Project Catalyst Trial Report

Smarter Weed Control Using Drone Technology

Grower Information	
Grower Name:	Michael Reinaudo
Entity Name:	Reinaudo Farming Company
Trial Farm No/Name:	F#0702A B# 5-3 Weed control using drone technology
Mill Area:	Victoria, Herbert Region
Total Farm Area ha:	2000
No. Years Farming: (Grower Experience)	50 plus years of family farming
Trial Subdistrict:	Tara/Seymore
Area under Cane ha:	1700

Trial Status

Completed / Continuing

Trial has now been completed. Further studies will be required to make this a successful trial.

Background Information

Aim:
To use high resolution aerial imagery from RPAs (drones) to map weed infestations in cane and to precisely apply herbicide using drones to treat the infestations

Background: (Rationale for why this might work)
This trial would demonstrate the effectiveness and cost savings of the precision placement of herbicide on the area of weed infestation only. It allows access to the crop when ground access is restricted, e.g. due to excessively wet ground.

Potential Water Quality Benefit:
Any reduction in the amount of herbicide used will benefit the environment with regards to runoff into waterways

Expected Outcome of Trial:
We would expect to see a reduction in the cost of weed control in the trial block, including the cost of the herbicide and the cost of machinery usage (including fuel) to produce the crop.

Service provider contact: Megan Zahmel: 0447 317 102

Where did this idea come from: Reinaudo Farming Company

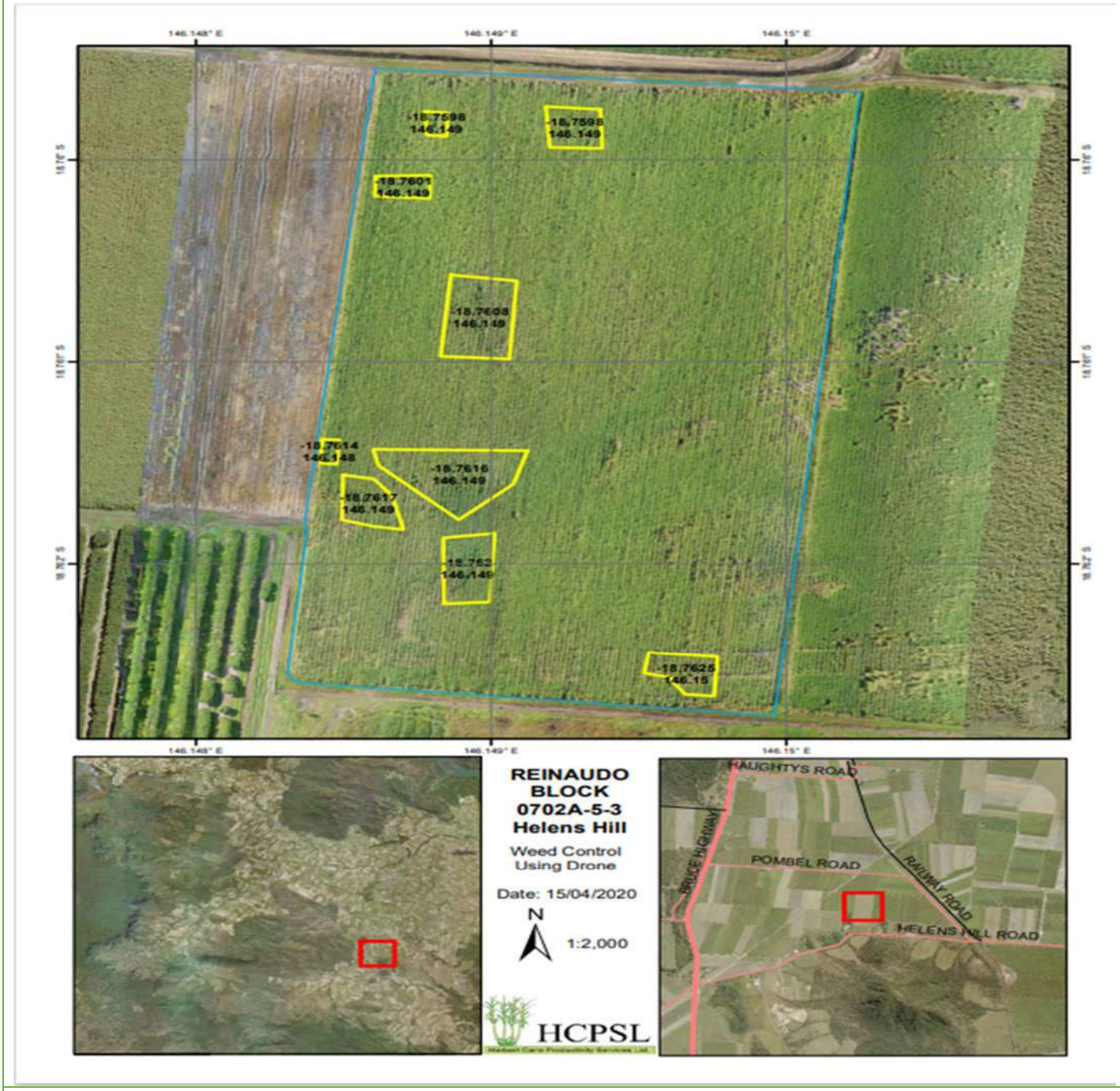
Plan - Project Activities	Date: (mth/year to be undertaken)	Activities :(breakdown of each activity for each stage)
Stage 1	Establish trial 2019/2020	- Trial farm chosen F#702A B#5-3. Block was chosen after Initial flight survey. - Initial survey flight – 16/04/2020 - Ground truthing – 20/04/2020 - Image processing – 27/04/2020 - Herbicide application – MCPA @ 0.95L/ha & Starane @ 0.8L/ha was recommended but for other reasons Tordon @ 1L/ha was used instead. - Majority of the weeds were Centro & Calypo vine. -13/05/2020
Stage 2	Sampling 2020	- Walk trial block to determine success of drone spraying – 19/06/2020

