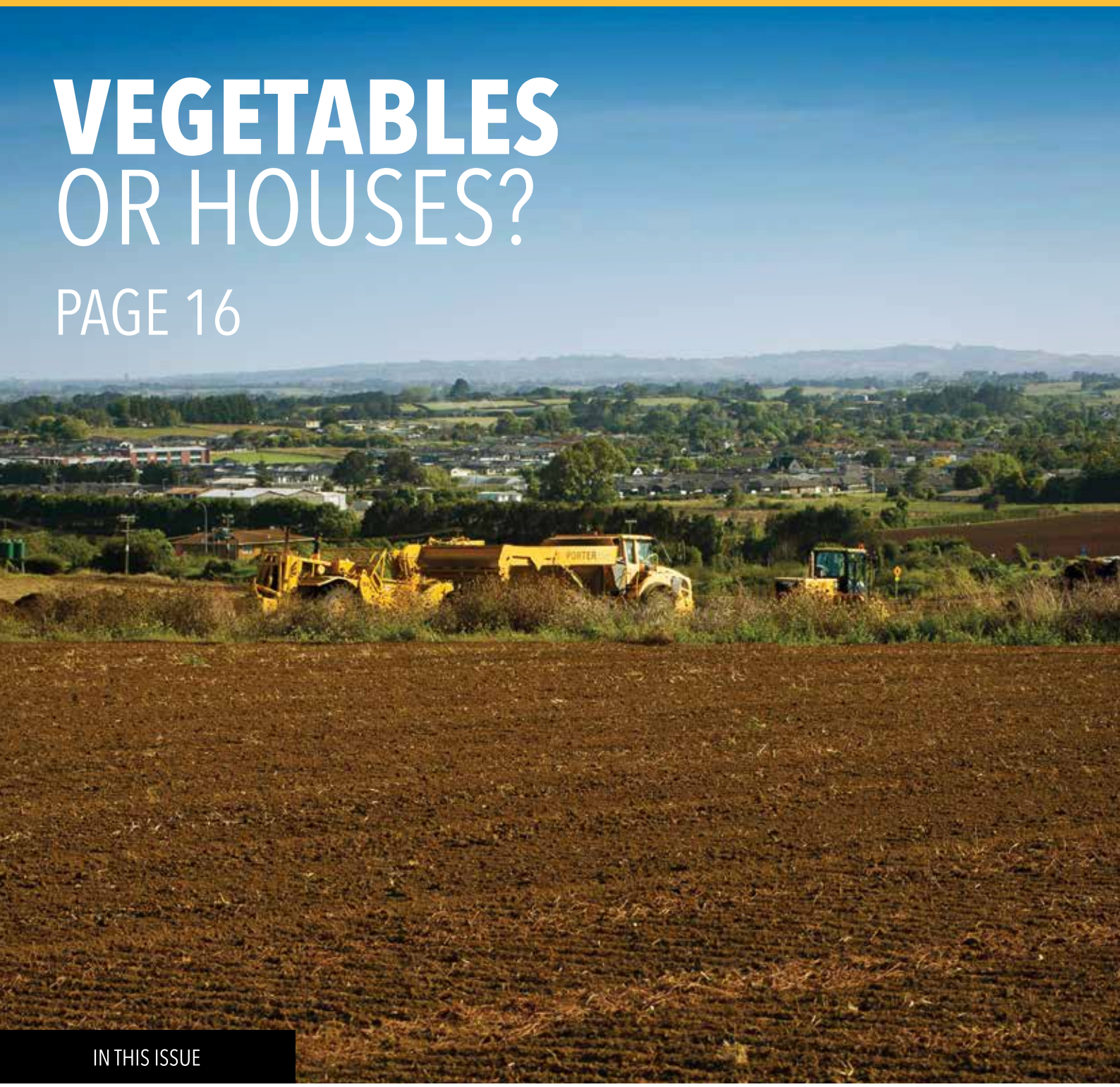
NZGROWER®

VOL 76 | NO 02 | MARCH 2021

HORTICULTURE NEW ZEALAND

VEGETABLES OR HOUSES?

PAGE 16



IN THIS ISSUE

New Cuc's on the block

Carranza

(Trialed as FHOL 125) Resistances: HR: Cca, Ccu IR: CVYV; CUSDV

Suitable for autumn, winter and spring plantings. Vigorous plant, open habit with medium length. Good in cold conditions. Strong root system enables high yield of 32-35cm dark green fruit.

Caobado

(Trialed as FHOL 180) Resistances: HR: Cca; Ccu IR: Px; CVYV; CYSDV

Vigorous plant with a strong root system, open plant habit. Dark green leaves with short internodes for ease of crop work, strong partial resistance to Powdery Mildew. Fruits are of 31-34cm length, minimal neck, capable of high yields of dark green fruits of high quality. Recommended for autumn, winter, spring production.

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MARCH 2021

CONTENTS

UP FRONT

YOUR LEVY AT WORK

YOUR INDUSTRY

TECHNICAL

PRODUCT GROUPS

ON THE COVER:

Pukekohe's unique soil, see page 16.
Photo by Trefor Ward.

WHAT'S NEW

A regular advertorial section of new products and services. This publication does not endorse the products or services featured here.

"BRISTLING WITH RISK" AND RSES INHIBITING PRODUCTIVITY IMPROVEMENTS?

Words by Barry O'Neil, President : HortNZ

Rabobank's *Agribusiness Outlook 2021* report concludes that while the outlook for the year is "bristling with risk" and bumps are anticipated, on the flip side, most agricultural sectors can expect average to above-average pricing, manageable cost inflation and production to hold up well.

"Bristling with risk" is not what I would call the current scenario facing many of our growers, who can't find sufficient labour for harvest due to political restrictions on access to Recognised Seasonal Employer (RSE) scheme workers. Even if they manage to harvest and pack their crops, growers are struggling to find reliable and affordable shipping.

And these are the lucky ones, who weren't rained on in Central Otago and lost more than 60% of their cherry crop, or smashed by hail in Nelson and lost not only 100% of this year's kiwifruit, apple and hops crops, but also been left with damaged trees and vines that will take years to fully recover.

"Bristling with risk" is one way of saying growing comes with challenges. As growers, we know there will be curve balls and tests. Who, a year ago, could have foreseen that we would not have access to RSE workers and backpackers to harvest and pack our produce? And that we'd be waiting for the government's response to the Climate Change Commission's draft report and its impact on growers.

But the growers I know are resilient types, who quickly pick themselves up from a knock-down, and get on with doing what they do best – growing. So let's hope the Rabobank report is accurate about above average pricing. Let's also make sure we are supporting those that have had knock-backs, as it's always reassuring to know that others are thinking of our well-being.

But then it got worse when I read the Productivity Commission's review called *New Zealand firms: reaching for the frontier*, which made me rather despondent and frustrated.

The review starts off okay and is primarily focusing on innovation as the key to New Zealand's economic future. At a high level, it seems to make good sense, calling for:

- **A greater focus on exporting specialised products at scale** to overcome New Zealand's hurdles of size and distance.
- **An overhaul of the innovation ecosystem** to support firms and drive innovation.
- **Focused government investment** in areas of existing or emerging economic strength and competitive advantage.
- **Collaborative, focused efforts** by the government, industry and researchers on innovation policy and investments.

But the review goes totally off the rails when it gets to the section and recommendations on migrant labour. It disturbingly claims that migration policy settings are inhibiting productivity improvements.

These claims are made in a supporting report by the New Zealand Institute for Economic Research (NZIER), which includes the RSE scheme as part of a wider discourse on migrant labour. Its conclusions are that the primary sector is reliant on low-cost migrant labour and is not attractive to Kiwis, due to low wages and working conditions.

It claims successive changes to New Zealand's migration policy settings have seen the skill levels of permanent migrants fall, and the skills of temporary migrants are now at or below the New Zealand average. This, the report claims, has encouraged businesses to continue to rely on low-cost migrant labour, which has inhibited productivity-boosting investment in capital and innovation.

The NZIER report recommends the current border closures due to Covid-19 present an opportunity to review and reset migration policy. "The Government should focus migration policy more on lifting productivity, by having a principle of primarily accepting only highly-skilled migrants, and over time reducing the inflows of low-cost temporary workers," it says.

I really struggle with the concept that our Pasifika workers are low-skilled, or that they are low-cost. Try and keep up with them picking to see the skills these fantastic workers have, who are rewarded for their work with the piece rates being paid.

Secondly, the NZIER report assumes we can replace skilled Pasifika workers with Kiwis or with automation. The job scene has tightened up incredibly over the past six months. Somewhat surprisingly, Statistics New Zealand data shows that the jobless rate dropped from 5.3% in the September quarter to 4.9% in last quarter of 2020.

> **Somewhat surprisingly, Statistics New Zealand data shows that the jobless rate dropped from 5.3% in the September quarter to 4.9% in last quarter of 2020**

We know when unemployment gets low, we struggle to get fit and employable workers into our businesses. Currently, we have a situation where seasonal workers are not available or the Kiwis available are predominantly urban unemployed who do not want to move and/or do not want to work in the primary sector.

And what about greater recognition for the real benefit to Pacific communities from the RSE scheme and the generosity of New Zealand businesses? If it weren't for the scheme, more New Zealand aid money would be needed to support communities who are now able to fund their own way.

The NZIER report doesn't acknowledge that a key factor in the significant growth of the horticulture sector has been the certainty of seasonal labour through Pasifika and backpacker workers. This labour resource has resulted in significant economic benefits for New Zealand and our communities, something that will be put on hold if we shoot ourselves in the foot here.

And automation? Unfortunately, I hear too many ill-informed people who believe we just need to invest and it will happen. Of course, it's a road we have all wanted to go down and many have invested significantly, such as in the apple and kiwifruit industries. However, in my opinion, it's not going to happen on most orchards for some time if at all. Why? Because orchard structures and the associated environment often can't handle the size and scale of machinery that is needed to be commercially viable.

We have all seen videos of orchards with unmanned ground machines. While they might look futuristic, they sometimes look to me just like toys, and little has come of the associated hype. But with some production systems, such as potato or onion and other vegetable harvesting, where you can get the big kits into the paddock to do the work and the growing system supports it, automation has already happened or is happening.

But where automation is the most suited is in the packhouse. The industry is already investing and seeing huge technology advances, whether that be automated camera grading systems, robotic packers and stackers, or fully automated coolstores. Real labour savings and efficiency gains have resulted, but packhouses are a far easier challenge, with a dry and clean standardised environment, than on the orchard.

Innovation is being introduced into the horticulture sector on a daily basis, whether that be new varieties, improved growing systems or moving away from harder chemicals. But the reality is that some activities will remain the same, and we need seasonal labour – especially the RSE scheme – to complement our Kiwi workers.

Lastly, to those growers that have suffered crop losses from rain, hail as well as drought now, we really feel for you and wish you all the best in getting back on your feet.

Kia kaha!

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NZGrower is produced by Horticulture New Zealand and is free for all levy payers. The magazine is also supported by: Vegetables New Zealand Inc, Process Vegetables NZ, TomatoesNZ, Potatoes New Zealand Inc, Onions New Zealand Inc.

The individual comments and views in this magazine do not necessarily represent the view of Horticulture New Zealand.

ISSN: 2230-2700

Your Levy AT WORK

MPA Associate Member (NZ)

Horticulture™ New Zealand Ahumāra Kai Aotearoa

This publication uses vegetable based inks and environmentally responsible paper produced from Forest Stewardship Council® (FSC®) certified, Mixed Source pulp from Responsible Sources.

Paper produced using Elemental Chlorine Free (ECF) and manufactured under the strict ISO14001 Environmental Management System.

This magazine is posted in an EcoPure plastic sleeve. EcoPure accelerates the biodegradation of treated plastics in microbe-rich environments. Plastics made with EcoPure are biodegradable in aerobic and anaerobic environments.

IMPACT OF COVID-19: WE MUST WORK TOGETHER

Words by Mike Chapman, Chief Executive : HortNZ

The tentacles of Covid-19 are once again impacting on our freedom of movement and our ability to produce healthy food.

This is the end that the public and our consumers see. But what they do not see is the impact Covid-19 is already having when it comes to shipping, seasonal labour, restrictions on growing and packing operations and so on. What neither the government nor the public appear to recognise is that in addition to the health impact, there is the economic impact that comes from all the additional costs that Covid-19 has imposed on industry. This will be made worse by not having enough seasonal labour for harvest and then winter pruning.

What is very apparent is the only way we are collectively as a country going to survive the twin health and economic impacts of Covid-19 is to work together across the whole country. To do this we need a collective vision and strategic direction for government and industry. We need to bridge the gap between what we know we need to do for New Zealand and the government cohesively enabling that. There are already examples of where we work well with government, and as with any working relationship, there is always room for improvement.

There are many challenges facing horticulture in addition to Covid-19 – freshwater and climate change regulation, regulation enabling us to grow healthy food and the long overdue overhaul of the Resource Management Act. If a piecemeal and fragmented approach is taken as we are forced to meet these challenges, we will miss a real opportunity as a sector and as a country to make a real lasting difference.

> “There are many challenges facing horticulture in addition to Covid-19 – freshwater and climate change regulation

Both with horticulture and government there are many competing factions, all with laudable intentions, but without direction and cohesion they are counteractive and impediments to progress. Even a modicum of co-operation will achieve unbelievable and long-lasting results. There are great examples where we collectively have achieved that – for instance, the career progression manager network. Their achievements in attracting workers and developing careers for our workers are paying huge dividends. This is a prime example of industry and government working together to find employment and careers for New Zealanders.

Building a cohesive and unified approach as we face the current uncertainties and challenges is the only way I think we will be able to continue to feed New Zealand healthy food. The collective horticulture industry groups have already developed a Covid-19 recovery strategy that focuses on our key challenges: labour; production systems and natural resources; data, monitoring and communication; trade, policy and government; diversity and partnerships; and innovation and automation.

> “... the only way we are collectively as a country going to survive the twin health and economic impacts of Covid-19 is to work together across the whole country

What we need to do is link these key challenges into a cohesive plan that government supports with its own initiatives and resources. We need the road map of where we are going and how we are to get there. We need to focus on the main activities that will collectively deliver the most impact and results, not only for horticulture but for New Zealand, by engaging and working together with the same goals and values. This is what we will be working on in the coming months – our integrated and collective industry and government plan for the future. ●

Thinking vegetable seeds? Think **Terranova.**

Spinach

Sunangel

- Very high yield potential.
- Robust, semi-savoy, dark green leaves.
- Best suited to shoulder and warm season.
- Similar time-slot to Kookaburra RZ.
- Resistances: HR:Pe:1-9,11-17 IR:Pe:10

Hybrid Cabbage

Lambada

- Dark green colour with flat round head shape.
- Good field holding ability.
- Large plant frame size. Short round core.
- Versatile harvest time slot.

Iceberg Lettuce

Siberinas RZ

- Vigorous variety for spring harvest.
- Large frame and head size.
- Well layered leaf structure suitable for processing.
- Round head shape with some leaf blister.
- Resistances: HR: Bl:16-26,31,32EU/Nr:0/Pb

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- Early maturing hybrid, with very good bolt tolerance.
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YOUR LEVY AT WORK

INDUSTRY WIDE ISSUES FOR INDUSTRY GOOD

NATURAL RESOURCES AND ENVIRONMENT

RESOURCE MANAGEMENT

The government has announced its intention to split the Resource Management Act into three different sets of legislation:

- The Natural and Built Environments Act (NBEA) – to cover land use and environmental regulation.
- Strategic Planning Act (SPA) – other legislation relevant to development and long-term regional spatial strategies.
- Climate Change Adaptation Act (CAA) – managing retreat and funding/financing adaptation.

Key points on the proposed Natural and Built Environments Act:

- Regional and District Plans will be replaced by One Plan per region.
- Positive outcomes to the environment are to be identified and promoted prior to consideration of management of adverse effects.
- Biophysical limits are seen as central to protecting and sustaining natural resources.
- Those who exercise powers and functions under the Act will be required to give effect to the principles of Te Tiriti o Waitangi.
- National direction will be consolidated into a 'National Planning Framework'.

The proposed consultation will be via a select committee process. The key dates are a draft Bill in May, and then the Bill to be introduced to parliament and considered by select committee in December, with the intention that all three pieces of legislation be passed by the end of 2022.

Horticulture New Zealand will develop a submission on the draft Bill following consultation with product groups, district associations and growers.

WATER

Water Services Bill

HortNZ is developing a submission on the Water Services Bill.

The bill will implement the government's decision to comprehensively reform the drinking water regulatory system. The Bill establishes Taumata Arowai as the new national water services Regulator.

Key points on the Water Services Bill:

- The implementation of Te Mana o te Wai.
- Drinking water suppliers to provide safe water through the development and implementation of safety plans.
- The protection of source drinking water by suppliers through the development and implementation of source water protection plans.
- Registration of drinking water suppliers.
- Multiple barriers to contamination being adopted.
- Ongoing monitoring and reporting.

The new requirements for water suppliers will apply to anyone who supplies water to others for domestic purposes. These regulations will capture some irrigation schemes, and some small supplies serving multiple users such as packhouses and worker accommodation.

HortNZ has been engaging with growers and irrigation schemes, and will make a submission in March.

CLIMATE CHANGE

Climate Change Commission

HortNZ is developing a submission on the Climate Change Commission advice to government on reducing emissions and adapting to climate change.

Key points from the Climate Change Commission's report:

- New Zealand's 2050 carbon zero target is achievable but not under current policy.
- Three new targets: 2% reduction on 2018 greenhouse gas emissions by 2025; 17% cut by 2030; and a 36% cut by 2035.
- Maximum cost of $33.7 billion across 14 years, which is suggested to be significantly lower than predicted due to technological advances.
- Biggest impacts are to Transport (required emission reduction 50% by 2035) and heat, industry and power (required emission reduction 44.6% by 2035).
- The cost of keeping emissions within the recommended carbon budgets is estimated at around 1% of New Zealand's GDP (Gross Domestic Product) in 2050.

There are opportunities for horticulture identified within the report, with horticulture expansion identified as being an opportunity to achieve emissions reductions for New Zealand. The proposed reduction in the use fossil fuel for heat highlights the challenge of developing viable alternative heating sources for glasshouses.

Feedback will be sought from product groups and district associations, and HortNZ will make a submission in March.

Go to **www.climatecommission.govt.nz** to see the full Climate Change Commission's report.

Horticulture™ New Zealand
Ahumāra Kai Aotearoa

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PROGRAMME THRILLS STUDENTS

Words by Alex Tomkins

Fourteen tertiary students from Massey, Lincoln, and Victoria Universities completed a two-week horticulture expedition around New Zealand late last year.

The group comprised students from a range of disciplines including Horticultural Science, AgriBusiness, Food Marketing, Food Technology, and Engineering.

The Aotearoa Horticulture Immersion Programme (AHIP) was run by the Massey Business School and NZ Apples & Pears, with support from AGMARDT (Agricultural & Marketing Research & Development Trust), Zespri and Horticulture New Zealand.

Students were exposed to the different value chains, various business models and potential career opportunities. The trip enabled students to grasp the sector's future challenges and opportunities. Students experienced the entire horticulture value chain from plant breeding to the end consumer. The group saw first-hand the potential role of technology, engineering and data management to improve horticulture production efficiency and environmental sustainability, and to provide a longer-term solution for labour challenges.

Throughout the trip, the bus was used as a moving classroom, allowing students to reflect, debate, and critically analyse their learnings and insights from visits. Students were challenged to think about their observations in terms of opportunities and implications for the future of horticulture.

The trip started in Christchurch and delved straight into the vegetable seed industry while also looking at precision horticulture. The group made their way up the South Island visiting Kaikōura, Marlborough and Nelson where they were exposed to diversified farming systems, viticulture, hops, boysenberries, and Māori AgriBusiness. The second week was spent in the North Island, focusing on the kiwifruit industry, the apples sector, and agri-tech.

The programme ended in the capital with the students presenting their insights to the Ministry for Primary Industries (MPI) and HortNZ.

Major observations and insights from the trip include:

- **Two-speed economy model**
  Within the horticulture industry, uneven growth rates within sectors have resulted in a two-speed economy. This is seen through the rapid growth of large corporate land management compared to smaller individual growers. Also, product groups primarily selling to export markets that are non-commodity and high returning are growing significantly faster than commodity horticultural products sold on the domestic market.
- **Volume to value to values**
  Historically within New Zealand's primary industries and horticulture sector, there has been a shift from volume to value. Recent transitions have seen a shift to values-based business models, with importance placed on longevity and prosperity for future generations.
- **Finite to infinite mindset**
  Students saw this in businesses where Kaitiakitanga and Manakitanga – showing respect for people and the land – were core values and reflected throughout the business and their story. Within the horticulture sector, there is an increasing shift in business values from a finite to an infinite mindset which is focused on long-term prosperity.
- **Consumer driven, Intellectual Property (IP) controlled value chains**
  During the AHIP study trip, students observed the consumer driven nature of horticulture with growing IP and Plant Variety Rights (PVR) controlled value chains, which bring significant value to the sector.
- **Data transparency and open innovation**
  Going forward, increasing collaboration within innovation and data transparency will allow for the technology and automation to improve efficiency and solve industry wide problems.
- **The missing middle of leadership talent**
  Over the next decade, a large proportion of industry managers and leaders will begin to retire. Therefore, developing future leaders and talent within horticulture to ensure knowledge is passed on needs to be an industry priority.

