

## Department of Agriculture and Fisheries – Drought and Climate Adaptation Program

### DCAP Project Final Report

Project ID	DCAP 12.2 - Communicating Climate Change impacts on Queensland's agricultural sectors.
Grantee Name	
Designated Project Leader	Name: Mr Grant Stone
Report authorised by:	Name: Dr Ramona Dalla Pozza Date: 23/06/2017
Report accepted by:	Name: Neil Cliffe Position: Program Manager, Drought and Climate Adaptation Program.

#### 1. Executive Summary

Primary producers recurrently struggle to cope with the impacts of Queensland's highly variable climate that are further exacerbated by climate change (McKeon *et al.* 2009). As a consequence, livestock management, ecological resilience of the property, mental health of landholders, and financial viability are episodically impacted by climate extremes such multi-year droughts (McKeon *et al.* 2004). However, increasing temperatures and associated increase in the frequency of hot extremes resulting from global warming are exacerbating the effect of rainfall deficits and increasing the severity of multi-year drought in terms of the speed of onset, intensity and duration (Nicholls, 2004).

The Climate Change Risk Management Matrix is a tool that can help address uncertainty by identifying the impacts, risk and vulnerability and adaptive responses associated with climate change. Identifying and analysing risks and opportunities, using this risk management approach, can help to plan responses to climate variability and climate change – and can enable organisations to be proactive and more effective in adapting to future uncertainty.

This project aimed to deliver 4-6 industry Climate Risk Matrix workshops targeted at primary producers to communicate the risks of climate change and drought in particular, to develop adaptation pathways. The development of factsheets to communicate adaptation strategies and pathways for those industries was also considered essential to support the workshop series.

Only 3 workshops have been completed to date (June 2017), however future bookings have been made to fulfil the intention of this project. Impact and adaptation factsheets for 13 Queensland regions have been completed, printed and were used in all the workshops. The factsheets will available from the USQ website and they will also be linked from the LongPaddock website.

Climate and drought education and communication tools (rainfall and pasture growth posters) have also been developed, reviewed, approved, printed and distributed – and were also used in workshops to enhance climate understanding.

## 2. Project Background

Adult learning workshops and forums have previously proved to be powerful motivational and education extension processes for communicating complex climate information specific to regional and sectoral interests. The research and extension team has 20 years of experience in delivering these types of workshops to rural Queensland. Additionally, the team are well experienced to explain the subtleties and interactions of climate variability and climate change, and practical applications of such information to improved climate risk management.

The Climate Risk Management Matrix (Cobon *et al.* 2009) has been used since 2010 in facilitated workshops by sectoral, industry, regional and agency representatives across Queensland. Through a participatory workshop process engaging with industry, regions and agencies, the Climate Change Risk Management Matrix is used to identify positive and negative climate change impacts, adaptive responses, and risk and vulnerability associated with climate change. Using this risk management approach to identify and analyse risks and opportunities helps to plan responses, adaptation strategies and action plans <https://www.longpaddock.qld.gov.au/products/matrix/index.html>.

This project complements a recent Department of Environment and Heritage Projection (EHP) funded Climate Risk Matrix Workshops (2016/17). A total of 6 half-day Climate Change Adaptation workshops were conducted by Neil Cliffe (DAF), Grant Stone (DSITI) and David Cobon (USQ) in Bundaberg, Gordonvale, Ipswich, Proserpine, Townsville and Yeppoon from late 2016 to early 2017. The workshops have been well attended (111 stakeholders) and have been well received from evaluation comments.

## 3. Project Methodology

### *Climate Risk Matrix*

A pre-existing collaboration between Grant Stone (DSITI), David Cobon (USQ), and Neil Cliffe (DAF) was instigated to undertake a series of workshops using the Climate Risk Matrix approach targeted at primary producers to communicate the risks of climate change and drought in particular, to develop adaptation pathways. This collaboration is linked to another DCAP project USQ 12.1.

The results of regionally focused industry workshops can be used to assess the specific impacts of climate change on selected high priority industries and areas of interest. This selection process will be guided by input from industry and DAF consultation, but could target industries at risk from climate change (e.g. specific crops within the horticulture industry). The Climate Risk Matrix approach will provide adaptation strategies and pathways that could be provided as factsheets on DSITI's new Climate Change in Queensland map application (developed for EHP - released 2016) to communicate the potential risks and adaptation options.

