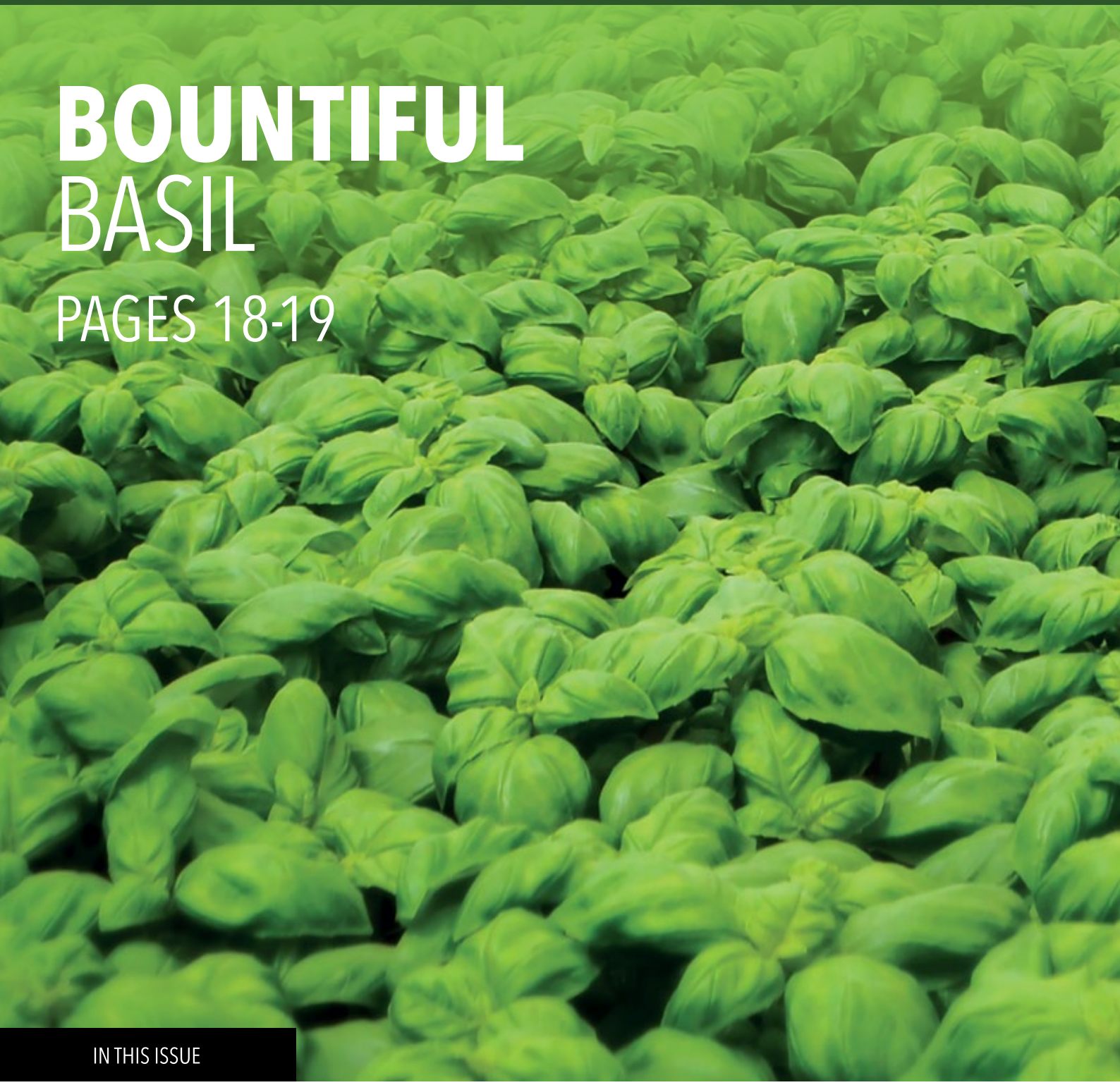
NZGROWER®

VOL 75 | NO 08 | DECEMBER 2020

HORTICULTURE NEW ZEALAND



BOUNTIFUL BASIL

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ON THE COVER:

Superb Herb 'is growing quite nicely', see page 18. Photo by Helena O'Neill.

CONGRATULATIONS TO JACINDA ARDERN AND OUR NEW GOVERNMENT

Words by Barry O'Neil, President : Horticulture New Zealand

New Zealanders have well and truly determined who will govern New Zealand for the next three years with Jacinda Ardern's Labour Party absolutely smashing predictions regarding the election outcome.

My congratulations to the Prime Minister and her Labour team as they begin the process of governing New Zealand for another term. I wish them all the very best in leading the people and country to future prosperity. It will be one of the most challenging three-year terms of any government, needing to keep people safe while we have economic woes forced by huge borrowing due to Covid-19. With our border closed to tourism as well as the world's economies grinding to a halt under further waves of Covid restrictions, it's not hard to see how tough it will be!

Tough times call for strong leadership, focusing on what really matters, and one thing about this government with its strong mandate and majority is they will be able to cut through the political malaise that normally slows down good policy making. And put simply, what matters most is the people of New Zealand and their communities and rebuilding a sustainable national economy.

Horticulture New Zealand recently released our post-election brief to the incoming government which highlights the areas on which we ask the government to focus its efforts.

It is titled "Backing horticulture's success and growing out of Covid," and I encourage you to read it (https://www.hortnz.co.nz/assets/Uploads/2020-07-17-HortNZ-election-manifesto-2020-.pdf).

I was delighted to see that pre-election the Labour party had a specific policy on horticulture – the first time I can remember a political party having such an explicit focus on our sector – to back the horticulture sector to seize new opportunities for growth and stay ahead of international competitors. We look forward to working with the Minister and his officials in realising this commitment.

And I welcome back Damien O'Connor as Agriculture and Biosecurity Minister as he knows us and our sector very well and we are very pleased that he has also been given the Trade and Export Growth portfolio.

Minister O'Connor has a priority in realising the primary sector roadmap *Fit for a Better World* to accelerate the productivity, sustainability and inclusiveness of the primary sector to deliver more value for all New Zealanders. The Prime Minister highlighted this priority in announcing Damien O'Connor as Minister, and as I have written already in the annual report, this roadmap aligns well with horticulture.

The initiative is about adding $44 billion in export earnings over the next decade, through a focus on creating value – we need to be donkey deep in levering off this initiative.

Horticulture growth and its opportunities for more sustainable use of our valuable land resources cannot be ignored, as previous governments have often done as they focused on the pastoral sectors; policy settings and a framework for horticulture growth must be delivered for the benefit of all New Zealanders.

I have just returned from attending the Kerikeri Fruit Growers' Annual General Meeting and while I was up, took the opportunity to visit growers and also to look at the future growth prospects for horticulture there. Both our two Board directors who come from Northland, are active in the future growth areas, and Kathryn De Bruin is also a Trustee on Te Tai Tokerau Water Trust, which is charged with delivering one of the largest infrastructure projects seen in the province in decades.

Up to four reservoirs are to be constructed which will collectively have the capacity to store up to 20 million cubic metres of water, a much-needed boost for the region's horticulture growth opportunities. Driving from prosperous Kerikeri it's like chalk and cheese when you get to Kaikohe. But now that community has been given a lifeline with one of these water schemes, horticulture developments will hopefully soon become the major employers of choice.

Our other Northland based director Dr Bruce Campbell has been actively working with a number of Northland Māori agribusiness groups as they diversify into horticulture, and fantastic to see firsthand what is happening. Bruce Campbell also chairs the Northland Horticulture Careers Progression Governance Group, promoting horticulture careers and doing everything possible to find the future workforce. He works closely Maria Fathollahi, the Northland career progression manager who – like all our career progression managers – is very able, energetic and well-connected to the community she is serving.

Finding labour is already a critical challenge, and in areas like Northland where growth is happening not only in horticulture but in other sectors as well, we are competing for the limited resource with others.

We need the immediate fix while we focus on the longer-term solution. The only immediate fix I can see is allowing Recognised Seasonal Employer (RSE) scheme workers to enter New Zealand, exactly as Australia is doing right now. Labour committed to open up travel bubbles when it is safe to do so, and we have argued it has been safe to do so since before the election, so this to us is the immediate priority. Our sector's RSE workers in Covid-free Pacific Islands present absolutely no risk at all to our people, but without allowing them entry, our seasonal work including harvest is being put at significant risk.

A longer-term fix everyone is already actively engaged on is how to attract more New Zealand workers into hopefully permanent jobs in the horticulture sector.

Trade and market access is another priority where our industry and Labour's policies align. We welcome the continued pursuit of high-quality trade agreements that diversify our trade relationships, such as the recently signed RCEP (Regional Comprehensive Economic Partnership) agreement, and hopefully soon to be trade arrangements with the European Union and the United Kingdom.

Labour has committed to repeal the Resource Management Act (RMA) 1991 and replace it with a Natural and Built Environments Act and a Strategic Planning Act. We agree the RMA needs a major overhaul to cut through red tape that is strangling our industry, but also to enable sustainable economic development activities such as water storage proposals agreed within reasonable timeframes, and without the huge costs currently involved.

I do have some advice for the green team, we are wanting to do our absolute best to address a changing climate, we also want our children swimming in clean rivers, and we really want sustainable production systems. But rather than using a stick approach, let's work together to find the carrots that will drive the changes needed. And to the blue team, how did you get it so wrong. You will rebuild. Please work with us to understand our issues in doing that.

I'm looking forward to working with this government to realise the potential that both they and we see is desirable and achievable to get more growing happening in New Zealand. Bring it on!

MIKE TO STEP DOWN AS HORTNZ CE

HortNZ Chief Executive Mike Chapman will stand down in 2021.

Mike has given the HortNZ Board notice of his intention to finish as Chief Executive during the course of 2021. Mike will continue his duties until his successor takes office, likely to be sometime towards the middle of the year. The Board has now begun the recruitment process.

"By the time Mike leaves, he will have been our Chief Executive for more than five years. He's made a significant contribution to the organisation and our industry during this period," says HortNZ President, Barry O'Neil.

"While the Board respects Mike's decision, he will be sorely missed and appropriate arrangements will be made to formally recognise his achievements around his departure."

NZGROWER

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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.

THE COMING SEASON

Words by Mike Chapman, Chief Executive : Horticulture New Zealand

The government has announced that it will permit some Recognised Seasonal Employer (RSE) scheme worker movement from the Pacific.

This was achieved after a concerted programme involving NZ Apples and Pears, NZ Kiwifruit Growers Incorporated and Summerfruit NZ – supported by Horticulture New Zealand, with HortNZ also representing the rest of horticulture.

Efforts to get visa flexibility for stranded RSE workers, working holiday scheme backpackers and other visitors started back during the first lockdown in March. These efforts were quickly expanded to the creation of a Pacific bubble, so RSE workers could return for the harvest and travel home again.

All this has been a seven-month campaign. At the same time, other problems caused by the Covid-19 lockdown have been raised with the government and Ministers. To name but a few: closure of independent fruit and vegetable retailers; border issues when Auckland was put in lockdown; and extending the one-year recognition of home-country driver licences for people stranded in New Zealand.

The horticulture industry collective of chief executives and business managers has worked as one to address these issues, first with daily meetings and now with weekly meetings together and with key government officials. This group also developed the Horticulture post-Covid Recovery Strategy and is identifying what needs to be done for the coming season and seeking government support for what is required.

> **“ One of the lessons from Covid-19 that we are now applying is that we all need to be more active with Ministers, Members of Parliament and the officials**

We have all had to learn how to manage Covid-19 in real time. Added to this has been the concern about keeping New Zealand safe, which has slowed decision making. We argued for quicker decisions, but keeping New Zealand safe has been the paramount consideration. We are strongly advocating for that approach to be tempered with the need to enable New Zealand’s economic recovery, and the important role that horticulture can undertake.

Making sure there is an adequate supply of seasonal labour is but one of the many roadblocks to horticulture continuing to grow and significantly contribute to New Zealand’s recovery, along with the rest of the primary sector. During the year we pursued the need for water collection and storage for both urban and rural New Zealand. We pushed hard and we will continue to push hard for compliance to be reduced to what is needed, especially when it comes to Farm Environment Plans and the implementation of climate and freshwater mitigations.

To highlight these and the other impediments facing horticulture, we produced a briefing for incoming Ministers. This is traditionally done by government ministries for the new Ministers after each election. Go to the HortNZ website to see a copy of this briefing.

As well as providing the briefing to our Minister, the Minister of Agriculture Damien O’Connor, and key officials, we also met the Minister to discuss it. One of the lessons from Covid-19 that we are now applying is that we all need to be more active with Ministers, Members of Parliament and the officials. The political environment is now different and getting action on horticulture’s issues has become harder.

I therefore think it is time for a fresh approach. I believe that will come out of horticulture’s post-Covid recovery strategy and the new cohesion we have across the product groups. We need that unity to make the difference with government.

That said, my time at Horticulture New Zealand is coming to an end after what will be a term of more than five years as chief executive. I will remain fully committed and in the role until my successor is appointed, which is not likely to be until the middle of 2021. In my final days, I will continue to do my best to further develop horticulture’s new framework for engaging and succeeding with government. ●

YOUR LEVY AT WORK

INDUSTRY WIDE ISSUES FOR INDUSTRY GOOD

NATURAL RESOURCES AND ENVIRONMENT

AIR

NZS 8409:2004 – Management of Agrichemicals Submission

NZS 8409:2004 provides practical and specific guidance on the safe, responsible and effective management of agrichemicals. This includes plant protection products such as herbicides, insecticides, and fungicides.

NZS 8409:2004 is referred to within Regional Plans. It is often a permitted activity standard for managing the environmental effects of agrichemical spraying.

Horticulture New Zealand will engage with product groups and growers to seek feedback on the draft guidance, and on HortNZ's own submission. The closing date for submissions is 1 February 2021.

CLIMATE CHANGE

He Waka Eke Noa – Grower Reference Group

HortNZ is facilitating a grower reference group. The growers include kiwifruit, avocado, berryfruit, process vegetable and fresh vegetable growers.

The grower reference group has discussed farm planning, emissions reporting and emissions pricing.

HortNZ is also facilitating product group reference groups, to keep product groups up to date with the progress of He Waka Eke Noa. HortNZ and product groups are working together to help growers meet the He Waka Eke Noa emissions reporting milestones. These milestones require a quarter of farms in New Zealand to hold a documented annual total of on farm greenhouse gas emissions by December 2021, and that all farms hold a documented annual total of on farm greenhouse gas emissions by December 2022.

WATER

Ngaruroro Water Conservation Order Mediation

In 2019 the special tribunal granted a Water Conservation Order (WCO) for the upper Ngaruroro river. The WCO required the upper river to be managed in its natural state.

HortNZ did not appeal the decision. But the decision was appealed by a number of parties. White Water Rafting NZ and Forest and Bird's appeal sought that a Water Conservation Order also apply to the lower river.

HortNZ joined the appeal in support of Hawke's Bay Regional Council. HortNZ's primary concern is that we do not support a Water Conservation Order being applied to the lower river.

In October, HortNZ attended Environment Court Mediation. Constructive conversations were held between parties, but matters were not resolved.

Hawke's Bay Outstanding Water Bodies Hearing

HortNZ has developed evidence on the Hawke's Bay Regional Council's proposed Outstanding Water Bodies Plan Change. HortNZ presented at the hearing in Hawke's Bay in November.

The proposed Outstanding Water Bodies Plan Change identifies 38 water bodies as outstanding. This includes the Heretaunga and Ruataniwha Aquifers. HortNZ's view is the Plan Change should focus on those water bodies that are truly remarkable.

HortNZ disagrees with the hierarchy of values proposed in the proposed Plan Change. The Plan Change proposes outstanding values are prioritised above significant values. The Plan Change also determines that economic and consumptive values cannot be classified as outstanding.

Horizons Plan Change 2 Hearing

In October HortNZ presented evidence at the Horizons Plan Change 2 hearing. Plan Change 2 is an interim plan change. The purpose of the Plan Change is to correct issues with the One Plan. Horizons will still need to develop another Plan Change before 2024 to implement the National Policy Statement for Freshwater 2020.

> **HortNZ's preferred approach is that Plan Change 2 should focus on ensuring growers are implementing good and best management practice**

The focus of Plan Change 2 is to get all growers and farmers within the target catchments consented with robust conditions. The consent conditions will drive the uptake of good and best management practices over time.

On the whole, HortNZ supported the changes that were made to the Plan Change 2, that were presented by the Council's Planner within the Section 42a report.

The exception to this was technical evidence that Council relied on to estimate the percentage reduction in nitrogen leaching that could be achieved by growers.

HortNZ's preferred approach is that Plan Change 2 should focus on ensuring growers are implementing good and best management practice.

Seven growers presented evidence at the Hearing. The growers described the work they are doing to manage environmental effects. They talked about their crops and markets and the specific requirements of vegetable growing. Growers highlighted the importance of vegetable growing for New Zealanders' health and the valued history of vegetable growing in the region.

LAND

Timaru District Plan Submission

Timaru District Council has notified the Proposed Timaru District Plan for public consultation. Key matters that are managed by the District Plan include:

- Land zoning and subdivision – managing how land use change can occur and where urban growth is located.
- Reverse sensitivity issues for managing conflict between land uses (including things such as noise, light, standards for sensitive activities).
- Provisions for buildings and structures such as glasshouses, packhouses, worker accommodation and crop protection structures.
- Storage and management of hazardous substances.
- Protection of special features and landscapes.

