Ministry for Primary Industries
Manatū Ahu Matua

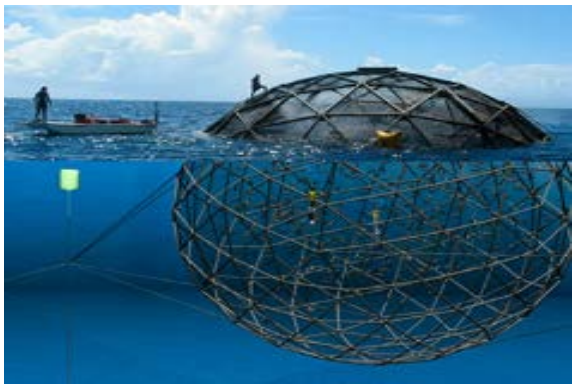
Shaping New Zealand's Food and Fibre Future

A report on industry workshops, held to consider what challenges our food and fibre industries might face in the 2030s.

February 2017

New Zealand Government

Growing and Protecting New Zealand



“Foresight is not about predicting the future,

it’s about minimising surprise”

Karl Schroeder

Executive Summary

MPI and industry used established future foresight techniques to consider what challenges our food and fibre industries might face in the 2030s. We tested our assumptions, considered emerging drivers and trends, and highlighted the challenges, implications and opportunities associated with potential change. We discussed a range of actions that we can undertake today, in order to make us more resilient to face whatever changes the future may bring.

MPI and industry are now working together to prioritise the action points raised during our workshops, and develop an implementation plan to support delivering some key results during 2017. Actions discussed relate to the broad areas of: telling our stories to consumers; enabling new technology and innovation in the primary sectors; nutrition; skills and expertise; the role of government; industry drivers and future "Vision"; readiness across supply chains; and how to maintain collaboration beyond our workshops.

We captured participant feedback at the end of our workshops. Participants reported a very positive range of workshop outcomes, including: exposure to new ideas and different viewpoints; consideration of primary sector cross-cutting issues; an increased knowledge of emerging trends and what or who may disrupt us; having their assumptions tested; and the opportunity to have a frank discussions about the government and industry interface (for example, regulation, policy setting, R&D funding, strategic direction). Industry participants supported ongoing collaboration around the topic of future resilience, and acknowledged that they need to now take their learnings back to their own board rooms and consider how they fit with their own strategies and brand approach.

Because our workshop participants were predominantly aged over forty, we tested also our scenario outcomes with a group of Future Problem Solving students at Nelson College, so we could capture their youthful perspectives. These were similar in some ways to our workshop participants but also added some new dimensions and are summarised in Appendix 2.

We will hold a follow up industry workshop in the latter half of 2017, prior to the 2017 PGP Conference & Expo.

Introduction

The Ministry for Primary Industries organised a series of workshops on New Zealand's Food and Fibre Future, which industry leaders attended during September and October, 2016. The all-day workshops provided an opportunity for us to look twenty years into the future and consider how our operating environment might look in the 2030s. Some questions we wanted to consider included:

- Who will our customers be?
- What products will they want?
- Has new innovation and technology significantly altered what we grow, how we grow it, how we process and distribute it, and how the consumer buys it?
- Will we be operating within environmental limits and will our communities still be supporting our industries and their respective land use activities?
- Might climate change and shifting geo-political forces require us to adapt what we grow, where and grow it, and how we trade?

Aims of the workshops

It is important to note that the aim of our workshops was not to predict our future. Rather, we wanted discussions about our future to highlight the range of opportunities and challenges we might face. Key workshop aims were:

- To question how our food and fibre industries can better prepare for future opportunities and challenges

- To test our assumptions of the future
- To consider drivers behind emerging trends
- To discuss risks and implications
- To increase our combined capabilities to use future insight tools and methodologies
- To start an on-going discussion between MPI and industry.

Links with other MPI workstreams

There is a significant amount of work being done across MPI which relates to the future and how we are positioned to face it. The outcomes of our industry workshops have been shared with the following workstreams:

MPI Internal Strategic Assessment

The Ministry for Primary Industries (MPI) is undertaking an internal strategic assessment aimed at providing a robust forward view for the New Zealand primary sector and MPI. Specifically the assessment is focused on the guiding question *'What might MPI's future operating environment look like in 2035?'*

The project is using a foresight approach designed to identify aspects of our future that are seen as uncertain, but which would have a big impact on our development. The strategic assessment does not replace other forecasting, intelligence and scanning work underway in MPI, but rather it seeks to complement those relatively stable trends that the business is already planning around. It provides an opportunity for collective long term thinking, looking out approximately 20 years. Additionally, the assessment has provided an opportunity to develop internal capability in foresight thinking and to build links within the broader government foresight community.

The Future of Food

The Future of Food project is a multi-year project aimed at improving our food system to better support export growth. Global food markets are changing rapidly, creating opportunities and risks for NZ exporters. We need legislation that supports growth and innovation, now and into the future.