Alex Tomkins

Geoff Lewis

Alex Tomkins was the inaugural winner of the Fruitfed Supplies Horticulture Scholarship with Massey University.

Alex has now finished her studies at Massey University graduating with a Bachelor of Agri Commerce, majoring in International Agri Business. She has secured a role within the graduate programme at Southern Cross Horticulture in the Bay of Plenty. This role will enable her to get first-hand experience with a vertically integrated business in the kiwifruit industry.

"I'm really interested in the export orientated kiwifruit, apple and avocado sectors and how these crops tie in with all I've learnt throughout my degree, from horticultural production to supply chain management and international marketing," says Alex.

For Alex, receiving the Fruitfed Supplies Horticulture Scholarship has helped her enormously. It was Fruitfed Supplies Technical Advisor Celese Prior, whom she met at university, who first suggested she apply for the scholarship.

"I'm really grateful for the financial support. I would definitely recommend applying for the scholarship as it has helped me make industry connections."

When you combine the knowledge of a third-generation grower with eager to learn university students, sparks fly.

Geoff Lewis – asparagus and strawberry grower and founder of Lewis Farms and Tendertips – explained to students the importance of diversity, a longevity approach to business planning and collaboration.

Geoff has diversified his operations with dairy, asparagus and strawberries. The complementary seasons of asparagus and hydroponic strawberries provide work for employees almost all year round, reducing reliance on seasonal labour. Tendertips has been growing and packing asparagus for 40 years. Succession planning and longevity is a key part of the Lewis family's operation to ensure the business continues to be passed to future generations.

The asparagus grader and packer used by Tendertips is a testament to Geoff's understanding of the need for collaboration with innovation and technology investment, as no one grower can do it all alone. Geoff partnered with a Massey University student research project to develop the technology used for grading asparagus in the Tendertips packhouse. As an industry, how can we leverage university students to be the innovation engine and problem solvers for growers?

GROWERS GET READY AS FEP DEADLINE DRAWS NEAR

Words by Kristine Walsh

Some Farm Environment Plans (FEPs) will soon be mandatory in Gisborne and it is hoped lessons learned there will help inform growers around the country when it is their turn.

Under the Tairawhiti Resource Management Plan, FEPs will be compulsory in Gisborne from 1 May this year for any farm that grows annual crops or commercial vegetables, or intensively farms animals.

And while there has been some confusion around when, where and how FEPs for other producers will become mandatory, growers are being advised to be proactive not only so they are compliant, but as a potential boost for their businesses as well.

For those in Gisborne who do have deadlines to meet, Horticulture New Zealand organised workshops that started on 11 February and continued into March to guide them through mapping their properties and working out how they operate around nutrient, irrigation and biodiversity practices.

The workshops stepped growers through the process using the Environmental Management System (EMS) add-on module designed, certified and audited by the HortNZ-owned NZGAP (New Zealand Good Agricultural Practice).

But even as more than 20 growers gathered for the first workshop, they did not know whether the audited NZGAP add-on would be accepted by Gisborne District Council (GDC).

"Industry templates are accepted by GDC in their rules, but we are seeking acceptance of the EMS audit in lieu of a Council review of each FEP," says HortNZ sustainability and extension manager Ailsa Robertson.

"The EMS framework involves a grower using the FEP template, and the independent auditor using the EMS audit checklist. This checklist is aligned with the EMS standards, which are benchmarked to regional council requirements, so these parts all come together in one, comprehensive assurance system for farm plans."

It has been endorsed by Environment Canterbury, but at the time of the first workshop, GDC said it was "currently evaluating whether this pathway can be used as a Farm Environment Plan (and) a decision is expected in the near future."

"Growers want to do the right thing but we do feel it is very hard to find the right information around what that actually is," says Gisborne Produce Growers Association chair (and Process Vegetables New Zealand board member) Calvin Gedye.

To be fair, GDC was one of the first local bodies to introduce mandatory FEPs and was itself operating in a bit of an information vacuum. It could not, for example, give details on when FEPs would be compulsory for growers of permanent crops because it had "not yet received new directives from central government."

In that context, HortNZ says the work it and other primary sector organisations are doing with both central government and GDC will likely give clarity to other local bodies as the FEP system rolls out around the country.

In Gisborne, HortNZ is preparing a case study of a local grower to show Council the layers of information that sit behind an NZGAP farm plan "to provide them assurance that growers using the EMS are meeting their requirements."

"So we are actively working to seek recognition of EMS farm plans and the EMS audit," says HortNZ sustainability and extension manager Ailsa Robertson.

"At the same time we are lobbying central government to accept industry assurance programmes, like the GAP schemes, in the new national freshwater regulations. If we are successful this would filter down to all councils, which would offer a lot more clarity going forward."

In addition to the Gisborne sessions, HortNZ has already run NZGAP add-on workshops in Pukekohe, and plans to do the same in Levin, Hawke's Bay, Marlborough, Central Otago and Northland.

Addressing the attendees in Gisborne, Ailsa Robertson said that while FEPs have to be done, they are nothing to be worried about.

"A farm plan is basically about documenting what you are already doing on a day-to-day basis, understanding what your key risks are, and making an action plan to address those over a period of time."

In town to guide growers through the process, agricultural engineering consultant Andrew Barber said it isn't about being the best, but about being better.

"Don't panic if you have to tick 'no' to a question on the checklist … if everyone was up to speed we wouldn't need FEPs at all," he said.

"There is no wrong answer – we can't all be perfect from the get-go – it is about finding and acting on opportunities to take action."

DRAFT FRESHWATER REGULATIONS DUE MID-YEAR

Aside from the issue of Farm Environment Plans, the Ministry for the Environment (MfE) and the Ministry for Primary Industries (MPI) are also working on the development and introduction of certified Freshwater Farm Plans (FWFPs).

The requirement comes as part of the Resource Management Act Amendment Act 2020, and according to MfE climate and water agriculture analyst Maggie Rogers, the agencies will confirm the process for establishing FWFPs as soon as possible.

"We know many farmers are already working to identify and reduce risks to the environment on their properties and we intend that the certified FWFP system will build on this, providing a mechanism to help farms comply with the National Environmental Standard for Freshwater Management," she says.

"In many cases a farm's existing plan may be able to be transitioned or adapted to meet requirements for a certified FWFP (and) this could apply to the NZGAP Farm Environment System audited add-on, providing it meets the requirements that are being developed.

"Until the new Freshwater Farm Plan regime is in place in their area farmers should continue using any existing plans to manage environmental risks. Implementing a certified FWFP is an ongoing process, not a one-off event. It's about understanding a farm's risks, and then continuous improvement moving the farm in the right direction."

MfE and MPI are engaging with stakeholders and experts in farm planning (from industry, councils and Māori) during drafting of the regulations and it is expected that there will be public consultation in mid-2021, Maggie Rogers says.

"The final regulations are expected to be in place in 2022 and there will be a gradual roll-out of the new system, by catchment areas, based on a range of priority criteria.

"Freshwater Farm Plans will become part of a wider programme of continuous improvement in on-farm environmental management, as part of the government's road map to a sustainable future for the food and fibre sectors."

ADD-ON HELPS GROWERS GET AHEAD OF THE GAME

An environmental 'add-on' could help growers get a jump on future demands for Farm Environment Plans (FEPs), and give their businesses a big boost in the process.

Supporting its grower group of around 80 orchardists, Gisborne marketer First Fresh is helping them achieve Environment Management System (EMS) standards as an add-on to their existing NZGAP (Good Agricultural Practice) certification.

Environment Canterbury has already endorsed the EMS as a stand-in for FEPs. And as other local bodies consider whether they will do the same, those growers will be ahead of the game as FEPs become mandatory around the country.

"None of our growers can operate without NZGAP certification so what we're saying is why wouldn't you also get the EMS add-on? It's good for the environment and it's really, really good for your business," says First Fresh compliance co-ordinator Mathew Bannister.

"Growers can focus on making any adjustments highlighted by the information in their plan and that makes for better practice, and much better business."

First Fresh had already worked on helping its growers get NZGAP's Social Practice add-on – which addresses labour force issues in the industry – and with that done, the EMS is the "first cab off the rank."

And to get the ball rolling Mathew did trials with a couple of growers to see just how easy it is, and what sorts of benefits can be achieved.

In the case of one trial involving a grower producing citrus, persimmons and kiwifruit, the operator did not have an on-line map … a requirement for the EMS add-on.

"So we jumped on Google Maps, spent an hour drawing it up, and now it's done," Mathew says.

"The bonus is he now has this fantastic new tool. For example, he now knows he has 2.5km of shelter belt so when he books the trimmer, he can be precise with information and that saves time and money.

"It's the same with information about things like waterways and nutrient budgets. Once you have that in hand you have the right background to inform decision-making going into the future."

During the other trial, the grower needed to record carbon emissions which meant measuring their fuel consumption, and that led to some interesting conclusions.

"Linking his fuel use to his income meant he could see where he had been using heaps of diesel even when there wasn't a lot of money coming in," Mathew says.

"Through that he realised he was harvesting and trucking low-grade fruit that wasn't bringing him a return, so he could plan better for next season to avoid that wastage. So not only did he fulfil his reporting requirements, he improved his operation as well."

In both of the trial cases, setting up the EMS allowed the growers to see any gaps between what they were already doing and what the EMS required, and according to Mathew Bannister, "the difference was negligible".

"Because our growers are already doing such a lot of good work, meeting EMS expectations is not a big challenge and that's what's given us the confidence to get behind it.

"Just a few years ago some were a bit resistant to the requirement to get NZGAP certification but now it's just a normal part of doing business. That's how we see the whole EMS/FEP process."

While some growers see the need for FEP or EMS structures as a regulatory niggle, Mathew Bannister says there are huge advantages for orchardists in particular.

"Permanent plantings aren't something you can switch out every year, they are there for a generation, which is why we describe growers as being incurable optimists," he says.

"In the face of all sorts of challenges they stick with it and just work towards doing better every year, and plans like these give them the evidence to ensure the decisions they make are the right ones." ●

Some FEP facts

HortNZ says Farm Environment Plans (FEPs) help growers assess their environmental risks, take action where required, and demonstrate progress on environmental objectives.

FEPs are not compulsory in many areas but under the 2020 Resource Management Amendment Act, they will eventually be "mandatory and enforceable."

HortNZ is working with councils around the country to see its NZGAP (Good Agricultural Practice) Environment Management System (EMS) add-on approved as a stand-in for an FEP.

The NZGAP programme covers risk assessment and good practices to manage resources, including protection and sustainable use of land and water; responsible use of agrichemicals and fertilisers; waste management; biodiversity; and waste, emissions and energy.

Horticulture™ New Zealand

TAKING PART IN A HORTICULTURE FIELD DAY?

THINK ABOUT BIOSECURITY! HERE ARE SOME EASY STEPS.

Field days are a great way to share information and knowledge in a hands-on way. However, movement of people, goods and vehicles between farms/orchards during a field day can present a biosecurity risk. Pests or pathogens can inadvertently be carried:

- onto the host's property
- back to the attendees' property.

Implementing simple everyday biosecurity practices can help to minimise the biosecurity risk for both hosts and attendees, which is a great outcome for all.

If you are an ORGANISER:

- Include biosecurity messaging on promotional material and in communications with host properties.
- Minimise the number of vehicles and use transport that is not usually used on the farm/orchard if possible.
- Keep a register of all attendees to ensure tracing is possible if required.
- Avoid visiting properties that are known to have high risk pest, pathogen or weed infestations.

If you are a HOST PROPERTY:

- Make sure good biosecurity practices are visible on your property.
- Provide a biosecurity briefing about the actions you'd like visitors to take so that attendees know what you expect of them.
- Ensure that you have a designated and clearly signposted parking area.
- Provide a footwear wash and disinfection station at the point of entry e.g. boot scrubbers and water for cleaning, sanitising spray or a footbath containing an appropriate sanitising product for disinfection.
- Provide hand sanitiser if people will be touching plants or soil.
- Avoid use of other people's tools and equipment for demonstrations, unless they have been thoroughly cleaned and disinfected first.
- Monitor the part of your property where the visit took place over time for unfamiliar pests, pathogens or weeds.

If you are an ATTENDEE:

- Make sure your clothing and footwear is clean. Avoid wearing clothes and shoes that you wear on your own farm/orchard.
- Clean and disinfect your footwear between each site during the field day and before returning to your own farm/orchard.
- Follow all biosecurity signage and requests at host properties.

BE A BIOSECURITY CHAMPION:

HELP TO PROTECT YOUR PROPERTY AND YOUR SECTOR FROM PESTS AND PATHOGENS.

HEALTH AND SAFETY IN HORTICULTURE

Words by Kate Trufitt

Last year, 2020, will be remembered for Covid-19, lockdown, Labour winning the New Zealand election, Trump losing the United States election, changes in family circumstances – the list goes on, both good and bad. We faced an ever-changed world, still we Kiwis just got on with it and even managed to have a summer holiday.

Operating during the height of Covid restrictions was a unique situation with extremely enhanced requirements for safety. It was also an opportunity for us all to gain a little more appreciation for the importance of good Health & Safety practices.

In 2021 we look to continue the momentum. While many think Health & Safety is just a tick the box compliance requirement, we hope to change this perception by offering practical solutions that add value to growers' businesses.

The Horticulture New Zealand Board has representatives from a diverse range of horticulture industries. I am a director on the Horticulture New Zealand Board and the chair of the Horticulture Health and Safety Council (HHSC). Antony Heywood is a senior manager of Horticulture New Zealand, general manager of Vegetables NZ and is the secretary of HHSC.

HHSC membership	Industry / Organisation represented
Kate Trufitt Chair	Horticulture New Zealand Board and Apata Kiwifruit Ltd
Antony Heywood Secretary	Horticulture New Zealand senior manager, Vegetables NZ general manager
Al McCone	Worksafe – agriculture lead
Loy Martinez	NZ Hothouse – covered crops (vegetables)
Erin Simpson	NZ Apples and Pears
Alysha Crockford	Mr Apple
Sarah Cameron	NZ Kiwifruit Growers Inc
Silua Ettles	NZ Winegrowers

The HHSC work on behalf on industry to improve Health & Safety practices across horticulture.

During 2021, we will continue to update you with the work we are doing and look forward to engaging with more growers on Health & Safety.

YOUR INDUSTRY

ACROSS THE SECTOR – ACROSS THE COUNTRY

24 ORGANIC PRODUCE DELIVERED

PUKEKOHE'S UNIQUE GROWING CONDITIONS WORTH FIGHTING FOR

Words by Andrew Bristol. Photographs by Trefor Ward

Bharat's mother in the field

Bharat says it all comes back to the soil

Bharat Jivan, whose family has been growing vegetables in Pukekohe for 70 years, says Pukekohe's unique growing conditions are worth fighting for and retaining.

"This is premium growing land that needs to be retained for vegetable production, but some people think we should build houses on it. Auckland's so lucky that vegetables are grown so close to it, however, that did not happen by chance. This land was identified as fertile soil. If you go south of Pukekawa, the soil changes. Yes, potatoes are grown down there but you don't get the premium price for them that you get for Pukekohe-grown potatoes. They also need washing because retailers don't want a dusty product. Washing's fine but it reduces shelf life and makes the potatoes more prone to greening."

Bharat says they can plant potatoes as early as 1 June because the soil is frost-free.

"Pukekohe is renowned for these potatoes. Also, when Ohakune runs out of washed potatoes and carrots in about October, this region takes over and fills the gap.

"It's all down to soil type and latitude. You can't just grow vegetables anywhere.

"We've also got customers in Europe who only want onions out of the Pukekohe region because of their long-keeping qualities. That's thanks to where and how they are grown."

Bharat – who is 50 – says he's only a caretaker of the land. He came onto the family farm 20 years ago and considers himself lucky because his son – who has just finished university – is happy to carry on working on the farm. Bharat suspects that his brother Pravin's son will do the same.

Jivan Produce grows onions – 70% for export with the rest for New Zealand – potatoes, lettuce all year round for fresh consumption and processing, and pumpkin and broccoli through the winter.

Bharat says "it's getting really hard to make a dollar."

"We used to crop 80 acres and make a comfortable living off it. Now you have got to have scale and with that, you have to have staff.

"We employ 12 or 13 people full-time, plus casuals and contractors for seasonal work. That's been really challenging this season but we're getting by.

"More and more people want full-time work. That's one of the reasons why we now grow broccoli in the winter. It keeps the staff going and it's good for the ground."

Bharat says that when he joined the business, he worked out that they needed to be caring for the soil a bit more.

"I started applying compost back then and now we do that on an annual basis. We also grow mustard, oats and barley

on rotation. We don't make a lot of money out of the barley but it leaves a lot of straw matter behind. We incorporate this into the ground and it makes the soil more friable. The straw's like a lot of little snorkels. It lets the ground breathe and prevents it getting compacted, and you see the benefits in your next vegetable crops."

Bharat says it all comes back to the soil.

Bharat says climate change is happening and it is a concern

"We've been growing here for 70 years and are still producing really good crops. That's through sound management, also because these soils are volcanic, really resilient and free draining.

"We purchased more land about a year ago but are not really growing any more crops or acreage. It's just so we can rest the ground more, but this is a hard thing to do as land around here is so expensive – $50,000 an acre or $125,000 a hectare.

"And yet, right on our boundary, they are building a school and around that, more housing. It's not the best site for a school, which we pointed out – even the local community board was against it – but it was too late."

Bharat says that some local growers "have gone up north looking for early ground."

"People also say we could move south of the Waikato River. But this is our home. We're not a corporate that can just up and move. This is where our family is based.

"Plus, all of horticulture's loyal support industries are right on our doorstep in Pukekohe. And then we'd have to get resource consents, which is not easy or cheap."

Bharat says "climate change is happening and it is a concern."

"We have a couple of properties that don't have water and we are limited by what we can grow on them.

"Once that Watercare consent goes through, there's not going to be much scope for expanding vegetable production, due to the most limited availability of water.

"That said, there's probably enough water here. We just all have to be smarter about it and all work together. For example, water harvesting in the winter; but it is just too difficult to build a dam with all the compliance and consents. It's even difficult for Watercare.

"It's also very costly and when you are selling potatoes for $4.00 to $5.00 a bag, you just can't justify the investment."

Bharat says water quality is good here, despite what people might read or hear about it.

"We test every year and have never picked up anything. We also test for residues every three months, but have never had an issue. That's because we do everything to internationally-recognised programmes, which are robust and independently audited.

"We rigorously adhere to these programmes, which costs us money. But then produce gets imported that has no quality assurance programmes behind it. I find that a little unfair. Also, what assurance do customers have about the quality or integrity of imported produce?

"My kids won't eat anything from overseas and more and more people want to know where their food comes from. And it's not good enough to just say it's imported."

Bharat says New Zealand vegetables are grown to high standards by caring and passionate growers. "But I do not know if that is appreciated enough. As I've said, Auckland is so lucky that we're right here and can have fresh vegetables picked that day delivered 365 days of the year."

Bharat shared these insights with representatives of Auckland Council, the Ministry for Primary Industries, Ministry of Foreign Affairs and Trade, and Ministry for Social Development as a part of an Onions New Zealand government officials bus tour in mid-February 2021.

SEASON CHALLENGES EVEN THE TOUGHEST OF GROWERS

Words by Andrew Bristol

Kevin (right) with long-term RSE worker

Kevin Bayley, who has been growing fruit for more than 30 years in the Hawke's Bay, says the risk with Covid-19 is that it makes New Zealand horticulture unsustainable.

"The fruit's been stunning this year – it's the best I've ever seen," says Kevin.

"The rain in November was the making of the season and it hasn't been too hot. We winged it with the summerfruit harvest but with apples, there's just not going to be enough workers to get the crop off."

Kevin estimates that Hawke's Bay is going to be about 4,000 workers short.

"Locals can never make up that shortfall and good people are hard to find. Several of my permanent employees have worked for me for more than 20 years, while some last for less than a week. That is why we need the Recognised Seasonal Employer (RSE) scheme, end of story, even though a lot of people are saying that technology is going to change our dependence. But that's 20 years away and won't happen quickly enough."

Kevin says thanks to Covid, everything's in disarray.

"The plastic crates the supermarkets demanded we put produce in this season were supposed to arrive in September but are now scheduled for February. It's also increasingly difficult to get parts for tractor and machinery repairs.

"There's going to be a point where New Zealand's economy is affected by worldwide supply shortages."

Kevin is constantly developing his land. "You have to keep up with development as trees get old. I have the plant variety rights to my own apple, Bay Queen. Ten new hectares of this variety has just cost us $1m in set-up costs."

Kevin says he enjoys being a grower but it is quite stressful. "Some things I just don't get. New Zealand prides itself as one of the world's best food producers and yet as a grower, there are all these obstacles to negotiate.

> **"What the horticulture industry does is awesome, it is a good industry, but there are many challenges at the moment**

The Fruit Shop has a loyal following

"Also, the two supermarket chains in New Zealand are competing with each other to drive returns to growers down, which is not sustainable. What's more, customers want perfect produce, but in New Zealand they're not willing to pay for it."

Five years ago, Kevin set up a shop in Hastings, which his daughter runs.

"The shop takes a lot of energy and my daughter does a great job. The shop's doing really well and is quite iconic in the Hawke's Bay."

Kevin says the horticulture industry is changing. "There are fewer and fewer family-owned enterprises and land is being sold to corporates for development. For smaller growers, it's getting too hard.

