



# INQUIRY INTO THE IMPACT OF CLIMATE CHANGE ON QUEENSLAND AGRICULTURAL PRODUCTION

Queensland Parliament State Development and Regional Industries  
Committee

August 2023

University of the Sunshine Coast submission

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## 1. Introduction

The University of the Sunshine Coast (UniSC) welcomes the Queensland Parliament State Development and Regional Industries Committee Inquiry into the impact of climate change on Queensland agricultural production and is pleased to provide a submission in response to the Terms of Reference.

UniSC's submission is provided through the lens of our significant expertise in forestry and climate change and focuses on the potential for trees and production forestry to play a direct and indirect role in the impacts of climate change on agricultural production in Queensland.

Production forestry as part of the Queensland agriculture portfolio will need to adapt to changing climate conditions to address new challenges related to:

- Changing pathogens, insects, and pests
- Increased exposure and damage to more frequent and more severe weather events
- Changes in growing conditions related to temperature and water availability
- Increased risk of fire events.

All of these challenges will have a direct impact on agricultural production.

At the same time trees and production forestry systems can be deployed alongside or integrated with other traditional agricultural land management to mitigate climate change impacts on the agricultural production systems, diversify land management strategies to improve climate resilience, and diversify economic opportunities on farms. These potential solutions should be more extensively researched and carefully considered given the significant impact climate change is likely to have on agricultural production in the next decade.

Finally, the carbon capture and storage potential of including more trees in the landscape both as long-term land management and sustainable timber production are well understood and should be considered as part of the medium to long term management strategy for Queensland.

UniSC would welcome the opportunity to elaborate on any aspect of our submission. If this is of interest, please contact Professor Mark Brown, Director of the Forest Research Institute at [mbrown2@usc.edu.au](mailto:mbrown2@usc.edu.au).

### 1.1 About UniSC

UniSC is one of Australia's youngest and fastest growing universities, and the first greenfield university to open in Australia since 1975. Our first campus, located on the Sunshine Coast, opened its doors in 1996. Today, our award-winning facilities span five campuses across South East Queensland, an area of unique geographical importance. UniSC is the world's only university with campuses on three connecting UNESCO biosphere reserves and the World Heritage Listed K'gari.

Consistent with our mission to enrich our regions by championing environmentally sustainable principles and practices, UniSC has strategically focussed on building a contemporary, sustainable, and accessible university. UniSC is home to two world leading research concentrations working in the areas of climate change and sustainability: the Sustainability Research Centre, established in 2007 with the goal of conducting cutting-edge research into pressing local, regional, and global challenges of economic, social, and environmental sustainability, and the Forest Research Institute, which undertakes work in the broad spectrum of forestry research areas that make direct and meaningful contributions to the sustainability of our wooded landscapes. We partner with industry, community organisations, and all levels of government to deliver innovative, high-quality research with real impact.

Our research also research informs our teaching. UniSC offers multiple programs and courses in climate change and sustainability to our students at the undergraduate and postgraduate levels. On the world stage, UniSC is recognised by The Higher Education (THE) Impact Rankings as a global leader in climate action, clean water sanitation, life on land, and life below water. This ranking comes alongside the Australian Research Council's recognition of UniSC as a producer of world-class research in 26 speciality areas, including environmental science, medical and health sciences, neuroscience, technology, and psychology<sup>1</sup>.

## **2. The role of forest plantations in agricultural production in a changing climate**

### *2.1 Impact and adaptation of current production forestry<sup>2</sup>*

#### *2.1.1 New and damaging pests as a result of climate change*

Forest and timber plantations, like most agricultural crops, will be impacted by more and new damaging insects, pathogens, and pests. At the same time trees are expected to be more stressed in more extreme growing environments making them more susceptible to these insects, pathogens and pests impeding growth or causing mortality.

#### *Recommendation 1*

The Queensland Government should invest in improved biosecurity detection, management, and response systems, and actively support increased cooperation across agricultural sectors, recognising that these measures are critical in supporting the agricultural industry to minimise these risks and potential negative impacts on production.

#### *2.1.2 Weather events as a result of climate change*

More intense and more frequent weather events are already having a significant impact on plantation forestry. Effectively, plantation forestry is managed on a relatively long rotation period of 25+ years. With increased rate of destructive storm events, particularly in Northern Queensland, large areas of forest plantation are being severely impacted every 10 to 15 years resulting in little or no economic result.

Plantation growers are already exploring land management options that will allow production over a shorter rotation period on their northern estate. However, they see increased risk to the broader estate and are hesitant to invest where a changing climate is likely going to lead to these extreme weather events moving further south and impacting more significant forest plantation estates.