The problems definition phase of this work programme has begun. Options development will take place during 2017. The decision making and implementation phases will occur in 2018, including the commencement of legislative and operational changes.

The Primary Sector Science Direction

The Primary Sector Science Direction is being co-sponsored by the Minister for Primary Industries, the Hon Nathan Guy, and Sir Peter Gluckman, the PM's Chief Science Advisor. It is an initiative intended to provide an integrated, longer-term view of science and technology needs.

The Science Direction will provide guidance around key priorities for all those looking to invest in research and development related to the primary industries in New Zealand. It covers all of NZ's primary industries across the whole value chain. Consultation has started, and MPI expects to report to Cabinet early in 2017.

What we did

Our Food and Fibre Future workshops were structured around three exercises:

- Testing our assumptions about the future
- Building future scenarios
- A Horizon-3 exercise to determine what actions we need to take today.

Testing Our Assumptions

"What is something you believe will always be true of New Zealand's food and fibre industries?"

We asked this question at the start of each workshop to identify the biases and assumptions we might hold towards our food and fibre industries. The key results of this exercise are summarised in the table below.

Our assumptions about the future	What might happen in the future to prove our assumptions wrong?
People will always want to eat animal protein	• People will choose to eat plant-based authentic proteins because they will be healthier, better for the planet, and better for animal welfare. They may also be cheaper. • People will choose to eat synthetic protein substitutes.
We will always use natural soil and water to grow our food and fibre products. There will always be a demand for New Zealand's traditional pasture-based farming systems.	• We will use artificial soil substitutes, recycled compost, or other strata. • We will use hydroponics. • We will use artificial farming systems (e.g. vertical farms). • We will use genetic engineering and grow things that perform exceptionally without natural soil and water as inputs. • We will use laboratories to produce animal proteins using cell-cultures (growing animal proteins without the animals). • A rapidly expanding urban population means cities will encroach on rural hinterlands. Rural land will be more valuable for housing land use, and we will be forced to consider other farming systems as a means of growing primary products.
Seafood will always be a source of plentiful protein for NZ	• Climate change will affect our fisheries. • Pollution or a major seafood food safety scare will cause lasting reputational damage. • Mismanagement of our fisheries will affect their sustainability. • Consumer drivers will change and eating wild-caught seafood becomes socially unacceptable.
The NZ economy will always rely on an agri-food economy	• The New Zealand economy will be reliant on our services industries, including tourism.
New Zealand will always be export capable	• We will suffer long-lasting reputational damage from a major biosecurity event. • Changing geo-politics will place greater restrictions on global trade. High tariffs make our goods uncompetitive in global markets. • A significant rise in global fuel prices will mean the cost of shipping and air freight deem our goods uncompetitive in global markets. • A significant change in society norms will mean 'buy local' has become a key driver for consumer preferences. Demand for products from New Zealand has dropped drastically.

We will always export most of our food and fibre products. We will always produce more food and fibre products than we need.	• We will succeed in adding value to our raw products and consume more of them domestically in new highly processed forms. • The NZ population will grow significantly and fuel a stronger domestic market. • Climate change will impact negatively on our productivity. • Society norms will enforce an environmental premise that we should 'convert NZ back to nature' and intensive production will lose its social licence to operate. • Water will become so valuable globally, it will be more viable for NZ to export its water than use it domestically to produce food and fibre products.
NZ will always have an advantage because of its plentiful natural resources	• New technology and innovation (including the use of GM) will allow other nations to produce comparable food and fibre products without such plentiful natural resources. • The marketing activities of other nations will 'catch us up.' They tell their natural resources and provenance story better than us. • Soil erosion, climate change, natural disaster, reaching environmental limits and/or disease will impact on the abundance and/or quality of our natural resources. • Communities will withdraw their social licence to operate and primary industries can no longer access our natural resources.

Building Future Scenarios

One aim of our workshops was to increase our knowledge and capacity around future insight techniques. Before we started to build future scenarios, our facilitators introduced workshop participants to the value of using future foresight methodologies, and some of their key limitations.

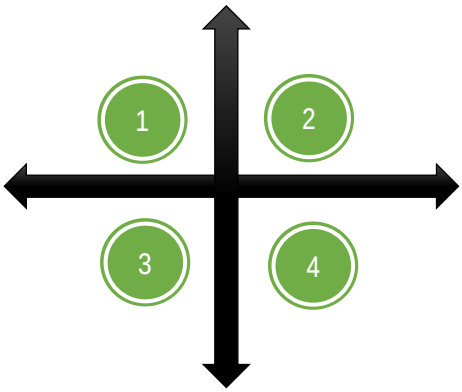
- Future foresight techniques do not aim to predict the future and cannot predict the future.
- Predicting the future is difficult due to a lack of information, incorrect theories, and unexamined assumptions.
- Of the three elements of leadership (hindsight, insight and foresight), foresight is the hardest to apply and the easiest to overlook.
- Foresight is about assessing and preparing for future possibilities.
- As humans we have a bias towards things that are tactile, measurable, simple and have a gradual linear progression. The future is none of these things, so many of us are uncomfortable working in a future time horizon.
- Future scenario building is a tool to help frame discussions.
- The scenarios we create are in themselves not important. The value of developing future scenarios is to draw out trends, drivers, risks, assumptions, challenges, opportunities, and implications.