"There are growers pulling out apples before harvest this season because of the labour shortage. What the horticulture industry does is awesome, it is a good industry, but there are many challenges at the moment."

THREE NEW CEOS SOUGHT FOR TOP ROLES

Words by Elaine Fisher

Recruitment is underway for three high profile chief executive roles within the horticultural industry, each offering challenges and opportunities for those appointed to fill them.

Mike Chapman, chief executive of Horticulture New Zealand, has signalled his intention to step down; Nikki Johnson, chief executive of New Zealand Kiwifruit Growers Inc will take up the role of strategic projects manager with Zespri Global Supply, based in Bologna, Italy, in April; Stu Hutchings chief executive of Kiwifruit Vine Health has been appointed the new chief biosecurity officer for the Ministry for Primary Industries.

Barry O'Neil, chair of Horticulture New Zealand, says these changes are not unexpected. "These are big, busy roles and there's no hint of jumping ship. Rather for those chief executives whose careers are continuing it is a logical part of their development progression that they want new challenges.

"Each leaves behind an organisation in a better place than when they joined. Nikki, Stu and Mike have carried out excellent work, fulfilled their responsibilities as chief executive of their respective groups and I admire what they have achieved.

"There is sure to be a large number of people interested in these roles and they will bring skills and experiences which will take these organisations to the next level.

> "It's a great time to be involved in horticulture as our industry not only has huge potential for growth but is also producing healthy, sought-after foods with lower environmental impacts than many other land uses

"It's a great time to be involved in horticulture as our industry not only has huge potential for growth but is also producing healthy, sought-after foods with lower environmental impacts than many other land uses."

Horticulture's growth will bring growing pains, and Covid-19 issues are far from resolved, including around shipping and air freight, the world economy and labour, but Barry says there's much to be optimistic about.

> "Each leaves behind an organisation in a better place than when they joined

The Climate Change Commission report includes the recommendation of transforming dairy land into horticulture at a rate of 2,000 hectares per year from 2025, something Barry thinks is very achievable.

"Horticulture is producing healthy crops with, in many cases, higher returns per hectare than pastoral farming, and less impact on the environment."

It's an industry built on innovation, and innovation will continue to help solve future problems including from new improved plant varieties, biological approaches to pest and disease control and increased use of automation to address labour shortages.

"Horticulture is a leading light in many of these fields and it's a collaborative industry which shares knowledge for the benefit of all."

The HortNZ Board is preferably seeking a New Zealander to fill Mike Chapman's role. "The board decided the right person for the role would be a Kiwi who knows the key players or can get to know them quickly, and who understands the special cultural perspective of our industry and Aotearoa New Zealand." ●

Solid investment with scope for growth

313 State Highway 3, Westmere, Whanganui

- Premium berry brand in growth phase
- Multiple revenue streams
- Established local and export distribution networks
- Packing and chilled/frozen refrigeration facilities
- Own water supply

Well known and respected berry brand, Windermere Farms is located on State Highway 3 just a five-minute drive north of Whanganui. On offer is land, buildings, home and business. Under current ownership, Windermere Farms has undergone significant development around business and production processes as well as product expansion with large investment in technology and infrastructure. Deemed an 'essential service', this investment is sound and provides further opportunities for growth in wholesale and retail products. The café could trade year-round as the infrastructure is already in place.

This is an ideal opportunity to be part of an industry hitting new heights in regards to scale of production and in delivery of quality fresh produce year round.

Business Details	
Land Area	9.9871ha
Wholesale Business	Strawberries, raspberries, blackberries and blueberries
Retail Store and Café	Fresh produce, jams, honey, wines and liqueurs
Buildings	Packhouse, chiller/refrigeration, retail store and café
Residence	Four bedroom, three bathroom executive home with pool
Water Supply	Town supply, on-site spring for irrigation
Production	Tunnel housing with substrate systems for optimal yield

For Sale by Deadline Private Treaty
(will not be sold prior)
2pm, Thursday 25th March 2021
158 Wicksteed Street, Whanganui,
New Zealand

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BAYLEYS

WHEN 'ABSENCE' IS A MEASURE OF SUCCESS

Words by Elaine Fisher

There are few roles in which success is measured by the absence of something, but helping to ensure 'nothing happens' is very much part of the job description for New Zealand's new chief biosecurity officer for the Ministry for Primary Industries (MPI), Stu Hutchings.

"Success in biosecurity is about not having incursions, but when nothing happens, there is the risk of complacency."

Recruiting the "team of 5 million" New Zealanders through public awareness campaigns has proved invaluable time and again with incursions such as fruit fly in Auckland and currently, helping combat Covid-19 in humans.

Stu, currently chief executive for Kiwifruit Vine Health (KVH), will continue to call on every Kiwi to help keep our country free of unwanted pests and diseases in a role which will take an overview of the work of the Biosecurity New Zealand directorates which focus on import health standards pre-border, at the border at ports and airports, and post-border.

"One of the mandates for the new role is to look across the whole system to provide assurance that it is working well."

"We're excited to have Stu join us as our first chief biosecurity officer, says Penny Nelson, Deputy Director-General, Biosecurity New Zealand. He has proven leadership in biosecurity, and in his previous roles he has always had a genuine focus on putting growers and farmers at the centre of everything he and his team do – something incredibly important to us at MPI, and integral to successfully all working together to keep unwanted pests and diseases from making their ways onto our farms and orchards and into our communities."

Biosecurity New Zealand systems protect New Zealand from imported pests and diseases that could harm the food and primary sector, New Zealand's environment and biodiversity, and the health of New Zealanders.

The new role is one Stu is well qualified for, given his wealth of experience and knowledge in management of biosecurity risks in both animals and plants, in research and innovation and through his wide network of contacts formed from working with farmers and growers, industry and central and local government partners.

New Zealand's new chief biosecurity officer for the Ministry for Primary Industries (MPI), Stu Hutchings

Stu joined KVH three years ago from the role of group manager for OSPRI and has had previous roles as acting chief executive there as well as at the Animal Health Board. A veterinarian by profession, he has also held roles within private vet practice and risk management product development for the New Zealand Veterinary Association.

Alongside his role with KVH, Stu has been an independent director on the Mycoplasma bovis board, which with MPI, is charged with eliminating the disease from New Zealand's dairy and drystock herds.

> **"One of the mandates for the new role is to look across the whole system to provide assurance that it is working well**

"Kiwifruit is an amazing industry to work in because of the proactive nature of the industry and I have especially enjoyed working at KVH. It has a passionate team of people and is an organisation in which you can come up with an issue or problem, talk it through, do background research and implement solutions relatively quickly. I have also enjoyed the collaboration between KVH, Zespri, New Zealand Kiwifruit Growers Inc and the wider industry."

Formed to take over the industry's response to Psa-V, KVH has been at the forefront of government and industry biosecurity collaboration, becoming the first to sign the Government Industry Agreement (GIA) in May 2014.

Now the focus for KVH is switching to a wider view than Psa-V, and Stu has been heavily involved in the work

leading to a proposed new regulation framework to better manage biosecurity risk to the kiwifruit industry.

"Instead of focusing on a single pest, like Psa, the proposed plan focuses on protection against the full range of biosecurity threats to our industry, and provides for a consistent and pragmatic approach to managing pathway risks such as young plants, budwood, pollen, orchard equipment and other items moved by people.

"The proposed plan is equivalent to the current Psa-V National Pest Management Plan (NPMP) but is more fit-for-purpose and makes sure all the right settings are in place so that we can detect anything new quickly enough to stop its spread, limit impacts, and aim for eradication."

The name chosen when KVH was formed in 2010 – Kiwifruit Vine Health – is a fortuitous one. It could have been the Psa Management Agency, but instead it is a name which focuses on vine health and leaves the way open to a much wider field of responsibilities.

"Instead of focusing on disease management, we can think about vine health from choosing the right varieties, to the health of plants which go on to orchards, to maintaining vines in a healthy state through soil health, irrigation and orchard management to improve their resilience to pests and diseases. We are seeing similar approaches to starting from a healthy place in veterinary and human wellness."

Stu grew up in Palmerston North and Wellington, returning to Palmerston North to study veterinary medicine at Massey University before working as a partner in a veterinary practice in Taupo.

"It was while I was there that I became interested in population-based disease control. Rather than focusing on individual animals it is thinking about the epidemiology of how a disease works and spreads across a population, understanding the risks to a whole group and working out how to address them."

At the time bovine tuberculous was a major issue among deer herds in the Taupo region, which helped spark Stu's interest in the bigger picture and led to his role with OSPRI. The organisation is a partnership between primary industries and the government and manages two national programmes – NAIT and TBfree. NAIT provides the national animal identification and traceability system and TBfree aims to eradicate bovine TB from New Zealand.

That aim is drawing closer to reality, but it's been a hard-fought battle hampered by the fact that wildlife such as possums can transmit the disease. "In the early days of the TB response whole herds were killed and we were constantly finding the disease. The emotional and financial strain on farmers was huge. Now numbers are so low, finding it in herds is rare."

Good progress is also being made towards eradicating M. bovis from New Zealand, and if that happens, New Zealand will be the only country in the world to do so.

"We are towards the end phase limit of the disease and can now start the phase to prove freedom from it. Recently there has been a small increase in detection, but that was not unexpected given the seasonal surveillance of bulk milk testing. Each season we expect more testing to find traces of M. bovis but the traces are getting less and less over time.

"This has been a great collaborative effort between the farming industry and government, with the farming community shouldering a lot of the burden both emotionally and financially."

> "Biosecurity incursions carry a significant personal and financial cost for all those affected

Biosecurity incursions carry a significant personal and financial cost for all those affected. The kiwifruit industry did an outstanding job during the Psa-V outbreak of 10 years ago, with no suicides attributable to the stresses caused by the disease's initial devastating effects.

"Pastoral care, making sure there is support for those directly affected, is a crucial part of the whole process."

Biosecurity New Zealand has turned some of its attention offshore to reduce the risk of incursions, and its work to keep out the brown marmorated stink bug (BMSB) has to date proved successful. "Last year interceptions of the BMSB on-shore were 50% down on the previous year because of the controls introduced in 30 plus overseas countries sending goods to New Zealand."

With the borders closed because of Covid-19 and fewer people entering New Zealand, some of the risks from unwanted pests and diseases have reduced, but goods and products are still arriving through the mail, shipping and airfreight, so Biosecurity New Zealand staff cannot relax their vigilance.

> "...when it comes to biosecurity there is no such thing as zero risk

For Stu, the absence of the need for a response to an outbreak, or successful detection and elimination on-shore will be the biggest reward in his new role.

"But when it comes to biosecurity there is no such thing as zero risk and there will be incursions in future." ●

FRESH2U FULFILS NEED

Words by Anne Hardie

Lucy Maxwell's organic delivery business is in growth mode

Fresh organic produce delivered to homes

Lucy Maxwell has been packing and delivering organic produce to customers across the Top of the South for eight years, then Covid-19 created a "year of complete madness" that pushed her business to a new level.

It prompted her to leave the farm shed where she had based her business all those years, to the ample space and chillers of The Food Factory in Stoke, Nelson, which was established for start-up businesses or those wanting to grow their business. Since lockdown last year she has needed "more hands on deck" and a new system to cope with demand.

She was doing up to 17-hour days through lockdown, and though many of those customers were temporary until they could get back out to the shops themselves, a good percentage liked their home deliveries of organic food and became regular customers.

Lucy sources organic vegetables, fruit, juice and eggs from about eight growers and suppliers who are mostly local, apart from those with produce that cannot be obtained locally. Produce arrives at her base on Tuesday and Wednesday morning and three part-timers help her fill the cardboard cartons – some recycled from customers – with either the customer's specific requests, a mix of fruit and vegetables that are available at the time, or solely vegetables. Orders are couriered as far as Picton and Hokitika to customers wanting fresh organic produce delivered.

"We're a trend. The organic market is growing and people like to know where their food is coming from."

Some customers only want certified organic produce such as Organic Farm NZ (OFNZ) which has a pod system that works on a peer-review process. It is more work but helps keep certification costs down. Other customers just want to know the food is grown organically.

Lucy puts out newsletters on her website and includes as much information as she can about all the growers so customers can make choices. She says her customers know that she is the person writing the emails and newsletters and she wants to make the choices available that work for them.

> "Until you have a reason to buy organics and to value organics, you aren't going to pay more money

"I let them know what is happening on the farms and in the organic world," she says. "I want to support as many growers as I can as well as offering it to customers, and I want customers to have the widest choice."

She says customers who want organic produce are prepared to pay more for it, but they represent just a percentage of the population who value organic food.

"They perceive the value in organics. Until you have a reason to buy organics and to value organics, you aren't going to pay more money."

The nature of her business means there is heaps of produce available for her customers through the growing season, but getting a good supply of produce in winter is always a challenge.

So far it has been a good growing season for her organic suppliers, although tomato growers had a slow start due to colder nights.

"Everyone is in a better position water wise than in the drought years, but we don't know what normal is anymore.

"I've been doing this for eight years now and so I turn up on their properties and have a yarn and pass information on to my customers."

She says it would be "awesome" if all the organic growers sat down together to work out their crops so that everyone got a good share of the pie. That would achieve a better selection of vegetables through the main growing season instead of large numbers of the easy-to-grow vegetables.

For every new organic grower, she says another winds up their business, often because of the workload involved in organics, while the high price of suitable land restricts growth.

Though Lucy is selling fresh produce, she also supplies customers with seedlings for their own vegetable gardens. She has decided it doesn't impact on her business and it's good for people to grow some of their food.

"I looked at where I was losing customers and seasonally people are growing their own. So if they're doing that, I can facilitate it. They won't grow the whole range and they will still buy what they don't grow from me.

"I'm English and grew up without growing anything, so I get quite excited about it and take lots of photos. I think it's good to grow things, on so many levels."

The former psychologist says she only became interested in food when she had children and began thinking about what they were eating. That led her to buying Fresh2U which was a small business operating from the farm shed.

Her goal now is to use the space and marketing support at The Food Factory to expand the business and work out its capacity in terms of supply, time and distribution.

WHILE 2021 FEELS VERY MUCH LIKE 2020, NOW IS THE TIME TO BE BOLD

Words by Ian Proudfoot : KPMG

In the December 2020 edition of this magazine, I explored the question 'Is it going to be OK' as we waved 2020 goodbye and looked forward to 2021.

I suggested for those that are prepared to be bold and see the world in front of them as it is today, the answer was undoubtedly yes. Sitting in Auckland, locked down at home again as I write, balancing work and home schooling and wondering why I didn't buy some extra flour at the weekend, it does not feel like 2021 is very different to last year.

While I recognise that the immediate disruption of another lockdown will not last forever, the consequences of what we are living through will have fundamental and far-reaching impacts on all aspects of our lives. We know this is the case; our lifestyles are shaped by practices and institutions that arose from the Second World War, or more recently, the September 11th attacks and the Global Financial Crisis.

At a guess the Covid-19 pandemic will materiality shift how public health is managed moving forward at both a country and a global level, as well as focusing people more closely on their own personal health outcomes. I also expect it will reshape how our global supply chains work given that the system has been stretched to the limit, and in some cases failed, for much of the last year.

> "In respect of health implications of the pandemic, I see a wealth of opportunity for New Zealand and particularly the horticulture sector

In respect of health implications of the pandemic, I see a wealth of opportunity for New Zealand and particularly the horticulture sector. The sector grows products that are widely recognised as being integral to a healthy diet and maintenance of a strong immune system. Greater focus on public health is likely to result in more demand for fruit and vegetables as governments look to address the root causes of poor health outcomes in their communities and consequently spotlight the role that diet plays. Global recognition of the strong health outcomes that New Zealand has achieved during the pandemic provides a platform for us to boldly leverage when talking to customers and consumers around the world about the attributes inherent within our produce.

> "Global recognition of the strong health outcomes that New Zealand has achieved during the pandemic provides a platform for us to boldly leverage when talking to customers and consumers around the world

The picture for global supply chains is less positive. The country woke up to the supply chain challenges industry has faced for the last year when it became apparent that many Christmas presents would not be under the tree on Christmas Day. The media narrative at the time placed the blame largely on delays at Ports of Auckland, which to me was unfair as our understanding is this is just one pain point in a global supply chain which is being disrupted by a lack of equipment, increased operating costs and delays at both ports of departure and arrival due to Covid related protocols and testing.

The problems we now see clearly with our supply chains have been building for years. The cost of operating a trade route to New Zealand is high, through both an economic and environmental lens, and we, in the main, are not a major market for global freight companies. Faced with significant challenges across their global businesses many may find it easier and economically viable to drop their New Zealand routes and focus on fixing the issues on the major trades between Asia, the US and Europe, which will have a more immediate and significant impact on the profitability of their businesses.

Now is the time to be bold in rethinking supply chains.

WE NEED TO BE CERTAIN WE ARE GROWING PRODUCTS THAT WILL COMMAND SUFFICIENT PREMIUM TO COVER INCREASED SUPPLY CHAIN COSTS INTO THE FUTURE

Combine sea freight challenges with the uncertainties faced in relation to air freight while borders remain restricted and discretionary travel limited, and the picture becomes even less positive. It is likely government support will be required for months (and potentially years) to come to provide access to affordable air freight for exporters whose product value proposition relies on rapid transit to market. Without support the cost of air freight would be economically crippling for many of the exporters that rely on these services to secure premium returns in market.

There is a burning platform for change facing almost every export focused food producer in New Zealand.

We grow far more product than we will ever eat in this country, so we have an inherent need to sell food to the world, both to generate economic wealth and secure our own food system. What the last year has taught us is that the systems and processes that we rely on to connect with customers and consumers are not as certain or reliable as we believed them to be.

Now is the time to be bold in rethinking supply chains. Recognising that we are an expensive place to ship product from, we need to be certain we are growing products that will command sufficient premium to cover increased supply chain costs into the future; this may mean what we grow has to evolve or change. It may mean that we need to explore new ownership or partnership models around freight channels, is now the time for an airfreighting or shipping co-operative? It may mean more product is stored, processed and packed in market, or even grown to our heat, light and water recipes in controlled cropping environments overseas.

The only thing we should be certain about is that nothing should be off the table as we look to capture the opportunities that our successful health outcomes have created for the food and fibre sector and horticulture businesses more specifically.

STAYING FARMSTRONG

Gerard Vaughan

Farmstrong is an award winning nationwide rural well-being programme that launched in 2015 to help farmers and growers live well to farm well.

Prior to launching, Farmstrong spoke to many farmers and some growers who said that they prioritised putting systems in place to look after their produce, land, stock and machinery, but weren't as good at putting things in place to look after themselves.

Farmstrong spokesperson, Gerard Vaughan, says that's why Farmstrong was started. "Just as growers draw on science to grow their best produce, Farmstrong draws on science to design tools and resources that help improve the well-being of people working in the business."

Farmers and growers also told Farmstrong that they operate in environments where families often live at their place of work, and many of the pressures, such as weather, regulations and fluctuating market prices are out of their control. Also, demanding workloads, particularly during peak times, can result in people not getting away from the business, which can contribute to increased stress levels.

Over the past five years, Farmstrong has attracted many farmers and growers who have shared what they do to make sure they are investing in their well-being.

"Alongside information on topics such as stress and burnout, recovery time, sleep and healthy thinking strategies, we include the practical things farmers and growers do to look after their well-being in their busy lives," says Gerard.

This year Farmstrong will be working more closely with the horticulture sector to better understand the various challenges faced by growers of different types of crop in their businesses, and work with them on solutions for self-care.

> **"...we include the practical things farmers and growers do to look after their well-being in their busy lives**

Early this year, Farmstrong undertook 50 face-to-face interviews with growers (business owners and those that work for them) to get a better understanding of their challenges and the things they do to take care of themselves. These interviews are being followed up with an online survey to get a wide response from as many growers as possible.

"The findings from this research will help to tailor our advice and initiatives over the coming years to the day-to-day realities of those working in the horticulture sector," says Gerard.

For more information on Farmstrong visit **Farmstrong.co.nz**

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TAKING WOMEN'S LEADERSHIP TO THE NEXT LEVEL

Words by Elaine Fisher

Joanne Turner

As co-owner of Woodhouse Farm Organics, and with 25 years' experience in administration, Joanne Turner has a diverse range of skills, and it was to hone and enhance these that she took part in the Agri-Women's Development Trust (AWDT) six-month Next Level leadership and governance development programme.

Operating a small horticultural business can sometimes be isolating, says Joanne, who with her husband Greg, runs their Demeter-certified berry farm near Palmerston North. There they grow raspberries, boysenberries and blackcurrants along with orchard fruit and vegetables which they sell at local markets and to retail outlets in the lower North Island.

"Sometimes my horizon is only one to two days ahead, as with perishable crops we are always looking for the next rain or sun event, when to apply compost or other day-to-day tasks. Taking part in the course was an opportunity to look further ahead and build a long-term strategy."

Joanne is also a member of the Biodynamics New Zealand Council which is the certifier in New Zealand under the Demeter certification trademark, registered in 1984. For three years she was council secretary, and it was in this role that Joanne decided to enhance her leadership and governance abilities and step up to become a council member.

Initially she applied for the AWDT's Escalator programme, but such was the demand from women in the industry to take part, that the trust established the Next Level programme. It is designed for change-makers and aspiring leaders across the sector, from farmers and growers to women in support and service industries, community-builders and executives.

