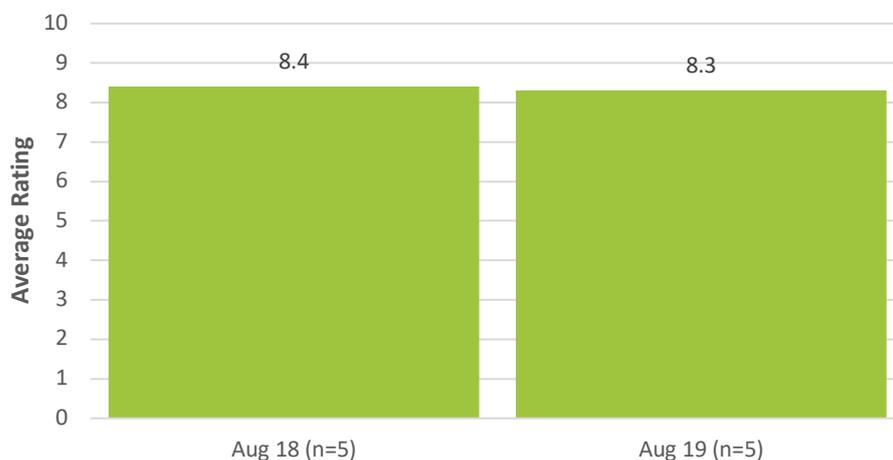
Project Leaders Webinars
Usefulness of webinar in terms of (better) understanding DCAP project progress



Project leaders were very satisfied with the progress made on their projects to date – overall average 8.35 on a 0-10 scale.

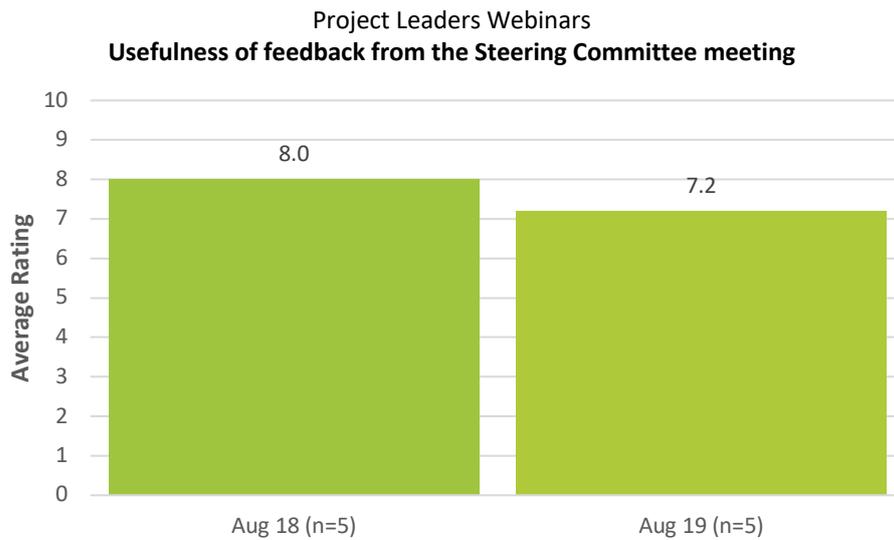
- **Comments from the August 2019 meeting included:** *Very Slow start - be we are going great now; Worked effectively with BoM to modify and improve how they display forecast model output - our changes make the model output more useful to researchers and industry.*

Project Leaders Webinars
Satisfaction with progress made on project to date



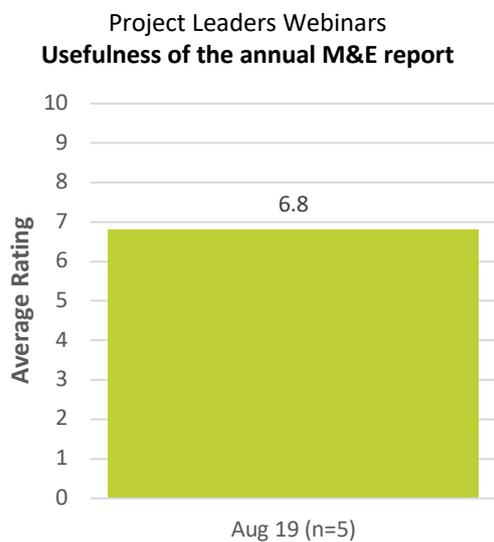
The feedback from Steering Committee meetings was seen as quite useful – though slightly less in August 2019 – overall average 7.6 on a 0-10 scale.

