

# Drought and climate adaptation program

## **Forewarned is Forearmed experimental forecasts and their use in managing a weed eradication biosecurity program**

### **Background**

Tom Bowditch is a Surveillance Coordinator as part of the Red Witchweed Biosecurity Response Project for the Department of Agriculture and Fisheries in Mackay, Queensland. His role includes managing the farming operations on eight impacted sugarcane and cattle farms in the eradication area which have been temporarily resumed by Biosecurity Queensland.

Tom used some of the Forewarned is Forearmed (FWFA) experimental forecasts including the rainfall products to help him plan activities in the eradication program around forecast dry and wet weather periods.

The project Forewarned is Forearmed (FWFA) aims to help farmers and agriculture value chains to proactively manage the impacts of extreme climate events. It will provide five new operational forecast products for extreme events weeks to months ahead. Forecasts of extreme events will provide opportunities for farmers to develop proactive response planning at the farm-gate level. Funding partners include the Australian Government, Queensland Government through the Drought and Climate Adaptation Program, Bureau of Meteorology and 14 other industry partners. The project lead is Meat & Livestock Australia (MLA).

### **Why use FWFA experimental rain forecasts?**

In mid-March 2019, the FWFA products and website were introduced to Mackay's Department of Agriculture and Fisheries staff involved in the sugar industry. During the presentation, a range of novel forecast products (which were available on the BoM experimental website) including pie charts, decile bars, meteograms and climagrams were demonstrated. Local rainfall stations were used as reference points and recent events used as examples for the participants to reflect on.

Tom showed a particular interest in accessing and evaluating some of the experimental rainfall products available through the FWFA experimental website. Tom indicated access to improved rainfall forecast information could better enable him to plan activities in the eradication program around forecast dry and wet weather periods. The multi-week and longer-term forecast potential beyond the shorter-term weather forecast products he was currently accessing, appeared to hold some promise in supporting better farm management operational decisions.

Tom was provided with access to the experimental website to enable him to familiarise himself with different product types and evaluate product usefulness over time. He has been accessing the site regularly and consistently over the past 16 months.

Tom was initially sceptical of a product that could more accurately forecast rainfall events. Before using the FWFA website, his planning ability was reduced to using a combination of weather forecasting tools and some guesswork. Tom was extremely pleased to see some degree of accuracy in the Climagram data when he monitored forecasts for the Mt Jukes Station from the experimental

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website. Tom monitored the FWFA website as a tool for analysing and predicting what the rainfall outlooks might be for farms in the local area. Tom noted that he felt if users were not familiar with statistics and probabilities then some of the interpretation of forecasts may be complex.

## How FWFA products helped with Red Witchweed eradication program

Red Witchweed is a parasitic plant that attaches to the roots of a “host” plant. The weed robs its host of water and nutrients, suppressing its growth and causing wilting and in some cases, death.



Red Witchweed  
(*Striga asiatica*)

Plant hosts of red witchweed include commercially important grasses and summer cereals such as sorghum, corn, rice and also sugarcane. It can also be found growing on a wide range of tropical grasses common in headlands and in pastures. Red Witchweed is an obligate parasite so needs a host to survive.



Tom Bowditch,  
Surveillance  
Coordinator, Red  
Witchweed  
Biosecurity  
Response Project,  
reviewing  
Climagrams on the  
FWFA  
Experimental  
website.

Farm management operations in the Red Witch eradication program that require the use of weather and climate forecast products include:

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- negotiating with farm managers
- managing and maintaining cultivation blocks and headlands
- planting and managing false host crops to allow the parasitic Red Witchweed seeds to germinate and die before attachment to a host
- weed and pest management activities including chemical application
- crop nutrient management activities
- soil fumigation activities
- soil containment and erosion controls
- crop and nearby offsite weed surveillance activities
- labour and plant hire management and deployment activities
- on-site workplace health and safety activities.