The Future Scenario Quadrant

We overlaid two axis to form a quadrant tool, which we used as the basis for developing future scenarios. An axis provides a **spectrum of possible eventualities**, anchored by **opposing alternatives** at each end. As an example, in the graphic below the horizontal axis relates to global trade. At one end of the axis is a 'borderless world' in which free trade proliferates. At the other end of the axis is a protectionist world where trade is limited by geo-politics and trade barriers. The vertical axis relates to the rate of uptake and technology in the primary industries, including its application on new processes and products.

Incremental market innovation from new technology has successfully occurred. We continue to grow products that use mostly natural inputs.

Open borders, unrestricted and global free trade. Consumers are open to worldwide sourced products

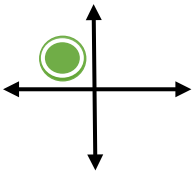


Restricted trade. Geo-politics are more inward looking and protectionist. "Regional localism" dominates. Consumers value locally-made products.

Fast uptake of technology, the market is highly disrupted by innovation and products are highly manipulated by technology. New, alternative products compete with the traditional food and fibre products NZ has always produced.

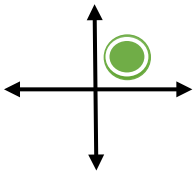
We used slightly altered axis in each workshop, and have used the scenarios created across all workshops to develop the four over-arching scenarios that follow. These four scenarios best represent the range of issues, drivers, trends and implications discussed by workshop participants.

1] A Borderless World



What has happened?	Implications
We have a free flow of trade globally, including online.	Fewer tarrifs, NTBS and quotas. National boundaries are blurred in a market sense. There are common consumer standards. More producer-consumer direct trade. Disintermediation (loss of the middle man).
We are utilising natural inputs (sun, soil, sea, air, water) for our products and can robustly demonstrate to the world that we are a 'green' producer	This is a point of difference for NZ. The natural inputs of many other nations are under stress.
We are routinely applying smart technology to our natural inputs. Innovative advancements have been made.	More uptake of industrial farming and processing methods. We capture technological benefits to gain competitive advantage. Technology helps us farm within environmental limits. We are using GE.
Extreme market segregation and consolidation has occurred. We have fewer very large companies, and many small, artisan niche producers. All have access to overseas markets.	Aggregation has occurred. Data is crucial. Supply chains and distribution chains must be super-efficient and flexible.
Our natural products are wedded to a well-being story, even 'new' products, e.g. plant based protein, processed into substitutes for animal-protein foods.	There are strong consumer drivers to farm plants as well as animals. Capital reallocation. New skills and capabilities required.
We have instant communication at low cost.	Each person is a market. Consumers are well informed. Consumers are not brand loyal but for some the story is all-important. Targeted marketing – changes to traditional marketing channels. The NZ Story needs to be consistent and evidence based.
Quality, safety, traceability, provenance, ethical production are all crucial.	Technology will need to provide assurance around all of these things.
Change happens fast.	Govt needs to keep up with pace of change (skills, regulation, policy, adoption of technology.

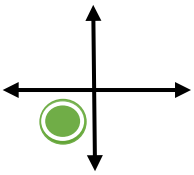
2] Clinging to Green



What has happened?	Implications
Global market protectionism exists.	Regional and local trade is predominant.
Our natural inputs are our only point of difference.	We are still trying to extract more value from the raw products we grow.
Commodity exports are no longer the cornerstone of NZ's primary industries.	Farmers and producers have been forced to diversify and adapt to remain economically viable.
Consolidation and market segregation has occurred.	We have a cluster of large companies versus many small artisan producers. Many of our large companies are multi-nationals. The number of owners/entities operating as primary industry businesses nationwide has reduced by at least one third.
As a consequence of a prolonged recession, following the collapse of our global markets, the majority of small operators cannot afford to invest in R&D and new innovations.	Our progression along innovation pipelines is slow and we have fallen behind the new cluster of world-leading innovative nations.
Buy local is a strong consumer driver due to geo-politics.	Our larger companies must invest in overseas markets (where possible), in processing infrastructure and brands, so our NZ raw ingredients can 'look local' in market. These drivers push corporate investment off-shore, with implications for NZ based jobs and local innovation stimulus. NZers value locally grown goods, and support a buoyant market for our artisan niche products.
High trade barriers exist, but NZ still trades with select markets who want our products	The government is required to invest heavily in negotiation of market access. We need to leverage NZ's natural advantage.
We have smaller markets but we are still feeding the elite.	We need a deep understanding of this select group of consumers and must constantly update this knowledge.
Global food security is an issue but NZ raw ingredients still trusted.	Traceability is vital.
Health is a major driver for our wealthy overseas consumers	Food and beverage products focus on health and wellbeing in their provenance stories.
We have a higher domestic population.	Exporting is no longer the prime focus for the majority of primary industry businesses. Rural hinterlands are under pressure from urban expansion.

