KPMG

Agri-business Agenda 2021

New Zealand, our consumers, and our 2040 future

June 2021

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The KPMG Agribusiness Agenda 2021

The state of the nation

Our annual review of the top of mind opportunities and challenges facing New Zealand's Food and Fibre sector. Based on conversations with industry leaders and the annual priorities survey.

Consumer insights

We have sought out the voices of our consumers, now and into the future, to understand what is driving the decisions they are making and the channels they are engaging with. We have drawn on input from contributors around the world, including market experts and local KPMG specialists.

The next normal

The future of the global food and fibre system is being shaped by unprecedented investment into disruptive new technologies and business models. In our fourth analysis of future developments in Agri-food, we focus on the strategic opportunities for New Zealand and find a world where the potential to sustainably create new value for our country is becoming clearer.

KPMG

Propagate

"Propagation is the process which grows new plants from a variety of sources."

KPMG Propagate combines the best of KPMG's global advisory capability with deep sector experience to assist New Zealand Agri-food businesses to achieve their growth aspirations and fuel our country's prosperity.

Contact Andrew Watene, Director, Head of KPMG Propagate to explore if we can help you grow.

E: awatene@kpmg.co.nz

Ministerial foreword

Hon. Damien O'Connor
Minister of Agriculture; Biosecurity; Land Information; Rural Communities; and Trade and Export Growth.

The Covid-19 pandemic has presented significant challenges for our food and fibres sector, but through hard work and finding solutions together, we're in a good position to lead New Zealand's economic recovery.

I'm committed to helping the sector maximise its opportunities and find ways to drive value growth, while improving outcomes for our rural communities and environment.

The Government is supporting the sector by maintaining our robust biosecurity system, negotiating strong trade agreements and investing in a slew of projects to boost innovation and help farmers and growers.

New Zealand has a great reputation as a producer of high-quality, safe and sustainable food. Our Fit for A Better World – Accelerating our Economic Potential roadmap underpins the sector's collective efforts to secure our place on the international stage.

The KPMG Agribusiness Agenda (Agenda) captures the pressures our food and fibres sector is feeling, and key elements we need to focus on to enable a more productive, sustainable, and inclusive economy. It is our responsibility, as Government, to provide the right foundations and support to enable the continued success of the sector.

The time is right for transformation. New Zealand is on this journey already, and our partnership-based Industry Transformation Plans (ITPs) will enable a step-change in our economy, one that is more resilient and future-focused. The ITPs will provide the agritech, forestry and wood processing, and food and beverage sectors support through this transition, while increasing the value of our products and services, and lifting New Zealand's productivity. They will focus on prosperity, sustainability, protection, and leadership.

A key priority for the Government is expanding New Zealand's market opportunities and providing a level playing field for our exporters by securing high-quality, comprehensive, and inclusive free trade agreements (FTAs).

In January 2021, we successfully signed our FTA upgrade with China, which included eliminating tariffs for 99 percent of New Zealand's nearly $3.3 billion wood and paper trade to China – this will have enduring benefits for our forestry sector.

We're making solid progress in respective FTA negotiations with the European Union and the United Kingdom.

We are also working to ensure our local communities and economies are supported through continued effort for equitable digital connectivity and workforce capability, all essentials highlighted in the KPMG Agribusiness Agenda.

For the 11th straight year, the Agenda identified that a world class biosecurity system remains the number one priority for our industries. To ensure our biosecurity systems are fit-for-purpose and future-proofed, we are reforming the Biosecurity Act to ensure our systems continue to protect our economy, environment, our taonga, and our people.

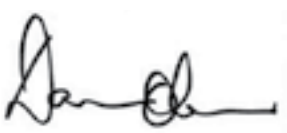
Reforming our land, water, and climate regulations will keep us on top of our sustainability journey. By engaging with iwi, hapū, Māori, sector leaders, and local communities we will achieve greater, fit-for-purpose policies which will enable us to achieve our whenua, freshwater, moana, and climate outcomes. These are all vital for a prosperous economy.

While our unemployment rate is around four percent, our food and fibres sector workforce challenges persist. As a country, we have worked hard to keep Covid-19 at bay. Keeping this in mind, we continue to evaluate our position on immigration and border policies to ensure we are allowing the right people with the right skills into New Zealand.

The Agenda raises the need to support our sector executives so they can focus on transformational strategies and grow their leadership skills and thinking. Creating the needed bandwidth for our sector leaders will enable them to drive their firms and products into the future and create opportunities for others in the sector to upskill.

Programmes such as Te Hono help to drive transformative change by uniting senior leaders from across the food and fibres sector. On the ground, initiatives such as a national integrated farm planning framework will make it easier and less time consuming for farmers and growers to meet their business and regulatory requirements, by incorporating regulated requirements into a wider farm planning process.

This decade will see a great shift in the global market. Ensuring New Zealand has a seat at the global table will require us to tap into the innovation and disruption occurring across the food and fibres system around the world, align our products with consumer values, and support each other through transformation efforts.



Executive summary

There's a great big, beautiful tomorrow... for New Zealand?

The 'essential food producer' positivity of last year's KPMG Agribusiness Agenda has given way to the realities of the now normal based on our discussions with food and fibre industry leaders and influencers.

So, while US$65.4 billion of venture capital has been injected into the food system over the last decade, driving a global food renaissance, for the first time in writing the Agenda there are tangible concerns over the ability of New Zealand organisations to engage in the disruption that is occurring globally.

This year's report has been the most challenging to write in the 12-year history of the series. It tells two quite different stories; one of almost endless opportunity for producers of sustainable, healthy food, the other of a sector that is fatigued, straining to cope with the wide range of issues that it is having to respond to on a day to day basis and with morale falling. One story is global, the other is very much a New Zealand story.

We highlight the opportunities that are available to the food and fibre sector, both from the customers and consumers that we connect with around the world and some of the transformational changes shaping the future of food and fibre. It tells a story of innovation and opportunity, of a world looking for safe, provenanced, evidence based food and one where producers are rewarded for delivering products with attributes that are valuable to consumers.

The Agenda also provides our analysis of the current state of the industry. Covid-19 has significantly increased the complexity of running a food and fibre business from New Zealand. This has made it challenging for leadership teams to have sufficient bandwidth to look forward and design strategies that will enable their organisations to capture the opportunities arising from the global food renaissance.

With the business challenges arising from the pandemic being very real for leaders, and the regulatory pressure to address the sector's environmental performance becoming urgent, it was clear from our conversations that industry morale has fallen significantly over the last year.

We have over the years had a preference to focus on the opportunities facing the sector and explore how these could be captured. This year the range of the concerns being raised during our conversations has led us to address these issues at some length, to ensure we continue to reflect the perspectives of our contributors accurately. At times it felt as though we were talking to leaders who were primarily focused on finding the strength to fight another day rather than the energised leaders of previous years, striving to unlock the door to the great big, beautiful tomorrow that is emerging rapidly across the global agri-food sector (borrowing from Walt Disney's Carousel of Progress).

Leadership overload

There is little doubt the world has become more complex in the last year. The practical challenges that Covid-19 has created (keeping people safe, shipping products around the world, finding sufficiently skilled people to do the work and connecting with business partners across borders) are consuming most executive time and effort. The speed at which things are changing is unprecedented and means very often that the appropriate decision in the morning needs to be revised in the afternoon. But it is not only these pandemic related challenges that are draining executive bandwidth from focusing on long term aspirations.

Regulatory change

The pace of regulatory change is greater than it has been in recent years and is expected to accelerate as the Labour Government looks to implement its transformation agenda. The changes expected are likely to have material impacts on farming systems as well as the operations, ownership rights and economics of businesses across the sector. The point was made that it is the breadth of change that is stretching many organisations, given that each new rule brings new compliance and reporting requirements and often requires changes to core systems.

A recent example that was pointed to during conversations was the decision to ban live animal exports. Although the change is to a relatively small part of the industry, it will impact the livelihoods of many people and is being implemented with a relatively short runway for them to not only change their businesses but to potentially have to reorganise their personal financial affairs. While few disagree that improving the industry's regulatory environment is necessary, particularly when it assists in protecting the long-term license to operate, the pressure the current pace of change is placing on executives is significant. Evolving business models that have been developed over decades creates huge management and resource challenges that need to be taken into account in designing regulatory programme, given this does divert attention from the bigger picture opportunities.

Perception

The role of perception in shaping the reaction of many stakeholders to food and fibre sector organisations was raised on many occasions. It was suggested that as more organisations focus on how they are perceived there is an increased risk that short term tactical decisions replace more robust decision making based on long term goals and ambitions. There is no question that perception is dominating public discourse in a world where much of the news media does little more than report what people have posted on social media – consuming executive time in responding as a consequence.

Can we connect to a world of opportunity?

While this Agenda recognises that the industry is currently operating under significant pressure it also illustrates that there remains great potential to become highly involved in shaping the global food renaissance in many ways.

These opportunities are evolving at speed driven by unprecedented innovation investment, governments around the world responding to the food resilience challenges that the pandemic has highlighted and a desire from impact investors and corporates to address some of the inherent inequities that exist in the system.

The door remains open for New Zealand organisations to participate in and benefit from the system transformation that is occurring. However, given the pace of change, there is a need to move quickly to be able to become a collaborator in the disruption that is occurring. New Zealand's global recognition as a producer of high quality, safe and sustainable food stands us in good stead as a desirable partner to many of the innovations that are occurring. However, what we are recognised for doing well today will not necessarily be relevant in a world of disruption forever.

Our organisations – be they producers, processors, exporters, research bodies, government agencies, finance providers or any other participant in the sector – need to act now to leverage our current reputation to secure their place at the table before our invitation to join expires.

New Zealand needs to continue to be a leader in the global food system. To achieve this, we have to make the connections with the innovation and disruption that is occurring across the system at scale. There will always be entrepreneurs and organisations that, through smart thinking and great innovation, will secure niche roles in the system. We have created our wealth from food by participating in the system at scale and our future prosperity demands us to retain this position.

We strongly believe that the ability to connect and participate in the future of food at scale remains available to New Zealand organisations however the people that will make this happen, executive teams across the industry, are the same group of people that are currently under significant pressure dealing with the day to day challenges of their businesses. There is often talk about industries or organisations reaching critical junctures in their history, and sometimes these points are more hyperbole in hindsight than reality, but it does feel that we have reached one of those points that has the potential to shape the future of the sector, and New Zealand.

The outcomes we achieve are heavily dependent on the small group of executives holding the key roles across the industry today.

Enabling our leaders

Agenda reports have often discussed the importance of developing the next generation of leadership talent. While this remains important, this year our message is that it is critical that we invest in enabling our current leaders to secure the critical seats the country needs at the top table in the future food system.

Given an individual's time is to all extent and purposes finite, creating the bandwidth for an executive team to focus on the future means things must be done differently across an organisation and the industry. What might this entail in practical terms?

Strengthening the executive bench

Jim Collins in his influential book 'Good to Great' talks about the importance of getting the right team in the right seats on the bus if an organisation is to make the transition to great. The book provides limited guidance on what the right size for the bus is, but our conversations suggest that for too long New Zealand organisations have been using buses with fewer seats than their international peers and competitors, and very likely, fewer seats than they actually need to optimise the organisation's performance. The pandemic has highlighted the lack of depth within many executive teams. With so many moving parts to manage closely, organisations have found that they have had to continuously increase the workload of a core group of executives rather than having the breadth of experienced people to share responsibilities. Given we expect our organisations to be globally competitive, we need to recognise that having appropriate depth across executive ranks is critical. It is no longer possible to shortchange ourselves on executive talent, the cost of doing so is significant and growing.

Seeking diverse advice

In last year's Agenda, we highlighted the importance of leaders creating environments where people with diverse perspectives have the confidence to thrive and share their experiences. We also highlighted how important it is for executives to listen to these opinions particularly when they relate to the future. However, this can be a significant challenge when day to day tactical issues become all consuming. The importance of fostering belonging and seeking diverse opinions is more relevant than ever but to deliver on this executives need to have the time to invest in their people and seek out alternative perspectives. This activity is often viewed as a nice to do rather than a need to do. We suggest executives need to place a high priority on taking the time to listen, reinforcing the need to ensure the leadership bench has enough resources available to it.

Extending networks and relationships

Being from New Zealand does not give any organisation an automatic right to a role in the next generation of the food system. Our organisations need to earn their invitation, which heavily relies on the connections that exist between people. Over the last year, maintaining and developing networks and relationships has been challenging. The Zoom or Teams call has kept us in touch but the personal elements of face to face meetings have been lost and many people have highlighted to us that important relationships, often maintained over a drink at a convention or through an annual site visit, have started to cool.

As we start to unlock it is critical our leaders have the time to reinvest in key networks and relationships. Without taking this time there is a risk we are not engaged in key initiatives for our future, simply because we are out of sight and out of mind.

Committing to corporate venturing

The other way to gain access to projects that are relevant to our future is to buy a seat at the table through investment. Corporate venturing is commonly used by organisations around the world to take positions in innovation that may be critical to their future but it is something that has not been so popular with New Zealand companies. Why is not entirely clear, but we believe it would be a combination of a lack of scale to commit to a portfolio of investments and, again, a lack of executive resource to make and manage investments. Previous Agendas have floated the idea of a New Zealand Food and Fibre Corporate Venturing entity, that is resourced with appropriate talent and capital by industry, government and, potentially, private investors. It's aim being to grow a global portfolio of investments in strategic, disruptive food and fibre opportunities that may be relevant to the industry in New Zealand over time.

Recognising the regulatory pressures

This Agenda highlights some of the areas of regulatory change specific to the food and fibre sector that leaders are currently having to deal with (it does not touch on other changes, such as fair pay agreements or health reforms, that apply across the economy). The Government has been clear that it wishes to make progress on an agenda of transformational change during this term, which means that there are many issues that they are seeking to engage with the industry on, as well as changes required to implement the rules when enacted. All this activity requires time from leaders across organisations. For the government, the ask from our conversations was simple, please ensure that work is co-ordinated across agencies so that consultation occurs and regulations are drafted in a way that reduces the burden placed on executive time. However, there is also the opportunity for organisations to collaborate more closely on how they respond to regulatory change so that the effort of response can be shared across multiple organisations to a greater extent than it is today.

Governing for growth

A final point to consider sits with the Directors and Governors of our organisations and challenges this constituency to ensure they are focused on governing with a growth mindset.

From our experience, we know that much executive time is consumed within an organisation preparing reports about what has happened in the organisation for their board. Preparing and considering these reports leaves little time for the leadership team or the board to consider growth within their normal operating cycle, meaning that important conversations about the future are often left to the annual strategy day. Directors, and Chairs, in particular, can set a growth focused cadence within their organisations, one that clearly defines the compliance information the board needs to see (maybe reporting by exception) and consequently allows executives to invest their time in looking to the horizon and beyond and reflects this in meeting agendas to adopt this wider perspective.

I recently had the opportunity to take part in a webinar organised by KPMG Ireland and the Irish Farmers Journal. The keynote was given by Tom Arnold, the chair of the agri-food strategy committee, that has prepared Ireland's latest national agri-food 10-year plan. The strategy aims to make Ireland the leader in sustainable food systems by moving beyond safe and high-quality food to place a focus on evidence based, sustainable food. Much of the discussion was almost the same as I have heard in numerous forums in New Zealand. Listening to the conversation, it brought home that New Zealand is not the only a country that is looking to capture greater value from high quality, sustainably farmed food and fibre. It also brought home that the world is moving forward regardless of how the pandemic currently impacts it – not waiting for things to go back to normal.

We must do the same thing. We must resource industry leadership to change the momentum of morale in the sector and orientate focus towards the future. We cannot afford not to capture opportunities to step into and leverage the great big, beautiful tomorrow that the global agri-food renaissance is creating.

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Agri-Food National
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The year in review

June 2020

— The New Zealand Government announce a new cap of 160 million tonnes of CO_2-equivalent greenhouse gasses in the Emissions Trading Scheme over 2021-2025 while Ministry for Primary Industries forecasts primary sector exports to grow $1.7 billion for the financial year.

— Fonterra Co-operative Group launches their new payment for sustainable milk with up to 10c per kilogram of milk solids determined by environmental and quality targets.

— Chinese alternative protein company Zhenmeat release a plant-based pork and crayfish after Beyond Meat's recent entry into the market.

— Bayer pays NZ$16b to settle all of their United States Roundup/ glyphosate court claims 'inherited' from their Monsanto purchase in 2018.

July 2020

— 'Fit for a Better World Roadmap – accelerating our Economic Potential' is released by the New Zealand Government, including intentions to increase export earnings by NZ$44b over 10 years.

— The Global Dairy Trade auction jumps by 8.3% on 8 July, its biggest lift in over five years.

— Changes to the Dairy Industry Restructuring Act remove the requirement for Fonterra Co-operative Group to supply milk to establishing competitors and allow the company to refuse supply from new conversions and farmers that don't meet its supplier standards.

— US$1.1 Billion is invested in alternative proteins so far for the 2020 calendar year, doubling the 2019 total. KFC releases an update of their developments in 3D-printed nuggets from chicken cells and plants.

August 2020

— The red meat sector increases 7% revenue growth year-on-year, while Chinese Influencers sell 70,000 cartons of UHT New Zealand milk in 60 seconds.

— New Zealand begins construction on its first large-scale bioenergy facility powered by food waste.

— Oxford University releases research that demonstrates honey can be more effective than conventional medicines for a strain of the common cold.

— Emerging Proteins NZ is launched to deliver a more coordinated approach across the food and fibre sector in this evolving food area for New Zealand.

— An Israeli start-up 'SavorEat' reveals their automated closed system robot which 3D prints and cooks' plant-based meats to consumer preference within six minutes.

Covid-19 stories

— Dairy overtakes tourism as New Zealand's biggest exporter, as border closures and domestic travel restrictions severely reduce tourism revenue.

— $4.8 billion of crop exports are expected to be lost in Africa due to international factory closures, a reduction in coffee and chocolate consumption, and cancelled flights.

— In New Zealand, Zespri donates 100 tonnes of kiwifruit to local communities through food rescue organisations. Fieldays is launched virtually and held on an online platform over two weeks.

— Wine sales in the United States drop significantly with a 22% or US$68 billion decrease in food service and drinking establishments in the first quarter of 2020.

— Face masks made with New Zealand wool grow a significant demand, and farmers put a NZ$110m price-tag on the cost of a rural contractor shortage that could see 27m tonnes of food go to waste.

— The United States Government unveils a US$1 trillion Health, Economic Assistance, Liability Protection and Schools Act (HEALS) package, which includes US$20b for agriculture.

September 2020

— The New Zealand Horticulture sector reached a record NZ$6.2 billion of exports in the last financial year, though the industry now grapples with a 10,000-worker shortage with the lack of backpacker and seasonal workers.

— A container ship "Gulf Livestock 1' carrying 5967 New Zealand cows and 43 crew sinks in the East China sea after a typhoon induced engine failure.

— International consumer research by Nielsen across the top 25 breakthrough innovations of 2020 exhibited a clear trend of 'mindful living and indulgence', a trend expected to continue to drive consumption habits into the foreseeable future.

— Data shows the greatest decrease in New Zealand's GDP since 1987 with a 12.2% drop in the June 2020 quarter with agriculture posting the smallest drop at just 2.2%.

— Reuters analysis on basket of goods variance shows that Covid-19 has disrupted consumer models, with the most significant factor identified as working from home and the resulting consumer trends.

October 2020

— Research is released by Auckland University of Technology that shows sheep and beef farms offset between 63 and 118% of their own greenhouse gas emissions.

— Tomatoes hit a weighted average of $13.26/kg in New Zealand, 44% higher than usual pricing.

— Fonterra Co-operative Group sells its farms in China for NZ$550m which is used to pay down debt.

— The United Nations 'World Food Programme' wins the Nobel Peace Prize for its efforts to combat hunger and improve conditions for peace in conflict-afflicted areas.

— The world's first flavour designed by artificial intelligence is created at Swiss company Firmenich and the world's largest insect farm begins its construction in France.

— New Zealand Avocado exports struggle with air freight decreases of 100% in Korea and 89% between Auckland and Thailand.

— A global poll with 150,000 respondents across 142 countries conducted by Gallup shows that 60% of respondents are worried about the safety of the food they eat.

November 2020

— A New Zealand study finds that 51% of children's diets are comprised of ultra-processed foods.

— Agri-food tech start-ups are recorded to have raised US$11.6b in funding in 2020.

— Additional bans are placed on Australia's exports to China including barley, sugar, red wine, timber and lobster.

— New Zealand's online dairy product sales in China increase 250% over five years, as China's e-commerce market experiences 60% growth in the first half of 2020 reaching 25% of the retail market.

— Cuddling cows for stress relief trends around the world, with prices reaching US$110 / hour in the Netherlands, while 'instagrammable shades' accelerate natural colour demand in food and beverage.

— Chinese officials confirmed that New Zealand was not the source of Covid-19 found on meat packaging in the city of Jinan.

— Denmark seeks to cull 15 million minks alongside a mink farming ban to the end of 2021 after a mutated version of Covid-19 was found in 11 people infected by minks.

The year in review

December 2020

- The New Zealand Government offers a $1000 bonus for those who take up a role in horticulture amidst the severe labour shortage.
- Tens of thousands of Indian Farmers begin one of the world's largest protests in history, against new agricultural laws including removal of a government agreed minimum price.
- Singapore becomes the first country to approve lab-grown chicken meat for commercial sale, made from genuine chicken cells cultured in bioreactors.
- The United States Food and Drug Administration (FDA) approves intentional genomic alteration in pigs for both human food and therapeutic uses for 'GalSafe pigs' which reduce a specific allergic reaction faced by some people when consuming red meat.

January 2021

- The Free trade agreement between New Zealand and China is updated, and amendments include tariff reductions, reduction of non-tariff barriers, and improved accessibility for New Zealand service providers.
- The European Food Safety Authority delivers its first scientific opinion on an insect-derived food, stating dried yellow mealworm as safe for human consumption.
- The United Nations announces 2021 as the International Year of Fruits and Vegetables.
- The United Kingdom launch a 10-week gene editing consultation as the environment secretary seeks to unlock the opportunity and potential of biotechnology without the constraints of the European Court.

February 2021

- A study of 18 nations shows that New Zealand has the lowest on-farm dairy carbon footprint, 46% less than the average of countries studied.
- The largest ever opinion poll on climate change shows 64% of people believe the world is in a climate emergency, switching to plant-based diets was the least favoured of 18 policy options.
- Data scientists using artificial intelligence beat traditional farmers by 196% in production and 75.5% in return on investment in China's Pinduoduo Smart Agriculture Competition.
- A start-up in the United States 'Air Protein' raises US$32m in a Series A funding round, using microbes to grow edible protein from carbon.

Covid-19 stories

- New Zealand consumers demonstrate sustained shopping, purchasing and consumption changes including an increase in baking ingredients, coffee and purchasing frozen foods.
- A Rabobank Food Waste report shows that households in Australia wasted nearly 13% of groceries, accelerated by Covid-19 and reaching a value of AU$10.3b thrown away.
- New Zealand Summer Fruit Chief Executive Richard Palmer reassures international customers of the country's Covid-free status after reports of the virus found on fruit packaging in the city of Wuxi.
- International research shows that 60% of people suffer from smell and taste disturbances when infected with Covid-19, and 10% of persistent problems beyond four weeks.
- New research discovers that a protein-based ingredient from milk is an effective antiviral agent against common influenza virus species.
- The World Health organisation announces that Covid-19 could potentially be transmitted on frozen packages of food, with implications for international product export from countries with high Covid-19 infection rates.

March 2021

- New study by IWSR shows that the global no/low alcohol beverage market is projected to increase 31% by 2024.
- Tomatoes sell for 8c/kg as prices hit a 12-year low.
- BNZ pilots $50 million sustainability-linked loan with dairy investor Southern Pastures, offering a discount when metrics on improvement of on-farm greenhouse gas emissions, total water quality and a reduction in total on-farm greenhouse gas emissions.
- Global food waste is calculated at 900 million tonnes.
- Slovenian start up 'Juicy Marbles', founded in 2020 has developed what is believed to be the world's first plant-based steak, marbled using sunflower oil.

April 2021

- StixFresh, a company in Kuala Lumpur has developed an all-natural, chemical-free sticker that keeps fruit fresh for up to two weeks longer, assisting in food waste reduction.
- VelTrack, a fully electronic, web-based system that enables velvet to be tracked and traced each step of the way from the farm to the market, and vice-versa, is set for first registrations on April 6.
- Alternative proteins are predicted to account for 11% of global protein by 2035 according to a BCG report. Or 22% if key regulatory and technological barriers are overcome.
- Happy Valley Nutrition Ltd is developing a $280m processing facility in Otorohanga to produce high-value specialty dairy ingredient powders for export markets.

May 2021

- Kaitahi As One won the small supplier category at the Foodstarter awards using indigenous superfoods in instant smoothie drops.
- Agritech NZ has launched a venture capital fund specifically for the agritech sector. The fund, Finistere Aotearoa Fund is worth $42 million and is backed by NZ Growth Capital Partners and Finistere Ventures.
- Fonterra Co-operative Group announces new capital structure options, and a 2021/2022 forecast milk price with a midpoint of NZ$8/kg.
- The United Arab Emirates has launched The Food Tech Valley in Dubai to triple the nation's food production and will be home to four main clusters: agricultural technology and engineering, a food innovation centre, R&D facilities, and an advanced smart food logistics hub.

- The Meat Industry Association (MIA) requests that their 25,000 strong workforce be the next priority to be vaccinated against Covid-19.
- The fourth Auckland lockdown has resulted in a significant surge in demand for support packages. Some foodbanks in the city experience a double in demand.
- The Ministry of Business, Innovation and Employment (MBIE) releases a draft report into the potential 'dumping' of potato fries and identified an increase in imports but no material threat to local industry.
- Australian labour recruiters increase marketing efforts to attract New Zealanders offering $2000 for relocations. Offers of paid airfares, accommodation and a wage of AU$32 an hour have been reported.
- The New Zealand government's rejection of 500 skilled dairy workers is stated to put producers under significant pressure. A survey conducted by DairyNZ and Federated Farmers found that 49 per cent of farmers are currently short staffed, and 58 per cent were experiencing increased stress levels.
- Covid-19 travel restrictions extend a severe vet shortage across rural communities.

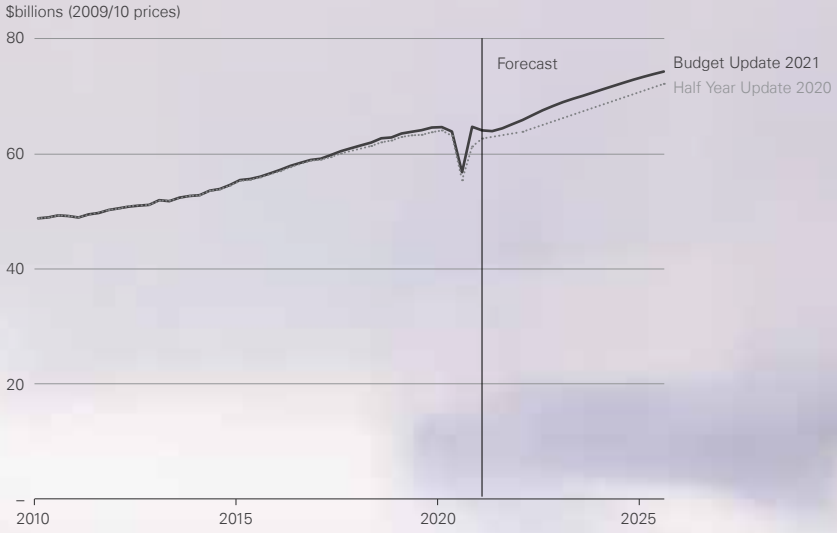
The last twelve months

New Zealand has gained an international reputation of almost 'business as usual' due to the Government's handling of the Covid-19 response.