- **Comments from the August 2019 meeting included:** *A little more detail would have been interesting - any specific comments made for example; Very happy to get this feedback from Neil. This is useful - especially as we want to make sure we addressing any concerns they have immediately.*



Project leaders from the August 2019 webinar found the annual M&E report somewhat useful/informative – 6.8 average rating.

- 
Comments from the August 2019 meeting included: *There wasn't opportunity to discuss in detail; This was also useful and it was good to have the explanation of the impact pathway as I would not have really known what was meant by it.*



New insights or understanding gained as a result of the August 2019 webinar included:

- *There seems to be a shift towards ensuring impact - and scope to work on legacy.*
- *Really about how we can better address the impact pathways.*
- *The Hort DCAP Experimental model forecast format and information will be of high value across all of Qld Ag Industry outputs*



Other comments about the webinar/project/DCAP included:

- *Would be great if these happened more often.*
- *Just really that I think the most valuable part of the meeting is to provide feedback on steering committee and also help us better address the M&E and while I think the project updates are good they could be done more efficiently, keep to 2 mins each e.g. top achievement - next steps and any issues (but difficult I know) and the meetings are not the regular so not a big deal I guess.*
- *With the staff expertise, industry knowledge, effort and \$ invested by industry and Qld Treasury into ACCESS S development and improvement, surely there will be an operational BoM forecast product publicly available at the end of current DCAP 2 project funding cycle.*



PROJECT LEADER WORKSHOP (DEC 19)

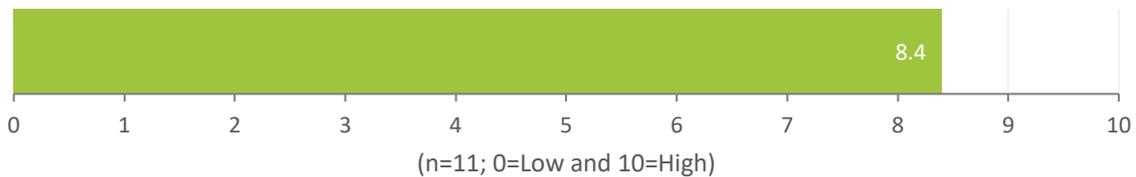
5th December 2019 – 12 respondents

Workshop participants highly valued hearing the perspectives of the Steering Committee and the resulting question and answer session

- **Comments included:** *Good overview and good to catch up with what other work is going on and to see if we can interact with other relevant work; Elton's attendance indicated a high level commitment to the project; High level, motivational; Valuable messages given; It was good to hear that the DCAP SC is pleased with our progress; Good to hear Elton's perspective on program performance, feedback from the DCAP Steering Committee and importance of case study development.*

Project Leaders Workshop (December 2019)

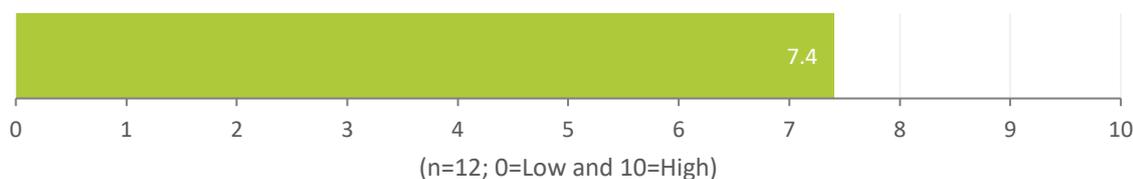
Usefulness of hearing Steering Committee perspectives and resulting Q&A



Updates from each project were seen as quite useful, though comments noted that some presentations went over time and could have been more focused.