There are restrictions on imports into NZ.	Consumers have less choice. Grey markets emerge. Quality and assurance related technologies are vital. Pressure on rural hinterland of conversion to new industrial land uses (NZ must do more on-shore processing and manufacturing).
There are higher environmental constraints	We are forced to use smarter production systems. We must embrace GE.
There are greater risks (bio-security, climate and weather)	We are forced to invest more in R&D to retain our resilience, and ability to adapt.

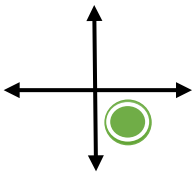
3] Son, Eat Your Technology!



What has happened?	Implications
Technology is now an everyday part of eating.	Our innovations are customer focused. Many food products are merely a means of consuming our necessary nutrition and are marketed around convenience (e.g. lunch is a pill).
Synthetic and new products exist that are far removed from what we are used to today	Food products that are marketed around taste, naturalness, and provenance are high end niche.
Most of the world's commodity products are produced in lab or factory environments, located near to global cities.	We can no longer compete in global commodity markets.
High innovation has occurred. Our production systems have greatly evolved.	Change and uptake of new technology is fast. Business and government need to be agile and adaptable. Constant horizon scanning is necessary.
More manipulation of natural products occurs. Lab based production and intensive production are common.	We have less pasture based farming systems and more indoor farming systems.
Technology, and a need to be more self-sufficient as a nation, has resulted in new commercialised uses for our timber and wool.	We have good drivers for diversification and innovation. We are using timber and wool fibres to replace products we formerly imported.
Mass consolidation has occurred. Large multi-strand businesses operate across the value chain, including production and manufacturing.	
We have highly specialised markets. Global trade is difficult, protectionism/nationalism common across world.	Relationships with our select few markets are crucial (govt to govt, and B2C)
Diversification has occurred. Some farmers have turned to new land uses - exporting water, carbon sinks, tourism or recreational uses for their land.	Increased urbanisation pressures from population growth and immigration (NZ is a desirable corner of the world in which to live). Much rural land lost to urban creep. Increased regional inequalities due to restructuring of rural industries and land ownership.
Overall, we have fewer animals in our production systems.	There has been a shift in our education and training priorities.
There is widespread uptake of technology across the world. NZ's point of difference is that we still have land (space), soil (still fertile), plentiful water (scarce in many countries), and a reasonable climate (more volatile elsewhere.)	We have quality naturally derived inputs for our high innovation, technology based farming system and product processing.

There is increased "food nostalgia" – people miss the heritage and authenticity of naturally farm-grown food. NZ has positioned itself as a world leading destination for yesteryear farming and food experiences.	Many farmers have moved into farm tourism, offering "moo-seums" and other visitor experiences.

4] Have a Doughnut, it's Good for You



What has happened?	Implications
There is easy movement of capital, goods and skilled labour.	Increased specialisation of nations is required due to free trade, tied to their natural capital.
We have internet enabled supply chains	It allows individual customisation of goods. We need a more agile regulatory system. New distribution channels need new assurance and verification technologies.
We have a bigger market, but we have to make tough choices about where to compete.	We need detailed customer insight to ensure we make the right decisions. We need to be able to change tack fast.
There is increasing homogenisation of culture, goods, and services. Finding a point of difference is a constant challenge.	We now have multiple 'NZ Stories.'
We have multiple, differentiated markets, e.g. high tech products, natural products, health and well-being products.	There are more explicit choices for customers. "Good for me." "Good for the environment." "A great food eating experience."
We have the technology to manipulate traditional product forms. E.g. a doughnut can now contain a host of different 'nutrition flavours', e.g. "maple and omega 3," "jam and antioxidant B." Food and beverage products can be highly personalised to meet our individual health needs.	Customers in niche markets are savvy and use biometrics, sensors and data to inform purchasing.
Alternative, efficient protein sources dominate.	There is less demand for farm animals.
Food and beverage production is knowledge and data based.	Farming is no longer about hard physical labour. There are many new production systems. New skills and capacities are required.
The natural environment is a source of genetics.	Science and engineering is routinely applied to natural inputs.
Demand for innovation and technology is a given.	R&D is firmly part of BAU.