The data shows how hard our industries are having to work to contribute to the economy's "better than forecast" performance. New Zealand's reliance on trade with China is cause for discussion; as our main trading partner, 44% of our total exports to China in 2020 were dairy, underpinning our reliance on this commodity and this market.

However, whilst everything may appear rosy on the surface...

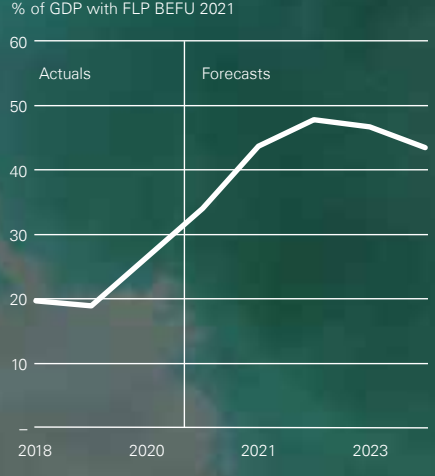
Real production GDP



Source: New Zealand Budget 2021

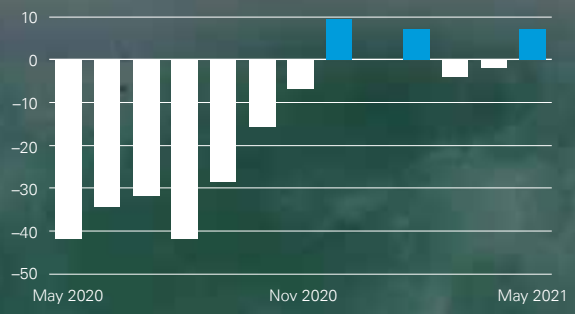
Government debt figures are climbing and business sector confidence is gradually recovering, with the agriculture sector a way behind

Net core Crown debt



Source: New Zealand Budget 2021

New Zealand Business Confidence



Source: Tradingeconomics.com | ANZ Bank New Zealand

Agri-sector Business Confidence

Mar 20

-79.4%

Mar 21

-22.7%

Children living in poverty

2019

13.2%

2020

11.3%

Obesity in 2019/2020

Adults

30.9%

Children

9.4%

Income inequality

70%

household wealth

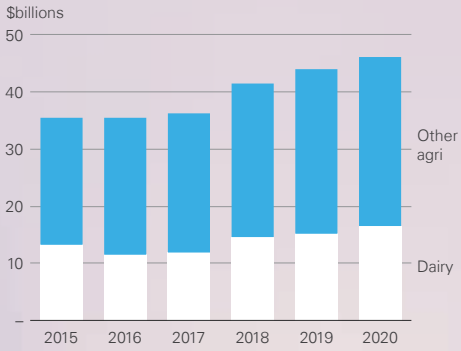
held by

20%

of households

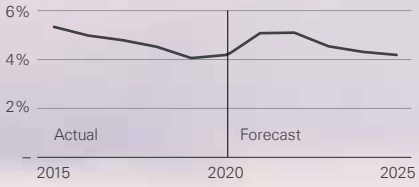
and social and inequality issues also continue to exist

Exports by Agri commodities



Source: Stats NZ - shinyapps.io

Unemployment rate



Source: NZ Treasury

Covid Resilience Ranking

(May 2021)

Source: Bloomberg

There is every reason for the international community and New Zealanders to celebrate our success in navigating the way through the pandemic, but there are clearly issues that need to be worked on. The recent Budget has gone a long way to address these by dialling up the investment in social infrastructure, housing, climate initiatives, welfare and taking on the challenge of health sector reform, and of course Covid-19 and the gradual opening of borders.

Despite the underlying issues we face as a nation, overall, we appear to be resilient and punch well above our weight when compared to our peers and main trading partners.

Tourism absolute dollar spend from visitors

Apr 19 to Mar 20

$12.2m

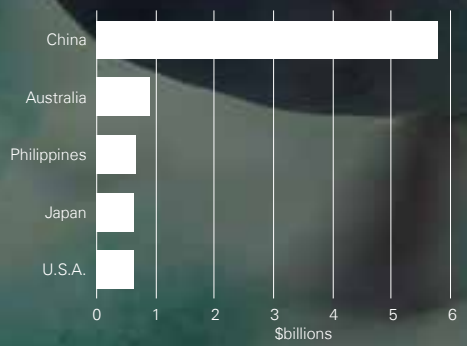
Apr 20 to Oct 20

$1.7m

Our tourism sector has been left with a $12b revenue gap, however, tourist operators are cautiously optimistic as the vaccination programme draws to a close at the end of this year thus increasing our chances of a re-opening of borders to international travellers.

Dairy exports by country

Year ended June 2020



Meanwhile, fruit, meat works and food processing industries are calling out for an immediate opening of Pacific borders to tackle what they're calling their worst ever labour crisis.

The question remains, how much longer will we be able to weather the storm?

State of the nation

There is much to be done

Given the unprecedented year that we have all lived through it is not surprising that the perspectives of industry leaders and influencers reflect a focus on the immediate challenges facing their organisations rather than the wider opportunities that exist across the global food system.

The pandemic, while suppressed in New Zealand, continues to rage around the world. Current border settings are stretching customer goodwill, disrupting paths to market and then cauterising the labour supply (both skilled and seasonal) which is the sector's lifeblood. The pandemic continues to add cost to operations as exporters continue to adopt higher alert level protocols to protect market access and keep their teams safe.

But the commentary we heard did not revolve solely around the pandemic. The general election delivered a result that is perceived to have reset the relationship between government and the food and fibre sector; lifting regulatory uncertainty and directly impacting investor confidence. While access to transformational technologies underpinning the global food renaissance is limited by workforce capability and regulation, making it increasingly difficult to maintain a competitive product offering.

Against a background of strong prices and farm gate returns, disruption and digitalisation offering new opportunities to all, and consumers being more connected to food's role in shaping their lifestyles, the discussions we had were unexpectedly downbeat. We always recognised that 2021 was likely to be tougher for the food and fibre sector than 2020 as the cumulative effects of the international response to the pandemic became more apparent. The range of issues covered in this year's State of the Nation section reflects the wide spectrum of issues that industry leaders are seeking movement on at the current time.

However, the comments we heard acknowledged the immediate pressures of day to day life, but spoke to a deeper, more fundamental morale issue across the sector than we had heard in the last 12 years. As one contributor noted, the industry is fatigued.

The heat of change has been rising for years and 2021 appears to be the year the 'frog has realised it is being boiled'.

The adrenaline of Level Four is well behind us, replaced by the daily grind of reacting to the volatility inherent in the here and now, with no end to the firefighting in sight. The burden is showing on people across the sector. As we discussed in the editorial, many New Zealand organisations run with limited executive bench strength compared to international peers; leadership capability looks likely to influence New Zealand's short to medium-term future.

We invited Roundtable participants to talk about the business issues keeping them awake at night and asked them to reflect on what needs to be done to turn these challenges into opportunities. In setting up the conversations we acknowledged the intense, volatile, uncertain, complex and ambiguous environment that all organisations are currently operating in; a set of circumstances we have labelled VUCA squared (see the sidebar).

What has happened to industry morale?

Last year, the industry had operated safely through the Level 4 lockdown and continued to generate export earnings. It was a hero of New Zealand's Covid-19 response.

The wider community had a better understanding of the importance of our food and fibre sectors to their health and the country's economic wellbeing. The industry was positioned to build on the enhanced connections that the community and our consumers around the world had with food.

This year the narrative from our contributors was very different. There were so many comments relating to low industry morale, we had to create a category to capture them as we analysed the Roundtable conversations. A range of suggestions were offered as to why many contributors perceived that industry morale has fallen significantly compared to last year, including:

↘ An observation that Covid-19 has driven short term thinking. Freight and labour challenges are forcing organisations to work with planning horizons of days rather than months or years. The major concern from this is that organisations are so focused on the day to day that the bigger picture and the aspiration it brings is currently out of focus for many people across the industry.

↘ The Fit for a Better World vision and roadmap was launched by the government in July 2020 to foster collaboration with a goal of unlocking new value, creating new jobs and enhancing sustainability. While the Ministry for Primary Industries (MPI) has been active initiating projects to help meet the targets set for productivity, sustainability and inclusiveness, many of our contributors have been left uncertain about the progress that has been made. Ensuring that the industry is kept informed about progress being made and how they can collaborate with MPI to drive success is critical to accelerating the vision's impact. Clear understanding of the progress made will help to reinvigorate morale.

↘ The wave of regulatory reform, concerning water, greenhouse gases, intellectual property rights (particularly around plant variety rights), nutrients and biodiversity, was identified by some contributors as a key factor keeping them awake. It was noted that while many in the industry are asset rich but are cash poor, and the uncertainties around what the final rules and their interpretation are going to look like is delaying investment decisions. Landowners and producers can't afford to get intergenerational investments wrong, so many are not doing anything as they wait for regulatory clarity. The lack of progress is impacting morale.

A VUCA squared world

A VUCA squared world is a world where risks are not considered in isolation because they consistently evolve, interact with each other and create outcomes that were recently in the realm of fiction rather than fact. When we think about a VUCA squared world we think about:

Geopolitics: Governments prioritise national interests ahead of the multilateral institutions that have shaped the last 70 years, initiating deeper tension, instability and competition.

Health: Conventional healthcare has failed communities when it was needed most, forcing individuals, communities and governments to seek new approaches to protect health.

Supply chains: The pandemic has demonstrated the limits of global supply chains leaving many exposed to shortages and stockouts; raising resilience will see domestic capability put first.

Inequity: Food access and Black Lives Matter have shone the spotlight on inherent (often unconscious) inequality in society; you become part of the solution or you are the problem.

Data: Data's power to transform the world make it the new oil; governments are recognising this and are looking to protect national data assets for economic and national security reasons.

Climate: The warming planet presents the biggest existential risk to society; while alignment on doing 'something' is greater than ever, disputes over what 'something' is will intensify into conflict.

A VUCA squared world is a world that requires continuous use of foresight to create plausible future scenarios rather than an annual strategy retreat. It is a world where action is led from purpose. It is a world where things are not what they were last year and are miles away from where they were before the pandemic.

It is a world that has moved on from the normal we were comfortable with.

↘ The point was also made that different departments of government as well as councils, industry good bodies, processors and customers are all issuing their own rules and interpretations. Not enough is being done to take a wider perspective and join these requirements up to make them easier to incorporate into day to day operations. The comment was made that farmers need to have their hands held during this period of historic change, to ensure the pressure on them does not become all-encompassing with potentially catastrophic consequences.

↘ Some contributors suggested it feels like there is too much focus on doing everything collaboratively, with progress being delayed until all stakeholders are engaged. It was acknowledged that working together is entirely appropriate on some occasions, but it makes no commercial sense to force collaboration when it is not logical as it will only create distrust and delay. Examples given included the challenges organisations face securing government support for projects they are pursuing alone or the expectation that red meat and dairy farmers should overlook their differing economic drivers to reach a consensus on the allocation of nutrient limits.

↘ The continued advancement of perception based 'facts' in the mainstream media is wearing on some contributors. The Roundtables took place around the time that Netflix released the 'Seaspiracy' documentary which highlighted the impact that slick presentation of only one side of a discussion can have. It was noted that there is a need to recognise that anybody can create a platform for their views if they have money, so these storytellers can't be ignored. However, an inability or unwillingness to respond with equally engaging yet factually balanced content, leaves many in the industry feeling like they have to defend themselves and their livelihood rather than being proud of the contribution they make to society.

↘ A final factor raised in a few conversations focused on the relationship between industry and for MPI. This must be put in the context that last year MPI was solely focused on supporting the sector through the lockdowns with all other work programmes having been parked. This year, MPI resumed these programmes as well as picking up additional initiatives for the new Government. The breadth of workstreams, the industry understanding of officials, the range of consultations and the timeframes for response and action were all identified as frustrations. The challenge for MPI is delivering on a busy regulatory programme while balancing it's desire to continue to work constructively across the country.

There is no doubt that the experiences of the last year have heightened focus on what works and what doesn't across the food system. With the inherent challenges of operating day-to-day, there is no question that the transformation agenda being promoted by government can (and is) feeling like too much for some in the industry. While the extent of focus on morale was surprising, it does highlight how important it is that people are focused on what they can control, if we are to benefit from the opportunities inherent across the Global Food Renaissance.

As the KPMG Partners were told at our recent meeting by Dr Lucy Hone from the New Zealand Institute of Wellbeing and Resilience, we have a choice in where we focus our attention. Dr Hone noted that if we are sensible, we should be realistic optimists and focus on things that matter most to us that we can change.

So what are the priorities that industry leaders and influencers think we should be focusing on in 2021?

The Top 10 priorities

This is the 11th year we have completed the industry leaders priority survey and for the 11th year in a row Biosecurity was the number one ranked priority, with a higher score than last year of 9.33 out of 10 (although one of our demographic groups did not make Biosecurity their top priority – a first for the survey!).

In a year where the world has been dealing with what is, hopefully, a once in a generation zoonotic pandemic it is no surprise that Biosecurity retained its number one rank.What is more interesting is the level of change in the rest of the Top 10. Only four other priorities retained their place in the Top 10 with five new entries, including all the new Covid-19 related priority questions that we included in this year's survey.

The three Covid-19 questions relate to some of the specific challenges that have arisen from the pandemic – the maintenance of resilient supply chains for transport and trade (ranked 4th, 8.21 out of 10), the need to improve labour availability to support day to day business operations (5th, 8.07 out of 10) and embedding digital technology across all business processes within an organisation (10th, 7.72 out of 10). The other new entrants into the Top 10, were accelerating initiatives to transition towards a net zero carbon future (6th, 7.90 out of 10) and equipping future leaders with the skills they need to lead through a whole of industry programme (8th, 7.84 out of 10).

Here are the 2021 Top 10 priorities...

RANK 2021	RANK 2020	ACTION	PRIORITY SCORE 2021 / 2020
1	1	World-class biosecurity	9.33 / 9.26
2	2	Sign high quality trade agreements	8.41 / 8.43
3	4	Deliver broadband equality to all	8.33 / 8.11
4	NEW	Covid-19 – Resilient supply chains	8.21 / NEW
5	NEW	Covid-19 – Labour availability	8.07 / NEW
6	17	Initiatives for a net zero carbon future	7.90 / 7.35
7	7	Accelerate innovation partnerships	7.85 / 7.82
8	16	Equipping leaders with critical skills	7.84 / 7.38
9	9	Support land use change for environment	7.78 / 7.70
10	NEW	Covid-19 – Digital acceleration	7.72 / NEW

Priorities that have fallen out of the Top 10 in 2021...

RANK 2021	RANK 2020	ACTION	PRIORITY SCORE 2021 / 2020
12	9	Invest in water storage and infrastructure	7.64 / 7.70
13	6	Strategic importance of food safety	7.59 / 7.96
=14	3	Create NZ provenance brands	7.56 / 8.21
=16	5	Promoting opportunities for future leaders	7.49 / 7.99
18	8	Deliver tailored products to market	7.41 / 7.72

It was not surprising to us that priorities relating to high quality trade agreements, accelerating innovation through partnerships and supporting farmers to evolve their land use for the overall benefit of the environment all retained their rankings in the Top 10, given our Roundtable conversations. It was also pleasing to see the urgent need for high speed broadband equality for all, increasing its ranking from 4th to 3rd place, with an increased priority score of 8.33 out of 10, given the conversations we have had over the last year about the role that connectivity plays in unlocking improved economic, social and environmental outcomes.

However, for every new entrant in the Top 10, there is a priority that industry leaders have assessed as being less important to their organisation and the industry currently, than it was last year. The biggest fall, down 11 places at 14th equal (7.56 out of 10) was creating New Zealand provenance brands. Other priorities to fall out of the Top 10, included promoting opportunities for future leaders (down from 5th to 16th equal), investment in food safety as a matter of strategic importance (down from 6th to 13th), delivering products tailored to consumers in the market (down from 8th to 18th) and investing in water storage and distribution infrastructure, which slipped out of the Top 10 from 9th equal to 12th.

The average priority score for all contributors fell in the current year to 7.14, a reduction of 1.65% on last year.

With so much to deal with in the last year, it is not surprising that we have seen a reduction in priority scores but in a world where there is so much noise, it is perhaps surprising that we have not seen a bigger reduction in the score.

We had expected to see Executives become more laser-focused on the priorities that have the most immediate impact and benefit to their organisations, this score suggests that despite the decline in morale, there remains a focus on the bigger picture and what is needed to move the dial for New Zealand as a whole.

This year we have also been able to look at the shift in average priority score for each of the contributing demographic groups. Interestingly only Baby Boomers show an increase in their average score, becoming the demographic group with the highest average score. It is interesting to reflect on why this might be, maybe the experience of other periods of great change, in particular the transformation of the sector during the 1980s, is shaping their thinking about the need to move with speed on multiple priorities during another period of disruption if we are to capture the opportunities that are on offer. Millennials and Generation-X'ers both show significant declines in their average score while our Female contributors continue to record higher average scores, again with a strong focus on environmental and people challenges that the sector faces.

	AVERAGE SCORE GIVEN TO A PRIORITY					
	OVERALL	MALE	FEMALE	MILLENNIAL	GEN X	BOOMER
Average Priority Score 2020	7.26	7.19	7.48	7.45	7.26	7.30
Average Priority Score 2021	7.14	7.04	7.35	7.24	6.98	7.37
Movement	-0.12	-0.15	-0.13	-0.21	-0.28	0.07

The Covid-19 questions

New Zealand has been credited with one of the world's leading health responses to the pandemic, achieved largely through closing our borders to the world to suppress the virus. For many life has returned to normal. However, normal is not normal around the world and there are questions about whether we have played and won the wrong game. The game we have played is one everybody started playing early in 2020, a finite game you win by vanquishing the virus. The result of this game has given our community a combination of comfort and complacency. It is a game premised on a belief that global norms will come back and will be what they were before.

However, we grow and sell food to the world and our contributors are getting signals that normal in our markets is very different to normal a year ago. There is a sense that the rest of the world stopped playing our game months ago and recognised that Covid-19 is an infinite game, one where the rules constantly change, the playing field shifts and the participants evolve. It is not a game about winning but one about adapting quickly to new realities so that you can remain a strong and sustainable player in the game in whatever the now normal reality is that the world serves up to you.

It is not surprising that the pandemic featured extensively in many of our Roundtable conversations, with significant focus on the three issues covered in our priorities survey; trade and supply chains, labour availability and digital acceleration.

Covid-19 – Resilient supply chains

Trade and supply chain challenges

There are significant practical supply chain challenges across the world, with delivery reliability globally having fallen from around 80% in 2019 to 35% currently. The bigger challenge facing our food and fibre sector is that Oceania only represents around 2% of global freight traffic and as a region has limited market influence and negotiating power with the major freight lines. The message from the Roundtables was that the industry needs to prepare now for further service reductions and for inflated prices to remain well above long term averages for the foreseeable future. New Zealand will need to be a value market for the shipping lines, which means pricing will need to be at a level that will provide enough profitability to retain services.

Higher costs of freight will force organisations to have to rethink supply chains to ensure that they are optimised to meet the consumers' need (including price) while still delivering a return to the processor and producer. One contributor highlighted that this may require exporters to rethink the consumer niches that they target, to remain viable as the export premium their product commands may not be adequate to cover the increased supply chain costs they will incur. The obvious response, increasing prices, may not be an option, even in premium markets as more competitors from around the globe attempt to secure the business with premium consumers.

The conversations also addressed the challenges of doing business remotely given the border restrictions in place, with contributors noting the pressing need to again get face to face with their customers to reignite existing relationships and develop new business. The importance of China to our economy has become very clear but the last year has also demonstrated the need to have access to a range of markets to ensure optionality should unexpected closures occur.

While there was much discussion of market optionality, and the importance of signing high quality free trade agreements was again ranked second in the priority survey, there was limited comment on the status of the current free trade negotiations with the UK and EU. It was noted that history suggests that it may prove challenging to conclude these agreements on a high quality basis, as it has often been the countries that see the world differently to us that have given us the most impactful FTAs rather than our traditional friends and allies. Given our size, often our trading relationships with allies are not as valuable to them as they are to us, providing little incentive to provide the type of access that ultimately transforms our ability to create long term value.

It was also noted that the pandemic has crystallised a focus on domestic food production in many countries, given the lack of supply chain resilience experienced over the last year. Local supply chains are prospering, often with significant government support, which creates a long-term risk for New Zealand exporters as consumers around the world, who have historically purchased exports, become more comfortable with the integrity and quality of domestically produced food. The overriding message from our conversations was that the pandemic has made it vital exporters become laser clear on the value proposition that their product delivers to a consumer, making it more critical than ever we understand our consumers (a theme explored in detail in the Consumer Insights section of this Agenda).

Covid-19 – Labour availability

Without people there will be no industry

The food and fibre sector has been short of people for the last decade, there are plenty of reports telling us this. Covid-19 has compounded the industry's pre-existing people issues, as border closures cut the supply of seasonal and RSE workers that have historically done the work that New Zealand residents have chosen not to do. The urgent fix to the issue was obvious to our contributors, we need to get our population vaccinated and borders open so that we can again welcome these workers to the country and to our rural communities.

It is fair to say there was some anger expressed during the Roundtable conversations about the people issues the industry is facing, given that without people it is difficult to create value that benefits the wider New Zealand community. However, there was also a recognition that the pandemic is not the root cause of the challenges faced, it has amplified issues that have existed for years. Seasonal and migrant labour has been used to manage these challenges, as happens in agri-food systems across the world.

It is important that the labour conversation is not only about fruit pickers but focused more widely on what will drive long term labour resilience.

The most immediate opportunity for the sector is to place greater focus on retaining its existing employees. Retaining people, through improved employment conditions, enhanced training, paying a wage that is very competitive for the work expected and better balancing work and personal lives, is critical given the battle for talent that is currently raging across the economy. Whether it is a skilled, semi-skilled or labouring role, the labour market is currently a sellers' market and employees will move to an employer that engages with them holistically as a person. The point was made that this is even more important to young people who are looking to bring their whole self to work, meaning that employers also need to upskill to be able to work with them effectively and ensure that their expectations are met and contribution maximised.

Beyond the immediate focus on retention, it was noted that there is much work that needs to be done across the education system. To date, the sector has not invested heavily in supporting the development of curriculum materials that educate, inform and engage students of all ages. The point was made that this should be a key focus. One contributor noted the impact that the Agribusiness Curriculum, developed at St Pauls Collegiate School in Hamilton, is having at schools across the country by providing high quality materials, clearly linked to NCEA pathways. It was also noted that there is work needed to ensure young people leaving school have obvious next steps, whether these are into vocational training or tertiary education.

While our contributors see the potential in automating manual jobs, they don't expect this to occur at a commercial scale for a decade or more. It was suggested while there is a burning platform today to push towards automation, as borders reopen and labour becomes available, the pressure to innovate is likely to subside. Automation is about more than robotics, often requiring a complete redesign of growing systems (the work being done on future apple orchard production systems being held up as a good example) and significant capital to implement. Investment is easier to make when a business is making money. With labour constraints impacting profitability, there is unlikely to be a rush of investment into automation despite the burning platform the industry is currently standing on.

One contributor succinctly captured the people conversation across the Roundtables noting that there are no signs that these issues will still not be problems in a decade.

We know we can't solve the problems this year, or even next year. We need to recognise that solving these issues will require consistent long term effort and investment into education, innovation and employment conditions to avoid us still talking about the same issues in 10 years.

Covid-19 – Digital acceleration

Connectivity to support digital acceleration

The need for equality of access to digital connectivity was the third ranked priority in this year's survey. The importance of accessing and utilising data across all stages of the food and fibre value chain was raised extensively in our discussions with industry leaders, a need which they believed had been materially accelerated by the pandemic (supported by the 10th ranking attached to the Covid-19 priority question related to digital acceleration).

The lack of accessible, affordable high-speed digital connectivity in rural areas remains a significant issue. It is an impediment to business, but it goes well beyond this; it is a significant barrier to maintaining vibrant rural communities. Good connectivity enables talented people to live in rural areas. Without that connectivity they are unlikely to relocate to a rural region and for those already living remotely, they become more likely to relocate to urban regions.

While digitalisation of society was described by one contributor as a 'fantastic benefit of the pandemic', it was widely acknowledged that gaining the benefits of utilising data in a business needs more than just connectivity. There is a challenge that much of the technology available remains ahead of network capability and beyond the mindset of many potential users, meaning there is a vital education exercise required to give people the confidence to use the technology, at the same time as enhancing connectivity.

Impactful technology tools come from integrating a variety of datasets. The point was made that we have significant work to do to have the necessary data available to developers to enable them to deliver world class tools. There is a need for the industry to coalesce around internationally recognised data standards so that the raw material (data) is readily available to smart people to create the future by integrating data, with existing technology and applications, for the benefit of all in the sector.

Given the speed at which digital transformation is occurring across the global food and fibre sector, we cannot wait for the government to lead the integration of data standards.

Data exchange is about securing long term commercial success. It needs data owners to recognise the value of their data is greater to them, to their customers and the country when it is shared and integrated with other relevant information.

World-class biosecurity

Biosecurity evolution

The system is critical to our ability to grow and export food and fibre to the world and the industry relies on the system being operated in a way that protects this ability.

Despite being the top priority for industry leaders again this year, there was little discussion around biosecurity during the Roundtables. It is fair to say with the borders closed this year the perceived risk of incursion has reduced, which may explain why there was less discussion about the issue than usual.

However, a couple of interesting points were raised that demonstrate how important a well-functioning system is to the industry's growth aspirations:

↘ Sectors within the industry, including horticulture, wine and aquaculture have strong growth ambitions. Achieving these ambitions requires us to grow the products that the consumer wants and to do this we need access to modern, world class varieties, for instance, the latest germplasm for our plant-based industries. Our biosecurity system, while focusing on keeping pests and diseases out, needs to be sufficiently flexible to allow products into the country that will safeguard our competitiveness. As one contributor noted, without the right varieties it does not matter how much land is planted, we will never create the premiums we are looking for. It was also noted that we need the right legislative protections surrounding plant variety rights ('PVR') to secure the most modern cultivators. Significant concerns were expressed that the PVR legislation in front of parliament currently, is not fit for purpose.

↘ Climate change will make us more exposed to new pests and diseases arriving at our border. Consequently, we need to change our biosecurity perspective so that our focus extends well beyond our border and gives us a clearer view of what is coming at us, as well as the tools that are available to manage the exposures. Logically, this also means we need to be thinking much more about the use of biocontrol agents, which again will need to be facilitated through the biosecurity system so that we can have access to the best technologies available around the world.

China: The multi-billion-dollar dilemma

The importance of China to our food and fibre industry has been very apparent in the last year.

China accounted for 55% of tradeable exports in the year to March 2021, compared to 51% last year. However, with more product flowing to Chinese customers, discussions around how much is too much have been reignited, particularly as we have looked over the Tasman and seen the impact on the Australian beef, wine and barley industries of politically motivated market closures. Contributors gave some interesting observations that are relevant to any organisation engaging with China:

↘ The Chinese Government is currently actively promoting the benefits to health from good nutrition, with a strong focus on dairy (which has helped support dairy prices over the last year). This has clearly demonstrated the very real benefits that can be secured from promoting the nutritional benefits of our products and connecting these clearly with Chinese consumers.

↘ Given high freight rates are not expected to fall, if we are to be the best supplier we can be to China then we need to have sufficient humility to listen to our customers and learn from them. This is very likely to involve detailed conversations about how we add value to our products, particularly in relation to where value-adding activities take place along the supply chain.

↘ The deep mistrust amongst Chinese consumers of domestically produced products is no longer an issue for many. It is no longer just enough to turn up and announce that you are from New Zealand to secure premium priced sales, we need to invest in world class marketing and science talent if we are going to compete with the domestic brands that have real momentum.