The programme combines individual learning and support from professional facilitators and coaches, with the power of a cohort-for-life – a group of like-minded women who grow to trust and support each other throughout the programme and beyond.

"I wanted to understand what a good leader was and to reaffirm that the council's function is different from management. We are a small not-for-profit council and it's hard not to try to do everything. Recently we have secured funding for extra staff time so we can now concentrate on governance, not day-to-day management."

Establishing exactly what the difference between management and governance is, was one of the strengths Joanne gained from the Next Level programme. "One module looked at governance which, having come from a management role, I found very useful.

"I thoroughly enjoyed the programme. All the presenters were excellent and generous in giving their time and expertise. I also now have the support of a network of lovely women from different backgrounds and experiences. I would thoroughly recommend the programme to other women in horticulture."

The Next Level course aims to help participants break through internal barriers to find confidence and courage; develop a mindset for leadership; find their way to motivate and lead; develop the ability to positively influence others; build communication skills; learn to stay cool under pressure; connect with like-minded, supportive women and create a personalised plan of action, including a governance CV.

There are still spaces available for South Island Next Level programmes: Dunedin (registration closes 23 March) and Christchurch (registration closes 13 April).

To find out more go to: **https://www.awdt.org.nz/programmes/next-level/.**

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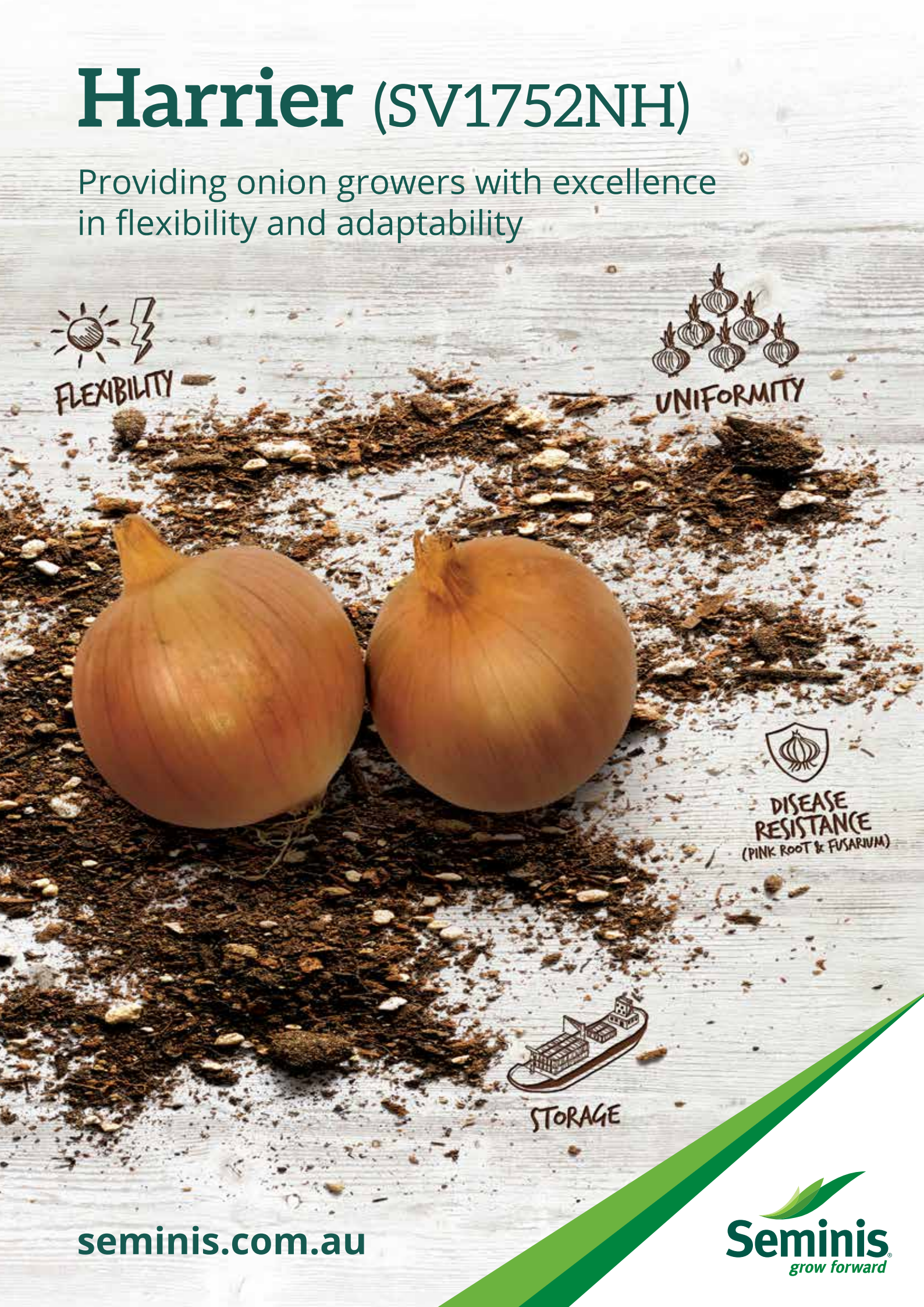

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CROPS STRESSED BY THIRD DRY IN A ROW

Words by Elaine Fisher

Western Bay of Plenty growers and orchardists are coping with the effects of the third dry summer in a row, and many who have not needed irrigation in decades are now looking at their options to secure water resources.

Phoebe Scherer, assistant consultant with Fruition Horticulture in the Bay of Plenty, says many did not expect the summer of 2020–2021 to be dry too. It followed a dry winter, and a spring with below average rainfall.

"Some kiwifruit growers who have been orcharding for 20 years without irrigation are finding their vines stressed and fruit size is smaller because the water reserves in the soil have not been replenished by the expected rain events.

"We are advising those who can, to apply for consents to sink bores or take surface water, but most water resources in the Western Bay of Plenty are already over-allocated."

In order to future-proof their businesses, other growers are building ponds or investigating ways of harvesting and storing rainwater, as are growers and orchardists who are establishing new plantings.

"There is a general realisation that climate change is happening, and we can no longer rely on rain arriving when we have traditionally expected it to."

Those who have access to bore water, town supply or other water sources are also more carefully monitoring irrigation to ensure water is used efficiently, and technology is helping.

> "water users need to be preparing and planning for water restrictions if the dry weather conditions continue

Fruition provides weekly and continuous soil moisture monitoring and irrigation scheduling services, using Sentek soil moisture equipment.

"Monitoring soil moisture enables growers to know how much water is going on, and how efficient it is in reaching the roots."

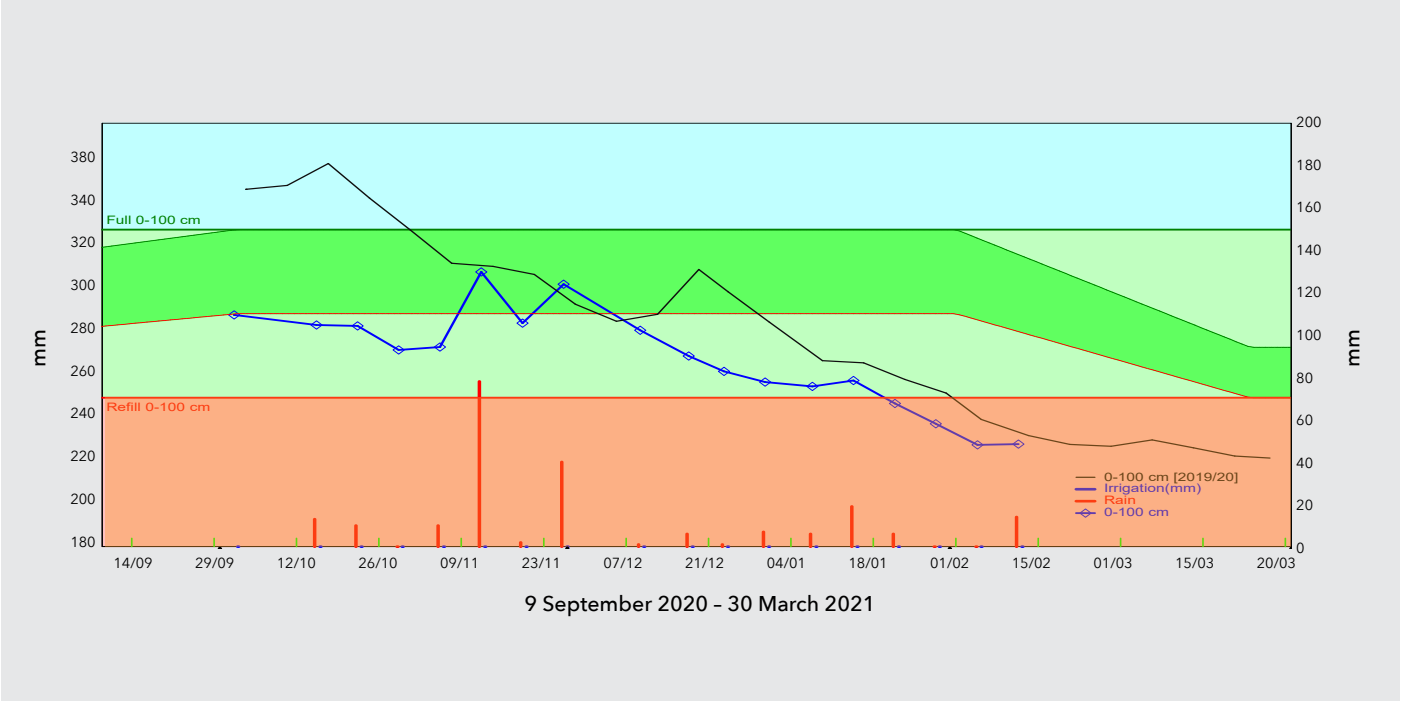
Phoebe Scherer

Management techniques such as applying mulch and compost are also being used to help retain soil moisture, says Phoebe.

Bay of Plenty Regional Council water shortage event manager, Steve Pickles, says the region entered 2021 with lingering drought conditions from long-term rainfall deficits starting in early 2019.

"We came into this summer on the back of last year's drought, which we never recovered from, so there was always a high chance of low stream flows this year," he says.

In mid-February, there was a risk that stream flows would reach critical levels, and council would impose water restrictions on consented water users, if significant rainfall didn't happen.



This graph shows the deficit of moisture in the soil of a Tuapiro orchard near Katikati in the Bay of Plenty. The blue line is this year's figures, while the black line is last year's readings. Moisture levels are lower than for the same time last year. (Source: Fruition Horticulture)

"The most affected area in the Bay of Plenty is currently waterways with their headwaters near the Mamaku ranges. It is most likely that the same processes affecting those streams are also reflected by decreased groundwater levels within the Rotorua geothermal system too," Steve says.

Under Level 2 of the Water Shortage procedure, the Regional Council will undertake additional flow measurements in affected waterways, increase assessment, analysis and reporting for the focus area, while also increasing communication with affected stakeholders.

"As advised last year, water users need to be preparing and planning for water restrictions if the dry weather conditions continue."

"Even though our initial focus is in the Rotorua area, other streams over the wider Bay of Plenty region are also dropping. So it is important that all water users plan for some possible disruption to their water supply this summer. This includes all consented and unconsented water takers.

> **"...most water resources in the Western Bay of Plenty are already over-allocated**

"Summer water restrictions may be needed in the near future to protect our local waterways, and the wildlife they support, from harm during record low stream flows."

Across the region, everybody can also do their part to help to care for local waterways. Water users should check for leaks in their systems and take steps to always use water as efficiently as possible to avoid wasting it.

NITROGEN EFFICIENCY INCREASED

Words by Glenys Christian

Balle Brothers agronomist, Graham Bunckenburg, with a crop of Agria potatoes at Puni, outside Pukekohe

Pukekohe-based vegetable growers, Balle Brothers, knew they were performing quite well when it came to reducing nitrogen applications, but the soon to be completed Fluxmeter Network project showed how even more gains could be made.

"It was confirmation that we were on the right track," says company agronomist, Graham Bunckenburg, who focuses on its potato crops.

"All our thinking has been about using nitrogen more efficiently."

In their case that's meant a move to reduce the base dressing to around 50% of the total going on, then apply up to three side dressings.

"The last ones might not go on if they're not needed," he says.

This has led to reducing nitrogen leaching from the soils potatoes are grown in to from 25 to 30 kilograms a hectare, with the impetus firmly there to reduce that even further.

"We knew that with our main crop potatoes we were coming from a good base, but there are challenges."

"That's where your agronomist skills come in."

He finds using nitrate Quick Test (QT) strips a good back-up tool to fine tune the rate and timing of side dressings.

"We don't use it extensively but it's there if we want it," he says.

"The trick is to get the minimum amount on in those side dressings."

A gradual improvement in nitrogen leaching levels has also been seen in soils where the company grows onions.

"Wasted fertiliser is wasted money," Graham says.

"We've probably achieved the easy gains."

> "All our thinking has been about using nitrogen more efficiently

But with seed quality, soil preparation, soil moisture levels and pest and disease threats all contributing to the final crop yield there's a lot in the mix. An attack of potato blight, for example, can mean nitrogen is lost which would otherwise have gone into the growing crop.

Balle Brothers is also acutely aware of the risk that bare land presents when it comes to leaching rates so has moved to growing a range of catch crops such as mustard, legumes or ryegrass to mitigate that. But there's always the ever-present threat of a big rainfall event right between when potatoes or onions are harvested and the catch crop grows enough to hold nutrients in the soil.

The Fluxmeter Network project, which will wrap up this month (March), began back in 2014 with 12 sites chosen around the country on a range of cropping soils which were planted in a range of different crops in the years since. One of the sites was on a Balle Brothers' property in the Waikato. The Foundation for Arable Research (FAR) led programme is mainly funded through the Ministry for the Environment's Fresh Water Improvement Fund. Co-funders and collaborating partners are FAR, Horticulture New Zealand's Vegetable Research and Innovation (VR&I) Board, Potatoes NZ and Ravensdown, along with local bodies Environment Canterbury as well as Horizons, Hawke's Bay, Waikato and Auckland regional councils. Plant & Food Research is also collaborating with the project, building on a programme of work funded by the Ministry for Primary Industries' (MPI) Sustainable Farming Fund (SFF).

At each site 12 fluxmeters were installed with rainfall and irrigation measured, along with the total nitrate and phosphate concentrated in the drainage water to estimate losses. With good knowledge about the ability of different soils to supply nitrogen to the crop being grown as well as the crop's requirements based on its predicted yield, it was hoped informed decisions could be made by growers about nitrogen applications.

The results found that high losses were associated with high drainage volumes, and high nitrate concentrations in the drainage water meaning nitrogen losses from the root zone were also high. Losses over the five years showed a wide range, but at a number of the sites nitrate levels have now been reduced to below the drinking water standard.

In most cases drainage losses occurred during the late autumn, winter and/or early spring months when rainfall and soil moisture content were highest. And at a number of the sites soil mineral nitrogen concentrations were high despite drainage losses being low, representing a high risk of loss. Cumulative phosphorus losses for the five years of trials continued to be low, but it was found there was some room for Olsen P levels to be improved, as well as reducing the risk of sediment movement and erosion due to wind and rain.

In a collaboration with another SFF project managed by FAR, a sediment trap was installed at a Hawke's Bay site to measure run-off volumes and find out how effective different setback widths are on different slopes at filtering run-off water and trapping sediment.

All the fluxmeter data has been made available to Overseer, with the Plant & Food Research modelling team now carrying out the calibration process and more vegetable crops being gradually added.

Graham, who is a member of the Potatoes New Zealand Agronomy Advisory Group, is now involved in the Sustainable Vegetable Systems Project. This will further analyse nitrate uptake and nutrient leaching, with monthly monitoring of potato crops through soil testing at different levels and a full bio-assay being conducted.

CLIMATE CHANGE AND HORTICULTURE

Words by Kirk Hope : Chief Executive, BusinessNZ

Recently the Climate Change Commission published its draft recommendations for how New Zealand can reach its target of net zero carbon emissions by 2050.

To reach the target the Commission is seeking a 2% reduction on 2018 greenhouse gas emissions by 2025; a 17% cut by 2030; and a 36% cut by 2035.

Those stiff new targets would mean the cost of emissions rising from around $40 per tonne of carbon currently under the Emissions Trading Scheme, to around $140 per tonne by 2030, and would mean sector-specific requirements on top of the current Emissions Trading Scheme (ETS) obligations.

Specific policies are recommended for transport, heat, industry and power, agriculture, forestry and waste.

The costs of those policies would fall unevenly on different sectors and also within sectors.

Horticulture, a sector that currently relies at least in part on fossil fuels, would likely face varying cost increases, and Horticulture New Zealand and others will no doubt be putting in submissions to the Climate Change Commission consultation process.

Among other impacts on horticulture, the Commission's recommendations would mean coal-fired boilers would have to be phased out, with a transition required to other forms of glasshouse heating – a significant transition cost for some.

Growers in the North Island who have moved from coal or oil-fired heating to the more environmentally-friendly natural gas will also be required to change, as the

Commission is recommending no new gas connections after 2025 and the use of natural gas to be phased out altogether by 2050.

Transport costs will also rise, in line with the Commission's suggestion that petrol and diesel prices could be expected to rise by up to 30 cents a litre by 2035.

The horticulture sector will no doubt be considering these recommendations carefully and working through the opportunities and challenges posed.

Increased costs will be the main challenge for the industry, but opportunities will also be found.

The key opportunity raised by the move to a net zero carbon environment is of course the prospect of mitigating climate change.

THE CLIMATE CHANGE COMMISSION IS SEEKING REDUCTIONS ON 2018 GREENHOUSE GAS EMISSIONS

Droughts and water shortages are a key challenge for horticulture. Increasing droughts on the East Coast where many food crops are grown, along with increased variability of weather in other parts of the country, are symptoms of ongoing climate change, and growers will be keenly aware of the need to ensure the rate of climate change is slowed.

The many growers who are exporters will also be very aware of the value of their environmentally friendly brand. Overseas customers increasingly desire foods produced in a healthy, low-emissions environment, and New Zealand's ability to achieve net carbon zero status will be a significant boost to their brand.

> **Perhaps the most important requirement overall is to balance our climate action ambition with economic growth**

Early mover advantage is another opportunity to be gained from forging ahead with the move to carbon zero. While the costs of converting from fossil fuels to other forms of glasshouse heating may be challenging at this time, they could be higher in future – growers who make the change now could reap competitive advantage for the future.

BusinessNZ is working through the Commission's recommendations thoroughly.

We are particularly interested in the Commission's assessment of the net cost of action, and will take some time to work through the assumptions that underpin those costs and what that might mean for businesses.

Our view is that there is a need to have cost-effective alternatives lined up before making significant changes.

And those changes will have to take into account our reliance on export competitiveness and our need to remain competitive in international markets.

Perhaps the most important requirement overall is to balance our climate action ambition with economic growth.

It is reassuring that the Commission thinks the impact on growth will be small and that the transition will create opportunities for new jobs, business and exports.

But as the Commission acknowledges, the impacts will not fall evenly, and it is important we support those people and businesses who will be impacted.

Horticulture is a sector where the impacts would indeed be uneven, and it will be important to make a strong case for financial or other support to growers affected by the move to carbon zero by 2050.

NEW SERVICE A LIFELINE DURING COVID

Words by Helena O'Neill

The Tregidga family run Clevedon Herbs & Produce near Auckland. Pictured are dad Phil, Amy, and Liz

For the Tregidga family behind Clevedon Herbs & Produce, growing fresh produce for their subscription box service has been a lifeline during a global pandemic.

The award-winning operation on four hectares at Clevedon was started by parents Phil and Jenny Tregidga, with their daughter Liz joining the business nearly 10 years ago.

After a good four years of hands-on learning and scribbling notes in diaries, Liz is now running the show, with her sister Amy handling the marketing side of things with support from other family members along with four long-term staff.

Their produce is all grown hydroponically except for the beetroot, carrots and radishes. They grow their own plants from seeds.

Liz's grandfather Percy Tregidga was one of the earliest growers of glasshouse tomatoes in the country, in Mangere, South Auckland. Her uncles, Mark and George, were the first into the large-scale hydroponic growing of tomatoes on the same farm.

Phil and Jenny wanted more of a country lifestyle for their family, purchasing land in the Wairoa Gorge near Clevedon. They began growing lettuce hydroponically, later importing red and fancy lettuce seed from the United States in the 1980s.

"You could get Butterhead [also known as Buttercrunch] lettuce but you couldn't get any of the coloured ones. A grower in the States supplied the seed to us and we tried out these others. All of a sudden there was a demand for it and the seed companies started bringing it in," Phil says.

"People were paying exorbitant prices for a lettuce when they first started."

Phil and Jenny were the largest growers of fancy lettuces right through the 1990s until the industry evolved and they got squeezed out of the market. They were soon asked to sell lettuce at farmers' markets.

While the farm is free of chemical sprays, it is not certified organic. Phil is a big believer in the philosophy of organics but not the practice of organics which uses about a third more land, which isn't sustainable, he says.

Feedback from people at the markets helped shape what the Tregidga family decided to grow.

"If I'm going to stand here for four hours, I'm going to be selling more than just lettuce," Phil laughs.

"Within five years we said goodbye to the supermarkets. It went from a hydroponic fancy lettuce farm to growing up to 40 types of different vegetables," Liz says.

The broccoli Italian tasty stems grow beautifully in the hydroponic system all year round and remain a favourite with both customers and Liz.