Some common themes across all scenarios

We were interested in the implications, emerging themes, issues and opportunities that each scenario raised. Some common themes we discussed were:

- What might a social licence to operate look like in these different futures?
- What kinds of new technologies will be socially acceptable?
- How will we define "natural" in the future?
- If technology uptake follows an exponential curve, will new social values and norms track to a similar curve?
- The necessity of research, science and technology was evident across all of the scenarios.
- A crucial need for market and customer insight was also common across all scenarios.
- Future customers will be knowledgeable, tech savvy, data hungry, and not necessarily brand loyal.
- The need for speed and agility, in both business and in government, was raised often.
- Likely market segmentation and consolidation were common themes, as were a need for diversification from today's farming systems.
- Many aspects of life will be more volatile (weather, geo-politics, economies, social disparities, community support for farming activities).
- All of the scenarios included a market segment for high-value, niche, artisan produced, quality products - with natural inputs and a great provenance story. And, even if natural inputs are subject to innovative processing techniques, the story around our natural inputs will be important.
- Emerging trends that are not primary sector related will still impact on NZ's primary sectors. The future is not only about innovation and technology, it is also about policy drivers, geo-politics, and a sudden change in society/consumer values and norms.
- We need to be ready to invest behind borders, e.g. in offshore businesses, build brands in-market).
- Don't be spooked – focus on the opportunities that change and discomfort may create.

We acknowledged many emerging trends, already happening, which would impact on all of the scenarios we developed – making them feel more "imminently plausible". For example:

- Meat protein substitutes are here and cannot be ignored.
- Farming is now happening in some curious places (e.g. old bomb shelters in London, disused high rise buildings in the USA, rooftop glasshouses.) New production systems will meet a demand for locally grown sustainable produce.
- Molecular science is unlocking vast potential for commercialising new products from the component parts of our raw materials (e.g. for medicines, insulation, oils, adhesives, clothing, dyes, construction materials…)
- New economic models for farming are here, e.g. crowd sourcing, social enterprise businesses, and shared ownership/renting.

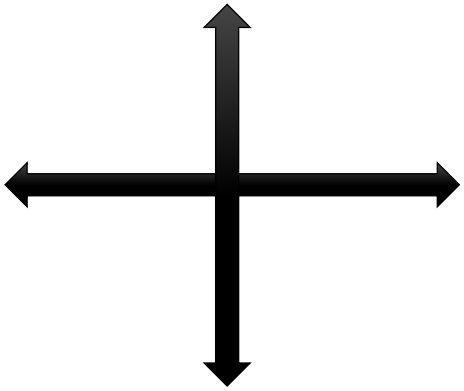
- Artificial intelligence and robotics are here – robotic harvesting, weeding, milking, autonomous drone mapping, self-driven tractors.
- Precision agriculture will take us from our current state to many of the scenarios we developed. E.g. the use of big data and the precision application of technologies.
- Today's consumers are up for anything. For example, chocolate flavoured butter, cricket flour, a meal created entirely from a 3D printer.
- Consumer values have the power to change the world. No matter where we are and what we produce, there is a consumer concern "coming soon to a retail premises near you." Consumer drivers around animal welfare, antibiotic resistance, carbon, water use, locally-grown, provenance, environmental limits, ethics and corporate social responsibility, high-value nutrition, the evils of sugar… and many others … are known to us. How accurately are we tracking the likely consumer concerns of five, ten, twenty years' time?
- Retail models are continually changing. On-line retail platforms and new delivery technologies mean every individual is a market.
- Our consumers' lifestyles are continually changing and their expectations around 'convenience' will continue to be redefine by their buying preferences.

Capturing our predictions

The workshops were not an attempt to predict the future. However, we did ask workshop participants to think about our primary sector industries in relation to the future scenario quadrant tool we were using.

Incremental market innovation from new technology has successfully occurred. We continue to grow products that use mostly natural inputs.

Open borders, unrestricted and global free trade. Consumers are open to worldwide sourced products



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Fast uptake of technology, the market is highly disrupted by innovation and products are highly manipulated by technology. New, alternative products compete with the traditional food and fibre products NZ has always produced.

We asked workshop participants three questions. The answers are displayed on the graph below.

Where do we sit on this quadrant today?