The reality is simple, the Chinese market is a high value market for many of our agri-food producers. Chinese consumer are prepared to pay more than others for our products. However, we can never afford to be comfortable when China is our largest market in a world where geopolitical tensions are high and the products we produce can be sourced from elsewhere.

Agri-tech: Understanding needed to deliver ambition

The Agri-tech sector in New Zealand has a dual role; it exists to support our food producers but also to grow export revenues from global customers wanting our technology.

To deliver on the ambitions set out in last year's Industry Transformation Plan (ITP), it is critical the sector recognises and understands the expectations of the consumers that eat the products that its customers produce. Only by doing this will it be able to help its customers meet the needs of those consumers and consequently create a value proposition that supports the adoption of the technology it creates.

New Zealand's agri-tech sector is largely comprised of small companies that have product relating to a single point in a farming system or value chain. They are companies that have found a problem to apply their technology solution to rather than starting from understanding the most significant pain points in a system and looking to develop a full system solution, either alone or with partners.

As we have discussed in previous Agendas, changing a farm system takes significant time and effort on the part of the farmer and the return generated from a point solution, financial or environmental, often does not justify this cost. One contributor noted that human interoperability with a product is often the biggest brake on adoption. Many in the sector consider this a user issue, rather than a fundamental issue with the sector's understanding of its market.

The ambitions of the ITP will only be realised if the sector invests time in understanding the people that use its solutions better, what they are seeking to achieve and then collaborates to solve their key system challenges.

Initiatives for a net zero carbon future

Decarbonised and regenerative farming

We have entered a period of transformational change into how we interact with all aspects of the natural world.

Consequently, it is not surprising that discussion around a range of environmental issues took up significant time during each of the roundtable conversations, with particular focus being given to what regenerative growing systems might mean for the country and the implications of New Zealand's zero carbon aspiration. The water challenges that the country faces were also raised, and they are discussed later in this section.

The concern was expressed that we are entering a period of huge change with a goal of improving a wide range of environmental outcomes, many of which are highly interconnected, but there is little evidence that the regulatory initiatives are as joined up and connected as they should be.

Joining the dots is critical if the industry is to deliver the environmental outcomes it aspires to achieve for itself and the community.

Finding a regenerative balance that works for New Zealand

One contributor at a roundtable noted that the discussions currently taking place across the sector on regenerative agriculture have the potential to be highly polarising; something that was borne out by the range of comments made on the subject during our conversations.

While it is recognised that there is much work to be done to develop enhanced environmentally attuned growing systems to be deployed by producers, there is a need for the complexity of implementing truly regenerative systems to be recognised so that the regulatory environment supports the journey rather than making efforts to move in the right direction worthless. For instance, if the regulatory view is that a more sustainable farming system will have 15% fewer animals, why would farmers try to do the right things to transition towards a regenerative system that retains its stocking level, if the regulation is just going to cut animal numbers and make an alternative approach uneconomic.

It was also highlighted that any discussion about regenerative farming systems needs to be clearly illustrated so that farmers fatigued with change can understand what the changes required to transition mean to them. The sector is looking for a pathway to regenerative that takes the middle ground, one that enhances the environment while also supporting their business. For instance, incorporating large scale tree planting into a farming system to sequester carbon could be an economic and environmental disaster if done with limited understanding. However, broader ambition to sequester carbon with a range of tools, including into the soil and targeted agroforestry, provides the opportunity to be truly regenerative and do what is best for the land, the planet and the business.

The sector needs to recognise the pressure for change coming from the community and, to some extent, from the consumer. Being good at intensive agriculture will not support the license to operate moving forward. This will mean that the journey from single product producer towards a multi-product farmer, looking for an economically and environmentally balanced product portfolio, accelerates. It will change how industry good organisations and government support producers.

It was noted that in many countries governments will provide direct financial support to farmers to make the regenerative transition. This is not on the table in New Zealand, so

we need to think carefully about how regenerative principles are made to work for all; maximising circularity opportunities, monetising ecosystem services farmers provide to society, and marketing our unique approach to regenerative as a premium attribute to consumers, all need to be in the mix.

Getting measurement right is key to the decarbonisation journey

The legislated requirement for New Zealand to transition to a zero-carbon country by 2050 has set a high aspiration. The Climate Commission have clearly illustrated the amount of work that will need to be done to deliver against the goals that the Zero Carbon Act has set for our future. The legislation has provided the industry with the opportunity to influence its own journey through the He Waka Eke Noa process, which provides the industry with the ability to shape its transition rules.

It was suggested that it is critically important that the industry presents well-reasoned and ambitious plan to the Government; anything too cautious is likely to attract tax liabilities or operational sanctions.

It came through strongly in the conversations that the food and fibre sector needs to think beyond planting trees and destocking farms in envisaging its zero-carbon future. The role of the oceans in sequestrating carbon, the opportunities available in bioproducts, the utilisation of new genetic technologies and recognising initiatives that permanently sequester carbon within a farming system all need to be fully explored as part of the plan. The challenge is that much of the technology that is required to provide the industry with a wider toolbox of decarbonisation strategies are still in the laboratory today. Innovation will be critical to unlocking a lower carbon future, and it is important that plans developed set goals for these technologies to become available and be adopted over the next 30 years.

It was also raised during several roundtable conversations that getting the metrics right to measure and report on the industry's decarbonisation journey is critically important. The immediate priority should be getting real clarity on the current greenhouse gas footprint of each sector in the industry across all gases and scopes of emissions. Only by having this comprehensive baseline information measured can organisations and sectors then give their stakeholders full confidence in the progress they are making in reducing their emissions. As one contributor noted, a lack of data gives the impression to the world that we are hiding from fact. In a world where we sell on trust, this could become a major issue for organisations, for sectors and the country.

As part of the industry's decarbonisation journey, ways must be sought to turn ambitious goals into commercial advantage. It was noted that monetising the transition makes time of the essence, as there are many communities and corporations around the world that have set similarly ambitious goals. While the need to shift towards a zero-carbon future has been well flagged for years, there are a lot of organisations that have done as little as possible to date, thus the work in front of them is significant.

The speed organisations seek to transition will determine the economic returns they are able to extract from decarbonising their business.

CASE STUDY

Energy: Future uncertainties

Energy featured in more of our Roundtable conversations this year than it has in the past. Previous energy related concerns revolved around the stability of rural electricity distribution networks, an issue that has not gone away, but this year the challenges of securing enough sustainable and cost-effective energy for high process heat was raised in numerous conversations.

The way we do food and fibre production in New Zealand gives us a world class on-farm energy footprint, one that helps us to remain cost competitive. However, it was noted that efficient on-farm energy use is only part of the story. There are fundamental questions around future energy sources for process heat in New Zealand, given the policy settings that have been adopted that will restrict the availability of natural gas as the obvious replacement for coal.

The suggestion was made that New Zealand is rapidly heading towards a period of energy insecurity as we transition towards a lower carbon future. It is not yet clear where the investment will come from to build the necessary generation capacity to provide sustainable electricity for process heat and transmit this energy to remote parts of the country where our food and fibre processing occurs. Concerns were expressed that the cost of transitioning the last few percentage points of our electricity supply from fossil fuels will be very expensive and it is this higher cost capacity that will be directed towards the industry, significantly impacting global cost competitiveness.

The industry mustn't wait for transition, but actively explore how it can apply circularity to utilise biomass produced from farming systems, in distributed generation systems to generate its own cost-effective process heat. Technology is emerging around the world although it is currently expensive. As prices fall these solutions have the potential to add another element to the sustainability story we tell the world.

CASE STUDY

Oceans: Unlocking a net carbon zero future quickly

Meeting the current dietary requirements of the world's population presents the global food system with significant challenges. The big problems requiring solutions have attracted entrepreneurs with disruptive solutions and around USD65 billion in venture capital investment over the last decade; however, most of this money has been directed at land-based agriculture and food solutions. Very little has been directed towards unlocking the potential inherent in the 'blue larder' – our oceans – a sector of the agri-food economy that, as one contributor noted, is very often left out of the conversation.

The same contributor noted that it is critical oceans are central to our conversations around not only how we decarbonise New Zealand's agri-food system, but how we decarbonise the country.

Recent KPMG analysis has concluded that the world will be very unlikely to achieve its decarbonisation ambitions without much wider consideration of the role that the oceans will play; it noted that there will be no green without blue. The good news is that coastal and oceanic ecosystems are very efficient carbon sequesters, with oceanic organisms, including seaweed, algae and phytoplankton, having the capacity to capture up to five times the carbon sequestered in tropical forests.

New Zealand has an exclusive economic zone of 4,083,744km², around 15 times the size of the country meaning that 93% of the area we have available to sequester carbon is ocean.

By leaving our oceans out of the conversation we potentially miss the most obvious solution to our country's zero-carbon future. We cannot allow this to continue. The agri-food sector needs to be active in promoting the potential of ocean farming, not just for fish, but for algae and plants for food and long term carbon sequestration, as being central to the industry's decarbonisation strategy as well as a mechanism to create new high value product export activities.

To continue to exclude blue from our green conversation means we will continue to miss our best opportunity to unlock a lower carbon future for our country.

The demographic differences

As we did last year, we have analysed the priority scores and ranks assigned to survey items by the demographic groups that completed the survey. We analysed five demographic groups (Male, Female, Millennial, Generation X and Baby Boomer). This year there are fewer deviations from the overall Top 10 ranking across the demographic groups, potentially reflecting the more consistent focus the pandemic has given organisations, however, there are some interesting observations when looking across the items each group has prioritised.

The most obvious difference is that, for the first time in the history of the Agenda, there is a ranking that does not place world class biosecurity at number one, as our female contributors have given top priority to equipping industry leaders with the skills they need (the overall 8th ranked priority). It is this priority which has the most deviation in its demographic ranking, with male, millennial and baby boomer contributors giving it a significantly lower priority, while generation-x contributors also ranked it highly.

Underlying this priority is a question over whether the industry should look to develop its own people or seek to bring in people that already have the skills, experience and CV's to do the job. A comment made in the Executive Summary (page 6) about the executive bench strength of many organisations would suggest the answer is probably a mix of both strategies – organisations need to commit to developing their people to have wider leadership groups that can step up, particularly in the face of significant disruption, but we also need to recognise that recruiting external people, potentially from offshore, may also be necessary to round out the executive skill sets held across an organisation.

		2021 DEMOGRAPHIC PRIORITY RANKINGS				
	OVERALL 2021	MALE	FEMALE	MILLENNIAL	GEN X	BOOMER
World-class biosecurity	1	1	2	1	1	1
Sign high quality trade agreements	2	2	3	2	3	2
Deliver broadband equality to all	3	3	4	=7	4	3
Covid-19 – Resilient supply chains	4	4	5	=3	5	4
Covid-19 – Labour availability	5	5	8	=12	6	6
Initiatives for a net zero carbon future	6	7	7	=3	=7	12
Accelerate innovation partnerships	7	6	14	=15	=7	5
Equipping leaders with critical skills	8	21	1	=19	2	27
Support land use change for environment	9	13	6	=10	9	=8
Covid-19 – Digital acceleration	10	8	11	=19	11	=8

Higher prority (10 or more above overall)	Higher prority (5 to 9 above overall)	Higher prority (within 4 of overall)	Consistent priority rank	Lower priority (within 4 of overall)	Lower priority (5 to 9 below overall)	Lower priority (10 or more below overall)

As was the case last year, our millennial contributor rankings differed most from the overall Top 10, with five alternative priorities being included in the Top 10. Most notably included water and animal related priorities in their Top 10, ranking priorities related to the implementation of water quality improvement initiatives and meaningful penalties for animal welfare at third equal. In fact, all but our male contributors included one of the water priorities in their respective Top 10, with female and generation-x contributors also giving water quality initiatives a high priority, while the baby boomers prioritised investment in freshwater infrastructure.

Despite not featuring in the overall Top 10, water was a subject discussed in many Roundtables, so we discuss the themes of those conversations further on page 28.

	DEMOGRAPHIC RANK 2021	PRIORITY SCORE 2021	OVERALL RANK	OVERALL SCORE
MALE				
Discussing Gene Editing technologies	9	7.67	19	7.38
Build NZ IP supply chains to deliver 365 days	10	7.64	=14	7.56
FEMALE				
Steps to minimise food waste/lift circularity	9	7.90	22	7.14
Implement water quality initiatives	10	7.87	11	7.70
MILLENNIAL				
Implement water quality initiatives	=3	8.38	11	7.70
Penalties for animal welfare	=3	8.38	=16	7.49
Ensure migrant workers appropriately treated	=7	8.25	25	6.90
Discussing Gene Editing technologies	9	8.13	19	7.38
Create NZ provenance brands	=10	7.88	=14	7.56
GEN X				
Implement water quality initiatives	10	7.56	11	7.70
BOOMER				
Invest in water storage and infrastructure	7	8.12	12	7.64
Recognise strategic importance of food safety	10	8.04	13	7.59

The need for a national conversation on genetic technologies also featured heavily in the Roundtables and the priority was given a Top 10 ranking by both male contributors and millennial contributors, however, it is interesting to note that this year the baby boomers, that had ranked the priority 8th in 2020, only ranked it 15th equal. It was also interesting to observe that our female contributors included the issues relating to food security, particularly food waste and circular thinking, in their Top 10, marking the first time that this issue has featured in the Top 10 of any of the contributor groups to date.

Invest in water storage and infrastructure

Water: a different issue in every region

While water related priorities have dropped out of the overall Top 10 ranking this year, they do appear in the Top 10's of all the contributing demographic groups apart from male contributors. The core of the discussion around water during the Roundtables related to challenges that have arisen from the government devolving the management of water policy implementation to local councils across the country. The reality is many of these councils lack the resources to do the necessary analytical work to support their regulatory function. In addition, they often have to work with one size fits all rules, which do not permit a widely accepted optimal outcome to be implemented for a region.

There is still a lot of water regulation to come as the Three Waters Reforms are finalised and implemented.

Contributors noted that the rate of change raises concerns that rules may be implemented in a rush that have not been properly analysed. While it was considered unlikely that the best outcome for the industry would be reached, it was hoped that enough time and resource would be allocated to ensure that an acceptable outcome is proposed. During our conversation in Christchurch, the level of uncertainty around water was identified as a key contributing factor to why the value of agricultural land is one of the few assets categories that has not seen a significant rise during the post pandemic period (despite commodity prices being at historically high levels).

The industry has accepted that there is currently little political support for the construction of additional water storage capacity, despite its importance in enhancing the sector's resilience to climate change. The point was made that it is very difficult to have a comprehensive conversation on improving the health of our waterways if key management tools, such as storage, are excluded from the discussion.

Our first Agenda in 2010 described water as New Zealand's liquid gold.

While we have more water than we need, a competitive advantage in the world today, this advantage is only useful if we know how to actively manage and use our water appropriately.

As one contributor noted, with water, we too often appear to be looking for quick and easy answers rather than trying to find sustainable, long term solutions that work for all stakeholders. Only making the effort to answer the questions properly will provide the water we need to support production and provide clean, safe waterways for all to use.

Discussing gene editing technologies

The missing conversation on genetic technologies

The continued increase in the priority ranking score relating to the comprehensive national conversation about the use of genetic technologies, including gene editing, was reflected in the Roundtable conversations where the issue was raised more often than it has been in the past. Interestingly, the perspective that changing our restrictive position on these technologies would cost us customers is softening, with one contributor suggesting it would have no impact on their international customer base as they are sophisticated enough to understand the issues and the risks surrounding the technology.

At the core of the discussions was the risk of not having a conversation on this issue.

It was noted that these technologies may provide important tools to enable the sector to respond to key challenges like climate change and global food insecurity. It was also suggested that our reticence to consider the tools would impact our ability to attract and retain top scientific talent, given the desire of these people to work with leading edge technologies.

While it is clear the issue remains polarising for many consumers, particularly at the premium end of the market, this is not a reason against having an informed, science based conversation on the wide spectrum of genetic technologies that are now available. As one contributor noted, a decision to adopt the technologies does not mean everybody has to use them. Many countries manage to balance gene technology assisted agriculture with organic and regenerative farming systems - it is not and should not be a yes or no conversation, we need to have the maturity to be more nuanced. Despite general support for a conversation, the counterargument was also coherently presented - in a world where being differentiated is more important than ever, our GMO-free advantage is something we should be amplifying rather than trying to make ourselves the same as everybody else.

While the need for a debate was widely recognised, there was little expectation that such a conversation will be initiated; despite though it could contribute to our battle against climate change. Numerous contributors suggested they saw little political will to initiate a conversation that would be inherently emotive. However, without a mature discussion, there is a risk we get locked out from the benefits others glean from these technologies, impacting our competitiveness and ultimately costing us customers and markets access.

CASE STUDY

The size of the biomaterials prize

We should remember that when we talk about fibre, we are talking about more than wool. Several contributors noted that the forestry and bioproducts sectors have much to contribute to the fibre conversation. Recent press coverage that New Zealand had run out of logs for local timber mills highlighted the extent to which forest products are exported, largely in log format. While this is an important contributor to export earnings, it does raise a question about the opportunity cost of not processing the logs locally, particularly as organisations around the world start to seek out bioproducts to enhance their environmental credentials.

Within our New Zealand ecosystem, we have the science and research capabilities to make us internationally relevant in bioproducts. The Te Ao Māori worldview enriches our technical capability with a unique perspective on the circularity of connections with the natural world. The world is not backing away from making organisations accountable for their carbon footprints meaning the pressure to replace products made from fossil fuels with alternatives made from biomaterials will only increase (as we discuss later in the Agenda).

It is important we are clear about the scale of our bioproducts opportunity. One contributor suggested that catching the bioproducts wave now could add $30 billion a year to GDP if we are strategic about the opportunities we pursue. There is the potential to make New Zealand as synonymous with bioproducts as Saudi Arabia is with fossil fuels. It was also suggested that the ability to process the by-product residuals from just 40% of our timber crop into bioproducts could potentially add $4 billion to the economy annually, while also enabling us to export higher value, better quality processed timber products to the world.

What is clear is that there is a sizeable opportunity in biomaterials as the world seeks these products and technologies and there would not appear to be a better country to take a lead in this sector than Aotearoa New Zealand.

Steps to minimise food waste/lift circularity

Food waste and equitable food access

For many contributors to this year's Agenda, a vivid image of the last year has been high quality, fresh fruit left to rot on trees as there was no one available to pick it. While the economic cost has been massive, the greater concern for many was the lost opportunity. This fruit has been wasted in a country where kids are going to school hungry every morning and more than a million people experienced food insecurity at the height of the Level Four lockdown. One contributor said it was criminal that we produce so much food yet have a nutritional deficit in society that is getting worse. There was little disagreement that the sector needs to become more involved in supporting a values-based food system in New Zealand; doing anything else makes the industry inherently part of the food inequity problem.

A contributor noted that 25% of the food we grow will never see a human despite our high food prices compared to most of the world. One explanation for this level of food loss is the lack of innovative businesses looking to create new markets for good quality, fresh and edible food that doesn't meet the visual grade for retailers. It is expensive to set up these businesses in New Zealand, scaling is challenging, regulation is stifling and the language ('food waste') puts consumers off the product. The suggestion was made if we changed the conversation to upcycled foods and established standards so entrepreneurs could gain credit for their impact, we might unlock a food system revolution.

In our focus on producing food for 40 million people, we may have overlooked that each one of those 40 million is a person and the reality is 5 million of them are our fellow New Zealanders. As one contributor suggested there remains a lot of truth in the adage, that charity begins at home. While we should not be embarrassed about selling high quality products for high prices and good margins around the world, we do need to recognise that doing this successfully on an ongoing basis relies on us making sure our own food system is working for all.

The issues surrounding our food system are complex and there are many perspectives on how they can be addressed. During our roundtables, we received a range of perspectives from leaders in the productive part of the food system. Their focus was ensuring products with appropriate nutrient density are supplied to domestic consumers, people are educated about the impact that food has on their health and how they can manage their diet to reduce health risk, that distribution channels reflect people's different family and cultural circumstances and that food is able to be provided at a price that is fair and equitable to all involved.

The recognition of the challenges surrounding our food system is greater than it has ever been but so is the desire of the industry to be part of the solution – **it sounds like it is time for a national korero on kai**.

KPMG has been proud to be working with the Aotearoa Circle and the National Food Strategy Leadership Group on the development of the Mana Kai Framework. A framework based on Te Ao Māori wisdom that is intended to be used to facilitate a national korero on enhancing Aotearoa New Zealand's food system. You can find more information about the Mana Kai initiative on The Aotearoa Circle website.

Penalties for animal welfare

Don't ignore the social license challenges of animal farming

Contributors suggested the industry should be careful not to underplay the long-term challenges of farming animals to its social license to operate. There is an intergenerational shift in perspectives around using animals for food in progress and for many, the killing of animals will become increasingly difficult to reconcile to their moral values. This makes it critical that farmers get animal welfare right to mitigate the risk that it creates to the industry's license to operate.

The inherent inconsistencies in the regulatory environment were pointed out, with the pork sector being highlighted. New Zealand pork farmers are required to meet high welfare standards for their pigs (right thing to do) but it adds significantly to production costs. However, import regulations allow lower welfare pork products to be sold in this country at a discount to domestically produced meat. The point was made our expectations around animal welfare should apply to all supply into the New Zealand market. Imported products should demonstrate compliance with the same welfare standards as domestic producers, given our welfare standards reflect the expectations of our community.

It was also highlighted that animal welfare is an area where perception is exposed to the impact of influencers. A contributor noted that the view that "if I become vegan, I save the planet" had become perceived truth for many, regardless of the environmental impacts of some plant-based alternative products. The industry needs to recognise that trying to argue science against emotion is always difficult so the focus on ethical production needs to be paramount. We need to be careful not to react ourselves out of animal farming. We need to stand behind the nutritional benefits of the products we grow while holding every farmer to account on meeting the highest standards of animal management.

The largest priority movements

Compared to last year, we have not seen many significant increases in priority scores in the 2021 survey – only two priorities (initiatives for a net carbon zero future and equipping leaders with critical skills) recorded increases of more than 5%. Last year there were 11 priorities that recorded increases of greater than 5%. As noted previously, this potentially reflects industry leaders having so many issues to deal with over the last year they have become more focused on a few key priorities.

It is not surprising that with the increased focus our survey respondents have recorded lower scores against 24 priority items (this compares to only nine items recording lower scores in 2020). Last year, the largest score reduction was 7.1%, this year there were eight priorities that recorded a larger reductions. The largest reduction being 14.4% in relation to the transition to resilient debt and equity structures, which was notable given that there was discussion during several Roundtables on funding the future of food and fibre. It was also notable that restricting the foreign ownership of land and agricultural assets has given back much of the surprising 13.6% increase that it recorded in 2020, leaving it as the lowest ranked priority again this year.

LARGEST INCREASES IN PRIORITY SCORE	RANK 2021	RANK 2020	SCORE 2020	SCORE 2019	CHANGE ON 2020
Initiatives for a net zero carbon future	6	17	7.90	7.35	7.48%
Equipping leaders with critical skills	8	16	7.84	7.38	6.23%
Deliver broadband equality to all	3	4	8.33	8.11	2.71%
Implement water quality initiatives	11	13	7.70	7.59	1.45%
Discussing Gene Editing technologies	19	18	7.38	7.31	0.96%

LARGEST DECREASES IN PRIORITY SCORE	RANK 2021	RANK 2020	SCORE 2020	SCORE 2019	CHANGE ON 2019
Restricting foreign land and agri ownership	40	37	5.03	5.47	-8.04%
Track global evolution of alternative proteins	34	28	6.25	6.84	-8.63%
Developing a national provenance mark	33	24	6.34	7.09	-10.58%
Rural/urban community understanding	26	11	6.87	7.69	-10.66%
Transition to resilient debt/equity structures	37	22	6.08	7.10	-14.37%

Track global evolution of alternative proteins

Alternative proteins or nutritional density?

Concern over the impact alternative proteins will have on the sector appears to have reduced, with it being widely accepted that novel products exist and are a new competitor for our existing industries. We explore later in the Agenda the latest food innovation. Our hope is that over time the conversation around food innovation evolves from one centred on protein to become a wider conversation about the nutritional density of food.

The world has been so focused on protein for the last decade, while allowing the nutritional density of food to dwindle, to the extent that much of today's food can be called out as not being what it was in the past. This means people eat more food and take on unnecessary calories to get the nutrition they need, with major public health consequences.

The suggestion was made that there is an opportunity for New Zealand, if we focus on becoming the global leader in growing food with nutrient density and complexity, food that tastes better and works with the human body, rather than spending too much time trying to find a niche amongst the global FMCG behemoths in the alternative protein space.

Rural/urban community understanding

Rural New Zealand: an overlooked team of 650,000?

The government have credited the Team of Five Million's contribution to the suppression of Covid-19 in New Zealand.

While the narrative has been New Zealanders pulling together many of the 650,000 people that live in rural New Zealand continue to feel that the rest of the country does not consider them equal members of our national team. One contributor noted that the rural/ urban divide remains a significant thing and continues to get wider as people become more disconnected from the sources of their food and fewer people in urban centres have direct connections to a farm.

It was interesting that the contributors to a conversation in Auckland, felt that there is less of a divide in the South Island, noting that mainland farmers appear to have more pride about being a farmer.

Ensuring our 650,000 rural citizens feel valued needs real action.

It needs balanced reporting of the sector in the media (celebrating success as well as holding the industry to account when it falters). It needs schools to fairly reflect the sector across the curriculum, highlighting the application of genetic science, big data and robotics in farming systems, rather than every project being about the environmental impact of farming. It needs the links between natural capital, farmers, food and societal benefits to be clearly articulated so rural communities are viewed as a vital and vibrant part of the fabric of New Zealand.

Transition to resilient debt/equity structures

Funding the future of food and fibre

The future food and fibre we produce will ultimately be driven by how capital providers choose to respond to policy settings and consumer markets.

The nature of capital available to the sector is evolving, less coming from long term family investors and banks, with more coming from fund investors who have very different time horizons and return expectations. The point was made that as capital sources evolve, the sector should be thinking strategically about how it responds to this: how land is used, the production activities pursued, and the business models used to create and capture value.

Many capital availability issues were raised during our conversations. There needs to be more options for producers to invest into their value chains, with products needed that will enable capital to be deployed towards the best value creation opportunities rather than it being predominately invested in production assets. The ability of older landowners to transition out of the industry was also highlighted, with many of the usual pathways not offering the certainty of value return they have in the past. This is being compounded by young people entering the industry who do not want asset ownership.

There is a need for creative thinking around the pathways in and out of the industry.

The point was also made that the banks can no longer separate finance from impact, they need to look at everything a customer does. Banks need to manage the climate impact of their lending books meaning that all loans will progressively become linked to sustainability.

Good producers already think long term, sustainability linked lending will offer an incentive for producers that are prepared to commit to long term initiatives in their farming systems. It was noted in one conversation that this transition is likely to happen quickly as many of the changes to lending structures are not difficult to implement in practice.

Survey methodology

We once again used an online survey tool to obtain industry leaders' views on the most pressing priorities for New Zealand's food and fibre sector. We asked contributors to rank a range of priority items on a scale of 1 to 10; with 1 being an item they considered to be of no priority for the industry and 10 requiring immediate attention and action. We used a consistent question set with those used in 2020 however did add three additional questions relating to specific priorities which have arisen out of the Covid-19 Pandemic. We received more than 90 valid responses which we were again able to categorise into demographic groups using gender and generation identifiers. As in previous years, the full survey results will be made available on the KPMG Agribusiness Agenda page of our website (www.kpmg.co.nz).

Consumer insights

Consumers now and in the future

CONTENTS

Inside the minds of current and potential consumers

Consumers make choices depending on what is important to them. Every consumer has different priorities that they will overlay across the purchasing decisions that they make.

