

# Climate change: what mixed farmers in Queensland really think and their strategies to manage it.

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## Abstract

Climate change effects and the impacts of a 'carbon economy' are vexed issues for policymaker, scientists and the farming community. Science is largely supportive of the need for global action, policy is highly contested and individual farmers must balance conflicting information with their own local experiences within Australia's highly variable climate. A partnership of Queensland projects has investigated mixed farmers knowledge and opinions of climate change, then provided some basic understanding of the process of climate change, and local assessments of historical climate trends and projections to support over 70 farmers develop strategies for managing climate change on their own farm. While not unanimous, the majority of farmers were deeply sceptical of climate change and cynical about climate change policy. On-farm strategies ranged from ignoring climate change altogether, to continuing to adapt to variable conditions, right through to changing their enterprise balance to reduce risks with more resilient pasture based systems. Most farmers were proud of their proven ability to adapt to changing circumstances and held a strong belief that ongoing technical development would enable them to adapt to future climates and climate variability. Regardless of farmers attitudes to climate change per se, policy and scientists must continue to support ongoing innovation to develop future farming systems and technologies that remain sustainable and productive.

## Key words

Strategies, climate change, management, resilience, risk, mitigation

## Introduction

In a world with a growing population, declining availability of prime agricultural land, increased demands for food security and continuous exposure to adversity there is a need to support farmers to build capacity to adapt to future change to meet future food supply needs for a growing population. In recent years climate change has become a key risk to consider, with increasing carbon dioxide in the atmosphere and already noticeable changes in climate trends at global and regional scales (Singh et al. 2012; CSIRO and BOM various reports). These changes and the impacts are not fully known which add further risk to farming systems.

One impact of climate change includes policy decisions such as the carbon tax. A survey conducted in 2011 identified government regulation as the top concern for farmers (CaseIH 2011). This is no surprise considering research findings by Australian Farm Institute show grain farmers in NSW could see a net income reduction of 5.5 percent after the first year of the carbon tax being introduced, despite agriculture being excluded directly from the tax (Davison 2011; Twomey 2011).

There has been a large investment into research and development for climate change to help the agricultural industry adapt and build resilience to the challenges it presents. For example, recent investment from the Australian Department of Climate Change and Energy Efficiency includes \$31 million into an Australian Climate Change Science Program, \$126 million into a National adaptation Framework, \$387 million into marine and climate change science and \$12.9 billion into securing water for the future (DCCEE 2012). Another investment by the Department of Agriculture, Fisheries and Forestry includes \$201 million to help agriculture reduce green house gases, \$99 million to assist industry and farmer groups test and apply climate research outcomes, and 46.2 million into a climate change research program (CCRP) that funds research and on-farm demonstrations to help prepare Australian primary industries for climate change and build resilience into the future (DAFF 2012). This investment is important to ensure farmers have the ability and resources

necessary to help them to adapt to the new challenges climate change presents; including a carbon economy and other associated government regulation.

Managing climate risk is central to farmers being able to reduce the adverse impact of poor conditions and maximise outcomes in favourable conditions. Studies into what makes people and businesses resilient identify the presence of several key attributes. These attributes include being optimistic, prepared, flexible, confident in their industry and themselves to make decisions, able to draw upon support and trusting networks for advice, and the ability to research and detect opportunities and challenges (Gray 2011; Greenhill et al. 2009; Johnson-Lenz and Johnson-Lenz 2009). With climate change and a carbon economy emerging it is important that appropriate support is available to farmers to ensure the key attributes of resilient farmers are achievable. To help focus future investment into policy, research, development and extension around climate change a study was undertaken to gain insights into what farmers in Queensland thought about climate change and what strategies they have in place to deal with it.

## Methods

Market research using qualitative semi-structured interviews was undertaken with 23 farmers and 9 advisors in Southern and Central Queensland to gain an understanding of their knowledge and perceptions around climate change. The market research highlighted several opportunities to tailor content and the communication process for the new project. The key findings considered in workshops and communications included:

- Relevant and local information, i.e. in context to the audience
- Balanced discussion on the topic
- Information on the basic processes and science behind climate change
- The removal of negativity from the topic and focus on opportunities and positives
- Focus on topics (e.g. management practices, soil carbon) that interest the audience and deal with how those practices can help adapt and stay profitable with climate change.

A partnership between Natural Resource Management Organisations, farmer based Landcare groups and State and Federal government projects developed and delivered eight workshops with a total of 73 participants in the Queensland Murray Darling. Workshops focused on principles and management of soil carbon, the basic processes driving climate change (such as the green house gas effect), local climatic trends and future projections relevant to the farmers attending. The link between climate change adaptation and mitigation (via soil carbon) was also explored. The workshop approached the topic of climate change in a positive manner, highlighting the potential benefits from CO<sub>2</sub> fertilisation and temperature increases (less frost) as well as potential threats. Farmers were asked to identify adaptation responses to climatic impacts that were relevant to their own enterprises and developed individual strategies to manage climate change. All personal strategies were collected and responses were pooled and common themes were identified. Individual strategies show insight into farmer's views about climate change, how they plan to manage for it and potential needs to improve their capacity to adapt into the future.

## Results

Key themes from farmer strategies to deal with climate change were identified. These themes and the amount of times each were selected are listed in table 1.

It is evident that, while not unanimous, the majority of farmers were sceptical of climate change and cynical about climate change policy. Strategies ranged from 'accept climate change', to 'continue to do the same and adapt to variability'. Examples of qualitative responses included:

- *'Nothing we are not already doing. Mute point. We are already adapting. Farm more effectively and increase pasture utilisation'*
- *'Adapt to climate change and different weather patterns, invest in pasture improvement and reduce costs'*
- *'Same as dealing with general variability'*
- *'Wait and see what government does. Increase soil organic matter, increase pasture quality and cover'*
- *'I'm 65 years old; bit hard to plan for next 20 years'*

Improving agronomic practices, keeping up to date with research and keeping up to date with climate change policy were the top themes selected 50, 29 and 23 times respectively. Farmer's strategies had more than one component within each, as shown in table 2.

