

Planning for Change: The Climate Report

Five key messages from the Climate Report

Rural Bank is pleased to release its first Climate Report for primary producers, an in-depth compilation of likely and predicted scenarios that agribusiness can consider and factor into forward management planning.

Climate change and its present and projected impacts on Australian agriculture is a complex, yet vital topic. As an industry whose prosperity is heavily reliant on the climate, it is vital that participants in Australian agriculture attempt to understand the implications for their businesses and plan accordingly. This report is designed to help you on that journey. By consolidating the latest scientific observations, projections, government policies and market trends, this report aims to provide a comprehensive, yet understandable, perspective.

The following is a summary of five key messages from the full report which can be accessed on the Rural Bank website.

1. Climate change is not just a future issue, it is happening now.

Climate change is the significant variation of average weather conditions over several decades or longer.

A range of factors can alter the climate significantly. Many natural phenomena can affect air temperature, however the most important contributor to climate change is the concentration levels of greenhouse gases in the atmosphere produced by human activity which can last in the atmosphere for much longer than natural drivers. Although greenhouse gases such as carbon dioxide, methane and other minor gases make up only 0.4 per cent of the atmosphere, their atomic structures have a significant impact on trapping heat energy in the atmosphere. Light energy from the sun passes through the atmosphere and is reflected or absorbed. The absorbed light is transformed to heat energy. While the reflected light passes back through the atmosphere and out, some of the heat energy is reflected by the greenhouse gases back into the atmosphere, causing the planet to warm.

Much of the conversation around climate change, including a significant segment of this report, highlights impacts likely to occur in 2040, 2050 and beyond. However, it is crucial to recognise that this is not when climate change is expected to commence. Climate change is happening now and has been underway in the past four decades. This is evident in 2023 being reported as the warmest year on Earth with global annual average temperature change of $1.54 \pm 0.06^{\circ}\text{C}$ above the average of 1850-1900 according to one estimate. Last year was not an outlier: the last nine years have included all nine of the warmest years observed in the instrumental record.

Rising global temperatures are strongly correlated with increases in atmospheric concentrations of greenhouse gases. The annual rate of increase in atmospheric carbon dioxide over the past 60 years is about 100 times faster than previous natural increases, culminating in carbon dioxide reaching a record high concentration in May 2023 of 424 parts per million (ppm).

Regrettably there is currently no substantial global progress on reducing emissions. The Global Carbon Budget 2023 report estimated fossil CO₂ emissions will have further increased in 2023. Projections suggest there will be another increase in greenhouse gas emissions in 2024. International agreements to limit greenhouse gas emissions have only had very limited success. Geopolitical considerations among other challenges continue to prevent progress.

Since the emission of greenhouse gases is the driving cause of global temperature rises, it seems inescapable that temperatures will rise until there is global commitment to reducing the source of the problem.

2. Confronting the uncomfortable risks projected from climate change is crucial for farm business planning.

The projected risks resulting from climate change make for uncomfortable reading, especially for agricultural production systems so heavily reliant on climatic conditions. In addition to the uncomfortable nature of projected scenarios, making decisions in response to those risks it is currently a complex matrix of moving pieces that interact with each other. Decisions that meet the evolving conditions will be hard to make, while not making a decision is also not intrinsically safe. The more successful

approaches to planning for changes seem to include taking steps where a business can also capture benefits. It is therefore prudent to investigate the likely impacts on the particular commodity and region that a farming business operates in.

In the assessment of risks from climate change, it is helpful to consider the two major categories of risk:

1. Physical risks: these include acute or short-term risks (such as the increased severity of extreme weather events) and chronic or longer-term shifts in climate patterns (such as changes in rainfall amount and distribution).
2. Transition risks: the transition to a lower-carbon business and economy entails navigating policy changes at national and international levels, changing legal liabilities, new technology, and market changes.