The challenge for our food and fibre organisations is working out which attributes are most important to the consumers that are critical to their success and then designing products, experiences and solutions that best meet those needs.

In last year's Agenda, we narrated 12 distinct voices of New Zealand's food and fibre sector. While the feedback on the report was overwhelmingly positive, it was noted that the voice missing was the critical voice of our consumers. Always seeking to respond to feedback, this year we have talked to current and potential consumers of New Zealand's food and fibre products at home and around the world to understand what attributes are driving their purchasing decisions and how these are evolving as they start to adapt to a world living with Covid-19.

As a starting point for our journey into consumers drivers, we thought that it would be useful to understand the importance current industry leaders believe that consumers place on a range of product attributes.

As part of this year's priority survey, we asked our contributors to give each attribute that we identified a ranking of between 1 and 10 for how important

they believe it is to consumers when they are making a purchase decision for a food or fibre product.

The result's chart illustrates the broad range of perspectives on the importance of individual attributes. Only four attributes received no one of two scores (the lowest importance) while only one category (vegan) received no highest importance scores (nine or 10). Overall taste, health and nutrition and convenience made up the three most important attributes for industry leaders, which we found surprising, we had expected that price would have been scored more highly.

In reality, the range of scores given to each priority reflects that each of the organisations that our contributors represent is targeting specific market niches and consumer groups. Their opinions of what is important will reflect their understanding of what is important to the consumers that they are engaging with. The point was made during one of the roundtable conversations that in the current world it is very important that we are listening very carefully to the questions that are coming from consumers.

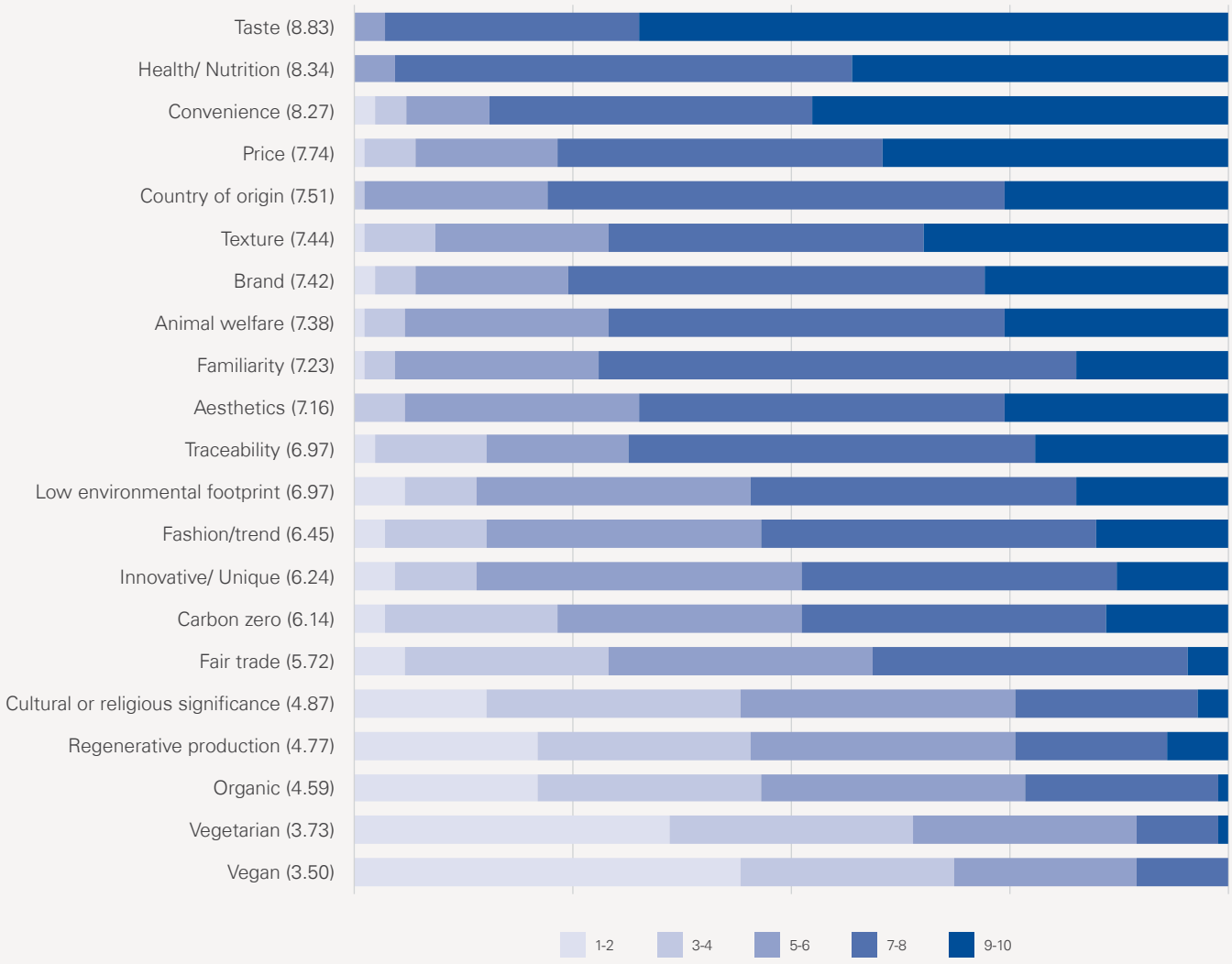
We need to recognise that in the Covid-19 world, consumers have been substituting products and experimenting based on what they have been able to access in attempting to create some interest in their lives. The impacts of this substitution and experimentation on long term consumer preferences will be significant in further evolving and shaping buying decisions. It was noted that it is becoming ever more difficult to categorise consumers as they join tribes that are not connected to factors that are easy to segment markets on (income, age, location, gender) but are centered on world views and lifestyle aspirations.

Influencing these consumers requires us to be very smart in how we interact with them – and that must start with understanding. In the following pages, we have talked to people that are close to a wide range of consumer groups to listen to what is influencing their purchasing decisions.

On the following pages, we report on conversations we have had with contributors in a range of markets around the world (both external experts and KPMG specialists) about how the consumers we currently sell to and could sell to in the future are adapting to Covid-19 and its ongoing impacts. We sought in these conversations to understand the attributes that are important to consumers in each market segment in selecting the products they are choosing to purchase, the channels that they are using to make those purchases and what are the key motivations underlying these decisions.

We have also asked our contributors to provide their assessment of the rankings that consumers in their market are placing on individual product attributes, which provides some interesting contrasts to the rankings generated by New Zealand industry leaders. We have featured

Industry leaders assessment of the most important consumer attributes



these rankings with each market commentary. It again reinforces the critical importance of focusing on what is driving consumer behaviour in the market niches that are being targeted, as what motivates one group of consumers could completely turn off another.

As the world becomes more complex, there is no longer a place for the one size fits all strategy.

New Zealand 'a retail perspective'

As if resetting from the global pandemic isn't enough for New Zealand food and beverage retailers to navigate, other external pressures have never been greater. Supply chain disruptions, ever increasing regulation and compliance requirements, non-seasonal and extreme weather events, changing consumer demand, the list goes on and on.

The New Zealand food and beverage retail sector is diverse, with a wide spectrum of retailers meeting consumer needs from markets, bricks and mortar retail, number of online and in-home alternatives. Some parts of the sector have grown and thrived, while other parts have been negatively impacted. There's an underlying feeling that many will not survive in the new future. However, this attitude is tempered by an underlying optimism and strong entrepreneurial spirit.

So what's made the difference, and what are some lessons for tomorrow?

In talking to people across the sector, it appears the food & beverage retail model is being reimagined as Covid-19 has accelerated trends and conditions.

It's never been more important to for food and beverage retailers to know their market, to understand their customers' behaviour – and then to relentlessly deliver, every time. But it's never been harder. This is not a set-and-forget situation, consumer behaviour is more fluid and trickier to pin down. Peoples' values, behaviour and spending habits changed in 2020 and are unlikely to return to exactly how they were before. There is no secret formula for success – retailers need to know who and what they are selling, and where and how they are selling it. Customer experience excellence remains at the heart.

Haves versus have-nots

New Zealand society is increasingly fragmenting into those that have income & wealth security, and those that have not. While the government grapples with policy responses to the accelerating social and economic inequality it's creating great complexity for retailers. Consumer confidence, security and control is incredibly fragile and fleeting as individuals, whanau, and communities face daily challenges and disruptions, and ever-changing future expectations of public-health and economic recovery.

Value and price are the most significant drivers of consumer behaviour. Consumer spend during periods of lock-down, hugely depended on income and wealth security. For many these insecurity continue post lockdown.

Individuals and whanau with low income security quickly drop the discretionary and focus on finding essential food items at the best price. Most likely shopping close to home, more frequently and with relatively small basket sizes. Out of home dining is likely to be infrequent. Adoption of trends that add cost is unlikely. Retailers have generally traded well when they have made essentials and staple items safely and easily accessible.

Conversely, those with income and wealth security have increased their spend on premium food and beverage both in absolute terms and share of basket. These consumers measure value in the perceived benefits and in the experience. Demand is accelerating and sharpening for hyper-local & indigenous products, health & nutraceuticals, and flexitarian & alternative proteins. The result for some retailers is successful start-ups, increased sales volumes and greater market share. Prestige products and experiences have seen growth as consumers have sought the reward themselves.

On-line versus bricks and mortar

The retailers relationship with consumers is changing. They need to build rapport across different mediums (on-line, in-person, delivery) to deliver expected experience. Food & beverage retailers that are not disrupting their own consumer experience will not have to wait long before someone else does it for them. This disruption

is happening fast, and often from unexpected quarters as new players enter and grab market share.

The uptake of on-line retail increased massively during lockdown. Somewhat contradictory, consumers often crave the good old-fashioned human touch and connection. Food and beverage providers stand-out when the right on-line technology matches with the right in-person or delivery experiences. Social media platforms and on-line retail tools remove some cost barriers to entry, meaning the marketplace has become incredibly crowded. The fight for consumer attention has never been more intense – there is unprecedented volumes of content at people's fingertips cut through is a challenge to many retailers with more traditional models. Consumers quickly seek and find alternatives if they do not get the personalised experiences they expect. Consumers are using social media channels to share stories of both good and, more impactfully, poor experiences.

Location remains incredibly important for bricks and mortar retailers and is largely inflexible in the short term. Food and beverage retailers continue to struggle in locations where there are less people than before (particularly CBD and international tourist hotspots).

People working from home are not buying coffees or eating lunch at CBD cafes and restaurants, and they are not doing a top-up shop at centre city supermarkets. Some spend has transferred to suburban retailers. With no international tourists the volume in traditional tourist hotspots simply isn't there. In combination these conditions are particularly impactful on regions, such as the Auckland CBD where a number of high-profile restaurants have shut up shop.

In response some restaurants closed their shop fronts, became ghost kitchens and focused only on in-home meal deliveries.

As consumers transition on-line, there is more available data. Some retailers are using this information to gain insight into their customers' homes and lives. However, it's challenging to personalise and predict consumer behaviour using this data. Finding different ways to connect with consumers, with new digital solutions and direct-to-consumer offers – often using new approaches originating overseas is critical to long term success.

One restaurateur decided to deliver meals to his online customers himself – getting first-hand information about who he was selling to and adjusting his menu as a result.

Do the right thing: by me, by your employees, by society and by the planet

Consumers need to be treated as individuals and feel valued and important. People expect retailers to understand their circumstances to drive deep rapport. Consumers return to retailers that they trust, that have authenticity and that have aligned values. Consumers are expecting that food & beverage providers adhere to a social contract. Consumers are paying greater attention to how businesses support their employees, meet societal expectations of diversity and inclusion and deliver on commitments to sustainability and the environment. Minimising food waste and support of food insecurity initiatives is also a growing consumer expectation. Corporate kindness has become fundamental.

People have high expectations and little tolerance for getting these things wrong. The pandemic has driven rapid innovation as problem solving has come to the fore. This provides both challenges and opportunities for food & beverage retailers. Challenges because issues like supply chain disruptions and seasonality create ever changing price and availability expectations and realities. Poor experiences are magnified on social media.

Opportunities arise because retailers that do it right have a distinct competitive advantage and the ability to enhance customer loyalty.

Ken Stephens
Private Enterprise, Partner

We've captured the insights of the following experts to inform this piece: **Marisa Bidois**, CEO Restaurant Association of NZ; **Steve Anderson**, CEO Foodstuffs South Island; and **Nigel Boswell**, Chief Development Officer, Bidfood.

Our subject matter experts representing the New Zealand consumer scored the importance of the following product attributes out of 10:

Price	9.5
Convenience	8.5
Familiarity	8.5
Health/nutrition	8.5
Innovative/unique	8.5
Taste	8.5
Texture	8.0
Fashion/trend	7.5
Brand	7.0
Aesthetics	6.5
Vegetarian	6.5
Fair trade	6.0
Animal welfare	5.5
Country of origin	5.5
Cultural or religious significance	5.5
GMO free	5.5
Low environmental footprint	5.5
Organic	5.5
Vegan	5.0
Regenerative production	4.0
Traceability	4.0
Carbon zero	3.0

Emerging economies

The search for premium prices and greater value, has seen New Zealand exporters focus on developed markets such as Australia, Europe, and the United States. However, are we missing large and lucrative markets that have an appetite for New Zealand products?

India, Brazil and Africa currently receive approximately 2% of New Zealand exports, yet in total, represent a population of almost two billion people. In exploring emerging economies, we hosted interviews with experts from India, Brazil and select countries in Africa including Nigeria, South Africa and Kenya.

Emerging economies are defined as countries that have established systems and markets but don't yet meet the criteria of a 'developed economy'. These countries all share a rapidly growing 'middle-class' population who display a willingness to pay for products with the value proposition they are looking for. The Indian middle-class population is estimated at 66 million. There is a further 16 million in the upper-middle and two million in the 'high-class – a combined population that could buy New Zealand products of 84 million. Across the continents of Africa and South America, the middle-class populations total 150 million and 130 million respectively.

Combined characteristics

There are three core characteristics shared by economies opportunity for New Zealand exporters.

Retail double-disruption refers to a rapid transition through different channels of purchase for middle-class consumers in these markets. With 'wet-markets' traditionally comprising of 60-80% of purchases for consumers in 2018/2019, a slow transition to modern retail has been accelerated by Covid-19. This has delivered a shift where between 60 and 90% of purchases are now occurring in established supermarkets and retail stores The pandemic lockdown has accelerated the second wave of disruption too – online retail. From a platform in its infancy, Covid-19 accelerated online food purchases into the mainstream in the space of months rather than years. Established supermarket chains and niche operators compete in the online environment but both provide opportunities to present New Zealand products to a captive audience and establish a presence with these consumers who are just becoming accustomed to new ways of accessing their food.

Cultural infusion captures the recent pivot to the pride that emerging economy consumers are placing in their locally produced products and traditional meals, in conjunction with a sustained appetite for international integration. There is a strong opportunity to gain the respect and excitement of emerging economy consumers with international products that exhibit a genuine intent at cultural infusion. This includes providing relevant products, prepared and packaged in a way that assists with use in traditional meals, products that combine international and local ingredients, and products from companies that have invested in the local economy through the provision of intellectual property, skills and services that empower local communities.

Product quality is one of the most significant contributors to value perception and willingness to pay a premium. There are a multitude of factors that can be used to define what quality means to a consumer from production systems to product attributes, but across these emerging economies there are three key attributes that define quality, these are:

- **Taste**, often associated by with blend of traditional flavours, textures and experiences.
- **Health**, strongly linked to social trends including minimal processing and additives, immune or weight-related properties and new products simply marketed as having health benefits.
- **Safety**, associated with trusted brands and labels, and often correlated with packaging and country of origin.

Region-specific insights

Despite some strong shared consumer insights between countries, there are also some unique trends that consumer experts believe will drive premium prices now and in the future.

India – Customisable foods

Consumer demand momentum is building behind products that have inherent customisation attributes or empower consumers to be able to customise products in their diets and meals. For international imported products, this means foods that are designed to provide customisation opportunities that align with Indian taste expectations and are relevant to the region of India where they are being sold. Some successful examples include Nestle adapting its standard yoghurt product to 'Dahi' an Indian fermented milk product which is now one of the top-selling brands in the category, PepsiCo customizing their chips range to include products such as 'Magic Masala' and 'Pudina Punch' and Coca-Cola adding a higher pulp content and Indian flavours such as Litchi, Dussheri and Kesar mango to their Minute Maid beverage brand.

Africa (Nigeria, South Africa and Kenya) – Fortified foods

Facilitated by a Gates Foundation campaign, foods that have been fortified to provide additional nutritional properties are exhibiting strong consumer demand in Africa. These opportunities exist through adding human-essential vitamins, minerals or other nutritional properties to staple foods, or foods already associated with health. This trend is particularly strong in the consumer segment of pregnant women, and women with young children. Some examples include Lisabi Mills, a Nigerian food processing company that produces cowpea flour fortified with vitamins A, B1, B2, B3 and iron.

Brazil – Innovative foods

Brazilian consumers, particularly those with a larger discretionary income or part of the younger consumer populations are showing increasing curiosity about different foods, particularly those at premium price points. There is less attachment to brand market point and more willingness to trial and pay for new types of innovative foods, particularly when associated with improved health outcomes. As well as being a major producer of chocolate, Brazil is also a significant consumer, providing a platform for both innovation and health. Chocolatier Kopenhagen launched 'Soul Good' a lactose-free, gluten-free, no added sugar chocolate range with added fibre targeted at the health and fitness community and retailing at NZ$6 for a 100g plain block, this product merging existing consumer tastes with new product trends.

Overall, markets in emerging economies offer considerable opportunities for New Zealand food and fibre exporters, particularly when those businesses invest in understanding the core drivers of value for their target consumers. Leveraging from the retail double-disruption platforms, developing products with cultural infusion and delivering on a targeted quality definition can attract a premium from the growing number of wealthy consumers in these regions while ensuring we deliver genuine value. A focus on opening trade with these countries and strengthening relationships will only accelerate the opportunities.

We've captured the insights of the following experts to inform this piece: **Richard Agetu**, IFAMA Young Board member, Nigeria; **Wambui Chege**, Independent Consultant, Kenya; **Giovana Araujo**, KPMG Partner & Agri-food Country Lead, Brazil; and **Sushil Parta**, KPMG Technical Director, India.

Our subject matter experts representing the emerging economies consumer scored the importance of the following product attributes out of 10:

Price	10.0
Taste	8.7
Brand	8.0
Texture	8.0
Aesthetics	7.5
Convenience	7.0
Health/nutrition	6.3
Organic	6.3
Familiarity	6.0
Country of origin	5.7
Fashion/trend	5.7
Innovative/unique	5.0
Cultural or religious significance	4.5
Vegetarian	3.7
Animal welfare	3.0
GMO free	3.0
Low environmental footprint	3.0
Fair trade	2.7
Carbon zero	2.3
Traceability	2.3
Regenerative production	2.0
Vegan	1.7

Europe

Europe, including the United Kingdom, is a marketplace where consumers are 'complex', 'unreasonable' and often 'contradictory'. However, with the New Zealand Government actively pursuing free trade agreements with both the EU and a post Brexit UK, they are expected to become more important markets for our exporters in the coming years.

Today's European consumer

The real cost of food has been decreasing across Europe over the last 20 years largely attributable to fierce competition amongst retailers with an unrelenting focus on 'lapping' last year's numbers to win. It is recognised that this behaviour has contributed to a decline in the nutrition levels of food and subsequent effect on consumers health, with major food companies recently acknowledging much of their portfolio's do not deliver healthy outcomes to consumers.

The question for executives has now become, how do we reduce the cost of food production while restoring nutrition in a way that is sustainable and scalable?

It has been a difficult year for retailers who needed to adapt at pace. To meet consumers needs they built hybrid on-and-offline models drawing on existing systems and infrastructure. These have been largely unprofitable, as it is difficult to be cost effective picking orders from a store floor, and expensive delivering within a short timeframe of an order being made.

On average grocers made less profit as they dealt with the pandemic. From a public relations perspective, it was deemed to be acceptable to breakeven or lose money; the consumer perception being that services were stood-up during a crisis, enhancing consumer loyalty.

The last year has highlighted the complexities of understanding everchanging consumer needs, now and into the future. Even organisations who have a direct connection and relationship with their consumers and hold significant data about their purchasing habits through well-established loyalty programmes, struggled to meet changed consumer needs and faced disruption.

A segment currently gaining ground is 'immediacy', instantly gratifying the wishes of a consumer, with new entrants such as Gorillas deemed to be successful. Gorillas can deliver 5 to 10 grocery items on motorbikes or bicycles within 10 minutes to consumers willing to pay a premium of 30% for the service.

Consumers of the future

20 to 30 years from now we will see a pronounced bifurcation of the consumer 'pool' that is beginning to emerge as a result of in the inherent inequity within societies.

It isn't expected to be a dramatic haves and have-nots divide but more a diluted version.In this scenario have-nots are not necessarily those in poverty, but a consumer segment who do not want to spend more than is necessary but come with high expectations.

It is likely there will be a migration of consumers from the haves to the have-nots as they are 'squeezed' out of the haves pool but keep expectations and preferences to maintain their lifestyle but at even at a lower price point.

There will be some consistent 'non-negotiable fundamentals' relating to ethical behaviour, sustainability and traceability that will be applied by all consumers. These 'needs' narrow as you segment each pool to include foods that are safe, consistent, high quality, with varying degrees of optionality and speed of delivery at an affordable price.

Consumers' devices and home appliances are expected to influence or even make some decisions meaning ultra-personalisation is no longer a consumer with a high willingness to pay. This trend is not limited to groceries and is likely to incorporate health diagnostics, which will connect with information on specific nutritional or medical needs to reduce the risk of potential health issues occurring.

Consumers' are likely to expect their shopping experience to be a journey that delivers value before, during and after and forms a meaningful relationship with brands that is reciprocal.

Technologies remove the bug bares of shopping and tap into curiosity, with the potential to change the bricks and mortar store by reducing SKU's and creating space for 'experiences'. Technologies will guide consumers through a store to aid decisioning with automation and robotics helping a consumer along the way.

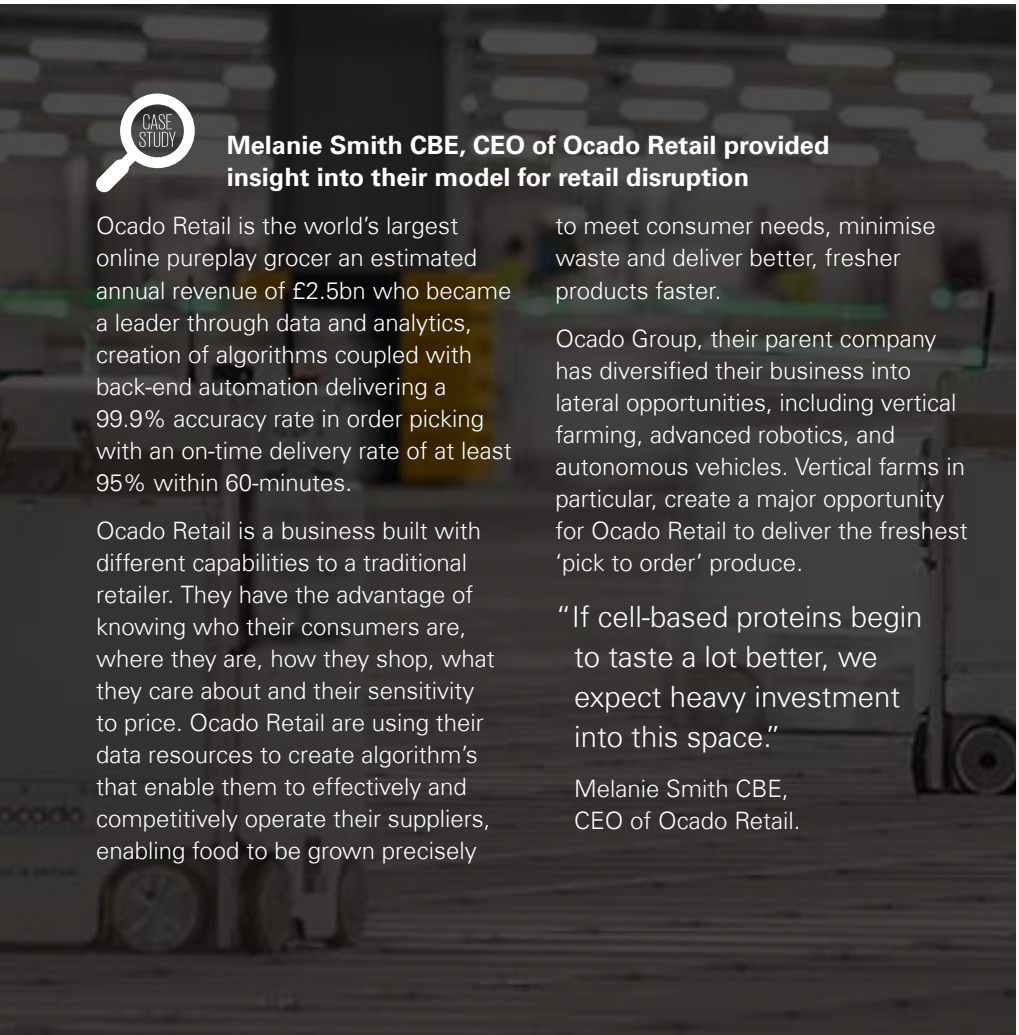
Interestingly 'resilience', 'reliability' and 'loyalty' were not explicitly discussed during interviews but will have continuity 'value' for in-market partners in a highly geopolitical world so how do we price in these factors as exporters to the world.

So, if you overlay data and analytics with automation across other value chains it begins to paint a very different picture of how future consumer needs could be met outside of what we in New Zealand 'know'… as one contributor noted 'if alternate or cell-based proteins can taste better, we will invest heavily into this space'.

For New Zealand to leverage these insights into the European and UK markets, there are some clear messages. Expectations of the non-negotiable fundamentals must be met, or preferably exceeded in support with a high-level of transparency.

Providing products and services that have a high level of personalisation and rapid delivery to consumer are also increasingly critical.

Delivering true premium value in these markets both now, and in coming decades, will mean contributing to consumers experience from the moment they first consider a product, through to the point where they have finished using a product or service, in addition to each step of purchase, usage and feedback in between. This end-to-end value delivery can empower both premium value, and ongoing loyalty, as an inherent part of New Zealand products and service offerings.



CASE STUDY

Melanie Smith CBE, CEO of Ocado Retail provided insight into their model for retail disruption

Ocado Retail is the world's largest online pureplay grocer an estimated annual revenue of £2.5bn who became a leader through data and analytics, creation of algorithms coupled with back-end automation delivering a 99.9% accuracy rate in order picking with an on-time delivery rate of at least 95% within 60-minutes.

Ocado Retail is a business built with different capabilities to a traditional retailer. They have the advantage of knowing who their consumers are, where they are, how they shop, what they care about and their sensitivity to price. Ocado Retail are using their data resources to create algorithm's that enable them to effectively and competitively operate their suppliers, enabling food to be grown precisely to meet consumer needs, minimise waste and deliver better, fresher products faster.

Ocado Group, their parent company has diversified their business into lateral opportunities, including vertical farming, advanced robotics, and autonomous vehicles. Vertical farms in particular, create a major opportunity for Ocado Retail to deliver the freshest 'pick to order' produce.

"If cell-based proteins begin to taste a lot better, we expect heavy investment into this space."

Melanie Smith CBE,
CEO of Ocado Retail.

Andrew Watene
Director, Head of KPMG Propagate

We've captured the insights of the following experts to inform this piece: Global Transformation Director, Global Multinational Consumer Goods Company, personal communication, May 2021; and **Melanie Smith**, CEO, Ocado Retail Group.