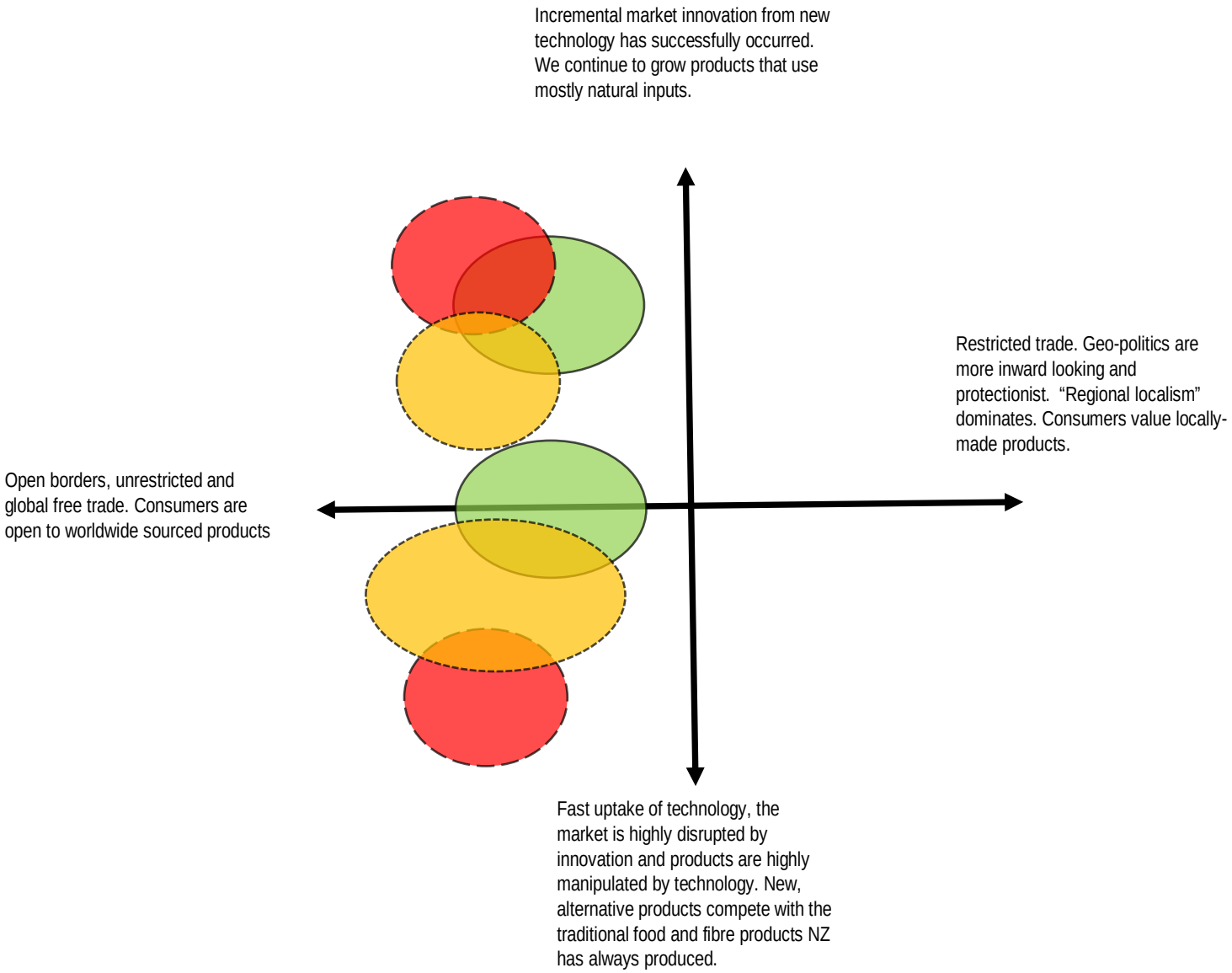
Two clusters emerged in response to this question, as shown below, coloured green.

Where on the quadrant would you like our primary industries to be positioned in the 2030s?

Two clusters emerged in response to this question, as shown below, coloured red.

Where, in reality, do you think we will end up in the 2030s?

Two clusters emerged in response to this question, as shown below, coloured yellow.



For all three questions, only a small minority felt we would move towards the right hand side of the horizontal axis – towards a more protectionist trade environment.

Note the split of the red clusters ("where would you like our primary industries to be positioned in the 2030s?"), which shows a desire within industry to pursue different approaches to innovation and its application.

Summary

Workshop participants reported the following workshop outcomes:

- Exposure to new ideas and different viewpoints
- Consideration of primary industries cross-cutting issues
- Better understand the issues of other primary industry sectors
- Increase knowledge of emerging trends
- Understand what or who will disrupt us
- Spark collaborative discussion and action
- Have a frank discussion about the government and industry interface (regulation, policy setting, R&D $, strategic direction)
- Have our assumptions tested
- Be challenged
- Think about how all this fits with our own brand approach
- Network – develop relationships with those who are going to "share this crazy journey"
- What opportunities might future discomfort create for us?

For MPI, the workshops delivered on our aims to start on-going discussions between MPI and industry and to increase our collective capabilities to use future insight tools and methodologies. The issues raised during our industry workshops have also been fed into the other future-related work programmes being undertaken by MPI, as outlined earlier in this report (MPI's internal Strategic Assessment, the Future of Food regulatory review, and the Strategic Science Direction work programme).

Things We Could Do

We used a Horizon 3 exercise to turn our focus from thinking about future scenarios, to actions we could undertake today to influence our ability to face future challenges and embrace future opportunities. The lists below capture the diverse range of topics discussed. Some of these points are specific actions whereas some are more general questions we need to collectively or individually consider. We will now work with industry to prioritise some actions points for the coming year (see the Next Steps section on page 13.)

Telling Our Stories

- It is crucial we continue to find and tell our compelling stories internationally to build New Zealand's profile.
- We need science based, data driven stories that are told in a way that also relate to consumer values.
- Social licence – we need to work together to consider how we can influence a mind-shift in society.