- **Comments included:** *Some went well over time – but it was a good chance to ask questions and there was good discussion; Presenters didn't stick to the task or the time limits, so it was a mixed bag. It is good to have an update and know how the projects are going – my preference is have this information outside of the meeting, and use this meeting for discussing the issues of focus for the meeting; Very informative as I am new to DAF; We were given specific topics - some PL's went way beyond this, too long and in some cases very repetitive; It would have been better to have heard more updates, and not just focussed on challenges, communicating successes etc.*

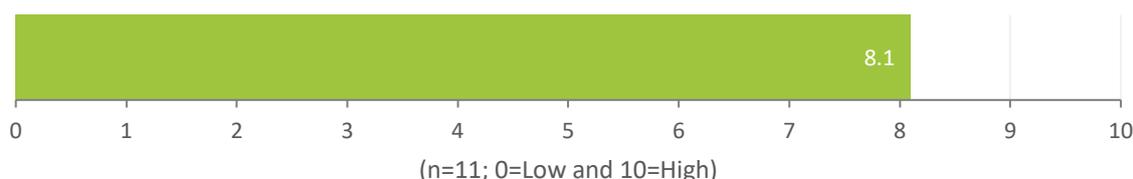
Project Leaders Workshop (December 2019)
Usefulness of updates from each project



Those who presented on their projects were quite satisfied with the opportunity to share about their projects and the usefulness of associated discussions – though a few commented that there were timing issues and the meeting could have been more focused.

- **Comments included:** *The meeting wandered too much, and sometimes focused on minute issues that are not relevant to the whole group; Keep to the topic and time - if so 1 day is ample time; I don't think 20 mins (incl. Q&A) is long enough to update on 12 months work and answer evaluation questions. I'm happy to do both, but think we needed a bit more time; Could have been more time for the presentations.*

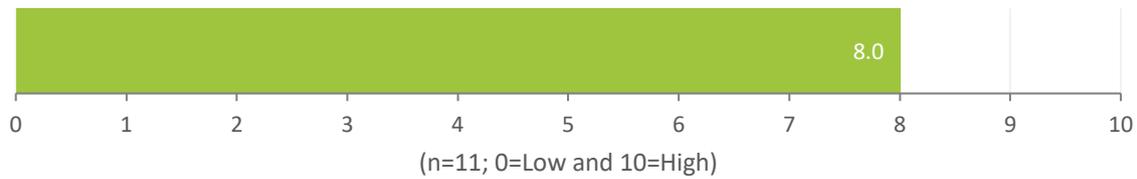
Project Leaders Workshop (December 2019)
Satisfaction/usefulness of opportunity to share/discuss your project



The presentations and discussions around case study development and approaches were seen as highly useful.

- **Comments included:** *Case studies mean differ things to different people, at least now everyone has a communal understanding of what is needed and why; I admit to being confused by the end of it, regarding using non-people as case studies. It would have been good to run through the various potential examples; Good technical advice on writing case studies. Purpose and boundaries of case studies should be clear; The case study "cheat sheet" is a useful resource, but I think the discussion around the purpose of the case studies still isn't clear - i.e. are they primarily used for (i) evaluation or (ii) communication/extension; That discussion went a bit too long but was useful/important to properly identify the appropriate way forward with this issue; May be opportunities to collect information across multiple DCAP projects (at least in the grazing industry) within specific case studies by having simple question prompts about projects other than our own*

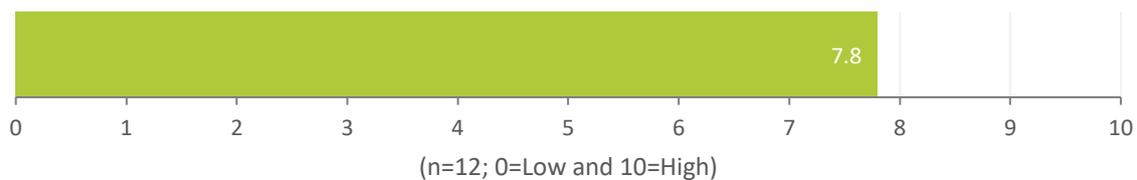
Project Leaders Workshop (December 2019)
Usefulness of presentation/discussion on case study development/approaches



Participants overall were happy with DCAP's progress to date, with comments noting it was on track, hitting the mark and over-delivering.