"The carrots are also really good because they're so sweet. We've got some rainbow carrots coming in now - they're great for kids' lunchboxes."

Celery is another popular vegetable, with customers saying how difficult it is to find spray-free celery.

"The people at the Howick Village Market – we've been there for 15 years now – every week for 15 years they come out and want their fresh veggies. When we take a break over Christmas they really miss out and often come out to the shop."

"And now a lot of the children have grown up and are coming through with their children."

"They're very loyal at the Howick Village Market," Phil adds.

"We only sell fresh veg; people don't eat as much fresh veg anymore and that's what we're up against. Over the past 20 years, the fresh vegetable market has come under a lot of pressure."

When Phil and Jenny ran the business, they stopped selling to restaurants and supermarkets by 2010 because it was no longer profitable with so many taking their cut along the way.

> **"Initially, they were sending out 10 boxes a week, which has now grown to around 100, peaking at about 250 during the Level 4 lockdown last year. Demand during lockdown led to 12-hour working days**

Now the only restaurant they supply is Kauri Bay Boomrock in Clevedon, where the chef Jeroen is determined to showcase as much local produce as possible. All other sales are from the subscription boxes, farmers' markets, and at the farm gate.

Clevedon Herbs & Produce launched a website in September 2019, a move that helped secure their future following the Covid-19 pandemic.

While the business has loyal buyers at the markets, sales were variable as the number of people attending the markets would depend heavily on the weather. Poor weather could cut sales in half, leaving Liz to research possible solutions.

The family soon started selling produce boxes direct to consumers online through their website. Customers can order a box of seasonal produce in three different sizes, boxed or individual seedlings, or create their own custom box of produce and/or seedlings. Boxes are delivered across the country via CourierPost.

"In that first lockdown we would have to turn it off 20 minutes later because we had tripled our normal orders," Amy says.

"There were about 450 in the email database before the lockdown and we went up to 1,400 within a month."

Initially, they were sending out 10 boxes a week, which has now grown to around 100, peaking at about 250 during the Level 4 lockdown last year. Demand during lockdown led to 12-hour working days.

Three weeks into the first lockdown they entered the 2020 Outstanding New Zealand Food Producers Awards, winning the Spirit of New Zealand title and receiving a gold medal award in the 'earth' category.

Liz is determined to keep the packaging as green as possible.

"We were hand-making our own greaseproof bags every week. Then I came across this company Econic."

They use the Hamilton-based Econic EcoClear bags for the leafy greens. The bags break down in compost within two weeks, and vegetables and herbs are packed in reusable-recyclable cardboard delivery boxes made in Auckland by Boxrite.

When things get tough Liz likes to escape Auckland to take a step back and refocus in order to get a fresh perspective.

"Weather is the main source of stress. We had a twister come through two weeks ago which tore off two roofs. Fortunately, the framework is still alright but we'll have to replace the plastic."

Liz is also passionate about supporting South Auckland-based charity, Oke. Oke provides Kiwi kids across South Auckland the opportunity to learn life and social skills by introducing productive gardens into schools. By giving the kids the tools to learn, Oke aims to empower schools and communities to grow essential life and social skills, and ultimately provide a better place for everyone.

The charity started in Papatoetoe in 2015 and has since built gardens from Onehunga to Drury, with plans to extend further.

"Doing the farmers' markets, seeing the families come through, and seeing the kids around veges … it put that link in that it's important for children to know where their food comes from. I thought about that a lot."

When Paul Dickson from Oke Charity approached them two-and-a-half years ago asking for any spare seedlings for the project, Liz couldn't sign up soon enough.

"It's not just building the garden, it's an education around the garden. The kids actually learn what to do in the garden and learn life skills."

"It's something for us to do for the community because we do have seedlings going to spare. I just call him up five or six times a year and donate any excess that we have.

"I went to Weymouth Primary School and saw the kids there getting their hands dirty. They've even got their own watering system there, collecting water off the roof … they learn about Papatuanuku [mother earth] and looking after the land.

"It's really important what he's doing." ●

STUDY OPPORTUNITY TURNS LIFE AROUND FOR YOUNG WHĀNAU

Samantha Dhand

Samantha Dhand never thought she could be successful at anything until she was introduced to a pathway of opportunity through studying horticulture at the Primary ITO.

Growing up has been something of a struggle for Samantha, who left school at 14 to work fruit picking in orchards in the Coromandel and Bay of Plenty.

Now 23, she's on the path to achieve her goals to work in human resources and administration in the horticulture industry.

By the age of 21 Samantha, of Ngāti Porou, had seven years' experience in the industry working in orchards, vineyards and packhouses, but she didn't know there was opportunity for her to succeed further in the industry.

"I always thought I would be stuck in an orchard for the rest of my life day-to-day. So many people I have worked with have been doing the same job for over 30 years. I didn't want to be that person."

Samantha is ever thankful for the day in 2019 when a Primary ITO trainer came to the orchard where she was working and suggested that she could study for a qualification in the industry.

Opportunity turns life around

It's an opportunity that she says has turned her life around, given her hope and a positive pathway for her five-year-old tamāhine (daughter) and the 14-year-old tungāne (cousin) that she raises.

"I didn't really know that a piece of paper could get you that far. I didn't know the Primary ITO existed and I didn't see myself studying.

"When you come from a family that is not that close and there are a lot of issues, you don't know of the opportunities that are there.

"I never knew I would get some sort of opportunity to be able to enhance my experience and learn a lot more than I ever knew. This will be such a great opportunity for my babies."

Samantha was raised by her grandparents, both Ngāti Porou, spending much of her early life on Pouakani Marae in Mangakino on the banks of the Waikato River. "I was brought up around my Māoritanga and I did kapahaka through my childhood."

The whānau is originally from Ruatoria, with her grandfather being from Hicks Bay. "They came from a very strong group there. Even though they moved away from the homeland they still had their connection to their whenua – we knew our connection."

Over the years Samantha's seen a range of work cultures in orchards, including workers lacking motivation because they don't feel valued.

Whānaungatanga inspires the mahi

Samantha says she is overjoyed at the connection she feels working for Tauranga based kiwifruit grower Ngai Tukairangi Trust Orchards, which has shown her a different side of the industry.

"To actually experience a place where Māoritanga means so much it is a different kind of feeling. It makes me feel more at home."

"It's the whānaungatanga, aroha, tautoko and mana within the company. The feeling of our tipuna beside us helping us achieve those individual tasks and goals but also bringing us together as a whānau."

A highlight for her was meeting the chairman in Matapihi. "He is Ngāti Porou like me and we worked out during our kōrero he had been brought up across the Makatoite river from my grandmother. That was so awesome to find that connection."

> "It's the whānaungatanga, aroha, tautoko and mana within the company. The feeling of our tipuna beside us helping us achieve those individual tasks and goals but also bringing us together as a whānau

Samantha's experience has inspired her to work in human resources where she can bring whanaungatanga into the workplace for both staff and management in horticulture.

"You don't see many Māori in the management side and when you do you see a huge difference. That is what I want to do."

"It's about making it a better experience for staff so that they enjoy their mahi and feel valued. If you bring the cultural aspect in they feel the mana and āwhina at home and at work."

Māori often get caught in a situation where they feel they have to follow in others' footsteps or take advice which can hold them back from achievement, she says.

"I didn't realise that it is not really your family who need to believe in you, it is you that needs to believe in yourself to get there."

"People will row with you but who will continue to row that waka when you no longer have the mana too? I've learnt we have to help ourselves and not rely on everyone around us, because not everyone is there to help keep your waka afloat."

> "Samantha says she is overjoyed at the connection she feels working for Tauranga based kiwifruit grower Ngai Tukairangi Trust Orchards, which has shown her a different side of the industry

Helping others to achieve

Samantha says she's motivated to help others achieve in the industry and is thankful to her tutor Sharon Fowler who hasn't given up on her even when she struggled.

A further boost was attending the 2020 Ahuwhenua Trophy Excellence in Māori Farming Awards, the first time the event centred on horticulture.

"I couldn't believe there were so many people coming to celebrate Māori. To see the encouragement that we have in the community makes such a big difference.

"For people to acknowledge our tipuna and our whenua and bring that different perspective. They make us want to teach others where we come from."

Two years after being introduced to an opportunity, Samantha is on a path to achieve her level three qualification in Fruit Production and having a bright future in horticulture for herself and her whānau.

COUNTRY'S LARGEST HOP GROWER CONTINUES TO EXPAND

Words by Anne Hardie

General manager of operations, Paul Teen, checks out the crop with Glen Clayton (centre) and Brian Clayton

Brian (left), Paul Teen and Glen above a river terrace at their Battery Hill hop farm

Not so many years ago the Clayton brothers knew nothing about hops apart from the aroma and flavours they instilled in a craft beer. Today they are the country's largest hop growers and still expanding.

Last year they produced close to 250 tonnes of hops for brewers around the world, and by the time their farms are fully developed that is expected to climb to about 1,000 tonnes from 500ha.

The three brothers, Brian, Glen and Andrew, originate from the West Coast where their parents still farm, and each left the farm for university and careers away in agricultural finance or in Brian's case, commercial law.

For several years they had been seeking a venture together and when Andrew started planting hops to establish his own hop farm, they realised the potential for something bigger. Not only was it a venture that matched their skills set of finance and development, but Brian says it was a product that craft brewers wanted.

"Our (New Zealand) hops are coveted around the world and we're only 1% of the world's hops. To us, the fundamentals were there. We're pretty passionate about it and feel at the end of the day we want to see where it can go, because it's a great product and there's not much of it around. Let's see if we can do it justice."

This is their third harvest – and Andrew's fourth – on properties they purchased and developed near Tapawera and Korere, west of Nelson. So far, 240ha on three former dairy farms and one sheep and beef farm have sprouted poles on river flats, terraces and plateaus, with 260ha yet to develop. In the midst of the plantings, a couple of $7 million processing and kiln facilities have been built to strip the cones from the vines (or bines) and dry them, ready for brewers.

"Demand is there and we feel there's room for everyone. One variety in the United States, Citra, is bigger than the whole New Zealand crop. It dwarfs the whole New Zealand industry."

They grow nine varieties of hops on their farms, being a combination of highly popular hop varieties as well as lesser-known varieties that spread the season. That enables them to harvest each variety at the optimum time for quality and also utilise the processing and kiln facilities as long as possible. Among their varieties is the 'rock star' of the New Zealand hop industry, Nelson Sauvin, plus Motueka, which have the aromas and tastes that brewers love. Brian refers to the variety Riwaka as the holy grail because it is a great brewer's hop, but can be temperamental to grow, which from a brewer's perspective means it can be hard to get their hands on.

He credits the work of New Zealand Hops and the plant breeding programme of Plant & Food Research, which has produced outstanding varieties. Brian says the challenge in breeding is pushing out the harvest window – in addition to producing new hops that brewers love. Last year New Zealand Hops released its latest new variety, Nectaron, which has intense tropical passionfruit and citrus aroma characteristics.

"The plant breeding programme has put New Zealand on the world stage because they have produced some amazing hops. If you have a great product, you are going to sell it."

This season represents a step change in production for the farms which are operating two eight-hour shifts during harvest. The first shift works between 6am and 2pm and the second from 2pm through to 10pm. That enables them to harvest five to six hectares a day as each variety hits its harvest window.

The crop is looking the best yet as plants mature, and following good growing conditions this season. Brian says it has been a steep learning curve for the entire team and admits it has been harder than they thought to grow a crop of hops and harvest it.

"Local growers have been so helpful to us and the cooperative has things in place for new growers – they want you to do well."

Because they have established new hop farms, they have been able to use some of the latest growing methods, and hence they have been one of the first to install drip line irrigation rather than overhead irrigation. The irrigation is more efficient and targeted to each plant and can deliver fertiliser to each as well.

Finding enough seasonal staff is a challenge for an operation based more than an hour from major settlements. Peak times are spring when vines are attached (trained) to the strings for them to climb, plus harvest from about mid-February through March. When the operation is fully developed, they will need about 200 workers at harvest. Finding accommodation for staff in a reasonably remote rural setting has been a challenge and so has Covid-19. So far, they have had a mixture of locals and backpackers and he says they have made sure they are proactive about sourcing staff, and there has been good collaboration with other growers to share resources.

The craft beer market has been challenging during Covid-19 and Brian says an estimated 80–85% of Kiwi hops are exported to countries such as the United States, United Kingdom, European Union, Australia and Asia. Many craft brewers have hunkered down and therefore sales have slowed, he says. It has also been more difficult to get in front of potential new customers with travel being ruled out.

"But we just have to keep pushing. We are lucky that processed hops don't perish, and we expect to see an uptick in brewer interest later this year as the vaccines are rolled out and the Northern Hemisphere summer comes into play.

BIOSECURITY 101: HOW MPI WORKS TO PROTECT GROWERS

Words by Heather Woods

Biosecurity staff at work

Mike Inglis, Northern Regional Commissioner for the Ministry for Primary Industries (MPI), spoke to us about the biosecurity approach to Covid-19 and more broadly about how MPI works to reduce the impact of threats to growers.

The Covid-19 response

Mike Inglis says New Zealand – the people, the government, and the many agencies tasked with managing Covid-19 – has done an excellent job, and the small freedoms we appreciate now like going to the beach, to work or to the shops, are testament to that. From an MPI perspective, it has taken solid leadership, clear deliverables and an outcomes-focused plan for it to work, and those qualities are second nature for Mike, coming from a background in Corrections where there is a policy of driving performance and operational excellence to ensure successful leadership. And he's a public servant at heart, so when Covid-19 made its grand entrance, the only option was to rally the troops and get down to business.

Protecting people is the number one priority so a Covid-19 oversight group was formed to engage with the Ministry of Health, unions and public service agencies at the airports. In the early days where flights from China were the main concern, it was all about arranging appropriate PPE (personal protective equipment), physical screens being erected, and physical distancing – everything we now know as the physical changes required and which are vital for biosecurity risk assessment on the passenger side. In fact, the entire MPI response was aligned with the Ministry of Health, with well-being at the core of their communications for the ongoing support of staff health and safety. It has also been important to support essential workers; they have done us all proud, they have helped keep us safe.

Threats to New Zealand and how they're managed

To be effective in managing threats at the border it is important to understand that the biosecurity system is not actually just about the border. Risks are managed through multiple layers of protection. Offshore agreements with other countries are in operation before people and cargo even reaches New Zealand. Countries exporting goods to New Zealand can help to mitigate the risk of biosecurity threats by following processes and procedures to ensure proper treatment and fumigation where required. On arrival at our border, goods are screened, passengers are scanned, and trained staff assess the high-risk targets and the likelihood of hitchhikers. If pests are found, they're eradicated and managed quickly.

Passenger non-compliance with biosecurity rules is usually unintentional, like forgetting an apple or orange in hand luggage, which makes targeting them difficult. But mistakes like that can be costly and allow threats like fruit flies to go undetected until it's too late. Staff are expertly trained in risk assessment, have access to effective tools,

and with the recent investment into new technology, scanners capable of automatic detection are adding a further layer of protection.

> **It is important to know that if you spot a threat, securing it and engaging MPI quickly is the best thing to do**

In recent years, the explosion of e-commerce has resulted in an increase of seed and plant products ordered online making their way into the country. MPI have worked closely with offshore teams and directly with companies to make sure they are following due process, maintaining our import standards, and that health standards are also understood. There is a risk of animal products and untreated goods arriving via the international mail centre, which is why MPI is working with NZ Post and investing in a new, high-tech centre due in 2023.

The team can't physically inspect everything that crosses the border, but import documents are checked, audits are conducted, and high-risk items are clearance checked before release. So protection for growers and their livelihood is quite extensive.

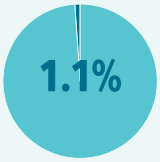
Passenger and cargo hitchhikers

Technology helps the fight against biosecurity threats, but as it is not 100% foolproof someone must still physically inspect and identify risks. It is a joint intelligence effort between Customs and Biosecurity to target and decide what consignments are a potential risk, may contain insect pests, and monitor the country of origin. About 5% of all cargo has bio-material that requires assessment, such as fresh produce and plant materials. There is a very clear biosecurity system in place that must be maintained to keep New Zealand disease and pest-free. Transitional facilities around the country are also inspected by quarantine officers and approved staff for clearing cargo.

The risk compliance rate is currently 98.9%. That means there's only a 1.1% chance of a threat sneaking through. Messaging to passengers is very clear, and education is ongoing, but people still make costly mistakes. For instance, there is a risk of African swine fever entering the country from people bringing in meat products. Staff and dogs are trained to inspect and confiscate these items. In the opinion of Mike Inglis the biggest risk to growers coming across our borders are fruit flies and brown marmorated stink bugs (BMSB). Technically, they're not ranked as two priority pests, but the impact they have has been seen first-hand, and fruit fly required full community support to eradicate it.

The Queensland fruit fly, the Pacific fruit fly and the Mediterranean fruit fly damage almost all fruit and vegetable crops, they limit trade and impact export markets. It is for that reason our health standards are so tight, to ensure imported fresh products are free from fruit flies and their eggs. There is also a national surveillance programme that actively watches for around one-hundred species of fruit fly, but in particular the Queensland fruit fly. There are about 7,500 pheromone traps around the country near airports, seaports and densely populated areas. So far, all large-scale removals have been successful.

BMSB is the other serious offshore threat to horticulture crops. They hide in cargo and confined spaces like machinery, and in mail, so mandatory offshore treatment is a key layer of protection. And that is one of the most successful programmes to date, collaborating with Australia officials to develop the offshore treatment programme that resulted in a reduction of BMSB interceptions by 73% in 2020.



THE RISK COMPLIANCE RATE IS CURRENTLY 98.9%. THAT MEANS THERE'S ONLY A 1.1% CHANCE OF A THREAT SNEAKING THROUGH.

Left to right : Northern Passenger Manager Craig Hughes, MPI Director-General Ray Smith, Head of Biosecurity New Zealand Penny Nelson, Northern Regional Commissioner Mike Inglis, Technology Team Leader Brett Hickman

73%

COLLABORATING WITH AUSTRALIA OFFICIALS TO DEVELOP THE OFFSHORE TREATMENT PROGRAMME RESULTED IN A REDUCTION OF BMSB INTERCEPTIONS BY 73% IN 2020

New import rules also take a hard line on sea cargo and vessels that don't comply, with inspecting officers given the power to prevent the discharge of cargo and direct them to leave New Zealand.

Using detector dogs

Detector dogs are some of the hardest working members of the MPI team, and they have excellent ongoing training in both plant and animal risk. Covid-19 had an impact on the number of quarantine officers required at a passenger level and while they've been redeployed elsewhere, the capacity of detector dogs has been maintained. The training methods used for the dogs are approved and independently audited every twelve months.

An entire centre, including kennels, is set up so the dogs can be put through their paces. Dogs are used for the detection of fruit flies, BMSB, and plant materials. And a close eye is kept ensuring there's a good balance between plant and animal detection training. Training the dogs for each kind of threat is similar in terms of the response expected by the dogs, and the rewards they are given to maintain their detection behaviour.

Beyond the training and ongoing work carried out by the dogs, MPI uses awareness campaigns and education to position the dogs publicly as a line of defence. Detector dogs are reliable, intelligent, and a crucial part of the biosecurity strategy.

When threats evade biosecurity

It is impossible to prevent every threat from finding its way into our community – nature will always find a way and human errors happen. But it is important to know that if you spot a threat, securing it and engaging MPI quickly is the best thing to do. The NZ Pest hotline is available for this purpose and Mike Inglis said he would welcome direct calls to get on top of anything that poses a risk to growers or the wider New Zealand population and environment.

The biosecurity pledge is to work together across borders, and that might mean physical borders, communities, regional stakeholders, or public service agencies. The goal is to identify problems and solve them quickly, before they become unmanageable, large-scale issues. Communication and engagement keeps conversations flowing and risky evaders at bay.

Growers: how to innovate safely

As growers, looking for new ways to work and new products and innovations in the horticulture sector is always top of mind. This might include sourcing new seed varieties or grafts from outside New Zealand. To do this safely, your best path forward is to engage MPI early. Everyone wants to be part of innovation in the sector, and early warning helps to plan for essential testing and monitoring. If we all play our part, growers can reach beyond the current scope of their business and take advantage of opportunities that may have previously felt out of reach, at the same time keeping our import standards high.

WSP: CAPITALISING ON CHANGE

The only constant in life is change, and land use is no exception. The choices we make while navigating change have an impact on the long-term resilience and sustainability of both businesses and the environment.

Climate change is already throwing a range of challenges our way, and the scientific consensus is that this will only increase with time. It's widely recognised that there will likely be higher average temperatures, increasing weather extremes, fewer frost days and patchier rainfall as time goes on - depending on location and how much we can mitigate these effects. However, with careful consideration, it's possible to understand, plan and adapt to the likely impacts for many of these factors using a range of tactical and strategic adaptations. These include changes in what crop is best suited to a local climate, refinements in pruning practices, which can help adjust to changes in growth patterns, and establishing new water storage and modifying irrigation practices, which can go a long way to creating resilience to patchier rainfall.

The impact of storm events on soil loss may be harder to manage. As such, vegetation cover, soil structure management and identifying ways to slow the flow of water through the soil system and across surfaces will be critical in horticulture.