New technology, innovation and development

- What R&D do we need to invest in now, to support the new kinds of IP our sectors will generate? This should include investing in the new technologies that frighten us (e.g. plant based proteins.)
- We must re-open a national discussion around genetic modification and engineering – and acknowledge that 'GM" is a suite of multiple possibilities.
- Identify who is likely to play in the innovation space, especially high disruption innovation. To make risk taking more viable we need to find better ways of sharing value "down" the value chain.
- We must continue investing in improving our climate change resilience.
- Assess what our key competitors are doing in the future thinking and disruptive innovation space.

- Public funding for R&D and innovation has a reputation of being fragmented and over-managed. The next review and restructure needs to get to the core of the problem rather than tinker around the edges. What indicators of success does government use to assess universities and CRIs? (Are they the right indicators from industry's point of view?)
- We need to cherry pick the technologies that will be winners for NZ. Partner with foreign companies if necessary. Be mindful of our competitive advantages and disadvantages and be realistic about the goals we chase.
- Don't forget the foundations that support innovation. E.g. Soil science underpins so much of what we are able to do. We must continue to invest in the basics.

Nutrition

- More research and analysis to develop our health, nutrition and wellbeing capabilities, including our understanding of taste and sensory experience.
- Look at food companies supplying nutritional ingredients to hospitals, pet food shelter, and other sectors where nutritional analysis / functional food is already happening.

Knowledge, skills and expertise

- Identify if new need to import skills and expertise in future thinking and new technologies.
- Better assess and share knowledge of why market failure happens.
- Build skills and capacity across a range of areas to make us more agile. Do we really know what they are? 'View point' is important. E.g. to encourage transformational change we need farmers to see beyond a 'traditional farmer' horizon and consider the implications of changing horizons.
- Engage key sector participants to develop a common understanding of our future potential.

Meeting Consumer Demands

- Undertake more collaborative customer insight (e.g. Te Hono Team USA project)

Government's role and opportunity

- Provide government support (enabling and funding) to support NZ companies who want to be future innovation leader OR fast followers OR fast fail disruptors. New government funding models may be required, e.g. a venture capital type of fund that supports fast fail innovation.
- Government also needs to consider how they can let businesses 'give things a try' (whether fast fail or determining multiple MVPS [minimum viable products]), and work with industry to backfill any necessary regulatory issues such innovation unveils.
- MPI, MFAT, NZTE have a role to play in facilitation. Ensure staff capabilities around facilitation include knowledge of future thinking, emerging trends etc.
- Government may need to incentivise behaviour change via some unpopular decisions, e.g. introduce a nitrogen tax.
- Continue Primary Growth Partnership or a similar style of funding. It promotes innovation.
- Ensure effective linkage of cross-industry futures thinking with existing MPI strategy programmes.

Maintaining collaboration beyond the workshop

- Continue the use of scenario thinking and other foresight techniques to build capability, drive a collective discussion, encourage effective partnerships that are action-focused.
- Leadership! Who is going to build the momentum created by these workshops? We must move from our 'we need to…' discussions to some 'how to…' discussions.
- Co-ordinate actions to build an ongoing strategic agenda that participants can engage within. Note that there is a significant difference between company led and industry led research, innovation and risk taking.
- Don't wait for everyone to agree – start with those committed to actions, even if this group is small to start with.

Industry drivers and future vision

- Monitor change – identify disruptive drivers. Help industry re-evaluate risks and opportunities. Identify how and where NZ can be disruptive?
- Use the ongoing scanning of market change to test our current sector growth assumptions.
- Define a preferred future vision (strategy!), potentially for market sub-sectors, but with broader cross-sector perspectives to ensure efficient collaborative actions where possible. A pan-sector strategy needs to consider the difference between evolution and revolution. Our current state is trying to add value to a century old farming platform (pasture-based). We must also consider the shifts occurring in the farming platform beneath us.
- NZ has a strong competitive advantage in that we have stable government, capable institutions, and a farming regime that is NOT held up by subsidies. We are perhaps more agile and able than we think. (If confidence is a key driver to investing in innovation, we need to shout louder about our strengths.)

Supply Chain

- Free trade is only of value to NZ if we have efficient and effective supply chains and distribution chains. We must ensure transport and packaging and tracking remain a part of our future discussions.
- Similarly, free trade is only of value to us if we have effective customs and border control systems. Will our regulatory border functions keep up with the pace of change?
- We need capability and readiness, so regulation is not always re-actively trying to catch up with innovation.

Next steps

MPI can play an active role (as an enabler and coordinator) to encourage pan-sector collaboration as well as industry-government coordination. But, ultimately, many actions raised during our workshop discussions need to be driven by industry, for industry.

It was clear from discussions held at our workshops that there is an appetite to move from our current stage of identifying the "what" (future problems, challenges, opportunities), to elaborating on the "how" (what actions can we realistically implement, who can lead on these actions, and by when?)