Examples of decisions and cost estimates in this program associated with improved rainfall forecasts and climagram weekly and monthly forecasts in particular include:

**Herbicide applications:** Chemical costs across the treatment area vary depending on use of knock down or particular selective herbicides from \$2,700 - \$6,000/treatment. Helicopter application costs of approximately \$8000 risk being wasted if a significant rainfall event occurs following spraying.

**Soil fumigation activities:** Dazomet applications can be timed successfully using rainfall forecasts, so that fumigant applications are made prior to rainfall events. This is important as without the rainfall occurring, hired water tankers are used to apply water to activate the product, which is expensive over the five days needed (\$1000/day) and is more hazardous to operators.

**Soil erosion control:** Grader hire for erosion control drainage works is expensive at \$2000/day, so rainfall forecasts which indicate dry periods ahead can be used to maximise the time for which machinery can be hired without down time and additional transport fees of \$700/move if operations need to be postponed.

**Planting decisions:** Longer-term rainfall forecasts can support decisions about which blocks to prioritise for planting to avoid issues with waterlogging or excessive drying prior to crop establishment. Potential losses in seed, fertiliser, labour and machinery costs would run into the thousands of dollars.

**Labour deployment:** Rainfall forecasts allow workforce planning to increase surveillance staff numbers from 6-8 after the first summer rains. Cost of the extra 2 staff are approximately \$2770 per week. Work can also be called off prior to engaging work crews to avoid loss of \$1250/day when crews are sent home early due to wet weather.

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Plant hire: General machinery hire of \$500/day can be planned for forecast dryer periods to more effectively minimise rental costs during down time caused by wet days.



Planting Soybean as a false host crop for Red witchweed control.

## Benefits of using the experimental forecast products

Tom believes that the benefits he has received from accessing these forecast products has been considerable. The Red Witchweed program farms over 100 hectares of soybean in the tropics. This cropping program is entirely dependent on rainfall and has no access to irrigation. Longer-term rainfall forecasts expressed in the climagram weekly and monthly forecasts have assisted Tom to plan activities and determine what areas need to be planted in order of priority, particularly as over the wet season, fields will often become too waterlogged for machinery to access.

Massive savings in machinery and plant hire as well as labour can be made without the need to stand contracting staff down for rainy days and having hired equipment standing idle. Having the ability to see if there will be follow-up rainfall to support seedling growth is crucial to achieving good crop establishment. Being advised of larger scale rainfall events allows time for increasing the effectiveness of erosion controls.

Regarding chemical usage on the farms, the dry fumigants used can be more safely applied if it is not raining, as water reacts with the powder, making the task increasingly hazardous if it has or will be raining. Further, heavy rainfall soon after the application of herbicides reduces the efficacy and causes runoff of unabsorbed chemical. Accurate forecasts allow expensive agricultural chemicals to be used effectively at the correct rates saving money, time and leading to better environmental outcomes.

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Ethylene  
fumigation  
rig preparing  
to complete  
a run.

Also the weed surveillance rounds must be completed in strict timeframes. If rain occurs it will cause delays leading to other activities being placed on hold so the strict timelines can be met. Having an overview with an indication of longer-term rainfall forecast amounts has been of great value.

## Reflection

Tom is very grateful that he was allowed to access the FWFA project website. Tom found the climagrams with rainfall forecasts for the weeks and months ahead particularly useful for obtaining an insight into likely periods of rainfall and also dry periods ahead.

He regularly accesses the climagrams every few days to assist with decisions about farm and surveillance planning activities and less regularly the longer term rainfall forecasts to assist longer term decision-making and planning. He also referred to the hot days plume maximum temperature product in the summer of 2020 to provide guidance for removing staff from the field for workplace health and safety purposes.

The potential cost savings and benefits from the use of the forecast products in this project would run into the tens of thousands of dollars. The economic benefits in planning activities and using resources at the correct time in this farming operation are enormous, especially when there is no access to irrigation.

Tom has talked to a few of the other landowners and asked them what they use to predict the weather and there seems to be a lot of scope for improvement, as they rely on the Elders weather app or just use other weather apps on their phones.