Our subject matter experts representing the European consumer scored the importance of the following product attributes out of 10:

Convenience	8.7
Health/nutrition	8.3
Taste	8.3
Price	7.7
Animal welfare	7.3
Low environmental footprint	7.3
Brand	7.0
Aesthetics	6.7
Texture	6.7
Vegetarian	6.7
Carbon zero	6.3
Innovative/unique	6.3
Traceability	6.3
Fair trade	6.0
Familiarity	5.7
Organic	5.7
Country of origin	5.3
Vegan	5.0
Fashion/trend	4.7
GMO free	4.0
Cultural or religious significance	3.3
Regenerative production	3.3

China

Being New Zealand's largest trading partner, the consumer market in China attracts particular attention and interest from New Zealand exporters, and this has only been heightened during the Covid-19 Pandemic.

In 2020, New Zealand exports to China totalled NZ$20.1 billion, comprising NZ$16.7 billion in goods and NZ$3.4 billion in services. Over that year, China received 64% of our infant formula, 72% of our mutton, 82% of our logs, and 93% of inshore shellfish.

We discussed with experts that have in-depth knowledge of the Chinese consumer market a wide range of questions from the retail and consumption habits of Chinese consumers influenced by the pandemic to the emerging food trends in China that are expected to maintain long-term momentum.

The changing lifestyle, increased health consciousness, the rapidly developing online market penetration as well as the application of advanced technology have changed the customer behaviours, which in turn will impact how New Zealand exporters approach and explore the Chinese market.

Change in lifestyle and increased health consciousness

Shoppertainment and health consciousness are the two key trends in China that are expected to continue to boost growth and opportunities. It is also expected that demand for lifestyle products and quality food and beverage will keep growing in the near future in China.

The Shoppertainment trend which interacts directly with livestreaming is attracting more online traffic and results in both increase an in online time (entertainment) and online revenue (shopping). In addition to using social media and e-commerce platforms as a venue to purchase products, consumers are also looking for some form of entertainment from their shopping experience as people spend less time outdoors. Livestreaming has captured a significant portion of spare time the Chinese consumer possesses and involves a highly interactive experience which is delivering exponential growth. Product suppliers likely to use livestreaming as a key sales platform are not exclusively Key Opinion Leaders (KOLs) but also brand ambassadors and even farmers, as long as they provide good quality products and share background stories that enable consumers to resonate to the products.

Consumer consciousness towards overall wellbeing and health has also increased. As a result, T-mall global, Alibaba's online platform for business-to-consumer online retail, had seen a very visible increase in the sale of health supplement and wellbeing products. Sales of certain subcategory products such as probiotics and Nicotinamide mononucleotide (NMN), a type of longevity supplement have performed particularly well.

Heather Hu
Senior Manager

We've captured the insights of the following experts to inform this piece: **Maggie Zhou**, Managing Director at Alibaba Group Australia and New Zealand; **Anson Bailey**, Head of Consumer & Retail, ASPAC at KPMG; and **Jessie Qian**, Senior Audit Partner at KPMG Shanghai.

Embracing e-commerce

Covid-19 has further accelerated everything digital in the Chinese economy which was already a leading market for online uptake and interaction. According to Anson Bailey, online sales in China are taking an increasing portion of the whole retail segment, which is still developing in total at a faster pace compared to other markets.

For example, shopping festivals in China have shown growing momentum in the past few years. In 2020, Alibaba's Single's Day achieved 85.6% increase in Gross Merchandise Value and reached a staggering sales record of US$74.1 billion.

On that single day, 250,000 brands participated in the festival with 31,000 brands from overseas.

Chinese consumers are living in a mobile first world. There are more than 1.3 billion customers on Ali platforms and another 1.2 billion on Tencent platforms. Following the increasing scale of online consumers, more businesses in China (including international brands) are moving towards these online platforms. Not only the mega platforms are emerging, but also other smaller platforms emerging. The most recent research done by KPMG in China shows that online purchase channel preference for consumer tech shifted from brand sites to platform sites during Covid-19. This is evidenced by the use of smart phones and internet in China as well as extensive use of mobile payments in China.

One contributor that when explained consumers could not travel overseas, Alibaba had seen a surge in demand for imported products via online platforms since consumers continue to look for quality products that they usually purchase when travelling overseas. This is also reflected in the extensive retailing record in the Hainan Free Trade Port.

The powerful combination of trends is feeding into the expectation of an ongoing boom in online shopping in China. These include senior groups becoming more engaged in online shopping, a sustained trend of consumers conducting regular food shopping on online platforms, and social media platforms linking product and shopping information which transforms purchasing decisions to a constant daily behaviour no longer driven by intention.

Emerging trend of Chinese own food consumer brands

The trend towards Chinese domestic brands has been evolving the past two to three years. It is mainly driven by the rise of Millennial purchasing power, especially consumers born between 1985-1990. Compared to their parents, the post 80s group are more open to local brands as long as quality of the products can be assured.

Our subject matter experts representing the Chinese consumer scored the importance of the following product attributes out of 10:

Carbon zero	9.0
Innovative/unique	9.0
Health/nutrition	8.0
Taste	8.0
Aesthetics	7.0
Brand	7.0
Convenience	7.0
Fashion/trend	7.0
Organic	7.0
Texture	7.0
Price	6.0
Traceability	6.0
Country of origin	5.0
Cultural or religious significance	5.0
GMO free	5.0
Regenerative production	5.0
Vegan	5.0
Vegetarian	5.0
Familiarity	3.0
Low environmental footprint	3.0
Animal welfare	2.0
Fair trade	1.0

They are more affluent and give higher priority to a healthy diet and quality of the products. Engagement with the brand plays a key role in their decision making when choosing a product. Communication through social media groups and KOLs are a particularly impactful enabling brands to engage with this group of consumers.

The popularity of new style Chinese tea represents the changing eating habit of Millennials. Instead of coffee purchase, these consumers are willing to pay the equivalent price and join in long queue for the new style Chinese tea.

Investors from venture capital and private equity are keen to invest in businesses that show promising growth trajectory even when profitability is not assured. This gives Chinese brands the capital needed to invest in product innovation and marketing to increase their market share. As a result, it provides additional advantage for the local brands when competing with international brands.

China's dual circulation strategy which puts more weight with domestic cycle may also support the rising of Chinese domestic brands.

Environmental, Social, and Corporate Governance (ESG) reporting and sustainability

Our contributors agreed that, shareholders, banks, regulators, media and consumers are closely watching the ESG space. With new technologies like blockchain, the end-to-end supply chain becomes more transparent. Consumers are more socially aware and vocal on the source of products, manufacturing process and significant food scandals (food safety). Gen Z in particular are showing themselves to be more militant than the previous generations on this topic.

It is becoming more apparent that Chinese consumers are starting to pay attention to the environmental impact of brands and products.

Key actions for New Zealand based exporters

For businesses in the food supply chain, it is essential to understand the local market development and figure out where the new consumer segments exist. It is recommended New Zealand exporters have a dedicated local team with sufficient understanding of the new marketing and channels as well as the competitive local brands or substitute products.

To compete with China's domestic brands, it is important to have a point of difference in the products. China's market is diversified in regions, age groups and various other factors. Focusing on a niche market would like provides more competitive advantage for New Zealand brands.

For future growth in the Chinese consumer market, Gen Z opportunities in the aging market should be key areas of focus.

Demographically, 300m Millennials are already a big consumer base in China, followed by 170m Gen Z consumers. It is expected that these Gen Z consumers will likely drive the next wave of consumption in China. As a result, there are hot trends towards the spreading of livestreaming, and the influence of key opinion leaders and key opinion customers. These trends are also supported by the use of technologies (e.g., AI, AR, VR, use of data) in the digital market in China.

Moving forward, Alibaba foresee the demand for products that cater to the needs of the aging population will be the next big trend. Unlike the current group of seniors, the group that will enter into their golden age (60 years and above) in the next 5-10 years has higher disposable income and are generally more affluent than their parents. This group is less sensitive to price and place higher importance to quality of the products.

Further opportunities in Asia

The range in populations, culture and wealth across Asia are significant, ranging from countries such as Singapore with a GDP per capita of over US$102,000 and ranked second in the world, to Cambodia below US$5,000 per capita and ranked 140th in the world. By contrast New Zealand is US$40,000 and ranked 63rd.

In this section we focus on three Asian countries, Vietnam, Indonesia and South Korea which get less attention in New Zealand than some of our more developed export markets. With a combined population of 418 million people and GDP of US$6.8 trillion, all three are part of the 'Next Eleven', a group of countries expected to become some of the world's largest economies driving the 21st Century.

	Population	GDP (PPP) per capita ($USD)
Vietnam	96 million	$10,755
Indonesia	270 million	$12,882
South Korea	52 million	$44,292

Data for 2019/2020, various sources

Though these countries have their own unique characteristics (particularly South Korea with its greater wealth), all share common themes in food purchasing and consumption, which we identified doing or conversations with local KPMG experts.

Diet revolution

Across all three countries, price sensitivity is high and remains a top factor influencing food purchasing decisions. However, appetite for paying premium prices is growing when the attributes of taste, quality and health (in that order) can be achieved. Driven by these attributes the diets in these countries are experiencing a revolution.

Consumption of meat and dairy is holding steady or growing, particularly for urban-based consumers (which in Vietnam consume more than 2.5 times the volume of dairy than their rural counterparts). While red meat consumption continues on a positive trend, its place in the diet is simultaneously evolving, while cheaper meats like chicken are slowly being replaced with quality red meats in a shift to enhanced luxury for the meat portion of a meal.

A 'race to westernise' is occurring at the same time as a growing pride in traditional foods and diets. These seemingly divergent trends are colliding to create a broad range of dietary demands within groups and even individual consumers. It would not be unusual for a person to consume a very westernised meal, a very traditional meal, and a meal integrating the elements of both an average week.

For New Zealand food producers and exporters, it is more important than ever to have a detailed understanding of country or even city specific cultural expectations. The diet revolution requires a consistent, real-time, in-market tracking of consumer trends and preferences to both maintain existing product relevance and identify future product opportunities.

Convenience is Critical

Perhaps greater than anywhere else in the world, the surge of demand for convenience is a significant driver of food purchase decisions in these countries.

Start-ups delivering fresh produce and daily meal deliveries are growing rapidly in large and medium sized cities. These types of service offerings require different types of in-market relationships for New Zealand export businesses. While building demand directly from consumers remains important, so too does meeting the expectations of food businesses that are providing the fresh food and meal delivery solutions to secure their place as the premium element of a meal.

South Korean Home Meal Replacements (HMR) are another example. HMR's which include a wide-range of prepackaged ready-made foods are purchased almost exclusively online and are expected to grow 20% between 2020 to 2022 reaching 5 trillion Korean won (NZ$6.15b).

For Vietnam and Indonesia, shopping is evolving from a wet-market dominated platform to modern retail and particularly large supermarkets. Modern supermarkets can be seen as the centre piece of shopping malls with wealthier consumers in particular transitioning to a preference for this shopping type and online shopping in its early growth stages. In South Korea, the evolution to the dominance of online shopping is already well in progress.

The forces of health & quality

Similar to most markets across the world, Covid-19 has accelerated the trend of purchasing for health. This health trend is observed both in deciding the combination of foods in a shopping basket, and also seeking individual products that may have immune-boosting properties.

Alongside health, is the concept of quality. Across all three countries, most consumers are transitioning

towards higher quality foods. Quality to consumers in these markets being represented by fresh foods, often imported from reputable countries and perceived as both tasty and nutritious.

Comparison of imported and domestic produce varies across product categories. Imported meat from countries such as New Zealand is generally considered of good quality and better than local produce, however domestically produced fruit and vegetables are often considered to be of equal quality to identical imported options.

One important additional factor in exporting products to these countries, is that environmental and ethical considerations are very low in priority for influencing food purchasing decisions. Any change in this area is predominantly evolving through regulation, such as government shifts from plastic packaging.

Consumers are slowly becoming more atoned to sustainability, and it is much more pronounced and important in South Korea, compared to Indonesia and Vietnam.

In exporting to these countries, New Zealand should be seeking to align products and marketing with taste, convenience, health and quality for capturing premium prices. It's also important to acknowledge the significant and unique differences between these countries, despite some shared similarities.

As New Zealand continues to explore new export markets for the food and fibre sector, the accelerating economies of Asia provide an exciting opportunity to progress strong new relationships for businesses, and deliver targeted value to consumers around the world.

Vietnam

"Vietnam is a melting pot of cultures."

Luke Treloar, KPMG Managing Director, Vietnam.

In Vietnam, history is critical component of the relationship people share with their food, and their food traditions. Examples are the Vietnamese breakfast of Baguettes filled with ham, cheese, pate and veggies, or the Vietnamese coffee made with concentrated coffee and condensed cream from early French influence. Contrasted with Nuoc Mam, a widely used fermented fish sauce used throughout traditional Vietnamese cuisine.

Indonesia

In Indonesia, education level is a key driver for food consumption habits. While education from primary to high school is compulsory, net enrolment at high school is only 61%. In addition to the high correlation with wealth, the education level of Indonesian consumers influences the decisions related to individual and family nutrition. For exporters seeking to provide products differentiated by nutrition, products should have clear nutritional information and be targeted at areas where consumers with a higher level of education are concentrated.

South Korea

In comparison to Vietnam and Indonesia, South Korea possesses a much more sophisticated e-commerce system and use-rate of online shopping. Online grocery shopping reached 25.9 trillion Korean won (NZ$39.1 billion) in 2020, up 53% from 2019. This widespread uptake of online shopping platforms means that exporters targeting the South Korean market must position products appropriately for these specific platforms.

We've captured the insights of the following experts to inform this piece: **Luke Treloar**, KPMG Managing Director Vietnam; **David East** and **Shindy Yuniarti** KPMG Partner and Senior Manager Indonesia; and **Jang-Hun Shin**, KPMG Partner and lead of Consumer and Retail in South Korea.

Our subject matter experts representing these Asian consumer markets scored the importance of the following product attributes out of 10:

Taste	9.3
Price	8.7
Brand	7.7
Convenience	7.7
Fashion/trend	7.7
Health/nutrition	7.3
Aesthetics	7.0
Country of origin	7.0
Familiarity	7.0
Texture	6.5
Innovative/unique	5.7
Organic	4.3
Cultural or religious significance	4.0
Regenerative production	3.7
Traceability	3.7
Vegetarian	3.3
Fair trade	3.0
Vegan	3.0
GMO free	2.7
Animal welfare	2.3
Carbon zero	2.3
Low environmental footprint	2.3

We've captured the insights of **Alpha Kennedy**, NZTE Beachehad Advisor, UAE to inform this piece.

United Arab Emirates

Our agenda consumer research pieces have predominantly focused on established existing markets, and potential large future markets, but there are multiple geographies around the world that are also well suited as export destinations for New Zealand food, fibre and systems.

We spoke with Alpha Kennedy NZTE Beachhead advisor about the opportunities for New Zealand businesses in the United Arab Emirates (UAE). The population of UAE is roughly double our own at 10 million people with a GDP per capita of almost US$60,000, 12th highest in the world. What opportunities does this relatively small but affluent market have for New Zealand?

Because of their wealth, UAE customers and consumers are often targeted with premium products. They have developed a 'shrewdness' towards product claims and are strongly focused on high quality. Most shopping is conducted online, including a high proportion of fresh foods, and dominated by a single retailer Kibsons that offers same-day delivery.

Novelty is a key attribute driving a premium for foods. However, this isn't just for novel end-products, but novelty introduced through packaging, colours and accompanying recipes.

Health, experience and aesthetics are also key attributes for premium products, alongside environmental, ethical and 'clean' credentials.

Perhaps most important for food exporters interested in opportunities in the UAE is the concept of loyalty. UAE businesses and individuals are less interested in countries that don't have on-the-ground investment in their people or infrastructure and unfortunately New Zealand is currently often considered in that category.

However, NZTE Beachhead investors are assisting in closing that loyalty gap. Investment in local intellectual property, infrastructure or simply having people on the ground in UAE is critical to establishing strong loyalty and consumer recognition.

Where New Zealand businesses often seek either existing markets for simplicity, or large markets for scale, it's important to consider the multitude of market opportunities that exist around the world when developing products.

We must ensure a genuine understanding of those markets when seeking to establish international relationships or export plans to those countries' consumers.

Our subject matter experts representing the UAE consumer scored the importance of the following product attributes out of 10:

Taste	10.0
Convenience	9.0
Country of origin	9.0
Aesthetics	8.0
Brand	8.0
Cultural or religious significance	8.0
Fashion/trend	8.0
Familiarity	7.0
Health/nutrition	7.0
Innovative/unique	7.0
Price	7.0
Texture	7.0
Fair trade	6.0
Organic	6.0
Traceability	6.0
Vegetarian	6.0
Vegan	5.0
Animal welfare	4.0
Carbon zero	4.0
GMO free	4.0
Low environmental footprint	4.0
Regenerative production	2.0

Generation Z

We've captured the insights of the following experts to inform this piece: **Anjuli Mack**, Transformation coach and leading NZ food influencer; **Say Song**, Founder, Caramel Marketing Agency; and **Ashley Knudsen** & **Lyall Minhinnick**, top three finalists in 2021 Beef & Lamb ambassador chefs competition.

Gen Z refers to individuals born between 1997 and 2012 and now includes approximately 2.5 billion people or 32% of the world's population. Individuals in this generation are the most diverse, best educated, and referred to as 'digital natives' growing up with technology such as smart phones and social media.

With such diversity, identifying representative consumer trends can be challenging; however, there are some key characteristics and behaviours that align many Gen Z consumers.

Technology is one of the most significant shared characteristics for Gen Z consumers. Up to 95% of this generation researches information and reviews online before making a purchasing decisions. A considerable amount of shopping itself is conducted online. This means that to target Gen Z consumers, an online presence is absolutely essential. However, an online presence alone is not enough. Gen Z consumers are the expert generation at identifying authentic online content, and seek not simply pretty pictures and a few key words, but a richness and depth of ongoing online content which connects them to brands and products. This includes personal stories of individuals involved in businesses, information about how products are produced, and what the impact may be from their purchasing decisions.

Sustainability is an important product attribute, as is an understanding of where a product has come from. Gen Z are also reaching the age where they begin entertaining guests as well as engaging with their wide social media audiences. They want to purchase products that are adaptable, innovative and aesthetically pleasing to express their individuality as they engage with the world both physically and online.

Though price is still a significant factor for this generation, Gen Z customers place value on experiences and novel

foods with a greater frequency of 'treating themselves'. This means price comparisons aren't necessarily made on a per kilo basis. They incorporate the perceived value in product attributes and experience.

For food and fibre businesses seeking to engage with Gen Z, key success factors include providing opportunities for individuals to express themselves through your products and services, to be agile to meet evolving preferences, and to ensure a continued and constant online presence and relationship.

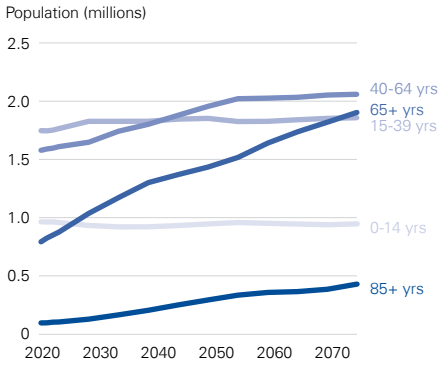
Our subject matter experts representing the Gen Z consumer scored the importance of the following product attributes out of 10:

Taste	9.0
Aesthetics	8.7
Convenience	8.7
Health/nutrition	8.7
Brand	8.3
Texture	8.3
Animal welfare	7.3
Fashion/trend	7.0
Innovative/unique	7.0
Price	7.0
Vegetarian	6.7
Country of origin	6.3
Fair trade	6.0
Familiarity	6.0
Organic	5.3
Vegan	5.3
Carbon zero	4.7
Traceability	4.3
GMO free	4.0
Low environmental footprint	4.0
Cultural or religious significance	3.3
Regenerative production	3.3

The ageing generation

A transformation is occurring for one of the most rapidly growing consumer segments – the aged sector, delivering a suite of challenges and opportunities in the provision of food.

By 2038 New Zealand's 65-plus population is anticipated to exceed 1.3 million and represent 22% of the country's population. The population of New Zealanders aged over 85 will more than double over the same period, growing from 88,000 in 2020, to 200,000 eighteen years later.



It is important to recognise that this growth in population at older age brackets is not a one-off surge that will pass with time, but represents a new normal of population age demographics for New Zealand.

By 2058, these populations will have surged further, with one quarter of New Zealanders aged over 65, representing 1.65 million people, and 356,000 of these, or 5% of the country's total population, will be over 85.

The growth in ageing population is not unique to New Zealand. Worldwide, there are an estimated 727 million people aged over 65 years old as of 2020, and this is also expected to double to over 1.5 billion by 2050, from 9.3% to 16% of the global population.

Consumers in the aged sector exhibit unique preferences, habits and requirements which result from a combination of lifestyle, health and background.

In this section we focus on the aged-care sector, from a New Zealand perspective. Despite the domestic and residential care focus, insights can provide value for both the ageing retail consumer, and international markets.

The aged-care sector model is roughly split with 20% of the market at the 'premium end' and 80% at the 'commodity end'. This whole sector may be viewed as an environment with lower levels of innovation and a slow pace-of-change, supported by the little change experienced in the food being served at residential care facilities over the past 25 years. However, the next generation of residents are not only the largest in history, but have the greatest cultural diversity and dietary expectations of any previous group – this is leading to a transformation in the food requirements and market opportunities.

Requirements of an aged-care resident consumer

There are several requirements that must be met in providing food in the aged-care sector. A critical component is the legal requirement which designates that all menus must be reviewed by a registered dietician on a two-yearly basis to ensure each meal and combination of daily food options meet nutritional needs.

Meal planning must also be resilient to seasonal variation and even unexpected climatic events. Food price surges or lack of food availability can cause disruption to planned meals and nutrition, requiring foods to be swapped out with nutritionally similar alternatives. One recent example being the Northland flooding which severely impacted kumara crops in 2017, and required many residential care facilities to adjust planned meals.

The requests for specialised meals are also increasing with more individuals seeking gluten free, dairy free or food options that support other types of health needs.

Combining several requirements means that every meal within a facility must be carefully considered, and there are two general food models that are followed. For smaller facilities (up to 120 residents) a common structure is to develop both a 'Summer' menu and 'Winter' menu each of which has a five-week rotation. This structure requires seven unique lunch and evening meals each week, for each of five weeks, and for each half of the year. This is a total of 140 different meal designs per annum. For larger facilities where scale allows multiple options per evening to be offered, the total number of meals to be designed each year can be even higher.

> " For our residents, food is one of the main opportunities left for individual expression, and in rights of personal choice."
>
> Lynley Irvine, Clare House General Manager

Challenges and opportunities

Texture is King. One of the fastest growing food requirements and opportunities for innovation in the aged sector is in food texture. Every individual meal must have serving options that encompass a range of textures to suit the differing demands of residents in a facility. As an example, a vegetable can be steamed and served as highly textured, or boiled over a longer time period to be made softer and less textured, or may need to be completely pureed in order to be eaten by some residents. Across all options, it's important that not only nutritional requirements are met, but also expectations on aesthetics

Biozoon's 3D printed smooth foods

which includes colour, size and shape. Moulds are increasingly common as a method for re-forming pureed foods into aesthetically pleasing designs, for example re-moulding pureed carrot into the shape of a carrot. This is increasingly important to aged consumers who don't want to sacrifice their eating experiences, including enjoyment and dignity, due to texture requirements.

For those consumers in older age demographics that are purchasing and preparing their own food, there are additional factors to consider. Firstly, ease of shopping itself is critical. Though education and access to online shopping are barriers in this demographic, 110,000 elderly and vulnerable New Zealanders used Woolworths Priority Assistance service and online delivery over Covid-19 demonstrating the transition of elderly consumers to technology platforms which will only continue to grow. Secondly is portion size, 405,000 people in New Zealand live alone and nearly half of them are over 65 years old. As a result, while food nutrition, texture and preference must be met, so too must appropriate portioning for those living both alone. Age-friendly portion sizes are still relevant for those living in a couple or group, with an average decrease in energy intake of 30% between a 20-year-old and an 80-year-old. Thirdly is packaging and convenience, with opportunities to provide solutions which deliver both independence and ease of use for opening food items and their preparation for meals.

Food preparation itself in both aged-care facilities and households includes several challenges beyond the design of menus and meals. For aged-care facilities this includes access to quality equipment, recruiting capable kitchen staff (generally in competition with restaurants), and the balancing act of purchasing frozen food to match seasonal shortages, within confined storage space. For households, access to quality and usable equipment is also key, in addition to easy-to-read instructions for product information including preparation requirements, safe food storage and expiration dates.

The combination of variables contributing to the transformation of the aged consumer presents opportunities for both smaller individual innovations and greater transformational business change. Individual innovation opportunities include nutrition-enhanced foods, light-textured products, natural food colours and moulds, and even food processing equipment. More transformational opportunities include business solutions that provide large-scale meal adaptability, nutrition personalised to individuals and digitally designed meals and menus.

As we reach a new normal population structure in New Zealand and around the world that is increasingly experience-heavy, the way we produce, prepare and serve food to these demographics will provide ongoing opportunity to deliver innovative and premium solutions. Perhaps most important is an authentic focus on supporting older generations to feel dignified, respected and empowered in their relationship with the food they eat.

We've captured the insights of the following experts to inform this piece: **Richard Green**, Chairman of Clare house Retirement Village; and **Lynley Irvine**, Clare House Invercargill's General Manager.

Our subject matter experts representing the ageing generation consumer scored the importance of the following product attributes out of 10:

Taste	8.0
Familiarity	7.0
Health/nutrition	7.0
Price	7.0
Texture	7.0
Convenience	6.0
Fashion/trend	6.0
Aesthetics	5.0
Animal welfare	5.0
Cultural or religious significance	5.0
Fair trade	5.0
Innovative/unique	5.0
Low environmental footprint	5.0
Traceability	5.0
Vegetarian	5.0
Brand	4.0
Carbon zero	4.0
Non-GMO	4.0
Organic	4.0
Regenerative production	4.0
Vegan	4.0
Country of origin	3.0

The flexitarian shift

Flexitarianism involves consumers adopting a diet that is predominantly plant-based while including meat and other animal products in moderation. Is this the new normal diet for parts of the world?

Numerous drivers promote or discourage animal-based food consumption. Here we explore some of those key drivers, and the transformational technologies that may completely change the equations.

Drivers of plant-based food consumption

In New Zealand, 34% of the population state they are actively following a meat-reducing diet, and 3% of these are vegetarian or vegan.

Globally, the population now stated to be restricting animal-based foods in their diets accounts for over 40% of consumers. Widely distributed reports on the future food system, including EAT-Lancet's 'Planetary Health Diet' report and Rethink X's 'Rethinking food and agriculture' report, have promoted a significant reduction in the consumption of animal proteins, particularly in western, developed nations.

With more focus on the impact of the food we eat on health and environment, there is potential for global plant-based food consumption to grow rapidly.

Pros	
Health benefits	Plant-based foods are widely recognised as having beneficial health qualities related to the wide range of nutritional compositions including vitamins, minerals and phytonutrients from different fruits and vegetables to other roots and extracts. A well-balanced plant-based diet can provide all human essential amino acids.
Environmental benefit	Plants have very efficient conversion of energy to food. Plants convert energy directly from the sun and energy is not lost through consumption at different trophic levels in the ecosystem. This generally means that plants produce the highest quantity yield of food per unit area when farmed on suitable land.
Animals are not directly slaughtered	Plant-based foods do not require the direct slaughter of an animal to provide food for human consumption. There are a variety of plant food options, and innovation is delivering more 'plant-based meats' or similar alternatives.
Technological advancement	Plant-based systems are benefitting from advances in technology such as precision fertilisation, irrigation and pest spraying, in addition to automation in picking, sorting and packing. Plant species are also more favourable for achieving rapid genetic gain, empowering improved efficiencies, yields and other genetic innovation opportunities.
Cons	
Biodiversity loss	Farming systems for plants generally have much lower biodiversity than animal agriculture systems and most plant-based foods come from extensive mono-culture systems.
Limited land-use options	Plant-based foods require specific land types to be cultivated or capital-intensive technological systems which are barriers to enhancing food security for a growing world population.
Reduced bioavailability of nutrients	Plant-based foods generally contain 'antinutrients' which can make the uptake of nutrients such as calcium more difficult for the body to absorb. Individual plants also have 'incomplete' amino acid profiles, lacking essential amino acids.
High use of fertiliser, pesticides	Plant cultivation is generally associated with a very high rate of fertiliser and pesticides at a much greater rate than animal agriculture, with associated impacts on health and environment that are often lesser known by consumers.