> **HortNZ held a grower meeting in Temuka to discuss growers' key concerns and issues**

HortNZ held a grower meeting in Temuka to discuss growers' key concerns and issues. HortNZ will review the proposed Plan, undertake further consultation with growers and prepare a submission in the best interests of growers.

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NZ GROWERS WELL PLACED TO MEET EUROPEAN GREEN DEAL

Words by Elaine Fisher

New Zealand growers can make the most of their competitive advantages when it comes to meeting proposed new standards like the European Green Deal, says Hawke's Bay AgFirst Horticultural Consultant, Leander Archer, who has just completed a report on the topic.

"The Green Deal is the EU's plan to be climate neutral by 2050 and make the supply chain more eco-friendly. That will impact on our exports to Europe."

The EU plans to carry out a series of initiatives aimed to protect the environment and boost the green economy and will expect countries exporting food to the union to move in the same direction.

Leander's report was for New Zealand Apples and Pears Inc and investigated what changes would be needed to meet the EU Green Deal requirements.

"Actually our growers are well ahead in this space, but there are things the industry will need to do to not only meet EU requirements but also new standards in this country," says Leander who is a member of Women in Horticulture. "I'm excited that the world is moving towards an eco-friendly future and I want New Zealand industries to lead in this space – the unfortunate part is then having to prove it to everyone, which means a lot of administration for growers.

"The usual carbon, energy, water use and chemistry use topics are all there, but there's also focus on biodiversity, food waste, nutrient loss and the very exciting one – reducing non-circular packaging."

> "The very exciting one – reducing non-circular packaging

When Leander joined AgFirst five years ago, after completing a Bachelor of AgriScience majoring in Horticulture at Massey University in 2015, she encountered an industry vastly different from that 15 to 20 years earlier.

Leander Archer, Hawke's Bay AgFirst Horticultural Consultant, and Women in Horticulture member

The industry she knows today is focused on beneficial insects, and targeted use of soft sprays. "When I heard about what used to happen with calendar spraying and the harsh chemicals applied in the past I was surprised," says Leander who is impressed at how growers now manage their orchards.

"I hold the environment very close to my heart and support management techniques which protect it. However, I have studied chemistry and understand that there are soft, targeted synthetic sprays which break down after use into non-harmful substrates. These are important to protect growers' crops and I would not like to see the industry lose the right to use them or lose the ability to register new ones. There's a new book on the topic called *Farewell Silent Spring* by Howard Wearing, published by the NZ Plant Protection Society."

Horticulture has proved to be perfect for Leander, who as a senior student at Tawa College in Wellington, had no idea what career she wanted.

"People were telling me to find my passion and follow that, but I wasn't sure what it was. I asked friends and family and they said 'avocados' and 'eating fruit'. I am good at science, care for the environment and enjoy interacting with people, but being a chef didn't quite fit."

> "Jobs are in some of the best regions in terms of climate

When a family friend suggested horticulture, Leander took a look at the Massey degree and became convinced that was for her – for many reasons. "It was a cool degree which led to a career in the fresh food industry, with a strong potential for job security; much of the work is outdoors and it's also about helping feed people, and the environment.

"Because horticulture is about growing food it means jobs are in some of the best regions in terms of climate and I enjoy regional areas and the small-town feel."

Another unplanned advantage was that house prices were more affordable in the regions. As a result, she and fiancé Connor have bought their own home. "It's very much a doer-upper but we are loving it."

While studying for her degree Leander had the chance to attend horticulture conferences and meet people from a diverse range of occupations. "This showed there are so many opportunities within horticulture."

Leander began with Hawke's Bay AgFirst as a technician and is now a consultant. She has a strong focus on environmental sustainability across all horticultural crops and is a specialist in the growing of apples and pears. Her roles include a mix of data analysis and reporting, environmental projects, orchard assessment and grower consultancy.

"I enjoy working with growers, helping them make sometimes small changes which can significantly increase their returns."

Assessing land for horticultural production and putting together orchard development budgets are some of Leander's favourite jobs. She also enjoys helping growers with orchard planning and crop estimation and sees a wave of Farm Environment Plans coming her way.

"Fruitgrowing and the environment are both extremely complex, linked systems and I love working with both. I don't think I'll stop learning for the rest of my career, which is just fine with me."

To keep up to date on Women in Horticulture news and activities, join our membership database by emailing **info@women-in-hort.nz**. We welcome everyone in New Zealand horticulture who is interested in this exciting initiative.

2020 BIOSECURITY WRAP UP

Words by Anna Rathé : Horticulture New Zealand Biosecurity Manager

Despite 2020 being a tough year for many reasons, there have been some great wins in the world of biosecurity.

The pea weevil incursion in the Wairarapa was declared eradicated in February this year, an achievement that is believed to be a world first. As well as this, operations in response to an incursion of Queensland Fruit Fly in Northcote, Auckland, came to a successful conclusion in January after six months with no detections, which meant that New Zealand was once again able to declare country freedom from the tiny but devastating fly.

The closure of New Zealand's borders in response to the Covid-19 pandemic has potentially had one small silver lining – reduced biosecurity risk via passenger pathways. New Zealand has strict biosecurity measures in place on all pathways to reduce the risk of new pests and diseases entering the country, but the reduced number of people arriving by air, private vessels and cruise ships is likely to have diminished the biosecurity risk even further.

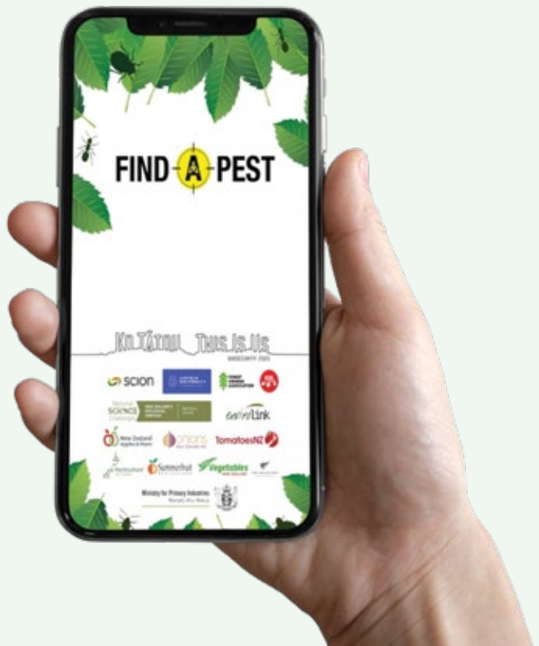
It was heartening to see funding allocated in this year's central government budget for new interim Level 3B Post Entry Quarantine greenhouse units. The additional capacity provided by the units should make some progress towards easing the bottleneck that is currently limiting importation of new breeding material. New plant varieties and germplasm must be held in secure containment in quarantine while undergoing testing for high-impact pests. The additional quarantine capacity should help with the horticulture sector's desire to access new breeding material while appropriately managing biosecurity risk.

This year has been an opportunity to review some important parts of the biosecurity system to ensure that they are fit for purpose. This includes continuation of the Biosecurity Act 1993 review which was instigated in 2019 and will continue into 2021, and the Government Industry Agreement for Biosecurity readiness and response (GIA) Deed is being reviewed by the partners. The Ministry for Primary Industries (MPI) also reviewed and updated a number of import health standards this year to make sure that we are keeping up with and managing the evolving risk from brown marmorated stink bug.

Industry, government and scientists continue to scan for emerging risks offshore. Currently we are keeping our eye on fall armyworm which has recently arrived in Australia, and spotted wing drosophila which is proving tough to manage in Europe and the United States. Readiness activities for brown marmorated stink bug, fruit flies of economic importance and *Xylella fastidiosa* are ongoing under the Government Industry Agreement framework.

Looking forward into 2021, we would like to encourage all growers to play your (very important!) part in New Zealand's biosecurity system. You can do this by:

- Committing to the preparation of an on farm/orchard biosecurity plan. Guidance that steps you through how to prepare a plan is available from your industry body and on the Horticulture New Zealand website.
- Making yourself familiar with the most unwanted pests, pathogens and weeds for your crop(s).
- Downloading the new find-a-pest app and reporting anything unusual. You can use the app or the MPI pest and disease hotline (0800 80 99 66) to report, whichever you prefer.
- Remaining vigilant when you open packages, mail or freight from overseas (including Christmas presents!) Unpack imported goods in an enclosed space and inspect them carefully for any unwanted hitchhikers.



HAVE YOUR SAY ON HOW AGRICHEMICALS SHOULD BE MANAGED IN NEW ZEALAND

NEW ZEALAND Agrichemical Education Trust

Words by Jane Lamb : New Zealand Agrichemical Education Trust General Manager

NZS 8409:2004 is the New Zealand Standard for the Management of Agrichemicals and informs the use of agricultural chemicals including plant protection products (herbicides, insecticides etc) and veterinary medicines. It has been more than 15 years since this standard was reviewed and updated.

The New Zealand Agrichemical Education Trust (NZAET) is leading this review and the new Standard is now available for public comment. The process, key changes and some important questions for industry to consider are set out here.

The process

A Standards Development Committee (SDC), with representatives from industry, central and local government and agrichemical users, was established in November 2019. In addition, five Working Groups were formed to look at specific elements of the Standard. That is, application technology; notification, signage and spray drift; off-label use; dairy detergents; and drones (and aerial application).

Every section of the NZS 8409:2004 Standard has been thoroughly reviewed with input from numerous experts. This final draft has been reviewed and approved to go out for public comment by the SDC.

Shall and should

The Standard includes both 'shall' and 'should' statements. Many but not all of the 'shall' statements are regulatory requirements. Compliance with all 'shall' statements is required to comply with the Standard. Industry quality assurance programmes such as NZGAP (Good Agricultural Practice) or regional plans may require compliance with part or all of the Standard, so it is important that agrichemical users review the proposed 'shall' statements to ensure they are all workable in their industry or particular situation. 'Should' statements reflect recommended or 'best' practice.

Key changes and questions to consider

While there are proposed changes to all sections of the Standard, the following reflects those sections and/or topics where more extensive change has been made.

Key changes and questions to consider		
Scope of NZS 8409	A key change to the scope of the Standard is to limit its application to the workplace. The Hazardous Substances Regulations 2017 are a significant determinant of the rules applying to hazardous substances and these regulations only apply to the workplace. The proposed Standard has been expanded to include dairy detergents. Fumigants, on the other hand, have been excluded from the new Standard due their very specific requirements and low number of users. Vertebrate Toxic Agents (VTAs) remain outside the scope of the Standard. In order to distinguish herbicides, fungicides etc from other agrichemicals such as dairy detergents, the term 'plant protection products' has been introduced. This is in line with usage overseas. Many plant protection products are sprayed onto the target plant, which introduces particular risks to be managed. The new scope also recognises that agrichemicals, particularly plant protection products, are used well beyond agricultural and horticultural activities. For example, the conservation sector is a big user of herbicides, as are the amenity and recreation sectors. The challenge for the proposed Standard is to ensure it is appropriate for all users of agrichemicals in the workplace, and all types of agrichemicals.	**Question:** Does the proposed Standard reflect your use of agrichemicals? Does it work for your particular situation?
Storage	Most changes in this section reflect regulatory changes, such as the requirement to obtain a Location Compliance Certificate if threshold volumes are exceeded. Some of the new regulations are very specific to classes and quantities of agrichemicals. To try to minimise complexity, the Standard is limited to quantities and hazard classes usually stored by agrichemical users. Those storing higher than usual volumes or more hazardous substances may need to consult the regulations directly to find the applicable controls for their situation. In particular, fumigants are not included in the scope of this Standard and the application to flammables is restricted to smaller quantities and assumes most stored agrichemicals are not highly flammable in nature. Another change to storage in the proposed Standard is the removal of the distinction between retailers and users. The Hazardous Substances Regulations apply controls based on the quantities and classes of hazardous substances, so a small retail supplier and a large user store may need to implement similar controls.	**Question:** Does the Standard clearly explain the regulatory requirements for agrichemical storage in a way you can understand? Do the quantity limits on flammables mean you will have to seek guidance beyond the proposed Standard?
Notification and signage	The current Standard has some gaps in relation to notification and signage. In most regions, these gaps have been filled through regional plan rules. However, this means there is significant variation between regions. Appendix C of the proposed Standard includes requirements for the preparation of a spray plan, notification of affected parties and signage when spraying. The concept of an 'on-site risk assessment' to be undertaken immediately prior to spraying is also introduced. This risk assessment is an opportunity to consider whether the job can be done safely and effectively given the conditions on-site on the day.	**Question:** Are the proposed requirements for planning, notification and signage workable for you?

Competency and training	There are requirements for competency and training set out in the Hazardous Substances Regulations 2017 and the Environmental Protection Authority (EPA) Hazardous Property Controls Notice. There are often also requirements in regional plans. Appendix F of the proposed Standards has been substantially rewritten to reflect new rules and also provide a recommended approach for regional councils and agrichemical users that meets the regulatory requirements. The type of equipment used, hazard classification of the agrichemical, nature of the location and degree of supervision influence the recommended or required level of training. Direct supervision and indirect supervision have been defined to assist with interpretation. As always, experience and on-job training are important alongside formal training or certification.	**Question:** Are the recommended qualifications and degree of supervision reasonable and workable for your industry and your particular situation?
Global Harmonised System of hazard classification	The EPA has advised a move from our current system of classification of hazards to the GHS (Globally Harmonized System of Classification and Labelling of Chemicals). This is being progressively introduced onto agrichemical labels and product data. The proposed Standard provides both the new and the old classifications when discussing hazard classifications, including a translation table in Appendix A. For ease of understanding, new terms such as 'high human toxicity', 'high ecotoxicity' and 'very high human toxicity' have been introduced to reflect common groupings of classes subject to particular controls under Hazardous Substances Regulations or the EPA.	**Question:** Does the Standard accurately reflect the transition from the current system of hazard classification to GHS? Is the introduction of the terms 'high human toxicity' and 'very high human toxicity' useful?
PPE	Appendix R covering personal protective equipment (PPE) has been rewritten to reflect the changes to technology and the regulatory environment. A new subsection has been added on the assessment of risk factors along with a table of risk factors similar to the widely used spray drift table of risk factors. There is also a new section on the use of enclosed vehicle cabs and procedures for avoiding contamination. More detail has also been provided on the selection of gloves.	**Question:** Does the new PPE risk factor table cover all risks appropriately? Is it a useful tool for assessing PPE requirements (alongside product information)?
Disposal	The disposal section (and Appendix M) has been updated to reflect current practice and higher environmental standards. Recycling of empty containers has been prioritised against other disposal options and the option for burning empty containers has been removed. More detail has been provided on how to dispose of contaminated water, for example from sprayer washings, and contaminated absorbent material used to clean up spills.	**Question:** Are all the 'shall' statements relating to disposal achievable in your industry or situation?

Feedback

A copy of the proposed Standard and submission documents can be found at: **www.standards.govt.nz**. Feedback is required by **1 February 2021**.

Feedback can be provided directly via the StandardsNZ website or provided to your representative industry organisation to consolidate on behalf of those they represent.

If you would like to seek clarification on any point prior to making a submission, please email your enquiry to the project manager (**mel.dingle@growsafe.co.nz**) or check the website (**www.growsafe.co.nz > news and updates**) for updates and FAQs.

YOUR INDUSTRY

ACROSS THE SECTOR – ACROSS THE COUNTRY

26 BIG CHANGES FOR BERRIES

REDUCING WASTE – CONSUMER EDUCATION IS KEY

Words by Glenys Christian

Shoppers need more education about why the fresh fruit and vegetables they buy are packaged the way they are, according to Professor Karli Verghese, the REDUCE programme leader in Australia's Fight Food Waste Cooperative Research Centre (CRC).

She told the post-harvest webinar series in mid-November that consumers need an explanation about why certain packaging is used for the food they buy.

"With cucumbers the plastic wrapping extends the shelf life," she said. "But consumers don't know that."

There are a number of ways to get such information out to shoppers, as it can be printed on the paper or plastic packaging, along with details about suitable storage. An example is the use of solid coloured plastic bags, which Woolworths uses for potatoes to protect them from sunlight, and this is clearly explained on the packaging.

Karli, who is also a principal research fellow in the industrial design programme of the School of Design at the Melbourne Polytechnic, said packaging is often viewed as having a negative impact on the environment as it is left over once a product is consumed. But it protects food and prolongs its shelf-life, which leads to an overall reduction in environmental impact by minimising food waste.

The Fight Food Waste CRC was set up two years ago. It now has 60 participants, from growers to state governments, all working collaboratively on 80 different projects over the next eight years with 30 PhD students involved in the research.

"It all starts with understanding why waste is occurring from harvest through retail sale to households," she said.

> "It all starts with understanding why waste is occurring from harvest through retail sale to households

A survey conducted last year showed that up to 60% of fruit and vegetables are wasted in some form, so there is an opportunity to understand what each of these groups are doing. Waste was ranked number eight out of 14 when consumers were asked about their priorities when it comes to purchasing decisions with price, quality, taste and shelf life taking out the top spots.