- **Comments included:** *I really think it's hitting the mark... it's going to come down to how well we can get the message out and people to adopt the info/tools... and to change the language discourse; all seems to be on track halfway through; All projects are over-delivering it seems; More impact information needs to be collected and reported to achieve and exceed project/program expectations.*

Project Leaders Workshop (December 2019)
DCAP's overall progress to date



Specific highlights or lightbulb moments resulting from the workshop included:

- *That P supplementation is not a widespread practice in a P deficient continent. The social science contribution was valuable. The cost of cyclone insurance is cheap 3 K for 50K cover - they should be lining up if they are coastal banana of Sugar growers I reckon.*
- *No light bulb, but the networking opportunity is excellent.*
- *We need comms activities coordinated to perform to perform even at a higher level to help build the program, it's outcomes/impact and reputation. We need to take the reins of some of the stories to help focus attention on DCAP's outcomes. 'Those who tell the stories, rule society' (Plato)...*
- *I think how much DCAP has progressed was an overall highlight*
- *Extent of the program - right up to insurance options*
- *That engagement metric on Facebook could be counted as awareness in KPI's - still not sure about this??*
- *That I could be networking more with other DCAP Program Leaders to consider opportunities for collaboration*
- *That case studies/narratives didn't have to be about a specific primary producer.*
- *That we need a communications scientist to help the projects out*
- *I think there is good integration happening where several projects are working across similar industries and regions etc. More could be done to cross promote each others activities and work together more perhaps...*



Actions planned as a result of the workshop included looking more at case study and communication opportunities as well as improving collaboration with other DCAP projects and planning more thoroughly and strategically for next phase of projects – Comments included:

- Case study idea fleshed out a little more and will put extra effort into project comms. Be interested to hear Damien's comments on industry feedback on FWFA Exp Forecast tools.
- Add case studies to the list of assessing how the project is making a difference. Having made or re-made connections, follow up with people and build stronger connections. Think more closely about the next steps.
- Work more closely with DES/USQ.
- More thorough planning and strategy for the next phase.
- More specific support to projects extending into Central West. and Programme needs to start planning for next cycle.
- Networking a lot more with all the DCAP Program Leaders to consider opportunities for collaboration.
- More case studies and comm's are needed
- Increase effort to enhance communication and develop few more case studies.
- Satisfied our project on track.
- Consult directly with project leaders about workshop program before face-to-face project leader workshops are organised.



DCAP INDUSTRY MEETING (DEC 19)

22nd July 2019 – 3 respondents

8.3 avg – Usefulness of meeting and presentations in terms of updating you on DCAP progress and achievements

- **Comments:** Good to have the opportunity to share DCAP with industry representatives; So important to know whom to speak to at the department and navigate the organisational chart; A little too dense - would have loved more focus on the crop insurance systems. But very informative!

8.7 avg – Value of DCAP's work towards improving decision making for producers regarding climate related influences

- **Comments:** Some industry members had little understanding of DCAP and its projects. DCAP could be more active in briefing industry perhaps; Good overview of everything DAF is working on; Great to see all the different areas being talked about at the same time - helped me make connections between different projects and see how they are related.

Important focus/area to address going forward with the program

- **Comments:** Outputs for decision-making at the enterprise and business levels; Biosecurity should be included. Maybe topic specific meetings with key bureaucrats from other Departments with cross over (e.g. telecommunications); Looking at cropping and horticulture - the hard nuts to crack.

Other comments about the meeting, project or future steps

- **Comments:** Opportunities to brief industry more regularly through whatever forums are appropriate should be taken; Great initiative - thanks for getting the ball rolling; Thanks for organising it!