MPI will work with industry to:

- Prioritise some key action points to work on during the next year.
- Agree how action points will be implemented, and by who, and by when.
- We will be calling for industry volunteers to join a small working group to move this forward. MPI will coordinate ongoing collaboration, whilst acknowledging that many of the actions discussed in our workshop will sit with industry.
- We will continue to work with other existing industry-government collaborative groups and forums, to ensure we build on existing efforts and avoid duplication where possible.
- We will hold a follow up pan-industry workshop in 2017 (to coincide with the Primary Growth Partnership Annual Expo).

Contacts

For information on the Primary Growth Partnership, see:

https://www.mpi.govt.nz/funding-and-programmes/primary-growth-partnership/

or contact the Investment Programmes Directorate at MPI through pgp@mpi.govt.nz

Appendix 1: Where on these axis will New Zealand sit in 2035?

Drawing on workshop discussions, we have also developed a range of other axis that will be relevant to future.
An axis provides a spectrum of possible eventualities, anchored by opposing alternatives at each end.

We live in a largely borderless world. The movement of goods, services and people is easy.		We live in a protectionist world. There has been a rise of nationalism. The movement of goods, services and people is more limited than today.
Innovation in NZ has been adopted at a steady pace by some industries and some parts of society.		The uptake of innovation in NZ has grown at an expediential, disruptive pace. We are using new technologies across society.
New Zealand's primary sector are still growing food and fibres that use natural inputs (sun, soil, water, pasture, the ocean).		Technology now enables us to grow food and fibre in labs and in indoor farming systems, using artificial inputs. We eat non-animal proteins.
Consumers have new attitudes to food. Food is functional. High-value nutritional food is common. Convenience is key. Lunch is a pill.		Consumers still value "natural" foods that look, taste and smell great. We still care about the provenance of food. Eating is still a social occasion.
NZ's population is now 15 million. Due to global geo-politics, NZ is a popular country to live in and we have had significant immigration.		NZ's population is 7 million – the growth caused by domestic population growth and strictly controlled migration.
NZ is still an export-based economy.		NZ's economy has had to diversify away from exports. We earn money from things like tourism, services, and have a larger domestic market.
Climate change has resulted in different weather and climate patterns and impacts across the globe.		Technology and some behaviour changes has allowed humans to limit the most significant impacts of climate change.
Food security is a global issue and a key geo-political driver. Food quality is a global issue. Consumers want assurance that food is safe.		Uptake of new technology has allowed us to keep up with the global demand for food.
NZ has adapted and diversified as necessary, and we live in a stable, peaceful society.		NZ has significant regional inequalities, rural versus urban tensions, and greater disparities between the rich and the poor.
NZ has invested in research, technology, and education. We have the skills we need to adapt. Our businesses invest in innovation.		NZ lacks the capacity and capabilities it needs to continually adapt. We need to attract skills and investment from overseas.
The NZ economy is dominated by fewer, larger companies. Consolidation has occurred. Companies control their supply and distribution chains.		The NZ economy is dominated by small businesses, e.g. some artisan, some meeting very local markets, some niche exporters.

Appendix 2: Exercise with Nelson College Future Problem Solving Students

Because our workshops were populated primarily by people aged over forty, we wanted to test our scenario outcomes with some young members of New Zealand's society. We ran a short one-hour session with a group of year 10 boys (aged 15) at Nelson College. The students all study Future Problem Solving so were able to readily engage with the concepts surrounding future scenario building and emerging future trends. Given the limitations of running only a one-hour session, the boys raised some insightful issues:

Future Driver	Implication
Employment will change Automation leads to a lack of jobs We have a lack of education/training in the skills NZ needs	Less than half the population work. Some of the population pursue non-paid interests that are productive and of value to society and the individual. Some of the population just get lazy.
Poor citizens will consume mass produced and maybe synthetic food, while only rich citizens will afford to eat real 'natural' food products.	A new rich-poor divide is created.
The nations of the west will become more nationalist and protectionist and the nations of the east will embrace the free market.	NZ has to choose who it aligns with – west or east? We have to form new alliances and not all of NZ society is happy with the change.
Farming will become more automated. This, plus land use pressures and consolidation means less farming jobs.	Mega cities grow as people are forced to move to cities for work. Comparatively speaking, rural communities are dominated by wealthy land owners, cities are dominated by poor workers. This leads to a growing urban-rural divide.
Population growth and an aging population will mean the young struggle to pay to look after the old.	We will need a cheap and convenient way to feed all the old people. Food function will be more important than quality or taste.
There will be more leisure time and unemployment, and the growth of the internet, social media, and virtual reality games and 'apps' will give humans many opportunities to live their lives in front of a screen and disengage with the real world.	Some people get increasingly disengaged with society. Human interaction and communication skills are lost. More people get obese and unhealthy and the state has to pay for their welfare and health.