"There's a real opportunity to focus on packaging," Karli said.

Some 64% of respondents thought fruit packaging wasn't required but 42% believed there is less wastage if food is packaged. And just over half of those questioned (55%) kept fruit and vegetables in its original packaging.

Asked whether the arrival of Covid-19 had affected consumer behavior she said there is increased consciousness of purchasing loose produce at the start.

"Then with all the home food deliveries, packaging was filling up recycling bins," she said.

It is estimated that Australia's food chain wastage totals A$20 billion a year, with up to A$2 billion of losses occurring in agriculture, up to A$1.2 billion in the post-harvest sector, a similar amount in processing, up to A$1.7 billion in distribution, A$3.5 billion in food services and over A$10 billion in households.

60%
of fruit and vegetables are wasted in some form

64%
of respondents thought fruit packaging wasn't required

A$20 billion
total of Australia's food chain wastage

SUPERB HERB
IN A POSITIVE PLACE

Words by Helena O'Neill

Tucked away to the northwest of Auckland is a fragrant operation producing a wide range of herbs and edible leaves.

Superb Herb grows 23 varieties of herbs; the most popular being coriander, basil, mint, and parsley. About three tonnes of herbs are produced every week across the five-hectare greenhouse space at Parakai.

Superb Herb managing director Ken Rogers says the company is in a positive place despite the often challenging environment caused by the Covid-19 pandemic.

While the year-round operation does not use RSE (Recognised Seasonal Employer) scheme workers, finding enough staff is always a challenge.

They employ about 60 staff and last year built a new, automated glasshouse at the Parakai site.

"The old systems are very labour intensive, so the big thing that we've done when we went into this new greenhouse is that we've mechanised and automated the front end of our business.

"All of the seeding and the spacing is now handled on mobile tables and with robots. We still have quite a lot of labour in the harvest end of the business but again, we're working on that.

"It's really impossible to get staff. The type of work is quite hard, and it's hot in the houses. The faster we can mechanise these things, the better," Ken says.

Seeded pots travel on automated tables to the germination area, where they can grow in a climate-controlled area, in nutrient-rich soil with minimal contact. Plants circulate throughout the 1.2ha greenhouse until they reach maturity, returning to the working area for harvest, packing and dispatch. Irrigation, fertilisation, and climate are all controlled and monitored electronically.

The system also automates the spacing stage in the first weeks of plant growth, when each pot has to be individually spaced so they can get the optimum light and ventilation. More than 7,000 pots are spaced daily by two spacing robots – something which used to be done manually.

The company was founded in 1974 by Jim Pike in Henderson Valley, originally growing cucumbers, capsicums, and eggplants, moving to herbs in 1980. In 2013 the company opened a second site, in Parakai. This has now become the centre of growing operations, with the packaging, packing and distribution handled at the original property.

Plants are grown in greenhouses using gullies with peat as the growing media. The new glasshouse is completely different, using an ebb and flow system from the Netherlands.

Sales and marketing manager Brigitte Hannett says the system is definitely the way forward, being much easier to handle and requiring less intensive labour.

Superb Herb uses integrated pest management, and all greenhouses have bio-mesh on them as the company tries to exclude pests.

"We don't use hard chemistry in the houses. We use eco-oil or neem, natural crop protection if required, otherwise, we use predatory mites to control pests. And it's working," Ken says.

"We've never been using chemicals but what we're doing now is to bring down the amount of sprays of neem and eco-oil that we use. A good example is the makrut [kaffir] lime. We used to spray it all the time, now we're using mites and the sprays are absolutely minimised."

The main focus is on supplying the retail market, although they also supply some restaurants. As for the impact of Covid-19 on supplying their Hong Kong market, Brigitte says that there were no major issues other than one week when they were unable to export.

There is room to grow at the Parakai site where they hope to move the packaging and packing operations from Henderson Valley within the next few years.

"The business is growing quite nicely," Ken says.

Brigitte says new products such as potted rosemary and French tarragon are also in the works, following the release of leafy greens in 2018.

> **"We don't use hard chemistry in the houses. We use eco-oil or neem, natural crop protection if required, otherwise, we use predatory mites to control pests. And it's working.**

"We've launched the leafy greens, out of the different types we have, one that is doing quite well is the pea tendrils. We call it crazy peas because it's crazy, it just grows back as soon as you cut it. You see it in a lot of restaurants as a garnish. It's not a herb so it's something different for us."

"We've looked at microgreens, we have one that is doing quite well, the micro-radish. It's beautiful, again not a herb, but it's a punchy, tiny radish."

Lockdown also sped up the launch of Superb Herb's online store and it has remained popular.

"I have a lot [of customers] from the South Island who don't seem to be able to find the specialty herbs – Vietnamese mint, garlic chives, the lemon basil. It's very often the same types of herbs that I'm seeing on the orders. So, if you can't find what you really want at the supermarket, there's another option."

Ken says that supermarkets rationalise their ranges to the stock that's moving – the bigger sellers – while the specialty stores like Farro will carry a larger range.

The key is finding the right format for each market.

"My Food Bag has been one of our customers since the beginning. They have been great, adding fresh herbs into their meal kits. We believe they have helped educate the public on what to use for what meal," Brigitte says.

"They've done a lot to develop the whole produce sector," Ken adds.

IS IT GOING TO BE OKAY?

Words by Ian Proudfoot : KPMG Global Head of Agribusiness

A common question in recent weeks has been how much I think things have really changed since March. Not an easy question to answer from the bottom of the South Pacific, unable to see for ourselves what has changed and assess what has become embedded into everyday life.

Cutting to the chase, the question really being asked is, things are going to be okay, aren't they? The simple answer to this question is yes. People still need food and the challenges food supply chains around the world have faced this year mean people now recognise the role food plays in their lives more than they have done for decades.

The focus on health and safety that has dominated global media all year also plays into our hands. We have always been a high integrity producer of food products and our 'success' in the initial phase of the Covid-19 response has reinforced this perception amongst the premium consumers we seek to sell to.

One thing that 2020 has demonstrated is that life is not simple. The global food system is complex and therefore there is not a simple answer to the question, are we going to be okay. What has become very apparent in recent months, as second waves of infection wash around the world, is that Covid-19 is not a battle we win and emerge from, it is a virus that is with us for the long-term and one the global community will need to adapt to. This means some of the behaviours adopted this year will become embedded, and my belief is that these will impact many aspects of how people access and consume food into the future.

> **Insights from colleagues around the world suggest that 2021 will likely be more challenging for the food system than 2020**

Insights from colleagues around the world suggest that 2021 will likely be more challenging for the food system than 2020. Rolling lockdowns and Covid scares will continue to impact the hospitality sector and global food service supply chains, making it difficult for growers and processors to connect their products with consumers, who will continue to source food digitally and eat at home. Labour constraints are unlikely to ease, as borders remain closed or highly restricted, making it challenging not only to harvest produce but ensure it is graded to maximise its value. The quest for sustainable, packaging solutions involving less plastic is being questioned as people seek confidence their food has been subjected to minimal human handling. Freighting product around the world will remain difficult and expensive as shipping lines and airlines continue to limit schedules to ensure their financial viability.

> **Now is the time for leaders to stand up and recognise that we need to rethink how and where we grow our produce and the technology we use to pick, sort and pack it**

Responding to these challenges with a 'business as usual' mindset will add cost at a time when economic recession means there are fewer people with the purchasing power to pay the price premiums we seek for our products. That is why we have reached the point in time when we need to think beyond riding the storm out and start to take the steps needed to pivot our businesses and our sectors to operate in the now normal future, that of a world that is learning to adapt to the virus.

We have no idea when (or even if) the Covid storm will blow out, and one of the clearest signals we are getting internationally is that people are recognising that life must go on. Yes, it will be different (working from home, wearing masks, sanitising continuously, more conscious choices about where you go, who you socialise with and what and how you choose to eat), but communities around the world are learning to keep living while the virus circulates around them. The challenge for us in New Zealand, behind our border and with a government committed to eradicating the virus, is how do we adapt to the new world that our consumers are living in and maintain our relevance to them?

Now is the time for leaders to stand up and recognise that we need to rethink how and where we grow our produce and the technology we use to pick, sort and pack it. Now is the time to put the consumer at the centre of everything we do and pivot our supply chains to ensure we are positioned to consistently and reliably meet their needs. Now is the time to redesign our consumer experiences to provide confidence about the safety of the products that we grow. Now is the time to pivot towards the future food system. This means going beyond the tactical moves taken to date and making fundamental shifts in strategy and redeploying investment to equip ourselves to thrive in the future.

Returning to the original question, is everything going to be okay? For those who are prepared to be bold and see the world in front of them as it is today, not how it was last year or how they think it should be, the answer is undoubtedly yes. It will possibly be better than before. For the rest, my guess is life is only likely to get harder. The key is that the decision to be bold rests entirely with you.

THE FUTURE IS NOW, SIR PETER SAYS

Words by Kristine Walsh

A SUSTAINABLE FUTURE: New Zealand food producers need to collaborate if they are to "play well" on the global stage, says Sir Peter Gluckman, in Gisborne to present his discussion paper The Future of Food & The Primary Sector: The Journey to Sustainability

The great thing about the internet is that, from somewhere as out of the way as Gisborne, you can get online, contact an illustrious Knight of the Realm and invite him to come and visit… and he just might.

So says NZ Food Innovation Network business development manager Nicky Solomon who, from her base in Gisborne, did just that.

When she did, Sir Peter Gluckman said yes, travelling to the East Coast in early November to share with growers and other stakeholders the findings of his discussion paper *The Future of Food & The Primary Sector: The Journey to Sustainability*.

So just 10 months after hosting the Edible Innovation event in Gisborne, the combination of Nicky Solomon and financial supporter Trust Tairāwhiti had done it again, drawing a crowd of around 80 to the picturesque Waikanae Surf Club to hear Sir Peter share key points from the paper he co-authored as a founder of the University of Auckland-based Koi Tū: The Centre for Informed Futures.

And the audience was all ears as he asked how they, as food producers, could help New Zealand capitalise on its rising reputation with a strategy that supports sustainability, while adapting to new technologies and consumer demands.

As a former chief science advisor to the Prime Minister, it is no surprise Sir Peter advocates for Government agencies to step up to create a "co-ordinated partnership approach with scientists, producers and manufacturers to support and encourage the food and production industries' journey towards a resilient future".

But he says individual producers must do their bit too, both on their own farms and in working collaboratively to make sector powerhouses that strengthen them all.

> **"We have a chance to leverage our position as a leading producer of elite primary products into developing a national brand that reflects our unique values and culture, our strength as a people, and our deep respect and affection for the environment."**
>
> ***– The Future of Food & The Primary Sector: The Journey to Sustainability***

For the food sector, the Covid-19 pandemic showed that more than ever New Zealand is reliant on a robust, vibrant food sector "and without it we would be in real trouble," he says.

"But it also raised a number of issues, among them the changing global supply chains, the challenges of a long journey out of economic downturn, and the importance of domestic food security.

"All this comes against the background of two fundamental changes that will dictate the future of food over the next 20 or 30 years – the biggest technological advances we have ever seen, and of course, the issue of climate change."

In terms of the first, Sir Peter says the raft of new technologies – from robotics to genetic engineering – can offer new ways of solving problems "but are not without philosophical discomfort."

And for the second, with around 22% of global climate change emissions coming from food production, growers must play their part in being good environmental citizens… if only because consumers will demand it.

"None of these conversations are easy and there is no magic bullet for a food sector that must ask questions like what is our future? Is it in a lot of niche markets? Is it going to be plant-based?

"These are not trivial questions for New Zealand but this is the reality as the world faces the prospect of feeding between eight or nine billion people."

> **"The Covid-19 pandemic showed that more than ever New Zealand is reliant on a robust, vibrant food sector "and without it we would be in real trouble"**

While science is at the centre of much of Sir Peter's work, the human factor must also be considered for a bright future in food.

"Farming and food production is an increasingly intellectually-driven process so we need to make sure our kids have the skills to be of value, and that we make best use of the workforce we have now," he says. "At the end of the day we have a provincial and rural social structure that needs to be protected and developed, and good planning and education will be at the centre of that."

A passionate advocate with a PhD in food science behind her, Nicky Solomon says she was keen for producers to hear Sir Peter's ideas partly because, while Gisborne grows wonderful food, much of it leaves the region without added value.

CREATING COLLABORATIONS: NZ Food Innovation Network's Gisborne-based business development manager, Nicky Solomon, says she is excited to have the opportunity to help food producers and processors take their work to the next level

"I think the pandemic reminded us of just how important food is to our economy, and our people," she says.

"But it also raised issues like how we feed our people sustainably and equitably, and how we address problems around supply chains, so I saw the Future of Food event as a chance for us to talk about how we see ourselves as food producers and how we feed a global population without damaging the planet."

And her view was supported by Trust Tairāwhiti general manager (commercial), Richard Searle.

"Here in Gisborne we grow a huge amount of high-quality fruit and vegetables on fertile soils on the flats, and the coast is rich in sheep and beef, seafood, berries, nuts and manuka honey," he says.

"We can all explore what consumers are looking for; how we can add value; how we address challenges from our changing climate; and how we can strategically use precious resources to best effect."

The final word, though, went to Sir Peter, who said that as a nation largely made up of small-to-medium enterprises, we need to collaborate if we are to play well on the global stage.

"Covid-19 has not changed how important the food industry is, but it has increased people's understanding of it, and now it is your time to build on that in a sustainable way," he says.

"If we only capture a tiny percentage of the world market we are onto a winner, so while New Zealand is small, if we work together we become so much bigger."

NZGAP
YEAR IN REVIEW

Words by Damien Farrelly : NZGAP Manager

In what has been an incredibly disruptive and challenging year, NZGAP has managed to operate successfully while continuing to develop and improve the certification system which provides assurance for the safe and sustainable production of fruit and vegetables in New Zealand.

Covid-19 response

Many NZGAP (Good Agricultural Practice) certification processes and systems have been digitised in recent years, however the swift move to Covid Level 4 meant that a complete move online was required and attained within days. This ensured that registrations and certifications could be processed remotely, so growers could continue to produce and supply to market while operating as an essential service during lockdown.

> **“ Many NZGAP certification processes and systems have been digitised in recent years, however the swift move to Covid Level 4 meant that a complete move online was required and attained within days**

NZGAP developed temporary rules and processes for off-site audit (record checks) and remote audits (interview and visual evidence of implementation), to ensure the continued credibility in certification where on-site audits were not possible. These rules are only applicable above alert Level 1, and have had limited uptake by growers to date, however NZGAP is now considering the long-term benefits and potential of remote and off-site audits, with the main benefit being reduced auditor time on-site meaning growers can get on with growing.

GLOBALG.A.P.

NZGAP continues to partner with GLOBALG.A.P. as a fully benchmarked scheme. GLOBALG.A.P. has launched a new version this year (v5.3) with another on the way (v5.4) to maintain their Global Food Safety Initiative (GFSI) recognition. As NZGAP is not currently GFSI recognised, there has been no need to re-benchmark to GLOBALG.A.P. at this stage. NZGAP GLOBALG.A.P. Equivalent will however be benchmarked to GLOBALG.A.P. version 6, which is due to be published in September 2021.

Food Act add-on

The Food Act 2014 continues to be implemented as an add-on to NZGAP and NZGAP GLOBALG.A.P. Equivalent certification. Many growers who are GLOBALG.A.P. certified have availed themselves of NZGAP’s ‘mutual recognition’ certification option as an effective way to comply with registration, verification and reporting requirements via their existing GLOBALG.A.P. system.

Food Act registrations will be up for renewal in 2021 (and every 2 years), and NZGAP seeks to make this process as seamless as possible for growers who will be notified two months in advance of their renewal date.

Environment Management System (EMS) add-on

The EMS is being adopted by growers across New Zealand with over 14,000ha currently registered and over 4,000ha already audited and certified. NZGAP is formally recognised by Environment Canterbury, and also aims to be recognised by central government via the Freshwater farm plan regulations which are expected to be developed soon as a result of the recent Resource Management Act amendment. NZGAP is also developing a climate change management area to support growers to meet He Waka Eke Noa commitments for management and measurement of their nitrous oxide emissions from fertiliser use. For growers, this will mean multiple outcomes will be met via the one integrated EMS in a similar way to how NZGAP currently meets the Food Act 2014 requirements. In addition, the EMS is currently being reviewed and improved based on feedback from growers and audits to date, as well as to incorporate improved practices from the latest research and industry guidelines (e.g. nutrient management).

ENVIRONMENT MANAGEMENT SYSTEM ADD-ON HIGHLIGHTS

14,000 HA
CURRENTLY REGISTERED

4,000+ HA
ALREADY AUDITED AND CERTIFIED

Social Practice add-on

NZGAP launched version 2.0 of the Social Practice add-on in November, meaning audits and certifications have now commenced. Version 1.0 of the Social Practice add-on was an interim registration and self-assessment process implemented in 2019 which enabled growers to get started and to improve their processes, policies and systems. There have been some minor changes due to feedback from growers and pilot audits, as well as incorporating measures to manage privacy risks associated with auditors reviewing employee records. With over 300 registrations to date, the Social Practice add-on will soon provide assurance of best practice for over 20,000 workers across the horticulture industry. Registered businesses can expect Social Practice to be audited as part of their next NZGAP audit.