Each type of risk requires a different response and there is continuous change in almost all the risk types mentioned. Acute impacts often have a highly visible nature and are regularly reported in media. Chronic impacts may be even more important. A second aspect of the risk of impacts is that there is a risk of several events affecting a region in close succession.

3. Projected changes in climate will vary across Australia's agricultural commodities and regions.

While the general trend of warmer temperatures resulting from climate change is true and persists into the next century, as a principle it is limited in its application for assessing risk and strategic planning at the level of an individual farm business with its specific agricultural commodity and location. To that end, impacts for major agricultural commodities and CSIRO temperature projections are presented and highlight the specific projected climate change impacts across commodities and geography.

A summary of impacts of climate change are presented for: beef cattle, dairy, cropping, horticulture, sheep and wool. Commodities are being impacted in varying ways as changes such as increased temperatures and shifting rainfall patterns result in unique risks for plant and animal productivity and reproductive performance. Each commodity has its own risks to be considered and will be impacted by climate change to varying extents.

The climate change projections discussed use the Representative Concentration Pathway (RCP) produced by the ICPP which models a scenario for atmospheric greenhouse gas concentrations on the assumption of business-as-usual with little reduction in global greenhouse gas emissions. This option, RCP8.5, most closely characterises the climate pathway we are on now.

Of particular interest is the projected increased occurrence of heat stress days. These are days over 35°C. This temperature threshold affects not only people, but plants and animals. In agriculture it is a threshold at which there are impacts on physiological processes, and hence on productivity. Generally speaking, additional heat stress days are projected to move south and towards coastlines in the next decade.

Across the states:

- QLD: in addition to warmer conditions, Queensland is also projected to see more intense extreme rainfall events and become drier in the May-October period.
- NSW: temperature is expected to increase, most notably in summer and spring and with a greater increase in hot days with distance inland. Rainfall changes vary across the state's regions with some projected to see increased rainfall for some seasons and declines for others.
- VIC: the state is set to become hotter and drier from the north toward the south with rainfall declining as storm tracks are shifting southwards. Spring is set to see the greatest decline in rainfall.
- TAS: temperature rises in Tasmania will be less than mainland Australia is projected to experience, however increasing temperature could help increase dryland pasture production. Annual rainfall is projected to increase along the east coast and decrease along the west coast.
- SA: warming and reduced rainfall is expected to be greatest in spring while annual rainfall is forecast to fall across all regions, with the Limestone Coast to see a relatively smaller decline in rainfall.
- WA: crop yields are expected to be impacted by reduced winter and spring rainfall coupled with higher temperatures in spring, with the eastern and northern wheatbelt to see the largest yield declines.

Our objective in this section is to stimulate interested parties to dig deeper into the available information that is relevant to their situation. We cannot be comprehensive about impacts or about strategies for addressing the risk that is unique to their situation. The science improves all the time, as it should. We therefore talk about kinds of responses, conscious that impacts are both chronic and acute. Responses fall into two categories: adaptive and transitional. We hope that farm managers will be able to use this concept in medium term strategic planning.

4. Reporting farm emissions and planning to reduce emissions makes good business sense. The outcome should in most cases be that a farm remains a farm, and a better managed farm as a result.

Legislation and related commercial changes around climate and carbon footprint reporting are starting to reach the farm gate. Since it is increasingly apparent that the objective of the Paris Agreement to "to hold global temperature increase to well below 2°C above pre-industrial levels and pursue efforts to limit it to 1.5°C above pre-industrial levels" may be missed, there is a strong likelihood of more legislation across all industries to reduce emissions.

This will also entail more reporting but could also drive demand for carbon credits as well. Systems for rewarding the removal of carbon in the atmosphere or preventing its release to the atmosphere, such as the Carbon Farming Initiative have been under development for more than a decade. They are maturing and will continue to be refined into the foreseeable future. Carbon markets arose as a financial incentive to reduce carbon levels in the atmosphere at the lowest cost, while adding a new industry to rural areas globally. Carbon markets have several advantages, in particular, that they are a rapid response to an urgent problem. It was clear from the earliest days that these measures were not a sufficient solution. As a consequence, decarbonisation of production systems was always part of the solution.