There are emerging opportunities around engineered wood products and bioproducts based on lignocellulosic fibre that, with support, could be developed and commercialised in Queensland to provide strong economic options to better manage tree crops on shorter rotations, increase overall production and provide viable tree crop options for land made unviable for other agricultural production due to climate change impacts.

#### *Recommendation 2*

The Queensland Government should invest more in exploring the emerging opportunities around engineered wood products and bioproducts and support the subsequent development and commercialisation of these products to provide strong economic options for Queensland plantation growers.

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<sup>1</sup> Excellence in Research for Australia (ERA), 2018.

<sup>2</sup> A. J. Carnegie, S. Lawson, J. Mason & H. Nahrung (2022) Forest health and biosecurity in a changing world, *Australian Forestry*, 85:4, 141-145, DOI: 10.1080/00049158.2022.2142373

### 2.1.3 *Bushfires as a result of climate change*

Over the past three to five years, bushfire has emerged as a significant and increasing risk for forests and forest plantations in South East Queensland.

In New South Wales, the most recent major fire event saw over 25 per cent of the plantation estate damaged or lost to fire. In addition to the direct impact on the plantations, this is having flow-on economic impact on the timber industry in that region, the impact of which is expected to continue for up to a decade. During that same fire season, severe bushfire events were experienced in Queensland, in areas not normally considered at risk.

Compounding the increased risk of bushfires, climate change impacts also significantly reduce the days it is viable to safely do fuel reduction burning, one of the few proven tools to mitigate bushfire risk. Internationally there has been success in improving bushfire resilience through different land management strategies including mechanical fuel reduction harvesting, in many cases providing an economic contribution to the cost of the operation by supplying biomass to bioproduct markets, and different integrated crop strategies.

#### Recommendation 3

The Queensland Government should provide investment to further develop similar management strategies to improve bushfire resilience for Queensland agricultural production land, which would be valuable to reducing this risk to production.

### 2.2 *Integration of trees into other agricultural land management systems to improve climate change resilience and diversify the agricultural production systems and economic opportunities*

The integration of trees in agricultural systems can improve overall farm resilience through the provision of diversified economic opportunities from trees (i.e. timber, carbon, biomass), and on farm environmental services (water management, protection from weather, soil structure)<sup>3</sup>. Overall success in these agroforestry systems requires new and innovative land management strategies to avoid negative impacts on the overall farm productivity. Past experience in implementing agroforestry systems has shown the critical importance of market opportunities aligning to the new agricultural systems, not developing a crop in anticipation a market will follow.

Further, in relation to typical agricultural crops that are grown in weeks or months, trees, even grown in short rotation, will take years to mature so appropriate support in policy and industry development will be required.

#### Recommendation 4

The Queensland Government should invest in research to better understand the land management dynamics of different tree crops/species with existing agricultural production systems, as well as how these adapted land management strategies will impact or need to be adapted to changing climate.

#### Recommendation 5

The Queensland Government should appropriately support policy and industry development to give land managers the confidence to commit to longer-term crops in their overall farm management.

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<sup>3</sup> O'Grady AP, Mitchell PJ (2017) *Agroforestry: realising the triple bottom benefits of trees in the landscape*. CSIRO, Australia.

### 2.3 Increasing the area of trees in Queensland to support global carbon capture and sequestration in plantation and sustainable timber and wood products

The planting of trees, particularly in efforts to restore traditionally forested areas that do not effectively contribute to food and fibre production, is seen as one of the most effective strategies for climate change mitigation when done in parallel with emission reduction efforts<sup>4</sup>. The tropical and subtropical east coast of Australia (i.e. Queensland) has been identified as having the highest potential in Australia, and arguably the world, to increase carbon capture and sequestration through tree planting and forestry management, particularly where opportunities to leverage trees into existing agricultural and grazing land management are fully realised.

Investment in research to better understand where tree planting and forestry management can be extended in Queensland such that it enhances food production or does not compete with food production is urgently required. This research will also need to understand and develop new land management strategies around performance of different tree species under different and harsher environmental conditions, effectively developing best practice on where and how to grow trees for combined carbon and wood product benefits and purely for carbon benefits.

#### Recommendation 6

The Queensland Government should invest in research to better understand where tree planting and forestry management can be extended in Queensland, to understand and develop new land management strategies, and to develop associated best practice guidelines.

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<sup>4</sup> Jean-Francois Bastin et al., The global tree restoration potential. *Science* 365, 76-79 (2019). DOI:10.1126/science.aax0848.