SOCIAL PRACTICE ADD-ON HIGHLIGHTS

2.0
VERSION 2.0 LAUNCHED IN NOVEMBER

300+
REGISTRATIONS TO DATE

Contractor Standard

NZGAP launched the newly developed Contractor Standard in November. It has been developed specifically for contractors providing services to NZGAP, Social Practice add-on, GLOBALG.A.P. and GRASP (GLOBALG.A.P. Risk Assessment on Social Practice) certified growers or supply chain operators. Using NZGAP certified contractors is a means for growers and other supply chain operators to demonstrate the contractors they engage have met the requirements of these standards at both a production and social practice level. This will reduce the burden of growers having to check a contractor’s compliance to Social Practice requirements themselves and enable them to check the status of contractors on the new NZGAP public register for contractors (e.g. registered, approved, suspended, cancelled). ●

BERRY CHALLENGES

Words by Geoff Lewis : Photographs by Trefor Ward

Labour shortages in horticulture could lead to loss of product, significant increases in the price in the local market, and the inability to cash-in on New Zealand's near Covid-free status following enquiries from North American outlets.

Strawberry Fields Ltd runs its commercial production at Hautapu near Cambridge and a pick-your-own at Whatawhata, 10 minutes west of Hamilton.

Owner Darien McFadden says while strawberries can be had through to Easter, the peak of his season is roughly two weeks over Christmas with a 'shoulder' of several weeks either side where the bulk of the crop comes in. Overall, he requires 150 staff during the seasons, of which he has 30 regulars returning.

"I have a core crew of about 20 people but this quadruples over the core of the season. At this time of year (October) we're getting 1 tonne of fruit a day, but we can get to 12 tonnes a day during the peak. That means we need four times as many staff to harvest. Traditionally these have come from offshore.

"We try to get Kiwis through Facebook, Work and Income, and word of mouth and do a lot of training. It is difficult to get New Zealanders over the peak period as many don't want to work over the Christmas period. But the government has put a cap on the Recognised Seasonal Employer (RSE) scheme workers (Pacific Islanders working in New Zealand) at 14,000 and because of Covid-19 they are not available.

"If growers of strawberries and asparagus can't get the labour, they're going to have to walk away from blocks of produce and manage what they can with what they have."

Another looming problem is export and airfreight.

Darien says strawberries have a short shelf-life and are picked 'white' or unripe and exported by airfreight – usually on passenger flights – to arrive at their destination in a saleable condition. The Covid pandemic has reduced international air travel to a trickle of its former self. As a result, finding space on aircraft for horticultural exports has become difficult and expensive.

Darien McFadden, owner of Whatawhata Berry Farm

"Rates for air freighted strawberries going to market in South East Asia have tripled. It used to cost about $1.40 a kilo but now it's around $3.80 a kilo."

Also, the Waikato and Bay of Plenty representative for sector body Strawberry Growers New Zealand, Darien says a market is going begging in the Northern Hemisphere as Kiwi strawberry exporters are receiving enquiries from the United States and Canada due to this country's relatively Covid-free status.

"Walmart has specifically asked for New Zealand strawberries. They can get product a lot cheaper from Mexico and Florida but they want New Zealand product because we are seen as Covid-free."

Strawberry Growers New Zealand executive manager Mick Ahern says about 85% of New Zealand strawberry production comes from the Auckland and Waikato regions, of which about 10% goes to export.

"In strawberries there's a lot of smaller operators who seem to battle through. It's the medium and larger producers in the Waikato and Auckland area who are not finding things easy. The RSE workers are the core of their workforce. Often experienced people who return season after season. The larger operators are getting anxious.

"What we really need is more New Zealanders to pick and to buy an extra couple of punnets."

BOYSENBERRY INNOVATIONS
NO SMALL BEER!

Words by Anne Hardie

Glen Holland and his daughter, Ariana, surrounded by their flowering boysenberry crop in early November

Tasman Bay Berries are adding a boysenberry flavour to kombucha, cocktails and even beer these days as they team up with local manufacturers capturing the superfood market.

It's quite a change in direction for the Nelson berry business, which not so long ago was scooping out boysenberry icecreams and directing the public into rows of berries to pick their own fruit. Back then, Glen Holland and his team harvested 43ha on the edge of Richmond and employed up to 200 people through harvest, mostly on machines.

Today with just 7ha and working in conjunction with his daughter, Ariana, they are concentrating on adding value to their boysenberry crop. By teaming up with mainly local manufacturers, their boysenberries are now a key ingredient in a range of products. The Nelson-based Chia Sisters adds their boysenberries into their sparkling coconut water range, while Kombucha Bros uses their boysenberry concentrate for a naturally-fermented, alcoholic kombucha. Parrotdog Brewery uses their berries for its Glen Boysenberry Sour which not only gets Glen's name on the can, but also their Tasman Bay Berries' story. Nutrient Rescue, which is all about health and well-being, puts their boysenberry powder into its Red Shots, aimed at increasing the daily intake of nutrient-dense fruit and vegetables.

Pic's puts their fruit into a boysenberry jelly and Little Beauties takes whole IQF (individually quick frozen), freeze-dried boysenberries and dips them in white chocolate. Annies' Fruit Bars has their fruit and Tasman Bay Food Group adds juice from their boysenberries into their Juicies.

"Our goal is to really develop the added-value part of the business," Glen says. "There's a lot of competition now with fruit powders around the world, so we're trying to maintain our New Zealand difference."

> **Like other dark berries, boysenberries have an extensive list of health benefits and are a rich source of anthyocyanins and antioxidants as well as important vitamins and minerals**

Glen with the Parrotdog boysenberry sour that bears his name

This season's boysenberry crop in flower during a break in the rain

Diversity is key and the goal is to contract 100% of their boysenberries to a range of manufacturers so they can add value through a wide range of products. They've been keen on diversity after being reliant on one manufacturer for a number of years and being caught out when it didn't all go to plan. Back then it could mean carrying leftover frozen stock from year to year, which was a considerable cost to the business. Whereas now a good chunk of the berries used for the added-value products are processed by a contract manufacturer into powder which can easily be stored and drip fed to their manufacturing partners as it is needed. Being able to sell their berry product through the year has also been good for cashflow.

"This spreads our risk and because it's a powder, it doesn't have to be stored in a freezer and we have a lot less stock."

Some of their manufacturing partners have sought them out to get product, while they have also actively looked for opportunities, and they also use brokers to sell their fruit concentrate around the world.

After harvest, the fruit is processed offsite as IQF, purée, concentrate, freeze-dried or powder. By contracting any processing, Glen says they can focus on what they do best, which is growing the berries.

Working alongside manufacturing companies to produce boysenberry products is well timed, with the berry enjoying the superfood status now sought after by customers around the world. Glen says they are starting to get enquiries from countries like the United Arab Emirates because people are more focused on healthy eating.

Like other dark berries, boysenberries have an extensive list of health benefits and are a rich source of anthyocyanins and antioxidants as well as important vitamins and minerals.

"People are more health conscious and there's been a lot of research on lung health with boysenberries."

The biggest challenge for the business is getting a crop of berries off the vines each year, and in early November days of rain coincided with flowering.

"A week of rain isn't good. It usually translates to difficulties with harvest like *botrytis*. We're limited with the chemicals we can use, so we have very few weapons in the arsenal now. We have to stop spraying from mid-flowering to achieve no residue on the fruit, and after that the flower has no protection.

"We are trying to grow a crop that is clean, residue free. We're always looking for new products that can do the job and they don't come around too often."

Ariana says every batch of fruit that is processed into concentrate or powder is tested to obtain a certificate of analysis so their manufacturing partners can give assurance to their customers.

Glen says their new direction enables them to work alongside food and beverage manufacturers and adapt the business to cater for what is needed. Any future growth in their berry business will be aligned with those partnerships, he says.

ASHBURTON MARKET GARDEN GETS HISTORIC LISTING

Words by Heather Chalmers : Photographs by Robyn Burgess, Heritage New Zealand Pouhere Taonga

Descendants of the Ng King brothers, the five original settlement landowners, gathered last year to celebrate the historic Ashburton market garden being declared a significant archaeological site

The last remaining example of a twentieth century Chinese market garden settlement in New Zealand will be restored after receiving funding and a historic places listing.

Restoration work will start in January at the Ng King Brothers Chinese market garden settlement in Ashburton after it received $130,000 in funding. This follows the site being added as a Category 1 historic place to the Heritage List.

The Ng King Brothers market garden operated from the early 1920s until 1964 and quickly grew to be the largest Chinese market garden in the South Island.

Heritage New Zealand Pouhere Taonga listing advisor Robyn Burgess says that the site is remarkable as its buildings are mostly intact and includes one of only a few remaining original Chinese pig pit ovens in Australasia.

The site was more than a business. Kinsmen from China were offered employment, company and education at the site. The King Brothers hosted Chinese travelling through the South Island. The Chinese sense of family and community meant that families lived onsite once the men were able to bring their wives and children to New Zealand from 1939.

By the late 1940s there were about 12 houses in the settlement and at least 80 people living on site. The nearby Allenton School set up special English classes to support the new children.

In the early 1960s, the market garden business was starting to wind down and the families started to move on to their own ventures in Ashburton and other South Island towns.

Consultant heritage planner Arlene Baird, who has been involved with the site since 2014, says it was incredibly challenging at the start. "These buildings which are so rich in history were in desperate need of repair, but due to the complex ownership of the property, funding options were very limited."

The Ng King descendants, Ashburton District Council and Heritage New Zealand worked collectively to save the site.

Yep Ng, son of one of the original King Brothers, spent five years contacting descendants to get their approval for the Ashburton District Council to manage the site as a reserve. "The original King Brothers settlers understood the power of co-operation and how it could lead to great success as a community – that same approach has been equally successful nearly 100 years later," Arlene says.

Funding has come from Heritage New Zealand, the Ashburton District Council and a grant from the Chinese Poll Tax Fund.

Historic photos from the Ng King Chinese market garden settlement at Ashburton

During restoration, the buildings will be retained as true to their original appearance as possible to enable visitors to imagine what life on the settlement would have been like 100 years ago.

> **The Ng King Brothers market garden operated from the early 1920s until 1964 and quickly grew to be the largest Chinese market garden in the South Island**

Restoration work at the Ng King Brothers Chinese market garden settlement site at Ashburton will begin in January

A new information sign has just been erected at the entrance to the former market garden settlement telling people about its history. Once the restoration work is completed, the site will be open to the public.

Further interpretation will explore the story of Chinese immigration to New Zealand, what the buildings were used for and what it was like to live in the market garden settlement. There will be picnicking areas, walkways, and open spaces for informal recreation. The former shop will also house artifacts found on site during the project.

The descendants of the original Chinese owners see this as their way of giving something back to the Ashburton community. The family have also recently conducted an oral history project, recording the memories of their elders who recall living and working on the site.

2020 – FAST AND FURIOUS

Words by Glenys Christian

Pukekohe vegetable growers learned a lot through the last year but many of those lessons they hope not to have to put into practice in the future, says Pukekohe Vegetable Growers' Association (PVGA) president, Kylie Faulkner.

Immediately before the first Covid-19 lockdown early in the year she said growers probably realised what was to come.

"But we didn't realise how quickly that would happen."

The saving grace was how rapidly growers worked out solutions for their own particular situations in order to keep their businesses running.

"We didn't know how we could operate with two metre distancing for pickers," she said.

"We couldn't get perspex right away but our maintenance manager came up with the idea of using plywood. It was all so fast and furious we forgot about how well we pulled ourselves together and rallied."

For Auckland's second lockdown in August the situation was more difficult to manage, with many growers having crops growing in areas under Level 3 restrictions but processing and packaging facilities under Level 4, inside the Auckland border.

"We had to treat them all the same," she says.

There were frustrations with the constant questioning of staff moving between properties, and the PVGA called in Horticulture New Zealand's help to get specific meetings on some issues.

"We just wanted to get on with it," she says.

Requests to meet with Police representatives made from the start of the lockdown weren't answered until three to four days before the lockdown ended.

"It could have been speeded up a lot," she says.

"There wasn't planning on a regional level."

Kylie says the big issue in the wake of the lockdowns was labour shortages which growers had been warning about for some time.

"We desperately need staff."

Kylie Faulkner says the industry desperately needs staff

Potato and onion growers are coming up to harvest time but one of the larger businesses in the area is short of 20 machinery operators who usually came from Europe to perform this work.

"It's not something that's going to go away and we've been saying that since May," she says.

"We need to be thinking 12 to 24 months out."

Redeployment of Biosecurity staff to try to attract more workers to the area is a work in progress and there are attempts being made to set up local training courses funded by the Ministry for Social Development (MSD) for "Covid refugees". But there are issues with those who find themselves out of employment not being skilled, not wanting to do physical work and not keen to move between regions when different crops are being harvested.

Environmental issues didn't stop. The PVGA appealed the Waikato Regional Council's Plan Change 1 which will be heard in the Environment Court next year, and also submitted on section 274, allowing it to address other submissions.

When it came to the Government freshwater reforms the PVGA had engaged with local iwi and hoped that the two groups would receive Ministry for the Environment (MfE) funding to study water issues on a catchment basis.

"We can't have one grower doing something amazing and others not," Kylie says.

Better results would be achieved by increasing knowledge and working together.

"We've had very positive conversations with iwi so far."

Getting more young people interested in horticultural careers will receive a boost when the PVGA awards its inaugural centennial scholarship later this year.

"That's really exciting because we want to invest in the future," she says.

Part of that was her involvement in the Trade and Enterprise Made with Care campaign aiming to showcase New Zealand primary production overseas, explaining over a range of media why the country produces such high quality, nutritious food.

Also looking to the future, the PVGA called a recent meeting between growers and packaging companies to address issues around the availability of crates. There had been a lack of communication, so the meeting gave companies the chance to explain the situation as they saw it.

> **"Getting more young people interested in horticultural careers will receive a boost when the PVGA awards its inaugural centennial scholarship later this year**

"And it was a good opportunity for growers to voice their concerns and ask questions," she says.

As for the year ahead, labour shortages are likely to feature as the biggest issue for growers, but Kylie is also acutely aware that there's just a short time until 2025 for Auckland Council to develop its freshwater policy which growers hope won't mirror the policy for Waikato. A meeting at the end of November between association and council representatives discussed water modelling tools as a first step.

"That's an interesting piece of the puzzle," she says.

It's also hoped that farm environment plan workshops curtailed by Covid-19 will be able to get underway early in the new year.

And hopes are high that once again the Young Vegetable Grower of the Year Competition will be able to be held in Pukekohe in May. ●

LOCKDOWN DID HAVE A SILVER LINING

Words by Glenys Christian

Doug checking kumara on harvester

After the prolonged drought early in the year, Dargaville kumara growers found Covid-19 did have a silver lining when it came to ongoing labour issues.

"If it had happened any other year it would have been a disaster," Northern Wairoa Growers association chairman, Doug Nilsson, says.

But with yields down around 40% because of the lack of rain through late 2019 and early this year, it was possible for growers to find enough labour and suitably social distance people so that the crop could be harvested in a much shorter time than usual.

"If not we would have lost half the crop," he says.

During lockdown there were problems however, being able to keep sanitiser and masks supplied to workers. And on his property just northwest of Dargaville, growing around 100 hectares of the crop annually, where an evening meal is cooked for workers, food deliveries were restricted. That meant shopping for rationed staples took a lot of extra time by a greater number of people.

One of the harvesters at Nilsson's

Doug Nilsson in the harvest

By the time the Auckland lockdown was announced in August some growers had been proactive and made sure they bought what they might need in plenty of time in case the same situation arose again. Only a few growers were impacted when it came to selling their kumara, such as organic producers or those selling through farmers' markets, which had to close.

Through the winter the relatively dry weather was appreciated by growers as they got their kumara beds in, and warm weather since has been good for planting. In mid-November most growers were on track with only a week lost through rain.

"We can't afford another because that will put the pressure on," he says.

"But that's nature. You have to roll with it."

The big issue for kumara growers remains labour.

"It seems the cost of labour is going up and productivity is dropping as fast," Doug says.

"Labour has gone from being around 40% of production costs to 60% over the last 10 years."

While kumara prices are quite firm and high growers can cope, but if returns were suppressed it would be a very different story. In order to retain staff he was the first kumara grower to provide on farm accommodation and now has room for 21 workers. That's worked well and some other growers are now doing the same.

Doug usually employs 13 Recognised Seasonal Employer (RSE) scheme workers, but has only five at present who haven't gone home. He's made up staff numbers with two different groups, one of which will be eventually going to work in the forestry industry. Three vans travel to Dargaville from Kaikohe every day bringing workers, with some of them driving an hour to meet up with a van. The cost is split three ways between growers, contractors and the workers, and there's a similar arrangement for workers coming from Whangarei. Some backpackers are still being employed as well as a few university students.

"If you had the same people you could invest in them, but there's a continual churn," he says.

"Growers don't mind paying a decent wage if they get an honest day's work."

> **"If you had the same people you could invest in them, but there's a continual churn**

Labour will continue to be an issue next year, he believes, along with growers needing to deal with a range of compliance issues from drawing up farm environment plans to keeping up with changing regulations around irrigation, spraying and fertiliser application.