Project Trial site details

Trial Crop:	Sugarcane
Variety: **Rat/Plt:**	Q186 4th Ratoon 2019
Trial Block No/Name:	B# 5-3
Trial Block Size Ha:	5.96
Trial Block Position (GPS):	Refer to Google earth maps
Soil Type:	Terrace Loam

Block History, Trial Design:

Initial drone flight and weed infestation points



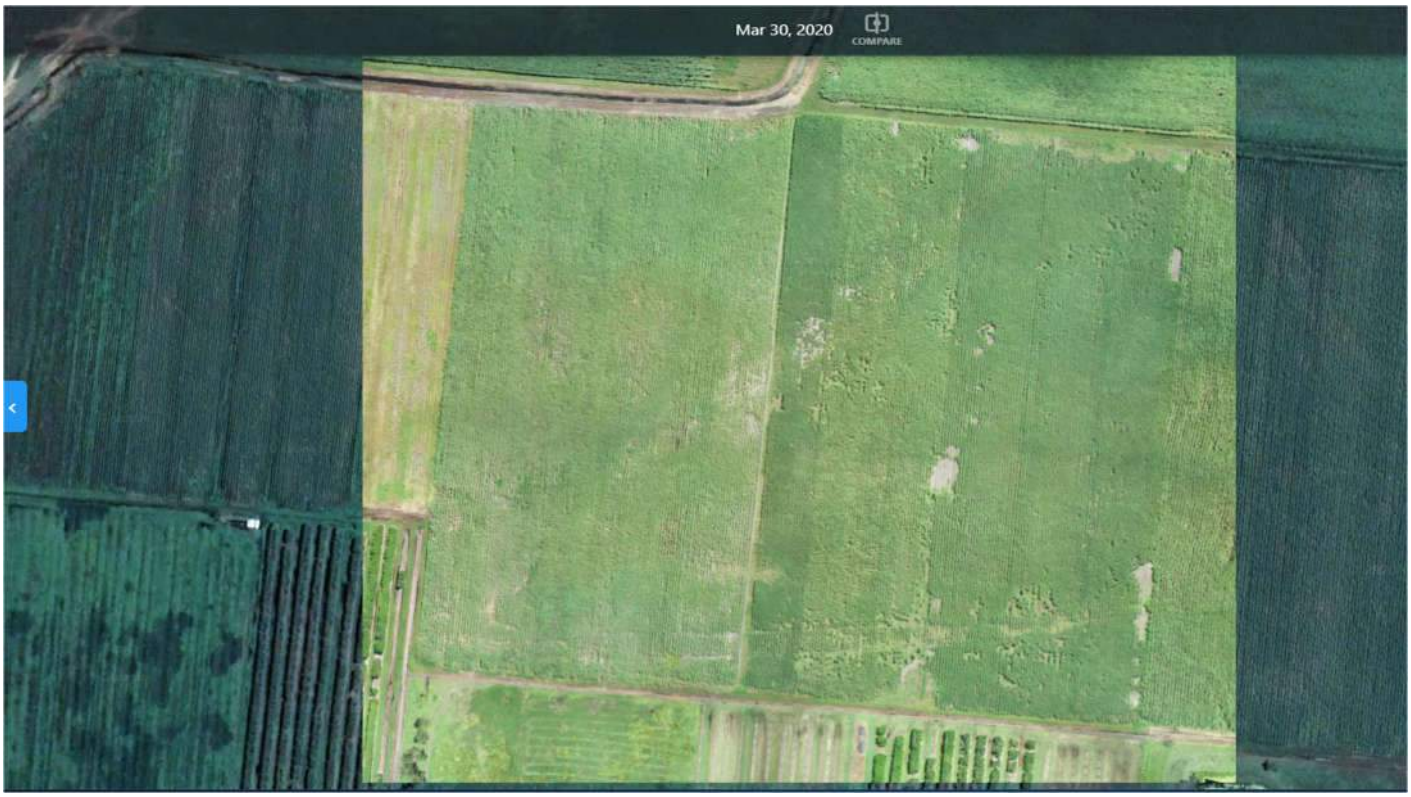
Treatments:

Drone to target weed infestation spots within the block. See imagery

Results:

Different type of Imagery used:

Original Imagery:



Elevation Imagery:

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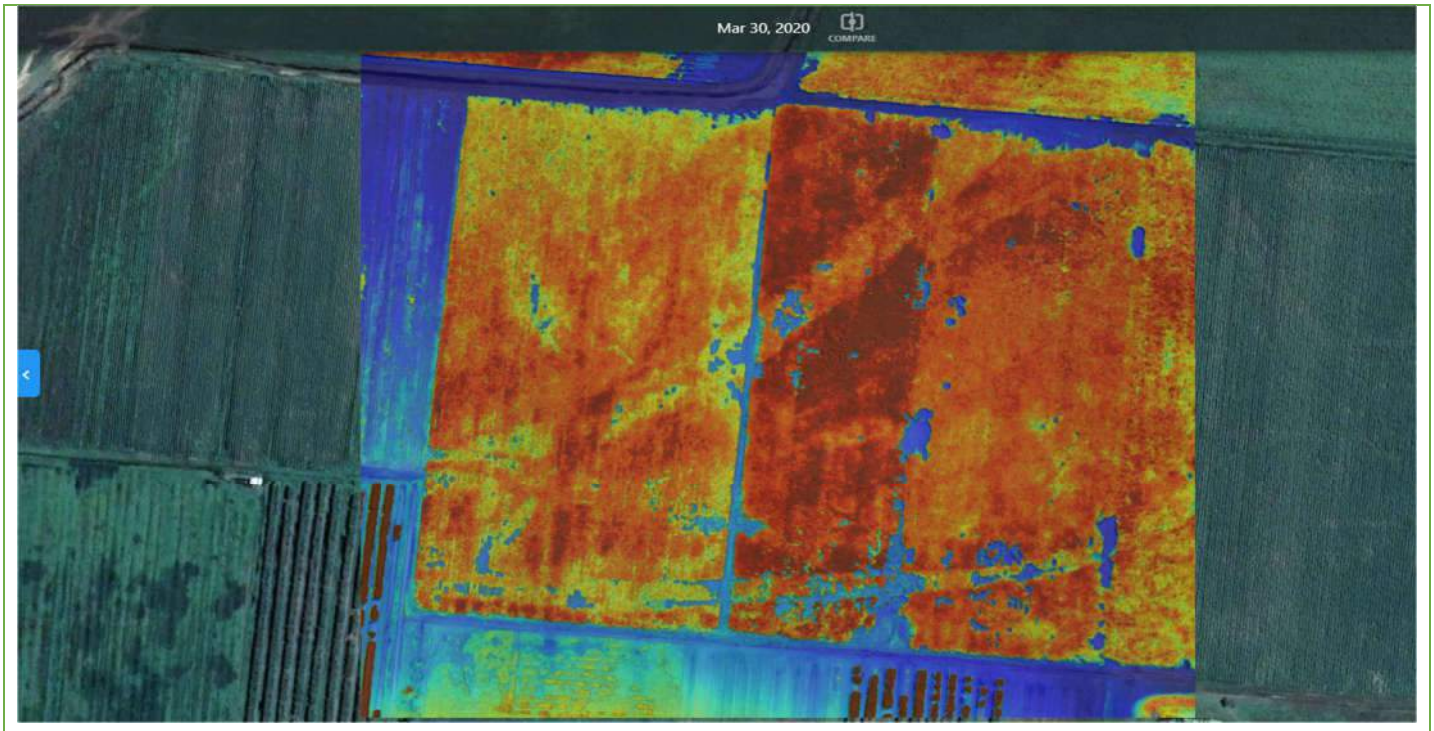
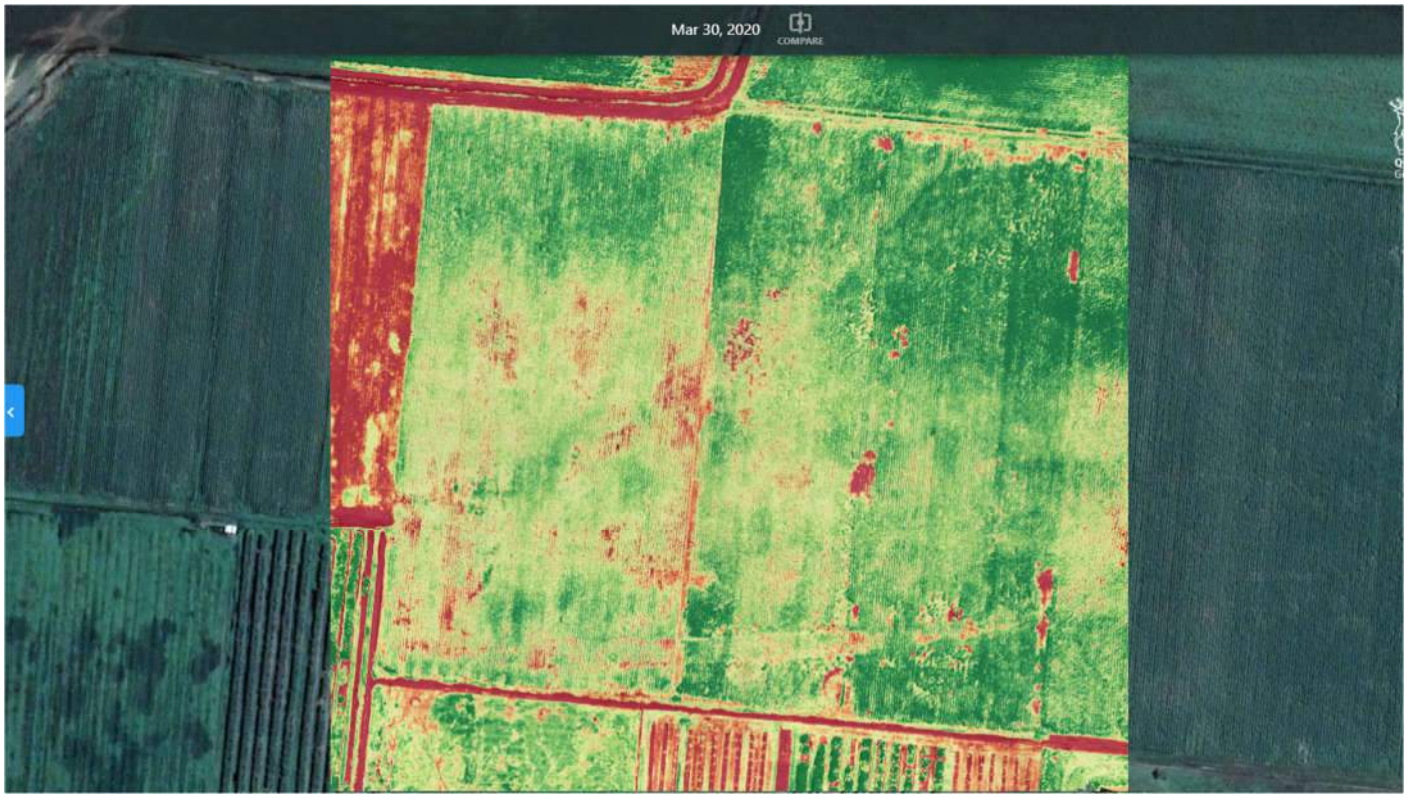