Changing the equation?

Consumers use knowledge of well-established variables to make their food choices, enabling their eating decisions to reflect both their needs and their values. For all of history, producing animal-based nutrition has relied on live animals, and plant-based nutrition has relied on suitable climatic environments. Emerging technologies have the potential to fundamentally change the foundation of these food choices.

Vertical farming. Technological and biological innovations are accelerating opportunities to produce plants in urban areas which are closer to the consumer. Vertical farming operations, particularly when supported by renewable energy, can provide efficient plant-based food production opportunities regardless of location and land quality.

Cultured meat. Technological and biological innovations are accelerating opportunities to produce and grow animal cells in production facilities without the need for animal slaughter. This retains the various benefits of animal-based foods with potential to reduce or eliminate animal welfare, safety, and environmental issues.

Pros	
High nutritional content	Not only do meat and dairy products have a high percentage of protein, the protein available in meat has a higher human digestibility (measured using the DIAAS method) and consists of more complete amino acid profiles than plant-based proteins.
Land-use efficiency	Animal-based production in New Zealand generally occurs on lower class land, not suitable for horticultural production, and technology such as precision farming continues to improve efficiency. 7.5 million hectares of New Zealand farming land is in grassland, and just 1.6 million is suitable for plant cultivation. Animal-based agriculture delivers the benefits of high-quality nutrition with low comparative environmental footprint per unit of nutrition.
Animal welfare enhancement	Integration of animal welfare frameworks including the five freedoms and related legislation in the Animal Welfare Act means that animals raised on New Zealand farms have strict ethical and welfare requirements with a sector focus on reducing pain and stress and maximising care and natural fulfilment.
Taste, texture and tradition	The composition of meat and dairy products are strongly aligned with human taste preferences with unique flavour and texture profiles which are difficult to replicate and have been an integral component of diets for a significant population over hundreds of thousands of years.
Cons	
Animal death, perceived suffering	Animal lives are restricted by human requirements to follow defined farming system regimes, and ultimately animals are killed for consumption and/or as part of breeding programmes.
Environmental impact	Animals produce concentrated quantities of nutrients in their excrement and release greenhouse gasses into the atmosphere through their digestive systems which can be associated with soil and water pollution as well as climate change.
Health concerns	Excessive consumption of red meat is linked with higher risks of major non-communicable diseases such as cardiovascular diseases and related cancers, particularly when highly processed.
Use of antibiotics and pesticides	Animal agriculture is often associated with some use of antibiotics, foliar or soil weed spraying and pesticide use of which residues can remain in the environment and the human food chain.

Drivers of animal-based food consumption

While two thirds of Americans say they are eating less of at least one meat, the US also tops annual meat consumption at over 100kg per person.

Consumption in 2020 was particularly high, with Europe following a similar trend. There's a strong relationship between meat consumption and wealth. Meat consumption in China has grown from less than 5kg per year per person in 1960, to 20kg in the 80s to over 60kg today. Similar trends have been noted in Brazil.

With countries such as Ethiopia, Rwanda and Nigeria eating just 7kg, 8kg and 9kg per person respectively and the world's population and wealth continuing to grow, there is potential for global animal-based food consumption to expand rapidly for decades.

Eating for planetary and human heath

The rise of the conscious consumer – defined by their demand for ethical, environmentally sound, and healthy food – is often cited as a key driver in the transition to a more sustainable food system.

In practice, 'eating sustainably' means a wide variety of things to Kiwis. Future food strategist, Dr Rosie Bosworth from Auckland University, says that millennials and youth are very aware of the higher climate and environmental impacts of livestock, relative to plant-based foods, and are adjusting their diets accordingly. Indeed, over one in ten Kiwis are now vegetarian or mostly avoid meat, and schools have started to educate children on how to replace animal with plant proteins. Meanwhile, the regenerative farming movement in New Zealand is enabling consumers to access meat and dairy with nature positive impacts; the consumption of organic foods (with no synthetic chemical inputs) is on the rise; and interest is growing in the ethics of production from farm to fork.

This trend is positive – not only for the planet, but also for human health. Evidence for living a full and active life with minimum ill health points to a plant-heavy diet, with lots of variety, and smaller amounts of animal proteins than we have traditionally eaten. Who gets to partakes in this trend, however, raises interesting questions of equity.

Fruits, vegetables and good quality meat and dairy are not cheap in New Zealand. Organic produce is even more expensive. For Kiwis at the lower end of the socio-economic spectrum, these foods are perceived as inaccessible. Rather, foods that are low in nutrients but energy dense, such as takeaways, processed breads and biscuits mean "money goes further and feed[s] more people". The result of eating too much of what is bad, and too little of what is good, for one's health creates a close link between poor health outcomes and food insecurity. The latter, defined as insufficient access to sufficient quantities of nutritious food to lead an active, healthy life, affects an unacceptably high number of Kiwis; one in five Kiwi children live in households with severe to moderate food insecurity.

While the drivers of food insecurity are complex and multifaceted, the problem is largely one of purchasing power. In the context of a housing crisis and rising rents (meaning less disposable income to spend on food), increasingly precarious jobs, and shocks from Covid-19, it is little surprise that food insecurity is on the rise around the world. This not so positive trend for those at the lower end of the wealth spectrum sits in sharp contrast to the conscious consumer; a number of negative impacts flow from food insecurity, including obesity-related non-communicable diseases such as diabetes and heart disease, stress, pressure to work multiple jobs, reduced ability to concentrate and poorer education and employment outcomes.

From the outside, it is easy to assume that people who are food insecure do not have the time or headspace to eat well, let alone to eat for planetary health. Statistics reflect this conclusion. Māori and Pasifika people, for instance, have significantly lower incomes and assets bases relative to Pakeha, and are disproportionally affected by obesity associated with poor diets; 47.9 per cent of the Māori population is classified as obese (compared to one in three adult New Zealanders), and this and this percentage is even higher for New Zealand-based Pasifika.

Rangimarie Price, former CE of Transforming Te Tai Tokerau for Good, notes that "poor health outcomes for indigenous peoples are a legacy of historical trauma", but cautions "numbers do not tell a full tale". According to Rangimarie, many Māori harbour a strong desire for whenua ūkaipō – connection to the land and the natural environment as a source of nourishment and belonging. Such connection is challenging in the context of an economic system that is governed predominantly by western values; competition, scarcity and extraction are poles apart from Te Ao Māori values that prioritise sharing, abundance, and reciprocity.

Many local Maraes are taking a stand to restore Te Ao Māori values, by enabling Māori to access to food that nurtures both whānau and whenua. Pā to Plate, for example, is a recently established social enterprise in Te Tai Tokerau that grows produce on Māori land to meet community-wide needs for affordable and nutritious food. Initiated by Professor Merata Kawharu as part of the Mauri Whenua Ora programme in 2017, it is a truly Māori-led initiative. Around 200 mana whenua and locals were engaged to ascertain how they'd like to redesign their local food system. As a result, Pā to Plate delivers multiple layers of value: food is produced to maintain and regenerate soil fertility; it creates

jobs for Māori; and produce grown at the Marae is distributed to the majority of its extended whānau who are connected to it, but no longer live close by. Ultimately, Pā to Plate aspires to build physical, emotional, cultural and economic connections between descendants and their land.

Pā to Plate is not alone in this endeavour. While there is little published research on the extent of Marae and Māori-led initiatives seeking to reclaim a sense of ūkaipō, a review of each region in New Zealand reveals at least one, and more often than not multiple initiatives – each working to improve the health and vitality of Māori, in ways that makes sense to their own worldviews and value sets.

Beyond Māori-led initiatives, a number of alternative food systems are popping up throughout New Zealand that hold potential to enable more consumers to participate in a food system that is not just healthy and sustainable – but also equitable. A promising example is the market garden model. In contrast to community gardens, a model that provides space for urban-residents to grow their own food, market gardens are run by serious growers with the intention of sustainably maximising output to feed local populations well.

Tim Bowater, founding member the Urban Farmers Alliance, an umbrella group of pioneering market gardeners, has observed that the model appeals to a broad range of consumers; "people want to know where their food comes from, and that it has positive, rather than degenerative impacts". The model is financially sustainable due to increasing demand from wealthier consumers, including restaurants, for local produce, and this allows greater freedom to pursue a social equity agenda. These encompass donations or cheaply priced vegetables, community composting, cooking classes, and education on healthy eating in schools. Tim sees "accessibility elements" in particular as core to the model; "the goal is to overcome the absurd reality that our current food system produces enough healthy food to feed 40 million abroad… but it's failing to feed its own 5 million."

To expand accessibility to a diet that serves both planetary and human health, Tim challenges large corporations to ground corporate social responsibility in place; "local market gardens need support to become financially sustainable, so that they can maximise positive impacts to community health and wellbeing". Beyond start-up finance, support can take the form of pro-bono business advice, building guaranteed food-procurement networks, and, at the upper end of the scale, donating underutilised land to the cause.

Jayden Klinac, Founder of For the Better Good, sees access to land as the biggest barrier to realising the full potential of market gardens. His newest initiative, Edible Earth, has recently secured land (free of charge) from Wellington Airport to trial market gardening at scale. The plan is to replicate and expand existing smaller-scale experiment: a Wellington bowling green turned regenerative urban farm that now feeds 400 households, educates parents and children on how to grow and cook vegetables, and has (in its first 12-months of operation) diverted 35,000 kilograms of waste from landfill.

Lucie Greenwood
Senior Advisor

We've captured the insights of the following experts to inform this piece: **Rangimarie Price**, former chief executive for Te Tai Tokerau iwi leaders' group, Amokura Iwi Consortium and also Tai Tokerau Education Trust; **Tim Bowater**, Co-Founder of the Urban Farmers Alliance; and **Jayden Kilnac**, Founder and CEO of For the Better Good and Edible Earth.

Similar to Māori-led initiatives, market gardens are unresearched and poorly understood. Both, however, provide viable working solutions to the challenges of food insecurity, sustainability and climate change. In addition to corporates stepping-up to support their communities, our government should equally perform a supporting role. Many of the ends that alternative food systems aim for align directly with its bolder ambitions. For instance, lifting Māori and Pasifika opportunities, reducing child poverty and improving child wellbeing, improved mental and physical health, and transition to a more sustainable and low carbon economy.

With the right support – to experiment, validate intended outcomes, and learn from mistakes – alternative food systems could prove natural allies to achieve these goals.

In turn, they could give power to communities to design food systems on their own terms, in the process enabling consumers from across the wealth divide to play a valuable role in supporting their own, the planet's, and future generations' health.


ORGANIC
TASTY DOUGHNUT
MIXED
life flavors

The next normal

The next normal

CONTENTS

The mega-themes shaping our world today

Since 2014, the Agribusiness Agenda has periodically provided perspectives on the mega-forces shaping the future of the planet, everything that lives on it and the global food system.

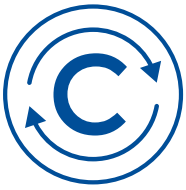
While we had identified the important role that the adoption of preventative healthcare will play in securing a prosperous and equitable future for society, we had not included the impact that a global zoonotic pandemic would have in accelerating transformational change across society.

The last year has demonstrated that change can happen quickly when there is no other choice. The fact that so much of what we consider inherent to everyday life – the ability to travel, the ability to connect with family and friends, the availability of options around how we spend our time and money – was curtailed or lost meant that change became a necessity for survival.

While much of the change experienced was forced by circumstances, in hindsight a lot of change has been guided by a recognition that the mega-forces shaping our lives will continue to shape the future as we adapt and learn to live with Covid-19.

When we last updated our mega-force analysis in 2019, we identified 17 megatrends grouped under five broad headings (the mega mega-forces; challenging the global status quo; future world citizens; empowering infrastructure; and seeking indefinite sustainable living). Mega-forces arise in response to the major risks that society is faced with. The last year has demonstrated that risks do not exist in isolation and are not static; they continually evolve, and outcomes can vary dramatically when risks interact with each other.

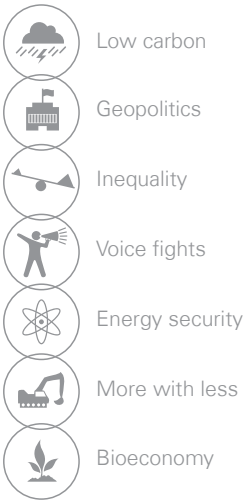
While each of the 17 trends identified in 2019 remain relevant today, the collision of risks that has occurred in response to the pandemic means that there has also been a collision of megatrends and we have simplified our analysis to six key global mega-themes, as well as one unique to New Zealand, that to us articulate the key drivers that are shaping the world we live in today and are likely to do so for years, if not decades, to come.



Equitable decarbonisation

Although the pandemic distracted media focus from the pressing challenges climate change presents global society, accelerating the speed of transition towards a lower carbon future has only become more critical as the consequences of a warming planet become apparent. While alignment between governments, business and civil society about the need to accelerate the equitable decarbonisation has never been greater, the perspectives on how this should be achieved are increasingly diverse and competition for resources to facilitate action appear likely to trigger new 'commodity conflicts'. The risk of populist movements arising amongst those displaced by climate transition (think those working in fossil fuels or, potentially, animal proteins) highlights the need to think carefully and act sensitively while still moving at the pace required to constrain warming to less than 1.5 degrees.

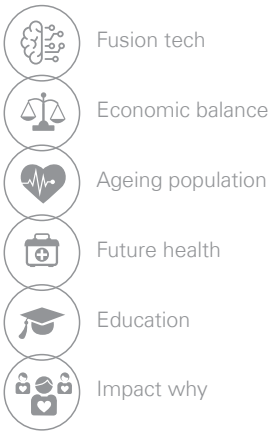
2019 GLOBAL MEGATRENDS COLLIDING

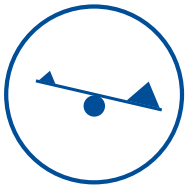


Reimagining healthcare

The pandemic has highlighted that traditional curative healthcare systems have clear limits; to function they require continuously spiralling investment in people and infrastructure while delivering outcomes that limit life expectancy and experience for many. A reimagined healthcare system will rise from the pandemic, one based on preventing people getting sick in the first place. A more holistic and proactive approach to care, drawing on tools including lifestyle incentives, digital primary care and food as a prescription, to tackle the non-communicable disease issues our lifestyles have created head on. This will free medical professionals to focus their time and effort on caring for the most vulnerable members of our communities.

2019 GLOBAL MEGATRENDS COLLIDING

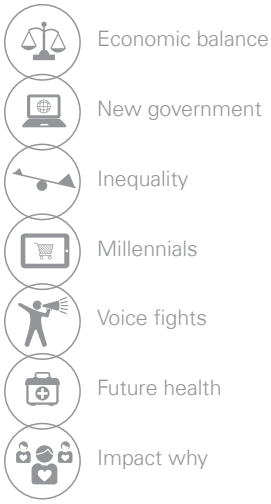




Inequity falls on everybody

One of the most dramatic changes of the last two years has been growing recognition and understanding of the extent of structural inequity across global society. It is also being more widely acknowledged that addressing these issues is not the sole responsibility of governments. The pandemic and the Black Lives Matter movement have in the last year challenged organisations to work out how they become part of the solution to these structural problems, they have recognised that if they are not part of the solution they are inherently part of the problem. Becoming part of the solution requires organisations to become very clear on their purpose and then implement measurement tools, beyond financial return, to track their progress on delivering against their purpose.

2019 GLOBAL MEGATRENDS COLLIDING



Geopolitical instability

Governments placing explicit priority on national interests over the collective good of the global community has been a defining feature of the pandemic and has accelerated a trend away from globalisation which had emerged over the last five years. Whether it be China's increased willingness to exercise global influence, 'post-Trump' America seeking to retake its place at the top table, the Middle East defining its role in a decarbonising world or Europe coming to terms with Brexit being a reality, much of what has been certain for decades is up for reassessment. Political and trade tensions are stretching existing alliances and forcing organisations to allow for widespread geopolitical uncertainty when assessing risk and planning for the future at higher levels than we have seen since the end of World War 2.

2019 GLOBAL MEGATRENDS COLLIDING

- Low carbon
- Geopolitics
- New government
- Data platforms
- Energy security

Data sovereignty

The exponential lift in the utilisation of digital technologies in the last year has been well documented. It has unlocked a wealth of new business model opportunities. Taking advantage of these opportunities relies on access to data – a lot of data. There is growing recognition amongst sovereign governments of the strategic importance of data to their national security and domestic economic prosperity. Consequently, at a time when organisations globally are seeking greater access to the world's data lakes, many governments are thinking about how they draw borders around their national data assets and manage access to protect their national interests. How this plays out will become clearer over time, but it appears likely that access to strategically important data will become more challenging, increasing the likelihood and severity of cyber confrontations.

2019 GLOBAL MEGATRENDS COLLIDING

- Fusion tech
- Geopolitics
- New government
- Millennials
- Education
- Data platforms

Informed consumers purge secrets

The digital native expects to be able to access information they need instantaneously. As people that are inherently comfortable with technology become the dominant consumer group globally, it should be assumed that every aspect of a business will be open to analysis and assessment by consumers. Well-informed consumers make it hard for organisations to keep skeletons in the closet. We are moving towards a society where secrets become ticking social media timebombs. The smart response is for organisations to take a lead in transparent, balanced reporting of all aspects of their activities, building trust by acknowledging where they need to improve and the steps that they are already taking.

2019 GLOBAL MEGATRENDS COLLIDING

- Fusion tech
- New government
- Millennials
- Urban dwellers
- Voice fights
- Data platforms
- Impact why

New Zealand specific mega-theme
The recognition of indigenous wisdom

The constant search for how a small country at the bottom of the South Pacific stands out in a volatile, uncertain, complex and ambiguous world has gained pace as we look to recover from the pandemic. The answer appears to have been with us all along, but too many of us have never taken the time to listen, learn and engage with the Te Ao Māori and its ability to connect the natural and spiritual world with the outcomes we seek for our environment, our communities and our whenau. Growing recognition that the wisdom inherent within Te Ao Māori is New Zealand's unique superpower means that significant effort and engagement is needed. Moving from tokenistic consultation and appropriation of words of cultural taonga (without adoption of the spiritual substance) to substantively embedding a Māori worldview into our day-to-day activities will allow us to truly capture the unique value of our indigenous wisdom in how we engage with each other and the world.

2019 GLOBAL MEGATRENDS COLLIDING

- Economic balance
- Inequality
- Education
- More with less
- Impact why
- Bioeconomy

Te Parapara Māori Garden, photo by Larry Koester, Flickr

Future of nutrition & alternative food systems

Jack Keeys
Manager,
KPMG Propagate
Agri-food Research
& Insights

We've captured the insights of the following experts to inform this piece: **Arama Kukutai**, Partner and Co-Founder Finistere Ventures, U.S; **Quinault Childs**, Research Director, Institute for the Future, U.S; **Damien Mcloughlin**, Professor UCD Michael Smurfit Graduate Business School, Ireland; **Sebastiaan Schreijen**, Rabobank Senior Analyst Consumer Foods, Netherlands; **Olivia Ogilive**, Postdoctoral Fellow University of Canterbury, NZ; **Volker Kuntzsch**, CEO Cawthron Research Institute, NZ; **Dennis Hucker**, Co-Founder Prescient Nutrition, NZ; **David Farquhar**, Managing Director, Intelligent Growth Solutions, UK; and **Abby Thompson**, CEO FoodHQ, NZ.

Nutrition

What will we eat in the future? Will our diets comprise of ultra-fresh locally-produced foods, grown and served at a community level? Will we be nourished solely by ultra-processed smoothies and 3D printed pills automatically served in our bedrooms? Some combination of the above, or something entirely different?

Technically there are many potential food and nutrition futures, depending on technological advancements, regulatory environments and, perhaps most impactful, public pressure and consumer demand.

Speaking to experts from New Zealand and around the world reveals some strong trends across technology, health and the consumer. These insights explore the most probable themes in our world's food and nutrition system as we look forward to 2040.

There are three core themes: Health Nutrition, Alternative Nutrition and Personalised Nutrition, which cover why consumers will choose particular nutrition options, what future nutrition options may look like, and how future nutrition may be delivered and consumed. We then discuss the alternative food systems which may feed us in the future.

Health nutrition

By 2040 our experts suggested that the primary driver of decision-making will be individual health for food purchases.

Nutritional education and demand

The direct link between nutrition and health, with its complex interactions, has become increasingly well understood both by the scientific community and the general public. The public engagement with food science and nutrition, particularly in relation to immunity, has experienced an acceleration due to the Covid-19 pandemic; however, the trend had already been growing fast.

Not only are consumers tracking their macro-nutrient intake on mobile apps and educating themselves on a variety of dietary options (despite varied scientific evidence) such as keto, fasting and Paleo, they're now often seeking pre-biotics and pro-biotics for gut health, or vitamins and antioxidants for immunity. 31% of consumers worldwide report buying more products tailored to their health, 50% prefer to buy products that naturally contain beneficial ingredients, and 54% claim to have educated themselves on ingredients and foods to boost their immune health. Continuing this trend, decisions on dietary intake will become inextricably linked with health.

Consumer education is generally not the bottleneck to healthy eating, with dietary guidelines easily available and understandable in most countries of the world. It is the application of our improved knowledge, promoted by changing consumer intention which will shift purchasing decisions.

Further advances in scientific knowledge and targeted individual consumer education will demand products that highlight health important properties and the implications for both short-term and long-term health.

B2D

In 2014 Zespri achieved the first health claim for a whole fruit in the world with the Zespri green kiwifruit and its contribution to supporting human bowel function. In addition to targeting consumers with foods on a health basis, examples such as this will present an entirely new business model and pathway to market as 'B2D' or Business to Doctor. The number of registered dieticians has been growing worldwide, with over 20 countries (including New Zealand) now having more than 1 registered dietician for every 10,000 of population.

The consumer pathway of directly prescribed foods and diets will have a considerably greater role in dictating food purchasing decisions over the next two decades.

More targeted food production

Not only does a shift to health nutrition influence the food processor, marketer and the customer, but also the producer. Majority of primary food producers across the world are paid based on the volume or weight of their produce. As the consumer shifts to demand products based on nutrition, the producer will be incentivised, or even required to shift to production focused on nutrition. The payment for milk fat and protein in the New Zealand dairy industry and sugar content in kiwifruit are early examples of this transition, and future producers will increasingly be paid based on the complete nutritional density of their produce. This delivers business opportunities to farmers, growers, and supporting organisations which provide products to enable nutrition focused production.

The health trend is also likely to accelerate the uptake of technology such as gene editing to enable producers to deliver more nutritionally dense produce.

Alternative nutrition

Nutrition derived from new or alternative sources has dominated headlines and innovation investment over the past few years and has continued to accelerate through the Covid-19 pandemic.

The popularised umbrella term is 'alternative proteins' which includes plant-based meat substitute products, cellular agriculture, and other novel foods. However, this will rapidly evolve to alternative nutrition as researchers and businesses extend into solutions that solve the more complex nutritional requirements of the human body beyond more simple protein requirements.

Plant-based

Of the different forms of alternative nutrition, plant-based proteins have delivered the highest growth in both investment and customer market share with a global value of US$10.3 billion in 2020 and a forecast compound annual growth rate of 7.1%, reaching US$14.5 billion in 2025. This is supported by strong drivers such as wide consumer acceptance of plants as a base food source, the association of plant-based foods with being 'healthy' and a wide variety of different plant species offering a range of nutritional benefits beyond protein content. The forecasted growth is further enabled by the sustained increase in primary produce volumes both through precision agriculture and production methods. Maturation of the plant-based food sector will also see meals evolve from a current emphasis on replacing meat components, to developing unique and complete plant-based meals.

Cellular agriculture

Lab meat, cell-based proteins or cultured nutrition refer to the process of growing animal products directly from animal cells. These products came from the use of biotechnology and tissue engineering to replicate cells in a controlled environment using a combination of nutrient and energy sources. Investment in this area has grown exponentially, with over $US1 billion invested to date. The potential advantages of cellular nutrition over traditional agriculture is the reduction or total removal of animal slaughter, the controlled production environment, and the scalable potential of the technology. As the technology progresses, so do the nutrition applications such as the potential for cultivating novel meat types that target specific texture, flavor and nutritional composition, growing meat from rare or exotic animals, and making high-quality protein production available in food-scarce geographies or urban environments.

Meat is a nutritionally dense and biologically complex product due to a combination of its composition, structure and eating qualities. These characteristics of meat make it a challenging product to replicate through cellular agriculture; however, significant investment is accelerating progress.

Dairy products are generally less complex, comprised of a select number of proteins and fats, which we often isolate into its individual components through our own processing facilities in New Zealand and then sell (e.g. selling 100% whey).

Despite the reduced complexity and relative simplicity in replication, dairy has currently received lower levels of international investment. It is, however, still increasing in scale, with cultured dairy company Perfect Day in the US recently increasing its total investment raise to US$300 million in July 2020, amongst other emerging businesses seeking to disrupt the dairy sector.

Other novel foods

Insect proteins, algae cultivation, and even 'air protein' are amongst other accelerating or leading-edge technologies with active research and investment from around the world. The world's largest insect farm is due to be opened by French firm Ynsect in early 2022 after raising US$372 million and is expected to produce 100,000 tonnes of insects per year in a climate-positive business structure. Algae products with a protein content of 40-60% and numerous potential active ingredients, vitamins and minerals are expected to grow to US$1 billion by 2026. Even start-up Air protein, which creates food from carbon dioxide in the air utilising microbial fermentation, raised US$32 million in January 2021, pushing the limits of our traditional concepts of food sources. These examples demonstrate both the appetite for investment in nutritional alternatives, in a push towards the goal of feeding sustainable nutrition to a growing global population, and the numerous disruptive innovations that will be fighting for a share of the consumers' wallet by 2040.

Personalised nutrition

From the shows we're recommended on Netflix to the adverts we receive on social media, the world around us continues to become more customised to suit our individual preferences and requirements, often through the passive collection of data.

The world of food is no different. Food is something individuals have long customised by themselves based on preferred combinations, flavours, brands, ingredients, dietary requirements and experiences. However, this manual, labour-intensive and time-consuming version of personalised nutrition will quickly evolve and be disrupted. The demands on time and a desire for improved convenience will continue to grow. It is from these pressures that businesses like MyFoodBag and HelloFresh have evolved, an early step in a personalised nutrition journey that saves shopping, decision making and recipe searching. But what's next, and what are the consequences for our food producers and consumers?

Integrated health, taste and other preferences

Supermarkets sell ingredients, but consumers want to buy solutions.

While consumers have long been able to personalise their own diets through selections in the supermarket and their preparation preferences in the kitchen, the food sector has been slow to innovate further in this space. The consumers of 2040 will demand personalised foods that are not only customised to their individual health, lifestyle and goals, but also to their preferences in tastes, textures and food formats. Over the coming two decades, leading-edge businesses will progress on their journey of offering affluent consumers the next level of personalised nutrition. Picture this: A consumer who has completed a DNA swab test to understand the nutrition recommendations best matched to their personal genetics, a consumer who has recorded their ethical and environmental preferences and a consumer who has an embedded or wearable tracker that provides real-time data on current nutrition requirements in their body based on blood readings, immunological status, recent exercise and various other inputs. That combined data could be automatically transferred to home devices that order, mix and/or print nutrition in the form of beverages or pills. Solutions will be convenient, matched to individual taste preferences, and provide exact nutrition.