"The compliance stuff is never ending," he says.

Chemical sprays, which growers would prefer not to use, are a big issue, with few products registered for kumara so there's a lot of off-label use. A number of these sprays are needed to control black beetles and crickets, but are being lost to growers as they are withdrawn from the market, and replacement products can only be used once a year because of concerns about resistance.

"There are no other options," Doug says.

Another issue is the lack of new investment in the industry.

"Growers have had to get larger over time. If you don't have 100 acres of kumara you have to have some other income, so they have had to scale up."

While there were over 100 kumara growers in the area, that's now plateaued at around 40.

"There's very few people buying in," he says.

"It's expensive unless someone is backing you, and the younger generation don't want to get into growing because of the labour problems and the stress of never knowing if you're going to have enough people turn up."

The Kaipara Kai Programme, partly funded by the Government Provincial Development Fund, has seen some growers look to alternative niche crops.

"There is some really nice land around the area but a lot of it is very flood-prone," he explains.

In other areas cropping might be successfully carried out if there were water storage options which weren't too expensive.

"We've tried to grow onions, strawberries and lemons but we've come back to kumara because it suits our soil."

PLUSES AND MINUSES FOR NELSON GROWERS

Words by Anne Hardie

Toby Conning in the field during November

Operating a food business during a global pandemic and the perennial challenges posed by the weather gods created multiple challenges during 2020 for the Conning family of Nelson in their market garden and fresh produce shop.

When lockdown was announced at the end of March, they kept the doors open at Connings Food Market on the edge of Richmond, as businesses grappled with which of them was considered an essential service. A few days later the police asked them to close the doors, and like many independent greengrocers they were left with considerable amounts of perishable stock in the shop.

Ben Conning says they were left holding between $30,000 and $40,000 of stock, and though they were able to move quite a bit of it after the doors closed, it was a high cost.

"We started doing home deliveries, which quickly proved very challenging when you aren't set up for it. Your wages are high for what you are getting out of it, but it kept our loyal customers happy."

When they were allowed to open the doors again at the beginning of the fourth week of lockdown, they offered a pick-up service for older customers who didn't want to enter a crowded shop until they were confident Covid-19 wasn't in the community.

Despite the challenges, the shop local imperative was a positive outcome for the shop, and Ben says they continue to benefit from it as long as they continue to do a good job.

> "Ben Conning says they were left holding between $30,000 and $40,000 of stock, and though they were able to move quite a bit of it after the doors closed, it was a high cost

Shop local couldn't replace their usually lucrative melon market this year though. Most of their melons were destined for the high-paying cruise ships that suddenly weren't there.

"So that killed that part of the market for us, and we usually get good money out of that market. Instead we ended up putting it in the Auckland market for a lot less, and we lost a lot in the paddock. They're an expensive crop to grow and normally profitable, but it didn't pan out with no cruise ships to go to."

Meanwhile, other produce such as leeks went "nuts" in the Covid-19 environment, with many growers harvesting them at a smaller size to meet demand. Other greens were also in high demand through winter compared with other years.

It was a dry, mild winter in the region – not really a winter at all – which meant many crops came on early and that created gaps in the market. Then in early November, the rain came, constantly for a while and growers couldn't get onto the paddocks to plant because the ground was too wet. Ben says that will lead to gaps in some lines of vegetables after Christmas.

The rain coincided with a key period for planting melons, though Ben says some growers planted earlier to target the early-season market in the absence of imported melons from Tonga.

He is cautious heading into summer, when melons and the mix of berries from their 4ha berry garden come onstream may be considered a luxury that customers cannot afford. Though to date Nelson has shown no signs of a slowing economy due to Covid-19.

The success of the berries also depended on the effect of the November rain during flowering, and whether there were gaps in the weather to spray for *botrytis* while they could still spray the emerging fruit. They run a pick-your-own operation and also freeze berries for the shop and the ice cream side of the business, with the latter providing options for fruit that has been damaged by rain.

Boysenberry grower Glen Holland who has Tasman Bay Berries was also looking for gaps in the weather in early November to spray the flowering boysenberry crop against *botrytis*. And like Connings, he had experienced increased market demand for fresh produce.

"If anything, we've seen more growth around boysenberries because of the specific health benefits of red fruit."

> "For much of the year, growers have been faced with lower prices for vegetables nationwide, which he attributes largely to the lack of tourists and cancellation of cruise ships

Vegetables haven't enjoyed the same growth this year, says Waimea Plains market gardener and Vegetables New Zealand director Mark O'Connor. He says it has been "a funny old year" and interesting to say the least, due to Covid-19.

Thomas Beimer packing broccoli in Connings market garden

Thomas Beimer and Annie Stuart packing broccoli at Connings market garden

For much of the year, growers have been faced with lower prices for vegetables nationwide, which he attributes largely to the lack of tourists and cancellation of cruise ships.

"You have three to four thousand people on those cruise ships and they load up with fruit and veges, so we've lost all that. And that's challenging for a lot of growers."

He says there are conflicting reports about whether Kiwis are spending money during the global pandemic and what they are spending it on, but it doesn't appear to be on more vegetables. And during the Covid-19 pandemic there are less people in the country to buy the vegetables being produced, and that means lower prices.

CANTERBURY GROWERS REFLECT ON THE SILVER LINING OF 2020

Words by Heather Woods

30 years of experience puts Lincoln and Lance Roper ahead of the pack

There's no debate that 2020 has been a year we'll never forget. But despite the uncertainty, hardship and just plain craziness happening in the world, growers are reflecting positively on the year that was, and are excitedly planning for 2021 and the future. We caught up with Lincoln Roper from Roper & Son and Leanne Roberts from Thymebank, to get their thoughts on just how horticulture has fared.

Forging ahead after a year of change

Leanne's world of micro-greens has been flourishing. Their commercial success is now solidly backed up with direct public sales via their online platform (which will see them through if another lockdown rears its head), and importantly, her team is stable. She does hear grumblings from colleagues who are worried about harvest (and the shortage of labour to help) so she appreciates her unique position.

It's been a tough year, but Leanne says it's been about more than just survival. She says Covid-19 was a kick that they needed in order to truly see their business, and it's given them the opportunity to look at what they could – and should – be doing. They've used the time to find newer and better ways to work as a team, and amongst the chaos they've been able to carve out time to realistically plan ahead and be innovative in their field, like the eye-opening process of adding automation into the mix. But it's the big-ticket items like increases in carbon taxes (especially for many South Island growers with limited options besides coal) and emissions trading that have her worried. She's concerned about the long-term impact it will have and how growers can move forward without support such as grants or subsidies.

> **Most growers understand the environmental aspect of coal, but they have very few other choices**

In Leanne's perfect world, growers would have access to financial support so they can transition off coal. Most growers understand the environmental aspect of coal, but they have very few other choices. Leanne says she would happily volunteer her site to trial new technology and help find a solution that isn't so damaging to the planet, but she still needs to keep growing. She says if heat pumps are to be the way forward, a deal with power companies is needed. They just aren't cost-effective to run and only add to the production cost, increasing the retail cost of food. To put it simply, concessions are needed. And most growers want to do the right thing by running well maintained sites.

In the meantime, she's moving on – looking forward and up – with a focus on the future, her team, and growing the freshest, high quality produce for their customers.

Winston Churchill's inspiring opportunistic thinking

The famous Prime Minister of the United Kingdom Winston Churchill said, "Never waste a good crisis." This is how Roper & Son have approached 2020 and how they plan to manage the imminent fallout in 2021. It's been a year of enormous challenge but it's also given them an opportunity to reflect on their position in the market. They've done their research, taken stock of how their marketplace is responding, and they've taken on advice from trusted colleagues. Now that they're seeing things a little clearer and understand where they are, they're able to be strategic with planning. And they'll need to plan carefully. If we have learned anything this year, it's that nothing is certain when you're dealing with a deadly pandemic that has no vaccine – yet.

The labour challenges facing so many growers also come up repeatedly as Lincoln describes a seemingly confused industry. Some growers are coping – just – and others have genuine concerns about the lack of available labour and how it threatens their entire business. Covid-19 has magnified the labour issue and there doesn't seem to be any relief in sight when it comes to opening borders for workers. Older growers are concerned with what's ahead of them and younger growers, interested in what's happening, are proactively accessing insights and market knowledge, exposing them to different points of view. And while planned government support (in the form of a Ministry for Primary Industries stakeholder) is helpful, what they really want to see is urban expansion truly investigated when it's occurring on highly productive land.

> **Some growers are coping – just – and others have genuine concerns about the lack of available labour and how it threatens their entire business**

2021 is going to be difficult for many people, not only growers, as the world adjusts to a new way of existing. And while things will never be the same again, growers are still out there doing everything they can to create a thriving product sector for all Kiwis to enjoy.

TECHNICAL

THE LATEST INNOVATIONS AND IMPROVEMENTS

48 PHYSIOLOGICAL PROCESSES OF PLANTS

SOIL REJUVENATION

opinion

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

With the new government formed between the Labour and the Greens, we can expect a greater emphasis being placed on the importance of sustainable food production practices.

Modern industrial agricultural practices worldwide are responsible for a lot of soil degradation, and the loss of habitat and biodiversity for both plants and animals, as well as causing severe environmental pollution. Most of this has happened on continually cropped soils for growing grains, pulses and vegetables for human and animal consumption. With an ever increasing human population demanding more food, the challenge is to meet such demand from a diminishing amount of useable arable land area.

One of the causes of soil degradation is the loss of humus which is the glue that holds soil particles together forming soil aggregation. Humus helps retain soil moisture and build soil structure, but is lost during cultivation practices, particularly rotary hoeing, used to create a fine soil seedbed in which the aggregates are destroyed. Another cause of the loss of humus comes from leaving the soil bare for a period of time when soil micro-organisms are mining the carbon from the humus to survive, at a time when there is no photosynthesis above ground pulling down carbon from the atmosphere and building plant matter above and below ground.

Humus is the dark substance found in the topsoil and is refined organic matter from dead plant and animal material formed over many years. Applying composts, animal manures and woodchips to the soil does not automatically become humus as soil organisms – bacteria and fungi in particular – need to decompose these organic amendments into smaller and smaller molecules. These molecules include starches, proteins, sugars, carbohydrates and amino acids, as well as mineral compounds. During this decomposition process, the nutrients contained in the amendments and dead plant material are utilised by the micro-organisms and eventually made available for plants to uptake. Once all of the useable substances contained in the organic material have been utilised by plants and soil organisms, the remaining residue of humic acid, fulvic acid and humin substrates form the humus, which is relatively stable and over time builds up forming carbon rich topsoils.

Humus can hold up to 90% of its weight in water and acts like a big sponge, creating greater drought resilience with less reliance on irrigation, and it improves water use efficiency. It is also negatively charged and retains important elements such as potassium, calcium, magnesium and most of the metallic micronutrients in the topsoil which plants need.

Mechanical cultivation and the use of chemicals and fungicidal sprays disrupt the microbial communities responsible for building humus, causing soils to lose their structure and become sterile and cloddy. With few microbes to facilitate in nutrient transfer, growers become reliant on saturating the soil in soluble fertilisers for their crops to yield well, causing the soil to become a lifeless medium. Without the glue of humus to hold it together, soil loss during heavy rain events becomes more severe, and when saturated in soluble nutrients, the waterways become more polluted.

To rejuvenate lifeless soils, cover crops or green manure crops can be considered which will keep taking carbon dioxide out of the atmosphere and transferring it into root mass underground. With this carbon source, soil organisms will colonise new root growth, and any leaf material that eventually falls onto the soil surface or is worked in can be broken down and recycled by the following crop, reducing fertiliser requirements. As for cultivation techniques, nil tillage, minimum tillage or strip tillage practices can help develop topsoil layers. Reducing chemical inputs, particularly harsh fungicides and pesticides which knock back positive microbial communities, is an important part of soil restoration.

Oxygen is often the most limiting element in over-worked soils. Rather than grinding the soil to a fine pulp, using less destructive equipment such as chisel ploughs or aerators which allow the soil to 'breathe' is vital for providing oxygen for plants and microbes to thrive. Changing the soil from an anaerobic, lifeless, plasticine-like goo, to a vibrant aerobic environment takes time and determination. For humans to continually abuse and lose productive soils by continuing along the path of doing what we have always done, will culminate in ecological Armageddon unless significant changes are made. Although the term Regenerative Agriculture has become a political catchphrase with no hard and fast definition of what it actually is, we can implement restorative techniques to rejuvenate our topsoils and rebuild the important humus content upon which much of terrestrial life has been dependent for several hundred million years.

STRONG LA NIÑA TO DOMINATE NZ SUMMER

Words by Georgina Griffiths : MetService Meteorologist

During November, La Niña conditions in the tropical Pacific Ocean continued to intensify. This event has now strayed into 'strong' territory, meaning that this is the first decent (strong) La Niña event in a decade. The last time we saw La Niña unfold at this intensity, was the summer of 2010–2011 (Figure 1)

November: fairly typical La Niña weather patterns

After intense, prevailing Highs produced extreme dryness during October across most of New Zealand (with the exception of Westland, Fiordland and Southland), the start of November saw a rapid change in weather patterns.

Humid northeasterlies and Tasman Lows became cyclical visitors to the north of the country, producing decent rainfall across the North Island. As per normal under humid and unsettled northeasterly conditions, there were some winners and losers in the rainfall stakes.

The Auckland water catchments rose by nearly 6% in a week, which was welcome rainfall for the region.

In contrast, Napier saw deluge rainfall on 9 November, with the highest intensity downpours focused in a narrow convective band over the CBD (central business district) area. This brought severe flooding and multiple land slips, power cuts and evacuations, resulting in a local State of Emergency being declared in Napier. Further rainfall also occurred on the following evening (10 November).

Napier Airport recorded a daily rainfall total of **120.2mm** in the 24 hours up until 9am on 10 November. This tally ranks as the seventh wettest daily total since records began at the Airport in 1950.

Chronologically, the last time that Napier Airport recorded a daily rainfall total of more than 120mm was in April 2011 (125.2mm, recorded in the 24 hours to 9am on 27 April 2011). This event occurred at the tail end of the very strong 2010–2011 La Niña event, which then went on to reinvigorate for summer of 2011–2012.

The Napier rainfall accumulation in Figure 2 clearly shows this drought-breaking rainfall event.

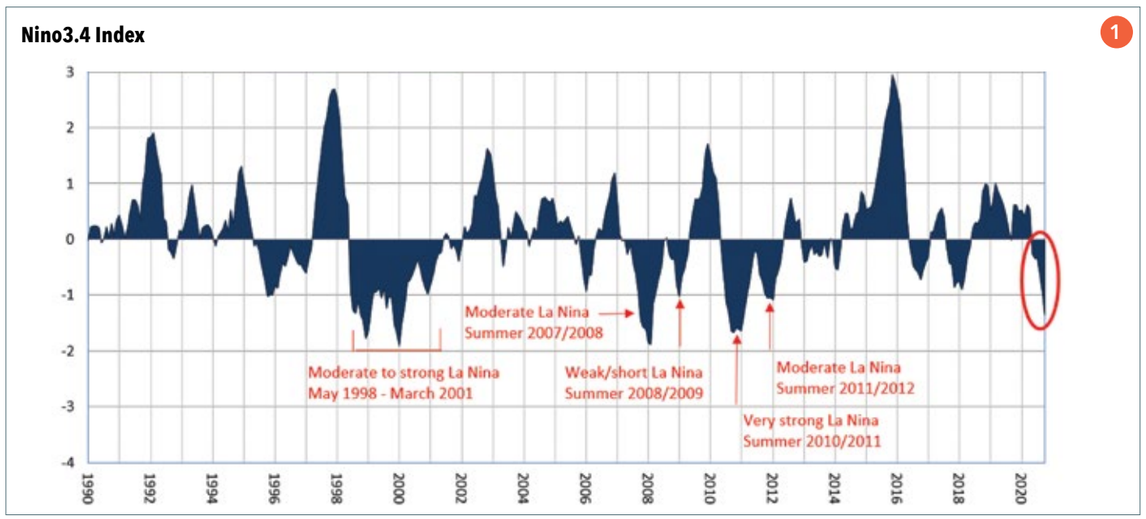


***Figure 1**: The NINO3.4 Index. This is one of several El Niño/Southern Oscillation (ENSO) indicators based on sea surface temperatures. NINO3.4 is the average sea surface temperature anomaly in the region bounded by 5°N to 5°S, from 170°W to 120°W. The current La Niña event is circled.*

Recent heat across New Zealand:

One of the trademark signals of La Niña is warmth over New Zealand: Widespread warmth, related to above average sea temperatures in the Tasman Sea and areas surrounding New Zealand, and the increased frequency of mild northeasterly wind flows over the country.

Figures 3 and 4 showcase the temperature anomalies recorded in two important growing regions, Napier and Blenheim. The heatwaves in late January to early February, and again at the end of October, stand out quite clearly.

No change to the La Niña summer predictions

There have been no changes in the MetService thinking around this La Niña.