A bigger challenge is that presented by multiple pests and diseases, as their climatic ranges change and 'sleeper' pests awaken. It's hard to predict where and when new pests and diseases will take hold, but when they do, we'll certainly know. Compounding the problem is that the tools we have available to battle them are becoming fewer, as resistance increases and public caution grows around the effects of pesticide and herbicide use. Creating more resilience to pests and disease will require a range of farm-scale strategies along with a broader perspective, for example diversification of crop choices in relation to the wider landscape.

Tipping points - those key moments in time when change must happen - are often the result of several factors combining at once to create a perfect storm. Weather events, changes in the market, a new pest or disease (of plants or humans), even personal events – any of these and more can combine to force change.

Tipping points can be a good thing – they are a moment full of potential, when an unsustainable trajectory can become a sustainable one. But these moments of challenge are sometimes the hardest points at which to make to conscious decision to pause and focus on the long term, integrated perspective needed to achieve that potential.

Taking time to build resilience and plan for future change means that when change does hit, the outcome can be highly positive. To do this effectively requires a range of skills and expertise, from soil science to social science; from crop suitability to international market access.

WSP in New Zealand has a unique breadth of science, engineering and planning skills, and is actively working with the horticulture industry to make the best decisions for current and future food production operations and the communities they feed.

Stephen McNally is Head of Primary Industries. He leads WSP's sector focus on food security delivered within scarce resources, irrigation infrastructure, technology innovation and horticulture's interaction with the environment and community.
Enquiries contact **stephen.mcnally@wsp.com**

TECHNICAL

THE LATEST INNOVATIONS AND IMPROVEMENTS

49 SUCCESSFUL PLANT GROWTH

UNDERSTANDING THE ESSENTIAL PLANT NUTRIENTS

Words by Joachim Nachmansohn

Photo of a plant in a growth media rich in plant nutrients

Plant nutrients are like vitamin supplements supplied to plants to provide the necessary nourishment needed for growth, survival and reproduction.

They are taken up by plants through the leaves and/or the roots. Nutrients are carried in solution in water or attach to soil particles. Plants express nutrient deficiency or excess (toxicity) by yellowing or browning of leaves, stunted growth and decreased crop quality and yield. These symptoms are usually clearly visible. Otherwise, a chemical analysis to determine nutrient concentration in the plant is the best tool to use. Acceptable nutrient ranges are illustrated in Figure 1.

Many plant nutrients

Plants are made up of carbon, hydrogen, oxygen (derived from air and water) and 14 nutrients that are essential for horticultural production. These nutrients are divided into groups depending on the amounts needed by plants. Macronutrients are nutrients that plants require in comparatively large quantities. Nitrogen (N), phosphorous (P), and potassium (K) are the three main plant macronutrients and are called primary nutrients. Together they make up about 75% of the total nutrients that plants require for healthy growth. The remaining macronutrients include Calcium (Ca), Magnesium (Mg) and Sulphur (S), and are called secondary nutrients.

Micronutrients are required by plants in smaller quantities. They are also known as trace elements (TE). They include Iron (Fe), Manganese (Mn), Zinc (Zn), Copper (Cu), Boron (B), Chlorine (Cl), Nickel (Ni), and Molybdenum (Mo). Plants require all these nutrients for balanced crop nutrition. Lack of a nutrient limits plant production reducing the quality and yield potential of crops, as explained in Figure 2.

> “Plants are made up of carbon, hydrogen, oxygen (derived from air and water) and 14 nutrients that are essential for horticultural production

Significance of the Plant Nutrients

Plants must be supplied with enough nutrients to meet their needs. The common mode of increasing availability of nutrients in the soil is by using fertilisers, either organic or inorganic. Nutrients in fertiliser need to be broken down into the form of specific ions (charged molecules) in order to become available to plants. The main plant nutrients and their significance in the production of crops are explained below.

Nitrogen (N)

Nitrogen is the nutrient that promotes chlorophyll content and is therefore very important in the development of green foliage. It is one nutrient that forms part of the plant’s DNA, allowing plants to grow and reproduce. Nitrogen is taken up by plants through the roots. It is made available to plants through use of common nitrogen fertilisers such as Urea, Calcium Nitrate, NPK and through compost or organic manure.

Phosphorous (P)

Phosphorous is known for its role in the transfer of energy. It is important in the transfer of food (energy) from the leaves to the other parts of the plant such as flowers, fruit and roots. Without it, photosynthesis (the process by which plants make their own food) cannot take place. It is usually supplied at planting to ensure full development from the start. Phosphorus is applied to the soil as a phosphate fertiliser.

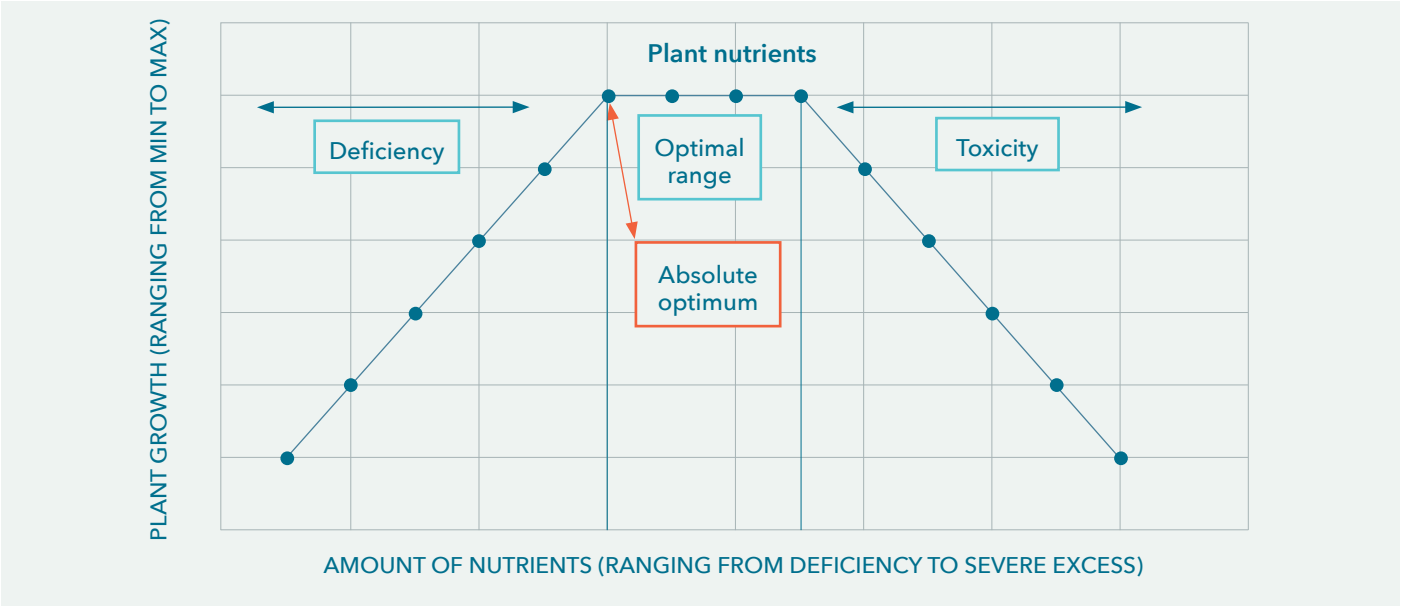


Figure 1. This figure illustrates the nutrient ranges that can induce growth in plants. Plant requires essential nutrients supplied in optimal amount in order to produce maximally without negative side-effects. When nutrients are deficient and in excess the production potential of the crop is reduced

Potassium (K)

Potassium is essential to the plant's general wellness. It boosts the plant's resistance to diseases by building its immunity against bacteria, fungal or viral infections. It also helps the plant cope with water stress as it regulates the opening and closing of the stomata (pores in the leaves that allow gas exchange). Potassium also helps in the development of flowers and fruit. Other than NPK fertilizers, it can also be supplied to the soil as potassium chloride/sulphate/nitrate.

Secondary Nutrients

Calcium (Ca)

Calcium is responsible for strengthening of the plant's structure and for maintaining plant quality and disease resistance. Calcium deficiency can lead to huge post-harvest losses. This is why post-harvest water (water used for rinsing, washing, cooling, waxing, icing, or moving fruit and vegetables) usually has high calcium content. The main source of calcium is lime and gypsum. It can also be made available to plants in the form of foliar fertilisers such as calcium nitrate and calcium ammonium nitrate.

Magnesium (Mg)

Magnesium helps in maintaining the health of the leaves as well as chlorophyll content, which is essential for photosynthesis. It determines the flavour and general appearance of fruit, as well as sweetness and sourness of the fruits and vegetables.

Sulphur (S)

Sulphur is critical for building essential amino acids in all plants. Organic forms of sulphur are responsible for the strong tastes and scents in some vegetables, such as garlic and onions. Sulphur is usually recommended for compacted soils as it acts as a conditioner by minimising the sodium levels associated with soil compaction. A main source of sulphur is manure, but it can also be supplied by sulphate fertilisers.

The micronutrients

Although needed in miniscule amounts compared to the macronutrients, micronutrients are equally essential for proper plant production management.

Boron (B)

Boron serves as a catalyst and is critical in the vital processes of the plant. It directly influences flowering, fruiting and division of cells.

Copper (Cu)

Copper assists in enzyme reaction processes and in photosynthesis. It is also the nutrient that is responsible for the production of lignin, which prevents the plant from wilting. Further, it has fungicidal properties and helps in the protection of plants against certain diseases such as blight.

Iron (Fe)

Iron is an essential nutrient necessary for transpiration in plants. It is also responsible for building and maintaining chlorophyll content in plants, and is therefore critical for the photosynthesis.

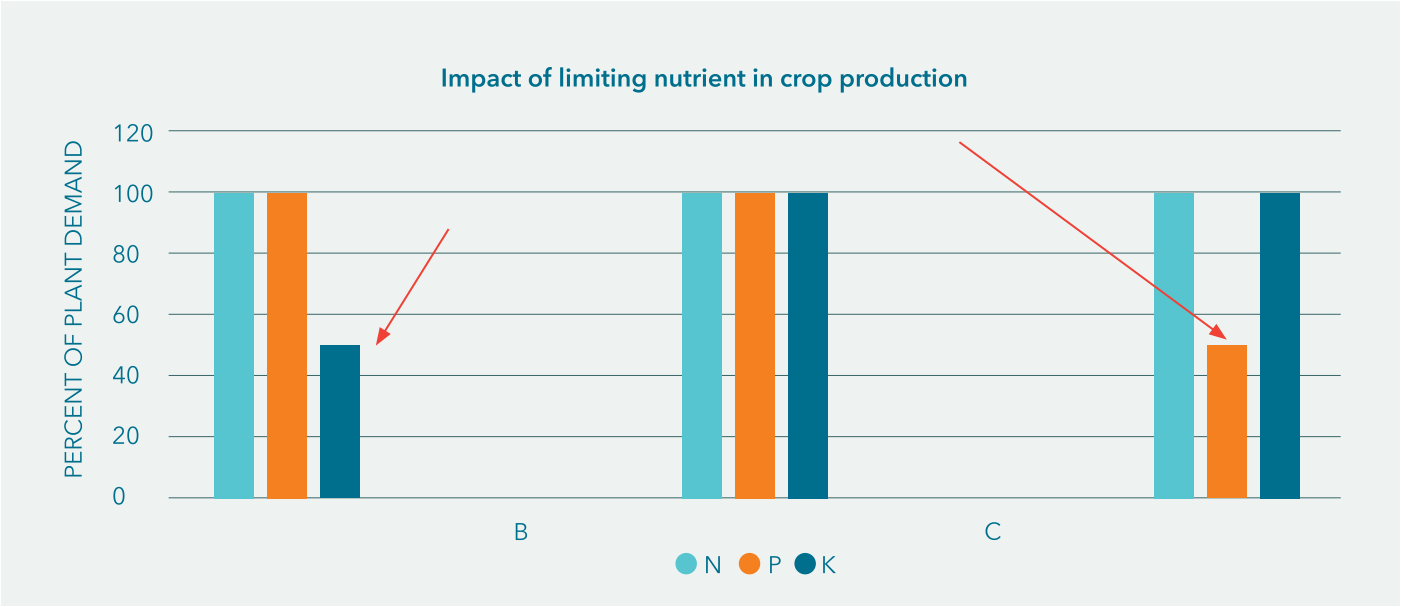


Figure 2. Illustrates the impact of nutrient in short supply. Unless all nutrients needed by the plant are supplied in accordance with plant demand, the yield of the crop will always be limited by the nutrient in short supply. In this case in a simple example of only NPK, however, the same logic applies for all nutrients

Manganese (Mn)

Manganese is an activator of several enzymes. It assists in the formation of chlorophyll and is essential in manufacturing different parts of the plant cell. As it also assists in supporting plant respiration, it is vital to the plant for both collecting and consuming energy.

Molybdenum (Mo)

Molybdenum is a catalyst responsible for speeding up enzyme activities. It helps the plant take up other nutrients such as nitrogen and phosphorous.

Zinc (Zn)

Zinc is a very important nutrient that helps in the activation of enzymes and is responsible for driving growth and development of reaction processes.

Chlorine (Cl)

Available to plants as chloride, it is responsible for the regulation of the process of photosynthesis and the balance of salts by regulating water. It has also been found to suppress certain plant diseases.

Nickel (Ni)

Nickel is responsible for the activation of several enzymes, one of which is required to process and reduce the toxicity of urea, which makes it very interesting from a fertiliser perspective.

> **“The New Zealand horticultural industry was projected to increase its production to $10 billion by 2020**

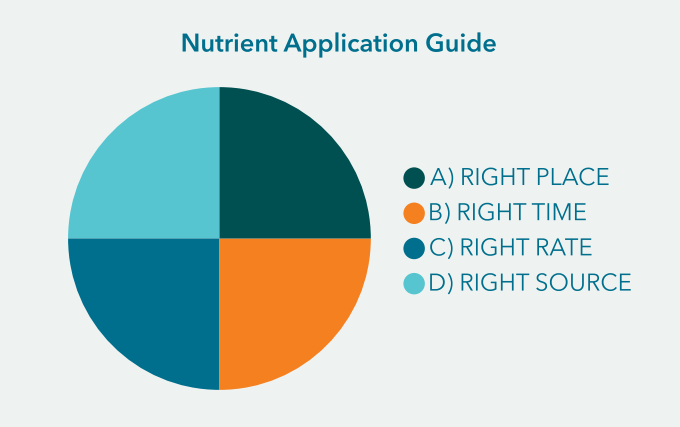


Figure 3. The figure illustrates the important factors to considered when applying fertilizers in commercial production

Balanced crop nutrition

The New Zealand horticultural industry was projected to increase its production to $10 billion by 2020. This means more nutrients will have been used and a lot more removed from the soils at harvest. Fertilising the soil requires proper analysis of the nutrients lacking in the soil, and proper calculation to determine the right quantity of nutrients to be added. It is therefore critical to monitor nutrient levels through soil testing and plant analysis, with an aim of supplying plants with all the essential nutrients required in optimal amounts to maintain healthy growth.

There is no point in applying excess nutrients as this would only mean more money spent on buying fertilisers when these nutrients will end up being leached. The aim is to match the fertiliser to the needs of the crop, and for nutrients to be applied at the required rate when needed by the crop at the right time, as illustrated in Figure 3.

HUMIDITY CONTROL IN THE GPE APPROACH

Words by Elly Nederhoff : Crophouse Ltd

In last month's article we introduced new energy-smart approaches to greenhouse climate control, such as Growing by Plant Empowerment (GPE).*

These approaches utilise refined measurements and sophisticated calculations to control heating, venting, fans and screens (as well as CO_2, fogging, optionally lighting, and so on). For many growers, these systems will be too expensive, but they are useful nonetheless, as they show new directions for sustainable production.

This article is again about humidity control, but now according to these new insights. As mentioned earlier, humidity control accounts for a major part of the energy consumption in greenhouses, especially in milder conditions. Only in cold weather is energy used predominantly for temperature control. Temperature will be discussed in detail in later articles.

More than relative humidity

Conventional climate control aims to keep the relative humidity (RH) within a certain range, say 75–90%, for two reasons. Firstly, the RH must stay far below 100% to avoid condensation and so reduce fungal diseases. Secondly, low RH is needed to keep the plants active, i.e. to keep the transpiration going. The conventional approach of combined heating and venting does work, but is rather crude and uses a lot of energy.

In the new climate control, there are two separate actions: (1) preventing condensation by keeping the humidity below the dewpoint. And (2) stimulating plant transpiration by manipulating the absolute humidity of the greenhouse air. Absolute humidity, dewpoint and other units are explained below and shown in the table. Note that throughout this article 'moisture' means the same as 'water vapour'.

Condensation and dewpoint

Condensation on cold plants (or parts of plants) is a problem. Plants becoming wet at night due to condensation can be avoided by keeping them warm by closing a screen (see previous article), or by avoiding too high humidity. Traditionally, condensation is prevented by keeping the relative humidity (RH) far below 100%. The new methods, however, are based on controlling the dewpoint (DP). Dewpoint is a measure of air humidity, expressed in degrees Celsius (°C). The dewpoint tells us, at a prevailing air humidity, how cold the glass roof or a part of a plant must be to become wet from condensation.

For example, if air has a temperature of 23 °C and RH of 70%, it has a dewpoint of 17.2 °C. This means that condensation will occur on things that are 17.2 °C or colder, such as the glass roof. The plants are most likely above 17.2 °C, so they stay dry. To prevent condensation, the dewpoint (humidity in °C) of the air must be sufficiently lower than the temperature of the plants (in °C).

Dry air has a very low dewpoint. As it is unlikely that the plants will get very cold, it is unlikely they will get damp. In contrast, saturated air (with 100% RH) has a dewpoint (in °C) as high as the air temperature (in °C). In this very high humidity, most surfaces will get damp. Only surfaces warmer than the air will stay dry, for instance the heating pipes.

Medium humid air (e.g. RH 85% and temperature 23 °C) has a dewpoint of 20.3 °C. Most plants will stay dry, but there can be some cold spots where the plant temperature is below the dewpoint. The plants here are at risk of condensation and infection.

Transpiration and water balance

Transpiration control is different too in the new-style climate control. It does not aim for a certain relative humidity (RH), humidity deficit (HD) or vapour pressure deficit (VPD). Instead, it aims directly for a certain level of plant transpiration. To do this, the computer calculates the water balance, based on absolute humidity inside, outside,

and above the screen (if closed). If the transpiration rate is not on target, the computer adjusts the devices (heating, vents, etc). This is much more energy-efficient than drastically increasing heating and venting based on RH, as in conventional control. Absolute humidity (AH) is the amount of water vapour in grams per amount of air, which is a more solid unit than relative humidity (RH).

The calculation of transpiration is briefly outlined here. When mechanical ventilation is used, such as extractor fans or climate units in semi-closed greenhouses, the rate of air exchange can be calculated accurately. It is then simple to calculate how much moisture is removed from the greenhouse air to the outside, and from this determine the transpiration rate. When natural ventilation through vents is used, the air exchange rate cannot be determined accurately. The transpiration is then calculated from the AH and the difference in plant temperature and air temperature.

Irrespective of the type of ventilation system, if the difference in AH between inside and outside is larger, then less ventilation is needed to remove enough water vapour, and to keep the ventilation going. Then less energy is lost.

In summary

The new control software obtains information about dewpoint (for preventing condensation) and water balance (for transpiration control) and a few other measures, and then decides how to adjust the devices, e.g. the screen, vents, fans, climate units and/or heating pipes. This saves energy.

Different units

In this article we used different units for different purposes. Relative Humidity (RH in %) is the easiest, but is temperature-dependent. For condensation, the best unit is Dewpoint (DP), as discussed above. For water balance and transpiration, the best unit is Absolute Humidity (AH) in gram moisture per m^3 air or in gram moisture per kg of dry air (the latter is sometimes called Specific Humidity, SH). Conventional greenhouse control often looks at Humidity Deficit (HD) or Vapour Pressure Deficit (VPD). Higher moisture deficit means drier air, which draws more water out of the leaves. Conversion from one unit to another is different at different temperatures, as shown in the table. A helpful tool for humidity units can be found at http://gpe.letsgrow.com/psychro.

TABLE: Units for air humidity.

RH = Relative Humidity in % of saturation.

AH = Absolute Humidity in gram moisture per m^3 of air.

SH = Specific Humidity (sometimes called Absolute Humidity) in gram moisture per kg air.

VPD = Vapour Pressure Deficit in kPa.

DP = dewpoint in °C.

Conversion depends on the temperature.