Regulators around the globe are playing a part by bringing in changes to consumer legislation to require high standards of evidence for environmental claims about products including about carbon neutrality. The consequence is higher costs for carbon projects to demonstrate their carbon sequestration, but these costs add value to carbon credit products. Evolution of the carbon market and potential associated products will continue well into the middle of the century and beyond. The sophistication of current technologies such as soil methods, tree planting technologies, technologies for quantifying carbon sequestered and more will continue to improve. All these developments should make carbon farming more attractive to farm business operators. After a decade of slow development, there is now rapid growth in the registration of carbon projects.

All that glitters is not gold, and the glitter of the market for carbon credits should not blind farm managers to other important factors in the business environment. The potential new line of business and new income needs to be developed strategically and synchronised with decarbonisation of the business.

Some farms are being asked now to report on their carbon footprint, and their plans to reduce their greenhouse gas emissions. All entities from the very largest financial institutions down the line to individual businesses are being asked to reduce their greenhouse gas emissions. We encourage farm businesses to see this reporting as a business decision, not a political decision. What is being sought is partly to better understand the impact of climate change on your business, as well as what sources of emissions might be arising from your business activities. As the old saying goes, if you can't measure it, you can't manage it. There are several emissions calculator tools online and most industry bodies now host one.

5. Observations and recommendations to guide future work.

Along this journey we consulted many data sources. Due to lack of uniformity in a number of areas, analysis of the potential future shaped by climate change in any given region becomes more difficult to assess and integrate into strategic planning.

There are few reference eras for predictions about future climate that are used in common across all Australian states. Many reports provide their own unique reference era. Fortunately, the CSIRO and Bureau of Meteorology predictions do use a meaningful and shared reference or baseline era. As this report uses data from those sources, we used the 1986-2005 era as a baseline when possible. It would be desirable to use a common reference era in common for all projections.

A source of further confusion is the use by different organisations of future states with eras as far away as 2090 and the twenty-first century. While the result may seem to show dramatic, perhaps even frightening change at that era, it is not particularly useful for strategic planning purposes. Indeed, it is possible that this very distant future state discourages engagement with an issue that is affecting the global and national economy now. Even 2050, another era appearing in some reports, is too far away to fall within formal and informal planning horizons.

As each year advances, the level of scientific understanding and reflection is deepening. In many cases the level of concern expressed by various organisations has been rising for more than a decade. The University of Exeter-based Institute and Faculty of Actuaries commented that most current climate change models do not include the likely impacts of exceeding tipping points. This is despite rising awareness

that exceeding the threshold may cause self-reinforcing changes to climate across large regions and affect other tipping points, causing the cascade effect mentioned earlier. The result is a general underestimation of climate-based risk. This underscores the urgency for authorities to update climate analysis regularly.

It would also be useful for farming businesses to have available some analysis of the integrated impacts of climate change in their industry as well as the likely impacts at an individual level. The integrated impact assessment provides a measure of significance to readers. The individual impacts provide the list of impacts for consideration in strategic planning.

The future business terrain is increasingly uncomfortable. The horizon suggests turbulence, more risks and less certainty. Nonetheless, collectively the global community can reduce, avoid or mitigate the risks and the rising costs of them by concerted effort. That can only happen if we start now with the deep conviction that the atmosphere does not care who emitted excess greenhouse gases, nor their reasons for doing so. What matters is the combination of an open mind and the willingness to make changes to restore safe levels of greenhouse gases in the atmosphere. That should result in more efficient and more resilient businesses, and more generous natural systems

Next steps

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Andrew Smith

Head of Development - Business & Agribusiness

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