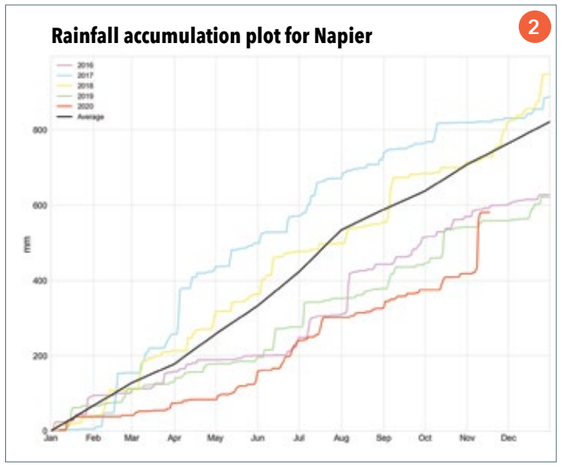
La Niña conditions are forecast to peak in intensity around Christmas time, or possibly early in the New Year. La Niña is then expected to continue through into early autumn 2021, albeit gradually weakening.

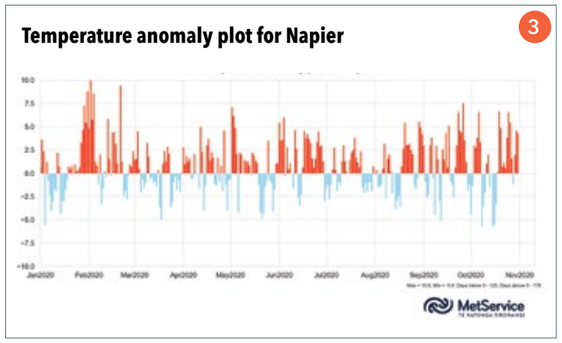
Although every La Niña event is different, you can plan for certain types of weather patterns to play out more frequently than usual.

MetService expect a fairly typical La Niña summer (December to February) weather pattern. While we should still see a wide variety of weather maps over New Zealand, there is the expectation that the weather maps that show up *most frequently* will be La Niña-like.

From a planning point of view, we should work on the principal of more frequent Highs than usual across the South Island, with a clear signal for drier-than-normal conditions in western and inland regions of the South Island.

Similarly, an 'active tropics' to the north of New Zealand is strongly indicated, with frequent easterly winds across the upper North Island, and an increased risk of a wetter than normal summer over the north and east of the North Island.





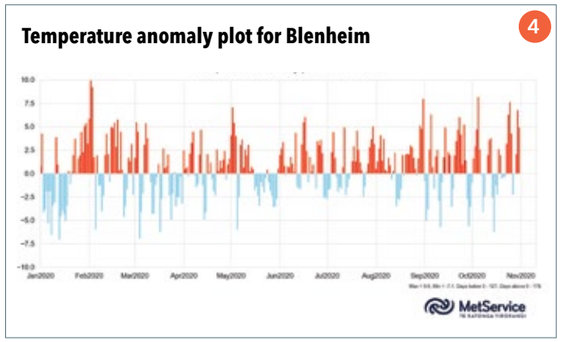


***Figure 2**: Figure 2: Napier annual rainfall accumulation (mm) for the last five years (2016 to 2020). The annual average rainfall accumulation is shown in black.*

***Figure 3**: Napier temperature anomalies (daily temperature deviations from the annual cycle, degrees Celsius) for the period 1 January – 1 November 2020.*

***Figure 4**: Blenheim temperature anomalies (daily temperature deviations from the annual cycle, degrees Celsius) for the period 1 January – 1 November 2020.*

As always, keep up to date at with our latest thinking via the MetService long-range commentary at **http://metservice.com/rural/monthly-outlook**.

ENERGY-WISE HUMIDITY CONTROL

Words by Elly Nederhoff : Crophouse Ltd

A large part of the energy used in a greenhouse is for temperature and humidity control.

There are two sides to humidity control: in summery conditions it is about avoiding *too low* humidity and the risk of drought stress. In winter, it is about avoiding *too high* humidity, for two reasons: avoiding fungal diseases and keeping plants active. In relation to energy saving, the focus is on high humidity winter-like situations. The standard method of keeping humidity low is by applying concurrent heating and venting, albeit in a smart way. But this wastes energy. The modern approach is based on air movement, air exchange and good screens.

Preventing condensation and diseases

First a brief recap of last month's article. It is very important to have a uniform temperature pattern in a greenhouse. Greenhouses with an uneven temperature and/or wet areas always harbour cold spots, where condensation occurs and diseases develop easily. This makes it necessary to choose the setpoint for relative humidity (RH) at a very low level, say in the 70% range. In contrast, if there are no cold spots, the RH can be safely maintained at a much higher level, even in the 90% range. Creating a uniform climate saves a considerable amount of energy and should be the first priority. On top of that, the tips of the plants must not get too cold as this attracts condensation – which often happens at night, caused by heat emission from the plant tips to the cold roof.

Stimulating transpiration and nutrient uptake

The other main reason for avoiding too high humidity is to ensure that plants evaporate enough water, and thus take up enough water with nutrients. In winter, especially at night and especially under a screen, transpiration can stagnate. This can lead to nutrient deficiencies, in particular calcium related problems. Then it can become necessary to 'activate' the plants.

In bright sunshine, transpiration is driven largely by radiation from the sun, while other factors have a relatively small effect. But when solar radiation is lacking, transpiration is low, and other climate factors such as air humidity, air movement, heating pipes and any artificial lighting have a greater impact. We can use those factors to 'activate' the plants, and ensure sufficient nutrient uptake.

The tips of the plants must not get too cold as this attracts condensation

Negative spiral of combined heating and venting

The standard method of controlling humidity in winter is by applying heating, venting, or both simultaneously. This is often a negative spiral. Imagine you want to avoid the plants becoming damp at night, perhaps under a closed screen.

If the humidity is controlled by slightly opening the vents or the screen (1% – 5%), then it gets colder and subsequently a computer controlled system will increase the heating to maintain the required temperature.

Alternatively, if the humidity is controlled by increasing the heating (e.g. pipe temperature), the air temperature rises to the point where the computer calls for further opening of the vents and/or widening of the screen gap, again to maintain the required temperature.

Both scenarios achieve the opposite of what we want: while the computer system tries to prevent condensation, at the same time it stimulates transpiration. The plants add even more water to the greenhouse air, and that water needs to be removed again. In the end it works, but this negative spiral pushes the energy consumption up. There is a need for a more energy-efficient method of humidity control. The answer lies in air movement, air exchange with outside (or with the compartment above the screen), and using proper screens.

Screens

An energy screen is of great value, especially in cold climate zones. In mild climates, screens are valuable too, although the type of screen can be different: less insulating and more suited to shading in summer. There are many different screen materials, and it is important to choose one that is adequate for the conditions. The benefits of closing a screen in cold weather are clear: warm air stays under the screen, while the cold is kept in the compartment above the screen. Secondly, the tips of the plants do not lose their warmth to the roof, because the screen blocks heat emission. (Heat emission is heat radiating out from the plants to the cold roof, which chills the tips of the plants.) Hence the plant tips do not get wet from condensation and are less prone to infection. Thirdly, good screen material does not gather condensation in large drops, so the plants are not subjected to a continuous trickling of water droplets or rain showers.

High humidity under a screen

A well-known problem is the accumulation of water vapour under the screen especially at night. A partial solution is creating a small screen gap so water vapour can travel to the top compartment, where it condenses against the cold cladding. Unfortunately, even a small gap of 1% to 5% causes energy loss, which counteracts the intention of an energy saving screen. A partial solution is using a screen material that lets water vapour pass through. The next step is to utilise air movement. A further step towards a solution is allowing air exchange with the compartment above the screen or with the outside air. These steps will be discussed in a following article.

DECIDING THE RIGHT RATE: MAKING A NITROGEN SIDE-DRESSING DECISION

LandWISE

By Luke Posthuma

Collecting a soil sample for a Nitrate Quick Test

Coaching growers to further refine nitrogen management across their operations has been a key part of the Sustainable Farming Fund (SFF) 'Future Proofing Vegetable Production' project. To decide on the right rate of fertiliser at side-dressing, we need to estimate how much nitrogen the crop requires to finish growing and deduct the nitrogen that will come from the soil.

Last summer, our Gisborne trials looked at innovative ways of applying starter fertiliser and liquid side-dressing nitrogen to sweetcorn crops. Across the trial blocks, we saw no difference in yields between the nitrogen rate or application method. Reviewing the deep soil tests collected prior to side-dressing, we realised all trial sites had sufficient nitrogen to achieve target yields, so had not required any extra nitrogen.

Soil testing to 90cm this winter has shown between 20 and 250 kg N/ha in paddocks across Gisborne. To maximise yield on some paddocks, growers could need to increase their side-dressing rates. On other paddocks, we are unlikely to see any yield response to applying additional nitrogen. The key message is to apply the right rate of nutrients in the right place (see October *NZ Grower* article on calibrating your fertiliser equipment, pages 40–41).

This summer, we are running a split field nitrogen application trial across twelve sweetcorn paddocks. The trial will compare typical grower practice with using the Foundation for Arable Research (FAR) *Quick Test Mass Balance Tool* to decide side-dressing rates. We are soil testing to 90cm a week prior to side-dressing the sweetcorn and calculating how many kilograms of nitrogen is in the paddock using the Nitrate Quick Test strips. We are coaching growers on using the Nitrate Quick Tests in their own paddocks to make informed side-dressing decisions.

Side-dressing Decision

To plan nitrogen fertiliser applications, we need to account for the nitrogen already in the soil and nitrogen that will become available through mineralisation of soil organic matter and crop residues.

Nitrogen mineralisation is the conversion of organic nitrogen in the soil organic matter and crop residues into a mineral form which plants can use. The conversion is done by soil microbes, and the process is highly dependent on the growing season weather.

Nitrate Quick Test

The Nitrate Quick Test is a simple, grower friendly tool to determine the concentration of nitrate-N in the soil. This can be used to assess the amount of plant available nitrogen in the soil, and the quantity of fertiliser required to finish growing the crop.

When we do the Nitrate Quick Test, we sample the full active rooting depth. For baby-leaf lettuce this could be 15cm, while for sweetcorn we are testing to 90cm. Note that this is different to a standard cropping soil test where just the top 15cm is sampled.

The Quick Tests are extra valuable after large rain events, showing if a further side-dressing of nitrogen is needed to finish growing the crop.

Coaching growers through using the Nitrate Quick Test, two 'lightbulb' moments happen when they realise that they can save fertiliser by not applying it where extra nitrogen is not required, and when they identify paddocks that are going to need more nitrogen than planned.

> **"The Quick Tests are extra valuable after large rain events, showing if a further side-dressing of nitrogen is needed to finish growing the crop**

Potentially Available N Test

The Potentially Available Nitrogen soil test shows how much nitrogen is expected to be mineralised from the soil organic matter. In long-term intensive vegetable cropping, this can be as low as 20–30kg N/ha. Where a paddock has been in long-term pasture or growers have less intense crop rotations, growers can expect 100kg N/ha or more from the soil organic matter.

Note that this is a 'Potentially' Available Nitrogen test, not a 'currently' plant available nitrogen test like the Nitrate Quick Test.

The main limitation of this soil test is that the soil sample is collected from the top 15cm. It indicates how much nitrogen could become available from the soil organic matter but does little to show how much plant-available nitrogen is in the root zone today.

Combining Potentially Available Nitrogen (taken before planting) and the *Nutrient Management for Vegetable Crops in New Zealand* information published by Horticulture New Zealand, the recommended nitrogen rates can be found for many common vegetable crops in this country.

Coaching a grower how to use the FAR Quick Test Mass Balance Tool

Making a Fertiliser Decision

Collecting a soil test will allow you as a grower to make a more informed fertiliser decision when deciding on the correct rate of fertiliser for your paddock. Using a soil test, you can justify increasing your nitrogen applications to a 'hungry' paddock while having confidence to reduce the rate on a paddock that already has a sufficient nitrogen. As growers are under increased environmental compliance pressure, soil tests are a key to showing responsible fertiliser management.

For more information, get in touch with us at LandWISE (**info@landwise.org.nz**) and check out our podcasts on Spotify or through our website (**www.landwise.org.nz**).

CENTRAL CONCEPTS IN NUTRIENT MANAGEMENT

Words by Joachim Nachmansohn

Nutrient management is about efficient use of plant nutrients for optimal crop production while conserving the environment. This involves factoring in the amount of nutrients to be used, the timing of application, the source of nutrients and the method of application.

All concepts of nutrient management are implemented via a medium (soil or substrate or solution). The goal is with good management to enhance crop production while minimising losses, either financial or environmental.

Horticulture production is a huge industry, and has been for a long time. Currently, the export market is a significant driver of production, which has grown to about 2 billion dollars in 20 years. With the industry's vision of 'healthy food for all forever', focus is now more on improved yields and quality for the long term. Improving yields and quality of produce calls for an in-depth understanding of nutrient management.

We cannot talk about nutrient management without talking about the soil. Soil mediates the nutrients available to the crop. A good quality soil is rich in nutrients, with a high capacity to store and replenish them. An efficient nutrient management plan incorporates activities that promote the soil quality, such as building up the soil organic content through the use of organic fertilisers, soil conditioners, biostimulants, cover crops, and when applicable minimal tillage. When soil quality is well managed, nutrient availability will increase, while leaching and losses will decrease.

Further growth of the horticulture industry will depend partly on how well new technology is embraced. For example, GIS (Geographic Information system) related tools are innovations that can further propel many growers to the next level. Such tools can help in the identification of nutrient concentration, producing nutrient maps of farms by utilising information from satellite imagery. This helps to determine nutrient requirements, forming a basis for fertiliser application. Information on other factors critical for crop production can also be gathered, so crop yields can be better predicted. Based on anticipated yields, more accurate decisions can be made on the amount of nutrients needed for production, making the over application of fertilisers that arises from uninformed decisions far less likely. These are important examples of preparatory measures that can enhance precision fertilisation, which is at the peak of modern agri-high-tech. This is key, since over application equals environmental contamination, while precise nutrient management equals efficiency – both for productivity and in a financial sense.

For efficient nutrient use, the nutritional needs of each crop must first be determined. This information on different crops is available in literature under nutrient uptake. The next step is to determine the amount of nutrients available in the soil, which is achieved by soil analysis. This should be backed up by plant analysis through routine monitoring of nutrient concentrations in the plants, as plant performance always provides the hardest empirical data. The goal is to feed the crop the exact nutrient amounts it needs, leaving no room for excesses, as illustrated in figure 1. Another way to fine-tune this procedure is to test the irrigation water, as it sometimes provides more nutrients than expected. Where the nutrients available in irrigation water are not taken into consideration, the chance of excess nutrients being leached out from the soil is high. These nutrients end up in the groundwater, and later on in surface waters. Have you ever asked yourself why some dams, lagoons and lakes are full of plants and/or algae? This is because the water has been enriched with nutrients.

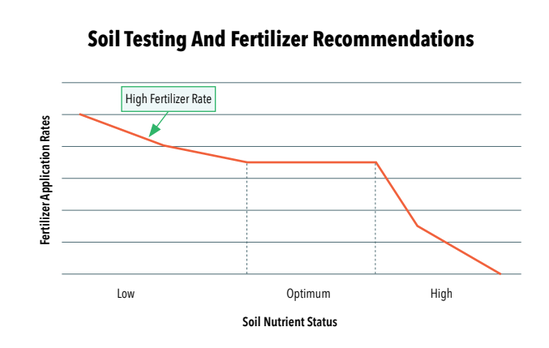


Figure 1. Soil testing and fertilizer recommendations. *When nutrients are low in the soil, higher fertilizer rates will be applied to build the nutrient levels in soil. When they are optimum, the nutrient levels can be maintained as they are and when the concentration levels are high, then there is no need of adding more fertilizers.*

Secondly, use of micro-irrigation techniques has been found to be an efficient way of managing nutrients. Nutrients are supplied to crops through irrigation systems – commonly referred to as fertigation – using fertiliser injectors. Only the exact amounts of nutrients needed by the crop are supplied through irrigation water, minimising nutrient loss while guaranteeing that crop nutrient demand is met.

Hydroponics, an interesting alternative to soil-based horticulture, involves growing crops in a solution rich in nutrients. According to crop demand, nutrients are supplied directly to the plants through the roots, ensuring they are taken up efficiently. The water is also supplied with oxygen to enhance root activity. The hydroponic system minimises losses by recycling any nutrient solution not taken up by the plants.

> **"Water is essential in the physiological processes of plants but only when applied in amounts sufficient to meet the water requirements of crops**

Water is essential in the physiological processes of plants but only when applied in amounts sufficient to meet the water requirements of crops. Water available to the plants through the soil is maintained through irrigation or precipitation. A good quality soil holds onto water needed by the plants and freely infiltrates. When excess water is applied through irrigation, the probability of nutrients being leached out of the soil is high. When little water is available, then nutrient uptake by plants is inhibited. Tensiometers (moisture probes) installed in the soil at different depths, can be used to monitor soil moisture. This will help in irrigation scheduling, determining when to irrigate and in what amounts.

Controlled and slow release fertiliser can also be used. These are fertilisers coated with polymers that slowly release small amounts of nutrients to the soil for a prolonged period, reducing incidences of leaching. The coating also helps to minimise nutrient losses through volatilisation (losses to the atmosphere) as is the norm with nitrogen-based fertilisers.

