



25 August 2023

Committee Secretary
State Development and Regional Industries Committee
Parliament House
George Street
Brisbane Qld 4000
Email: sdric@parliament.qld.gov.au

To whom it may concern

Re: Inquiry into the impact of Climate Change on Queensland agricultural production

Bundaberg Ag-Food & Fibre Alliance provides a united voice for primary producers in the Bundaberg region and works toward securing the long-term interests of our members and our industry. This submission focuses on growers who predominantly produce sugar cane and other crops in the greater Bundaberg region and provides feedback to the *inquiry into the impact of Climate Change on Queensland agricultural production* on issues relevant to the local experiences of primary producers in the greater Bundaberg region and serves to represent their interests.

The terms of reference are for the committee to inquire into and report to the Queensland Legislative Assembly on:

- a) the impacts of climate change and climate variability on Queensland agricultural production and the existing and potential future risks of climate change on the sector.**

Under the future climate scenarios of +4.5 and +8.5 Bureau of Meteorology (BOM) predictions are that in the Bundaberg Region the average annual rainfall may decrease from an average of 1,050mm to 950mm. What is interesting is that the Bundaberg Aero weather station has recorded an average of just under 1,000mm since it began recording in 1942. This dip below 1,000mm was as a result of the three driest year periods recorded in Bundaberg's history from 2018-2020.

From a sugar cane perspective, the greatest issue from a reduction in rainfall is the potential impact on yield. A 100mm (1ML) reduction in rainfall will have an 8-10 tonnes per hectare reduction in yield year on year. To maintain yields at the current level an additional 1ML of irrigation water will be required, which puts additional strain on the Bundaberg Irrigation System.

The strain is increased as currently sections of the scheme are not able to supply the level of irrigation water currently required for the farms and if an additional 1ML is required of the 200 days growing season for cane, additional infrastructure to deliver the water will be required.

The unknown from the modelling for the Bundaberg Region, which is already one of the most variable rainfall areas on the Queensland Coast, is how much is dependent on an increase in the variability of rainfall from both a timing and volume perspective. Currently the region experiences a summer

dominated rainfall pattern that often has long periods with little to no rain and then a 5–7 day period of high rainfall. This matches the climate kelpie of the Madden Julian Oscillation with the amount of rain affected by the El Nino Southern Oscillation, Indian Ocean Dipole and the Southern Annular Mode climate drivers and their effects on the weather patterns.

An increase in the variability of rainfall, especially over the summer months, will lead to an increase in the requirement for irrigation to fulfill the requirement for moisture to grow the crop. To minimise the moisture deficits that occur from the current irrigation infrastructure when the period of no rainfall exceeds six (6) weeks the growers will need to investigate the possibility of using new irrigation infrastructure such as a low-pressure irrigator. These irrigators cost \$5,000 per hectare and a standard unit in Bundaberg irrigates 50 hectares provided the grower has two (2) Sunwater irrigation outlets, a standard four (4) span lateral move irrigator has a requirement of 56L/second and the current outlets have a capacity of 25-30L/second. To utilise the low-pressure irrigators effectively, growers require 4ML/ha and ideally 6ML/ha, which is a significant increase on the average 2ML/ha. These low-pressure irrigators need to be fully utilised with additional water to justify their capital expenditure.

The volume, amount of rainfall, in each rainfall event is critical for growing a crop such as sugarcane. For a crop such as sugarcane low rainfall volumes less than 10mm are not counted towards the effective rainfall number. Effective rainfall is the volume of rainfall that increases soil moisture levels until it is full. As such, rainfall events in excess of 100mm only have the first 100mm counted as effective as very few soils in the district have enough capacity to store more than 100mm. On average somewhere between 700-800mm is deemed effective in any one average year and provides the baseline for the 6ML/ha required for optimal yield. The other critical figures regarding rainfall volume is the total amount, especially large rainfall events to create runoff and the intensity of the rain. Rainfall runoff is critical for storm water to be captured in on farm tail water recycling pits and farm dams which can be utilised as supplementary irrigation water to boost available irrigation water when allocations are low. This runoff water is also critical for the environmental flows in the rivers and creeks as well as providing water to be captured in government owned dams which are used for irrigation and drinking water supplies as well as supplying water to the recharge areas of the groundwater systems.

One of the greatest impacts is that in a drying climate there is less water captured in the large irrigation supply dams. This reduces allocation announced to growers and means a change in practices depending on the type of irrigated agriculture the farming enterprise participates in. Generally, in time of shortages, water is applied to the higher value crops and as such growers have the option to use the water on their property on their highest value crop, or temporary transfer the water for a return to another grower who has a higher value crop. This works well with sugarcane and annual small crops where in sugarcane's case the more valuable younger age crops are irrigated and the others struggle with limited or no irrigation. For annual small crops the amount of crop area planted is matched to the announced allocation for the year so that maximum productivity can still be achieved, just from a smaller area. For permanent tree crops such as macadamias, there is no option but to buy enough water to keep the trees alive and hopefully produce a crop. This is harder in years where the cost of production is higher than the value of the produce harvested.

There is no impact from the number of 0°C days, currently zero, which will remain the same for all the climate change predictions. There are some scenarios for the number of 35°C and 40°C days of which there may be an increase in the 35°C days but no increase for 40°C days. For sugarcane there is only minimal impact from a potential increase in evapotranspiration and if enough water is available, there is no real impact. For pollinated crops there may be an impact from the increase in the number of hotter days as pollen viability is generally affected by increased temperatures. This may mean a change to planting windows for existing crops, a change in varieties or a change to a more heat tolerant crop

in the farming system to avoid crop losses. Again, the greatest impact is on the permanent tree crops which are harder to change in a varying climate.

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

Crucial to agriculture in the Bundaberg region are the repairs to Paradise Dam to return the dam to its full original height and capacity, this would provide the additional irrigation water required to maintain current production levels. With some of the scenarios for sugarcane the additional irrigation water may lead to an increase in yield due to a longer growing season.

Given that the majority of crops in Bundaberg will require additional irrigation water due to decreased rainfall and that a fully repaired Paradise Dam will have approximately 90,000ML of irrigation water to sell, the next bottleneck will need to be fixed. Unfortunately, in the 1970's when the initial Wooongarra, Gooburru and parts of the Isis sections of the irrigation scheme were constructed there was no spare capacity for additional water to move through the irrigation network to get to the farms. These and other bottlenecks in the irrigation system need to be fixed so that maximum water can be moved through the channel system to obtain maximum value from the water and infrastructure.

One thing that needs to be remembered is that farmers and graziers live and breathe the impacts of climate change on the weather systems that impact their properties every single day. The variety of sugarcane or wheat is generally the best one adapted to the weather systems over the past decade while meeting market specifications. Graziers are adapting and changing breeds of cattle in response to the weather as well as market demands. Like everything in life there are early adopters, and those that take more convincing, and as such Government needs to make sure it assists with the adoption and resilience of farmers and graziers rather than being a hinderance.

Should you require further explanation or clarification please do not hesitate to contact me.

Yours faithfully

Tanya Howard
Company Secretary