

Inquiry into the impact of climate change on Queensland agricultural production

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Committee Secretary
State Development and Regional Industries Committee
Parliament House
George Street
Brisbane Qld 4000

By email to: sdric@parliament.qld.gov.au

Dear Members of the State Development and Regional Industries Committee,

Re: Inquiry into the impact of climate change on Queensland Agricultural Production

The Next Economy acknowledges the contribution the agricultural sector has made to Queensland's economy and its place in supporting the vitality of regional communities. We welcome the opportunity to contribute to the inquiry on the impacts of climate change on agricultural production across the State.

The Next Economy is a not-for-profit regional economic development agency that supports regions across Australia to develop strategies to manage economic change in ways that are climate-safe, socially just, and regenerative of natural systems.

Our submission shares insights from our recent engagement with industry, academics and regional communities. As part of our broader program of work, we conducted interviews and desktop research to understand the issues facing farmers and regional communities and the opportunities to support a climate resilient, adaptable and regenerative agriculture sector.

Impacts of climate change and climate variability on Queensland agricultural production and the existing and potential future risks of climate change on the sector

It is well documented that climate change impacts are significant and diverse including shifting regional climate patterns, loss of biodiversity and species distribution, and more severe floods, droughts, heatwaves and bushfires. The varied effects of climate change will continue to have repercussions for Queensland's agricultural and farming systems, regional economic development, livelihoods and natural systems more broadly.

Impact on crop viability

Unpredictable and limited water supply, increasing frequency of extreme weather events and shifting weather patterns are already impacting the resiliency of Queensland's farming systems. These stressors necessitate adaptation and transformation of current farming and broader agricultural practices to minimise a decline in the quality, quantity and nutritional value of crops and

resources.¹ The interconnected nature of climate risks and that of the agricultural and ecological systems (habitat, biodiversity, natural carbon sinks) means that sudden shocks and slow onset stressors experienced by one system flow onto other systems in ongoing feedback loops.² These further compound the risks to, and impacts on, agricultural production and in some cases may see specific agricultural regions become unviable over time.³

Changing climate and environmental conditions are expected to increase the distribution of diseases and the number of pests present among crops and livestock. To ensure existing crop types remain viable, it is likely that agricultural production will increasingly rely on fertilisers and pesticides, require greater water access (including increased use of irrigation), and even shift certain crops to more favourable geographic locations. This will place extra strain on soils, and will directly impact regional economies, disrupt communities and potentially disturb conservation areas and habitats in need of regeneration.

Increased competition for land

On-farm diversification activities to support decarbonisation such as carbon abatement, renewable energy projects (wind and solar farms), and bio future crops, as well as off-farm activities such as growing urbanisation and expanded critical minerals mining and processing activities, will increase the competition for land.⁴ These activities will also be competing with new agri-businesses as the sector grows to meet increasing food production demands. The quest for new agricultural lands will compete with the need for increased conservation efforts and the need to restore existing ecosystems to address biodiversity loss and increase climate resilience more broadly.

If not managed carefully, these activities could have negative environmental impacts on land and water resources, release additional carbon and pollute air and groundwater. These impacts on the health and resilience of different ecosystems may in turn affect the productivity of the agricultural sector which is reliant on healthy natural resources.

Regional livelihoods and resilience

Responding to the unpredictability of extreme weather events, and sudden loss of crops and livestock creates additional stress on farming livelihoods and poses a risk to the viability of local economies, and the social fabric that binds communities together.

Climate change also poses an occupational health and safety risk to agricultural workers through events such as extensive exposure to heat, degraded air quality and greater exposure to agro-

¹ DAFF, *Climate change impacts and adaptation on Australian farms:*

<https://www.agriculture.gov.au/abares/products/insights/climate-change-impacts-and-adaptation#adaptation-will-help-offset-future-climate-impacts>

² Cocklin and Dibden, 2009, *Systems in Peril: Climate Change, Agriculture and Biodiversity in Australia:*
<https://iopscience.iop.org/article/10.1088/1755-1315/8/1/012013/pdf>