When you need a quick fix in sorting nutrient deficiency problems, the use of foliar fertiliser is the most efficient way. Nutrients are applied directly to the leaves of the plants, with no potential for losses. Again, plant analysis can help give guidance on the deficient nutrients. Top dressing fertilisers when deficiencies have been identified are really not recommended, especially when there are pre-existing soil conditions such as soil pH issues (acidity or alkalinity) or compacted soil that would interfere with nutrient availability to the plant roots.

Whenever possible, apply fertilisers when the crops need it most: When root activity is high, at the peak of the vegetative stage in fruit crops and at flowering stage for most vegetables. These are the basic concepts (illustrated in figure 2) that can be fine-tuned through demand driven fertilisation.

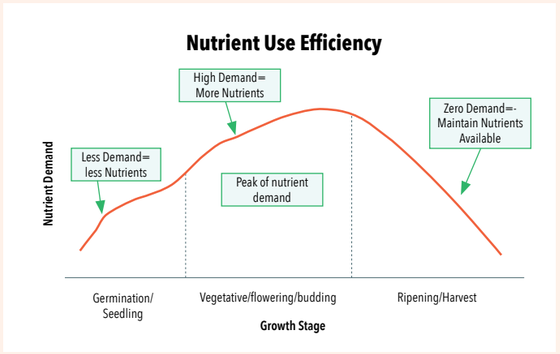


Figure 2. Nutrient use efficiency. *For efficient nutrient use by crops, nutrients should only be added as per the demand generated by the crop. When the demand is less, then only small doses of nutrients should be applied and vice versa. This concept ensures that crop nutritional demands are met minimizing nutrient losses to the environment as a result of excess application.*

For intercropping and crop rotation systems, legumes are used as the secondary crop to fix atmospheric nitrogen into a form more available to plants. However, this process cannot be overly relied on, and careful assessment for further available nitrogen is important before nitrogen fertilisation is undertaken, as this tends to inhibit the natural fixation process of nitrogen that the legumes provide. To the best of my knowledge, only demand-driven fertilisation in precision fertigation has accomplished increased nitrogen fixation when legumes are fertilised with nitrogen.

It is possible to identify nutrient deficiency through visual inspection if you have a keen eye. Nutrient advisors can provide apps to help identify nutrient problems. The key is to identify which nutrients are in demand, and then establish the amounts of the most common fertilisers to apply.

Finally, did you know that there are apps for nutrient management record keeping? These allow growers to keep track of all the amounts of nutrients added as fertilisers and/or manures in farming operations. This helps with planning, not to mention drawing important inferences about specific practices on individual farms. Of course record keeping itself is not novel, but it is a way to be thorough, to prevent repetition of mistakes, and to think things through. It keeps the mind active and prevents us from blindly following recommendations and traditions. Essentially, it grounds us in common sense; the tool that can solve most of all the problems in the world, including in plant production. Then it's much easier to allow innovation and technology to do the rest.

GREENHOUSE CUCUMBER PRODUCTION

final word

By Mike Nichols

When I completed my university degree training at Nottingham University in England in 1957, I worked for a market garden, F A Secrett Ltd, just South of London for about a year.

F A Secrett was considered to be the father of market gardening in England at that time and had established a modern enterprise on sandy soil just to the south of Guildford in Surrey. I worked in the greenhouses and most of my time was spent with tomatoes and cucumbers.

The cucumber production was interesting because it involved both the traditional growing method and another newer method. Cucumbers were traditionally grown in specialised greenhouses where the plants were grown up the sides of the house and over the top on a wire structure. The cucumbers were in a mixture of loamy soil and well-rotted strawy horse manure. This system involved a considerable amount of labour in order to train the plants because all the cropping was based on the laterals and sub-laterals, and no fruit was allowed to develop on the main stem. In addition, all the male flowers had to be removed as these were the telegraph type of cucumber, which is parthenocarpic, and when pollinated swells unevenly.

The other system of training used was the cordon system in which the plants were grown in soil in a traditional vinery type greenhouse normally used for tomatoes, and trained up a single string, like tomatoes, to the wire. Once again, all the male flowers were removed and the plants cropped on the laterals, which were stopped generally at two leaves and the fruit simply hung down. Irrigation and feeding were by drip irrigation.

When I arrived in New Zealand in August 1958, I discovered that the telegraph type of cucumber was virtually unknown. I think there was one grower in Auckland growing this type, and the main cucumbers grown were of the short green type and occasionally the Apple cucumber. At all times they were grown in soil.

In England in 1962 to study for a Master's degree I found that cucumber production in greenhouses was in a state of flux. There was an extreme shortage of good loam soil and of strawy horse manure, and alternatives were being sought. One approach was to use bales of wheat straw almost like a hydroponic medium as it slowly rotted down.

On my return to New Zealand in April 1965 to lecture in horticulture at Massey University, I discovered that Massey was now growing the long telegraph type of cucumbers.

At about this time there was a new development in greenhouse cucumber production. The first of the gynoecious (female only) varieties had been introduced. We obtained seed of the Princess variety from Nunhems Seeds in the Netherlands for a trial at Massey. The seed was expensive, from memory about $1 per seed compared with the standard telegraph variety Butchers Disease Resistor (BDR) which had both male and female flowers and cost about $0.10 per seed. However, in our first trial Princess produced at least two cucumbers more per plant than BDR when cucumbers were worth about a dollar each. More importantly, there were no male flowers to remove, and the fruit developed on the main stem.

One of the problems of greenhouse cucumber production at that time was the root rot disease *fusarium* so the following year we grafted the variety Princess on a *fusarium* resistant rootstock (*Cucumis ficifolia*). The grafting went well but the exercise failed because the grafting operation shocked the plant so that it became a conventional cucumber plant with male flowers up the main stem. This meant we had to remove the male flowers from the stem and crop it on the laterals, which was something we had not planned to do. Of course, the more recent gynaecious cucumber is far more strongly female than Princess so this problem probably would not occur now.

Cucumber production has changed very much over the years with the development of hydroponic systems, and the ability to provide the plant with water and nutrients on demand has simplified a lot of the problems that existed 50 years ago, but there have not for example, been any major changes in production methods as have occurred in tomatoes. By this I mean the development of improved training systems capable of exploiting the high light intensities of the summer, while still being able to produce satisfactory crops during the low winter light levels.

The greenhouse tomato industry does this by layering plants, so that one planting lasts a full 12 months; by controlling the fruit size with trust thinning; by grafting onto disease resistant rootstock; and by modifying the amount of leaf on the plant by increasing the number of main stems per plant during the summer.

I suspect that a similar strategy might possible with cucumbers, for there is little doubt that cucumbers require more space per plant in the winter and can be grown at higher density during the summer months. The simplest way of achieving this might well be to use grafted cucumber plants and to increase the number of main stems per cucumber plant during the summer months in a similar way to what is done with tomatoes. What we are actually doing in horticulture is harvesting the sun, and the tomato industry does this very efficiently. Fruit load could be controlled by simply controlling the number of cucumbers allowed to develop per leaf so that if the cucumbers are going to be too large you increase the numbers of fruit per plant, and vice versa – really the equivalent of truss thinning.

> **"Cucumber production has changed very much over the years with the development of hydroponic systems, and the ability to provide the plant with water and nutrients on demand has simplified a lot of the problems that existed 50 years ago**

The only risk as I see it would be that of controlling powdery mildew, and provided this can be controlled either environmentally or by soft pesticides (bicarbonate of soda?) then a long crop would be a much more efficient way of producing cucumbers year-round.

PRODUCT GROUPS

ALL THE LATEST NEWS FROM YOUR PRODUCT GROUPS

Antony Heywood, General Manager : Vegetables New Zealand Inc.

MONITORING BIOSECURITY RISKS FOR THE VEGETABLE SECTOR

Words by Lisa Wong : Research & Technical Specialist, Market Access Solutionz Ltd

Exotic pests and diseases that enter New Zealand could have damaging effects on the vegetable industry. New pests and diseases that are emerging overseas and causing damaging effects on crops could also be a risk to vegetable production in New Zealand.

The risk of new pests and diseases can arise from a changing distribution because of trade or the movement of plants, people or consignments. They can also arise because their host association is expanding, or they may have a greater impact in their new environment compared with their country or region of origin.

Monitoring new and emerging pests and diseases overseas can help New Zealand growers prepare and manage these biosecurity risks in the event they arrive.

A project 'Monitoring biosecurity risks for the vegetable sector' has been supported by Vegetables NZ Inc through the Vegetable Research and Innovation (VR&I) Board for many years. Recognising the importance of monitoring biosecurity risks, and facing issues similar to the vegetable sector, the Foundation for Arable Research supports its growers by also contributing to this project.

> **"The risk of new pests and diseases can arise from a changing distribution because of trade or the movement of plants, people or consignments**

To monitor biosecurity risks a range of sources are examined to obtain information on new and emerging pest and disease risks. These include the scientific literature, international databases, industry publications, and reports and alerts from regional and national plant protection organisations including the Ministry for Primary Industries (MPI).

What are the priority vegetable pests and diseases?

Some new pests can be a concern across multiple vegetable sectors while others may affect only one host crop. An example of a new pest affecting multiple vegetable crops is fall armyworm (*Spodoptera frugiperda*). Its main vegetable hosts are allium, brassica, *Solanum* spp. cucurbit, kumara, beans and sweetcorn, as well as Poaceae (grasses and cereals).

Each vegetable product group has a number of pests that are regularly monitored because there is a greater potential for them to enter, spread and become established in New Zealand – these are termed 'priority pests'.

Some priority pests are common across more than one product group because they have a broad host range and can affect a variety of crops. Table 1 lists priority pests for the vegetable product groups. Vegetables NZ has identified 16 priority pests that are tracked through the 'Monitoring biosecurity risks' project. Leafminers are an example of a priority pest which is common across all five vegetable product groups. Leafminers are a highly polyphagous insect. Vegetables NZ has priority pests that are common to other product groups, for example, the tarnished plant bug is also a concern for Process Vegetables NZ, and the Black bean aphid for TomatoesNZ.

To help growers identify pests and recognise disease symptoms on crops, factsheets for priority pests have been developed and are available on the Vegetables New Zealand website (www.freshvegetables.co.nz). Factsheets describe the pest and its characteristics, its host plants, why it is important to look out for it, and how it disperses.

Find-a-pest app is another source of information growers can use for pest identification.

http://www.findapest.nz/

***Table 1**. Priority pests for vegetable product groups. Priority pests that are coloured are common to two or more product groups.*

VEGETABLES	TOMATOES	PROCESS VEGETABLES	ONIONS	BUTTERCUP SQUASH
Leafminers	Leafminers	Leafminers	Leafminers, Onion leafminer	Leafminers
Cucurbit yellow stunting disorder virus	Chilli thrips	Chilli thrips	Chilli thrips	Cucurbit yellow stunting disorder virus
Banded cucumber beetle Diabrotica baleata	Pepino mosaic virus	Tarnished plant bug	Onion fly	Cucurbit beetles *Diabrotica spp.*
Cucurbit beetle *Diabrotica speciosa*	Tomato torrado virus	Fall armyworm	Centre rot	Squash Leaf Curl Virus
Tarnished plant bug	Tomato leafminer	Bacterial wilt of bean	Onion bacterial blight	
Black bean aphid	Black bean aphid		Tobacco thrips, Flower thrips	
Red spider mite	Red spider mite		Black onion fly	
Fall armyworm	Tomato Pinworm		Leaf hoppers	
Capsicum chlorosis virus	Capsicum chlorosis virus		Leek moth	
Tomato apical stunt pospiviroid	Tomato apical stunt pospiviroid		Bulb mite	
Flea beetles	Flea beetles			
Sweet potato weevils	Potato spindle tuber viroid			
Western corn rootworm	Tomato yellow leafcurl virus			
Cucumber green mottle mosaic virus	Tomato infectious chlorosis virus			
Swede midge	Tomato brown rugose fruit virus			
Root knot nematode				

Chilli thrips are less than 2mm long

Keeping an eye on the border

A potential pathway for exotic pests and diseases is fresh produce imported from countries where new pests may be present. Analysing the pest records of imported consignments is an indication of the exporting country's compliance with New Zealand's Import Health Standards. Imported products can contain unwanted (termed 'regulated') pests which can pose a threat for the vegetable industry.

The most recent analysis of pest records showed that regulated pests are often intercepted on imported vegetables. When regulated pests are detected, the consignment is treated before being released.

Among the pests that have been intercepted are Diptera flies. These flies have been intercepted on green beans which are imported in large volumes from Australia, peas from the United States, and cucurbits which are mainly imported from Australia and Tonga. Thrips species are another group of regulated pests that are often intercepted on imported vegetables.

Pest records for imported cut flowers and foliage are also analysed because they can be a potential pathway for new pests and diseases of vegetables. An example is chilli thrips which are a priority pest for tomatoes, process vegetables and onions. Chilli thrips can be dispersed on infested plant material, and are often intercepted on roses from India, even though flowers are treated at the border.

Through the 'Monitoring biosecurity risks' project Vegetables NZ maintains an awareness of the risks posed by pests and diseases globally. Once these pests have been identified, Vegetables NZ develops factsheets so that growers can keep up-to-date on which exotic pests and diseases they need to keep an eye out for when scouting crops. Maintaining awareness of these high risk new and emerging pests and diseases is important so that New Zealand growers remain ahead and are prepared for potential incursions.

The *Vegetable Growers' On-Farm Biosecurity Manual* should be used to assist growers in planning biosecurity management. This manual has been sent out to most growers, and if you need a copy, please contact Vegetables New Zealand.

For more information please go to the Vegetables New Zealand website: **https://www.freshvegetables.co.nz/**

REFLECTING ON 2020

Words by Helen Barnes : General Manager, TomatoesNZ Inc.

To say that 2020 has been a year of unprecedented uncertainty and disruption feels like a huge understatement.

However, I believe that fresh tomato growers can take huge pride in the way they responded to the challenges of 2020 with innovation and resilience.

Throughout the year and despite the lockdowns, growers adapted their production and sales to keep providing essential, healthy, high quality tomatoes for New Zealanders to enjoy; they kept employing people; and they kept contributing to the economy.

The challenges and frustrations of operating under the threat of Covid-19 have not yet disappeared. Border restrictions mean lower seasonal labour supply and greatly reduced opportunities to export; costs of operating have increased; and there is still the possibility of further lockdowns affecting business in the future.

At TomatoesNZ we are continuing to work closely with the other horticultural product groups and Horticulture New Zealand to do everything possible to support growers. That includes speaking at least weekly with government officials about the policy and other settings that growers need to succeed and prosper. These range from conversations about future energy solutions, to the types of R&D and innovation needed to take the industry forward.

It is our privilege and pleasure to do this work in Wellington for all of New Zealand's fresh tomato growers.

How do shoppers buy fresh tomatoes?

TomatoesNZ commissioned a Nielsen Homescan research report in August to understand fresh tomato consumers and shopper purchase dynamics. This information has been instrumental in informing domestic market promotion this summer.

Key findings:

- 5.6% value growth for tomatoes in the previous year, with positive growth across all tomato purchase metrics – all tomato types have gained buyers, were purchased more often and had higher spend per shop.
- Core tomato buyers are adults over 45 years. Younger shoppers and households with younger children buy fewer tomatoes.
- Barcoded (packaged) tomatoes account for more than half the category sales, but are purchased less frequently than loose tomatoes and showed lower growth in sales compared to loose tomatoes during the year.
- The average volume of fresh tomatoes per household shopper surveyed is currently 8.8 kilograms annually.

The research figures suggest there is an opportunity to increase loyalty and repeat purchasing among shoppers who already frequently purchased tomatoes, because tomato spend for the year did not increase as much as fresh vegetable spend.

TomatoesNZ is looking into further research to understand why tomatoes are less appealing to younger shoppers and families with young children. This will guide how to address barriers to purchase whilst keeping our core buyers happy.

If you would like to receive the Nielsen report please contact Karen Orr at **karen.orr@hortnz.co.nz** or call **021 926 890**.

Look out for fresh tomato promotions this month

TomatoesNZ has invested in a new fresh tomato promotional campaign to remind Kiwis to enjoy tomatoes now whilst they're plentiful, full of flavour and great value.

The campaign is running from mid-November to mid-January, whilst there is plenty of supply available. A series of rotating ads will be used on Facebook and interactive stories on Instagram under a new "**NZ Tomatoes**" handle.

The social media-based campaign's objective is to increase the frequency of purchase by encouraging shoppers to add tomatoes to their weekly shopping basket. The plan includes providing recipes, inspiration and nutrition facts to remind consumers of reasons to purchase fresh tomatoes.

In addition, we've teamed up with 5+ A Day to enhance the ongoing promotion of tomatoes the team provide through their extensive social media and publicity channels. A radio ad is airing across the Mediaworks stable of stations for two months. Their stations are Auckland Mai, More, Rock, Breeze, Sound and the Edge. A billboard is currently celebrating the tomato season in Mt Wellington, Auckland, and this will be in place until the end of December.

Please follow and share @nztomatoes and @5adaynz on Facebook and Instagram.

Updated residue compliance information poster – insecticides and fungicides

A TomatoesNZ *New Zealand residue compliance information for fresh greenhouse tomatoes 2020* poster was mailed to members in November. This replaces last year's edition of the same poster.