### *Workshop process:*

- Warmup exercises on extreme climate experiences and location
- Discussion on climate trends
- Presentation of climate information (historical and trends) and sources
- Presentation of Impact and adaptation brochure content (USQ, EHP), FORAGE climate projection report,

Rainfall, wet/dry period, Tropical cyclone and pasture growth posters; other sources of Climate Change information (e.g. Climate Change in Queensland map application)

- Prioritisation of topics for Matrix exercise
- Group work with Matrix exercise
- Results shared from Matrix exercise
- Workshop evaluation

*Evaluation:*

- Appropriateness, quality, reach, engagement, access and reactions from participants engaged in extension and communication activities across projects.
- Assess feedback data from workshop participants.

*Posters for discussion and education:*

The well-regarded *Australia's Variable Rainfall* poster was updated, re-printed and distributed <https://www.longpaddock.qld.gov.au/products/australiasvariableclimate/index.html>. Three other new posters have been developed, with 2 released and one under review.

- *Australia's Variable Rainfall* poster: updated, reviewed, printed and distributed (>1,500 since 2016)
- *Queensland's extended wet and dry periods* poster: generated, reviewed, printed and distributed (>500 since 2017) <https://www.longpaddock.qld.gov.au/queenslanddroughtmonitor/droughtresearch/wetdryposter.pdf>
- *Australia's Variable Rainfall* with Tropical Cyclone tracks poster: generated, reviewed and printed
- *Australia's modelled pasture growth* poster: generated and under review – awaiting feedback for approval and release.

## 4. Project Results

### 4.1 Achievements and Outcomes

*Climate Risk Matrix Workshops:*

Three workshops were held at Calliope (March), Ayr (May), and Rockhampton (June) with two more workshops booked for Proserpine and Injune (July).

- The workshops were attended by 47 participants in total.
- Aspects of past climate variability were communicated to stakeholders to provide a context for future climate change and limitations of the existing instrumental climate record (DCAP project 16).
- Participants became engaged in a collaborative learning process and investigated practical adaptation pathways.
- Future climate risks better understood (in particular those related to extreme events such as droughts and floods).
- Assessment of factsheets communicating adaptation strategies and pathways.
- Attendees have increased awareness of existing climate risk information (e.g. factsheets, posters, FORAGE reports and Climate Change in Queensland map application etc.).
- Output has been recorded from Matrix process group work.
- Over 2,000 rainfall posters (mixed) were distributed.
- Social media post spinoffs (e.g. Climate change impact on giant rat tail grass).

*Evaluation:*

- Collected quantitative and qualitative evaluation on appropriateness, quality, reach, engagement, access and reactions from participants (see DCAP 12.1)
- Assessed feedback data from workshop participants for positives/negatives and potential improvement

*Posters:*

- *Australia's Variable Rainfall* poster: reviewed, updated, printed and distributed (>1,500)
- *Queensland's extended wet and dry periods* poster: generated, reviewed, printed and distributed (>500)
- *Australia's Variable Rainfall* with Tropical Cyclone tracks poster: generated, reviewed and printed

- *Australia's modelled pasture growth* poster: generated and reviewed – awaiting feedback for approval and release
- Posters will be presented (conference paper and oral presentation) and distributed at the Australian Rangeland conference at Port Augusta (September 2017)
- Posters will be hosted on the LongPaddock website for viewing/downloads
- A scientific journal article is in preparation to explain the analysis for the *Queensland's extended wet/dry periods* poster
- The *Queensland's extended wet and dry periods* poster was also positively reviewed by Professor Mark Howden (Director of the Climate Change Institute at the Australian National University).

## 4.2 Unintended Outcomes

### *Climate Risk Matrix Workshops*

While bookings were made for workshops (Middlemount, Rockhampton, Injune), numbers were reduced and the events were postponed/cancelled. This was due to weather events, clashes with farm management tasks and possibly the advertising media out of sync with local news sources.

### *Posters*

- The *Queensland's extended wet and dry period* poster was showcased at the Queensland Drought Mitigation Centre (QDMC) launch on 20 June 2017 [https://www.longpaddock.qld.gov.au/queenslanddroughtmonitor/drought\\_research.html](https://www.longpaddock.qld.gov.au/queenslanddroughtmonitor/drought_research.html). The first and last 2 periods have been enlarged and will be used as backdrops/talking points for the launch.
- The posters may feature at stalls held at the Royal National Association (RNA) show (Brisbane 2017) and BEEF 2018 (Rockhampton).

## 4.3 Partnership Formation

### *Posters*

- A partnership was formed with a group of University of Queensland students undertaking an ICT subject assignment which involved an “online visualisation for Queensland’s extended wet and dry period poster”. Stage one of the visualisation has been completed (Semester one students) and will be continued Semester two students (2017). The target for this visualisation is the LongPaddock website as a further extension aid <https://deco3800-weather.uqcloud.net/>.
- Collaboration with A/Prof Jozef Syktus, University of Queensland, as the *Queensland's extended wet and dry periods* poster is a visualisation of the historical climate records analysis undertaken in the DCAP Project DSITI 3.2 (Multi-year Droughts). Companion SST, MSLP and moisture flux prototype posters have been generated to match the 18 wet and dry periods and will be used as additional extension aids.