Humans require short-term feedback loops, which is why we see consumers making consumption decisions which provide a short-term reward due to pleasurable tastes or experience but may take months or years off of the end of their lives.

As the collection and integration of individual data into insightful information becomes more available, so too will the immediate bodily consequences of consumption habits, as readings of data such as blood glucose, liver function and fat percentages become more readily available to track health.

Purchasing habits

As the growth in online shopping accelerates, so does the dominance of algorithms in learning our preferences, presenting our product options, and making the shopping experience both simpler and more convenient. The current physical supermarket has in-store differentiation for approximately 10 different consumer groups, based on characteristics such as gluten free, sports products and organic ranges. However, across more targeted characteristics such as age differences, allergies and intolerances, and health and weight status, there are already personal markers available for over 100 target groups – these just don't fit in the physical supermarket. They do,

however, fit online. With supermarkets generally consisting of up to 35,000 SKU's, the average person uses about 300 – or 1% – of those available. As online platforms dominate food purchases, embedded algorithms will present consumers with the products that match their preferences. With this technology, the decision to buy shifts from the belly to the brain. Loyalty shifts from brands to platforms, concentrated on those with which we share our data and double as the platforms that present us with refined purchasing options.

Food products will become a type of 'lego block'. Algorithms supported by consumer information will determine which blocks are suitable options and then build the diet that matches an individual's requirements.

This presents a shift in both marketing and product development for food companies, as factors such as ethical and environmental status dictate whether a product is even presented to a consumer, and nutritional composition becomes a stronger decision-making variable when integrated with price.

As the megathemes accelerate, the pace of change in food moves faster than ever before. How might New Zealand's own food and fibre sector evolve?

With external pressures of consumer perceptions, the environment and global competition, it is almost guaranteed that if New Zealand still has a place in the world food system in 2040, it will look quite different than it does today. Here we explore some potential alternative future food systems that could become critical elements of our future food and fibre sector, and we outline opportunities and actions for New Zealand across these areas.

Opportunities of the ocean

New Zealand's Exclusive Economic Zone (area within which the country has sovereign right) is over 4 million square kilometers, or 15 times the country's land area and the fourth largest in the world.

Therefore, the fact that this Opportunities of the Ocean piece is a relatively short section rather than a significant or even dominant portion of our agenda is an indication that New Zealand has yet to recognise the potential of this natural resource. Seafood and aquaculture exports are valued at $2 billion, or 2.8% of New Zealand's total exports, compared with land-based food and fibre exports at around 65%.

Sustainable seafood

In 2020 global research showed that 88% of consumers want better sustainability information to inform seafood purchasing decisions and 37% are willing to switch or pay for brands and products that protect ocean ecosystems.

New Zealand launched a Quota Management System for its fisheries in 1986, and had the first major fishery to be certified as sustainable by the Marine Stewardship Council for its hoki fisheries. Currently 90.9% of commercially caught fish in New Zealand comes from fish stock that are above their 'soft limit' for overfishing, and 82% are scientifically evaluated to have no sustainability risks. This provides an excellent foundation for New Zealand to be using the right pricing models to achieve premium prices on our seafood.

However, even with New Zealand's strong sustainability credentials on a global scale, there is a limit on scalability of wild-caught fish.

Fish aquaculture provides much greater scalable opportunities. The aquaculture industry is in the process of launching its own new sustainability standard called A+, and investment in research is leading to international breakthroughs. A recent example includes Plant and Food Research's 'mobile farm' which is developing farming systems that can move around the ocean autonomously to optimise for temperatures, currents and water quality as conditions change through the year.

New Zealand is in an excellent position to develop a wild-caught fisheries and fish aquaculture sector that is world-leading in both sustainability and technology. New Zealand also has several competitive advantages to leverage from including the vast ocean area, sustainability management, scientific and technology expertise, and anticipated resilience to warming oceans (diversity of fish species seeking cooler New Zealand waters is actually expected to increase).

Integrating land & sea

One key requirement for opportunities of the ocean to be maximised is to ensure that we integrate thinking between land and sea farming systems. The New Zealand native seaweed Asparagopsis armata is a current example. A 0.5% inclusion of Asparagopsis in the diet of dairy cows is claimed to reduce methane production by 95% while having little to no effect on animals and production. This highlights an opportunity to utilise ocean resource for decreasing the green house gas emissions of animal agriculture. However, it is also important to make sure the massive potential of the sea isn't all spent on solving old problems of the land, instead of creating solutions in the form of new high value food system opportunities.

One example of this is Karengo, a group of edible seaweeds that have been used by Māori as a traditional food source and currently part of the High-Value Nutrition programme exploring the commercial opportunities for its micronutrient, unique fat and other nutritional properties.

Other Aquaculture

Algae Aquaculture holds potential value as both a food source and for carbon capture. Similar to the existing process of growing trees for carbon on land, the ocean can be used to farm large volumes of sea weed that grow rapidly and store a high concentration of carbon. This carbon-rich biomass can then be 'dumped' into the deep ocean as a carbon sink. The production system has the additional benefit of acting as a fisheries nursery during its cultivation.

Shellfish open ocean towers are another example of systems which can grow a variety of shellfish, are placed in the open ocean and are able to cultivate high value foods. Investment in these systems can protect stocks of wild harvest and enable scalability.

Actions

The value of every cubic metre of ocean should be assessed for its highest possible value use, similarly to how our land classes are structured. This means first and foremost protecting ecologically important marine areas, and then understanding those areas that are suitable for integrating with high-value commercial activity. Understanding our portfolio of possibilities for protein replacements, novel nutrition and even pharmaceutical products and production systems then enables an effective ocean strategy to be developed for the country.

Vertical farming

The world has pushed cultivatable land area for the production of plants to the limit with 1.57 billion hectares of cropland worldwide, up 12% or 160 million hectares in the past four decades.

There is extremely limited land availability for future expansion without further deforestation or ecosystem destruction. One solution to the need for more food must be increasing yields from existing land and traditional agricultural practices with advancements in precision digital farming in developed nations, and improved education in developing nations. However, another innovation solution is the acceleration of modern controlled cropping systems which will increasingly allow a wide range of plant based products to be grown in intensive systems close to the consumers that will ultimately eat the products.

In recent years there has been significant investment into vertical farming systems, with solutions being developed that can be scaled to match the size of the market opportunity. The smallest systems can fit within a supermarket to enable customers to 'pick their own' produce through to large scale systems that deploy advanced LED lighting technologies, AI based environmental control systems (that combine light, heat, water and nutrients to precisely manage weather recipes for particular products) and connections to automated harvesting and distribution platforms. Vertical farming systems offer: the ability to protect crops against the weather, pests and disease without resorting to sprays; reduce labour requirements; use a smaller land footprint which enables them to be much closer to urban consumers; deploy crop management technology to optimise harvesting to maximise nutrition; and, potentially most importantly, lift yields many times on traditional farming systems through multiple crop cycles.

These technologies provide a platform for sustained and targeted future plant production and will become more widely adopted in major cities around the world. A great example is Singapore's 30x30 vision, which sees the city state seeking to reduce its dependence on food imports through growing 30% of the food it requires domestically by 2030. This bold ambition will require the deployment of vertical farming systems in a range of different ways to lift the resilience of domestic food production. Early investments have seen a range of systems being supported for use in different ways, as part of community food hubs, on the roofs of high rise buildings and in farming clusters, to ensure space available on the island is maximised. It is also apparent that as new cities are being developed, for instance the proposed new capital for Indonesia, these systems are being integrated into city plans.

Actions

With New Zealand's very efficient and globally competitive horticulture sector, the economics for vertical farms replacing existing production are not as obvious, but there are other ways our producers can work with the technology. This could include the precision production of plant products for higher-value pharmaceutical, nutraceutical and cosmetic markets. We have the opportunity to integrate unique New Zealand flora into these systems, strengthen the connection to food amongst urban Kiwis, and add new experiences in retail and tourism. There is also the opportunity to license our IP to vertical farmers around the world to grow branded New Zealand products from which we can generate revenue without having to freight products to the world.

Selling farm-system packages

New Zealand can feed approximately 40 million people; however, this is in the context of a world where global population increased by over 81 million in 2020 alone.

With a push from volume to value and delivering high-quality foods to the world's most discerning consumers, we can improve economic returns from the 0.5% of the world's food that we produce. But how can we leverage our knowledge, skills and experience to empower impact across a much greater portion of the world's population?

We spoke with AgritechNZ CEO Brendan O'Connell on the opportunities to sell our systems as well as our food, as countries around the world chase improvements in food security and domestic food production. What could be seen by some food exporters as a threat may actually be a significant opportunity.

The maturity, co-ordination and professionalism of New Zealand's Agritech system is evolving rapidly, with the establishment of Agritech New Zealand, accelerators such as Sprout, and government support through the Industry Transformation Plan (ITP). The continued coherence of this ecosystem is critical in identifying complementary products and services that can be integrated in a collaborative systems package.

Farm systems structured as industiralised processes are already commercialised worldwide and particularly in sectors such as pork and poultry. As our food-producing systems in New Zealand become more developed and technologically connected, we are well positioned to complement these with our expertise and knowledge.

As a result, New Zealand has the opportunity to progress towards development and sale of Whole-System Packages that combine hardware, software and intellectual property (including genetics, processes and training) to assist food production around the world and significantly scale our impact on the global food system. This has the added benefit of earning export revenue not just for raw product, but for technology and information and/or royalties for its use.

New Zealand already has examples of similar approaches to parts of systems, such as the model implemented by Zespri for growing kiwifruit outside of New Zealand or the technograzing systems sold to beef and sheep pastoral farmers around the world, including the US and UK, for advanced rotational grazing.

However, we could sell genetics, virtual fencing, farm planning software, automated robotics, waste management, renewable energy, sensor technology, processing knowledge and marketing/brand platforms for a complete package.

To really leverage this opportunity, New Zealand must create the right education and training programmes, which would include an advanced course based on interdisciplinary skills and international business. This can be supplemented by 'importing' or partnering with international expertise.

Rather than provide just the high-valued physical food representing a 0.5% portion of the global diet, we could empower safe, sustainable and quality systems to feed many more, and empower improved global food security at the same time.

New Zealand's opportunities

There are 11 actionable insights that provide opportunities for individual New Zealand businesses and collaborative progress as a sector.

1. Emphasising product value propositions to be synonymous with health. Improving the health status of New Zealand's public is an important component of this to enable authentic and trusted international messaging.
2. Pioneering Food Business to Doctor models, where investment in health research and achieving medicinal claims can position New Zealand as a leader in the future B2D models.
3. Evolving and enhancing primary product payment systems to further incentivise a focus on quality nutritional content rather than yield.
4. Leverage our competitive advantages in existing plant cultivation, which includes natural resources, climate and intellectual property, and develop commercialisation opportunities for other native flora that can provide globally exclusive value propositions.
5. Embed mātauranga Māori knowledge and principles to be central within our production systems and products, not only for Te Tiriti o Waitangi requirements and product differentiation, but also to ensure concepts such as Tiaki and te Taiao – which are embraced by our sector – are used authentically and with complete commitment for long-term future social, environmental and economic success.
6. Develop innovative, integrated cellular agriculture business models with New Zealand meat producers that enable us to lead the world in the development and ownership of patented cell-lines that can be sold for royalties, and position us at the premium end of these technologies as they emerge to mainstream production.
7. Invest in renewable energy and energy storage to facilitate the emergence of energy-intensive future food production systems and incentivise international investment while empowering domestic innovation options.
8. Provide targeted investment to promising novel food applications in New Zealand, including the development of circular systems with the integration of insect proteins and waste streams which could even include indigenous insects such as Wētā in addition to research on commercial potential and characteristics of unique New Zealand algae, fungi and seaweeds.
9. Invest in information technology education for the existing workforce and the next generation of New Zealanders. Information Technology will be fundamental to every type of future food production system from traditional agriculture to automated lab-based production.

Results of a children's survey published by the Education Commission in 2020 showed the job goals of 7-13 year-old New Zealand children. The top five were Sportsperson (17.6%), Vet (6.3%), Police (5.3%), Teacher (4.9%), Social Media Influencer (4.7%). IT/ programmer came in at 0.5% despite the significant demand and career opportunities.

10. Develop new forms of business models that are structured to sell technology and intellectual property for food production systems and unique product attributes rather than simply selling physical food. Embrace scalable opportunities that empower international food security while providing economic return to New Zealand.
11. Ensure our food achieves the appropriate ethical and environmental accreditations to be 'on the web-page' as online shopping accelerates alongside the algorithms which dictate which products will be displayed. Build on this by ensuring our foods continue to evolve with science, and prove their nutritional quality which take them from the web-page to the online shopping cart as the products of choice.

Future New Zealand pastoral systems

Genevieve Steven
Farm Enterprise Consultant

We've captured the insights of the following experts to inform this piece: **Gwen Grelet**, Landcare Research; **Sam Lang**, Quorum Sense; **Brad Lake**, Tapapa NZ; and **Kate and David Acland**, Mt Somers Station.

A taste of the future

In the year 2040, New Zealand will be using high-tech yet natural farming systems. The meat and milk produced from these systems will be nutrient dense, carbon neutral, and beneficial to ecosystem health.

Pasture-based meat and milk will no longer be considered food but a premium form of natural medicine to nourish and treat the body.

All New Zealanders will enjoy locally produced medicinal meat and milk. Our community health will be significantly improved, with lower rates of non-communicable disease.

New Zealand will export our premium meat and milk to wealthy, conscientious consumers around the world who chose to feed their bodies with ethically and sustainably produced 'real' food that can be 100% traced to New Zealand farms. A true premium will be captured.

Forces shaping New Zealand pastoral systems

Five of the mega-themes shaping the world will influence New Zealand pastoral systems.

1 Re-imagining healthcare

There is a bright future ahead for pastoral systems in New Zealand supplying high quality, natural food to conscientious consumers. We will continue to excel at turning sunlight into protein and will employ technology to make further gains in efficiency. As the future of animal proteins in the human diet is being questioned in many countries, the debate has helped New Zealand to redefine the value proposition of our pasture-based milk and meat. Sustainably produced, nutrient dense, unprocessed meat and milk – eaten in moderation – are healthy and good for the body.

2 Inequity falls on everyone

In 2016, 89% of deaths in New Zealand were due to non-communicable diseases[1]. As a premium producer of food which is exported and consumed all over the world, the industry recognised how exposed it was to poor health outcomes in New Zealand. To ensure equality of access, functional and sustainable domestic supply chains are key to achieving nutritional equality in 2040.

3 Data sovereignty

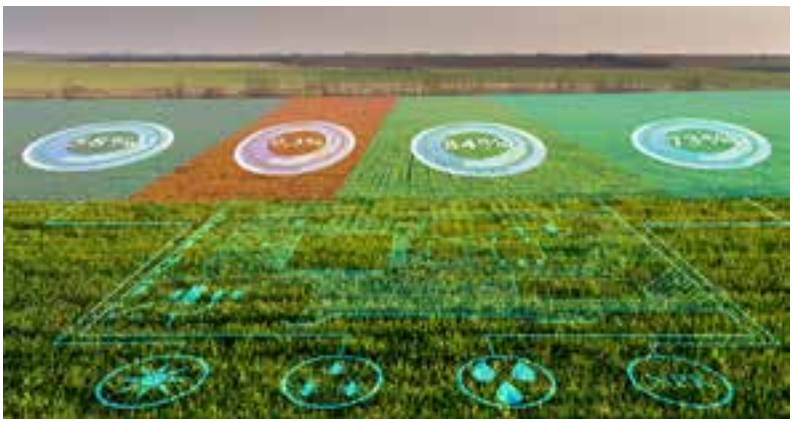
There is currently a large volume of data being collected on New Zealand farms to help farmers make well-informed, timely decisions and to uphold product assurances. This data is not yet being fully utilised to convey a unique production story to the consumer by 2040. Business leaders and farmers should perform due diligence over data ownership to enable it to be leveraged before committing to any trade deals/partnerships.

4 Informed consumers purge secrets

Digital natives will be the main consumers in 2040. They will be tech savvy and well accustomed to using data to make informed purchasing decisions. There is a huge opportunity for New Zealand to capture more value for our products by using data to convey a tailored story to those consumers, targeting their environmental conscience. At the same time, it is paramount that we achieve 100% product traceability and tell our production stories with honesty and integrity. A failure to do so will only send consumers the message that we have something to hide. This is particularly important when animal protein production is under scrutiny around the world and there is a lot of misinformation on social media – New Zealand has the opportunity to tell our truth.

5 The recognition of indigenous wisdom

As we strive towards New Zealand's climate and environmental goals, we are searching for solutions and new ideas that will help these be achieved. Regenerative agriculture is one of those ideas that is being explored as a solution. It is a holistic approach to managing eco-systems – some might even describe it as philosophical. So, what can be learnt from Te Ao Māori – the Māori worldview – that could be applied in our pastoral farming systems? What spiritual and natural teachings from Māori can be combined with the principles of regenerative agriculture?



Future New Zealand pastoral systems

The conversations with industry leaders highlighted three ways in which pastoral farming will change between now and 2040.

1 Digitisation of farming

We will become data farmers. Data will be key to the precision management of farms as well as the marketing of our products to create trust. The quality and health of data will be just as important as that of sheep and cattle.

Drones, remote monitoring and robotics will further change the way we farm, allowing for gains in efficiency to be made and time to be saved. Farms will change physically, with fences no longer required as devices like Halter collars become common place and stock can be shifted via an app. Drones will capture pasture cover levels, the metabolisable energy of feed, soil fertility and monitor weed and pest pressure. The potential is infinite!

Data will allow a unique profile to be built of an animal's nutrition, health and wellbeing, giving an overall picture of its quality of life. Technology will also capture information about the emissions profile of individual animals and the farm, the quality of water on the farm, the soil health, and the level of biodiversity on that property. These factors will all be overlaid and conveyed simply through a smart interface to give consumers confidence that they are making a food choice that is good for the planet and good for their personal nutrition.

Technology will allow 100% traceability and for unique provenance stories to be told and capitalised on, whether those be regional or Iwi. 100% traceability will back up the NZInc story, protecting and enhancing its integrity. Blockchain will play an important role in achieving this because the data cannot be corrupted.

All products will be sold under NZ brands and with nutritional accreditation. We will target conscientious consumers who understand the broader ecological impacts of consuming ethical and regeneratively produced food. Te Taiao becomes a globally recognised regenerative standard, making accredited farmers trusted producers.

A sustainable true premium will be paid by global consumers for ethically and regeneratively produced New Zealand products.

1. https://www.who.int/nmh/countries/nzl_en.pdf?ua=1

2 Regenerative farm ecosystems

Farms will be managed using the principals of regenerative agriculture to continue producing world-leading meat, milk and wool. Farms will be viewed as an eco system and holistically managed with a focus on soil, water, biodiversity and carbon. Farmers will have a deep knowledge of how these factors interact and be paid for the ecosystem services that they provide.

The focus will be on continuous improvement and striving for environmental excellence. New science and technology will enable a better understanding of how regenerative principles can be applied in a New Zealand context. Environmental excellence is not a static measure; it will continually move as the science community learns more.

The image below illustrates the future of regenerative pastoral farm systems.

Soil – farm systems will be designed with a core focus on soil health. Diverse plant species in combination with grazing animals will be used to cycle nutrients and protect and enhance soil carbon.

Agroforestry – agroforestry will reduce erosion and run-off of soil into waterways - pastoral land on rolling-moderate hill country will also be converted. The layering effect of trees, shrubs and diversified pastures will create a biodiverse micro-climate, that protects soil against the climatic extremes of flood and drought, reducing soil loss via erosion. Increased resilience to climatic extremes will result in productivity increases and better livestock performance due to reduced environmental stress. Widespread planting will provide shade and shelter for animals, addressing animal welfare concerns.

Biodiversity – corridors of planting, natives and exotics, will connect farms, districts and regions i.e. biodiversity can move across the Canterbury Plains and be connected between Banks Peninsula and the Alps. Biodiversity planning will happen at the catchment level.

Emissions – the emissions profile of all farms will be well understood and used to make on-farm decisions to keep improving. Farms will be capturing carbon and using this attribute to market products as climate positive. The first farm in New Zealand to become certified as carbon neutral was Lake Hawea Station in 2021. Farms will align with processor or marketer programmes to supply carbon neutral meat, milk and fibre to select customer groups.

Chemical inputs – more science will have been done to measure the ecological impacts of synthetic chemicals in New Zealand. Their use will be minimised as new biobased alternatives becomes available.

Water – waterways will be healthy and safe. Water will be the ultimate measure of ecosystem health as it is impacted by how land is managed.

Farmers will be recognised as guardians of land, with support and assistance.

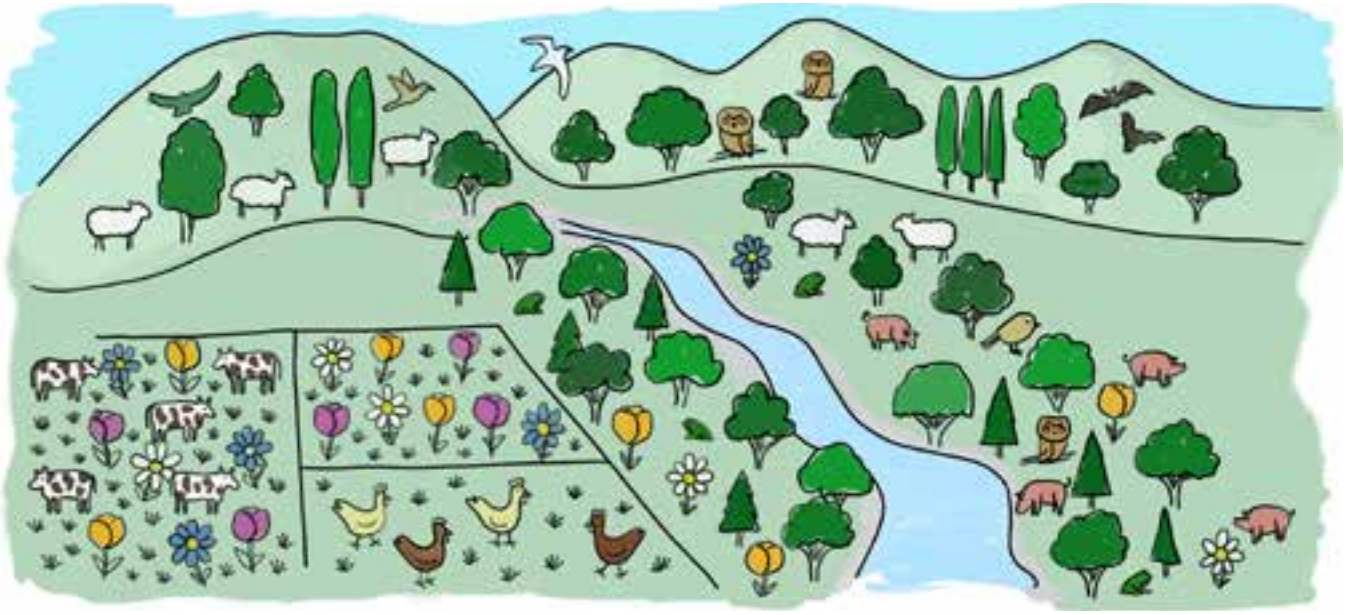
3 Diversified farm landscapes and integrated systems

Farm systems will comprise of diverse, complementary enterprises as well as being commercially viable. Enterprises will be matched to the environment, with full consideration given to how they can enhance healthy ecosystem function and support circular nutrient, carbon and energy transfer. For example:

Rolling hill country – the integration of sheep, cattle, deer, goats and birds (chickens, ducks etc.) with agroforestry.

Irrigated, flat land – the inclusion of novel plant protein crops such as hemp, lentils or oats, sheep milking and beef finishing.

Landscapes will be covered in diverse, strategically planted trees and shrubs managed for agroforestry. Larger trees will be planted on dryland areas, whilst irrigated land will be planted with smaller shrubs and trees which don't interfere with pivots. Widespread planting will be crucial for soil



preservation, protection from climatic extremes, and providing adequate shade and shelter for animals. Trees will provide an alternate source of income when specific species are harvested for a certain market e.g. native timbers for furniture making. Carbon credit and ecosystem service schemes will provide additional income streams for farmers.

The focus will shift away from individual farm plans towards district or regional plans whereby farmers and the community design them collectively.

Irrigation will be recognised as a valuable tool for building soil carbon and providing water security in a warming climate.

The role of GE is unclear, with some interviews seeing the potential for it to help New Zealand address its climate and environmental challenges and support low cost production. Whereas others held the opinion that if New Zealand were to employ GE technology then our products would no longer be natural and we would lose our point of difference, reflecting the range of views expressed by industry leaders.

More producers will supply their local towns with medicinal and ethical milk and meat. As a result of the re-localisation of supply chains, New Zealanders will be re-connected with local farmers and growers and have an understanding of how food is produced.

Food producers will be respected for their care of the land and for producing high quality, healthy and safe products for all New Zealanders.

Future farmers and owners

Livestock numbers will decrease in response to regulation to achieve climate goals. At the same time regulatory and compliance costs on farms will have increased, making it harder for small family farms to be viable. Whilst there is opportunity to capture more value for products, this will take time and not all businesses will be well positioned financially or have the right skill sets to do so.

As a result, the majority of land will be owned by Iwi, family corporates or private corporates. Land will be managed or leased by young, dynamic people with a broad skillset, with equal weighting of importance placed on production, environment and business.

In order for smaller family farms to remain viable, they will need to work collectively and pool resources to manage environmental and land management requirements.

Key take home actions for farmers

Get involved with a catchment group in your area to work collectively on environmental initiatives and to learn more about land use and business diversification options. Catchment groups are popping up around New Zealand currently. They are a constructive channel through which to influence environmental policy.

Thriving Southland is a fantastic example of catchment groups working together across Southland.

Learn more about the work of He Waka Eke Noa and the resources they have available to help farmers calculate the emissions profile of their farm. All farmers and growers are required to know the greenhouse gas 'numbers' for their farm by the end of 2022.

Make sure that all farm production information is being captured using a digital farm management tool. Having production information recorded digitally could enable exciting partnerships with premium payment opportunities.

Visit the Kiss the Ground website and watch the movie – it is free to access, or you can watch it on Netflix. This movie will help you to understand the market demands for regenerative produce.

Remain open-minded to new concepts, such as regenerative agriculture. Take the time to read publications in farming papers, attend events and talk to other farmers to learn more about what it is. 'Regeneration' is the language being used by customers around the world, therefore it is important that we don't shut it out and take the time to understand it and what it means in a New Zealand context.

Future bioproducts

Justine Fitzmaurice
Director

We've captured the insights of the following experts to inform this piece: **Dr. Florien Graichen**, Scion; **Dr. Trevor Stuthridge**, Agresearch; **Dr. Max Kennedy**, Ministry for Business, Innovation and Employment; **Wayne Mulligan**, Fomana Capital Limited; and **Anna Yallop** Bioresource Processing Alliance.

Introduction to bioproducts

Bioproducts, sometimes referred to as bio-based products, are products that are wholly or partly derived from materials of biological origin. Bioproducts are made from renewable raw materials, and in some, but not all, cases the products are biodegradable. Some examples of bioproducts are plastics, adhesives, packaging, construction materials and fuels.

Bioproducts have gained much interest because of the potential benefits they offer to our world. The European Biomass Industry Association describe the potential benefits as:

- Additional product functionality
- Reduced resource required for production
- Efficient use of natural resources
- Higher process efficiency meaning that less energy and water are required during production, with less toxic waste.
- Reduction of CO2 by using renewable raw materials
- Lower toxicity in end products.