³ Stephen Bartos, Farmers for Climate Action, 2022, *Fork in the Road. Impacts of Climate Change on our Food Supply:*
https://farmersforclimateaction.org.au/wp-content/uploads/2022/03/Fork-in-the-Road_V5.pdf

⁴ National Farmers Federation response to AEMC Renewable Energy Zones Discussion Paper
https://nff.org.au/wp-content/uploads/2020/11/2019.11.08_NFF-Submission_AEMC_REZ1.pdf_NFF-Submission_AEMC_REZ1.pdf

chemicals due to higher use by producers. Farmers increasingly struggling with market pressures, vicious debt cycles, rising input costs and deterioration of soil and landscapes is likely to contribute to mental health issues.⁵

The economic and well-being pressures faced by farmers due to the direct and indirect impacts of climate change may contribute to closures of smaller farms, consolidation and takeover by large-scale corporate agribusinesses and emigration of families. Demographic changes and population decline will have an impact on the accessibility and quality of services in regional areas, increase socio-economic disadvantages and further challenge the resilience of regional communities.

Impact on First Nations communities

Climate change will impact First Nations populations differently depending on their geography, socioeconomic status, cultural activities and connection to Country. It has and will continue to negatively impact the health and wellbeing of First Nations communities, especially in communities with poor access to appropriate housing and essential services and infrastructure.⁶ Climate change will also affect the way in which native botanicals and bush foods grow and populate the landscape, impacting bio-cultural practices on country, and the bush food industry more broadly.⁷

Although it is relatively small in scale compared to other agricultural production, the native foods and botanicals industry holds significant value both economically and culturally for individuals residing in arid regions of Australia. Any mitigation and adaptation strategies in mainstream agricultural practices or the farming of native botanicals and bush foods, must consider the rights and interests of First Nations people, their livelihoods, and bio-cultural knowledge and practices.

Additional challenges to adaptation

Any approaches to adapting farming systems, agricultural processes and land use practices to manage climate risks and (in some cases) reduce carbon emissions, benefits from taking a systems approach to consider the flow on impacts and feedback loops. A systems approach illuminates how adaptation efforts in the agricultural sector could impact (both positively and negatively) other sectors in the economy, as well as the environment, and the broader society.

As an example, Agricultural Technology (Ag-tech) as an adaptation activity, has the potential to increase yield and create more efficient farming practices.⁸ It also has the potential to support farmers to understand their carbon sequestration practices and enhance the development of natural capital through accurate geo-spatial mapping, remote sensing and modelling. There is, however,

⁵ Department of Health and Aged Care, 2023, *Taking Stock: Suicide prevention tool for Australia's farmers*: <https://www.health.gov.au/ministers/the-hon-emma-mcbride-mp/media/taking-stock-suicide-prevention-tool-for-australias-farmers#:~:text=Suicide%20rates%20among%20farmers%20in,by%20suicide%20every%2010%20days>.

⁶ Quilty et. al., 2022, Climate, housing, energy and Indigenous health: a call to action: https://healthinfonet.ecu.edu.au/key-resources/publications/45432/?title=Climate++housing++energy+and+Indigenous+health++a+call+to+action&contentid=45432_1

⁷ Matthew and Lee, 2016, *Conceptualising climate change adaption for native bush food production in arid Australia*: <https://digitalcollections.cdu.edu.au/nodes/view/4815>

⁸ ABARES, *Disruptive technologies: opportunities for the brave*, <https://www.agriculture.gov.au/abares/products/insights/megatrends-2021/disruptive-technologies#informationrich-production-systems-will-provide-new-levels-of-control-and-accountability>

growing concern that the challenges and risks posed by the digitalisation of agriculture⁹ if unaddressed will:

- Create greater inequality because of different levels of internet access and telecommunication infrastructure across regions.
- Push small scale farmers who do adopt the technology further into debt.
- Diminish regional employment and human resources.
- Develop a dependency on technology for decision making.
- Compromise the rights to data sovereignty and ownership.
- Exacerbate underlying structural power dynamics and vulnerability drivers that impact smallholder farmers.
- Expose farmers to external risks due to specific characteristics of land and farmers' livelihoods being made available in data sets.

