

ADAPTING TO A CHANGING CLIMATE: CASE STUDY 31

HAWKE'S BAY PIPFRUIT ORCHARD

Optimising irrigation to reduce costs and improve quality

THE ORCHARD

- 26 hectares in Central Hawke's Bay.
- Organic apple production.
- Apple varieties include Braeburn, Royal Gala and Granny Smith.
- Sandy loam soils of moderate water holding capacity (50 to 75mm).

THE BUSINESS

- Mr Apple New Zealand Limited is a vertically-integrated pipfruit growing, packing, coolstorage and exporting company based in Hastings, Hawke's Bay.
- The company grows a range of pipfruit varieties under both conventional and organic programs.
- The company owns 14 orchards in Hawke's Bay, totalling around 1000 hectares – the largest pipfruit grower in New Zealand.
- Fruit for export is also sourced from grower suppliers. Mr Apple is responsible for the export of 3.5 million cartons of apples each year, around 20 percent of the national crop.
- Employs about 200 permanent staff and up to 2000 seasonal workers.

David Cheer, Manager, Kanuka Orchard.

Precision irrigation management on Kanuka Orchard not only helps with the efficient use of irrigation water but is also driving improvements in fruit quality.

Mr Apple New Zealand Limited has been following global climate change developments closely for a number of years. Company operations manager, Richard Hill says, "being a pipfruit exporter, we are subject to international market access requirements. Many of these, particularly the recent European move towards carbon labelling, are being driven by international climate change policies, so we have to keep abreast of things."

This company has also developed an awareness of climate change implications for the future of pipfruit production in Hawke's Bay. "The predicted temperature rises and changes in rainfall patterns on the East Coast could have some significant implications for pipfruit production," says Richard, "particularly in areas such as irrigation management. There's a limited water resource out there, which could get scarcer. We want to make sure we're using every last drop we pump in the most effective and efficient way."

Mr Apple has an ongoing policy of reviewing and improving its orchard management practices. "We are constantly looking at how we can do things better, which essentially means driving efficiencies whilst maintaining or preferably improving fruit production and more importantly fruit quality," says Richard.

As a result Mr Apple has a number of on-going research and development projects in relation to irrigation management. "Recent research on fruit quality, particularly in relation to dry matter, is showing how crucial it is to get irrigation right, from the design and maintenance through to the scheduling of applications," says Richard.

Mr Apple is also part of a MAF Sustainable Farming Project which will help to quantify and better understand patterns of pipfruit water use for both conventional and dwarf trees.

KANUKA ORCHARD

David Cheer is an orchard manager for Mr Apple and is also responsible for driving irrigation research and development within the company. As with all pipfruit growers, there has been a recent move towards more intensive plantings of new varieties on dwarfing rootstocks. Investment in new varieties is essential to maintain New Zealand's competitive edge in the global market.

"Mr Apple has a number of orchards in Central Hawke's Bay," says David. "Many of these are on light soils with low water-holding capacities. This has helped focus the company's drive towards the development of optimum irrigation practice as, with the lighter soils, there's little room for error."

There have also been some recent challenges in the Ruataniwha basin with regard to water availability. "The run-of-river surface water is fully allocated and the regional council have now placed any further allocation of ground water on hold until such time as they better

understand the ground-surface water interactions. Add climate change projections into this mix and to me this means optimising irrigation management is a key component in future proofing the company."

IRRIGATION PRACTICE AT KANUKA ORCHARD

SYSTEM DESIGN AND MAINTENANCE

The irrigation system at Kanuka, a 26-hectare organic pipfruit orchard, was designed and installed over 20 years ago. The consent allows the orchard to pump water at a rate of 20 l/s from a 200mm bore with a maximum weekly take of 6718m^3; a water meter was installed as part of the consent conditions. However, this has turned out to be a great tool to help better manage irrigation applications, that is, comparing what should have been applied with what actually was. Irrigation is by a micro-sprinkler system which irrigates a continuous wetted strip along the tree rows applying 4mm/hr.

The orchard is broken up into 11 irrigation blocks based on soil type and variety. Each can be irrigated separately or in a combination with others. This allows for flexibility and the opportunity to deliver the right amount of water to different varieties at different growth stages. "Successful pipfruit production focuses on farming dry matter to maximise the potential of the fruit. Research is showing just how vital getting the plant available water part of the equation right is, both too little or too much water at the wrong time can have huge implications for fruit sizing, pressure, brix and flavour," says David.

To ensure optimum performance the irrigation system is maintained regularly throughout the season. At Kanuka they also annually overhaul the system after pruning. All the laterals are flushed and block operating pressures are also checked. David explains: "We were part of a MAF Sustainable Farming Fund project a couple of years back where guys came and completed an irrigation evaluation. I was fairly confident they'd find the system was up to scratch as we put a lot of effort into maintenance. The report they produced showed the system was running right on the 80 percent efficiency mark, I'd been told this was the benchmark figure and also pretty good considering the system was 20 years old."

Regular checks and maintenance are essential for the optimum performance of the irrigation system.

FOR MORE INFORMATION

- The Sustainable Farming Fund supports rural communities to achieve sustainability. Resources, publications and reports are available at **www.maf.govt.nz**
- Details and reports of Sustainable Farming Fund project 02/051 *On-farm Irrigation Evaluation: Code of Practice, Certification and Training* are available on the MAF Sustainable Farming Fund web page. Search by project number at **www.maf.govt.nz**

Key points

1. **Climate change projections for the East Coast of New Zealand, including higher temperatures and less rainfall, means successful and efficient irrigation is a key component of resilient orchard practice.**
2. **Optimising irrigation performance is essential for achieving cost efficiencies and driving fruit quality parameters.**
3. **Regular soil moisture monitoring is an important tool for precision irrigation management.**
4. **Have your irrigation system designed, installed and regularly maintained to a high standard.**

The irrigation evaluation project highlighted two key areas to ensure long-term optimum performance from micro-sprinkler orchard irrigation systems:

- Know your system's design pressures and regularly (at least annually) check each block's valve pressure is set correctly. This ensures the intended amount of water is being applied.
- Clean your system regularly (at least annually and more frequently if water is poor quality) including filters and flushing laterals. This greatly removes the incidence of sprinkler plugging ensuring the intended amount of water is being applied evenly throughout the block.

SYSTEM OPERATION

Soil moisture monitoring is carried out throughout all the company's orchards. David says: "It's common sense really, especially now our research is showing soil moisture availability at certain growth stages is strongly correlated with fruit quality. We could justify the additional monitoring costs before from the potential energy savings that could be made by only pumping the water required, especially from the deeper wells in Central Hawke's Bay. But now we are starting to realise that regular soil moisture monitoring opens up all sorts of other opportunities when it comes to precision irrigation management."

THIS IS ONE IN A SERIES OF CASE STUDIES CALLED ADAPTING TO A CHANGING CLIMATE

Published by Ministry of Agriculture and Forestry
PO Box 2526, Wellington 6140.
Freephone: 0800 008 333
Web: www.maf.govt.nz