	10°C				20°C				30°C			
RH	AH	SH	VDP	DP	AH	SH	VDP	DP	AH	SH	VDP	DP
%	g/m^3	g/kg	kPa	°C	g/m^3	g/kg	kPa	°C	g/m^3	g/kg	kPa	°C
100	9.4	7.6	0.0	10.0	17.4	14.5	0.0	20.0	30.5	26.5	0.0	30.0
95	8.9	7.2	0.1	9.2	16.5	13.7	0.1	19.2	28.9	25.1	0.2	29.1
90	8.5	6.8	0.1	8.4	15.6	13.0	0.2	18.3	27.4	23.8	0.4	28.2
85	8.0	6.4	0.2	7.6	14.7	12.3	0.4	17.4	25.9	22.4	0.6	27.2
80	7.5	6.1	0.3	6.7	13.9	11.6	0.5	16.4	24.3	21.1	0.9	26.2
75	7.1	5.7	0.3	5.8	13.0	10.8	0.6	15.4	22.8	19.8	1.1	25.1
70	6.6	5.3	0.4	4.8	12.1	10.1	0.7	14.4	21.3	18.4	1.3	23.9
60	5.6	4.5	0.5	2.6	10.4	8.7	0.9	12.0	18.3	15.8	1.7	21.4
50	4.7	3.8	0.6	0.1	8.7	7.2	1.2	9.3	15.2	13.1	2.1	18.4
40	3.8	3.0	0.7	-2.9	6.9	5.8	1.4	6.0	12.2	10.5	2.6	14.9
30	2.8	2.3	0.9	-6.7	5.2	4.3	1.6	1.9	9.1	7.9	3.0	10.5

**New approaches to greenhouse climate control*

There are several new approaches, for example GPE ('Growing by Plant Empowerment'), HNT ('the New Way of Growing'), semi-closed greenhouse systems and more. Full implementation requires investment in thermal screens, fans, measuring boxes above the screen, sensors for plant temperature, new software, as well as time for training. It can be an interesting and useful exploration for energy-intense greenhouses that produce high value crops getting the balance right so that investments are earned back by energy saving and by enhanced production and improved quality. For more information on GPE, see www.plantempowerment.com

FAO'S GLOBAL SOIL PARTNERSHIP

opinion

By Robin Boom : CPAg, Member of the Institute of Professional Soil Scientists

If you think the recent focus by government and regional councils on cleaning up the environment, using sustainable agricultural practices and reducing greenhouse gases is unique to New Zealand and other wealthy nations, this is not so.

The Food and Agricultural Organisation (FAO) of the United Nations in 2012 established an initiative called the Global Soil Partnership among member nations to promote sustainable soil management as a means to achieve global food security and nutrition while protecting the environment. It recognises that soils are the vital source for our food and nutrition, with 99.7% of our food (calories) coming from the land and only 0.3% coming from oceans and aquatic ecosystems, therefore it is crucial our soils are nurtured and protected. Added to this, sustainable soil management also provides other ecosystem services such as water purification, nutrient cycling, climate regulation and flood protection. Perhaps more pertinent to New Zealand than many other countries, sustainable soil management also impacts on our fishing and aquaculture industries, in particular mussel and oyster farming.

The current Director General of FAO, Dr Qu Dongyu from China stated 'Soil is the mother of agriculture, the mother of life'. It is estimated that 75 billions of tonnes of topsoil is lost annually around the globe mainly from wind and water erosion, but also from salinisation, contamination, urbanisation and other competing land uses. Approximately 33% of our global soils are degraded and policy makers around the world are exploring opportunities to embrace sustainable goals. Curtailing the loss of productive land is essential for human survival going forwards.

Currently about 80% of the world's cropland suffers from moderate to severe erosion with another 10% experiencing slight erosion. There is approximately 1.5 billion hectares of cultivated land worldwide, and it has been estimated that 2 billion hectares of cropland has been abandoned since humans started agriculture some 12,000 years ago, because it became unproductive due to non-sustainable practices. Maintaining good soil structure is critical for preventing erosion. Soils with a medium to fine texture, a low organic matter content, and weak structural development are most easily eroded. Over-cultivation is the principle cause for degrading soil structure and loss of organic matter. Such soils become impervious to water and air filtration, with water running off and taking soil particles with it in the process. Bare land is much worse for erosion than land covered in vegetation, be it alive or dead vegetation, as the above ground plant biomass dissipates raindrops and wind energy, and the topsoil is held together better by the root biomass underground. Topography and slope also have a major influence on the degree of erosion, along with rainfall patterns, over-irrigation and wind exposure. Although topsoil can be grown over time with good management practices, the rates of topsoil loss vary between ten and forty times greater than its development on average worldwide.

> "One of the consequences of erosion is the loss of plant nutrients that topsoil contains

One of the consequences of erosion is the loss of plant nutrients that topsoil contains such as nitrogen, phosphorus, potassium and micronutrients. Typically, eroded soil contains three times the nutrients of the remaining soil, and with the loss of organic matter which contains around 95% of the total nitrogen and 25–50% of phosphorus, the environmental and economic harm becomes very costly. Nitrogen and phosphorus are the principle feeders of toxic algal blooms, causing eutrophication in lakes and rivers, and also impact on the marine environment and aquatic life in our oceans.

Nutrient management for crop production can be particularly challenging as on the one hand, too much fertiliser applied to the land results in excess greenhouse gases and pollution of our soils and waterways, and on the other hand, there needs to be sufficient nutrients to supply crop requirements so that all of the time and investment put into crop preparation, seed, and other chemical inputs, is not wasted.

In some third world countries, there are serious micronutrient deficiencies where people are getting enough food to eat in terms of calories and proteins, but the food is lacking in essential vitamins and micronutrients.

One of the projects the Global Soil Partnership is spearheading is the Soils for Nutrition project in some countries where micronutrient deficiencies in the population is known. Chronic micronutrient deficiency can have dramatic consequences such as low energy levels, reduced immune system and brain function, and reduced overall work productivity. These symptomatically affect children and pregnant women in particular, and to combat this problem the project has a pilot trial running in Bangladesh fortifying rice with zinc and iron which is rotated with vegetables (cauliflowers and potatoes) and pulses (mung beans).

I have observed first hand incorrect fertiliser practices in poor rural communities in Moldova, Sri Lanka and India. In Moldova, farmers growing wheat, maize and sunflowers were being sold a liquid humate product which contained a small amount of boron but not much else, yet soil tests I took revealed the main issue was a severe lack of phosphorus, so I recommended they apply some DAP (Di Ammonium Phosphate). Their soils are calcareous, with very high calcium levels and high pH levels (above 8.0), which would mean that applying acidic superphosphate or triple super, the phosphorus would be rapidly bound up, so DAP was a much better phosphate option due to its non-acidic form. As a consequence the Moldovan farmers doubled the yields of their crops. In Sri Lanka and India, the main element most farmers were applying to their crops was nitrogen as Urea or Ammonium Nitrate. Unfortunately the soil samples I took in Sri Lanka were stopped at Customs at Dubai and sent back to Sri Lanka. There is a high percentage of children dying from kidney failure in Sri Lanka which is a problem that has developed over the past three or four decades, and as there is no soil testing done over there I cannot help but wonder if this kidney failure has developed from a serious micronutrient deficiency through continued cropping and exhaustion of background nutrient levels.

Here in New Zealand we are blessed with an abundance of food grown not just locally, but also imported from around the globe. Even though we have naturally low soil selenium levels, eating seafood which has good selenium levels, and importing oranges and grapes from California where soils are almost toxic with selenium, helps even things out. Livestock farmers know the importance of selenium supplementation given either directly to their animals or via the soil where selenium is applied as prills with the fertiliser, so our meat and dairy products should not be low in selenium, even though locally grown fruit, vegetables and cereals probably are. With produce grown on land where good soil management practices are being implemented, we can hopefully continue to be an exporter of healthy nutritious food which is totally sustainable, taking the right steps to prevent further environmental degradation by soil and nutrient loss.

BOOM OR BUST SUMMER – FOCUS ON NORTHERN NZ

Words by Georgina Griffiths : MetService Meteorologist

La Niña update

As expected, La Niña conditions peaked in intensity in the tropical Pacific Ocean in mid-December 2020, and then have exhibited a generally easing trend since that time. The most likely outcome as we head into autumn (March through May 2021) is further weakening, meaning that overall, neutral ENSO (El Niño Southern Oscillation) conditions are expected by April. A neutral state of affairs is then predicted to continue as we enter winter.

New Zealand weather maps January and February 2021

Even though La Niña has peaked, a lag effect has meant that it was still a major driver of our weather maps to start 2021. In both January and February, intense Highs were intermittently present to the south of New Zealand and over the South Island (Figure 1, Figure 2). While each High located over the South Island produced easterly winds over the upper North Island, these Highs were mostly dry in January (such as seen in Figure 1). However, as February progressed, an active area in the tropics to the north of New Zealand resulted in some wetter easterly rain events for the upper North Island (such as seen in Figure 2).

This pattern of highs being intermittently located further south has meant that the early part of 2021 has not been as dry as was experienced in 2019 and 2020 for the upper North Island (e.g. regions north of about Taupo). In those two drought years, the subtropical ridge that holds over Northland was stuck fast, and kept rain-makers away from northern New Zealand.

Boom or bust rainfall

Summer rainfall is traditionally 'boom or bust' in the northern regions, with rainfall at this time of year known to be fairly 'unreliable.' That is, spotty afternoon thunderstorms can be highly 'hit or miss', with one farm copping significant localised rainfall, and the next door neighbour seeing virtually nothing in the gauge.

In addition, most of the heavy rainfall for northern areas of the country is generated from weather systems coming from the tropics or subtropics, to the north of New Zealand. And these systems are also generally unreliable! For example, two Tropical Cyclones had formed by mid-December 2020 (Tropical Cyclones Yasa and Zazu), but neither came close to New Zealand to deliver any rainfall.

At the start of February, another three Tropical Cyclones had formed (Ana, Bina and Lucas), but once again, these systems did not yield any decent rainfall for New Zealand. Notably, forecasts of subtropical or ex-tropical systems are generally less accurate, giving a double entendre to the sense of 'unreliable'!

Northern rainfall – so far, better than the last two years

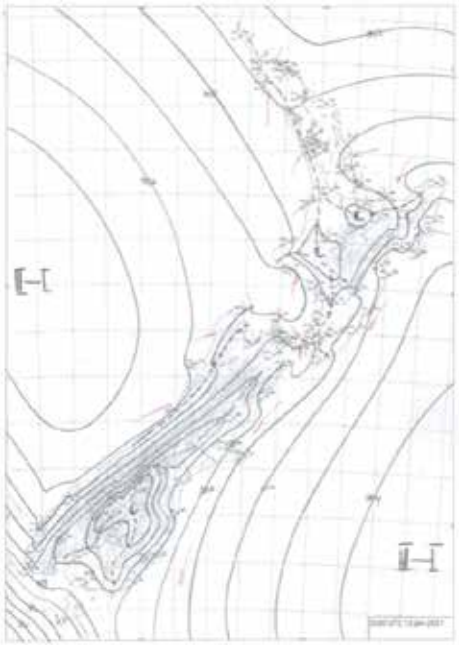
To highlight the better-than-the-last-two-years rainfall so far this year, Figures 3, 4 and 5 show year-to-date rainfall accumulation, compared to normal, and compared to previous years, for Kerikeri, Whitianga and Te Puke. All three locations received some decent rainfall in mid-February 2021, and all three locations were running wetter than the two previous years, at the time of writing.

As always, you should keep up to date with the MetService long-range forecast at **http://metservice.com/rural/monthly-outlook**. Or sign up to the Monthly Outlook for delivery straight to your email inbox at **www.metservice.com/emails**.

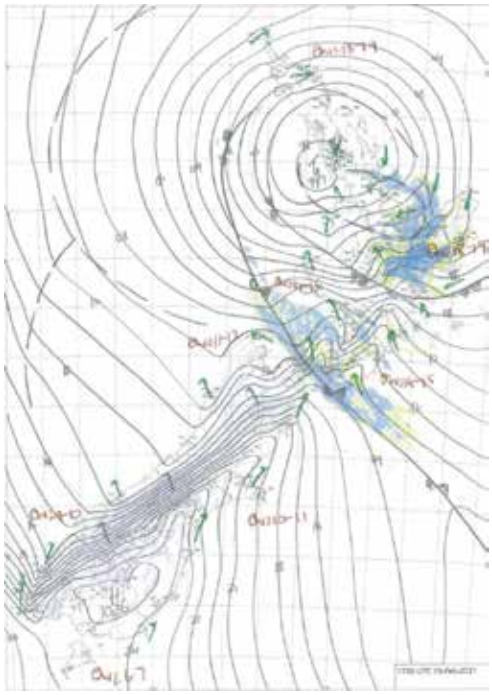
***Figure 1**: Hand drawn analyses, such as this one shown for 3pm 12 January 2021, help inform the MetService Expert Meteorologist's knowledge of meso-scale features and synoptic patterns every 3 hours, every day. This helps the MetService forecasters to determine which weather models are accurately capturing current conditions, meaning that their forecasts are likely to be better than those models which are not*

***Figure 2**: Hand drawn analysis for 6am 16 February 2021, showing a significant Low and associated rain bands affecting the North Island*

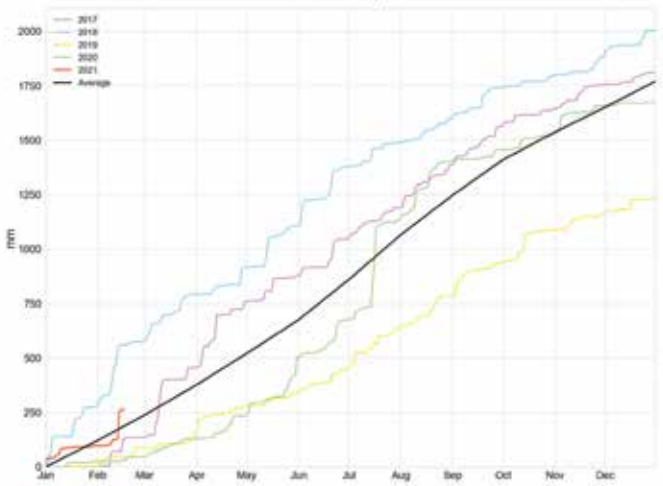
Rainfall accumulation plot for Gisborne 1



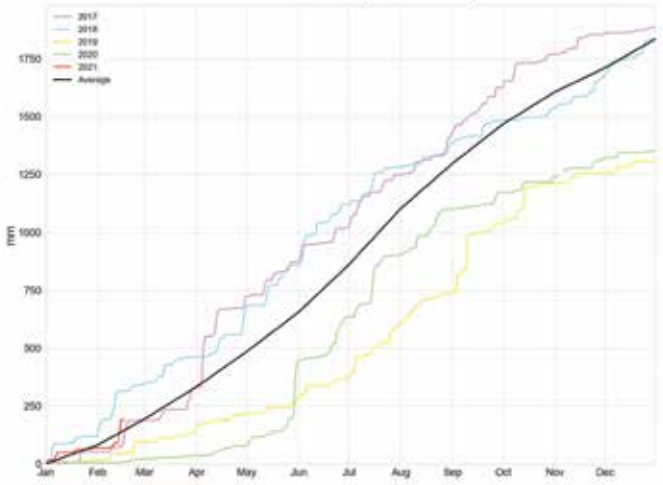
Rainfall accumulation plot for Napier 2



Rainfall accumulation plot for Kerikeri 3



Rainfall accumulation plot for Whitianga 4



Rainfall accumulation plot for Te Puke 5

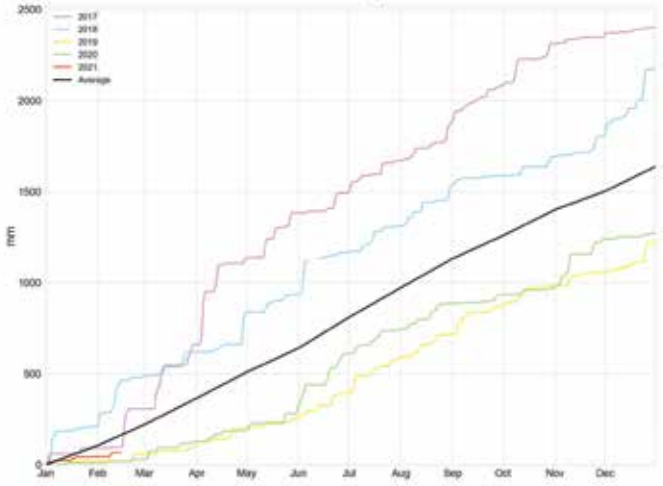


***Figure 3**: Kerikeri annual rainfall accumulation (mm) for the last five years (2017 to 2021). The annual average rainfall accumulation is shown in black*

***Figure 4**: Whitianga annual rainfall accumulation (mm) for the last five years (2017 to 2021). The annual average rainfall accumulation is shown in black*

***Figure 5**: Te Puke annual rainfall accumulation (mm) for the last five years (2017 to 2021). The annual average rainfall accumulation is shown in black*

PRODUCT GROUPS

ALL THE LATEST NEWS FROM YOUR PRODUCT GROUPS

Process Vegetables NZ

LOOKING STRATEGICALLY AHEAD TO 2030

Words by Leanne Stewart : General Manager, Process Vegetables New Zealand

To explore the direction the process vegetable sector should take between now and 2030, Process Vegetables New Zealand (PVNZ) will be undertaking a strategy exercise in early April 2021 with our board, processor representatives and a facilitator to guide us through the process.

It is good practice to regularly review strategic direction, and now is the time for PVNZ to ensure we're working towards making our sector as productive, resilient and sustainable as possible.

> "now is the time for PVNZ to ensure we're working towards making our sector as productive, resilient and sustainable as possible

PVNZ is interested in your input and has identified some questions for growers to think about to help inform the development of our new strategy. This gives you the opportunity to have your say in the direction the sector will take between now and 2030.

If you are interested in providing input please answer the questions below by sending an email to Leanne Stewart, PVNZ general manager at leanne.stewart@hortnz.co.nz before the end of March 2021.

1. How has the process vegetables sector changed over the last 10 years?
2. What does success look like for the process vegetable sector in 10 years' time?
3. What are the priority work areas that PVNZ should be focusing on – what should we do more of, less of, start doing or stop doing?
4. What do you see as the top three challenges and opportunities facing your business?

PVNZ will use your responses and the output of the strategy session in April to develop a draft strategy that we'll share with growers and processors for your feedback. We hope to have a final strategy document for endorsement at our Annual General Meeting, to be held in the first week of August 2021 at the New Zealand Horticulture Conference.

MAGICAL BUS TOUR
WITH GOVERNMENT FRIENDS

Words by Antony Heywood : General Manager, Vegetables New Zealand Inc.

Stuart Davis, LeaderBrand Pukekohe, explains the technology to vacuum cool lettuce before sending it to market. This technology allows the lettuce to last longer on the shelf, giving a better quality customer experience

Every year, in an inspired engagement project led by Onions New Zealand, we invite government on a magical bus tour of Pukekohe and Hawke's Bay.

Why is it magical? To quote the tour guide:

"It is important as an industry good body to assist with helping both growers and government learn a little more about one another's priorities and systems. It gives officials the opportunity to talk to vegetable growers directly and understand the complexities and challenges that growers face. It also presents the opportunity to ask questions in context to the growers' environment."

In government's capacity as a watchdog for the public, it will make decisions based on the best interests of NZ Inc. It is the product groups' and Horticulture New Zealand's task to balance the ledger and ensure growers' viewpoints are recognised. To ensure our industry is earning its social licence, the grower story needs to be told. What better way than to go out to farms and show how things are done.

We would like to thank the following growers for their input on the day:

- Kylie Faulkner and Stuart Davis from LeaderBrand
- Herman and the team from ENZA Zaden
- AS Wilcox's marketing and supply chain team
- Bharat Jivan

Each of these growers told the group their story, and about some of the challenges they are experiencing.

The following themes were common in much of the discussion.

1. Vegetable crops are different from other crops due to the complexities of rotations.
2. Labour is still a concern for the vegetable sector. The loss of Recognised Seasonal Employer (RSE) scheme workers and working visa holders is having an effect on harvest dynamics and food supply.
3. Growers are passionate about their land and have been guardians for multiple generations. The loss of good vegetable growing land will be a loss for all New Zealanders and our food supply. *Pukekohe was identified 100 years ago as the best place to grow leafy greens as it does not have winter frost.*
4. Growers are conscious of their inputs and emissions (nitrogen and carbon) and have mitigations in place to reduce these to industry best practice.
5. The government can help growers to become better guardians of the land by working with them to meet the new limits on freshwater and other emissions.
6. The Pukekohe Vegetable Hub is a significant contribution to GDP (Gross Domestic Product) (through supply of vegetables to Auckland and employment for the Franklin district), but growers have not had a lift in profit margin for more than eight years. The rise in the minimum wage and cost of environmental compliance needs to be balanced against a mechanism for more equitable pricing of quality vegetables.
7. Growers are often caught in the middle on supply chain shortages, like product crates. When a decision was made to change from one type of crate to another type, which needed to imported, this caused a shortage in crates. This is frustrating and costly for growers. If a grower is unable to harvest at peak times, the produce will fail quality parameters and it will remain in the field or get dumped. Any shortage or constraint in the supply chain has a ripple effect. The grower will have the highest risk in the supply chain due to produce perishability.
8. New Zealand produce is recognised for its quality and reliability. Exporting vegetables is profitable if growers can access markets. Growers need assured channels to export markets that are accessible and equitable for free trade. Free Trade Agreements are required for growth in our industry.

Vegetables New Zealand Inc (VNZI) is working to make the above points apparent at all government levels. HortNZ is working with the Ministry of Social Development to try and ensure Pukekohe has enough labour. The Commerce Commission is undertaking a grocery market review, which will throw light on the equity within the supply chain. Market access issues are being tackled by a number of product groups, including VNZI, with much of the heavy lifting undertaken by Onions New Zealand, which has a strong market access focus.

There is real benefit in telling the grower story to government. The end result will be a more resilient and viable industry.

Potatoes™ NEW ZEALAND

POTATO TUBER MOTH TARGETED

Words by Glenys Christian

Mulching trial at Pukekawa

Two Pukekawa trials are showing some early promise for potato growers when it comes to greater control of the potato tuber moth, *Phthorimaea operculella* (PTM).