Systemic risks like this, when imposed or overlaid on the agricultural sector in Queensland have the potential to jeopardise the sustainable delivery of goods and services.

Another example that demonstrates the risks of maladaptation in the agricultural sector in Queensland is the anticipated growth of the Australian bio-futures industry. Queensland has the capacity to grow the necessary feedstock for a range of new packaging, fuels and other processing industries, including tallow, sugarcane, cropping residues and alternative crops such as Pongamia.¹⁰ Bio-future crops have the potential to support decarbonisation, but a range of risks have been identified including:

- Increased scale of production could compete with other agricultural activities for land and water resources.
- Additional carbon may be released if land clearing and deforestation is not contained.
- The health of ecosystems already under conservation and protection, and those in need of regeneration, including the Great Barrier Reef could be jeopardised.¹¹

These examples demonstrate the need for understanding, considering and managing systemic risks to avoid triggering new social, environment and economical hazards, amplifying existing threats, and leaving the agricultural sector more vulnerable to climate change in the future.

⁹ Soma and Nuckchady, 2021, *Communicating the Benefits and Risks of Digital Agriculture Technologies: Perspectives on the Future of Digital Agricultural Education and Training*:

<https://www.frontiersin.org/articles/10.3389/fcomm.2021.762201/full#:~:text=While%20digital%20agriculture%20promises%20environmental,the%20issue%20of%20data%20ownership>

¹⁰ Queensland Government, *Biofutures Roadmap and Action Plan*,

https://www.statedevelopment.qld.gov.au/__data/assets/pdf_file/0023/72239/biofutures-roadmap-and-action-plan-june-2022.pdf

¹¹ Queensland Government, *Cane*: <https://www.reefplan.qld.gov.au/land-use/cane>

Opportunities for the Queensland Government to create and support resilience, adaptation and mitigation measures in preparing the agricultural sector for future climate change

Regional Australia and agricultural communities are faced with the difficult task of producing food and fibre for a growing population while both mitigating and adapting to climate change.

Addressing this challenge will require changes to the way we produce agricultural products and there is a growing acknowledgement across regional communities that we need to prioritise practices that regenerate natural ecosystems and communities while addressing climate change. Our research and discussions with agricultural producers and regional communities have revealed several opportunities to ensure a thriving future for the agricultural sector in Queensland.

Regenerative agriculture and land management

Regenerative agriculture refers to a suite of practices, encapsulating a holistic approach to farming and land management that seeks to restore and enhance ecosystem health, mitigate climate change and build resilience in food and fibre production. Regenerative approaches have been gaining momentum as an effective measure that can build the capacity of the agricultural sector to be able to adapt, absorb and recover from shocks and stressors brought about by climate change, and to meet the growing demand for food and fibre.

Regenerative agriculture encompasses more than just a focus on leveraging and strengthening ecological processes and adapting farming practices for ongoing productivity. The principles and practices that underpin a regenerative approach also consider the well-being of communities and society. Farmers implementing regenerative practices in different parts of Australia are seeing positive environmental benefits, increased farm resiliency and improved well-being of their families, workers and the broader community since adoption. Many are motivated to leverage the outcomes of regenerative approaches to reduce their dependence on the rising costs of high-input farming, increase their self-efficacy, focus on the health of their farming landscape and reap the social and economic co-benefits of adopting regenerative approaches.

Despite the growing interest in regenerative agriculture amongst farming communities and other actors within the public and private sector, there is a risk, cost and knowledge barrier associated with changing farming practices.

Practical adaptation measures can de-risk the transition of farming practices to those that are more resilient, regenerative and adaptable in the face of climate change. Examples include:

1. Create system levers that reduce risk and accelerate the transition to regenerative agriculture practices:

- Promoting policy and regulatory changes that enable existing farms to pivot towards regenerative land and agriculture practices.
- Incorporating natural capital accounting in policy, government and regulatory decision-making to better account for the true costs and benefits of farming practices.