A booklet with additional information on individual trade named products is also in progress and will be provided to all greenhouse tomato growers shortly. Meantime a spreadsheet (MS Excel) version is available electronically to members. Please get in touch if you would like the files, or more copies of the poster.

We recommend that growers dispose of previous years' compliance information as some of that information is now out of date. If you have any suggestions for improving the format or information provided please let us know.

Greenhouse vegetable grower energy survey

Thank you to everyone who completed the online greenhouse energy survey during late October to early November. We received over 70 responses and several enquiries. Congratulations to Andrew MacLaurin from Flat Tac Capsicums in Ngatea who was the lucky winner of the gourmet food basket.

Data gathered from the survey will be used to help inform a bid for funding support from government towards research and implementation of energy transition options for greenhouse growers. In November a Government Investment in Decarbonising Industry (GIDI) Fund was announced. The $70 million fund, administered by the Energy Efficiency & Conservation Authority (EECA), will allow business and industries to access financial support to switch away from boilers run on coal and gas, to cleaner electricity and biomass options.

TomatoesNZ and Vegetables NZ have been talking with EECA for several months now about the heating needs of greenhouse growers, recognising that there is not a 'one size fits all' approach for indoor vegetable growers. We are hopeful of forming a co-funded partnership arrangement to help provide growers with options and support for lowering emissions in a fiscally sensible manner.

We will provide a summary of the aggregated data analysis from the survey early in 2021. If you have any questions in the meantime please contact us.

2020: THE YEAR THAT PROVED OUR INDUSTRY'S RESILIENCE AND AGILITY

Words by Gemma Carroll : Communication & Engagement Office, Potatoes NZ Inc.

Field Walks 2020

The words 'unprecedented' and 'extraordinary' have been used a lot this year and the New Zealand Potato Industry has risen to all the challenges that have come our way: domestic and international lockdowns; changing health and safety guidelines for the pandemic response on farms and at processing facilities; import threats to our processing sector and uncertainty about the market domestically as well as for export.

Add to that the many regions facing Plan Changes and a future where even more proof of good farm management is essential for both regulatory and social licence to grow. It's a wonder we're all still standing.

We know everyone is feeling weary and quite probably tired from so many Zoom meetings, weather bombs and uncertainty, yet the planting and harvesting continues around the country and New Zealand can be grateful for the beautiful food we have continued to produce and supply.

Some of the industry wins this year:

- Field Walks 2020 in Pukekohe, Levin and Canterbury were packed with our latest R&D updates and were attended by around 60 people across the country.
- A rapid response to the global pandemic with swift organisational action in writing a Recovery Plan to support the industry including:
  - The Market Research project to capture the changes in domestic consumer behaviour.
  - A tariff application to the Ministry of Business, Innovation & Employment (MBIE), to ensure a level playing field for our New Zealand producers in light of the European Union import threat. This is now successfully under investigation with MBIE.
  - A call cycle to PNZ members to ensure grower welfare and capability.
  - Collaboration with other Primary Sector organisations to ensure food supply and waste reduction.
  - Research and Development have 10 current projects which can be viewed on our website here https://potatoesnz.co.nz/research-and-development/research-projects/
  - The Chip Group activities were cancelled due to hospitality closures during lockdowns and we pivoted into a #SaveOurFries #nzfries #buylocal campaign on social media which garnered huge support online and media attention, which bolstered our application to MBIE for investigation into the EU import threat.
  - Nationwide meetings were held with growers on the Regional Plan changes and hearings were completed with presentations from our grower representatives, processor representatives, PNZ team and planning consultants at the Horizons Council and Environment Canterbury (ECan).
  - The annual November Means New Potatoes event also pivoted and became a highly successful digital campaign, which is running for three months from 29 September until 28 December on multiple digital channels. Engagement is in the 200,000s at the time of writing and we still have six weeks to go. The campaign is informed entirely by the Market Research Project done earlier in the year and supports the goals of our Recovery Plan.
  - The PNZ Biosecurity, Emissions & levy Information System (BELIS) went live at the end of October and is streamlining all our administrative data.
  - The Sustainable Vegetable Systems had a $4.7 million funding injection from the Ministry for Primary Industries (MPI) and gained partnerships with Plant and Food Research, Vegetable Research & Innovation (VR&I) and Horticulture New Zealand.

Potato Tuber Moth (PTM)

  - Another project with important outputs is the Potato Tuber Moth (PTM) project, which has completed a Literature Review, now available on our website. PNZ technical manager Dr Iain Kirkwood is meeting with Plant & Food Research weekly and extending their PTM research findings to agronomists and growers on his regular farm visits.
- In February 2020 the board revised our industry strategic goals to be:
  - Double the value of fresh and processed New Zealand based exports by 2025.
  - Enhance the value of the domestic market by 50% by 2025.
  - Zero net nutrient and greenhouse gas (GHG) emissions from the potato industry by 2050.

This aligns with the government's emissions targets and maintains our industry's social and regulatory licence to operate.

We ended the 2019 year with an industry value of $1,088 million. Our industry has achieved domestic value growth of 44% since 2013.

> **PNZ would like to acknowledge the consistently hard work of the growers, processors and everyone working in and for our industry**

PNZ would like to acknowledge the consistently hard work of the growers, processors and everyone working in and for our industry. We look forward to 2021 gathering momentum for our emissions management and market growth.

Process Vegetables NZ

2020 THE YEAR OF CHALLENGES

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

This year has been one that we'll all remember for many reasons.

In early March John Seymour passed away. John had worked for Process Vegetables New Zealand (PVNZ) sector since 2011. He made a significant contribution to our sector and wider horticulture. This was closely followed by the onset of Covid-19 restrictions that turned most of New Zealand, including the horticulture industry, on its head. However, horticulture found itself in the privileged position of being classified as an essential service.

Some Covid-19 disruption

For process vegetable growers there was less disruption than in other horticulture sector during the lockdown, due to growing contracts with processors that meant we had certainty of sale, instead of being in an open supply chain. Additionally, there have so far not been any significant labour shortages either. Process Vegetables NZ, together with Horticulture New Zealand and the other horticulture industry organisations, worked in collaboration with government officials to ensure the industry continued to operate safely. This collaborative approach has continued post lockdown, with the development of the Horticulture post-Covid Recovery Strategy, that provides a pathway for the wider industry to recover and grow as we move into a new world. More specific to the process vegetables, we are currently exploring ways to work more effectively with other vegetable groups to avoid duplication and better allocate resources.

> **We are currently exploring ways to work more effectively with other vegetable groups to avoid duplication and better allocate resources**

Adverse events

As we have seen over the last few years, adverse weather events are becoming more frequent and severe. At the beginning of 2020 the entire North Island was classified as being in drought status. Although this is something that most regions have now moved out of, water continues to be a scarce commodity that must be carefully managed. In contrast to this we have seen localised heavy hail and rainfall events in Canterbury and Hawke's Bay that resulted in crop loss for some process growers. NIWA (National Institute of Water & Atmospheric Research) tells us we are beginning to experience La Niña weather conditions, which will be bringing above average temperatures across all of New Zealand, mostly normal or below normal rainfall and soil moisture levels, and river flows are most likely to be below normal in the north of the North Island and the east of the South Island. So weather challenges will continue into 2021!

UPCOMING LA NIÑA WEATHER CONDITIONS

- River flows are most likely to be below normal in the north of the North Island and the east of the South Island
- Above average temperatures across all of New Zealand
- Mostly normal or below normal rainfall and soil moisture levels

Promotion

PVNZ continues to contribute to vegetables.co.nz, which resulted in the development of promotion videos showing how frozen corn and peas are produced and processed. This is in addition to the continuation of the use of process vegetables in the 'cooking in schools' programme. Moving forward, the vegetables.co.nz initiative will be focused on two main areas, education and promotion of the health aspects of vegetable crops.

Research

PVNZ is now in year two of the three-year project looking into the variability of pea seed and how it affects crop yield. This year glasshouse trials continue to assess variability within and between commercial seed lines. With the results of the year one and two glasshouse trials, the third year will include validating results in field trials in both Hawke's Bay and Canterbury. PVNZ is also part of the $27 million 'A Lighter Touch' project that is seeking to use agroecological crop protection practices for better market access, improved productivity and profitability, crop diversity and a lighter touch on the environment. Within this framework PVNZ has the opportunity to propose projects along with other sectors to address shared crop protection challenges. Similarly, PVNZ continues to contribute to projects under the Vegetables, Research and Innovation (VR&I) board, with other vegetable and arable organisations. Under VR&I's new strategy we are focusing our research efforts on crop protection, environmental stewardship and common reporting frameworks.

> **Under VR&I's new strategy we are focusing our research efforts on crop protection, environmental stewardship and common reporting frameworks**

Biosecurity

For the past few years, biosecurity has been an increased focus for PVNZ. This year our biosecurity levy order passed into effect, we saw the official closure of the successful fruit fly response and we're currently responding to an incursion of the tomato red spider mite in the Auckland region. This demonstrates the continual challenges the process vegetables sector faces. Even with the border mostly closed to international passengers at the moment, there is still incursion pressure from the cargo and mail pathways. Next year the PVNZ board will take part in a biosecurity capability exercise to learn about what happens in a biosecurity response at the governance and operational level, which is one of our minimum commitments of being a partner of the Government Industry Agreement for Biosecurity Readiness and Response (GIA).

Opportunities for 2021

As an optimist I like to think that 2021 will bring the process vegetables sector more opportunities than challenges. I've been in my new role as PVNZ general manager since July now and have come to appreciate the unique way the sector operates. Together with David Hadfield and Lynda Banks, PVNZ will continue to identify ways to navigate the challenges that come up next year to ensure process vegetables growers continue to thrive.

BIG YEAR FOR PLUCKY LITTLE SECTOR

By James Kuperus : Chief Executive, Onions NZ Inc.

Looking back, I came into 2020 grinning with optimism.

We were going to gain access to Thailand, Indonesia looked to be extremely short of onions due to the Dutch having restricted access, and the crop had an excellent start with great preparations and establishment in 2019. By February, it was a different picture. The tariff on New Zealand onions remained at 127% for Thailand, Indonesia wasn't issuing quota, a bigger crop was coming on stream than anticipated and a global pandemic was emerging. What a year.

Taking all of this into perspective, I think by and large most people would say we've come through this year in a better shape than one would expect – for onions. In saying this, the amount of stress growers had to absorb this year around managing staffing during Covid-19, waiting for Indonesia to open, shipping delays and so on, we need to be making sure we are getting a fair return for the effort and stress put into growing and exporting onions.

The Indonesian market continues to cause headaches for growers, exporters and Onions New Zealand. As a collective we have become more mature when dealing with the trials and tribulations that Indonesia brings with it. We are well connected with New Zealand officials in Wellington and Jakarta, and exporters place a lot of trust in Onions New Zealand to manage commercially sensitive information to get the best outcome for them and the sector. As a collective, it takes a lot of nerve to hold stock for a market that may never open and leave the industry with 35,000 tonnes to move somewhere else.

Onions New Zealand knows the value of this market to growers and exporters. We continue to put time and resources into developing meaningful relationships to help resolve these barriers as they arise. Over the course of this year, Onions New Zealand has been supporting Indonesian students in New Zealand, meeting frequently with the Indonesian Embassy officials and other senior Indonesian officials. We were fortunate enough to even host members of the Indonesian Presidential Advisory Board in Hawke's Bay in February. Unfortunately, this year we were unable to visit the market to build on the relationships we have been developing in market, but I'm sure this will return to normal again soon. Onions New Zealand's strategy stays focussed on building relationships with New Zealand officials and directly with Indonesian officials where possible.

Under the leadership of the Board of Directors, Onions New Zealand has maintained a watchful eye on the horizon as well. The challenges and opportunities for the sector are going to be around meeting consumers' demands domestically and globally for food with less agrichemicals and lower impacts on the land and atmosphere. Onions New Zealand has research underway to work towards addressing some of these concerns. The Sustainable Farming Fund (SFF): Onion Pathways project is continuing to look for ways to reduce our Mancozeb dependency, with the European Union looking to ban it in 2021. Coupled with the work under the Sustainable Food & Fibre Futures (SFFF): A Lighter Touch, looking at incorporating biological solutions and identifying the regulatory barriers to registering new products. The sector is heading in the right direction for future challenges and opportunities.

Furthermore, on the research front, growers and the wider industry now have access to over 40 weather stations around the country, daily reports on the weather and disease pressure plus benchmarking reports on chemical applications compared to others in the region. We are also engaging more with crop protection companies to signal shortages in the chemistry toolbox.

My job is made infinitely easier with the support of growers, exporters and the wider sector. I believe firmly that industry bodies need to be accountable to members to be returning value for levies and support received. I believe Onions New Zealand does this for members and by and large, the Board of Directors and management have identified the right priorities that we can have the greatest impact on.

I am looking forward to another onion harvest and seeing what 2021 brings our plucky little sector.

COOL SEASON LETTUCE COVERED: SOUTH PACIFIC SEEDS INTRODUCES FIVE NEW VARIETIES

As many iceberg growers will be aware, South Pacific Seeds have been working intensively over the past nine months on an entirely new programme to bring to market.

New genetics from four separate breeding programmes has resulted in an impressive trialling schedule which has given rise to what we believe is the best cool season schedule we have ever had. Four new varieties have been commercialised for the 2021 season for harvest – from early Autumn through until late Spring/early Summer – giving grower's reassurance of continued productivity. The various breeding programmes we are drawing off each have their own strengths, which fits nicely into the range of requirements growers have in various areas of the country over this period.

While the past Winter/Spring period was quite warm and dry (in general), trials were spread widely to cover as many different soil types and microclimates as possible. Specific characteristics have been identified as a minimum requirement depending on end use; for instance: frame size and type (for bagged or fresh/loose market), environmental conditions (frost tolerance in mid-Winter and bolting tolerance in Spring) and disease pressure (with screening for anthracnose and mildew being paramount). At SPS we aim to carry on our tradition of strength in the iceberg sector and look forward to sharing our new material with our growers.

For more information contact South Pacific Seeds on **0800 77 22 43**

PICADOR
(SPS027-0)
- Incredible uniformity with a tight frame
- Ideal for fresh and bagged market
- Warm and cool shoulder (Autumn and Spring)

Bl. 1-29, 32, 34

BARCELONA
(SPS037-0)
- Extremely high cut-out
- Very round, medium head size
- Cool shoulder and early Winter harvest

Bl. 1-35

MATADOR
(SPS029-0)
- Vigorous true cold season type
- Sure-heading, high cut-out
- Winter and Spring (wide window)

Bl. 1-27, 29, 30, 32

CENTAUR
(SPS156-0)
- True Spring shoulder harvest type
- Uniform maturity

Bl. 1-29, 32, 34; Nas (0)

SPS155-0
(TRIAL 2021)
- Late Autumn/early Winter harvest type
- Attractive, dark green, uniform heads

Bl. 1-29, 32, 34; Nas (0)

WSP:
GUIDING FUTURE-READY STRATEGIES

Variations in rainfall, temperature, drought, wind patterns, fluctuations in sea level, conditions that allow weeds, pests and microbes to flourish and changes in atmospheric CO_2 or ozone level – all associated with climate change – pose a risk to food and fibre production.

Whether plant or animal based, all food production ultimately needs soil derived nutrients, atmospheric carbon dioxide and sunshine. Yield reliability is almost entirely linked to consistency of water supply for plant growth.

A western diet, often high in sugars, fats and animal-based protein takes in the order of 1-1.2 hectares per person of land to grow the ingredients. By comparison, a subsistence diet based on grains takes closer to 0.2ha to feed a person; realistically this is only to a level above famine classification.

New Zealand has about 14 million hectares of land with high production potential, and a low population which is approaching 5 million people. This means New Zealand's land and water resources can, and do, support food supply to millions of consumers around the world as well as sustaining internally.

Current industry challenges sit squarely in the decisions around adaptation to climate change and how future weather patterns may affect food production land suitability.

With changing climate conditions, we may see crop production rates and efficiency of resource use climb; new crops previously unseen in some regions may emerge in response to increased temperature, rainfall and available carbon dioxide.

The recently gazetted National Policy Statement for Fresh Water Management and Draft Policy Statement for highly productive land, set-out a nationwide approach to protecting our most sensitive water bodies and productive food producing soils. The horticulture industry is facing pressure from urban sprawl, but we need to ensure as an industry there is enough land for primary production now and in the future.

In a country with abundant natural freshwater resources, incorporating productive land use within catchments through **careful harvesting of enough water for reliable food production, and the protection of natural water bodies from contamination is a fine balance that needs to be driven by sound science and human centric inputs**. Our food production industry is heavily investing in this and is on the pathway to be recognised as one of the most sustainable in the world.

WSP's work in the horticulture and agriculture sectors is focused on the establishment and operation of water storage and distribution infrastructure, and how management of nutrients and sediments can be improved through adoption of good environmental management practices.

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 horticultures interaction with the environment and community. Enquiries contact **stephen.mcnally@wsp.com**

SOUTH PACIFIC SEEDS

HAS YOUR **COOL SEASON**

COVERED!

PICADOR
(SPS027-0)

BARCELONA
(SPS037-0)

MATADOR
(SPS029-0)

CHECK PAGE 63 FOR OUR FULL RANGE

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0800 77 22 43

seeds for a healthy life