The pest, which comes from South America and has now been found in over 90 countries, particularly presents a problem around Pukekohe. This is due to the area's dry, hot summers and mild winters which allow potato growers to leave their crops in the ground from mid-January through to April. But cracks in the volcanic clay soils provide plenty of opportunity for tuber infection by PTM larvae.

Organophosphate pesticides have been relied on at the later stages of potato growth for PTM control but due to overuse, environmental impact and increased biological resistance developing, many are now being phased out, says Pukekohe company, Inta-Ag's chief executive officer, Shane Smith.

Integrated pest management (IPM) strategies have been looked to for the future, but biological controls can be affected by ultraviolet light or rain. While irrigation to prevent the soil becoming dry and cracked is one of a number of cultural methods used, growers face a trade-off with late crop potatoes left in the ground, as they would prefer to use this water on their still growing crops to increase yields, Shane says.

IPM programmes are the main focus, but as they are slower to work and often operate at very specific growth stages of the pest, growers and agronomists will need to build up an understanding of how this can be integrated into a future programme, he believes. So Inta-Ag has been running a trial on a potato grower's land at Pukekawa using straw mulch to see what effect it can have on PTM. Ten tonnes of straw mulch were applied on the one-hectare trial site in October last year and several traps set up to catch PTM as well as TPP (Tomato Potato Psyllid).

Shane says he is aware of the mulching technique being used by organic potato growers in the United Kingdom which keeps the soil moisture levels higher as well as preventing the PTM larva getting to potato tubers so easily. Mulching has also brought about several other benefits which were not foreseen, as growers there have noticed fewer weeds in their crops and better disease control, particularly when it comes to sclerotinia.

It is too early yet to tell how effective mulching has been in the Pukekawa trial as full results are expected in April or May when PTM damage can be fully assessed after the potato crop has been in the ground for some time. But Shane says that from his weekly visits to the trial site it already appears that nightshade, potato growers' worst weed threat, is being kept at bay.

When it comes to potential costs for growers looking at straw mulching for their crops, Shane says this needs to be balanced against the expense of using pesticides. And a lot would depend on the price of the straw mulch they used. The potato grower involved in the trial also grew barley, so rather than selling the baled straw was able to use this as mulch, considerably reducing his costs.

"A lot of Pukekohe growers are growing barley now as a break crop before onions," he says.

"It depends what will work for each grower."

Some might decide to try the mulching just on their late planted potato crops as well as further fine-tuning crop rotations in line with IPM principles.

"There may be a mix of two of three different techniques," he says.

Already there are plans for the trial to be repeated next season over a larger area. Shane hopes that straw mulch can be used on around 20ha spread over two or three different potato growers' properties, and that it will take in a variety of local areas such as Waiuku where PTM damage can be particularly prevalent.

Another PTM trial which is in its first year at Pukekawa is also being run by Inta-Ag. It is looking into the effect of different cover crop mixes sown on potato headlands. Buckwheat, linseed, clover, Phacelia and Smart radish were sown to attract PTM to those areas rather than the potato crop, with the mix possibly being adjusted. There are plans to involve Plant & Food Research to assess exactly what insects are found in the traps later this year.

"Already we've seen an abundance of insects," Shane reports.

"You notice straight away there are birds swooping down on the headlands and more white butterflies."

A Potatoes New Zealand literature review of PTM control methods was carried out last year and can be found on its website **https://potatoesnz.co.nz/research-and-development/technical-bulletins/**

TomatoesNZ

CONSULTATION OPEN ON SWEEPING NEW MEASURES TO REDUCE NZ'S EMISSIONS

Words by Helen Barnes : General Manager, TomatoesNZ Inc.

The Climate Change Commission (CCC) released their Draft Advice for consultation on 1 February.

It includes advice on the first three emissions budgets and on policy direction for the government's first emissions reduction plan. Consultation on this advice is open until **14 March**. TomatoesNZ will be joining with Horticulture New Zealand and Vegetables NZ to make a joint submission. Some key points included in the CCC advice:

- Proposes replacing coal used for industrial process heat (including heating commercial vegetable greenhouses) with biomass and electricity by 2030; and replacing gas with biomass and electricity by 2035. Along with boiler conversion, they assume significant improvements in energy efficiency.

- All new space heating or hot water systems installed after 2025 in new buildings (including glasshouses) would have to be either electric or biomass, and no further natural gas connections to the grid, or bottled LPG connections would be allowed to occur after 2025.

- The report notes constraints on biomass supply in some regions; and electrification of process heat will be at a significantly higher operational cost, with expansion of the electricity transmission and distribution grids also required. It notes biomass "uptake will require the development of supply chains for gathering and processing biomass along with the establishment of local markets." And that process heat must be phased in a way that would enable assets and infrastructure to be replaced on "as natural a cycle as possible" to maintain growth while minimising costs from stranded or written-down assets.

- They also advise on the phase out of industrial free allocation in the New Zealand Emissions Trading Scheme (ETS). "If an ongoing and substantial risk of emissions leakage becomes evident, industrial free allocation phase out rates could be slowed down."

Following consultation, feedback will be incorporated and the final advice will be presented to government by 31 May. The government will have until 31 December to decide whether to accept the recommendations. The full report is available at: https://www.climatecommission.govt.nz/get-involved/our-advice-and-evidence/

Tomato Red Spider Mite Survey completed

A small, established population of tomato red spider mite, ***Tetranychus evansi*** (TRSM), was detected at Auckland Airport in May 2020. The TRSM was found on black nightshade weeds ***Solanum nigrum*** during a routine High-Risk Site Surveillance inspection by the Ministry for Primary Industries (MPI). It was estimated that the population had been present for two or more years.

Under a GIA response, a "delimiting survey" of the greater Auckland area was commissioned to assess how far the TRSM population had spread and whether it was already present in commercial growers' operations. The survey sites included both indoor and outdoor growers' properties and non-commercial locations (e.g., roadsides, parks).

The survey was carried out in during spring (September/October). TRSM was found at eight sites:

1. Auckland airport (first detection)
2. Pakuranga
3. Manakau City Centre
4. Mount Wellington
5. Manurewa (Auckland Botanic Gardens)
6. Howick (Lloyd Elsmere Park)
7. Panmure
8. Māngere

None of the sites where the mites were found were commercial – they were all in gardens or weedy areas.

Tomato Red Spider Mite is very small – the size of a full stop – so accurate identification requires an expert. The tomato red spider mite got its name because it eats tomato plants, is red, and makes silk webbing to protect itself and its eggs, like some spiders do. The mite multiplies quickly and in large groups they can mummify plants, wrapping them up in silk webbing.

Crop hosts include tomatoes, potatoes and eggplants. They also attack beans, kumara and some ornamentals – roses and orchids. Weed hosts include the nightshades, shepherd's purse, cleavers and fat hen.

Eradication of established populations of TRSM is difficult due to its biology, including its tiny size making detection difficult with the naked eye, abundance, preferred presence under leaves, dispersal traits and the difficulty of spraying for it effectively, the high rate of population increase (up to 10 generations per season), parthenogenic reproduction (only one female is needed to establish a population) and resistance to miticides.

Because of these factors and the large area that the pest is already established, and the fact that export trade impacts are low, MPI and industry parties agreed that eradication is not a feasible or cost-effective option, and would also be socially unacceptable (due to spraying).

This means that the most likely outcome is that TRSM will be deregulated, and we will move to focusing on long-term management instead of eradication.

Updated Exotic Pest Fact Sheets

The TomatoesNZ Exotic Pest Fact Sheets, available for download on the TomatoesNZ website biosecurity page, have been updated. We now have 15 fact sheets available, with the addition this year of Fall Army Worm, which has established in Australia.

Covered crops remit update

A remit was supported at both the TomatoesNZ and Vegetables NZ Inc 2020 Annual General Meetings:

That TomatoesNZ Inc. and Vegetables NZ Inc develop options for, and an opportunity to vote on, combining covered crops under one representative product group or body.

A small working group of members of TNZ and VNZI have met twice to work on developing some options to present to growers. The group plans to develop a proposal based on the scenarios they have identified which will be provided to growers for feedback in April-May. Steps following this will depend on grower comments and may include a vote at the TomatoesNZ and Vegetables NZ AGMs in early August 2021.

Global tomato congress online

The Global Tomato Congress will be held online overnight (starting at 8:00pm NZ Time) 16 – 17 March 2021.

You can register for free on their website: https://www.globaltomatocongress.com/

There are three concurrent sessions which cover marketing and consumer trends, new varieties, packaging, new technology, pest and disease management, and sustainability.

MORE AFFORDABLE DEHYDRATORS

Auckland based Netropolitan is a specialist importer of processing equipment for Artisan food producers.

Recently turning their attention to the fruit and vegetable sector, Netropolitan have imported the latest range of IKE closed loop dehydrators, offering a new and lower price point in effective dehydration solutions. The WRH-100 series machines quickly and efficiently dehydrate a wide range of fruit and vegetables. Starting from just $16,000 the WRH-100 series come complete with trays and accessories, these units can dehydrate up to 100kg of produce. Larger machines are available capable of dehydrating up to 1500kg of product per batch. Similar currently available dehydrators start from $100,000 so this range offers options for niche businesses or for the purposes of researching and testing new food options with less financial outlay.

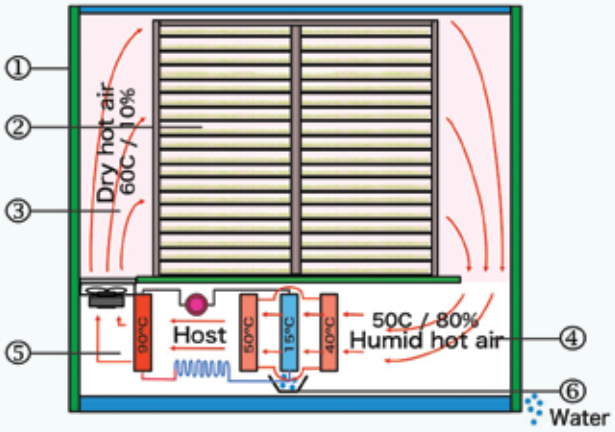
When it comes to energy efficiency these dehydrators are top performers, as heat is circulated within the 'closed loop', ensuring minimal energy losses. Easy to install and operate, these are simple compact plug-in models which have optional cloud-based support if required.

> "IKE closed loop dehydrators offer a new and lower price point in effective dehydration solutions

The IKE WRH-100 series is suitable for a wide range of dehydration uses including tomatoes, vegetables, mushrooms, meat and fish, seeds, berries, nuts and flowers. Produce retains colour and fragrance on the low to medium settings and retains much of the nutritional value of the original produce.

With increasing disruption to export and freight channels it's an excellent time to re-think the post-harvest options for surplus fruit and vegetables which may otherwise go to waste. Similarly, with imports getting more expensive and problematic, options to supply the home market with products which have traditionally been imported may now be economically viable particularly if the equipment required for niche innovation is affordable.

WORKING PRINCIPLES



Description of Parts:

1. Drying house
2. Material to be dried
3. Hot and dry air
4. Hot and humid air
5. Core body of the dryer
6. Condensed water (released from the drying house)

A limited number of IKE-100 dehydrators are now available in New Zealand. Make enquiries directly to Gerald Hochwimmer on **021 258 380** or email **info@netropolitan.co.nz**

CHOOSING THE RIGHT TECHNOLOGY FOR SIZE REDUCTION, SLICING AND CUTTING SOLUTIONS

Food manufacturers are always looking to increase productivity and minimise costs. For fruit and vegetable processors, this can be achieved with the right size reduction equipment for their operation. Sales and operations manager of Heat and Control, Scott Burrows, discusses some common considerations for processors of fresh produce looking to invest in capital equipment.

Time poor consumers continue to seek healthy choices in the supermarket, which in turn is driving demand for healthy and convenient vegetable products.

Both fresh and frozen vegetable processors are developing innovative style cuts which can be used in a prepared meal kit for customers to easily add to recipes at home.

Zucchinis or squash can be cut into a long, noodle-like strip, while beets and carrots can be presented in a novelty bowtie cut, instead of conventional straight cuts. The most advanced size reduction equipment on the market can deliver a clean, precise cut for fresh vegetables, resulting in a limited moisture release for increased shelf life compared with alternative cutting methods.

Some ingredients are easily processed through gravity feeding, while others need to maintain structural features and are more easily belt-fed into the cutting area, where the timing of cuts corresponds to the belt speed – a method used when slicing leafy vegetables. Density, structural fragility, temperature and flowability should be taken into account.

The type of knives used in size reduction technology is key to producing a cleaner cut. Ensure the knives are made from stainless steel of the highest grade to produce the sharpest edge so that the knife lasts for longer, and the cutter has fewer knife changes. Rigorous quality assurance testing should also take place to make sure the equipment can withstand tough environments.

Types of slicers

With a belt-fed wheel slicer, produce is delivered onto two high-speed feed belts sloping together to form a 'V'-shaped feed trough. The belts are synchronised with the rotating slicing wheel to ensure proper advance of product per revolution of the wheel. Knives under tension serve as spokes and support the rim of the slicing wheel. The knives are slightly twisted to create a uniform pitch from the hub to the rim.

A belt-fed wheel slicer

A TranSlicer™ by Urschel is an example of this type of machine. This type of cutting application is ideally suited for leafy vegetables including romaine, iceberg, kale, radicchio, cabbage, spinach, celery, cucumbers, eggplant, honeydew, cantaloupe, and leek. This type of slicer accepts firm and leafy (or more compressible) products up to certain diameters, and is ideal for elongated products that benefit from proper orientation, reducing overall waste.

With a versatile comminution mincer or slicer, produce is guided to the high-speed, rotating impeller where it revolves at a high speed inside the cutting head. Centrifugal force propels the produce outward past the cutting edges of the stationary reduction head.

These types of cutting applications are used in the production of dry, paste and liquid size reduction volumes including purées for fruit juices, and fruits and vegetables for baby food or soups, with various consistencies available. A Comitrol™ by Urschel is ideal for this type of size reduction.

For more information contact Heat and Control New Zealand on **+64 9 274 4182** or get in touch via **info@heatandcontrol.com** or **www.heatandcontrol.com**

A RICH HISTORY OF SUPPORTING GROWERS' INTERESTS

Fruitfed Supplies, as it's known today, was originally formed in 1916 as a grower-owned organisation to advocate for and support those within the horticultural industry.

Starting from humble beginnings, the New Zealand Fruitgrowers' Federation commenced its commercial activities in 1920, opening its first store in Hastings. The Federation's primary focus was to represent the interests of horticultural growers, using its collective buying power to provide crop protection products and harvesting equipment.

At the same time the New Zealand Fruitgrowers' Federation became the voice of the horticultural industry, lobbying central and local government for favourable legislation for growers and the communities that relied on the success of the industry.

Moving forward in time, and with growers' continuing support, the Federation thrived operating both as a retail store as well as promoting and advocating on behalf of the horticultural industry. From the 1930s through to the 1970s, the organisation was the main source of products and equipment for use in orchards and market gardens and continued to facilitate grower advisory groups within horticultural growing regions.

By the 1980s the New Zealand Fruitgrowers' Federation's ownership structure changed and the Fruitfed name was created. It was when Williams and Kettle Limited purchased Fruitfed Limited that Fruitfed Supplies was born. What followed was the acquisition of Williams and Kettle by Wrightson, and soon after, the merger between Wrightson and Pyne Gould Guinness that saw Fruitfed Supplies, as it is today, as the horticultural division of PGG Wrightson.

The name may have changed but not the company's focus: to continue to support and collaborate with growers. Having worked with growers through the evolution of horticultural practices over the years, the team at Fruitfed Supplies can be relied upon to provide customers with technical advice and solutions for a range of horticultural crops.

The foundation of Fruitfed Supplies' technical expertise is its Research and Development (R&D) team who complete over 50 trials a year assessing the performance of agri-chemical, biological and organic products in horticultural growing situations within New Zealand. This information

Hayden French, Fruitfed Supplies Technical Horticultural Representative (right) with Tasman grower, Toby Conning

helps growers, who in consultation with a Fruitfed Supplies Technical Horticultural Representative, can create an effective spray or control programme, having a good understanding of product choice and timings.

Complementing R&D is Fruitfed Supplies' Crop Monitoring team who provide a valuable service to growers. With Crop Monitors out in the field identifying pest and disease levels in a crop, growers in discussion with their Technical Horticultural Representative, can use this data to make informed decisions on control measures to help protect crop yields.

PGG Wrightson and Fruitfed Supplies have a combined network of 91 stores located in the main agricultural and horticultural regions of the country.

Fruitfed Supplies

Visit **fruitfedsupplies.co.nz** to find out more about Fruitfed Supplies' range of products and services, or to find a store near you.

Fruitfed Supplies is a trading division of PGG Wrightson Ltd (PGW). PGW and the writer do not warrant the information's accuracy, quality, outcome or fitness for any purpose.

Classified advert rates

	1	3-5	6-10	11
Quarter Page	$435	$420	$395	$355
Eighth Page	$245	$235	$225	$205
Cameo (W40 x H65mm)	$145	$140	$135	$125

Custom $40 per column cm

To book a classified advertisement in our next issue contact:
Debbie Pascoe (09) 2363633, M: 0274 858562
Email: dpascoe@xtra.co.nz

HAPPY (3)1ST ANNIVERSARY ENZA ZADEN!

ENZA ZADEN

Enza Zaden New Zealand turned one in January this year. But we're calling it our (3)1st Anniversary because we can't forget about the 30 years of service we have had in New Zealand before supplying direct to growers. Have we helped you in the past three decades? If not, please lettuce know, better still, if we did help you, lettuce know what went well.

This is the re-start, and in some cases re-connect, of our long association with New Zealand growers. Our varieties continue to help growers to succeed. With winning varieties such as Wildebeast, the green incised lettuce famous for its huge yield. Oriola, that produces large iceberg lettuce over summer. Sampson, the pumpkin for high yield. Marando, the fastest maturing red variety capsicum. Altair, an amazing cauliflower for winter curd quality and Campari, the tastiest tomato.

In the last year, we sometimes failed but from this we learned, we got up and then we tried again. Thank you for supporting the change in the way our vegetable seed is delivered in New Zealand. We appreciate it when you choose Enza Zaden.

Did we help you succeed with our lettuce, onion, pumpkin, spinach, cauliflower, capsicum, tomato, cucumber, zucchini and herb varieties? Please reach out to us so we can connect (or re-connect) you with varieties that perform best for you. Contact Bev on 09 963 0122 or sales@enzazaden.co.nz now to lettuce send you trial seed.

For technical advice on open field crops: Aneil Hari 021 367 242, or sales manager Herman van der Gulik, 021 858 939. For glasshouse crops: Louise Millar 021 711 709. **www.enzazaden.co.nz**

"Lettuce help you to grow an excellent lettuce crop. Our breeders have been producing lettuce varieties for New Zealand growers for over 30 years." says Herman van der Gulik, Sales Manager, Enza Zaden New Zealand.

INTRODUCING ENZA ZADEN LETTUCE

AUTUMN ICEBERG:

Nolaf NEW! autumn to late autumn, medium size, dark green colour, sure heading and fast maturing, adaptable.

Kravitz NEW! autumn harvest, faster maturing, medium sized, fast filling, sure heading, good tolerance to pinking.

Witiza NEW! autumn harvest, medium to large-sized heads, highly uniform, dark green, sure heading smooth leaf.

AUTUMN – WINTER ICEBERG:

Pedrola, autumn standard, reliable, adaptable, produces medium sized heads with high pack out in changeable weather.

Diegola, robust, adaptable winter variety, large frame and good wrap for head protection, uniform round heads.

Icemaker (aka Icefall), late Autumn and late winter excluding mid winter, medium to large framed, with large heads, adaptable to go into Spring period.

WINTER:

Botiola (aka Icebreaker), winter standard, reliable, large size heads, firm heads with good volume, even under adverse conditions.

Pelayo, for very cold climates with large frame and large heads for Southern climates mid winter.

Sancho (New to Trial), the largest mid winter variety in our assortment that handles cold conditions with large head size and large frame.

SPRING ICEBERG:

Pedrola, spring standard, reliable, adaptable, produces medium sized heads with high pack out in changeable weather.

Nolaf NEW! spring and autumn, medium size, dark green colour, sure heading and fast maturing, adaptable.

Berruguete NEW! true spring variety, med-large head and frame, cold tolerant, versatile, uniform and high cut out, strong against big vein.

SUMMER – AUTUMN:

E01E.12373, (New to Trial), flexible summer to autumn type, flexible wide harvest window, large heads, suits fresh market best with good recovery for processing, excellent results in the 2021 summer.

VICENTOLA, flexible variety for later Summer and into Autumn, flexible variety, beautiful flat round shape for easy harvest, dark green.

EAZYLEAF - YEAR ROUND:

Wildebeast, standard high yielding mid-dark green incised coral, serrated spiky leaves, fine leaf attachment with crisp texture, pair with Rhone.

Rhone, high yielding deep red incised coral type, spiky serrated leaves, fresh green highlights, fine attachment, pair with Wildebeast.

Budgee, compact green multi cos type, great taste, many leaves of the same size, perfect for salad mix leaf.

GREEN OAKLEAF:

Alvier NEW! mid green fresh shiny oakleaf, with smaller lobes, very uniform, high yield of well filled heads, open field and NFT, year round production.