- Positioning regenerative agriculture amongst nature-based solution options for mitigation and adaptation to climate change.¹²
- Transforming regulatory systems to balance competing pressures on land use (decarbonisation, sequestration and growing demand for food and fibre).

2. *Build the capacity of farmers, producers and actors across the agricultural value chain:*

- Provide farmers with on-farm training and mentoring to build literacy in climate adaptation, natural capital accounting, disaster risk reduction, regenerative agriculture and land management.
- Create regional demonstration sites for regenerative practices.
- Resource more on-farm field days.
- Invest in expert advisory services that provide practical support to farmers on adaptive practices.
- Incentivise greater collaboration between farmers and researchers regarding ecological changes and impacts on farming practices to develop innovative and practical solutions.
- Support the establishment of local food hubs in underserved regions. In line with circular economy principles, these could function as markets, food transport hubs and processing facilities, and community education spaces that support the transformation of local economies.
- Promote the development of socio-technological solutions to reduce emissions and sequester carbon in the agricultural sector. Examples include the installation of renewable energy on farms, and new approaches to vegetation management to reduce clearing and improve soil carbon.
- Promote initiatives that reduce agricultural and food waste across the entire supply chain, including shortening supply chains and applying circular economy principles to transforming waste into new products.

3. *Support farmers to lead adaptation efforts towards regenerative and nature-based approaches by:*

- Creating investment mechanisms that support farmers who prioritise regenerative ecological outcomes.
- Supporting the creation of community-led, regionally-based food and agriculture transition plans, underpinned by a regenerative, just, and resilient outcomes framework.

¹² Department of Climate Change, Energy, Environment and Water, *Nature Based Solutions for Climate*
<https://www.dcceew.gov.au/climate-change/policy/nature-based-solutions-for-climate>

- Providing incentives and support to accelerate regenerative adaptation in agricultural practices to respond to particular ecological timeframes.
- Incentivising efforts to enhance, measure and value natural capital.
- Developing a business case and showcase the opportunities for a new skilled regenerative workforce in agriculture.

4. Bridge the gap between Western and First Nations biocultural knowledges and worldviews to support more resilient agricultural practices:

- Value and incorporate First Nations knowledge and views on environmental protection, biodiversity conservation and land management practices in policy development, planning and regulation.
- Promote opportunities to resource and learn from First Nations agricultural practices.
- Ensure meaningful engagement with Traditional Owners when developing region-based sectoral strategies and plans.
- Adopt adaptation strategies for crop production and wild harvest of native foods and botanicals.¹³
- Continue the ongoing journey of facilitating First Nations' access and rights over land and sea Country.

Summary of points for consideration

The Next Economy has shared the following points for the Committee's consideration regarding the impacts of climate change and climate variability on Queensland agricultural production:

- Impact on crop viability.
- Increased competition for land and water resources.
- Impacts on farming livelihoods, health and the resilience of regional communities.
- Impacts on First Nations communities and practices.
- Other risks associated with a lack of adaptation across the agriculture sector.

We have also outlined several practical measures that present opportunities to strengthen the resilience and adaptive capacity of the agricultural sector into the future including the need to:

- Create system levers that reduce risk and accelerate the transition to regenerative agriculture practices.
- Build the capacity of farmers, producers and actors across the agricultural value chain.

¹³ Matthew and Lee, 2016, *Conceptualising climate change adaption for native bush food production in arid Australia*: <https://digitalcollections.cdu.edu.au/nodes/view/4815>

- Support farmers to lead adaptation efforts towards regenerative and nature-based approaches.
- Bridge the gap between 'Western' and First Nations biocultural knowledges and worldviews to support more resilient agricultural practices.

The Queensland Government has the opportunity to support innovative and inclusive practices across the agricultural sector to increase resilience to future climate shock. The Next Economy encourages the Queensland Government to continue engaging with farmers, land manager, First Nations groups and other stakeholders across the agricultural value chain to ensure policies and programs create a climate-safe, socially just and regenerative agriculture sector.

We welcome the opportunity to engage further on this issue and please get in contact if you have any questions about this submission.

Kind regards,



Dr Amanda Cahill
Chief Executive Officer
The Next Economy