**Table 1: Key themes identified within farmers strategies to deal with climate change and the number of times they were identified within 73 strategies.**

Strategy themes to deal with climate change	Total
1 Ignore, do not believe	2
2 Wait and see if climate change is 'real' or a 'fad'	4
3 Continue to manage variability	13
4 Keep up to date with climate change policy, see what develops	23
5 Accept and adapt to climate change and variability	12
6 Keep up to date with agricultural research	29
7 Improve crop and pasture agronomy	50
8 Change enterprise mix – land suitability	8
9 Economics – reduce costs, maximise profit	6
10 Manage risk – utilise opportunities, reduce impact of poor seasons	12
11 Mitigation	6

**Table 2: Number of times themes were selected together within an individual farmers' strategy to deal with climate change. Note: numbers reflect key themes in table 1.**

Theme	1	2	3	4	5	6	7	8	9	10	11
1. Ignore, do not believe	0	0	2	0	0	0	2	0	0	0	0
2. Wait and see if 'real' or a 'fad'	0	0	1	3	1	1	3	0	0	0	0
3. Continue to manage variability	2	1	0	3	0	4	10	1	1	1	0
4. Keep up to date with climate change policy	0	3	3	0	5	14	15	1	1	1	2
5. Accept and adapt to climate change and variability	0	1	0	5	0	6	5	2	1	3	1
6. Keep up to date with agricultural research	0	1	4	14	6	0	17	0	3	4	2
7. Improve crop and pasture agronomy	2	3	10	15	5	17	7	6	5	8	5
8. Change enterprise mix	0	0	1	1	2	0	6	0	0	3	0
9. Economics – reduce costs, maximise profit	0	0	1	1	1	3	5	0	0	0	0
10. Manage risk – utilise opportunities, reduce impacts	0	0	1	1	3	4	8	3	0	0	0
11. Mitigation	0	0	0	2	1	2	5	0	0	0	0

Two farmers who did not believe in climate change (Theme 1) had strategies to continue to manage climate variability and improve their agronomic practices. Farmers who were very sceptical (Themes 2 & 4) had strategies to wait and see if climate change is actually a 'fact or fad', to keep informed with policy on the topic, keep up to date with agricultural research and improve pasture and crop agronomy. Farmers who accept climate change or are more willing to adapt to climate change and variability (Theme 5) had strategies to improve pasture and crop agronomy, to keep up to date with agricultural research and climate change policy. Farmers who decided to continue to manage for climate variability as their strategy (Theme 3) also included keeping informed on government policy and agricultural research, along with improving crop and pasture agronomy.

The strategies show that despite farmer's beliefs about climate change, they still have strategies in place to improve current management and to stay up to date with policy and research advances to ensure ongoing business success. This characteristic demonstrates farmer resilience. It also demonstrates the ongoing need for research and policy advances to support continuous improvement in the agricultural sector. Examples of qualitative responses include:

- 'Get new information on climate change and opportunities – steady as she goes'
- 'Continue to be informed and continue to adjust what is happening on my farm to reflect new technologies and changes in conditions'
- 'Keep up with recent research, grow crops with shorter maturing times, keep more grass and cover, use weather forecasts more for making decisions'
- 'Continue with current management of seasonal variation. We have been managing by forecasts. Management includes increasing soil carbon, increase soil water holding capacity and managing price risk'
- 'Listen more! Continually adapt to increase bottom line'
  - 'Keep up to date and make decisions as required'

Most farmers were proud of their proven ability to adapt to changing circumstances and held a strong belief that ongoing technical development would enable them to adapt to future scenarios. Broad research areas and improved agronomic practices that farmers were interested in included:

- Climate and weather predictions
- Soil health (soil organic matter)
- Grazing management (stocking rates, feed management)
- Pasture improvement (establishment, performance, legumes, fertilising options)
- Cropping management (rotational cropping, including legumes, varieties, tillage, machinery, fertiliser, input costs)
- New opportunities and advancements in agriculture

## Conclusion

Farmers had mixed opinions and strategies to deal with climate change. Irrespective of farmers opinions about climate change they had a plan. The most dominant themes in farmer strategies were to improve agronomic practices, keep up to date with agricultural research and keep up to date with climate change policy, manage risk and variability. These themes resonate with Gray (2011) and Greenhill et al (2009) who identified the following attributes of resilient farmers:

- Optimistic and confident
- Research and identify opportunities, changes, trends and threats
- Prepared for disruptions and have a plan in place to deal with any changes
- Build flexibility into their operation so they can make timely changes to capture opportunities and reduce impacts of adverse events
- Build trusting supporting networks and relationships with other farmers, experts and the community
- Continually test and experiment with new options

Long lasting successful businesses outside the agricultural sector have also been found to have these key attributes (Johnson-Lenz and Johnson-Lenz 2009). These attributes allow for timely confident decision making that reduces risk and supports a productive, profitable and sustainable business.

These are promising results; with plans in place, positivity and belief farmers have in themselves, faith in future information and research to help them adapt to future changes farmers appear to have resilient attributes necessary to deal with climate change. From these results it can be concluded that as researchers, planners and policy makers we have a responsibility to ensure we uphold the expectation placed on us to support farmers decision making through investing in appropriate Research Development and Extension (RD&E). Such an investment should help to build the ongoing capacity of primary producers to the huge task ahead of them; feeding the ever growing human population while dealing with future changes.

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