Our interviewees for this section talked about their view of the current state of bioproducts in New Zealand, trends and challenges affecting this sector, and the opportunities that New Zealand could take to support a successful bioproducts sector.

Current situation

While bioproducts provide significant potential for New Zealand, and there is Research and Development (R&D) and investment happening in pockets, all interviewee agreed that the bioproducts sector in New Zealand is embryonic at this stage. Many companies are starting their journey with bioproducts, but they are typically early stage and the products are usually not mainstream for these companies yet. These companies often tend to focus on packaging, but there are many more applications that New Zealand could take advantage of.

Compared to the rest of the world, New Zealand is lagging behind. Demand for bioproducts is growing globally. Consumers are very interested in the ethical credentials of the products they buy. There is an expectation from consumers that products are environmentally friendly, and for many, multiple use of products is more desirable than biodegradable products.

New Zealand has natural advantages that would allow it to deliver to these consumer needs, but we are currently not taking the opportunities to position us well as leaders in bioproducts.

Trends

1 Recognition of indigenous wisdom

Linked to the mega-theme raised earlier, a consistent trend raised by interviewees was the strong alignment between Te Ao Māori worldview and the bioeconomy; long-term investment into our land and natural resources; value-based uses of our natural resources and providing a sustainable economic future for generations to come.

2 Different type of investor

Investors in bioproduct businesses see economic profit as only one dimension of their portfolio; sustainability is also a critical component. For some, investment horizons are expected and waiting for an economic return is acceptable if sustainability gains are delivered. Investors carry out rigorous due diligence on biobased claims to ensure they are true and accurate and this is expected to continue as the bioeconomy grows.

3 Focus on functionality

Combining different raw materials, rather than focusing on a single resource when producing bioproducts, can produce new functionality. This trend provides greater opportunities to produce successful bioproducts and support the use of multiple feedstocks contributing to more efficient use of natural resources. This approach touches many sectors and will have a significant impact on the whole economy.

4 Smaller and niche manufacturing

There is an emerging trend towards smaller and niche manufacturing for bioproducts, whereas in the past bioproducts manufacturing has typically been only at large scale. Smaller and more niche manufacturing could allow New Zealand to have decentralised and multiple regional manufacturing facilities, providing benefits to communities and some level of self-sufficiency for the manufacture of bioproducts.

Challenges

1 Policy and regulation for bioproducts not in place

In New Zealand policy and regulation to support the development, and use of, bioproducts is lacking. Overseas, it has been shown that the market alone will not create an effective bioproducts sector and government direction and support is required as seen in the EU. There are multiple government agencies who have an interest in the bioproducts which adds to the complexity of developing policy and implementing regulation.

2 Low risk appetite from industry

Risk is inherent in research and development and bioproducts is no exception. Bioproducts also often require significant capital investment for proof of concept and testing commercial viability. Many interviewees also spoke of a commonly held misconception that New Zealand is too small to participate effectively in the bioproduct sector. Combining these factors means that, for many businesses, the risk is not palatable, and they may not embark on investigating the feasibility of bioproducts as part of their businesses. Others may mitigate their risk by limiting their investment to a single or small number of products, with limited marketing support which often results in the product not being successful.

3 Limited capital for infrastructure

There is a lack of new capital for large infrastructure in this area, either for pilot facilities or commercial scale production. Funding for science and innovation will progress the development of bioproducts, but without infrastructure the research won't be used in New Zealand. New Zealand is producing bioproduct feedstocks, with or without a bioproducts sector, and if we don't process our feedstocks here, we will end up exporting our feedstocks for others to process and extract value from converting a potential premium opportunity into a commodity product.

4 Proof of environmental credentials

Many consumers are very concerned with the environmental impact of the products they use. These consumers are also highly educated on environmental impacts and have sources of information at their fingertips through social media. New Zealand producers of bioproducts will need to navigate through the mixed messaging of social media to ensure that their stories are told accurately and in a compelling way. It will be essential to demonstrate that our biomass is produced sustainability and to distinguish it from biomass grown in plantations overseas that have negative environmental impacts. Communication with consumers will be critical to success.

Opportunities for New Zealand

1 Policy support and regulation

To accelerate the development and use of bioproducts in New Zealand policy and regulation is required. In the absence of policy and regulation traditional thinking on the use of natural resources will dominate and New Zealand will not be well positioned to take full advantage of the bioproduct opportunities within its reach. Policy and regulation should include empowering low climate footprint products, supporting green procurement and direction on the use of technologies that are not currently acceptable in New Zealand. It may also require some targeted government support as part of its decarbonisation strategy.

2 Te Ao Māori connections to bioproducts

Te Ao Māori is strongly aligned to the principles of development of bioproducts and there is an opportunity for iwi and Māori businesses to lead in the bioproducts sector and to partner with others. New Zealand has many unique raw materials including native bioactive materials and indigenous fibre sources, which could provide commercial advantages to Kiwi businesses on a world stage.

3 National bio-pilot facility

Investment support especially at early stage development is critical to success. Proof of concept is typically done as part of the R&D, however, to have an influence on the value chain, pilot scale production, at least, is required. Public-private investment for a national bio-pilot facility would derisk scaling up from the R&D phase for companies, encouraging more bioproduct development. The national bio-pilot facility could also encourage collaboration between companies, so that one company's waste stream could become input for another's core process.

4 New Zealand bioproducts branding

There is an opportunity for collaboration across the bioproducts players to develop a consistent and coherent market presence globally. If New Zealand wants to be known for bioproducts, a common New Zealand brand would help consumers to identify and differentiate our products in the marketplace. This brand could also be short-hand for confirming environmental credentials and provenance of products, making choosing New Zealand bioproducts easy for the consumer.

Future human capability

We've captured the insights of the following experts to inform this piece: **Steve Saunders**, CEO, Robotics Plus; **Jo Baxter**, Director, Baxter Executive Search; and **Sophie Heading**, Director, KPMG Lead Global Geopolitics.

For most of Agriculture's history, the role of people in the food and fibre sector has evolved relatively slowly. This has transformed in recent decades, and particularly through the last 10 years.

Farmers and growers with already broad knowledge sets have had their roles expanded to meet the demands on a modern producer, from technological understanding to comprehensive environmental stewardship. Entirely new knowledge, skills and experience has entered the sector in areas from advanced automation to data science. And the rapid pace of change will not ease up. So, what can we expect next for the future of labour and human capability in food and fibre.

Overall, the confluence of three significant trends are expected to radically change the role of human capability. These are: The new dominance of technology, Geopolitics including changes in global market economics, and the rising primacy of Environmental, Social and Corporate Governance (ESG).

Here we explore the impact these trends may have on food and fibre in New Zealand, and those people involved in the sector.

The capital shift – human to technology

People have been the dominant source of knowledge and productivity in almost all food and fibre businesses since mankind began implementing agricultural practices. As a result, people have also been the most valuable asset for businesses and countries in producing, processing and selling food and fibre. This is changing for the first time in over 10,000 years.

There is now a shift from human capital to physical and technological capital which will forever change the dynamics of the global food system. The combinations of automated and self-operating machinery, real-time micro and macro sensors, machine learning and artificial intelligence means that those businesses and countries with greatest ability to invest in physical capital are at an advantage.

Low-cost labour has been a vehicle for accelerating economic growth in countries. The capital shift however reduces this growth opportunity for current and future nations seeking to grow through low-cost labour advantages and intensifies the international demand for talent, which is critical in creating, establishing and maintaining advanced physical capital.

For New Zealand, this means that now is more important than ever before to invest in the development and retention of a talented workforce who are an essential component of supporting the country both during and after the capital shift.

Geopolitics & automation

Covid-19 has resulted in food being re-recognised a globally strategic sector, and countries are seeking to rapidly improve their self-sufficiency and food security status.

This will lead to further state intervention in the sector through the form of stronger industrial policy and the targeting of foreign influence.

The political governance pathways of the world's largest influencers have diverged. The European Union is following a model dominated by regulation, the United States a private model and China a public model. The European Union is funding the private sector in food and fibre, the United States is seeing a venture capital dominated funding landscape, and China is investing through public funding. All of these governance and funding pathways do share one thing in common – the push for more efficient and automated food production.

For New Zealand, investment in automation of our food and fibre sector is critical. This has been emphasised through Covid-19 and the severe worker shortages across the sector that have been caused by reduced access to international skilled labour and the seasonal workforce.

New Zealand has globally unique farm system demands for automated technology and a small market for selling this technology. As a result, we are not able to rely on the development and import of international innovation – New Zealand must be solving our own problems with technological solutions developed here.

There are two key success factors to enabling this. Firstly, our industries need to collaborate, not compete. Industries should be investing in technology at a pre-competitive level rather than individual businesses within the same industry investing for exclusive access to technology to then compete with other New Zealand businesses. This not only supports greater investment scale, but also greater potential market-size for the automation and technology businesses which are utilising extremely limited human talent tied to multi-year projects. Secondly, while focusing on New Zealand specific problems, we also need to identify how these technologies are internationally relevant and able to be scaled for international export. This can support the success of our technology businesses who are otherwise serving a relatively small domestic market, but also provides an export revenue outside of consumable food and fibre products.

Next generation governance

New Zealand's leaders in governance are sitting in the driving seats and taking the country's food and fibre sector into the future. But are these drivers all heading to the correct destinations or even in similar directions?

Are the drivers diverse enough for the journey required? Is each driver trying to operate too many different vehicles simultaneously? And are many of our drivers still seeking international roads rather than being committed to driving on our own?

As New Zealand's population reached 5 million during a re-patriotisation phase through the Covid-19 pandemic, it was often quoted that the country would be benefiting from an influx of international talent returning home. In reality, the anticipated brain gain appears to still be exceeded by our brain drain. A record number of New Zealand executives announced their departures in the past 12 months and many are still seeking the allure of international experience and remuneration that isn't offered in New Zealand.

As we have noted in previous Agendas, the country's governance pool is small with limited diversity. Most directors in food and fibre are spreading their involvement across multiple boardrooms and attempting to guide these organisations with limited time to build a deep and detailed understanding of a company's internal and external challenges, opportunities and future requirements. Only 12% of CEO's in New Zealand's agri-food businesses are female, and our diversity in age, ethnicity, education and background is limited in executive teams and boardrooms. This limits the scope for governance structures to empower innovative solutions and comprehensively respond to the economic, social and environmental challenges of the current and future world.

One solution for this limited governance pool in New Zealand is to open boardrooms to more international expertise. As virtual discussions have become the norm, international executives and directors offer an opportunity to rapidly expand the size and diversity of the talent pool available, while also providing unique on-the-ground international insight into key countries and markets.

It is also crucial that the food and fibre sector makes an active and intention-driven investment into the recruitment and upskilling of a diverse next generation of leaders. These emerging leaders can begin contributing to conversations and ideation, while developing into the sectors future established leaders.

A simple but effective sector strategy would be for those at board and executive levels to be accountable for developing 2-3 successors.

Managing a workforce of the future

The demands and motivations of the workforce are evolving and require a re-focus from organisations that are seeking to retain and empower their employees.

According to the World Economic Forum, 54% of employees will require upskilling to remain effective in their roles within the next two years, and 94% of employees would remain at organisations for longer if that company invests in their career development. Training has now become a more compelling factor to join an organisation than starting salary. This means that there is both an employee expectation and a competitive requirement for organisations to provide opportunities for their employees to be supported with ongoing training and skills development.

The current Millennial generation and emerging Generation Z population (now up to 50% of the workforce in many large economies) also have greater expectations of their workplaces beyond salary and even training. Meeting these wider expectations provides competitive advantages to those companies in attracting talent. According to Gallup this includes three key characteristics. The most important characteristic is for employers to demonstrate authentic care about employee wellbeing (including all of career, social, financial, community and physical), in addition to this is ethical and transparent leadership group and a workplace that is diverse and inclusive of all people.

The other transformational change to the future workforce is the impact of technology and automation. Through technology and automation high-value roles are created that require greater skills and knowledge, and the optimisation of systems by technology can sometimes increase labour requirements at different parts of the value chain. However, technology and automation will inevitably displace a significant portion of the workforce, and organisations, sectors and countries will be under increasing social and political pressure to support those displaced. This may mean re-imagining roles that capture and deliver greater value in shorter time periods, such as reducing work weeks from five days to four. This will also create significant pressure on the support of employees to be upskilled and re-skilled internally, rather than companies going through a process of firing and hiring.

Overall, the broad trends of geopolitics, ESG and technology, combined with transforming expectations and requirements in governance and the general workforce means that leadership in the food and fibre sector is more important than its ever been. New Zealand can seize opportunities including collaborative technological investment, diverse governance succession models and international engagement for expertise and targeted export markets. But there are important steps required in order to grasp those opportunities. The oxymoron is that a transition of power from human to physical capital means that talented, engaged and supported people are currently more important than ever. New Zealand food and fibre must take a step back from the day-to-day operations and execute on some radical and large-scale changes to ensure our systems and structures are designed to empower labour and human capability in preparing for the future world that we will be operating within.

Future of logistics & supply chain

Andrew Watene
Director, Head of
KPMG Propagate

We've captured the insights of the following experts to inform this piece: **Mark Scott**, General Manager New Zealand, Cosco Shipping Lines New Zealand Ltd; **Winstone Chee**, Managing Director, Altitude Fresh; and Commercial Director, Leading Pan-Asian Retailer, personal communication, May 2021.

Future of the supply chain

One of the largest global disruptions the Covid-19 pandemic has accelerated is in supply-chain and logistics.

Some typically consistent transport lines have increased in cost by over 500%, while a large proportion of air freight and even many shipping lines have disappeared altogether. With New Zealand so geographically isolated from the rest of the world and only representing 0.5% of global shipping revenues, we are in a precarious situation. We are a relatively insignificant nation in the scale of global shipping, but are so heavily reliant on international transportation systems to deliver the exports which support our food and fibre sector, and our country's economy. With this challenge upon us and embroiled within a world of geopolitical uncertainty and climate change, understanding the future of supply chains and logistics is perhaps the most important it has ever been in New Zealand's history.

Current situation

Estimates suggest that the shipping component of existing supply-chains equates to approximately 940 million metric tonnes of carbon dioxide or around 2.5% of total global carbon emissions. This does not include emissions that arise from additional road, rail or air transport of the products before and after shipping or from warehousing. While food is only one element of the global supply chain, it is a significant component, and increases the focus on the long-term sustainability of supply chains.

There are already initiatives and investment underway to enhance the sustainability of supply chains, including engine technologies that enable 'slow-steaming' allowing ships to travel at slower speeds with the benefit of a 20% reduction in energy use. Onboard technologies such as waste heat recycling and low resistance paints to protect against accelerated corrosion and any subsequent effect on the environment also help vessels become more efficient in the near future.

It is the conscious consumer making decisions to buy one product over another based on factors including environmental impact, that are driving organisations throughout the supply chain to rethink how they do business. Carbon reduction is one driver, but it is inherently interconnected to the strategies of organisations and their fundamental business and operating model's which is where the real change will come for the future supply chain.

The pandemic has, and continues to have, material impacts on supply chains. For many consumers around the world, they have had to adapt to being told the product that they want to buy is on back-order with an estimated arrival date of two to three months from now.

While the practicalities of shipping through the pandemic have been challenging, the results of freight companies have led to a general view that those in logistics and shipping have benefited from the pandemic. The 'boom' hasn't been a 'boom' as the volumes didn't increase, prices charged for service did, but so did cost to serve. The pandemic applied more pressure on less ships for the same volumes for the period. The challenge hasn't been about on-board capacity, more so delays through the journey of a trade lane and knock-on effects to 'set-windows' on each port. These 'set-windows' have different levels of 'value' for the shipping lines, which can

be different to the value attributed by customers.

Capacity and throughput were an issue in different countries and their respective ports for two reasons. Firstly, is a reduction in movements on port, with an example in New Zealand seeing decreases from 2,000 to 1,200 containers in a window or 60%, caused by challenges such as social distancing.

The second is the effect Covid-19 had on labour with 'work gangs' turning into 'work bubbles' to mitigate health risks to workers while trying to improve safety conditions and increasing mechanisation and automation. It had a compounding effect of low productivity, delays and a backlog of imports, and container availability with reefer containers being affected more than ambient.

It affected the delicate balance of ratios between inbound and outbound containers, both ambient and reefer, and having to reposition equipment to meet seasonable demand, globally. New Zealand normally holds inventory of equipment in Nelson or Napier, but those stocks quickly depleted leaving the country and many exporters short of the equipment they need to product to consumers around the world.

Vessels are usually on a 'cycle' of seven round trips per year depending on the lane at an average cost of $6,000 a day which has since increased to approx. $30,000 a day. The 'costs' account for missing 'set-windows' on a port, lower loading levels due to throughput, and rising operating costs, including opportunity costs because of delays and not being able position to meet new demand.

Costs continue to rise with inbound cargo and empties landing in the North Island for example, but needing to reposition to the South, which means extra moves, which eats into movement allowances within windows, space, and time, not to mention costs.

The challenges that have been experienced in global supply chains over the last year illustrate the interconnected, systemic challenges that are inherent in current shipping pathways given the existing infrastructure deployed. What they don't highlight as clearly is the impact that dramatic changes in consumer behaviour have had on global trade patterns. These changes have occurred very quickly as consumers have responded to their alternative reality and this has complicated trade patterns further.

Last year witnessed a dramatic increase in consumers purchasing online with a corresponding increase in demand for home deliveries. It saw the digital high street quickly developed in a digital city as consumers sought to access the products they want from suppliers around the world, creating new shipping challenges.

As has been highlighted earlier in the Agenda, this switch to online has come with a decrease in demand for more traditional offline shopping with layers within supply chains that previously served the purpose of getting products on store shelves quickly becoming bottlenecks rather than enablers. Leading retailers in China delayed opening of any new stores, and in some cases closing more than are being opened, because of the shift in behaviour and bottle necks.

So, shipping lines or those who operate within the supply chain didn't 'win' per se and have a lot to address in the future.

Supply chains of the future

It is clear that in aggregate the world's supply chains are facing some of the biggest challenges as we tackle climate change meaning that any future supply chain scenario is likely to be centred on impact as much as optimisation or efficiencies.

It's interesting to observe through conversations with executives in shipping, industries and varying levels of retail that the most prominent change affecting supply chains is in business and operating models within industries and that this level sets the balance of supply-and-demand based on their drive to meet the everchanging needs of consumers.

Geopolitics, market access and the complexities of a VUCA Squared world are considered within those business

models and have leaders questioning the benefits of existing operating models and methodologies that have been successful for decades, such as 'far or off-shoring' over 'on or near shoring' or just-in-time methodologies when you have to balance planet with performance. In fact the conversation in the last few months has moved from just-in-time supply chains to just-in-case supply chains, which are holding much larger buffers to allow for volatility.

We expect that in 20-30 years from now, the world's supply-chains will operate at high levels of trust not yet seen. Privacy and data sovereignty issues across jurisdictions that have plagued meaningful collaboration have been addressed, at a minimum between nations who are aligned in purpose.

This trust enables a digital transformation of supply chains also at a level not seen before, enabling advanced analytics and algorithms to be used throughout the system across national borders in a seamless way. Self-orchestrated systems are enacted on and share an appropriate amount of information end-to-end to achieve smart movements from an origin to a destination, which in the broader sense encompasses growers to consumers.

Innovation with supply chains accelerates the world's efforts to meet climate goals, reducing the amount of fossil fuels used with tactical efficiencies being made while new sustainable sources of energy are found that can effectively, sustainably and safely move large amounts of freight around the world.

The digital integration of the supply chain enables pathways to be designed from the grower forward. Optimisation starts by balancing harvest patterns with logistics requirements, reducing the amount of handling of products while not allowing unnecessary movement of products past a point should errors be present. It could see

traditional 'maturation' of products in different stages of the value-chain than we are used to further reducing the impact on environment while simultaneously utilising energy captured from other waste streams.

Executives we talked to in the shipping sector, outlined that they are seeing signals that suggest frequency of services will need to increase to meet smart-and-proactive personalisation of products with significant orders of vessels being made to meet that demand (although this does raise questions about what the right size of a vessel will be in the future depending on how desire for personalisation impacts shipping routes). It is likely autonomous electric vehicles will be the preferred choice for last mile delivery and that within 20-30 years this trend will have extended to other larger forms of land transport, on road and rail.

It isn't clear how long Covid-19 will affect aviation, or at least the passenger side of aviation.

Covid-19 impacts are likely to continue to shape the world for at least the next 3-5 years so 15 years beyond that doesn't feel far away. Anticipating that the pandemic and other global shocks which are certain to occur and impact aviation over the next 20 years, are adapted to and changed procedures become common place (reflecting past experience, for instance, the adoption to new security measures after the 9/11 attacks) it raises the question of how we reimagine aviation and its role within our supply chains or its profit models to help solve challenges facing the industry.

The Sea-air freight model is being considered by Singapore to become a transhipment hub with the premise of being a 'bonded country' while delivering logistics efficiencies. It asks which industries could benefit most from the existing infrastructures of aviation and what is possible?

It provides opportunities to rethink the final mile or final city aspect of distribution, perhaps hobbyist or schools have an option to create revenues, with drone clubs becoming a preferred option for final mile or city distribution.

Laterally it embraces innovations such as digital or sovereign currencies on different distributed ledgers or other technologies not yet invented that facilitate faster trade, reduce risk, and enable growth.

These are seeds of what is coming, digitalisation at a scale not seen before. Data, analytics, algorithms, self-orchestration, mechanisation and automation collectively being used to meet the world's biggest challenges around climate change while simultaneously becoming smart, shorter supply chains of the future connecting growers to consumers with faster, fresher, more nutritious products.

An ethical future for agri-food?

Ian Proudfoot
Lead Author, Global Head of Agribusiness National Industry Leader Agri-Food

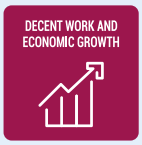
The global food system has many challenges!

UN Food and Agriculture Organisation data shows 690 million food-insecure people in the world. On the face of it, this is positive given previous data has suggested the figure to be over 800 million, but the historic data has been wrong. The updated data suggests the number of food-insecure people has increased by 60 million since 2014 suggesting we are moving further away from achieving the SDG 2.1 Zero Hunger target by 2030.

At the same time as 8.9% of the global population is food-insecure, World Health Organisation data suggests that about 13% of the world's adult population are obese (about 650 million adults), a rate which has tripled since 1975. In addition to the adults, there are also around 340 million children that are obese. Today, most of the world's population live in countries where more people die from complications associated with their weight than from malnourishment. We are moving away from achieving the SDG 3.4 target to reduce deaths from non-communicable diseases by a third by 2030.

Across low income countries, women make up 48% of agricultural employment. As producers, rural women face greater constraints than their male counterparts in accessing essential productive resources and services, technology, market information and financial assets. Societal conventions mean that much of their labour remains unpaid and unrecognised. The global food system is a long way from achieving the SDG 5.1 target to end all forms of discrimination against women and girls.

Agriculture accounts for around 72% of all water withdrawals globally. Currently, 1.1 billion people lack appropriate access to fresh water and a total of 2.7 billion people are water scarce for at least one month of the year. By 2025, it is forecast that two thirds of the global population could be facing water shortages. Achieving the SDG 6.4 target to ensure sustainable withdrawals and supply of fresh water also appears to be getting further away rather than closer.



According to the International Labour Organisation, 1.1 billion people work in agriculture and around 58 million in fishing globally. This includes 62% of the population in sub-Saharan Africa and 46% in South Asia. The ILO highlights that labour practices in the sector need urgent attention given the scale of the working poor and the inherently dangerous and uncertain working conditions. Achieving SDG 8.8 relating to protecting labour rights and providing a safe and secure working environment for all workers will depend heavily on the extent to which the sector can reform labour practices.

Estimates suggest that a third of all food produced on the planet currently goes to waste, although this data has not been updated since 2011. SDG 12.3 target to halve the amount of food wasted by 2030 appears to be very challenging for an industry that has yet to finalise how this target will be measured.

It is estimated that 33% of the earth's soils are already degraded and forecasts suggest this will get worse. Degradation of the planet's surface is negatively impacting the well-being of 3.2 billion people according to the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services. SDG 15.5 calls for urgent and significant action to reduce the degradation of natural habitats and halt the loss of biodiversity. Once again it looks like we are heading in the wrong direction.

Looking at the headline data the food system is leading the world in the wrong direction in respect of equitable food access, public health, sustainable water use, labour rights, food waste and biodiversity.

If we had space we could find data to highlight further issues facing the food system in relation to the recognition of indigenous rights, degradation of the oceans, consumption of nonrenewable resources in food supply chains and contribution to climate change.

The sector uses more land, oceans, more water and employs more people than any other sector of the global economy. It is consequently not surprising that it is core to many of the most important challenges facing global society today. It is facing a stark choice – it can become part of the solution to these issues or it is inherently the problem.

Becoming part of the solution

As the global food renaissance accelerates, extensively disrupting every aspect of the global food system, the need to change the direction of travel on many of the SDG achievement metrics is greater than it has ever been.

In September this year, the UN will host a global summit on Food Systems in New York. This summit has been convened by the Secretary General of the UN to awaken the world to the fact that we all must work together to transform the way the world produces, consumes and thinks about food. The summit aspires to achieve a positive, lasting impact on global food systems; those systems that connect the activities that facilitate the production, processing, transporting and consumption of food. Because every citizen of the planet requires food to function and thrive, food systems touch every aspect of human existence.

Our premise for the future is that the global community will hold food systems accountable for delivering a more equitable, healthy, sustainable and prosperous future for all on the planet. The world is looking for the industry to take leadership in recognising its weaknesses, owning the consequences of its activities and taking actions, individually and collaboratively, to improve future outcomes.

Consequently, every organisation needs to find the areas where it can make substantive contributions to the change agenda. As we have written in past Agendas, it is not about playing SDG bingo and trying to do something under each of the 17 goals. It is about choosing the areas where an organisation can have a real impact, either directly with our community in New Zealand or by applying innovation and knowledge to help others around the world and going deep in a limited number of areas.

While some of these activities may not have an immediate commercial outcome, the impact of not doing them needs to be considered on how an organisation will be perceived by its community, its regulators, its consumers and, potentially most importantly given the earlier discussion on leadership capability in this Agenda, its people.

What could this look like for a New Zealand organisation?

- It might be as simple as participating in a global initiative to standardise how environmental and community impacts are reported on its products (think health stars for climate, water and modern slavery for instance).
- It could be sharing key data and intellectual property open source platforms so that other researchers around the world can use this knowledge to advance their own work. Feedback could then help the sharer make advances that directly benefit its business.
- It might involve collaborating with others to fund and launch an XPrize style competition to look for better ways to do something really important for New Zealand, but also to the world, for instance, methane free animal agriculture or new bio-based solutions for aquaculture by-products.
- It could relate to the creation of an impact investment fund that provides 'micro-finance' to community level food security initiatives to help them increase their impact using disruptive agri-tech in collaboration with other companies, philanthropic funds and government.

Your 'it' could be anything that has an impact in addressing the challenges facing the global system that you choose to focus on. However, we believe your 'it' must be something meaningful in creating or accelerating change. This does not mean your 'it' can't be substantive and relevant to the success of your business (as one roundtable contributor noted we should never be embarrassed about selling high quality products at fair prices, whether this is to the world's most affluent consumers or to those who are supporting the most vulnerable). As we suggested earlier, organisations face a stark choice; either they become part of the solution or they are the problem.

Being part of the solution provides the greatest likelihood of participating fully in a future food system that is offering plentiful new opportunities.

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The 2021 KPMG Agribusiness Agenda reflects the opinions of agri-food sector leaders across New Zealand and the world through survey insights, group discussions and one-one-one interviews, we're grateful to all 172 of them.

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