Plant Health Imagery:



Google Earth Imagery:

Drone in action photos:

Before Herbicide application with drone:

After Herbicide application with drone:

Ground truthing effectiveness after herbicide application with the drone: Small amount of chemical damage and no real affect or die-off of vines.


3 weeks after
spraying


3 weeks after spraying


Out of spraying zone blue top cane
back


Missed this part from imaginary

Conclusions and comments

Unfortunately, the trial did not record a very high kill rate of vines and weeds due to several reasons:

- The area that was sprayed with herbicide was still alive upon inspection with some small signs of chemical uptake but not enough to terminate the established Calypo vine which has gone to seed since time of the herbicide application.
- It is thought that the termination rate has been low due to the recommended chemical not being used. Tordon was used instead at 1L/Ha
- When ground truthing the aftereffects of the herbicide, it was noticed that juvenile weeds like young blue top had died at the spaying points but were visible where imagery had missed the weeds in the initial inspection.
- By missing small young weeds with the imagery in the initial inspection, these have now established and gone to seed causing future weed problems
- Herbicide application with drones maybe better utilised in smaller cane targeting broadleaf weeds like sickle pod and giant sensitive plant or used as a mapping system which can than relay a prescription to the tractor for precision herbicide spraying
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Advantages of this Practice Change:

Less herbicide needed for weed control. By using Drones to apply the herbicide, growers can get to weed infestations without having to access the block. e.g. Wet weather events

Disadvantages of this Practice Change:

Drone protocols and licences if the grower wants to take on this practice themselves. Or the Hire cost of contracting someone else to do the job

Will you be using this practice in the future:

Yes, but with a different approach. Looking to target broadleaf weeds in younger/shorter cane.
The grower is wanting to use the drone imagery to map the weed infestation then use this to create a prescription that can be uploaded to the tractors GPS system and target Guinea grass and nutgrass areas

% of farm you would be confident to use this practice:

Still trialling different approaches to best utilise drone and herbicides