## 4.4 Lessons Learned

### *Climate Risk Matrix*

- There may be a better opportunity to use Climate Risk Matrix in dedicated projects (e.g. Horticulture and Western BMP proposals – DCAP 2), rather than running a series of workshops for Regions/industries.
- The preparation and travel associated with delivering the workshops across Queensland posters takes a considerable amount of staff resources.

### *Posters*

- The development of the posters takes a considerable amount of staff resources and time to develop, create, validate and review posters.

## 4.5 Implications for the Future

- There is particular interest from Growcom and DAF for Climate Risk Matrix workshops and other DSITI

climate products and tools related in DCAP 2 project proposals.

- The growing assortment of Posters generated by DSITI will have a dedicated presence in climate workshops undertaken by future DCAP projects.
- It is intended to produce instructional videos to relate DSITI climate products and tools for more accessible coverage.
- There are teaching and product use opportunities for the new course "CLI8003 Climate Food Water and Energy Security for USQ's International Centre for Applied Climate Sciences (ICACS).

## 5. Conclusion

Three Climate Risk Matrix workshops targeted at primary producers were held to communicate the risks of climate change and drought in particular, to develop adaptation pathways. Factsheets were developed and communicated to relate adaptation strategies and pathways. Two more workshops to be held in Proserpine and Injune are planned for July, which will complete the project.

Evaluations from the workshops participants has shown that participants found the presentations, content and Climate Risk Matrix process an informative and enjoyable experience.

Climate and drought education tools (rainfall and pasture growth posters) were developed, reviewed, approved, printed and distributed – and were also used in workshops to enhance climate understanding. Over 2,000 posters (total) have been distributed to date.

Further development, enhancement, integration, communication (including the use of multimedia) of products and services will be further explored as project funding is granted.

## 6. Financial Statement (Revenue received/Expenses paid/Revenue unspent

As agreed to be supplied after financial reporting for June has been completed.

## 7. Additional Information

Nil.

## 8. References

Cobon, D.H., Stone, G.S., Carter, J.O., Scanlan, J.C., Toombs, N.R., Zhang, X., Willcocks J. and McKeon, G.M. (2009) [‘The climate change risk management matrix for the grazing industry of northern Australia.’](#)  A Climate of Change in Australian Rangelands, The Rangeland Journal, Volume 31 Number 1

McKeon, G., Hall, W., Henry, B., Stone, G. & Watson, I (eds) (2004) [‘Pasture Degradation and Recovery in Australia's Rangelands: Learning from History’](#) Department of Natural Resources Mines & Industry, Queensland Government

McKeon, G.M., Stone, G.S., Syktus, J.I., Carter, J.O., Flood, N.R., Ahrens, D.G., Bruget, D.N., Chilcott, C.R., Cobon, D.H., Cowley, R.A., Crimp, S.J., Fraser, G.W., Howden, S.M., Johnston, P.W., Ryan, J.G., Stokes, C.J. and Day, K.A. (2009) [‘Climate change impacts on northern Australian rangeland livestock carrying capacity: a review of issues. A Climate of Change in Australian Rangelands’](#) The Rangeland Journal, Volume 31 Number 1

Nicholls N. (2004) The changing nature of Australian droughts. *Climatic Change*, 63, 323-336.

Nyamwanza, A.M., et al., (2017) Contributions of decadal climate information in agriculture and food systems in east and southern Africa. *Climatic Change*, DOI 10.1007/s10584-017-1990-4.

## 9. Appendices/Attachments

### 9.1 Milestone Reports

DSITI summary provided.

### 9.2 Case Studies

N/A

### 9.3 Project Reports

N/A

### 9.4 Scientific Papers

ARS Conference abstract

### 9.5 Products/Product Descriptions

- Australia's Variable Rainfall poster available at:  
<https://www.longpaddock.qld.gov.au/products/australiasvariableclimate/index.html>
- Queensland's extended wet and dry periods poster available at:  
[https://www.longpaddock.qld.gov.au/queenslanddroughtmonitor/drought\\_research.html](https://www.longpaddock.qld.gov.au/queenslanddroughtmonitor/drought_research.html).
- Australia's modelled pasture growth poster: generated and reviewed – awaiting feedback for approval and release – see attachment 1.
- Australia's Variable Rainfall with Tropical Cyclone tracks poster: generated, reviewed and printed – see attachment 2.

### 9.6 Other Relevant Attachments

Nil.