

CASE STUDY: TE HAPUA

Peach production soars with new irrigation approach

Who would have thought reducing water would lead to better peach crops? Janine Holland talks to Heinz Wattie's Senior Crop Supply Agronomist, Bruce Mackay, about research which encouraged them to dramatically reduce water application on one of their test orchards. A modified irrigation strategy has led to increased crop production and improved quality of fruit at Te Hapua.

Growing juicy, delicious and copious peaches is the aim of Te Hapua orchard in the Heretaunga Plains. As one of Heinz Wattie's long serving orchards in Hawke's Bay, the property has been used as a trial site for a new approach to irrigation since 2010.

The people behind the orchard are committed producers, but Te Hapua has always had significant challenges with the variable soils, says Bruce.

"It's a long skinny riverbed property with soils that range from 8mm water holding capacity (WHC) to 40mm WHC. They had installed a lateral and sprinkler permanent irrigation system which is well designed and maintained. We checked performance at all the extremities last season to find outputs still performing as designed."

In 2007, Heinz Wattie's Ltd initiated an 'Optimising Water Use Project'. The aim was to better understand water demands of optimal crop production in peach orchards. The company wanted to create good data sets that could justify water consent applications or renewals in an anticipated environment of changes to resource management. The goal, says Bruce, was to usher in a new era of more efficient water use by its growers.

Five properties were chosen to take part including Te Hapua.

"The aim was to try to improve the performance of their irrigation. We recognised there wasn't enough information out there on the actual water use requirements of these crops. Their irrigation strategies were based around old evapo-transpiration data. They basically applied their consented volume on a fixed rotation."

Initially a three year project involving Aqualinc (previously Hydro-Services), and taking a lot of advice from Dr Tony Davoren and local representative, Melanie Smith, Heinz Wattie's has elected to carry on with the research.

"We have continued with three of the properties so we can carry on generating data. Three years is not long enough to generate good data, especially when you throw a drought into it."

The 'Optimising Water Use' project started by analysing the highly variable soils at Te Hapua with an EM38 survey.



Te Hapua orchard representative Joe Burbury (left) and Bruce Mackay examine peach quality.

The orchard was planted in 2003/04, initially without any irrigation, but with a water consent. Following the first crop in 2005/06, moisture stress in the skinnier soils severely impacted fruit size, with a percentage not achieving the 55mm required for processing. A decision to install permanent irrigation was considered the only option to irrigate the entire 19 hectare property. Te Hapua is located on leased land so investing capital in this context had to be well justified, says Bruce. They adopted an approach that focussed on good design and performance, without bells and whistles, relying on old tractors and PTO pumps and manual valves. This approach has served them well with the system still performing to the letter nine years later. The system is divided into 14 irrigation blocks initially related to pump capacities and block dimensions. Permanent micro sprinklers sit between each tree minimising irrigation application on the grass planted between the rows. Water is taken from shallow wells close to the river via three pumps.

CASE STUDY: TE HAPUA (CONTINUED)

“Following the EM mapping we were able to identify the soil boundaries. We grouped the areas of like resistance and then HydroServices installed a series of tubes in each representative area to monitor soil moisture, and determine the individual soil’s water holding capacity. What we found was that some of the soils were really skinny and others were quite robust,” says Bruce.

The orchard was fortunate in that the already established irrigation blocks approximated the now determined soil boundaries.

Concurrent with this project, Hawke’s Bay Regional Council, Pipfruit NZ, Summerfruit NZ, Zespri, Winegrowers, Mr Apple and others were involved in the Croplr calculator project being undertaken by Steve Green and Dr. Brent Clothier at Plant and Food Research, which was tasked with very similar objectives. Bruce Mackay sat with this group as well and was able to share experiences from their ‘Optimising Water Use’ project.

“What we recognised was that the growers were looking for weekly recommendations for irrigation scheduling. What it did was make sure our systems were working to maximise crop production. HydroServices was able to demonstrate the “Double Sigmoid Curve” that portrays the growth stages in peach crops. Aligning this information with soil boundaries, we would provide Te Hapua with recommendations for each irrigation block for the coming week.”

The net result, says Bruce, was a huge lift in productivity, alongside quality enhancements.

Before they started the project, Te Hapua was producing 110–140 tonnes of peaches at a point in its life-cycle where it should have been close to peak production. The property’s challenging soils however were limiting its potential, but irrigation targeting made the difference.

“Prior to this project, the grower would go out every five days and apply six hours of water over the whole property. What they didn’t realise was that the soils with the 8mm WHC were actually under severe moisture stress for three and a half of the five days, and the soils with the 40mm WHC were saturated. There was only a portion in the middle that was sort of performing, and that was only at a particular growth stage. What the soil moisture monitoring achieved for them was being able to align crop demands (which vary through the growth phases) with the soil’s ability to hold and make moisture available.”

“They were burning through a lot of water, diesel and physical energy. When we started sending them irrigation schedules, the amount of irrigation applied halved. Some blocks had to be irrigated every two days, others maybe every eight to ten days depending upon the weather.”

For the next two seasons, production doubled and the size and quality of the fruit improved. Then the 2013 drought struck and the property’s consents were cut due to minimum flows restrictions on the river a week out from harvest.



A still from ‘The NZ Watties’ Peaches story’ – part of a Golden Queen peaches commercial for TV.

“They only produced 110 tonnes of peaches and they were wee ones. It was just heartbreaking,” says Bruce.

Te Hapua has now re-negotiated their consents with the Hawke’s Bay Regional Council, armed with the information gained over those four years, and allowed for by some changes in the recently notified Plan Change 6 that in times of water restriction due to minimum flows, they still retain access to some water.

“The regional council has come to the party so we don’t run out of water. We still get curtailed but not put on total restriction.”

This arrangement was aided by the data Heinz Wattie’s could produce from the project proving their efforts to minimise water use.

“The growers have also removed trees from the skinniest soils and replanted other areas to earlier maturing varieties. We did suggest irrigating at night but this wasn’t deemed necessary,” says Bruce.

Despite rationing water use – or more accurately because of it – Te Hapua is now a much better performing orchard for Heinz Wattie’s. The five orchards in this project all had production per hectare in the top six out of 131 properties in 2012. While this result hasn’t been repeated to quite the same level since, all properties in the trial are consistently in the top 10%.

Putting their irrigation strategy under the spotlight has paid off for Te Hapua and for Heinz Wattie’s.

“Heinz Wattie’s are as an industry aiming to be ambassadors. If we see innovations we consider worthwhile, we will implement them to show people in our industry how they can work. That is one of our intentions with this project.”

With 60 peach growers supplying them in the Hawke’s Bay, Bruce says the project has been considered a success. Not only are these properties improving, others are emulating what they are doing and average yields, fruit size and fruit quality is improving.

“So it’s a win-win as we are clearly using less water. If we have good soil moisture monitoring with well sited probes a soil map is forever. For us, it’s all about using the water resource as well as we can.”